HUMANITARIAN CRISIS
DRIVERS OF THE FUTURE:
PREPARING NOW FOR WHAT
MIGHT BE

SYNTHESIS REPORT

Humanitarian Futures Programme, King’s College London
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1. This report focuses upon plausible humanitarian crisis drivers of the future as a means for promoting pro-active strategies about what might be. The objective of this exercise, however, is not to predict, but rather to propose crisis drivers that demonstrate [i] the types and complexity of future crisis drivers, [ii] new types of considerations that will have to be taken into account for dealing with them, and [iii] steps that need to be taken now to prepare for the future.

2. Three crisis drivers have been chosen to fulfil these objectives, and are discussed in Section I: Crisis Drivers of the Future. They are [i] the waters of the Third Pole case study which traces the consequences of Himalayan meltwaters “from source to sink” to reflect on a potential crisis driver in a regional context; [ii] the collapse of “wat/san” capacities in ever more crowded urban areas provides a crisis driver analysis from a sectoral perspective; and [iii] from a global perspective, pandemics are viewed both as a crisis and a crisis driver. Each of the crisis drivers mentioned in this report are developed in greater depth in three companion studies, as part of the overall project.

3. The three crisis drivers that are discussed in this report and are the subject of separate companion studies initially arose out of literature reviews and a series of discussions with analysts and humanitarian practitioners in various fora over the past four months. While these three drivers are not only plausible but compelling, it would be folly to assume that there are not a host of others that might have been selected. The purpose of this exercise, however, is not to assume that these three are “definitive”, but rather that they are indicative of a range of crisis dimensions and dynamics that are partially new and exponentially more dramatic.

4. The crisis drivers and their consequences also formed the basis of research missions to China, India and Russia, where the views of experts from a variety of institutions and government ministries about these and other possible crisis drivers were sought. Towards the end of the research programme, separate meetings were held with experts from the United Kingdom and the United States about the findings and conclusions of the Humanitarian Crisis Drivers of the Future initiative. These were further tested in separate “validation meetings” in which experts were brought together for a final review of the research programme.

5. In mid-November 2009 a group of practitioners representing non-governmental organisations from Europe, the United States and Asia as well as donor governments and multilateral organisations reviewed the three cases in the context of how each would be handled in terms of long-term strategies and strategic leadership. This took place in the context of the Humanitarian Futures Programme's Stakeholders Forum on 19-20 November 2009.

6. The crisis drivers under review are unusual for their potential impact, regionally, globally or both. Their dynamics and dimensions will be directly dependent upon a range of technological failures, miscalculated policy interventions, the sheer velocity of change and non-sustainable livelihoods. They, too, will be dramatically influenced by issues that have become an increasing part of humanitarian parlance. These include population growth and related demographic shifts, consequences of climate change, water availability, new and emergent disease and intensive pollution.

7. The Waters of the Third Pole. The waters of the Himalayas hold huge reservoirs of frozen fresh water, and hence are considered a “third pole” and the water tower of Asia. They represent the sources of ten of the world’s greatest rivers, and reach across 3500 miles of the Hindu Kush Himalaya region – a region home to 1.3 billion people.

8. The Hindu Kush-Himalayan (HKH) region is probably the world’s greatest source of natural hazards, when the diversity, types and dimensions of such hazards are all taken into account. These hazards range from earthquakes, floods, mass land movements, deltic flooding, natural contamination, fires and atmospheric brown clouds. When linked to human intervention and related impacts upon agriculture, health, water quality, population growth, demographic shifts, Third Pole waters and the HKH region will see over two decades time unprecedented food insecurity, new forms of disease, mass displacement, major habitat and infrastructure collapse, demise of livelihoods and intensification of conflict directly affecting an estimated 500 million people three decades from now.

9. Generally speaking the validation process that took place in China, India, Russia, the United States and the United Kingdom confirmed the seriousness of the potential crises and catastrophes that could emerge from the waters of the Third Pole. Recommendations to begin to prepare for such eventualities focused upon addressing key knowledge gaps that inhibited effective long-term planning, promoting science and technology consortia to provide instruments for monitoring trends and preparedness activities and region-wide intersectoral vulnerability mapping. HFP Stakeholders were concerned in no small part by the region’s “technological isolation”,...
but more significantly by the failure to see this regional issue as a developmental challenge.

10. Pandemics in a futures context. Pandemics are both crises and potential crisis drivers. As drivers, they can be drivers of compound crises. Each iterative strike of a pandemic wave has the capacity to weaken society, and reduce the resources available to fight the next pandemic or other crisis threats. Pandemics generate crises beyond health and potentially make affected societies less resilient to cope with the next sequence of crises. Their impacts upon health and economic systems and their effects on human security in general further explain the designation, crisis driver. Not only are pandemics geographical in impact they can also be temporal. Indeed, the full impact of a pandemic may not be realised until generations later.

11. From validation interviews and meetings, it was agreed that in dealing with pandemics, there is a tendency to become trapped in a “silo mentality.” Inadequate effort is made to incorporate the types and levels of impact that a pandemic would have on societies as a whole into planning processes. The crisis driver thesis was seen as relevant, but the level of knowledge needed is not available for large parts of the world. The recommendation that underpinned ways to deal with this crisis driver was the need to use the inter-pandemic period as a platform for preparation. Towards that end it was suggested that one needed to incorporate pandemic preparedness into existing emergency planning processes, use 21st century communications technology to enhance monitoring and expand the network of those involved in emergency prevention, preparedness and response, with particular emphasis on the private sector. HFP Stakeholders felt that four steps were required: [a] community-based collaboration mechanisms; [b] develop collaboration framework; [c] clear collaboration incentives; and [d] pandemic collaboration treaty.

12. Water and sanitation in urban contexts. The enormous challenge that water and sanitation presents in urban, urban-slum and peri-urban situations is normally understood in terms of their impacts upon health and livelihoods. Some recognise their potential as sources of epidemics and pandemics. However, it is not the direct consequences of non-potable water and poor sanitation that make water and sanitation such a compelling crisis driver. It is the spill-over issues of wat/san that can have far ranging humanitarian consequences arising out of corruption, exploitation and criminality. These can generate conflict and political violence, undermining governance capacities at national as well as at urban levels.

13. Wat/san in urban areas was not regarded by some influential experts in India as the compelling crisis driver that HFP’s initial research had suggested. In part the potential impact of the driver was subsumed by discussions about wider political issues, including government capacities, poverty and inequality and national priorities. The driver, in other words, was assumed to be part of a much more complex set of factors that would trigger major humanitarian crises. That said, there was little doubt that for most respondents, urban and peri-urban poverty in all its manifestations would be the source of major epidemics, and that the inescapable trap that such areas represented offered the realistic prospect of intra-slum/community and intra-urban conflict and violence over time.

14. Among the key recommendations to deal with this challenge was the need to develop business models and engineering solutions that matched social structures and governance networks of slums. In that context, one should consider using existing networks of slum leadership to provide business incentives for the expansion of clean water networks within slums. At the same time, one should consider using low tech, flexible infrastructures that support service provision and low tech incremental waste removal and treatment systems.

15. The report suggests that for concerned parties to address the sorts of threats symbolised by the crisis drivers under review, it needs to adopt a three pronged strategy. The first concerns the need to establish networks and systems for long-term crisis prevention, preparedness and response, though recognising that there are already related initiatives under way such as the multi-donor funded International Centre for Integrated Mountain Development (ICIMOD) early warning project under way in the Hindu Kush-Himalayan region. The second proposes a more active advocacy role to mobilise the interest and commitment to longer-term strategic planning by a wider coalition of like-minded actors. The third recommendation is to establish a monitoring coalition that will ensure that vulnerability mapping and preparedness planning are constantly reviewed and updated.

16. The implications of these future crises for today’s humanitarian sector are fundamental. The nature of future crisis drivers, their dynamics and dimensions will, by necessity, make humanitarianism far more overtly political than it is perceived to be at present. Non-governmental and multilateral organisations will have to adapt to highly politicised humanitarianism, and traditional donor governments will no longer have their sway over recipient states in an emerging multi-polar state system.
Effective humanitarian action will depend upon an ability to anticipate and understand the changing dimensions and dynamics of future crisis drivers. This in turn means that greater attention and resources have to be invested in developing pro-active strategies about what might be, and in so doing to look for new forms of collaboration and new types of innovation that will strengthen humanitarian approaches to prevention, preparedness as well as response.

It is in this context that the Humanitarian Futures Programme, King’s College, London, has embarked upon an initiative to identify humanitarian crisis drivers of the future. The objective of this exercise, however, is not to predict, but rather to propose plausible crisis drivers in order to demonstrate (i) the types and complexity of future crisis drivers, (ii) new types of considerations that will have to be taken into account for dealing with them, and (iii) steps that need to be taken now to prepare for the future.

With this overall objective in mind, the analysis that follows is divided into four sections. Section I: Crisis Drivers of the Future – explains what is meant by “crisis drivers” and then looks at three looming examples and why each was chosen: (i) the Third Pole case study traces the consequences of Himalayan meltwaters “from source to sink” to reflect on a potential crisis driver in a regional context; (ii) the collapse of “wat/san” capacities in ever more crowded urban areas provides a crisis driver analysis from a sectoral perspective; and (iii) from a global perspective, the pandemic case study suggests the importance of inter-pandemic periods in order to prepare for crises that could impact upon billions of people. Each of the crisis drivers mentioned in this report are developed in greater depth in three companion studies.

Even more than the crisis drivers themselves, this analysis is concerned with the consequences of such drivers upon vulnerable peoples. Section II: Exposing Vulnerabilities will focus upon types of humanitarian crises that such drivers will create. It will look at factors that will transform drivers and related hazards into humanitarian crises, and will then in turn look at their possible dimensions and dynamics in terms of synchronous, simultaneous and sequential crises. In order to give challenging examples of what the future might hold, futures-based scenarios have been designed in ways that extend the potential consequences of each driver in a one to two decade vision. Hence, the 2030 East Asian scenario suggests what might be plausible results from a sequential set of crisis drivers. The crisis befalling San Paolo by 2016 is indicative of a possible synchronous failure, driven in the first instance by the simultaneous driver of a wat/san-based pandemic.

The purpose of exploring possible future crisis drivers and their impacts is ultimately to pose the case for looking towards the future in a more proactive way. This theme will not be new to many in the humanitarian sector, and there are few who seem to disagree with it. Nevertheless, the major constraint that often arises is the practicality of investing time, energy and resources on proactive, futures-oriented strategies. Section III: Preparing Now for the Future suggests that there are time-saving and cost-effective ways to prepare for what might be. Yet, perhaps there is an even more fundamental issue at stake, namely, in an ever more vulnerable world can one afford not to begin to prepare? Practical steps that concerned actors in the wider humanitarian and development sectors might consider are proposed in Section IV: Ways forward for the International Community.

Looking at Futures in the context of the past

In the context of humanitarian intervention, there are two inter-related consequences that the futures discussed in this report hold for humanitarian actors. The first is that vulnerability, per se, will become a deep and abiding issue for governments and governance. The second is that the nature of the humanitarian actor will have to change because of the changing implications of future vulnerability.

The first point is better understood if one looks back over the past three decades where “disasters” and “emergencies” were normally regarded as aberrant phenomena – divorced from normal life. Increasingly it is now accepted that rather than aberrant phenomena, humanitarian crises are reflections of normal life, of the ways that societies are structured and allocate their resources.

The future, therefore, suggests that humanitarian crises will increasingly be at the core of governance concerns. In other words, societies will increasingly have to come to terms with a range of potential threats that will bring the issue of vulnerability to the heart of the political process. This is not to suggest that “gloom and doom” will not be offset by a plethora of scientific, social scientific and technological innovations and understanding; but rather to emphasise that whereas humanitarian issues might not have been a core concern to governments in the past, in the future they will be at the heart of government. They will be reflected in issues of vital concern to the very functioning of society and state, including water and food security, livelihoods.

Hence, humanitarian crises and vulnerability will become deeply political issues – issues so fundamental that they will not be readily relinquished to well intentioned international actors. Governments, therefore, will be increasingly reticent to accommodate non-governmental organisations that are insensitive to abiding political interests. Multilateral organisations that have uncomfortably sought over the past two decades to balance

Purpose and Objectives

Section I: Crisis Drivers of the Future
humanitarian principles with their obligations to member states will be compelled to steer hard towards the latter. And in a world of multi-polar powers, the capacity of any single donor government to influence the behaviour of a recipient state with “their threats of aid” consistently and over time is no longer realistic.

To that extent, the capabilities and capacities of humanitarian actors will have to change significantly to accommodate emerging highly politicised humanitarian interests. They will find themselves competing with a wide range of alternative humanitarian actors, including non-state actors, representatives of the corporate sector, the military and mobilised Diaspora.

A Note on Methodology

The three crisis drivers that are discussed in this report and are the subject of separate companion studies, initially arose out of literature reviews and a series of discussions with analysts and humanitarian practitioners in various fora over the past four months. While these three drivers are not only plausible but compelling, it would be folly to assume that there are not a host of others that might have been selected. The purpose of this exercise, however, is not to assume that these three are “definitive”, but rather that they are indicative of a range of crisis dimensions and dynamics that are partially new and exponentially different.

The crisis drivers and their consequences also formed the basis of research missions to China, India and Russia, where the views of experts from a variety of institutions and government ministries about these and other possible crisis drivers were sought. It was felt that these countries were important for the study for at least four reasons:

- each is rapidly emerging as a new type of global actor, and gaining a feel at this stage for the ways that they individually see humanitarian issues, is in and of itself, important in anticipating future crisis drivers;
- each is normally not part of the humanitarian dialogues that take place in what are conventionally regarded as the humanitarian sector, and to begin to open a dialogue is an important step to expand the humanitarian perspective;
- as potential major actors globally and in terms of humanitarian issues – the views of the three concerning HFP’s three crisis drivers need to be taken into account;
- the importance of their respective views is intensified by the fact that each in one way or another will be dramatically affected by all three proposed crisis drivers. Here, the inadequate efforts to date by India and China to reconcile their trans-boundary water management issues not only is a factor that will compound the impacts of “natural hazards”, but also could lead to serious violent conflict. In a related context, Russia’s continuing concern about Chinese pollution of the Amur river is also seen to be a potential source of extreme hazard and of potential conflict.

Towards the end of the research programme, separate meetings were held with experts from the United Kingdom and the United States about the findings and conclusions of the Humanitarian Crises of the Future initiative. These were further tested in separate “validation meetings” in which experts were brought together for a review of the research programme.

Following these reviews, representatives from non-governmental organisations from Asia, Europe and the United States joined with representatives from multilateral organisations and donor governments to determine what strategic leaders would do to address the sorts of potential crises that the three cases presented.

Section I: Crisis Drivers of the Future

Crisis drivers now and in the future

A crisis driver, for the purposes of this analysis, is a factor or set of factors that has the potential to expose human-beings to life-threatening hazards. The degree to which a crisis driver leads to a crisis will depend upon the ways that human activities make human-beings vulnerable to a crisis driver’s impact. Hence, the proverbial earthquake in an unpopulated desert is not a crisis, per se. The event could be a crisis driver, however, if it occurred where human-beings may have settled near the quake’s fault line.

Three crisis drivers and their triggers

The three crisis drivers to be discussed below were not chosen for their originality or uniqueness. Each in various ways has been the subject of considerable attention – partially or wholly – in the past. Each has been recognised as representing a phenomenon that could well lead to future crises, and each in various ways has already led to crises regionally and globally.

At the same time, the crisis drivers under review are unusual for their potential impact, regionally, globally or both. Their dynamics and dimensions will be directly dependent upon a range of technological failures, miscalculated policy interventions, the sheer velocity of change and non-sustainable livelihoods. They, too, will be dramatically influenced by issues that have become an increasing part of humanitarian parlance. These include population growth and related demographic shifts, consequences of climate change, water availability, new and emergent
Humanitarian Crisis Drivers of the Future: Preparing now for what might be disease and intensive pollution.

The selection of each of these potential crisis drivers underscores a further point, namely, any hopes for mitigating their impacts will depend directly upon taking a longer-term perspective on development. The inter-relationship between development, disaster risk reduction, prevention and preparedness is brought out starkly in the discussions on the Third Pole, water-salan and pandemics. The continued bifurcation between development and issues related to humanitarian crises – no matter how understandable might be the institutional justification for it – will only intensify the potential hazard.

Of additional importance to this study is that each of the drivers under review resonated with experts who were interviewed in China, India, Russia, the United Kingdom, including those practitioners attending the HFP Stakeholders Forum, and the United States. This is not to suggest that there were not differences in weight given to each, but rather that on the whole – from different perspectives – the three crisis drivers discussed below were deemed highly plausible and potentially very threatening. Hence, after the description of each driver, two related issues are explored. The first is the perceived plausibility of each, as seen through the lenses of those interviewed for the study; and the second are those questions that these and other experts feel must be addressed to understand the nature of the driver in sufficient depth to develop planning approaches for dealing with what might be.

The Waters of the Third Pole

There are few better examples of the vital importance of regional cooperation to mitigate potential catastrophe than the Waters of the Third Pole. No nation in the region has the sole capacity to protect itself from the consequences of this crisis driver, and the survival of millions within the individual borders of individual states will depend upon the combined action of states across borders within the region.

Look at any topographic map of the world and one of the most striking features will be the huge mass of mountainous terrain in the Hindu Kush-Himalayan (HKH) region in southern Asia. This region represents one of the most geographically active zones on Earth and the mountains are still growing as India continues to push northwards into Eurasia. Such is the size, elevation and climate of this region that it hosts the largest areas of glaciers, snow and permafrost outside of high latitudes, which is why it has become known as the Third Pole. These huge reservoirs of frozen fresh water represent the sources of ten of the world’s greatest rivers, and consequently the Third Pole crisis drivers are of significant concern.

From glacial meltwaters to cycles of crisis impacts

Glacier melt
Increased temperatures
Floods
Droughts
Changing river runoff
Natural arsenic poisoning

Demographic pressures
Urbanisation
Irrigation
Energy demands
Migration
Water withdrawal
Land degradation

Earthquakes
Glacial lake outbursts
Decreasing biodiversity
Salination
Rising sea levels

Famine
Water wars
Chronic disease
Refugee crises

Water pollution
Disputes over water allocation
Loss of livelihoods
Crop reduction
Lack of water management
Cross-border tensions

Forced displacement
Groundwater depletion
Dam building
Water transfer projects

Water scarcity

Humanitarian Crisis Drivers of the Future: Preparing now for what might be
Pole is often considered to be the water tower of Asia.

The HKH region extends some 3,500 km from Afghanistan in the west to Myanmar and China in the east, and runs through Pakistan, Nepal, India, Bangladesh and Bhutan. It represents one of the most extreme natural and cultural environments of the world, and is the source of ten huge Asian river systems. The drainage basins of these rivers cover an area of 8.6 million square kilometers, which is equivalent to the size of Brazil, and provide water for an estimated 1.3 billion people or around 20% of the world’s population. In total, around 3 billion people directly and indirectly benefit from the water, food and energy provided by the river basins that originate in the HKH region.

All the main rivers originating in the HKH region are fed to some degree by glacial meltwater, with 40–45% of the river flow in the Indus and Tarim coming from melting. The proportion of glacial melt in river flows is predicted to increase, as the majority of glaciers in the HKH region, with the exception of those in the Karakoram area, are receding due in no small part to climate change. Increased melting will initially increase the volume of water in rivers, which will lead to wider spread flooding, but as glaciers recede and disappear the amount of meltwater will decrease significantly. With this decrease groundwater recharge rates will also decline substantially. This, in combination with reduced surface flows and variations in summer monsoon precipitation, is likely to lead to highly significant water stress in many parts of the HKH region and associated river basins.

Key geological and hydrological characteristics reflect the diversity and dynamism of the HKH region. Of all the factors affecting regional climate in the HKH region and its river basins, the influence of the Asian monsoon is certainly one of the most important. The Indian monsoon exhibits decadal variation, but on average it accounts for about 70% of the annual rainfall for the region between June and September. Glaciers, clearly a major characteristic of the region, are increasingly melting, which results in the creation of lakes. These lakes are subject to sudden breaches that can release 15,000 cubic meters per second and move in fast-moving torrents some 50 metres deep.

Although systematic data is still lacking, current observations point towards a general trend of degradation in Himalayan ecosystems, especially among the rangelands and wetlands that occupy the majority of land in the region. Such systems fulfil a vital role in the region’s water cycle. Acting as a buffer for glacial meltwater and runoff from precipitation, they help ensure that year-round stream flows remain relatively stable in the basins they serve, as well as acting as valuable resources in themselves for the people that inhabit them.

If current trends continue, one can expect to see an overall increase in seasonal stream flow variations, combined with a rise in the instance of major droughts and floods. Also due to changes in climate, the hydrological cycle will be altered. Perhaps nowhere else on Earth will this play out more than in the HKH region and its rivers basins, with huge volumes of water moving from mountains to the sea. Changes in precipitation have been observed throughout the region, but these are highly variable. Diminishing trends in annual mean rainfall have been observed in the arid plains of Pakistan and NE India and the total number of rainy days and annual amount of precipitation has decreased. However, the frequency of occurrence of intense rainfall events has increased in many parts of Asia, in particular during summer monsoons, with the knock-on effect of more mass movement of land and more severe flooding.

The HKH region is probably the world’s greatest source of natural hazards, when the diversity, types and dimensions of such hazards are all taken into account. These hazards range from earthquakes, floods, mass land movements, deltic flooding, natural contamination, fires and atmospheric brown clouds. When linked to human intervention and related impacts upon agriculture, health, water quality, population growth, demographic shifts, Third Pole waters and the HKH region will see an estimated 500 million people directly affected by unprecedented food insecurity, new forms of disease, mass displacement, major habitat and infrastructure collapse, demise of livelihoods and intensification of conflict in two decades time.

**Plausibility assessment**

In India and China, the main themes that arose in discussions with experts on the *Waters of the Third Pole* focused primarily on water availability and access in the region. In Russia, there were clear differences when it came to the potential impact of climate change upon the socio-economic well being of the country, but possible impacts that the HKH water driver might have – despite potential effects on neighbouring countries in Central Asia – proved to be of relatively little interest. That said, there were Russian concerns that clearly relate to the sort of “water as a crisis driver theme” explicit in the Third Pole scenario. There were, for example, frequent references to the interaction between climate change, melting permafrost and human vulnerability – particularly when it came to recurrent massive flooding, collapse of aging infrastructure and ultimately political unrest due to perceived government indifference.

The views of Chinese experts focused principally upon water-related disasters stemming from the Third Pole crisis driver. “The environmental crisis, particularly for water, is coming to China earlier than expected,” noted the President of the Institute of Environmental Studies in Beijing’s Renmin University. However, the issue for China may be less about the impact of climate change on water availability, and over the next decade more about pollution.

There is general consensus that the situation in terms of water availability and pollution in those rivers fed by the Third Pole is worsening in what has been described as the *forthcoming future*. 
As water scarcity increases, so, too, will demographic trends severely impact upon China’s water needs. The Chinese Academy of Agriculture already assumes that agricultural output will decline by 5 to 10% by 2030 just at the time that the over 60s will represent about 25% of the overall population.

Of particular interest in this context is the criticism which experts appear to be levelling at government authorities. The government is seen as too concerned with short-term issues, and has done little to invest in planning and preparedness as the Japanese have done. The Chinese government and its researchers have, in the final analysis, not done enough to deal with climate change impacts.

In discussing specific future crisis drivers with Indian experts, many interviewees raised wider points relating to the ways that crises are likely to change over the coming decade. While some interviewees disagreed with the assumption that crises would become more complex and larger in scale, most felt that the growing population and population density would mean a significant shift in the scale of affected populations. In particular, for regional crises drivers that would affect both India and China, such as the Third Pole issue, the sheer numbers of people at risk would make these crises on a previously unseen scale. However, while conscious of the idea of crises on a larger scale, and crises that would cross borders, people also emphasized the need to take into account the difference in contexts and to address crises within the particular social, economic and political environment. This was raised in relation to the difference between India, Russia and China, both in the ways the types of crises that would result from longer term threats, and in the ways that governments would respond to them. At the same time, it was stressed in relation to different parts of India itself (between states, between rural and urban areas, between different cities and even between different parts of the same city), and to different parts of society (urban and rural populations, social class and caste, ethnic and religious groups). One interviewee described India as a country within which there is “a Japan and a sub-Saharan Africa”, and the importance of understanding crises within this context was emphasized by many.

Other interviewees saw the future bringing types of crises that are fundamentally different, with the consequence that past knowledge, experience and systems of coping will no longer be relevant. In part this relates to the unprecedented scale of future crises, but there was also felt to be such a difference between the nature of threats emerging, in particular from climate change and environmental degradation, and those that have previously been seen, that “we will have no wisdom from the past to rely on”. This was raised both with reference to disaster preparedness and response systems, and also with reference to traditional community strategies for coping with disasters. Nevertheless, there was little doubt that salt water encroachment, degradation of wetlands and reduction of river flows would all be part and parcel of the changing Third Pole water patterns.

Based upon validation meetings in the United States, it was evident that few of the experts interviewed had much to say about the Third Pole issue. While everyone acknowledged that it was of considerable importance, there was little evidence that they had the time or financial backing to study it in greater detail. Nevertheless it was clear from one senior official involved in both climate change and security that “the scale of the potential crisis there prevents researchers/thinkers from looking at it more carefully. It will simply be catastrophic, even in the best of circumstances. Obviously, China’s behaviour and own national vulnerability in the face of increasing water scarcity is key to what will happen across that region and beyond.”

From experts’ views in the United Kingdom, the impacts of the Third Pole crisis driver were not perceived as new. Similar events have happened in the past, but important elements will be new. Firstly, whereas historically people migrated to new areas when environments were no longer able to sustain the population, this would now be much harder. Secondly, the scale of these impacts is greater than in the past. There was a general belief that the impacts of this driver is potentially much more extensive and interconnected than previously seen crises in the region, including complete devastation of ways of life.

From the HFP Stakeholders’ perspectives, it was felt that there needed to be a greater sense of defining the probability of catastrophe, and that the action that was needed was inherently developmental. Generally, they also saw the need to promote global financing and technology transfers to address the potential risk. It was essential from their perspective that the issue be addressed from a regional perspective and not from country perspectives in the region.

### Addressing the unknowns

There is no doubt that the Waters of the Third Pole is regarded as more than a plausible crisis driver. Nevertheless, there are at the same time, a variety of issues that need to be better understood and clarified to understand that driver’s full implications. It is evident that there are considerable technical issues that remain unknown in the HKH region. The IPPC’s fourth assessment could not state for certain what the consequences of climate change will be throughout the region with any certainty. It is evident that these knowledge gaps are due to the sheer enormity, complexity and vast diversity of the region. At the same time, these knowledge gaps are also due to gaps in technical capacities. Hence, the causes of wetland degradation is due to the difficulties of gathering relevant data and accurate figures about meltwater rates, and data gathering is complicated by the difficulty of access to some of the Himalayas more impenetrable zones.

Beyond the technical difficulties that need to be addressed to narrow knowledge gaps, there is also a considerable lack of understanding about those who populate the region. As is all too evident in analyses of community vulnerability and solutions in
other parts of the world, those who purport to understand threats and solutions of those in the HKH region often do not understand the linguistic, cultural and socio-economic differentiations that mark the region’s diverse populations. In that sense, there really is no adequate understanding about the region as a whole, no “map” about potential risks and opportunities that would serve as a useful planning instrument.

**Pandemics in a Futures Context**

Increasingly crises have to be seen in terms of their accumulative impacts, or, in other words, the ways that one crisis weakens the overall resilience of societies to withstand future crisis drivers. In this context, a pandemic stands out as an excellent example of ways that one crisis can erode societal resilience over time – making it initially a crisis and subsequently a crisis driver. Given their dynamics – aided by various aspects of globalisation, eg, trade and travel – pandemics can readily be seen as a global crisis driver.

As drivers, they can be drivers of compound crises. Each iterative strike of a pandemic wave has the capacity to weaken society, and reduce the resources available to fight the next pandemic or other crisis threats. Pandemics in that sense can generate crises beyond health and potentially make affected societies less resilient to cope with the next sequence of crises. Their impacts upon health and economic systems and their effects on human security in general further explain the designation, crisis driver. Not only are pandemics geographical in impact they can also be temporal. Indeed, the full impact of a pandemic may not be realised until centuries later. According to historians, the bubonic plague of the 14th century was partially responsible for the industrial revolution in the 18th and 19th century.

Today, battles with pandemics continue. The HIV/AIDS pandemic is finally stabilising outside Africa after 25 million people have died, and 33 million are infected. However, neither the full societal impact nor its effects upon food insecurity, livelihoods and resistance to disease have been adequately calculated. As these uncertainties remain, the international community is at the same time preparing for other bouts of pandemics. The so called “swine flu”, or H1N1, is the most recent in a series of possible pandemic threats that have manifested themselves over the past decade, including SARS and Avian Influenza, H5N1. And while many governments, multilateral organisations and non-governmental organisations are preparing to address these specific threats, there is little effort expended in calculating the cross-sectoral impacts of such possible events.

The standard causes of pandemics are generally understood. They are the result of disease mutation for which humans are not immunologically prepared, a zoonotic disease when an infectious disease crosses over and is transmitted from animals (in some instances, by a vector) to humans, or quite possibly in the future, human engineered pandemic arising from biological war.
fare or terror. Most pathogenic viruses that affect humans have originated in animals and crossed to humans. They account for 60% of all infectious diseases, and 75% of all emerging infections.

Despite the growing acceptance that pandemics would have devastating impacts upon affected societies, it is clear that despite considerable preparation efforts, present solutions for pandemics need strengthening. The world, according to the 2008 joint UNICEF-World Bank Global Progress Report is only 40 percent prepared for pandemics and the majority of these are developed countries. Even this preparation, however, belies a more worrying perspective, namely, pandemics continue to be viewed predominantly as a health issue.

Viewing pandemics in this perspective creates a “silo mentality” and ignores the compounding impact of pandemics, the degrading of resilience and the cascading effect that will be felt across sectors. Pandemics, viewed as an engine of crises, will encourage greater cross sector engagement with a broader range of stakeholders. To mitigate the consequences of the driver, it has to be slowed before it gains momentum.

In the first instance this requires reframing the context in which pandemics are analysed, beginning with a more cross-sectoral perspective on potential impacts. Information in this regard is central, but it is all too evident that the sources of such information – particularly at community levels – too often is ignored by conventional pandemic information networks. Measures that need to be addressed in preparing for the pandemic as crisis driver will depend upon using inter-pandemic periods to build up preparedness activities well beyond the situation that exists to date.

Pandemics are normally seen as crises, but less so as crisis drivers. Yet, if one takes into account the sorts of crises that pandemics as a driver can generate, one can argue that the consequences of pandemics as a driver might well exceed the toll that a pandemic can have, for example, upon health related mortality and morbidity. Where the latter might directly cause disease-related deaths in terms of hundreds of millions, the perspective of a pandemic is about two critical factors. The first is that the driver is responsible for closing down systems which in turn would generate crises; the second is that the pandemic crisis driver – through its eventual impact upon systems – would have a compound effect, namely, weakening a wide range of systems and structures that would become less capable to cope with each new round of pandemics.

**Plausibility assessment**

As one looks to the future, it is clear that the sources of pandemics would appear to be increasing. Experts’ suggestions range from disease arising out of soil-based farming to those spread via organ transplants. Few, however, have focused upon pandemics as enduring crisis drivers. It has been clearly recognised in India that pandemics as a crisis driver would take the form of triggering flows of migrants from poorer countries in the region to India for the latter’s comparatively better health system. These flows would lead to various human tragedies, stemming from lack of food, livelihoods and under the circumstances of what has been described as xenophobic violence. Yet, the preponderant opinion of experts in India was that pandemics would lead to a kind of global isolation where individual countries would become totally preoccupied with protecting their own populations at the expense of collaboration.

In India, however, the long-term impact of pandemics as a major crisis driver did not generally resonate. The compound nature of pandemics, per se, was not considered plausible, nor did the assumption that pandemics as crises and crisis driver would appear at shorter-intervals find much support. Opinion was divided about whether pandemics, themselves, would ever become as virulent as often suggested in professional studies and public media. On the other hand, Chinese views saw the issue of pandemics far more extremely. In the words of Professor He Fan of the Chinese Academy of Social Sciences, “Historically, infectious diseases come along with the process of human civilization, and they have a profound and comprehensive impact on development on human civilization, and the effect will be even more violent or even worse than war.”

In an October 2008 study, Chinese and British analysts agreed that epidemics and pandemics would directly impact upon eight factors that directly related to humanitarian crises in China and throughout the developing world. These included a direct correlation between pandemics and rapid increase in malnutrition and acute poverty. In other words, from their perspectives there was a clear case that pandemics could be regarded as not only the source of crises but the drivers of others as well.

The problem in the eyes of British and US counterparts from health, nutrition, security and international relations perspectives is that in dealing with pandemics, there is a tendency to become trapped in a “silo mentality”. Too little effort is made, according to a recent Crisis Drivers Validation meeting in London, to bring together the types and levels of impact that a pandemic would have on societies as a whole. It is not that the crisis driver thesis is not relevant, but that the level of knowledge needed is not available for large parts of the world. HFP Stakeholders suggested a four step approach: (i) establish acceptance among communities that formulate a collaboration benefits them; (ii) develop a framework for collaboration; (iii) create incentives for collaboration such as pandemic response fund, enforcement mechanism (sanctions); and (iv) pandemic collaboration treaty that would incentivise countries to act when not in their interests, would have built in flexibility to changing circumstances and would involve shared responsibility.
Addressing the unknowns

There was a relatively consistent assumption that there was still inadequate understanding about the source of future epidemics and pandemics. That issue goes beyond the standard issue of animal to human transmission, and goes into the realm of diseases that may be the result of bio-terrorism or as a result of “viruses” that could in the future be the result of new forms of technology such as nanotechnology. Communication on various levels was also seen as a considerable unknown that needed to be addressed. Indian and Chinese experts were aware that there was little incentive for communities that might be affected with potentially epidemic disease to communicate their condition to authorities. Official responses could underline local livelihoods, but how to overcome such concerns was a challenge.

Even if one could overcome such local inhibitions, adequate communication networks suitable for poor communities made it difficult to monitor relevant health patterns in a timely manner. To what extent were there technologies as well as more effective social networking systems that could enhance informed communication? A related unknown concerned the issue of awareness and education. Villagers and those in cities could not be assumed to know the nature or cause of disease. These were seen to some extent as a problem that crossed socio-economic divides, but the poor clearly had less opportunity to be diagnosed – even assuming that available medical services had diagnostic capacities. Here, again, was a very fundamental unknown, namely, how could one deal with this pervasive knowledge and education gap?

The most prevalent unknown concerned the true consequences of a major pandemic. Anecdotes about potential impacts were seen as plentiful, but there was little clear analysis about the ways that a pandemic crisis driver could affect societies globally. In a related context, there was an unknown that emerged from experts in both India and the United States, and that went to the root of future pandemics where some assume that global climate variations will make disease outbreaks worse. This assumption had to be tested, because, arguable if global climate change happens slowly, organisms will have a chance to adapt accordingly.

A further unknown had to do with prevention and preparedness capacities, and was raised in discussions with US experts. While there were many good and capable institutions such as UNSIC and WHO that had played coordinating roles dealing with particular aspects of pandemics, there was no major international means to coordinate pandemic prevention and preparedness activities from an inter-sectoral perspective. This was deemed necessary, but could it be done and what would it look like?

Water and Sanitation in Urban Contexts

The rapid growth in urban population around the world has led to a proliferation of urban slums in many developing world cities. UN HABITAT estimates that by 2050, over 5 billion people will be living in cities, with an average of 30% living in slums. This figure is forecast to be much higher in lesser developed countries, with up to 80% of urban dwellers in some African countries expected to live in slums. The majority of slums lack access to sufficient water and adequate sanitation. In 2000, there were around 1.1 billion people (18% of the world population) without adequate water and 2.6 billion people (> 40%) without adequate sanitation. These defi-
ciencies have lead experts to coin new terms such as ‘water poor’ and ‘water desperate’. Future projections for water and sanitation are bleak, with most developing countries off-target to meet Millennium Development Goals of adequate water supplies, and increasing numbers of urban dwellers world-wide not expected to have access to improved facilities for water or sanitation.

The enormous challenge that water and sanitation present to the humanitarian sector in itself is all too clear. However, it is not the direct consequences of non-potable water and poor sanitation that makes water and sanitation such a compelling crisis driver. Rather it is the implications of water and sanitation in a wider urban and ultimately national and regional context that will make “wat/san” one of three priority crises that the humanitarian sector will have to face.

Access to clean water in urban areas is recognized to be a significant management challenge, not necessarily a supply challenge. Sufficient water exists in most cases for adequate water provision in urban areas. Various institutional, political, and economic barriers exist which prevent water from reaching slum dwellers where and in the ways they need it. Solutions must focus on local management incentives and innovative infrastructure delivery approaches if they are to be successful.

Lack of clean water and sanitation bring their own crises. Health problems such as malnutrition, diarrhoea, cholera, malaria, dysentery, schistosomiasis, dengue fever, typhoid fever, gastroenteritis, hepatitis A and cancers are common, especially when water is mixed with industrial and sewage effluent. What is less so are the spillover issues related to water and sanitation that will generate crises that extend outside conventional management solutions. Water and sanitation can clear lead to further humanitarian crises that stem from:

Corruption, exploitation and criminality: As with any valuable commodity, the provision of clean water and sanitation facilities in slums is an attractive target for corruption, greed, collusion and exploitation. This is particular true where political oversight lacks accountability and enjoys an excessive of discretionary control, resulting in collusion between government officials and private sector water providers. The result is extortionate prices and weakening of civil society, which limits both slum dwellers’ ability to raise themselves out of poverty and limits the ability of external actors to change the system. Wat/san stress in slums should therefore be considered a major driver of corruption and capacity reduction, thereby limiting the effectiveness of future response efforts to a range of complex humanitarian crises.

Conflict and political violence: While water and sanitation shortages have rarely caused direct international conflict, there is extensive evidence that water shortage at the local level produces increased violence and conflict amongst different water users. The threat is especially great in high density, multi-ethnic, politically unequal environments of concentrated poverty, as is often found in many slums. Wat/san stress should therefore be considered as a major driver of criminal and political violence as slum populations struggle to reconcile the differences they see between access to fresh water and clean living conditions.

Increased risk of disease: One of the greatest issues of concern for future humanitarian crises is the potential for new or mutated emerging diseases originating in the world’s slums. With constant population churn, close proximity between animals and humans and poor health and sanitation, the opportunities for new disease vectors are huge in most slum areas. The situation is made more difficult due to the lack of adequate surveillance and access to slum populations. Wat/san stress in slums is therefore likely to be a major driver not only of new diseases and possible epidemics in the coming decades, but also of societal collapse and conflict that will threaten the lives and meagre livelihoods of hundreds of millions of people.

Plausibility assessment

One of the central assumptions that underscores the wat/san crisis driver is that urban growth is a given. As the study that accompanies this analysis stresses, there is a presumption that mega-cities and peri-urban areas will be demographic landmarks of the foreseeable future. And yet the population of cities in Russia are not increasing overall. Urban ethnographic mix is changing; there is a flow of people from rural to urban areas; and infrastructure conditions are seen to be worsening; but urban populations remain relatively steady, if not in decline.

In this context, water and sanitation issues will be one of a set of intersecting factors that will result not only in health crises but also conflict. According to a senior official in the Institute of Economic Forecasting, water access and sanitation will be dramatically affected by the rapid decline of infrastructure in most urban areas. Here, a combination of weak regulation of health services, failure to introduce appropriate technologies by the authorities and government corruption underpinned what will undermine the water and sanitation infrastructures in the future.

The assumption that urban growth was a given was also challenged by experts in New Delhi and Bangalore. Clearly there was an overall increase in slum populations in most cities in India. However, it was suggested that the rate of that aspect of urbanisation was slowing down, and that the prospect of increasingly unbearable existence in urban slums will be a “pull factor” leading many slum dwellers back to rural areas. Such trends though would be quickly reversed if there was a significant agricultural failure.

Though urban wat/san was not regarded as a “top of the list” driver of future crises by many, its implications were felt to have wider ramifications. “The crisis in urban areas was not just
about increasing numbers, but how different groups shape the politics [...] These crises [areas of the city without water and sanitation, high infant mortality] are not a natural construct arising from population increase; that does not tell you anything." The problems of a huge gap between areas of the city that have access to infrastructure and those that do not is “no longer in the technical realm... but in the dimensions of how the elites interact with the lower income groups and who pays for it.” The problem, however, is that technocratic solutions to water and sanitation have limited impact and what is really needed is an approach based on a deeper understanding of the root level social aspects of access to infrastructure. This was described by one expert as the opposite of existing policy research: “The work now in this area is policy research—we might analyse the policies and programmes that are put in place. But much of the issue is ‘outside policy’, and we need to look also about how people influence the system from different angles.”

This need for more local and contextualised approaches to the wat/san issue struck a considerable chord in validation meetings in the UK. There was a clear sense that technological solutions were available and that from a technological point of view they could work to relieve some of the supply sides of the issue. Nevertheless such solutions would probably have limited success for the very reason that other imposed solutions failed so often in the past. There was too little effort to appreciate the political and social contexts in which water and sanitation played out in cities and in slums in particular.

China, with its burgeoning urban populations, growing slum conditions and intensive industrialisation, is fully aware of the potential consequences of deteriorating access to and quality of wat/san in urban areas. There, however, is a general disinclination to control pollution at the expense of industrialisation, and as Professor Ma Zhong has noted that “the pollutions that we have (affecting urban water) are cumulative, the more we repress it the more severe the problems might be in the future. The decision making mechanism of the Chinese government though is crisis driven, without forecasting and (sic) all-around consideration.”

The wat/san crisis driver thesis was going to be an increasingly important issue in peri-urban environments, according to experts in the United States. Such environments are the floating urban areas, including that used for industry. One of the areas of wat/san in urban areas was not regarded by most experts as the compelling crisis driver that HFP’s initial research had suggested. In part the potential impact of the driver was subsumed by discussions about wider political issues, including government capacities, poverty and inequality and national priorities. The driver, in other words, was assumed to be part of a much more complex set of factors that would trigger major humanitarian crises. That said, there was little doubt that for most respondents, urban and peri-urban poverty in all its manifestations would be the source of major epidemics, and that the inescapable trap that such areas represented offered the realistic prospect of intra-slum/community and intra-urban conflict and violence over time. The question which this prospect creates is how and in what ways can conflict on the potential scale contemplated be controlled by authorities; and in attempting to control, what sorts of humanitarian crises would that unleash, and how could one assist the afflicted?

This sort of speculation aside, there were various unknowns that needed clarification before the wat/san crisis driver could be addressed. It was seen as increasingly important to have a far better understanding about patterns of urban and peri-urban growth than one has now. UN HABITAT’s efforts in this regard were recognised as important, but a more sensitive understanding of the ebbs and flows of urban-rural peri-urban migration from a “grass roots perspective” was needed. While there was a general conviction that the wat/san driver and the more abiding context of which it was a part was a deeply political issue, there nevertheless remained unknowns about a whole host of technologies, including dry systems for sanitation. There, too, needs to be a deeper understanding about the coping mechanisms of people in slums and peri-urban areas when it comes to water and sanitation. A considerable amount of analysis has been done on such mechanisms, but not with a perspective on their long-term efficacy.

An additional unknown that was seen as essential to answer is the relationship between rural and urban water systems. There are many “answers” in the sense that the preponderance of water usage for agriculture significantly outstrips water usage in urban areas, including that used for industry. One of the areas of unknowns is how best to balance agriculture and urban usage as an interactive system.

**Addressing the unknowns**

Wat/san in urban areas was not regarded by most experts as the compelling crisis driver that HFP’s initial research had suggested. In part the potential impact of the driver was subsumed by discussions about wider political issues, including government capacities, poverty and inequality and national priorities. The driver, in other words, was assumed to be part of a much more complex set of factors that would trigger major humanitarian crises. That said, there was little doubt that for most respondents, urban and peri-urban poverty in all its manifestations would be the source of major epidemics, and that the inescapable trap that such areas represented offered the realistic prospect of intra-slum/community and intra-urban conflict and violence over time. The question which this prospect creates is how and in what ways can conflict on the potential scale contemplated be controlled by authorities; and in attempting to control, what sorts of humanitarian crises would that unleash, and how could one assist the afflicted?

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Section II: Exposing Vulnerabilities and Crises of the Future

The nature, dimensions and dynamics of future humanitarian crises will be increasingly different from the types of crises that have marked the past two decades and before. This in no small part will be due to the extent to which human beings inadvertently and directly are making themselves increasingly vulnerable. The inter-related factors of population growth, demographic shifts, activities that exacerbate climate change and the inappropriate use of water all reflect ways that human beings expose themselves to the impacts of crisis drivers.

The exponential change in the overall reach and impact of future humanitarian crises has also to do with levels of complexity that go to the core of the ways that societies determine priorities, allocate resources and govern themselves. In other words, the factors that to such a significant extent will lead crisis drivers to expose human vulnerability and result in crises and catastrophes have to do with the four inter-related factors already noted in the previous section, namely, technological failures, miscalculated policy interventions, the velocity of change and non-sustainable livelihoods.

When some combination of those factors noted above come together, crisis drivers become humanitarian crises and catastrophes. The consequences of these events, however, need to be seen alone a further dimension, namely, impacts in terms of synchronous failures, and sequential and simultaneous crises.

Exposing vulnerability

Human vulnerability to a host of hazards is increasing due to the sheer growth of populations, demographic shifts and factors arising out of climate change. The full consequences of such factors upon human vulnerability are not adequately understood, but there is no doubt that those involved in long-term speculation about future threats accept that these three factors will interact with crisis drivers in ways that will lead to an ever more intensifying range of disasters, emergencies and catastrophes. At the same time, there are other equally as poignant factors that will transform crisis drivers into major humanitarian crises in the future.

One such factor can be encapsulated in the term, “technological failures.” Of the four factors to be noted here, technological failures might well be the trigger which will release the worst potential impacts of crisis drivers throughout the world. The spectrum of such technological triggers is vast, ranging from cybernetic systems collapse and related failures of outer-space technologies to biological terrorism and radioactive leakages from Central Asian storage sites. Such failures could have particular impact upon human populations because of their ubiquitous nature, and because of the sheer complexity of predicting their impacts.

For humanitarian actors, there are at least two important considerations when it comes to the consequences of technological failures. The first has to do with exposing vulnerabilities, per se; the second has to do with the impediments that technological failures pose for effective and appropriate humanitarian response. As for the former, there can be little doubt that there has been an exponential increase in human dependency upon technology. Such dependencies are in so many ways reducing “North-South divides,” as, for example, more and more financial transactions and transfer of resources become globalised over the Internet. The potential failure of technological systems that protect nuclear reactors, water flows from dams, sewage and water sources is increasingly at the heart of vulnerability – traditional and foreseeable.

The possibility of technological failures has further consequences for relief workers who increasingly will depend upon various forms of technological innovation to respond. Again, the growing emphasis upon Internet-based applications reflect potential threats to effective response, as more and more delivery systems and monitoring depend upon on-line capacities. The vulnerability of entire logistics sequences is but another case in point.

In China, India and Russia the prospect of longer-term technology-driven catastrophes frequently focused upon hydroelectric power systems. The $1 billion disaster which struck Russia’s Sayano-Shushenskaya power station in August 2009 was seen as symbolising the sorts of threats that would increasingly lead to the destruction of water supplies and infrastructural damage. Even epidemics resulting out of transplanted organs, according to a senior official in Moscow’s Central Research Institute of Epidemiology, would be the consequence of “technological failure.” In India a senior government disaster management official described the threat from a biological disaster as the “biggest threat to humanity,” though the spectre of cyber terrorism that would “paralyse the economy and society” is frequently mentioned as a major technological threat.

Closely related to technological failures are miscalculated policy interventions. Throughout the scientific and policy community there is a persistent refrain that governments do not understand or do not bother to understand the impact of technologies or the ways that one needs to assess the impact of technological innovation. A case in point is the evident momentum to bury carbon dioxide underground as a means to deal with fossil fuel emissions. In a carbon sequestration power plant, CO₂ is extracted from the exhaust and then pumped into aquifers and old gas fields several kilometres beneath the Earth’s surface. Yet, what according to a growing number of scientists is not taken into account is the consequence of CO₂ expanding below the surface to the point where it could trigger an earthquake.

Faulty policies continue to lead farmers in some water scarce areas of Pakistan and India to opt for water intensive crops such as rice and sugarcane. One recent example is the Water Transfer Project, designed to transfer massive volumes of water from the
The velocity of change in many ways brings together the two previous drivers. The sheer rapidity of socio-economic and political transformations combined with scientific discovery and technological innovation is proving in many instances beyond governmental capacities to understand or adequately respond to their potential consequences. The persistent criticism that governments and related authorities are overly focused on the short-term or are mainly reactive could lead one to suggest that that is in no small part a reflection of governments' lack of well-developed capacity to deal with longer-term risks. Naturally short-termism is also a reflection of political calculations where more kudos will be derived from response than longer-term prevention and preparedness measures. Yet, there, too, is the assumption, or political calculation that many of the sorts of risks suggested by the types of drivers noted in this report are not only long-term but also are perceived as “low probability events” by governments and authorities responsible for humanitarian action. However, as Kunreuther and Michel-Kerjan have demonstrated to deal with “often highly uncertain situations where the impacts can be devastating...requires a paradigm shift from traditional risk management strategies” towards something more akin to the Global Risk Network and the OECD’s Network on Financial Management of Large-Scale Catastrophes:

Both these initiatives recognise that firms, governments, non-governmental organisations and international organisations need to take into account interactions at an international level...It is often the case that events destabilising one's organization is one of the factors that occur outside of normal routines. Training top decision-makers to deal with these “it cannot happen” scenarios has become a critical element success in managing large-scale risks in a new era of catastrophes. But one thing is clear: proactive leaders will be the ones to glean the benefit from initiatives that reduce the potential impact of future catastrophic events on their own activities and those of other stakeholders.

An additional factor that exposes human vulnerability is the non-sustainable nature of present-day livelihoods. There, for example, is a growing view that soil-based farming will increasingly exacerbate the risk of infectious disease. The extent to which that example is truly a potential threat is still being assessed, but it is evident that the ways that agriculture uses water throughout much of South Asia offers all too evident examples of multiple threats arising out of present day livelihoods — not merely in terms of over exploitation of ground water, but also the directly related natural contamination (eg. arsenic poisoning) that enters the water system.

The gamut of industrial activities that spurs on the impact of crisis drivers is considerable. Chemical pollutants and intensive use of fossil fuels are two very well-recognised cases in point. Dam construction for hydroelectric power generation and for water control is another. In one way or another, a combination of short-term, contending priorities and a failure to anticipate potential crises emerging out of such activities intensify the impact of crisis drivers.

**Crises of the future in synchronous, sequential and simultaneous settings**

The crises of the future in so many ways are reflected in the scenarios noted below. The crisis drivers that resulted in each of these crises are plausible in a futures context, and certainly reflect variables that have authenticity today. The Chinese crisis is of significance in this context for two essential reasons. In the first place, the sheer scale of the crisis forces one to rethink in whole new ways about the resources and capacities that would be required to deal with events such as those described. Secondly, the crisis also suggests the nature of a phenomenon that will be increasingly evident in the future, namely, sequential crises, or, the dynamics resulting from one crisis driver triggering another crisis driver or multiple crisis drivers.

The San Paolo scenario concerns a series of factors, including water and sanitation drivers and the breakdown of conventional governance structures which lead to a serious pandemic. To that extent it demonstrates once again sequential crisis drivers and crises. Its importance, however, is also that it suggests that policy-makers and planners need to think in terms of *synchronous failures*. In other words, a synchronous failure reflects the consequences of a full-scale collapse of systems, threatening the survival of large swathes of social and economic structures. Such systems collapse can be triggered by a range of factors such as cyber-hacking into economic systems (eg. banks), electricity failures that cripple infrastructures (eg. flood barriers) and radiation poisoning (eg. exposure of nuclear waste sites). In the San Paolo context, a pandemic leads to systems failures. As policy-makers and planners look to the future, they will also have to confront another reality, namely, *simultaneous crises*. Increasingly one will have to anticipate that major humanitarian crises will occur at the same time, more than likely in different parts of the world and quite possibly as the result of different types of crisis drivers. A principal concern is that the conventional humanitarian response sector will not have the capacity to meet two or more such crises occurring at the same time, and that a kind of large-scale triage will be the inevitable consequence.
Scarcity, pollution and conflict in a Far East Asian context: 2025-2030

Over the past two decades the Chinese government has failed to address underlying structural issues in domestic water allocation, develop systems of water pricing and rights, curb waste or allow water trading. Instead, government response has been to rely on water-transfer projects and to limit water allocations to provinces, rather than to promote conservation through market mechanisms. By 2025, unregulated economic activity and over-exploitation of limited or contaminated water sources had combined to push China’s water crisis into catastrophic proportions.

Groundwater tables under the northern plain have dried up, or at least sunk so deep that farmers are unable to extract the remaining water. The continuing melt of the Himalayan glaciers and rising temperatures have rendered the Yellow River and its major tributaries seasonal resources. The Shiyang River in Gansu has completely disappeared. The oases of the northern plains are particularly reliant on glacier meltwater, and many, like that of Minqin County, have been completely evacuated. The early 2020s saw the water availability per person in the Hai, Huai, and Yellow (Huang) river basins fall well below 500 m³/year, less than the minimum for human existence. In the former breadbasket, desertification continues to overwhelm arable land on all sides. Dwinding glaciers have caused the Gobi desert to encroach further upon the oases in the Xinjiang Uyghur Autonomous Region. Desertification now affects 600 million people, nearly half the country’s population.

Policies of state-directed environmental migration have now relocated 3 million farmers and nomadic herders in Qinghai, Ningxia and Gansu to Xinjiang and Inner Mongolia. This has having enormous environmental and social repercussions since the now-arid destinations themselves are unable to provide adequate support for increasing populations and there is not enough arable land for migrants to sustain new livelihoods. Ethnic tensions have been escalating in China’s western hinterlands, sparking repeats of the ethnic riots seen in Xingjiang in 2009. These incidents culminated in a series of savage riots that spread from Hohot, Lhasa and Urumqi throughout urban centres in the region in June 2025. In Urumqi alone it was reported that 500 people were killed in police clashes.

As the summer of 2025 progressed, severe droughts, worse even than in 2024, threatened to drive the 200 million inhabitants of the North China plain into potential starvation, and the army is enforcing water rationing in the overrun cities of Beijing and Tianjin. In the run-up to the National People’s Congress in October 2025, the Chinese Premier Li Keqiang announced the launch of the construction of the western section of the South–North Water Transfer Project (SNWTP), aimed at increasing crop production in the Gobi desert and easing over-crowding in the east. In an attempt to gain popular support as the national water crisis accelerated, the Chinese leaders disregarded international agreements and abandoned any effort to carry out an Environmental Impact Assessment – despite the serious pollution associated with construction of the central section of the project.

India–China relations have been at an all-time low since the completion of the 40,000MW dam at the ‘Great Bend’ of the Tsangpo-Brahmaputra River in 2019, harnessing the power of the deepest canyon in the world. This far exceeds the scale of projects such as the Three Gorges Dam, and the Indians claim that maximum river flow has already been reduced by 20%. On 1 October 2025, Chinese National Day, Chandra Singh, the Indian President announced that, unless China discontinued water-transfer plans, India would make an official declaration of war. In the first weeks of October, India deployed an extra 60,000 troops in the border area and strengthened air defence in Ladakh. Seemingly uncontrolled skirmishes broke out between troops on the border, resulting in casualties on both sides. Chinese internal conflicts over water allocation and pollution were so widespread that the threat to national security provided a useful focus for the government as it aimed to encourage patriotic unity against a common enemy.

Chinese troops were deployed to quell rising dissent within Tibet about environmental damage caused by mega-infrastructure projects. Chinese nuclear missile deployment in Haiyun and Da Qaidam in Qinghai province was confirmed, but the international community remained powerless. No bilateral agreement was ever reached between India and China after the memorandum of agreement to share hydrology data in 2002 degenerated into a means for China to exhort payment from India in return for often-dubious information. Attempts by NGOs to establish an international dialogue and roadmap towards a ‘benefit-sharing’ agreement have failed, and the international community can only watch and wait.

In the face of Chinese aggression, India has pursued its own grand plans. By 2025 a canal had been constructed to move water from the upper parts of the Ganges, Yamuna and Brahmaputra Rivers westward, ending in the Luni and Sabarmati Rivers in Rajasthan and Gujarat. This diverts water away from the Ganges, a few kilometres from the India–Bangladesh border. The immense levels of construction along the river severely affected the flow of water downstream in Bangladesh. Stagnant reservoirs have led to high levels of toxic algae and bacteria that Bangladesh claims are now poisoning hundreds of thousands of people.

In order to complete the western water-transfer route, China has also diverted water from the Lancang (Upper Mekong) River, and a series of 15 cascading dams has been completed. The 292-metre Xiaowan dam is now the world’s tallest, as high as the Eiffel Tower. The reservoir behind the dam has grown to 105 miles long. Able to store half the entire flow of the Mekong,
the cascade of dams is having a devastating effect downstream on Cambodia, Laos and Vietnam.

Dramatic changes to the river’s unique cycle of flood and drought – the annual flood pulse – have wrecked the delicate ecosystem of the region. In the waters of the Mekong that used to sustain the world’s second-largest inland fishery, the majority of fish species are now extinct and the 60 million people who use the river as a source of food or livelihood are struggling for survival. Cambodia’s great central lake, Tonle Sap, the nursery of the lower Mekong’s fish stocks, used to fill up in monsoon season with a fifth of the Mekong’s waters. In 2030 it is dried up, and the loss of livelihood pushes another 25% of Cambodians below the poverty line and endangers many more.

On 7 September 2030, severe monsoon floods deluged 1.4 million hectares of land in the Mekong Delta, affecting 14.2 million people in Laos, Cambodia and Vietnam. The Vietnamese government’s ‘living with floods’ programme of the 2010s, to resettle people living in vulnerable zones, has failed due to lack of funding. Thus 5.3 million people in An Giang, Dong Thap and Tien Giang provinces have been driven out of the Mekong and the Red River Deltas. Climate refugees have swelled the population of Ho Chi Minh City, and Cambodia has shut its borders in panic.

The Mekong River Commission dissolved in 2015, after failing to prevent China’s dam-construction programme. Therefore, there are now no regional mechanisms in place to cope with a humanitarian disaster of this massive scale. Moreover, expensive construction and reinforcement of thousands of miles of dikes built after the Commission collapsed in Laos, Cambodia and Vietnam will exacerbate the disaster in its aftermath. Barriers inhibit the self-cleansing mechanism of rivers and trap millions of cubic yards of industrial waste, hundreds of thousands of tonnes of industrial rubbish, and millions of tonnes of pesticides and fertiliser from fish and shrimp farms. The livelihoods and lives of the approximately 30 million inhabitants of the Mekong Delta are under long-term threat.

From the favelas of Sao Paulo to global pandemics

Over 1 million people are estimated to live in the favelas of Sao Paulo. As with other slums, the majority of these residents experience severe water and sanitation stress. Many also live in very close quarters with other humans and animal species, leading to a perfect “Petri dish” for interspecies viral mutation.

In this scenario, poor sanitation and high population densities lead to a new outbreak of virulent influenza, which would come to be known as H6N1 to scientists. The crisis began in December 2015, when a wave of pigs and poultry in one of Sao Paulo’s largest slums fell ill. The infected animals were lethargic, exhibiting high fevers and hemorraging mucus membranes, followed quickly by death within a day. Although the owners of the animals were concerned, they were disconnected from official health and sanitation networks and were unable or unwilling to report the deaths the authorities.

Within weeks the disease had spread to humans and aid workers within the slum began to notice a spike in flu-like symptoms. By this point several weeks had passed and the virus had reached beyond the confines of the slum and was already spreading throughout the country. By the time the WHO teams arrived in the country on December 12th, the first human outbreaks were already occurring and additional reports were coming in from other parts of South America, Mexico, and Miami and New York. The team immediately realised a crisis was brewing and the WHO immediately raised the pandemic alert to Phase 4, noting a new strain in animals which also appeared in a small number of human beings.

The situation deteriorated swiftly from there. The new H6N1 form of the virus was particularly infectious, with an estimated transmission rate of over 60%. It was also particularly deadly; over 2% of those contracting the disease died within a month. The vast majority of the exposed population had no immunity to this new mutation, making them even more vulnerable.

While significant efforts had been poured into the preparation of anti-viral medicines and vaccine research, the medical community’s attention had been focused on preparing vaccination for the H1N1 variant, which rose to prominence years earlier in 2009. But the genetic material of the H6N1 mutation was sufficiently different that even these preparations proved ineffective.

Victims of the experienced similar symptoms to the ‘Spanish Flu’ outbreak of 1918. These included lethargy, cough, fever and high temperatures, followed by hemorrhaging from the nose, stomach, and intestines, and secondary infections of bacterial pneumonia which usually killed the victim. Although anyone was vulnerable to infection, it was the poor and the undernourished that were hit the hardest. Previous studies found that malaria and malnutrition increased the chances of death significantly. Those with HIV or other immuno-difficiencies were particularly affected, comprising nearly 1/3 of the death toll in 2015.

By 15 January 2016, the virus had spread to nearly 80 million people worldwide. Carried abroad by international long distance commercial flights, the illness leap-frogged out of Asia and appeared in Hong Kong, London, Paris, Marseilles, North Africa, New York, Beijing, Calcutta and Dubai almost simultaneously. By the February of the new year, the number of affected had risen to 390 million.

The economic costs were staggering. Economies in the developing world, particularly those who lost large portions of their population, were reduced to 20 or 30% of their previous levels. Labour shortages, production incapacity, distribution restrictions and a falling demand undid much of the progress made in the global distribution of goods since the turn of the millennium. Worldwide economic losses were estimated at over
Stock and equity markets collapsed as frantic investors attempted to shift resources into more stable long term value that might outlast the pandemic. Demand shocks, in the form of changed preferences, less trust for overseas products, and loss of income and wealth exerted a major pull on the world economy. The supply shocks were greater, however, resulting from the lost labour and transport disruption. As a result, costs in all economic sectors rose and spending declined.

By the end of the crisis, over 140 million people had died, nearly 4 billion people were affected, and the face of global commerce was changed forever. The social and economic damage left many of the world’s poor even more vulnerable to other, more standard crises. The international humanitarian community itself was severely affected as well; many members of international aid and policy organisations were themselves afflicted, severely reducing their response capacities.

### Section III: Preparing Now for the Future

The central theme that underpins this study is that the sorts of crisis drivers and crises discussed in this study are plausible, in some instances probable and in all instances open to prevention and preparedness initiatives now. This does not mean that prevention and preparedness measures on a strategic level can, generally speaking, be geared to precise forecasts or specific predictions. It does mean, however, that there are activities that can be initiated now that will reduce degrees of uncertainty, provide more effective planning frameworks and help to make planners and policy-makers more able to anticipate and adapt to the what might be’s.

#### General themes

In the research for this report and its related studies, there have been three broad and consistent themes that have emerged out of the literature and perhaps more importantly through the project’s validation meetings in China, India, Russia, the United Kingdom and the United States. These three themes are: lack of sensitive information, failure to use sensitive risk assessment methodologies and policy planning failures. There are indeed exceptions to these general themes. In the case of the waters of the Third Pole, for example, a major multi-donor funded project has been established through the International Centre for Integrated Mountain Development (ICIMOD) to develop an HKH flood early warning system. However, despite such worthwhile initiatives, these themes nevertheless point to a fundamental lack of integration of key interactive variables and at the same time reflect a lack of sensitivity about ways to prepare for dealing with what might be.

#### Lack of sensitive information

As noted under the heading below, Ten First Steps, there is an extensive catalogue of unknowns that prevent policy-makers and planners from developing a more sensitive appreciation of future risk. More accurate vulnerability mapping, for example, should be an objective for those concerned with humanitarian action; and the capacity to close some core knowledge gaps is increasing through a range of technical innovations, including remote sensing technologies. At the same time, knowledge gaps – such as those that pertain to local perception of vulnerability – will depend upon governments and relevant authorities being sufficiently committed to understanding the potential threats and coping mechanisms of those at community levels.

#### New types of risk methodologies

The types of risk methodologies being developed by private corporations such as Munich Re and Swiss Re along with other research institutes are, as mentioned earlier, changing the paradigm of dealing with risk management strategies. All too often traditional strategies are based upon trend extrapolation rather than uncertainty manipulation. For anticipating a future redolent with uncertainties and complexity, one needs to engage more actively with the sorts of OECD and WEF initiatives noted by Kureuther and Michel-Kerjan. Here, too, one needs to accept that new types of risk methodologies also have to be supported and accepted by those who might not perceive the need or have the technologies or know-how to be part of the analysis. It will be of importance now to bring a wider community to become involved in new approaches to longer-term risk assessment.

#### Policy planning failures

It is all too easy to point fingers at public authorities – be they government departments or local authorities – for failing to look more strategically into the future. There are a host of reasons that such anticipatory analysis does not take place at a level and in ways that result in policy. One such reason is that often the consequence as well as the methodology of such longer-term speculative approaches is not fully understood or appreciated. Stove-piped structures and isolated institutional interests account for some resistance to developing longer-term risk assessments and related strategies. Also the ways that one defines risk, for example, within geo-political borders, hampers a fuller appreciation of the complexities that need to be addressed, as does a general tendency throughout most governments and international organisations to avoid risk.
Ten First Steps

There were specific areas for action deemed essential to promote ways to prepare for the future. These have been consolidated into a total of ten action points, between the three crisis drivers:

Waters of the Third Pole

The majority of recommendations for the waters of the Third Pole crisis driver pertain to research that needs to be undertaken to ensure more systematic, holistic and integrated planning. The complexities that surround this particular crisis driver are many, but it is evident that an issue of major concern is knowledge, or, the lack of it. This is evident when it comes to parts of the puzzle that are still unknown, perspectives that remain fragmented and inadequate analysis of a fuller range of socio-economic categories.

It is also essential to seek ways to ensure that the various research strands proposed in this analysis and reflected in myriad research programmes and projects either completed or underway are coordinated. Rarely have computer and internet capacities been used to bring together the wide-ranging research, findings, conclusions and recommendations that relate to a subject so extensive and complex as the HKH region. It is, however, necessary to do this if the knowledge gaps and existing knowledge are to be brought together for effective action.

(1) Addressing the knowledge gaps. The numerous knowledge gaps mentioned in this report and discussed in more depth in the companion study need to be closed. It is important to bring together leading sectoral and regional experts to establish a prioritised programme of essential futures-oriented analyses to narrow knowledge gaps where possible. In the light of major climate change initiatives that are emerging out of China and other countries in the region, it is important to capture this momentum of concern. Hence, the framework for a Third Pole forum should be established as part of the Copenhagen follow-up, with an initial programme of cross-sectoral, integrated research agreed at ministerial level by November 2010 within an 18-month period, and its findings, including research proposals, should be supported by consortia consisting of bilateral and multilateral donors.

In making this recommendation, it is of abiding importance to stress the need for a holistic systems approach to be introduced into any Third Pole analysis. As the scenarios introduced in Section 2 above make evident, the sorts of crises that one will have to face in the future are by no means uni-causal. The intersecting complexities will increase, and only with a systems lens will this, and enduring solutions be evident.

(2) Promoting innovation consortia. A watching brief to help identify, prioritise and support implementation of scientific and technological innovations needs to be established. This initiative would focus on scientific and technological means to monitor trends and impacts; and it could be based upon a consortia of experts in the region – drawing upon institutions noted in Annex II of this report as well as key experts, many of whom are also noted in the aforementioned annex. This particular recommendation is not intended to minimise the deep political, sociological and economic issues that underpin many of the challenges facing the region. It is, however, to stress that wherever applicable and appropriate, policy-makers and planners should have ready access to advanced technologies to support efforts to deal with issues of prevention, preparedness and response.

This consortia initiative will be essential for addressing knowledge gaps (eg, meltwater rates in inaccessible terrain) as well as for identifying and providing instruments for monitoring and updating essential information at local and regional levels.

(3) Vulnerability mapping in a regional context. A regional mapping exercise and system are required to identify and monitor those factors that will create humanitarian crises at local and regional levels. The mapping exercise in the first instance will need to focus on how such factors interact, their dynamics and probable dimensions of impact. The ‘map’ itself should reflect details from specific urban and rural community levels to the wider regional context. It should be a key objective of the exercise and system to ensure that localised dynamics are incorporated into the regional framework. This will also require deeper investigations into community resilience at the micro level. This varies substantially across regions and can affect the severity of any future crisis scenario.

Water and Sanitation in an Urban Context

As with all efforts to promote effective anticipatory prevention and preparedness, there is an essential admix between the social context, socio-economic factors and the opportunities that arise out of new forms of scientific and technological innovation. The recommendations below reflect that essential mixture.

(1) Develop business models and engineering solutions that match the social structures and governance networks of slums. Many urban environments actually have enough water in absolute terms to provide for the needs of their residents. The challenge is how to equitably manage and distribute this water. In order for new solutions to be effective they must properly understand and interface with existing management structures, power relationships, and governance networks within slums. Many modern infrastructure solutions are technology driven and ignore the essential dimension of social networks and relationship structures. As a result they often encounter resistance or lack of maintenance. If new systems are to be developed, they must begin with a deeper understanding of who controls water distribution now; what their relationship and obligations are, both
to their customers and their other creditors or “bosses”; and what political pressures and business models will encourage these players to participate in and expand upon new solutions. New water and sanitation projects are almost certainly at risk of failure should these social dimensions be ignored.

(2) Acknowledge the level of uncertainty and change inherent in slum social structures. Modern slums experience a constant ebb and flow of new residents, opportunities, and constraints. Anecdotal evidence suggests that political favour and economic position shift at a rapid rate relative to changing populations and internal political workings, the dynamics of which will be largely uncertain or opaque to the outside observer. It is therefore necessary that this level of uncertainty and change is explicitly acknowledged if appropriate solutions are to be developed to meet the water and sanitation challenges of slum environments.

The best way to design service delivery models that work with, if not take advantage of, this uncertainty is to not design the system at all. Put another way, the tactical opportunities and constraints of most slum environments are such that no map or Excel based business model will be able to capture the relevant variables. It is therefore necessary to develop systems which can be self-deployed in an emergent fashion, bit by bit, by those in the slums with intimate knowledge of where deployment opportunities lie and what can be done to exploit them. This micro-infrastructure approach is similar to the financial model taken by the Grameen Bank, relying upon local relationships and local knowledge to deploy a modular, self-assembling banking system which the users themselves design and maintain.

(3) Utilise existing networks of slum leadership (legitimate and otherwise) to provide business incentives for the expansion of clean water networks within slums. In order to achieve these goals it is necessary to build relationships with existing leadership factions within slum environments to produce business models which they can profit from. There are many ways that this can be done. Two possible solutions are noted below and developed more fully in the companion study, Urban catastrophes: The wat/san dimension.

Modular, incremental delivery systems using low tech, flexible infrastructures that support transitional service provision. Following the principles outlined above, it is proposed that water delivery systems within slums must be able to be lightly, cheaply, and rapidly deployed. Explore modular, low tech, incremental waste removal and treatment systems. In addition to water provision, similar modular, self-designed approaches can be used to address the challenge of waste removal and treatment.

Revisiting Pandemics from a Futures Perspective

Pandemic threats are not new, as is noted in the companion study, Revisiting Pandemics from a Futures Perspective. Yet, the dimensions and dynamics of this crisis driver are vast in terms of potential global impacts, and equally as unpredictable. It is also increasingly evident at the same time that governments find it difficult to give the priority that the threats of pandemics demand, given in particular a host of other contending needs and concerns. Furthermore even in those instances when the threat of pandemics does trigger action, it is difficult to sustain the momentum of concern and resource commitment during those downtimes, or inter-pandemic periods. Hence, the recommendations proposed here look for ways to use that downtime as well as generate interest in this catastrophic crisis driver over time.

(1) The inter-pandemic period as a platform for preparation. A time interval between pandemics is called the ‘inter-pandemic period’ by WHO (Phases 1 and 2 of the WHO threat level). This is clearly the best time to engage in prevention and plan for disaster preparedness. However, this ‘non-disaster’ time is not conducive to securing donor funding or media attention. This time needs to be repositioned as a phase of action for energetic pandemic preparedness and a platform for pandemic proofing. Pandemic preparation has to be placed in the context of scarcity of resources and prioritisation of needs. With competing demands for resources, governments are highly likely to under-spend on pandemic preparedness in inter-pandemic years. One will need to reframe the ways that inter-pandemic periods are used. The next three recommendations suggest how that might work.

(2) Incorporating pandemic preparedness into existing plans. The world is confronting a cluster of crises and potential disasters, including terrorism and natural or climate-change exacerbated events such as earthquakes, tsunamis, drought and floods. Given the enormity of these crises in terms of preparation and planning, most institutions will have to operate degraded-response planning and will continue to do so in the short and medium terms.

In order to build capacity to manage these possible future disasters effectively, governments, civil society and the private sector need to examine how existing resources and capacities can best absorb the demand of pandemic planning. This also requires systems design. For example, at airports, national border authorities could screen for pandemic symptoms rather than creating a separate screening body.

(3) Applying 21st-century technology to pandemic preparation. Local-level engagement is needed to acquire knowledge for planning and response. Therefore, those with deep local knowledge, such as local community officers or community health workers, need to be engaged in pandemic preparation. Modern
communications technology could be used to harness this knowledge. Networked global surveillance using SMS technology, for example, could build on the prototype work developing health campaigns undertaking disease tracking of avian influenza in Africa and coordinating health workers in Malawi. Greater emphasis has, at the same time, to be given to very rapid diagnostic technologies, such as MassTag PCR, GreeneChips and High Throughput Sequencing. The aim is to use powerful small platforms to diagnose new viruses quickly, and to reduce reliance on large organisations.

Modern technology can also be used to develop culturally sensitive communications messages, perhaps through translation applications to avoid misunderstandings, and such facilities could be used in the field by aid workers. Reducing negative consequences would encourage cooperation and strengthen networks. Communications technology could also be used to update risk information, and dispel rumours. One of the strengths would be the possibility of bottom-up communications responsive to local psychological, social, cultural, health and socioeconomic factors, which would be likely to enhance local resilience.

(4) Improving pandemic governance by engaging the private sector. In the context of pandemics, both the private sector and civil society could also be engaged to enhance governance. It is assumed that the former, the private sector, has not only vested interests but highly relevant capacities to strengthen multilateral and bilateral efforts to provide consistent and systematic support for pandemic monitoring, prevention and preparedness as well as response. Here such fora as the World Economic Forum, the World Business Forum on Sustainable Development and the Global Compact as well as the previously noted WEF-related Global Risk Network should provide a basis for a concerted effort to mobilise the capacity of the private sector.

Section IV: Ways Forward for the International Community

Moving beyond the first decade of the 21st century it is evident that being prepared for dealing with what might be in terms of major humanitarian crises and catastrophes requires capacities that transcend any single government, multilateral organisation or set of NGOs. It requires new forms of coalitions and partnerships, new approaches to innovation and new perspectives on strategic planning. It is in this context, that this report proposes three strategic initiatives for actors concerned with the dimensions and dynamics of emerging crisis drivers:

Catalytic role. In an interview for this project with a senior official in the US government, the interviewee noted that one of the problems that had to be faced when putting together, for example, reports on climate change was “that there were few experts who could put the pieces together and make connections that are necessary to develop future scenarios. Instead there are many experts who do piece work, but are unable to put it all together.”

From HFP’s own analyses of the three crisis drivers, it is all too evident how much material is available on each, how many studies and research programmes and projects are focused on the plethora of issues that make each of the crisis drivers so plausible and compelling. And yet, there is no coherent, systematic focus on vulnerability, for example, in the HKH region that brings together the multi-dimensional and multi-sectoral factors that are essential to define, monitor, prevent and prepare for possible crises.

There are institutions, networks and collaborative fora that would be willing to act as the basis of a vulnerability mapping system in the HKH region, but there has been no single entity that has taken the lead in initiating what all agree is essential for the region’s longer-term survival. Be it the waters of the Third Pole or other crisis drivers, the challenge in an increasingly crisis-prone world will be to mobilise and energise the capacities of a wide range of actors who have the knowledge and the capabilities to narrow “knowledge gaps” about potential crisis drivers.

Hence, greater efforts will have to be made to bring coalitions of actors together to help map potential long-term vulnerability, and in so doing to promote long-term prevention and preparedness strategic frameworks for those with humanitarian roles and responsibilities.

Advocacy. All too many humanitarian initiatives have started with the intention of bringing together like-minded actors only to find that good intentions have been thwarted by the urge or political necessity of going it alone. The fact of the matter is that the sorts of crisis drivers reviewed in this report and companion studies offer few opportunities to go it alone. In an era of probably unparalleled complexity and uncertainty, the influence of key governments should be used to garner the commitments of an essential and most likely diverse set of actors to promote long-term vulnerability mapping and strategic planning options.

This sort of advocacy role should be used to promote the interests of scientific bodies to engage in “dialogues” about ways that science and technology can enhance prevention and preparedness, and should also encourage the active participation of various military groups to engage with relevant coalitions and networks to promote long-term strategic perspectives and options.

An advocacy role goes hand and hand with the catalytic role that is so greatly needed. In this context, greater engagement of the multilateral sector, the increased involvement of the private sector in issues of vulnerability, the clear interests of research institutes and government departments, for example, in China, India and Russia, offer considerable advocacy and coalition pos-
Monitors. The gulf between research and practical implementation has always been considerable, and in the field of humanitarian studies and action that gulf clearly exists. Given the potency of a growing number of crisis drivers, the luxury of not utilising compelling ideas is no longer affordable. It is with this in mind that the proposed coalition of like-minded actors should actively promote – as catalyst and advocate – a monitoring structure designed to ensure that the coalitions and structures put in place to create vulnerability mapping systems and strategic options are fulfilling their functions. With this in mind, the following should be established:

1. **A group of eminent persons.** This group, supported by technical experts, would focus on a specific set of agreed crisis drivers to assess the extent to which progress is being made on vulnerability mapping systems and strategic planning options. The group would be asked to provide an annual report on its findings, and to provide an assessment of where further action needs to be taken;

2. **Monitoring and evaluation network.** This network would inform the work of the group of eminent persons, and at the same time undertake technical analyses to determine the impact of on-going and proposed initiatives to deal with the potential impacts of future crisis drivers.
Annex I: Terms of Reference

Planning from the Future: Engaging in a New Humanitarian Dialogue

In an increasingly fluid global environment characterised by a growing number of inter-related values, influences and actors, effective humanitarian action will depend upon an ability to anticipate and understand the various dimensions and dynamics of future crisis drivers. In so doing, those with humanitarian roles and responsibilities will be able to serve vulnerable populations in more timely and appropriate ways, including more effective prevention, preparedness and response.

In order to identify key crisis drivers and place them in a wider contextual framework, the Humanitarian Futures Programme, King’s College, London, has developed a six-month project for the consideration of USAID/OFDA which focuses upon a limited number of futures issues that will:

[i] form a broad typology of crisis drivers that, in turn, will be sub-divided into a range of potential disasters, emergencies and catastrophes;

[ii] reflect the views of distinguished analysts from a diverse sampling of the world’s most prominent research centers;

[iii] suggest new and innovative operational streams of humanitarian activities most relevant to meeting these challenges;

[iv] result in a futures-oriented network for monitoring and updating initial project findings.

Project background

The overarching objective of the Humanitarian Futures Programme [HFP] is to assist organisations to prepare for an increasingly complex humanitarian future. Towards this end, HFP works with a wide array of governmental, inter-governmental and non-governmental organisations to enhance their capacities to anticipate and address the main drivers of vulnerability, on the one hand, and opportunities to offset such vulnerabilities, on the other. Through its work with identified partner organisations, HFP hopes to inform the longer-term strategic processes and modus operandi of the wider humanitarian sector.

Project objectives, outcomes and activities

Objective: The principal objective of the project is to identify a core number of critical humanitarian crisis drivers that will help guide the work of humanitarian actors to develop strategies that focus upon prevention, preparedness and response for the foreseeable future.

In identifying these critical crisis drivers, the project will indicate ways in which these drivers will manifest themselves, namely, the sorts of catastrophes, emergencies and disasters that may ensue from their impacts.

The project should also provide a broad indication of the types of operational streams or sets of activities that might follow from those identified crisis drivers in order to enhance prevention, preparedness and response. These would include broad categories of future innovation as well as new forms of collaboration.

Sub-objective 1: In providing an analysis of potential critical humanitarian crisis drivers, the project’s findings and conclusions will be tested for their overall scientific probability and for their cultural as well as geographical relevance;

Sub-objective 2: Emerging out of the project’s methodology will be various insights into knowledge management, relevant research centers and key social and natural scientists that could assist humanitarian organisations to monitor and update the crisis drivers analysis. This sub-objective would form the basis of an Annex to the main project analysis;

Sub-objective 3: As an additional benefit of using the validation methodology suggested in the Activities section, below, the study will also be able to provide some insights into practical measures that should be considered for mitigating various aspects of some of the identified crisis drivers.

Outcomes: The six month project will result in a substantive analysis of key future humanitarian crisis drivers that will amongst other things reflect the research and analysis of some of the leading social and natural scientists in major centres around the world. It is assumed that in total the analysis of these drivers will comprise a study of approximately 28 pages, based along the following lines: see table on following page.
Activities: The methodology that will be used to complete the project involves three broad approaches. First, an extensive review of the literature in relevant social science and natural science disciplines will be a consistent strand of the project’s activities throughout. Secondly, a wide range of natural and social scientists professionals in recognised research centers as well as in the field of humanitarian action will be interviewed in order to arrive at the project’s objective in a meaningful and evidence-based manner. And finally, a series of ‘validation meetings’ and workshops will be held to generate new ideas and wherever possible consensus on key humanitarian drivers and their impacts and consequences, again to ensure that the study’s findings provide a solid foundation for future action.

Interviews for the study will take place in China, Russia, India as well as in the United States and the United Kingdom. In this way, the study will make certain that its findings move beyond conjecture to include a true mapping of scientific thinking and research about the future from across the globe. Such interviews could also form a basis for the creation of collaborative networks between donors, concerned governments and key global experts in order to deal with particular crisis drivers in the future.
### Table of Phase II Activities

<table>
<thead>
<tr>
<th>Timing and sequence</th>
<th>Activity</th>
<th>Project objective</th>
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<tbody>
<tr>
<td>June 2009 – Basic research</td>
<td>Desk top review</td>
<td>Review of extensive range of social science and scientific literature that pertains to potential drivers, vulnerability and impacts</td>
</tr>
<tr>
<td>July 2009 – Basic research</td>
<td>Cont...Desk top review</td>
<td>Cont...review, focusing upon innovations that might mitigate the impact of possible crisis driver threats, including new forms of collaboration</td>
</tr>
<tr>
<td>June/July 2009 – Interview process begins in the US and UK</td>
<td>Preliminary discussions with relevant scientists and social scientists to ascertain overall direction of drivers analysis</td>
<td>Interview process will provide important input into identifying crisis drivers.</td>
</tr>
<tr>
<td>July/August 2009 – Preliminary analysis</td>
<td>HFP will produce an internal paper, summarising its findings to date, and focusing principally upon core crisis drivers</td>
<td>This preliminary analysis will bring together the desk top research with initial interview findings.</td>
</tr>
<tr>
<td>July/August 2009 – Interview process begins in Russia, China, India</td>
<td>Interviews continue, and will lead to a more substantial preliminary analysis</td>
<td>Revised preliminary analysis incorporating initial interview findings will serve as basis for first validation meetings</td>
</tr>
<tr>
<td>September 2009 – First validation meetings</td>
<td>Validation meetings to be held in the US and UK in workshops for natural and social scientists</td>
<td>These meetings will lead to drafts of Sections II and III of the project</td>
</tr>
<tr>
<td>September 2009</td>
<td>Drafting</td>
<td>During the month of September, preliminary drafts of Sections I, IV and V</td>
</tr>
<tr>
<td>September 2009</td>
<td>Validation meetings [locations to be determined]</td>
<td>Workshop to analyse and comment on Sections II, III, IV and V</td>
</tr>
<tr>
<td>September 2009</td>
<td>Drafting continues</td>
<td>Final draft based in part on results of validation meetings</td>
</tr>
<tr>
<td>October 2009</td>
<td>Report finalised</td>
<td>Submit report to USAID/OFDA</td>
</tr>
</tbody>
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Annex II: List of Experts and Mission TOR’s

China

Wang Angsheng, Former Director of the Center of Disaster Reduction, the Chinese Academy of Sciences; Emeritus Professor of the Institute of Atmospheric Physics, the Chinese Academy of Sciences; the Chief Expert of the Chinese National Disaster Reduction Commission from 1990-2005; the 1998 United Nations Sasakawa Disaster Prevention Award winner.

Ma Zhong, Professor of Economics and President of the Institute of Environmental Studies at Renmin University in Beijing. Steering Group Member of Ministry of Education Environmental Studies Education Department and the editorial boards of China Environmental Science, Journal of Natural Resources and Wetland Science.

He Fan, Assistant Director of Institute of World Economics and Politics, Chinese Academy of Social Sciences and Deputy Director of Research Center for International Finance, Chinese Academy of Social Sciences.

Ma Jun, Director, IPE (Institute of Public and Environmental Affairs) and Consultant, Sinosphere Corporation.

Luo Yong, Deputy Director, National Climate Center of China Meteorological, Director of the Climate Change Center of China Meteorological Administration and the Climate Research Laboratory, Chairman of Climatic Resources Applied Research Committee of China Meteorological Society, Executive Director of the Beijing Meteorological Society

Kang Shichang, Professor, Head of the Nam Co Observation Station in Tibet, Assistant Director of the Institute of Tibetan Plateau Research with Chinese Academy of Sciences and research associate scientist of Climate Change Institute of University of Maine, USA.

India

Solomon Benjamin, Associate Professor, National Institute of Advanced Studies (NIAS)

Dhar Chakrabarti, Executive Director, National Institute for Disaster Management (NIDM)

Ramaswamy Iyer, Honorary Professor, Centre for Policy Research (CPR)

Ashok Jaitly, Distinguished Fellow, The Energy and Resources Institute (TERI)

Vinod Menon, Member, National Disaster Management Agency (NDMA)

S.D. Muni, Visiting Fellow, Institute for Defence Studies and Analysis (IDSA)

Veena Nayyar, President, Women’s Political Watch

G. Padmanabhan, Emergency Analyst, UNDP India

GS Preetha, Pandemic Influenza Preparedness Trainer and Coordinator, UN India

Srinath Raghavan, Senior Fellow, Centre for Policy Research (CPR)

Jairam Ramesh, Minister of Environment & Forests, Ministry of Environment & Forests

S. Ranganathan, Professor, National Institute of Advanced Studies (NIAS)

O. Ravi, Joint Secretary (Disaster Management), Ministry of Home Affairs

Nandini Sharma, Professor of Community Medicine, Maulana Azad Medical College

Shekhar Singh, former Convenor of the National Campaign for the People’s Right to Information

Carol Upadhyya, Professor, National Institute of Advanced Studies (NIAS)

A Vasani, Professor, National Institute of Advanced Studies (NIAS)

Krishna Vatsa, Regional DRR Advisor, UNDP BCPR

KP Vijayalakshmi, Associate Professor, Jawaharlal Nehru University

US

Dickson Despommier, Professor of Public Health in Environmental Health Sciences (and Microbiology), Colombia University, founder of the Vertical Farming Project

Calestous Juma, Director Science, Technology and Innovation, Center for International Development, Belfrer Center for Science and International Affairs, Harvard University


David M. Morens, M.D., Senior Advisor to the Director, National Institute of Allergy and Infectious Diseases, National Institutes of Health and Associate Editor of Emerging Infectious Disease

Erik R. Peterson, Senior Vice President; William A. Schreyer Chair in Global Analysis; Director, Global Strategy Institute, affiliated with CSIS’ Global Forecasting Unit

Mark Schneider, Senior Vice President, International Crisis Group, Washington DC

Alex Steffen, Executive Editor and Founder, WorldChanging.org
Humanitarian Crisis Drivers of the Future: Preparing now for what might be

UK

Tony Cass, Professor, Deputy Director and Research Director, Institute of Biomedical Engineering, Imperial College

Steve Edwards, Dr, UCL Aon Benfield Hazard Centre

Ripin Kalra, Senior Research Fellow, Urban Development and Regeneration, University of Westminster and WSP

Graham Mitchell, Reader, Immunobiology, King's College London

John Seaman, Co-Director, Evidence for Development

Richard Taylor, Lecturer, Department of Geography, University College, London

Russia

Tatyana Dmitrievna BELKINA, Director of the Housing Research Centre at the Russian Academy of Science’s Institute of Economic Forecasting.

Viktor Georgievich BLINOV, Director of the Department for Scientific Programmes and international co-operation at the Federal Service for Hydrometeorology and Environmental Monitoring

Ivan BLOKOV, Dr. Campaigns Director for Greenpeace Russia

Yevgeny Shlemovich GONTKMAKHER, Professor, Executive board member of the Institute of Contemporary Development, and Deputy Director of the Russian Academy of Science’s Institute for the Study of the World Economy and International Relations

Sergei Viktorovich GORYACHKIN, Director of the laboratory of soil geography and evolution

Viktor Mikhailovich KOTLYAKOV, Academician, Director of the Academy of Science’s Institute of Geography.

Viktor Vasilievich MALEYEV, Academician, Dr, Deputy Director of the Central Research Institute of Epidemiology

Gennadi Maksimovich NIGMATOV, Leading Consultant at the Scientific Research Institute attached to the Federal Ministry for Civil Defence and Emergency

Nikolai Ivanovich OSOKIN, Deputy Head, Department of Glaciology,

Boris Aleksandrovich REVICH, Dr, Senior Research Consultant for laboratory analysis and health forecasting at the Academy of Science’s Institute for Economic Forecasting

Terms of Reference for Futures Crisis Drivers Missions to China, India and Russia

Introduction

Missions to China, India and Russia will be undertaken by King’s College, London’s Humanitarian Futures Programme [HFP] between August and mid-October 2009 as part of HFP’s Crisis Drivers of the Future project. The purpose of these missions is broadly speaking

i) to determine what planners and policy analysts foresee as factors, or drivers, that will lead to large-scale catastrophes over the next decade,

ii) to determine in light of #i, above, the perceived importance given to such crisis drivers as pandemics, water and sanitation issues in urban areas and the consequence of melting snows in the Himalayas;

iii) to ascertain the sort of futures-oriented prevention and preparedness planning being undertaken to address issues emerging out of responses to #i and ii, above.

The crisis drivers project in context

The principal objective of the Crisis Drivers of the Future project is to identify a core number of critical humanitarian crisis drivers that will help guide the work of humanitarian actors to develop strategies that focus upon prevention, preparedness and response for the foreseeable future.

In identifying these critical crisis drivers, the project will indicate ways in which these drivers will manifest themselves, namely, the sorts of catastrophes, emergencies and disasters that may ensue from their impacts.

The project should also provide a broad indication of the types of operational streams, or, sets of activities that might follow from those identified crisis drivers in order to enhance prevention, preparedness and response. These would include broad categories of future innovation as well as new forms of collaboration.

Sub-objective 1: In providing an analysis of potential critical humanitarian crisis drivers, the project’s findings and conclusions will be tested for their overall scientific probability and for their cultural as well as geographical relevance;
**Sub-objective 2**: Emerging out of the project’s methodology will be various insights into knowledge management, relevant research centers and key social and natural scientists that could assist humanitarian organisations to monitor and update the crisis drivers analysis;

**Sub-objective 3**: The study will also be able to provide some insights into practical measures that should be considered for mitigating various aspects of some of the identified crisis drivers.

**Outcomes**

The six month project will result in a substantive analysis of key future humanitarian crisis drivers that will amongst other things reflect the research and analysis of some of the leading social and natural scientists in major centers around the world. It is intended that the study will form the basis of a series of follow-up initiatives, including international workshops, seminars and related horizon-scanning initiatives intended to bring the world of longer-term humanitarian crisis policy planning closer to the world of science and technology.

The initial HFP study for which this research project has been designed will be completed by December 2009.
This project has been supported by the US Agency for International Development’s Office for Disaster Assistance.

The three studies linked to this report are **Urban Catastrophes: The Wat/san Dimension; Humanitarian Crises of the Future: Waters of the Third Pole; and Revisiting Pandemics from a Futures Perspective**.

This is a consistent finding from HFP’s Organisational Self-Assessment Tool. Sample and the OSAT are available form the Humanitarian Futures Programme, King’s College London.

Examples of such fora include preparations for Horizon Scanning presentation, China Dialogue initiative, HFP’s Futures Group meetings and data arising out of HFP’s Organisational Self Assessment Tool. These can be seen on HFP’s website -humanitarianfutures.org. See Annex I for the project’s Terms of Reference, which also outlines the project’s methodology.

See Annex II for a list of experts and institutions visited for the purposes of this research programme. This annex also includes the terms of reference for the three missions. In a separate report, *Humanitarian dialogues in China, India and Russia*, the views of these experts are described more fully.

See Annex II for a list of those experts whose views were sought in the United Kingdom and the United States.

This meeting took place in London on 19-20 November 2009 in the context of the annual Humanitarian Futures Programme’s Stakeholders Forum. The agenda focused on Strategic Leadership and Crisis Drivers of the Future.

These are the Tarim (Dayan), Amu Darya, Indus (includes Sutlej), Ganges, Brahmaputra (Yarlung Tsangpo–Brahmaputra), Irrawaddy, Salween (Nu), Mekong (Lancang), Yangtze (Jinsha), and the Yellow (Huang He).

There exists a medium-level of confidence that climate change has already affected many parts of Asia and this trend is predicted to continue. Owing to the vast size of, and climate variability within, the HKH region and the river basins stemming from it, it is only possible here to make very general statements about past, present and future climate trends and variability. Some key facts are presented in Table 2. The HKH region has shown consistent trends in overall warming during the past 100 years which may have been much greater than the global average of 0.74°C over this period. The degree of warming appears to increase with elevation, as observed in Tibet and Nepal and warming is more pronounced in winter than in summer. In fact, in some mountains, such as the Karakoram and Hindu Kush and the Hengduan in southwest China, summer temperatures exhibit consistent decline. See, for example, Jianchu et al., “The Melting Himalayas: Regional Challenges and local impacts of climate change on mountain ecosystems and livelihoods,” International Centre for Integrated Mountain Development Technical Paper, 2007.


13 “But I think that in the next decade, the Chinese will see less disaster brought by climate change, than water pollution caused by accumulated local environmental pollution.” He said, “Songhua River pollution incident, as well as the blue algae incident in Taihu Lake are important signals, but they had not drawn sufficient attention in the country, and experience of government in dealing with crisis caused by large scale water pollution is still very insufficient.”

14 China Dialogue, HFP Humanitarian Crisis Report: China Section. 30 September 2009

15 Interview with Professor He Fan, Assistant Director, Institute of World Economics and Politics, Chinese Academy of Social Sciences, Beijing, September 2009


17 “This is not to say that influenza (as a crisis driver) is not important...In a serious outbreak there would be high levels of death -- the Tesco supermarket refrigerated lorries would be called in as morgues -- not least for the crises that would emerge out of widespread disruption.” UK Validation Meeting Report, p.5, 1 October 2009

18 Interview with Tatyana Dmitrievna Belkina, Director of the Housing Research Centre, Russian Academy of Science’s Institute of Economic Forecasting.

19 One interviewee noted that between 15 and 20% of Russia’s hydrological facilities are in disrepair. The prospect, for
example, that chemical waste storage could leak and, via the rivers Oka and Volga, pollute Nizhni Novgorod's water supply is very real. A combination of deteriorating water and sanitation supplies, growing economic and ethnographic divisions and inadequate housing was perceived as a recipe for emerging conflict. Interview with Dr. Ivan Blokov, Director, Greenpeace Russia, September 2009


21 Op cit. #


23 Interview with Academician Dr. Victor Vasilevich Maleyev, Deputy Central Research Institute of Epidemiology at the Russian Academy of Medical Sciences, September 2009

24 This discussion is taken up in the HFP analysis of the Third Pole. Andrew Chadwick of the British Geological Survey has warned of this sort of event occurring, and Ernest Major, a seismologist at the Lawrence Berkeley National Laboratory in California briefed the US Senate in September 2009 on the carbon sequestration policies, noting that “it is such a new technology that none of these issues have been addressed.” Richard Fisher, “Don’t provoke the planet,” New Scientist, 26 September 2009, Vol.20, #2727, pp.8-9


26 See: HFP UK Validation Meeting Report, 1 October 2009

27 Howard C. Kureuther and Erwann O. Michel-Kerjan et al, *At War with the weather: Managing large-scale risks in a new era of catastrophes*, The MIT Press, Cambridge, Massachusetts, 2009, p.558. The World Economic Forum’s Global Risk Network was established in 2006 between the WEF and a combination of corporate and research institutions. Its methodology involves demonstrating ways to anticipate the probability of risk in ways that conventional means do not. Similarly, the OECD network promotes the use of alternative risk management strategies in order to seek answers to common problems.

28 Interview with Dickson Despommier, Professor of Public Health in Environmental Health Sciences and Microbiology, Columbia University. September 2009. Professor Despommier suggests that alternatives to soil-based farming include aeroponics and hydroponics, and that soil-based agriculture will be increasingly prone to sources of epidemic disease.

29 This issue is explored further in two out of the three studies linked to this project, ie, *Urban Catastrophes: The water/san dimension* and *Humanitarian Crises of the Future: Waters of the Third Pole*.


31 Op cit #26