Open data for Disaster Risk Reduction

Presentation by Craig Duncan, Senior Coordinator, UNISDR
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I am very happy to be able to make this presentation.

While the concepts I will present are not new, they all deserve to be better understood and articulated.

The initiatives I will show ARE new - most are works in progress, and ALL of them are looking for help and insight from people like you.

Full disclosure: I am not taking credit for these projects or ideas. I am here as knowledge broker, who is lucky enough to work and be friends with the people behind them.

It is also a quick overview of some very complex topics.

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With all due respect to my friends and colleagues working in disaster response (I worked 10 years in humanitarian assistance).

Humanitarian response is NOT what I am here to speak about today.

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At the UN Office for Disaster Risk Reduction.

Our message is simple: disasters are bad, and preventing them is in our best interest.

Ref: www.unisdr.org
We all regularly see disaster reports on the news.

For those affected they are horrific, and the consequences are often felt in families for generations.

But risk is mostly invisible.

This is a beautiful beach in Brittany called La Baule that I was lucky enough to visit this summer.

It was partially formed by a tsunami.

In fact there are 34 tsunamis recorded in France since 1700, and certainly many more before that.

Ref: www.tsuniami.fr

So that is the first fairly obvious, but important concept.

In our society, neither the public, nor politicians get excited (or elected) about rare, low probability catastrophic events.

Until they happen...

So what is Disaster risk - a simple word with very complex implications.

Components of risk include:

Hazard - earthquakes, cyclones, tsunamis - that are likely to happen.
Exposure - refers to the assets that we construct - or put in the way.

Vulnerability - is the ability of things (including social constructs) to withstand an event.

(Resilience is an appropriate buzzword that I will avoid, as it is currently being used differently in almost all development contexts)

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The third concept I would like to introduce is very dear to us at UNISDR.

Landslides like this one in Venezuela get a lot of attention and international assistance.

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But Landslides like this one in Nepal are largely unrecorded.

Unless you were on that road that day you would not have heard about it.

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We refer to this as Intensive vs. extensive risk.

Intensive events get a lot of attention. Extensive events get very little.


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The problem is that on a global scale, the hundreds of thousands of small events can cumulatively outweigh the larger events.

This chart shows that over 90% of events are the small often unrecorded ones - but their effect on development gains is Huge.

Obviously, the first thing people in a disaster affected area worry about is not losing a family member or friend to the disaster.

The good news is that we have evidence that mortality is decreasing in many regions for many types of hazards.

The bad news is that economic damage is increasing at an alarming rate.

We are just coming to terms with the amount of actual loss.

2.5 trillion of loss in the 21st century is almost unfathomable.

The real news is that we are discovering that disaster loss is at least 50% more than we previously thought.

There is currently a 180 billion dollar leak in the global economy.

And the trend is upward, not downward.

Perhaps similar to the global financial industry, the concepts of private gain and socialized loss also apply to disaster risk.
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The profits of construction (which often means constructing risk) have been taken long before a disaster hits.

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This often leads to the local population bearing the costs of a disaster, and the poorest families are often hit the hardest.

We speak of stakeholders in the DRR domain, but it not always clear who is holding what stake.

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So while we now know the extent of direct loss, we are also getting a better understanding of the indirect losses due to disaster events.

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This is the port of Kobe Japan.

Kobe has been prosperous since the 1800s, as is was one of the only ports open to foreign trade during the Meiji era.

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In 1985, a devastating earthquake hit Kobe, killed over 5000 people and destroyed large parts of the city including the port facilities.

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While Japan is extremely good at rebuilding, and if you visit Kobe today, you would never know that it had been destroyed.

However, the port of Kobe went from being the 3rd busiest in Japan to the 19th busiest port.
Business moved away, and never came back...


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Lastly, I would like to refer to the social and conceptual framework of risk.

Are disasters an exogenous and unpredictable disruption to "normal" society.

Or are disasters simply the consequence of poor development choices.

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Perhaps the etymology is a clue to our attitude.

Disaster comes from the Latin = bad star = bad luck.

Catastrophe on the other hand comes from the Greek = down turn.

Down turns are much more related to what we construct rather than simple bad luck.

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This is Kathmandhu, well known as the site of an upcoming major earthquake event.

How do we choose to consider that fact?

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So the real reason I am here is to tell you about some great open initiatives to deal with these issues.
The first is the Index for Risk Management project led by the UN agencies and the European Commission.

This index is designed to use a large array of open datasets to give a global picture of the relative risk in all countries.

While previous models relied on private sector "black box" algorithms, the InfoRM is being developed as an open model.

Ref: http://ohri.jrc.ec.europa.eu/

InfoRM will show both seasonal changes in the risk index and also scale to sub national and regional effects.

This is NEW – there will be a steering group meeting in October and the first report in early 2014.

In order to improve the availability and interoperability of disaster data, OCHA is also developing an Open schema known and the Humanitarian Exchange Language, or HXL.

Ref: http://hxl.humanitarianresponse.info/

In a complex working environment with hundreds of actors, HXL will help data exchange without the need for a single system.
The Open nature of HXL will result in the generation of linked open data that can be used by anyone.

In the complex world of sustainable development, there are many silos and the very words we use can be a barrier to effective effort.

The Reeep Open thesaurus is beginning to bridge the gaps. It is an RDF compatible map of concepts.

For example, while coming from the renewable energy and environmental side of climate change thinking, it is already including terms used in climate change adaptation (the getting ready for change part).

And we are working with them to extend it to the words and concepts we use in disaster risk reduction, as while it is closely related to climate change adaptation, there is little communication or linking between the two.

Reep is a well-known champion of Open Data and I would like to give them credit for their work in bridging across development silos, and recommend their workshop tomorrow.

Perhaps together we can build an ontology of resilience.

Ref: http://www.reeep.org/clean-energy-and-climate-glossary-thesaurus

As I mentioned, small disaster events are rarely recorded or counted in national risk assessments.
In order to invest in risk reduction however, it is essential to understand the extent of current losses.

We are trying to change that.

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The DesInventar.net project is an Open source, open standard which has now been used in over 70 countries to collect detailed loss data.

With the European Commission we are developing a global open standard for loss indicators.

Ref: www.desinventar.net

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Often we find that a single disaster reported globally is actually often hundreds of smaller events, each with local consequences.

One global database lists 1200 disaster events in the U.S. National data collection efforts have listed over 700,000.

This granularity is extremely important, as while countries need to know the extent of their losses, and make real decisions at the local level.

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As part of the GAR, UNISDR is developing an open global risk model.

This probabilistic model is emerging and for the first time ever, it is giving us real value estimates of possible disaster for every country.

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Previous models have been deterministic, based on limited and imperfect data collection.
This is very different as it is based on all future possibilities of hazard events, rather than on our limited record keeping of recent disasters.

Probabilistic risk takes into account all of the possible hazard events.

It is especially important as most events have not happened yet...

Or they happened so long ago that they are not part of our historic memory.


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Like the tsunami that destroyed the Lebanese (at the time Phoenician) coast 1500 years ago… and could happen again.

http://en.wikipedia.org/wiki/551_Beirut_earthquake

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This probabilistic model is emerging and for the first time ever, it is giving us real value estimates of average annual disaster losses and the probable maximum loss for every country.

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A risk model is also dependent on exposure. The Global Exposure Database has been developed by UNEP and divides the world into pixels that represent a 5 X 5 kilometer area.

Housing and other built assets and determined using various sources, and each pixel has a set of values for exposure.

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Excellent new hazard models are now being developed to give us a precise picture of the potential events.
The Global Earthquake model is an excellent example and will launch the Open Quake service in early 2014.

Ref:  http://www.globalquakemodel.org/openquake/about/

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Probabilistic risk is determined according to a time frame or return period.

A 100 year return period represents a 1% chance of that event happening in a given year.

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The CAPRA viewer can show the relative risk for any return period.

Ref:  http://risk.preventionweb.net

Psychologically, we have issues with that idea, as we consider it highly unlikely to occur.

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But would you buy a lottery ticket if you knew you had a 1 in 100 chance of winning?

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To pre-empt a question about climate change...

This map has become quite famous. It comes from the IPCC report on extreme events, and demonstrates that according to the best climate models available that extreme events (such as Hurricane Sandy) will happen more often than before.

Ref:  http://ipcc-wg2.gov/SREX/
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The Open Data for Resilience initiative of the World Bank is an attempt to crowd source, downscale and distribute the ownership of exposure data.

Ref: https://www.gfdrr.org/opendri

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While the hazard models for earthquakes, cyclones and other events are getting more precise, exposure data remains relatively coarse and limits our ability to make finer risk estimates.

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So the World Bank is using crowd sourcing, combined with tools like Geo Node and Open Street Map to get actual data on exposed assets.

This picture was taken in Kathmandhu Nepal

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The OpenDRi Field Guide will be available later this year.

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Lastly I want to introduce a personal project that has not quite started yet.

It is all well and good to be speaking at this conference (in English) about this topic.

But this is an issue of global concern, and needs to be understood everywhere.

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At UNISDR we have managed to translate around 30 terms into 19 languages, but that still represents a fraction of the earth's population.
Right here, right now, I would like to launch an effort to get 100 terms into the 100 most spoken languages.

Anyone that has expertise in crowd sourcing, translation, or is just interested in this project - please contact me.

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So here we are - living with risk.

We are in a relationship with risk and we need to manage that relationship. In fact, as humans, we like risk in many ways but need to make sure we are risk aware.

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We can either reduce risk, transfer it through things like insurance, or accept it.

...or ignore it at our peril.

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But in order to do these things, we need access to the best possible information.

Open knowledge leads to risk informed decision making.

The underlying concepts and issues need to be openly known, and through the initiatives I have shown we hope to be providing the best possible information.

...so we can have the best possible relationship with our risk.

All references and contacts for this presentation are available at: www.preventionweb.net/opendata