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Some Thoughts on Humanitarian Logistics and Quantitative Methods

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Outline of the presentation

- Acknowledgements
- Introduction to the CSIR
- Some thoughts on some research issues in humanitarian logistics and quantitative methods
- Conclusions and the way forward

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Introduction to the CSIR

- Statutory science council established in 1945
- A leading scientific and technology research, development and implementation organisation in Africa
- Over 60% funded by research contracts, royalties, etc
- Official name is CSIR
  - Used to be: Council for Scientific and Industrial Research
- Built Environment Unit (Acting Director: Hans Ittmann)
  - Logistics and Quantitative Methods (L&QM)

Some research issues in humanitarian logistics and quantitative methods

- Identifying people in a disaster
- Facilitating movement of people and aid
- Producing 'before' and 'after' pictures of disaster areas
- Predicting or preventing disasters
- GIS to support humanitarian logistics
- Inappropriate donations
- Preventing looting and pilfering
- Deployable logistics systems
- Logistics of information flow
- Scales, indices or indicators of disaster severity, aid effectiveness, refugee conditions, etc

Identifying people in a disaster [1]

- After disasters, authorities are often unable to give accurate casualty figures
  - If they don't know how many have been killed, they don't know how many survived but are still trapped or isolated somewhere
  - Don't know where to target search and rescue operations
  - Don't know if they still need to run search and rescue operations
- Need to identify accurately the survivors and their needs
  - To record that they are not missing
  - To identify resources needed (eg: specific medicines)
    - Eg: diabetics affected by Hurricane Katrina
- Applies to "slow moving" disasters as well
  - Eg: young AIDS orphans who cannot access services because they do not have identity documents, and do not know how to get them
  - Eg: Kabelo Thibedi, who took a hostage to try to get his ID after a two-year wait

Identifying people in a disaster [2]

- What records are available?
  - Local authority records
  - Neighbours and eyewitnesses
    - How coherent would their accounts be, under the circumstances?
- However, this need for information on people needs to be balanced with other issues
  - Invasion of privacy
  - Governments using the information against their citizens that they consider to be hostile

Facilitating the movement of people and aid [1]

- Physical access to disaster areas can often be difficult because of disruptions to transport networks
- Bureaucratic access can often be worse!
  - Overzealous bureaucrats or those wanting bribes
  - The supply chain of paperwork
  - Eg: delays in issuing visas for foreign humanitarian workers
    - Sometimes because of suspicion of their intentions
      - Eg: journalists in disguise
  - Eg: aid impounded because of customs clearance, inadequate documentation on the supply chain (eg: for drugs)
- Could all the appropriate documentation be prepared in advance, to be used when necessary?
  - Would need an authority (eg: UN) to pre-verify the credibility of the documentation

Facilitating the movement of people and aid [2]

- Need to facilitate the movement of legitimate humanitarian workers, aid and victims
  - While not at the same time facilitating the movement of criminals and contraband!
    - Are disasters magnets for criminals?
  - Facilitation/control not only of what goes into the disaster area, but also what comes out of it, such as stolen goods
    - Eg: the looting of the Iraqi Museum in Baghdad
  - Spectators at disasters and crowd control

Producing 'before' and 'after' pictures of disaster areas [1]

- ‘Before' and 'after' pictures of a disaster help to determine what has happened and the extent of the damage
  - Applies particularly to disasters happening over a wide area
    - Earthquakes, floods and landslides
  - In remote areas, authorities can take days to determine where the damage has occurred
  - Repository of satellite imagery is available for the 'before' pictures
    - Frequency of revisits by the satellites
    - Images are geocoded and hence readily comparable
    - Need multiple sensors, because of cloud cover, etc, particularly for the ‘after’ pictures

Producing 'before' and 'after' pictures of disaster areas [2]

- On a smaller scale, data bases of buildings
  - Eg: for a fire or a hostage taking
  - Eg: USA building detailed data bases about schools
  - Facilitate the movement of people in and out of the schools should a disaster occur
  - Locate people in the buildings
  - Locations of hazardous materials, etc

Predicting or preventing disasters

- Much is being done to measure the earth and combine the measurements with models to provide warnings of natural disasters
  - Earthquakes, volcanoes, tsunamis, floods, droughts, veld fires, etc
    - Eg: a warning was given for the Indian Ocean tsunami, but it did not get through to the appropriate people
    - Eg: CSIR's Advanced Fire Information System (AFIS)
- Could we develop models for predicting 'social' disasters?
  - War, civil unrest, famine, epidemics, building fires, hostage taking, etc
  - Vulnerability maps
  - Enable interventions to be made

GIS to support humanitarian logistics

- Geographical information systems (GIS)
  - Basic mapping of where everything is (or was before the disaster)
  - Trafficability, mobility constraints, alternative supply routes
  - Optimise use of transport resources
  - Availability of resources
    - Water, food, shelter, health care, etc
  - Planning and managing programmes such as demining
- GIS allows one to combine multiple data bases and data sources and to present information coherently
- Location-based services (LBS)
  - Track the movement of people, goods and vehicles
  - To reroute traffic around obstructions, etc

Inappropriate donations

- Unfortunately, many well-intentioned people make inappropriate donations in responding to calls for aid
  - Wrong clothing for the climate or season
  - Cultural differences
  - Perishables that expire too quickly
- Places an unnecessary burden on the humanitarian logistics
  - Could these be redirected to more appropriate beneficiaries?
    - Would need a data base of what is needed by whom
  - Reverse logistics problem
    - Return the donation to its sender
- Could inappropriate donations could be stopped early in the supply chain?
  - Reduce the cost of processing them
  - Ensure that the donor gets the message quickly
    - Prevent further inappropriate donations

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Preventing looting and pilfering

- Is looting and pilfering of aid a major problem?
  - One has to balance the control of the storage and movement of goods, with the need to get them where needed as quickly as possible
- Does the problem lie with the politicians and local leaders?
  - Is a supply chain that they do not control a threat to their authority in the area?
  - Do they distribute resources fairly?
  - Do they steal in bulk?
- Needs an efficient policing capability on the ground to investigate and prosecute such theft quickly as a deterrent
  - Could be a mismatch of cultural norms

Deployable logistics systems

- Can one build portable generic logistics systems that can be deployed into disaster areas and set up quickly?
- What are the key parts of the logistics problem that could provide maximum benefit while needing minimum customisation?
- Could one use computers such as the XO-1 laptop of the One Laptop per Child association (OLPC)?
  - Low cost, rugged, wind up power, wireless broadband
- One won't get perfection in a disaster areas, but a few tweaks to the logistics system could make a big difference

Logistics of information flow [1]

- Panic seems to be the norm with disasters
  - Even slow moving ones such as the Asian bird flu crisis!
- Authorities then tend to target the wrong measures
  - Eg: killing wild birds as vectors of bird flu
- Instead of dealing with the root causes
  - In this case, unsanitary poultry farming and shipping contaminated poultry manure all over the world
- Panic is probably driven by the lack of accurate and credible information
  - Eg: often, when discussing a breaking news story about a disaster, news anchors and reporters on radio or TV:
    - Do not listen to one another
    - Contradict one another
    - Exaggerate the problem

Logistics of information flow [2]

- The logistics of information flow in humanitarian logistics tends to focus on the supply chain only
- How can one improve information flow about other aspects?
  - Into, out of, and within a disaster area
  - Sharing success stories and information resources with other agencies, the media and the public
  - Standardization of the information to streamline information flow
  - Validating the information flow
- Pre-disaster information flow
  - Eg: people with chronic diseases should know what to do in an emergency
    - Eg: substitute medicines

Scales, indices or indicators

- Scale or index for the severity of a disaster
  - Tailor the response appropriately
  - Determine the level of the authority responsible for managing the disaster
  - Allocate resources between 'competing' disasters
  - Educate the public about the type of response they could expect to the disaster
- Index could decay (reduce) as the effects of the disaster are dealt with
  - Or some other index used to indicate the response still needed
  - Indeed, it might be useful to have several different indices
- Indicators for refugee situations and aid effectiveness
  - Assess how well they are being managed
  - Health, access to water and food, schooling disruption, etc.
  - Millennium Development Goals (MDGs)

Scales, indices or indicators

- Examples
  - FAO/FSAU's Integrated Food Security and Humanitarian Phase Classification (IPC)
    - Aims at comparability, rigour, transparency, relevance and close linkage with action
  - NOAA's Northeast Snowfall Impact Scale (NESIS)
    - Ranks storms by size, amount of snowfall and number of people affected
    - Determined retrospectively after the storm
  - Saffir-Simpson Hurricane Scale
    - Based on the hurricane's present intensity
    - Used to estimate potential property damage and flooding

Conclusions and the way forward

- Considered here some research issues in humanitarian logistics and quantitative methods
  - Identifying people in a disaster
  - Facilitating movement of people and aid
  - Producing 'before' and 'after' pictures of disaster areas
  - Predicting or preventing disasters
  - GIS to support humanitarian logistics
  - Inappropriate donations
  - Preventing looting and pilfering
  - Deployable logistics systems
  - Logistics of information flow
  - Scales, indices or indicators of disaster severity, aid effectiveness, refugee conditions, etc
- Are these research issues relevant and of interest?

Thank you!

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