

**Participatory Mapping and Participatory GIS (PGIS)
for CRA, Community DRR and Hazard Assessment**

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Introduction

It is surprising that there are not more applications of Participatory GIS or participatory mapping towards hazard identification and risk mapping. Community and individual local spatial knowledge has considerable value-added, as well as supplementary and cross-validating knowledge, for understanding disaster risk situations and designing community-based amelioration. Applying local spatial knowledge (LSK) of course also has some challenges and drawbacks. [²] The hazards considered in the 'PGIS for DRR-CRA' literature are more often environmental – geophysical disasters, pollution, climate change (cf. van Aalst et al 2008) etc., but they include also socio-economic and socio-cultural-political risks. The vast majority of Participatory GIS applications are in frequent, recurrent (common) hazards where local people have the ability to accumulate knowledge and experiences. Local information may also be available for understanding preparations and responses concerning rare event disasters like earthquakes and tsunamis, but this is rarer and it is more difficult to cross-check. (cf. Battista & Baas 2004; Dekens 2007a)

The 'PGIS for DRR' literature addresses a range of applications in DRR and CRA which can be categorised into:

- mapping people's local knowledge of hazard characteristics
- mapping vulnerability assessments
- mapping coping strategies, resilience, and adaptation
- mapping people's perceptions and priorities in overall risk assessment
- spatial planning, such as planning the siting of hazardous materials and structures;
- spatial planning - the siting of warning systems, relief centres, shelters, escape routes, etc.
- mapping urban risks, as a special category for LSK knowledge analysis and mapping
- mapping slow onset hazards as a special category
- post-disaster mapping needs.

¹ All references in McCall, 2008

http://ppgis.iapad.org/pdf/080916_PGIS_PSP_LSK_biblio.pdf

² See an extensive literature review on 'local knowledge for disaster preparedness' by Dekens (2007a) for ICIMOD.

P-mapping and PGIS are well suited to extracting people's 'lay' local (maybe indigenous [³]) knowledge. The values of seeking local knowledge include: mapping direct experiences and historical 'folk memories' of e.g. inundations, floods, storm surges, water-logging, landslides, vulnerability to earth movements, avalanches, forest & bush fires, storm damage, bio-hazards, health hazards of disease and pest outbreaks, urban conflagrations, environmental pollution, traffic safety, 'social hazards' of crime, street and family violence, children's safety, and drugs, etc., and some slow onset hazards such as drought. These types of local knowledge are essential for comprehensive hazard assessment for developing planning and policy. This knowledge has added value, supplementary to conventional planners' knowledge on DRR derived from data sets, surveys, remote sensing, and simulation modelling. And it is vital as complementary information to query, cross-check and validate the conventional DRR planning sources.

Challenges include: the integration of local knowledge of frequent hazards with independent but time-limited data from remote sensing images. What are the appropriate criteria and measures of credibility and reliability? What are the appropriate scale and degrees of precision for linking participatory with remotely-sensed information?

'Vulnerability mapping' in the DRR and CRA context has been used for a long time in a non-spatial meaning of 'mapping'. It refers to the listing, frameworking and analysis of vulnerabilities of different categories of people under different circumstances (e.g. Villagrán de León, 2006). Such conceptual and theoretical discussions, as well as some spatial data issues, are investigated by Bankoff et al (eds) (2004); Twigg (2001); Wisner, Blaikie et al. (2004); Brooks (2003)); Heijmans (2004); and Delica Wilson & Wilson (2004). In most circumstances, women and children are a more vulnerable group, and the gendered conditions and aspects of vulnerability, capacity and coping are examined by i.a. Fordham (2004); and Enarson et al. (2003).

But in the PGIS and P-mapping context, 'vulnerability mapping' specifically refers to the locational identification and analysis of vulnerability in a spatial setting. e.g. what are the spatial contiguities of vulnerable people with different hazards, different protection / coping systems and with the socio-economic status of the people. Thus there forms a connection with environmental equity and spatial justice, (below).

P-mapping and PGIS are well suited to assessing needs and analysing problems, local perceptions and priorities, for understanding adaptation, people's coping strategies (cf. Dekens 2007), and for communicating these to planners, policy makers and scientists. 'The clarity and conciseness of 'citizen maps' allows decision makers to take into account citizen inputs which used to be ignored.' (Forrester et al. 2003)

An initial step for mapping local knowledge – of hazard status, priorities, vulnerability, capacity, adaptation, coping mechanisms, overall risk, etc. – is the identification of locally acceptable and credible indicators. See Briguglio (2003), and two papers by Lavell, Risk Indicators at Different Spatial Scales (Lavell 2003) and an application in El Salvador (Lavell 2004), Also: Villagrán de León (2006).

³ The term 'local knowledge' is intended to incorporate the widely-used concept of 'indigenous knowledge', but to be inclusive also of the accumulated, inter-exchanged, experienced, felt knowledge of long-term local people, as well as that of indigenous peoples.

The UNU DGIM [4] at ITC is working with integrating local knowledge of frequent hazards, especially flooding and landslips, with objective but time-limited data from remote sensing images and other external measures. Local people's knowledge can cross-check the remotely-acquired data, they can provide historical spatial information unrecoverable from other sources, and importantly, they are the primary source of value assessments, attitudes and coping strategies. (Peters 2003, 2008 i.p.; Angraini 2007, Wigati 2008). Such information is also collected for understanding the preparations for, and responses to rare event disasters like earthquakes (Kumar Jimée 2005; Montoya 2003), and tsunamis (Bhattacharyya 2006; JKPP 2006). Alternative media of knowledge acquisition and communication are being assessed, e.g. video (Montoya 2003), participatory 3-dimensional modelling (P3DM) (Garcia 2008 i.p.). Coping with post-tsunami trauma and recovering lost (spatial) knowledge can be supported through participatory mapping of destroyed neighbourhoods with children or adults (McCall 2005).

PGIS and P Mapping for DRR and CRA: Cases

In the applications of participatory mapping and PGIS for spatial information about risk and hazard problems, representative examples are:

Local Knowledge of Hazards

Mapping people's historical knowledge of the location, frequency, spatial extent, intensity (force), of frequent hazards – floods, landslips, wind storms, avalanches, volcanic events, etc., or military hazards.

- Mozambique, Sofala Province: P-GIS and disaster risk management, assessing flood vulnerability with PGIS methods; Community mapping and community integrated GIS. (Kienberger & Steinbruch 2005; Kienberger et al. 2005; Kienberger 2007)
- Mexico City urban expansion of Mexico City into volcanic activity areas, air pollution (Moctezuma-Barragan, 2007; 2001)
- Landslide risk assessment for Thanamaula Village, Nepal, Parbat. hazards, landslide risk mapping, CRA, vulnerability, Sharma (2007)
- Community participatory approach for disaster prevention in Sierra Norte de Puebla, Mexico. CRA, landslides, PRA, communications, (not PGIS) Lopez Mendoza (2007)
- Local (historical) knowledge of urban flood characteristics (extent, frequency, damage, etc.), flood risks assessment, differential vulnerability, and coping strategies, for high and low frequency events, in Naga City, Philippines (Peters 2008; PhD i.p.) using PRA, P mapping, PGIS.
- Cambodia, northwest: P-mapping of hazard areas from landmines (Williams & Dunn 2003)
- Manitoba: local sampling of water quality near a copper-zinc mine, indigenous knowledge of changes in taste in local meat & water (Grenier 1998)/ (Sallenave 1994)

Mapping Vulnerability Assessment:

- Participatory 'Capacities & Vulnerabilities Assessment', Finding the link between disasters, hazards & risk and development using RRA, PRA, participatory gendered mapping, vulnerability mapping, resource mapping, etc, in The Philippines. (de Dios, 2002)
- Action Aid PVA with community mapping and community risk management in Bay of Bengal: Andaman & Nicobar Is., and Bangladesh.

⁴ DGIM - School for Disaster GeoInformation Management.

- Raumoco Watershed Vulnerability Mapping, East Timor, Pmapping, PGIS, P3DM, for vulnerability and capacity. (CADRE 2007)
- Vulnerability concepts and methodologies at the: National Scale Vulnerability Assessment / Megacity Scale VA / and Local Scale VA. Coping capacities and resilience and vulnerability perception are related concepts. (Villagrán de León 2006)
- Community level adaptation to climate change. (van Aalst et al 2008)
- Raumoco Watershed Vulnerability Mapping, East Timor, Using P-mapping, PGIS and P3DM, for disaster risk, vulnerability, and capacity. (CADRE 2007)
- Also see: Falk (2005) for Danish Red Cross; Heijmans & Victoria (2001) for Centre for Disaster Preparedness & Citizens' Disaster Response; Abarquez & Murshed (2004) for ADPC; Enarson et al. (2003) for International Hurricane Research Center.
- Indicators for disaster risk assessment: Lavell (2003) Construction of Risk Indicators at Different Spatial Scales; and Briguglio (2003) Socio-Economic Indicators to Evaluate Disaster Risk. (both published by University of Colombia Manizales, for IADB-ECLAC-IDEA), and Lavell (2004), case study of Lower Lempa River El Salvador.
- For urban natural hazards, see especially: Pelling (2003) The Vulnerability of Cities. Natural Disasters and Social Resilience.

Mapping Coping Strategies, Resilience, and Adaptation

Mapping People's Perceptions and Priorities in Overall Risk Assessment

Mapping people's evaluations and priorities, responses and coping strategies in space, e.g. variation within urban municipal areas due to social, economic, ethnic, religious, income, livelihood, etc. differences.

- Flood risk assessment, San Sebastian, Guatemala (Peters 2003; Peters et al. 2005) using P mapping, risks, hazards, urban floods, Sierra Madre, Samala river basin.
- Community mapping of CRA issues related to flood hazards – local knowledge, coping strategies, vulnerability, priorities, etc. in Indonesia: Coping with urban flooding in Semarang, Java, (Anggraini 2007). Community assessment, Bogowonto River, Java (Wigati 2008). Jakarta, participatory mapping and CRA of flood hazard, coping , etc. in vulnerable community in Jakarta (Marschiavelli 2008)
- Urban disaster management perspective, earthquakes, Costa Rica. Geo-data acquisition through mobile GIS and digital video: (Montoya 2003)
- PGIS and political ecology to study flood vulnerability, South Africa, Limpopo Province, Thulamela Municipality: coping strategies, mental maps, PRA, "household flood vulnerability is socially constructed, it is mediated by locally contingent political, socio-economic and environmental factors" (Nethengwe 2007)
- "Folklore meets GIS for risk reduction" in Naiquata, Venezuela. LSK of urban hazards, risks, elderly & children, GIS (Muñoz 2007)
- India, village & urban neighbourhood environmental hazard mapping by children (CSDMS) (Gupta et al, 2003; Kumar 2003, Mallick & Kaira 2003; Mallick et al 2005; Mathur et al. 2001)

- Community mapping in Tsunami affected areas, Aceh, Indonesia. (15-min video; community mapping used in post-tsunami Aceh, (Indonesia. Indonesia Community Mapping Network (JKPP) 2006)
- Mapping lost homes in post-disaster situations (McCall 2005)
- Coping mechanisms – by risk sharing or risk spreading using locational strategies. Distribution of crops and livestock and storage, etc. amongst micro-environments in flood plains, steep slopes, fire-prone, storm-vulnerable, and other hazardous areas, etc. western Nepal (Zurick 1990); Bangladesh (Paul 1984); Mozambique (Brouwer & Nhassenga 2006) Kathmandu Valley, Nepal (Jigyasu 2002), Karakoram, Pakistan (Iturrizaga 1997) (All refs, in Dekens 2007a)

Spatial Planning - the Siting of Hazardous Materials and Structures

Dealing with siting decisions for LULUs (locally unacceptable land uses) such as power stations, waste dumps, hazardous and polluting factories. Locations of environmental hazards which urban or rural people have to deal with – e.g. spatial extent and degree of air pollution, water sources, waste water, chemical and fuel dumps, uncontrolled garbage.

- Padgett (1993) worked with people's participation in GIS in siting decisions for LULUs (locally unacceptable land uses) including environmental hazards.
- Kellogg (1999) applied GIS to develop a neighbourhood environmental information system for inner-city communities in Cleveland, keeping track of environmental hazards and resources.
- Haryana India: Farmers' P-mapping of industrial air polluting agriculture, (Mukherjee et al 2001) Gupta (1989) was an early example of P-mapping of risks facing farmers in India.
- Applying social impact assessment and P mapping to examine livelihoods at risk due to construction of Mphanda Nkuwa Hydroelectric Dam, Tete, Mozambique. (Morrissey, 2007)
- Neighbourhood environmental information system for inner-city Cleveland, keeping track of environmental hazards. (Kellogg 1999)

In USA and UK especially the handling of nuclear waste and siting of nuclear power plants.

- California: A co-sited combination of the nuclear risk space with regions of indigenous NRM interests: mapping nuclear hazard implications for the hunting grounds of the Southern Palute people., etc. (Clark Labs 2002)
- Participatory spatial decision making for nuclear waste disposal using an interactive Web-based GIS (Carver, Evans & Kingston 2005) <http://www.ccg.leeds.ac.uk/atomic/>
- There are experiences from USA and UK dealing with industrial and urban waste and pollution, and especially with the handling of nuclear waste and siting of nuclear power plants, etc. (e.g. Padgett 1993)
- e.g. the influence of geographical data on spatial decision making for nuclear waste disposal using an interactive web-based GIS (Carver, Evans & Kingston 2005 A, B) (Evans, Kingston, & Carver 2004).
- Siting of hazardous waste facilities in Wales & Canada, using different decision methods. Local government and unwanted land uses & water pollution: does interactive decision making help conflicts? (EIA & DSS, but not GIS) (Huiteima, 2000)

At the macro scale of siting decisions, mapping hazards, floods, earthquakes, etc. Consider the political institutional distortions in mapping. Applying the three R's of GIS-based site selection: Representation, Resistance, and Ridicule. See: Monmonier

(1997) Cartographies of Danger: Mapping Hazards of America; and Monmonier (1998).

Spatial Planning - Siting of Warning Systems, Relief Centres, Shelters, Escape Routes, etc.

- location of, and access to, flood shelters influenced by local elites, northern Bangladesh (Khan 1991; Dekens 2007)
- selection & location of escape routes from tsunamis, Sumatra (ITC 2007)
- type and location of traditional flash flood warning systems, Chitral, Pakistan (Dekens 2007b)
- traditional and new community flood warning systems, Bogowonto River, Java (Wigati 2008).

Urban (Social) Hazards – Crime, Drugs, Accidents, etc. [5]

Mapping the realities and the perceptions of social dangers and safety and lifestyle hazards, crime and security. These are mainly urban issues, such as: anti-social behaviour, street drunkenness, street and house crime, drug dealing, road and other accidents, robbery and rape. Thus, there are obvious links to gender issues, especially women's actual and perceived spaces, and to children's safe spaces.

There are similar social public concerns in the mapping of public (individual and group) perceptions and attitudes towards sites of presumed social risks e.g. prisons, drug rehab centres, asylum / immigration centres.

Urban Cases

- Locations of social hazards for women, unsafe urban sites:
 - 'Through the eyes of women' - Photos, voices and participatory tools for re-imagining women's space in Belfast (McIntyre 2003)
 - 'Women's Safety Audits for a Safer Urban Design': Poland, Warsaw, safety maps, (lighting), P mapping (UN-HABITAT, 2007)
- For children – danger areas in the city for children; road accidents & other hazards on the journey to school
 - Liverpool: "Mapping our walk to school": children, traffic, hazards (Hull & Molyneux 2005)
 - San Francisco Bay, CA, "Livable streets for schoolchildren." Safe Routes to School using children's mental maps and P mapping (Appleyard 2005)
 - Safe routes for children's journey to school in Denmark, UK, USA, (not GIS) walking, cycling, Sustrans (Osborne 2005)
 - Society for Human Exploration: classic mapping of children's urban spaces, Detroit & other North American inner cities of deprivation and planning neglect (SHE 1971) (Bunge 1969, et al)
 - Madison? WI. Pmapping & PGIS of social environment with youth and children, using photos, drawings, narrative,.(Dennis 2006)
- Social vs. Environmental hazards:
 - Morelia, Mexico: rapid participatory mapping and PGIS with residents of a low-income colonia on the urban fringe found that hazards from crime, drug-dealing, lack of policing, poor street lighting etc. outweighed the 'physical' hazards due to flash floods, landslips, or garbage dumping in people's priorities, (McCall pc 2005)

⁵ All references in McCall, 2008

http://ppgis.iapad.org/pdf/080916_Urban_PGIS_refs.pdf

- Guatemala City: Youth, gangs and violence: social and spatial mobility of young people with P mapping. (Winton 2005)
- Health and AIDS
 - Exploring the association between HIV and violence: young people's experiences with infidelity, violence and forced sex in Dar es Salaam, Tanzania. mapping of youth meeting areas. Lary et al. (2004)
 - Mapping HIV-AIDS, violence & sexual abuse, for adolescents in rural Zimbabwe. The 6 (spatial) "risk areas" are bush/rural terrain, commercial centres, home, school environs, spiritual venues, roadside. (Power et al 2007 "But there are no snakes in the wood": risk mapping as an outcome measure in evaluating complex interventions.)
- Participatory mapping for crime:
 - South Africa, Cape Province: safety audits made by local community with PGIS against crime and security and social hazards, PGIS (Mans 2006)
 - Liebermann & Coulson (2004) Participatory mapping for crime prevention in South Africa.
 - Chicago crime maps. (Lindenbaum, 2006)

Slow Onset Hazards / Disasters:

Slow onset and / or long return time hazards such as drought, sea level rise, diffusion of pests and diseases, etc. This is related to identifying and mapping people's responses to global and local climate change, assessing adaptation strategies, etc.

- Community level adaptation to climate change is addressed by van Aalst, Cannon et al. (2008) who assess the use and applicability of participatory CRA methods to understanding adaptation, disaster risk preparedness under situations of global and local climate change. They review a number of standard DRR methodologies including PRA; Vulnerability & Capacity assessment, and CRA, but do make much use of geospatial tools like PGIS.
- Namaqualand, South Africa. herders' cognitive maps and drought coping strategies on communal rangeland, using local ecological knowledge (Samuels 2006; Debeaudoin 2001)
- Southern Ethiopia and northern Kenya: Participatory mapping of environmental and conflict risks in arid lands with pastoralist peoples (Boran, Gabra, Samburu peoples et al.) (Smith et al. 2000).
- Senegal: Expert knowledge and local knowledge for cartographic decision-support tools to deal with drought risks and hazards. (Touré, Ibra et al 2004)
- Australia: N. Queensland, Threat Identification Model (TIM) DSS linked to GIS assesses sustainability of agricultural land management, including hazards (Smith et al. 2000)

Post-Disaster Mitigation Mapping

Several NGOs and agencies are engaged in post-disaster rapid-response emergency mapping and GIS. Little of this is participatory, because it concentrates on acquiring, checking, updating, upgrading and disseminating maps and images which are not easily available to the emergency workers or local administrations in the disaster area. Primary examples are:

- **MapAction** <http://www.mapaction.org/index.html> a UK-based charity initiate some semi-participatory spatial information with "Supporting humanitarian operations with real time mapping". There is also a pilot eg. of GPS + PDA (PGIS) for water & sanitation issues in Delhi.

- **GISCorps**, a URISA program in USA has worked since 2003 in many developing countries and operates entirely on a volunteer basis. San Francisco CA, USA. <http://www.giscorps.org/>
- **Global MapAid**, another not-for-profit, predominantly functions in slow onset disasters such as food security, drought, HIV monitoring and orphanage survey refugee, programs. but also when necessary in rapid onset disasters such as floods. <http://www.globalmapaid.rdvp.org/> info@globalmapaid.rdvp.org
- **Aid Workers Network**, Local “Humanitarian mapping”, but it is not really P-mapping. (Douglas-Bate 2003). C.f. Applying GIS in a humanitarian crisis in Kosovo (Smith 2000).
- Using sketching and p-mapping for trauma therapy with children and for ‘mapping lost homes’ & neighbourhoods in post-disaster situations, eg. tsunami (McCall 2005)
- **CyberTracker** software creates data entry templates to use on Windows PocketPC or PalmOS handheld computer to gather and map locally-generated, spatial knowledge. Connected to a GPS, CyberTracker instantly geo-references data. “CyberTracker’s unique design allows users to display icons & text which makes data collection faster. It allows field data collection by non-literate users and school children”. CyberTracker has been applied to local spatial knowledge in post-disaster relief operations. CyberTracker, Cape Town, South Africa. <http://www.cybertracker.org/index.html>

CRA / Community DRR Manuals and Toolboxes utilising Participatory Mapping, etc.

ProVention

Community Risk Assessment Methodologies and Case Studies.

Compiled by Maya Schaerer (2006?) Geneva: ProVention.

Main website www.proventionconsortium.org

This is a well-organised, annotated overview of Community Risk Assessment (CRA) approaches and methods, many of which are highly relevant to PGIS issues, applications and methods. This ‘Guide to Handbooks and Guidelines’ reviews the products of many agencies and NGOs, including Asian Disaster Preparedness Centre (ADPC); Oxfam, ActionAid; Centre for Disaster Preparedness Philippines, International Hurricane Research Centre, Florida; South Pacific Disaster Reduction Programme of the UN Dept of ESA; and the Philippines National Red Cross Society. Likewise there is a cross-indexed user-friendly guide to PRA and other survey tools for community spatial information, including hazard mapping; resource mapping; risk mapping; and gendered risk mapping. (NB of course the term ‘mapping’ in this context does not always mean just representation of geospatial information) The website also includes many case studies.

Benson, Charlotte; and John Twigg with Tiziana Rossetto (2007)

Tools for Mainstreaming Disaster Risk Reduction: Guidance Notes for Development Organisations.

Geneva: ProVention Consortium (184p.)

<http://www.proventionconsortium.org/?pageid=37&publicationid=132#132>

Tools dealing with risk, disaster, hazards, vulnerability, livelihoods and participation, and including Logframes and EIA & SIA tools.

IFRC, OAS, PAHO, UNICEF, ProVention (2006?)

Community based Vulnerability and Capacity Assessment (VCA) in Central America

This set of six manuals is a collaborative effort between the Organization of American States, the Pan-American Health Organization, UNICEF and IFRC supported by

ProVention, aimed at promoting community-based disaster risk reduction activities in the following fields: school maintenance, disaster mitigation of rural water supplies and sewerage systems, natural hazards and school shelter, community early warning systems for small valleys, floods awareness practice guides, community dialogue on water and climate.



[Mantenimiento Comunitario de Escuelas](#)
(pdf, 12.5MB)



[Manejo de Albergues Temporales](#)
(pdf, 8.4MB)



[Inundaciones](#)
(pdf, 6.9MB)



[Prevención de Desastres en Acueductos Rurales](#)
(pdf, 10.8MB)



[Alerta Temprana](#)
(pdf, 12MB)



[Diálogo Comunitarios sobre Agua y Clima](#)
(pdf, 11.3MB)

Action Aid Participatory Vulnerability Analysis (PVA) Case Studies

Johannesburg: **Action Aid**
<http://www.actionaid.org/wps/content/documents/PVA%20case%20studies%20Final.pdf>

Keywords: community mapping, disaster, community risk management, hazards, India, Andaman Is., Nicobar Is.; Bangladesh; ActionAid - Ethlet Chiwaka and Roger Yates (2005)

[Participatory Vulnerability Analysis: A step-by-step guideline for field staff](#)
London / Johannesburg: ActionAid International. (35p.)
www.proventionconsortium.org.

ADPC

Abarquez, Imelda; and Zubair Murshed (2004)
[Field Practitioners' Handbook](#). Pathumthani, Thailand: **ADPC** (Asian Disaster Preparedness Center) (163p.)
<http://www.adpc.net/pdr-sea/publications/12Handbk.pdf>

Keywords: community mapping, handbook, disaster, community risk management, hazards

Alliance Frontiers Prevention Project (2006)

[Tools Together Now! 100 Participatory Tools to Mobilise Communities for HIV/AIDS.](#)

Brighton: International HIV/AIDS Alliance (251p.)

http://www.aidsalliance.org/graphics/secretariat/publications/Tools_Together_Now.pdf

Keywords: PRA, PLA, community participation, training, health, AIDS, mapping tools, Pmapping (not PGIS), gender tools, institutions, priorities, planning & policy tools,

CARE USA

Timothy Frankenberger, Kristina Luther, James Becht, M. Katherine McCaston (2002)

[Household Livelihood Security Assessments: A Toolkit for Practitioners](#)
Atlanta GA: CARE USA. (92p.)
www.kcenter.com/phls/HLSA%20Toolkit_Final.PDF

General assessment methods included in the HLSA include: Livelihood analysis; Analysis of livelihood security; Opportunity analysis; Rights and responsibilities analysis; Gender analysis; Stakeholder analysis; Institutional analysis

Heijmans, Annelies; and Lorna Victoria (2001)

[Citizenry-Based & Development-Oriented Disaster Response](#)

Centre for Disaster Preparedness and Citizens' Disaster Response Centre. (171p.)

Keywords: hazard mapping, risk management, RRA, PRA, participatory

community mapping, vulnerability mapping, social,
Source: www.proventionconsortium.org

Lavell, Allan with Elizabeth Mansilla and David Smith (2003)
Local Risk Management: Ideas and Notions relating to Concept and Practice.
Guatemala: **CEPREDENAC** Centro de Coordinación para la Prevención de los Desastres Naturales en América Central, CEPREDENAC – PNUD; and: Geneva: UNDP, Regional Programme for Risk Management in Central America. (62p.)
<http://www.crid.or.cr/digitalizacion/pdf/eng/doc15784/doc15784-contenido.pdf>
Keywords: Disaster Risk and Prevention Management Project 1999 – 2004 (Centro Humboldt, Nicaragua) El Centro Humboldt; (some mapping)

CIDA (1996)
Capacity and Institutional Assessment: Frameworks, Methods, and Tools for Analysis.
[http://www.acdi-cida.gc.ca/INET/IMAGES.NSF/vLUIImages/CapacityDevelopment/\\$file/1996-06-02Tools\(Wkshp6\).pdf](http://www.acdi-cida.gc.ca/INET/IMAGES.NSF/vLUIImages/CapacityDevelopment/$file/1996-06-02Tools(Wkshp6).pdf)

Falk, Knud (ed.) (2005)
Preparing for Disaster – A Community-Based Approach.
Copenhagen: **Danish Red Cross** (2nd ed.) (36p.)
Manila: Philippine National Red Cross (1st ed. 2002)
http://www.proventionconsortium.org/themes/default/pdfs/CRA/CBDP_Philippines_Booklet.pdf
Keywords: Philippines, community risk management, disaster, P-mapping, community mapping, hazard maps, resource mapping, GIS (18-20)

Enarson, E.; Meyreles, L., González, M., Hearn Morrow, B., Mullings, A. and Soares, A. (2003)
Working with Women at Risk: practical guidelines for assessing local disaster risk
International Hurricane Research Center, Florida International University (104p.)

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van Aalst, Maarten K.; Cannon, Terry; and Burton, Ian (2008)

www.ihrc.fiu.edu/lssr/workingwithwomen.pdf
Keywords: PRA, participatory mapping?, risk mapping, social, gender,

Oxfam Great Britain - Philippines Programme

de Dios, Honorio B. (2002)
Participatory Capacities and Vulnerabilities Assessment: Finding the link between disasters and development.
Quezon City: Oxfam Great Britain - Philippines Programme (82p.)
http://www.proventionconsortium.org/themes/default/pdfs/CRA/PCVA_2002_meth.pdf
CVA matrix includes : Gender desegregation matrix ; Resource mapping; Community mapping; Hazard mapping; Transect walk; Matrix ranking/scoring; Wealth ranking; Venn diagrams; Community visioning; Seasonal calendar; Timeline; Focus group interviews; Role playing; Household interviews

UN - UNDHA & UN ESA

Luc Vrolijk (1998)
Guidelines for Community Vulnerability Analysis: An Approach for Pacific Island Communities.
South Pacific Disaster Reduction Programme (SPDRP), South Pacific Programme Office of the United Nations Department for Humanitarian Affairs and the United Nations Department for Economic and Social Affairs. (97p.)
www.proventionconsortium.org
□ Capacity and Vulnerability Assessment (CVA) and action planning consisting of situation analysis, prioritization, action planning
□ Participatory Rural Appraisal (PRA).
A range of *participatory tools* are used in the analyses: Timeline; Changing trends matrix; Seasonal calendar; Schedule of daily activities; Food path analysis; Classification of building/structures (scoring); Transect walk; Risk mapping; Scoring table of economic activities, community; Vulnerability/capacity scoring tables; Venn diagrams; Scoring tables of community priorities

Community level adaptation to climate change: the potential role of participatory community risk assessment.

- Global Environmental Change 18, 165-179.
Keywords: adaptation; (Climate change); Disaster risk reduction; preparedness; PRA; Vulnerability & Capacity assessment; CRA, review, tools
- Bankoff, G.; Frerks, Georg; and Hilhorst, David (eds) (2004)
Mapping Vulnerability, Disasters, Development, and People.
London: Earthscan
Keywords: risk, hazards, vulnerability factors, coping, gender, participation, empowerment, El Salvador,
- Battista, F.; and Baas, S. (2004)
The Role of Local Institutions in Reducing Vulnerability to Recurrent Natural Disasters and in Sustainable Livelihoods Development. Consolidated Report on Case Studies and Workshop Findings and Recommendations.
Rome: FAO, Rural Institutions and Participation Service.
- Blaikie, Piers, Cannon, Terry, Davis, Ian, and Wisner, Ben (1994)
At Risk: Natural Hazards, People's Vulnerability, and Disasters.
Routledge, New York, NY.
- Bollin, Christina (2003)
Community-Based Disaster Risk Management Approach. Experience gained in Central America.
Eschborn: GTZ , Division 4200 Governance and Democracy. (63p.)
<http://www.gtz.de/de/dokumente/en-community-based-drm.pdf>
Timelines, actor mapping. Problem trees ranking venns vulnerability & capacity analysis, SSI, Participatory observation Social / Wellbeing Ranking
- Briguglio, L. (2003)
Methodological and Practical Considerations for Constructing Socio-Economic Indicators to Evaluate Disaster Risk. Institute of Environmental Studies. Manizales: University of Colombia, Programme on Information and Indicators for Risk Management, IADB-ECLAC-IDEA.
- Brooks, N. (2003)
Vulnerability, risk and adaptation: a conceptual framework.
Tyndall Centre for Climate Change Research, Tyndall Working Paper, no. 38,
www.tyndall.ac.uk/publications/working_papers/working_papers.shtml
- Dekens, Julie (2007a)
Local Knowledge for Disaster Preparedness: a Literature Review.
Kathmandu: ICIMOD (84p.)
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- **Green Map System**, Canada, USA, worldwide: www.greenmap.org
- **GreenInfo**, California: "Mapping in the Public Interest" <http://www.greeninfo.org/>