

7th International Conference on Building Resilience (ICBR 2017)

Using Scientific Knowledge to
Inform Policy and Practice in
Disaster Risk Reduction

Procedia Engineering Volume 212

Bangkok, Thailand
27 – 29 November 2017

Part 1 of 2

Editors:

D. Amaratunga
R. Haigh

ISBN: 978-1-5108-5871-8

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© by Elsevier B.V.
All rights reserved.

Printed by Curran Associates, Inc. (2018)

For permission requests, please contact Elsevier B.V.
at the address below.

Elsevier B.V.
Radarweg 29
Amsterdam 1043 NX
The Netherlands

Phone: +31 20 485 3911
Fax: +31 20 485 2457

<http://www.elsevierpublishingsolutions.com/contact.asp>

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

PART 1

EDITORIAL: USING SCIENTIFIC KNOWLEDGE TO INFORM POLICY AND PRACTICE IN DISASTER RISK REDUCTION	1
<i>D. Amaratunga, R. Haigh</i>	
EVOLUTION OF DISASTER RISK GOVERNANCE IN GREATER MANCHESTER: A CASE STUDY FROM THE UK	7
<i>Kathryn Oldham, Karl Astbury</i>	
ENERGY TRANSITION IN THE AUSTRIAN CLIMATE AND ENERGY MODEL REGIONS: A MULTI-RISK PARTICIPATORY GOVERNANCE PERSPECTIVE ON REGIONAL RESILIENCE	15
<i>Nadejda Komendantova</i>	
STUDY ON HOUSING UNITS LOCATE IN VERY HIGH AND HIGH LANDSLIDE HAZARD PRONE AREAS OF HALL-ELA DIVISIONAL SECRETARIAT DIVISION, SRI LANKA	22
<i>Jude Prasanna, Winson Gnanatheepan</i>	
PROCESS INCLUSIVE INFRASTRUCTURE: NOTIONS TOWARDS CYCLONE RESILIENCE IN BANGLADESH	30
<i>Shafinaz Sameen</i>	
SOCIALLY-INTEGRATED RESILIENCE IN BUILDING-LEVEL WATER NETWORKS USING SMART MICROGRID-NET	39
<i>Kemi Adeyeye, Abderrahmane Bairi, Stephen Emmitt, Katherine Hyde</i>	
LESSONS LEARNT FROM LONG TERM IMPACT OF 2004 TSUNAMI RELOCATION: A CASE STUDY OF SELECTED RELOCATION SETTLEMENTS IN AKMEEMANA DIVISIONAL SECRETARY DIVISION IN GALLE DISTRICT, SRI LANKA	47
<i>Nishara Fernando</i>	
ENHANCEMENT OF FOOD SECURITY THROUGH APPROPRIATE PACKAGING TO BUILD UP RESILIENCE FOR DISASTERS	55
<i>S. B. Navaratne</i>	
ASSESSMENT METHOD FOR SEISMIC VULNERABILITY OF OLD MASONRY BUILDINGS IN SRI LANKA	61
<i>Sudhira De Silva, G. H. M. J. Subashi De Silva, H. M. S. S. Padmal</i>	
FLOOD HAZARD ZONING OF TARLAC CITY: TOWARDS THE DEVELOPMENT OF FLOOD OVERLAY ZONES AND PROVISION	69
<i>Murphy P. Mohammed</i>	
DISASTER RISK REDUCTION AND MANAGEMENT OF TARLAC CITY	77
<i>Murphy P. Mohammed</i>	
HAZE POLLUTION IN CHIANG MAI, THAILAND: A ROAD TO RESILIENCE	85
<i>Liwa Pardthaisong, Phaothai Sin-Ampol, Chanida Suwanprasit, Arisara Charoenpanyanet</i>	
NEURO MULTIPLE CRITERIA ANALYSIS SYSTEM FOR UNIVERSITY-INDUSTRY PARTNERSHIPS	93
<i>A. Kaklauskas</i>	
IDENTIFY THE RISK FOR LEPTOSPIROSIS DISEASE DURING FLOODING PERIODS (SPECIAL REFERENCE TO MEDIRIGIRIYA DIVISIONAL SECRETARIAT DIVISION IN POLONNARUWA DISTRICT)	101
<i>K. B. P. C. A. Wijerathne, E. M. T. K. Senevirathna</i>	
TSUNAMI EVACUATION ROUTES USING NETWORK ANALYSIS: A CASE STUDY IN PADANG	109
<i>Faisal Ashar, Dilanthi Amaratunga, Richard Haigh</i>	
CHANGING BUILT FORM AND IMPLICATIONS ON URBAN RESILIENCE: LOSS OF CLIMATE RESPONSIVE AND SOCIALLY INTERACTIVE SPACES	117
<i>Bhaswati Ray, Rajib Shaw</i>	
ENABLERS AND BARRIERS OF ADAPTING POST-DISASTER RESETTLEMENTS	125
<i>Pournima Sridarran, Kaushal Keraminiyage, Dilanthi Amaratunga</i>	
A MODIFIED BALCIK LAST MILE DISTRIBUTION MODEL FOR RELIEF OPERATIONS USING OPEN ROAD NETWORKS	133
<i>Lance L. Putong, Marlene M. De Leon</i>	
SPATIAL AND TEMPORAL VARIATIONS OF SATELLITE-DERIVED PM10 OF CHIANG MAI: AN EXPLORATORY ANALYSIS	141
<i>Chanida Suwanprasit, Arisara Charoenpanyanet, Liwa Pardthaisong, Phaothai Sin-Ampol</i>	

COMMUNITY PERCEPTION ON ADVERSE EFFECTS OF NATURAL HAZARDS ON LIVELIHOOD AND ENHANCING LIVELIHOOD RESILIENCY: A CASE STUDY AT PATHARGHATA UPAZILA, BARGUNA	149
<i>Md. Abdur Rahim, Ayesha Siddiqua, Most. Nusrat Binte Nur, A. K. M. Mostafa Zaman</i>	
PLACE BASED APPROACH TO PLAN FOR RESILIENT CITIES: A LOCAL GOVERNMENT PERSPECTIVE	157
<i>Anumitra V. Mirti Chand</i>	
FRAMEWORK CONSIDERATIONS FOR COMMUNITY RESILIENT TOWARDS DISASTER IN MALAYSIA	165
<i>Noraini Omar Chong, Khairul Hisyam Kamarudin, Siti Nurhuda Abd Wahid</i>	
A FRAMEWORK FOR UNDERSTANDING THE INFLUENCE OF ISOMORPHIC PRESSURES ON GOVERNANCE OF DISASTER RISKS	173
<i>O. Toimpre, J. Mackee, T. Gajendran</i>	
A CONCEPTUAL FRAME USING ‘KNOWLEDGE’ AS A LENS FOR DECONSTRUCTING THE SENDAI FRAMEWORK PRIORITY 1: UNDERSTANDING DISASTER RISKS	181
<i>O. Toimpre, T. Gajendran, J. Mackee</i>	
INVOLUNTARY DISASTER RELOCATION AND ITS IMPACT ON CHILDREN: A CASE STUDY IN GALLE, SRI LANKA	190
<i>Malith De Silva</i>	
NECESSITIES AND CHALLENGES TO STRENGTHEN THE REGIONAL INFRASTRUCTURE RESILIENCE WITHIN CITY CLUSTERS	198
<i>S. Thomas Ng, Frank J. Xu, Yifan Yang, Mengxue Lu, Junjie Li</i>	
REVIEW OF NATIONAL MULTI-HAZARD EARLY WARNING SYSTEM PLAN OF PAKISTAN IN CONTEXT WITH SENDAI FRAMEWORK FOR DISASTER RISK REDUCTION	206
<i>Rabiya Mukhtar</i>	
EARTHQUAKE VULNERABILITY ASSESSMENT FOR RCC BUILDINGS OF GUWAHATI CITY USING RAPID VISUAL SCREENING	214
<i>Tanaya Sarmah, Sutapa Das</i>	
ENHANCING URBAN RESILIENCE THROUGH TECHNOLOGY AND SOCIAL MEDIA: CASE STUDY OF URBAN JAKARTA	222
<i>Efrain Sitiinjak, Bevita Meidityawati, Ronny Ichwan, Niken Onggosandojo, Parinah Aryani</i>	
A POST-DISASTER FUNCTIONAL ASSET VALUE INDEX FOR SCHOOL BUILDINGS	230
<i>Rizalyn C. Illumin, Andres Winston C. Oreta</i>	
PROFILING INFORMAL SETTLEMENTS FOR DISASTER RISKS	238
<i>Matthew Abunyewah, Thayaparan Gajendran, Kim Maund</i>	
CONCEPTUAL FRAMEWORK FOR MOTIVATING ACTIONS TOWARDS DISASTER PREPAREDNESS THROUGH RISK COMMUNICATION	246
<i>Matthew Abunyewah, Thayaparan Gajendran, Kim Maund</i>	
ECO-TECHNOLOGICAL APPROACH TO DEMARCATTE TSUNAMI EVACUATION SITES IN MATARA DISTRICT, SOUTHERN SRI LANKA.: "A CASE STUDY IN GANDARA AND DEVINUWARA"	254
<i>Chandana Perera Gunasena, K. D. N. Weerasinghe, Ranjana Piyadasa</i>	
RESILIENT HEALTH INFRASTRUCTURE: STRENGTHENING HOSPITALS’ CAPACITY TO RESPOND EFFECTIVELY DURING DISASTERS AND CRISES	262
<i>Ab. Samah Norazam</i>	
A MODEL AND SYSTEM FOR AN INTEGRATED ANALYSIS OF THE ITERATIVE LIFE CYCLE OF UNIVERSITY-INDUSTRY PARTNERSHIPS	270
<i>A. Kaklauskas, D. Amaratunga, R. Haigh, A. Binkyte, N. Lepkova, A. Survila, I. Lill, S. Tantaee, A. Banaitis</i>	
CONSTRUCTING AND INDEX TO MEASURE THE ADAPTIVE CAPACITY TO CLIMATE CHANGE IN SRI LANKA	278
<i>U. S. Thathsarani, L. H. P. Gunaratne</i>	
INVESTIGATING THE RESILIENCE OF CIVIL INFRASTRUCTURE FIRMS IN NEW ZEALAND	286
<i>Marie Claire Pascua, Alice (Yan) Chang-Richards</i>	
COMMUNITY EMPOWERMENT THROUGH REHABILITATION AND RECONSTRUCTION IN SOCIAL SECTOR OF KUALA KRAI, KELANTAN, MALAYSIA	294
<i>Iffah Farhana Abu Talib, Roshana Takim, Mohammad Fadhil Mohammad, Padzil @ Fadzil Hassan</i>	
COLLABORATIONS IN ROUTINE EMERGENCY MANAGEMENT: LESSONS FROM SWEDEN	302
<i>Jörgen Sparf, Evangelia Petridou</i>	
TEN YEARS LATER: ECONOMIC RESILIENCE OF SMALL SCALE ENTERPRISE FOLLOWING EARTHQUAKE IN BANTUL YOGYAKARTA	309
<i>Tri Yumarni</i>	

CHALLENGES IN INTEGRATING DISASTER RISK REDUCTION INTO THE BUILT ENVIRONMENT – THE VIETNAM CONTEXT	316
<i>Vinh N. Nguyen, Kanchana Ginige, David Greenwood</i>	
MALAYSIAN ENTREPRENEURSHIP THROUGH ‘BUILDING BACK BETTER’ (BBB) AGENDA IN THE REDEVELOPMENT OF BANDA ACEH	324
<i>Roshana Takim, Mohammad Fadhil Mohammad, Abdul Hadi Nawawi</i>	
DEVELOPMENT OF DAMAGE FUNCTIONS FOR FLOOD RISK ASSESSMENT IN THE CITY OF COLOMBO (SRI LANKA)	332
<i>Priyan Dias, N. M. S. I. Arambepola, Kumari Weerasinghe, K. D. N. Weerasinghe, D. Wagenaar, L. Bouwer, Hans Gehrels</i>	
ASSESSMENT OF FLOOD HAZARD AREAS USING ANALYTICAL HIERARCHY PROCESS OVER THE LOWER YOM BASIN, SUKHOTHAI PROVINCE	340
<i>Kamonchat Seejata, Aphitha Yodying, Tubtim Wongthadam, Nattapon Mahavik, Sarintip Tantanee</i>	
TAKING BACK CONTROL: ISSUES AND BENEFITS OF BOTTOM-UP REDEVELOPMENT	348
<i>Shenuka De Sylva</i>	
OPTIMISATION OF FLOODING RECOVERY FOR MALAYSIAN UNIVERSITIES	356
<i>Nurashikin Mohammed, Rodger Edwards, Andrew Gale</i>	
ONE PAGE PROJECT MANAGEMENT APPLICATION ON FLOOD PREPAREDNESS: CASE STUDY OF THAILAND	363
<i>Sarintip Tantanee, Kanapoj Wandee, Suphot Tovichakchaikul</i>	
DISASTER PREPAREDNESS ATTRIBUTES AND HOSPITAL’S RESILIENCE IN MALAYSIA	371
<i>Nor Malyana Samsuddin, Roshana Takim, Abdul Hadi Nawawi, Sharifah Nur Aina Syed Abwee</i>	
PROVISION OF SOCIAL INFRASTRUCTURE FOR RESETTLED VICTIMS OF THE 2004 TSUNAMI: EVIDENCE FROM THE GRASS ROOTS	379
<i>Namal Weerasena, Dilanthi Amaratunga, Siri Hettige, Richard Haigh, Pournima Sridarran</i>	
MAINSTREAMING SOCIAL TRANSFORMATION IN RECOVERY AND DEVELOPMENT PROJECTS: CASE OF SRI LANKA	387
<i>S. Hettige, D. Amaratunga, R. Haigh, N. Weerasena</i>	
DEVELOPMENT OF EMPIRICAL WIND VULNERABILITY CURVES OF SCHOOL BUILDINGS DAMAGED BY THE 2016 TYPHOON NINA	395
<i>T. J. S. Acosta, J. J. Galisim, L. R. Tan, J. Y. Hernandez</i>	
INTEGRATED MEASURES FOR MANAGING PERMANENT HOUSING RECONSTRUCTION	403
<i>Abdulquadri Ade Bilau, Emlyn Witt, Chamindi Malalgoda, Irene Lill, Dilanthi Amaratunga</i>	
IS POST-DISASTER HOUSING RECONSTRUCTION WITH PARTICIPATORY METHOD EFFECTIVE TO INCREASING PEOPLE’S AWARENESS FOR DISASTER PREVENTION?	411
<i>Miwa Abe, Chiho Ochiai, Kenji Okazaki</i>	
MEASURING THE LEVEL OF DISASTER PREPAREDNESS IN AUCKLAND	419
<i>Ma Katrina Rañeses, Alice Chang-Richards, Jaime Richards, Jackie Bubb</i>	
OBSTACLES AND BENEFITS IN IMPLEMENTATION OF GOLD, SILVER, AND BRONZE (GSB) MODEL IN EMERGENCY RESPONSE IN THE UAE	427
<i>Saif Alawadhi, Chika Udeaja</i>	
ADAPTIVE DECISION FRAMEWORK FOR CIVIL INFRASTRUCTURE EXPOSED TO EVOLVING RISKS	435
<i>Ji Yun Lee, Henry Burton, David Lallemand</i>	
BUILDING COMMUNITY RESILIENCE IN THE RE-SETTLEMENT OF DISPLACED COMMUNITIES	443
<i>Yamuna Kaluarachchi</i>	
FUNDING MECHANISMS FOR DISASTER RECOVERY: CAN WE AFFORD TO BUILD BACK BETTER?	451
<i>Kristen Macaskill, Peter Guthrie</i>	
STAFF STRESS: THE SLEEPING CELL OF HEALTHCARE FAILURE	459
<i>Nebil Achour, Subasheni Munokaran, Faith Barker, Robby Soetanto</i>	
IDENTIFICATION OF THE “PATHOGENIC” EFFECTS OF DISRUPTIONS TO SUPPLY CHAIN RESILIENCE IN CONSTRUCTION	467
<i>Nurul Afroze Zainal Abidin, Bingunath Ingirige</i>	
CHALLENGES TO BUILDING HOUSING RESILIENCE: THE CASE OF FIJI POST-CYCLONE WINSTON	475
<i>Diocel Harold Aquino, Suzanne Jane Wilkinson, Gary Raftery, Regan Potangaroa, Alice Chang-Richards</i>	
RISK ANALYSIS OF THREE-STOREY REINFORCED CONCRETE MOMENT-RESISTING FRAME STRUCTURES USING PERFORMANCE-BASED WIND ENGINEERING	481
<i>Olivas Ace</i>	

UNDERSTANDING WATER SYSTEMS RESILIENCE PROBLEMS IN TANZANIA	488
<i>Lukuba N. Sweya, Suzanne Wilkinson, Alice Chang-Richard</i>	
MULCHING AS AN ADAPTATION TECHNOLOGY FOR RICE FARMERS TO COMBAT THE WEED PROBLEM UNDER WATER SCARCE CONDITIONS. ‘A CASE STUDY IN NILWALA DOWNSTREAM, MATARA DISTRICT, SRI LANKA’	496
<i>U. A. J. Ratnayake, K. D. N. Weerasinghe, W. A. U. Vitharana, C. M. Naverathna, G. D. Amarasinghe</i>	
QUALITATIVE FLOOD RISK ASSESSMENT FOR THE WESTERN PROVINCE OF SRI LANKA	503
<i>Kumari M. Weerasinghe, Hans Gehrels, N. M. S. I. Arambepola, Hari Prasad Vajja, J. Herath, K. B. Atapattu</i>	
INTEGRATION OF INDIGENOUS AND SCIENTIFIC KNOWLEDGE IN DISASTER RISK REDUCTION: RESILIENCE BUILDING OF A MARGINALIZED SAMPAGUITA GROWING COMMUNITY IN THE PHILIPPINES	511
<i>Susan T Bacud</i>	
UNIVERSITY-INDUSTRY LINKAGES IN THE DISASTER RESILIENCE SECTOR: A CASE STUDY OF THAILAND	519
<i>Sarintip Tantanee, Panu Buranajarukorn, Phisut Apichayakul</i>	
GOVERNANCE AND RECOVERY: COMPARING RECENT DISASTER RECOVERIES IN SRI LANKA AND NEW ZEALAND	527
<i>Morten Gjerde, Shenuka De Sylva</i>	
COASTAL TOURISM AND CLIMATE-RELATED DISASTERS IN AN ARCHIPELAGO COUNTRY OF INDONESIA: TOURISTS’ PERSPECTIVE	535
<i>Nurrohman Wijaya, Alhilal Furqan</i>	
HOUSEHOLD LIVELIHOOD RECOVERY AFTER 2015 NEPAL EARTHQUAKE IN INFORMAL ECONOMY: CASE STUDY OF SHOP OWNERS IN BUNGAMATI	543
<i>Ranit Chatterjee, Kenji Okazaki</i>	
LIVELIHOOD STRATEGIES AFTER THE 2004 INDIAN OCEAN TSUNAMI IN BANDA ACEH, INDONESIA	551
<i>Nafesa Ismail, Kenji Okazaki, Chiho Ochiai, Glenn Fernandez</i>	
BUILDING RESILIENCE FOR DRINKING WATER SHORTAGES THROUGH REVERSE OSMOSIS TECHNOLOGY IN COASTAL AREAS OF BANGLADESH	559
<i>Md. Shamsuzzoha, Md. Rasheduzzaman, Rajan Chandra Ghosh</i>	
FIRMS’ CONTRIBUTION TO FLOOD RISK REDUCTION – SCENARIO-BASED EXPERIMENTS FROM JAKARTA AND SEMARANG, INDONESIA	567
<i>Thomas Neise, Javier Revilla Diez</i>	
BUILDING URBAN RESILIENCE FOR DISASTER RISK MANAGEMENT AND DISASTER RISK REDUCTION	575
<i>Nuha Etinay, Charles Egbu, Virginia Murray</i>	
IMPLEMENTATION OF WATER SAFETY PLAN CONSIDERING CLIMATIC DISASTER RISK REDUCTION IN BANGLADESH: A STUDY ON PATUAKHALI POURASHAVA WATER SUPPLY SYSTEM	583
<i>Md. Shamsuzzoha, Tapos Kormoker, Rajan Chandra Ghosh</i>	
DISASTER RISK REDUCTION THROUGH BODIESEL FROM YELLOW OLEANDER (THEVETIA PERUVIANA)	591
<i>C. P. Rupasianghe, K. S. S. Gunathilaka</i>	
RESEARCH METHODOLOGY FOR THE DEVELOPMENT OF A FRAMEWORK FOR MANAGING POST-DISASTER HOUSING RECONSTRUCTION	598
<i>Abdulquadri Ade Bilau, Emlyn Witt, Irene Lill</i>	
THE ROLE OF HUMANITARIAN AGENCIES IN RECONSTRUCTION AND DEVELOPMENT OF DISASTER AFFECTED COMMUNITIES IN JAPAN AND THE PHILIPPINES	606
<i>Sandra Carrasco, David O’Brien</i>	
MODIFICATION OF A TWO-WHEEL TRACTOR AS A VERSATILE POWER MACHINE FOR POST DISASTER RECOVERY PROGRAMS	614
<i>N. P. G. Pushpitha, K. D. N. Weerasinghe, Deitrich Maier</i>	
EARTHQUAKE DAMAGE ESTIMATION SYSTEMS: LITERATURE REVIEW	622
<i>K. A. R. V. D. Kahandawa, N. D. Domingo, K. S. Park, S. R. Uma</i>	
EXAMINING THE ROLE OF URBAN FORM IN SUPPORTING RAPID AND SAFE TSUNAMI EVACUATIONS: A MULTI-SCALAR ANALYSIS IN VIÑA DEL MAR, CHILE	629
<i>Jorge León, Cyril Mokrani, Patricio Catalán, Rodrigo Cienfuegos, Carolina Femenias</i>	
RESIDENT’S SATISFACTION TO RELOCATED HOUSES AFTER 2004 INDIAN OCEAN TSUNAMI, THAILAND	637
<i>Titaya Sararit, Kondo Tamiyo, Elizabeth Maly</i>	

DISASTER RECOVERY PROCESSES: ANALYSING THE INTERPLAY BETWEEN COMMUNITIES AND AUTHORITIES IN CHENNAI, INDIA	643
<i>Jonas Joerin, Franziska Steinberger, Ramasamy R. Krishnamurthy, Anna Scolobig</i>	
ERGONOMICALLY DESIGNED AND DEVELOPED “GO-BAG” FOR SCHOOL CHILDREN: A SURVIVAL KIT	651
<i>Ma. Teodora E. Gutierrez, Arriane A. Palisoc, Kristel Lirio, Winly Secreto, R. Taruc, Klienne Noble</i>	
A MODEL FOR HUMANITARIAN SUPPLY CHAIN: AN OPERATION RESEARCH APPROACH	659
<i>Ma. Teodora E. Gutierrez, Jose Edgar S. Mutuc</i>	
THE EVALUATION OF COMMUNITY PARTICIPATION IN POST-DISASTER HOUSING RECONSTRUCTION PROJECTS IN MALAYSIA	667
<i>Ruhizal Roosli, Jestin Nordin, Geoff O’Brien</i>	
COPING STRATEGIES IDENTIFIED AND USED BY VICTIMS OF FLOOD DISASTER IN KOLONNAWA AREA: AN ANALYSIS FROM A SOCIAL WORK PERSPECTIVE	675
<i>H. U. S. Samaraweera</i>	

PART 2

COASTAL COMMUNITY RESILIENCE LEVEL OF TSUNAMI PRONE AREA : A CASE STUDY IN SRI LANKA	683
<i>P. Sooriyaarachchi, A. L. Sandika, N. Madawanarachchi</i>	
MODELING A TROPICAL URBAN CONTEXT WITH GREEN WALLS AND GREEN ROOFS AS AN URBAN HEAT ISLAND ADAPTATION STRATEGY	691
<i>H. M. P. I. K. Herath, R. U. Halwatura, G. Y. Jayasinghe</i>	
RISK OF SEAWATER INTRUSION ON COASTAL COMMUNITY OF BENTOTA RIVER BASIN SRI LANKA	699
<i>M. D. N. D. Perera, T. K. G. P. Ranasinghe, R. U. K. Piyadasa, G. Y. Jayasinghe</i>	
A MODEL FOR ENHANCING THE ROLE OF INFORMATION AND COMMUNICATION TECHNOLOGIES FOR IMPROVING THE RESILIENCE OF RURAL COMMUNITIES TO DISASTERS	707
<i>M. F. M Firdhous, P. M Karuratane</i>	
DISASTER-BASED BUDGETING IN NEW PUBLIC HEALTH POLICY OF THAILAND	715
<i>Tipwimol Taekratok, Pudtan Phanthunane, Thaweesak Taekratok</i>	
FLOODING DISASTER: THE EFFECT ON THE ADOLESCENTS AT ANGODA RAHULA COLLEGE, SRI LANKA	723
<i>Enoka Randeniya</i>	
CARBON FOOTPRINT OF AN ORGANIZATION: A TOOL FOR MONITORING IMPACTS ON GLOBAL WARMING	729
<i>M. G. G. Awanthi, C. M. Navaratne</i>	
MAPPING CHALLENGES AND OPPORTUNITIES FOR AGGREGATING INFORMATION ON SYSTEMIC RISKS FROM MULTIPLE STAKEHOLDERS	736
<i>Peter Månsson</i>	
THE IMPACT OF NATURAL DISASTERS ON MICRO, SMALL AND MEDIUM ENTERPRISES (MSMES): A CASE STUDY ON 2016 FLOOD EVENT IN WESTERN SRI LANKA	744
<i>Gunathilaka Samantha</i>	
BUILDING RESILIENCE ON WATER QUALITY MANAGEMENT THROUGH GREY WATER FOOTPRINT APPROACH: A CASE STUDY FROM SRI LANKA	752
<i>W. M. S. Wickramasinghe, C. M. Navaratne, S. V. Dias</i>	
PHYSICAL AND SOCIAL ASSESSMENT OF THE WATERLOGGED AREA AND SUITABILITY OF THE “INCLUSIVE AND ADAPTIVE TIDAL RIVER MANAGEMENT TECHNIQUE” TO ALLEVIATE WATERLOGGING IN SOUTHWEST BANGLADESH	760
<i>A. S. M. Maksud Kamal, Abrar Hossain, B. M. Rabby Hossain, S. M. Kamrul Hassan, A. K. M. Mamunur Rashid</i>	
CHILDREN’S PERSPECTIVE ON ADAPTATION TO HEAT WAVES AND HEAVY PRECIPITATION IN DHAKA, BANGLADESH	768
<i>Syeda Atia Ashraf, Mohammad Faruk</i>	
BUILT ENVIRONMENT FLOOD RESILIENCE CAPABILITY MATURITY MODEL	776
<i>Onaopepo Adeniyi, Srinath Perera, Kanchana Ginige</i>	
PATHWAYS TO RAISING DISASTER RISK REDUCTION AWARENESS AMONG THE INFORMAL CONSTRUCTION STAKEHOLDERS: A CASE OF NEPAL	784
<i>Ksenia Chmutina, Joanne Rose, Suman Dhun Shrestha, Dilip Bhatta</i>	

AN ANALYSIS OF COMMUNITY BASED FLOOD EARLY WARNING SYSTEM IN THE STATE OF AZAD JAMMU & KASHMIR.....	792
<i>Ismail Khan, Abid Razaq, Asif Jan, Somana Riaz, Naeem Shehzad</i>	
URBAN DYNAMICS: AN UNDERVALUED ISSUE FOR WATER LOGGING DISASTER RISK MANAGEMENT IN CASE OF DHAKA CITY, BANGLADESH.....	801
<i>Sadia Subrina, Farahnaz Khadiza Chowdhury</i>	
3D VISUALISATION TOOL FOR IMPROVING THE RESILIENCE TO URBAN AND COASTAL FLOODING IN TORBAY, UK.....	809
<i>Albert S. Chen, Mehdi Khoury, Lydia Vamvakeridou-Lyroudia, Dave Stewart, M. Wood, D. Savic, Slobodan Djordjevic</i>	
MAPPING URBAN INFRASTRUCTURE INTERDEPENDENCIES AND FUZZY RISKS.....	816
<i>Barry Evans, Albert S. Chen, Alison Prior, Slobodan Djordjevic, D. Savic, D. Butler, P. Goodey, J. Stevens, Graham Colclough</i>	
BUILDING BACK BETTER IN THE COOK ISLANDS: A FOCUS ON THE TOURISM SECTOR.....	824
<i>Sandeeka Mammakkara, Suzanne Wilkinson, Maruia Willie, Robert Heather</i>	
ASSEMBLING AND (RE)ASSEMBLING CRITICAL INFRASTRUCTURE RESILIENCE IN KHULNA CITY, BANGLADESH.....	832
<i>Fuad M. M. Ali, Bingunath Ingirige, Nurul Afroze Zainal Abidin</i>	
NEW STRATEGIES FOR RESILIENT PLANNING IN RESPONSE TO CLIMATE CHANGE FOR URBAN DEVELOPMENT.....	840
<i>Kumjin Lee, Heseong Chun, Jongsub Song</i>	
DECISION-SUPPORT TOOL FOR RETROFITABLE FLOOD RESILIENCE.....	847
<i>Elise Delgrange, Kemi Adeyeye</i>	
NATURAL DISASTERS AND PUBLIC HEALTH IN THE ERA OF SUSTAINABLE DEVELOPMENT GOALS: A RETROSPECTIVE STUDY OF THE OCTOBER 2015 HINDU KUSH EARTHQUAKE IN PAKISTAN.....	855
<i>Junaid Ahmad, Mokbul Morshed Ahmad, Nafees Ahmad</i>	
CHALLENGES FACING THE CONTROLLING STAGE OF THE DISASTER RESPONSE MANAGEMENT RESULTING FROM WAR OPERATIONS AND TERRORISM IN IRAQ.....	863
<i>Hajer Al-Dahasha, Udayangani Kulatunga</i>	
BUILDING RESILIENT CITIES: A SIMULATION-BASED SCENARIO ASSESSMENT METHODOLOGY FOR THE INTEGRATION OF DRR AND CCA IN A MULTI-SCALE DESIGN PERSPECTIVE.....	871
<i>Giulio Zuccaro, Mattia Federico Leone</i>	
COMPARISON OF NATIONAL STRATEGIES IN FRANCE, GERMANY AND SWITZERLAND FOR DRR AND CROSS-BORDER CRISIS MANAGEMENT.....	879
<i>J. Abad, L. Booth, S. Marx, S. Ettinger, F. Gérard</i>	
EMERGENCE OF SOCIAL COHESION AFTER A DISASTER: (WITH REFERENCE TO TWO FLOOD AFFECTED LOCATIONS IN COLOMBO DISTRICT-SRI LANKA).....	887
<i>Udari Samarakoon, Wathsala Abeykoon</i>	
A CONCEPTUAL FRAMEWORK TO ANALYSE CONSEQUENCES OF POST CONFLICT RECONSTRUCTION INTERVENTIONS.....	894
<i>Maheshika M. Sakalasuriya, Richard P Haigh, Dilanthi Amaratunga</i>	
EMPOWERING LOCAL GOVERNMENTS IN MAKING CITIES RESILIENT TO DISASTERS: RESEARCH METHODOLOGICAL PERSPECTIVES.....	902
<i>Chamindi Malalgoda, Dilanthi Amaratunga, Richard Haigh</i>	
MODELLING PREDICTORS OF EARTHQUAKE HAZARD PREPAREDNESS IN NEPAL.....	910
<i>Mina Adhikari, Douglas Paton, David Johnston, Raj Prasanna, Samuel T. McColl</i>	
BUSINESS SECTOR PREPAREDNESS IN DISASTER MANAGEMENT:: CASE STUDY WITH BUSINESSES IN SOUTHERN SRI LANKA IN BOTH ASPECTS OF NATURAL AND TECHNOLOGICAL DISASTERS.....	918
<i>K. K. N. B. Adikaram, C. M. Nawarathna</i>	
THE CHANGING CITY: RISK AND BUILT HERITAGE. THE CASE OF LISBON DOWNTOWN.....	921
<i>A. Nuno Martins, Catherine Forbes, Andreia Amorim Pereira, Daniela Matos</i>	
AN ASSESSMENT ON THE EFFECTIVE PREPAREDNESS AND DISASTER RESPONSE: THE CASE OF SANTA ROSA CITY, LAGUNA.....	929
<i>Joseph Berlin P. Juanzon, Andress Winston C. Oreta</i>	
MULTI-HAZARD DISASTER RESILIENT HOUSING WITH BAMBOO-BASED SYSTEM.....	937
<i>Sutapa Das, Parthasarathi Mukhopadhyay</i>	
STRENGTHENING SKILLS IN RESEARCH METHODS IN HIGHER EDUCATION INSTITUTIONS TO IMPROVE SOCIETAL RESILIENCE TO DISASTERS.....	946
<i>Renuka Thakore, Champika Liyanage, Dilathi Amartunga, Richard Haigh, Amina Mustapha</i>	

INTEGRATION OF DISASTER MANAGEMENT STRATEGIES WITH PLANNING AND DESIGNING PUBLIC OPEN SPACES	954
<i>R. R. J. C. Jayakody, D. Amarathunga, R. Haigh</i>	
ACCEPTANCE TO BE THE HOST OF A RESETTLEMENT PROGRAMME: A LITERATURE REVIEW	962
<i>Pournima Sridarran, Kaushal Keraminiyage, Nishara Fernando</i>	
METHODOLOGIES OF CONTEMPORARY DISASTER RESILIENCE RESEARCH.....	970
<i>Emlyn Witt, Irene Lill</i>	
CHALLENGES ASSOCIATED WITH INTEGRATING CCA AND DRR IN THE UK- A REVIEW ON THE EXISTING LEGAL AND POLICY BACKGROUND.....	978
<i>Nuwan Dias, Dilanthi Amarathunga, Richard Haigh</i>	
COMPLIANCE TO BUILDING CODES FOR DISASTER RESILIENCE: BANGLADESH AND NEPAL	986
<i>Iftekhar Ahmed, Thayaparan Gajendran, Graham Brewer, Kim Maund, J. Meding, Jamie Mackee</i>	
MITIGATING THE HUMAN-CROCODILE CONFLICT IN SRI LANKA: A STUDY BASED ON THE NILWALA RIVER AREA IN MATARA DISTRICT	994
<i>Pradeep Uluwaduge, K. V. D. Edirisooriya Menike, E. M. T. K. Senevirathna, G. C. L. Pathirana</i>	
EXPLORING INTERDEPENDENCIES AND COMMON GOALS IN DISASTER RECOVERY COORDINATION.....	1002
<i>Emmanuel Raju, Per Becker, Henrik Tehler</i>	
ANALYSIS OF CAUSES AND EFFECTS OF COASTAL EROSION AND ENVIRONMENTAL DEGRADATION IN SOUTHERN COASTAL BELT OF SRI LANKA SPECIAL REFERENCE TO UNAWATUNA COASTAL AREA	1010
<i>E. M. T. K. Senevirathna, K. V. D. Edirisooriya, S. P. Uluwaduge, K. B. C. A. Wijerathna</i>	
UP NOAH IN BUILDING RESILIENT PHILIPPINES; MULTI-HAZARD AND RISK MAPPING FOR THE FUTURE	1018
<i>Neyzielle Ronnicque Cadiz</i>	
VOLUNTARY OR INVOLUNTARY RELOCATION OF UNDERSERVED SETTLERS IN THE CITY OF COLOMBO AS A FLOOD RISK REDUCTION STRATEGY: A CASE STUDY OF THREE RELOCATION PROJECTS	1026
<i>Nishara Fernando</i>	
UNDERSTANDING DISASTER RISK AND MITIGATION SPECIAL REFERENCE TO RATNAPURA DISTRICT.....	1034
<i>K. V. D. Edirisooriya, N. S. Vitanage, P. Uluwaduge, E. M. T. K. Senevirathna</i>	
THE ROLE OF COMMUNITIES IN COPING WITH NATURAL DISASTERS: LESSONS FROM THE 2010 CHILE EARTHQUAKE AND TSUNAMI	1040
<i>Jenny Moreno</i>	
LANDSLIDE SUSCEPTIBILITY MAPPING USING LOGISTIC REGRESSION MODEL (A CASE STUDY IN BADULLA DISTRICT, SRI LANKA).....	1046
<i>Hasali Hemasinghe, R. S. S. Rangali, N. L. Deshapriya, Lal Samarakoon</i>	
EVALUATION OF THE IMPACTS OF OIL SPILL DISASTER ON COMMUNITIES AND ITS INFLUENCE ON RESTIVENESS IN NIGER DELTA, NIGERIA	1054
<i>Oshienemen N. Albert, Dilanthi Amarathunga, Richard P. Haigh</i>	
DEVELOPMENT, POLITICS AND DISASTER MITIGATION: A CASE STUDY OF THE MORAGAHAKANDA IRRIGATION PROJECT.....	1062
<i>Mahesh Senanayake</i>	
THE RELATIONSHIP BETWEEN NATURAL DISASTER AND ECONOMIC DEVELOPMENT: A PANEL DATA ANALYSIS.....	1068
<i>Karnjana Songwathana</i>	
FAILURE OF RECONCILIATION IN SRI LANKA AND RISK OF REPRODUCTION OF WAR?.....	1075
<i>N. C. R. Silva</i>	
HOW CAN PSYCHOLOGY INFORM DISASTER RESEARCH?	1083
<i>Sarita J Robinson</i>	
INVESTIGATION OF EFFICIENCY AND EFFECTIVENESS OF THE EXISTING DISASTER MANAGEMENT FRAMEWORKS IN SRI LANKA	1091
<i>Chandana S. A. Siriwardana, G. P. Jayasiri, S. S. L. Hettiarachchi</i>	
AN ANALYSIS OF INCLUSIVENESS AND ACCESSIBILITY OF CYCLONE SHELTERS, BANGLADESH	1099
<i>Mohammad Faruk, Syeda Atia Ashraf, Muhammad Ferdous</i>	
ASSESSMENT O URBAN DISASTER RESILIENCE IN DHAKA NORTH CITY CORPORATION (DNCC), BANGLADESH	1107
<i>Md. Humayun Kabir, Miharuru Sato, Umma Habbiba, Tariq Bin Yousuf</i>	

RISK-BASED RESILIENCE ASSESSMENT MODEL FOCUSING ON URBAN INFRASTRUCTURE SYSTEM RESTORATION.....	1115
<i>Citra S. Ongkowijoyo, Hemanta Dolo</i>	
UNDERSTANDING OF IMPACT AND PROPAGATION OF RISK BASED ON SOCIAL NETWORK ANALYSIS.....	1123
<i>Citra S. Ongkowijoyo, Hemanta Dolo</i>	
IMPACTS OF DISASTER TO SMES IN MALAYSIA.....	1131
<i>Zairol Auzzir, Richard Haigh, Dilanthi Amaratunga</i>	
A CAPACITY ANALYSIS FRAMEWORK FOR MULTI-HAZARD EARLY WARNING IN COASTAL COMMUNITIES.....	1139
<i>Richard Haigh, Dilanthi Amaratunga, Kinkini Hemachandra</i>	
LONG-TERM SATISFACTION OF RESETTLED COMMUNITIES: AN ASSESSMENT OF PHYSICAL PERFORMANCE OF POST-DISASTER HOUSING.....	1147
<i>E. E. Wijegunaratna, G. Wedawatta, L. J. Prasanna, B. Ingirige</i>	
URBAN AGGRESSION BY IDEOLOGICAL, POLITICAL AND ECONOMIC STRAIN - ANTHROPIC HAZARDS.....	1155
<i>Cristina Olga Gociman, Tiberiu Florescu, Cristian Iosif Moscu, Mihaela Girneata</i>	
SOUND PRACTICES OF DISASTER RISK REDUCTION AT LOCAL LEVEL.....	1163
<i>Dilanthi Amaratunga, Chamindi Malalgoda, Richard Haigh, Abhilash Panda, Harkunti Rahayu</i>	
EMPOWERMENT AND LEGITIMIZATION OF EFFECTED COMMUNITIES IN POST-DISASTER RECONSTRUCTION.....	1171
<i>Kamran Shafique, Clive M. J. Warren</i>	
ENVIRONMENTAL POLICIES WITHIN THE CONTEXT OF COMPENSATION FOR OIL SPILL DISASTER IMPACTS: A LITERATURE SYNTHESIS.....	1179
<i>Oshienemen N. Albert, Dilanthi Amaratunga, Richard P. Haigh</i>	
ROLE OF WOMEN IN DISASTER RISK GOVERNANCE.....	1187
<i>Kinkini Hemachandra, Dilanthi Amaratunga, Richard Haigh</i>	
MAPPING STAKEHOLDERS ASSOCIATED WITH SOCIETAL CHALLENGES: A METHODOLOGICAL FRAMEWORK.....	1195
<i>Kanchana Ginige, Dilanthi Amaratunga, Richard Haigh</i>	
THE INFLUENCE OF COGNITIVE AND AFFECTIVE RISK PERCEPTIONS ON FLOOD PREPAREDNESS INTENTIONS: A DUAL-PROCESS APPROACH.....	1203
<i>Lara Altarawneh, Jamie Mackee, Thayaparan Gajendran</i>	
FUEL WOOD TREES IN MARGINAL SMALL HOLDER TEA PLANTATIONS IN SRI LANKA: STAKEHOLDER'S PERCEPTION.....	1211
<i>I. R. Palihakkara, Makoto Inoue</i>	
BUSINESS RESILIENCE: A STUDY OF AUCKLAND HOSPITALITY SECTOR.....	1217
<i>Val Tibay, Joanna Miller, Alice (Yan) Chang-Richards, Temitope Egbelakin, E. Seville, Suzanne Wilkinson</i>	
THE BARRIERS TO RESEARCH AND INNOVATION IN DISASTER RESILIENCE IN HIGHER EDUCATION INSTITUTIONS IN ASIA.....	1225
<i>Champika Liyanage, Renuka Thakore, Dilanthi Amartunga, Amina Mustapha, Richard Haigh</i>	
A STUDY INTO THE ROLE OF INTERNATIONAL COLLABORATIONS IN HIGHER EDUCATION TO ENHANCE RESEARCH CAPACITY FOR DISASTER RESILIENCE.....	1233
<i>Dilanthi Amaratunga, Champika Liyanage, Richard Haigh</i>	
CONCEPTUALIZATION OF MILITARY'S COMMON OPERATION PICTURE FOR THE ENHANCEMENT OF DISASTER PREPAREDNESS AND RESPONSE DURING EMERGENCY AND COMMUNICATION BLACKOUT.....	1241
<i>C. Kumsap, V. Mungkung, I. Amatacheewa, T. Thanasomboon</i>	
DEVELOPMENT OF RESEARCH AND INNOVATION CAPACITY INDEX OF HEIS ON DISASTER RESILIENCE RELATED STUDIES.....	1249
<i>Ezri Hayat, Champika Liyanage, Richard Haigh, Dilanthi Amaratunga</i>	
EVALUATING RESILIENCE IN TWO REMOTE AUSTRALIAN COMMUNITIES.....	1257
<i>Philip Morley, Jeremy Russell-Smith, Kamaljit K. Sangha, Stephen Sutton, Bev Sithole</i>	
NOTES ON NATIONAL EARTHQUAKE EDUCATION PROGRAMS IN ISRAEL.....	1265
<i>Joshua Schmidt</i>	
KNOWING MAINTENANCE VULNERABILITIES TO ENHANCE BUILDING RESILIENCE.....	1273
<i>Lam Pham, Ekambaram Palaneeswaran, Rodney Stewart</i>	
COASTAL HAZARD ASSESSMENT IN NORTHERN PART OF JAKARTA.....	1279
<i>Hamzah Latief, Mutiara Rahmat Putri, Farrah Hanifah, Ika Nur Afifah, M. Fadli, Dominic Oki Ismoyo</i>	
COMMUNITY LEVEL INDICATORS OF LONG TERM DISASTER RECOVERY.....	1287
<i>S. Hettige, R. Haigh, D. Amaratunga</i>	

ASSESSMENT OF THE POSSIBILITY OF UNGLAZED TRANSPIRED TYPE SOLAR COLLECTOR TO BE USED FOR DRYING PURPOSES: A COMPARATIVE ASSESSMENT OF EFFICIENCY OF UNGLAZED TRANSPIRED TYPE SOLAR COLLECTOR WITH GLAZED TYPE SOLAR COLLECTOR	1295
<i>Wbmac Bandara, Bk Amarasekara, Cp Rupasinghe</i>	
THE CHILD VICTIMS OF THE ACEH TSUNAMI: STORIES OF RESILIENCE, COPING AND MOVING ON WITH LIFE	1303
<i>Maila Dinia Husni Rahiem, Steven Eric Krauss, Husni Rahim</i>	
LOCALIZING DISASTER RISK REDUCTION AND CLIMATE CHANGE ADAPTATION IN PLANNERS' AND DECISION MAKERS' AGENDA: TECHNICAL COMPREHENSIVE MODEL, QUEZON CITY, PHILIPPINES	1311
<i>Tabassam Raza</i>	
A REVIEW OF HUMAN JUDGMENT IN STOCK CONTROL SYSTEM FOR DISASTER LOGISTICS	1319
<i>Inna Kholidasari, Taufika Ophiyandri</i>	
INCREASE IN DISASTER RISK DUE TO INEFFICIENT ENVIRONMENTAL MANAGEMENT, LAND USE POLICIES AND RELOCATION POLICIES. CASE STUDIES FROM SRI LANKA	1326
<i>Priyanka Dissanayake, Samantha Hettiarachchi, Chandana Siriwardana</i>	
LANDSLIDE HAZARDS IN FIJI, MANAGING THE RISK AND NOT THE DISASTER, A LITERATURE REVIEW	1334
<i>Marina C. Drazba, Alice Yan-Richards, Suzanne Wilkinson</i>	
ESTABLISHING THE INDIAN OCEAN TSUNAMI WARNING AND MITIGATION SYSTEM FOR HUMAN AND ENVIRONMENTAL SECURITY	1339
<i>S. Hettiarachchi</i>	
STRATEGIC CHALLENGES IN DEVELOPMENT PLANNING FOR DENPASAR CITY AND THE COASTAL URBAN AGGLOMERATION OF SARBAGITA	1347
<i>H. Rahayu, R. Haigh, D. Amaratunga</i>	
COMMUNITY ADAPTATION TO COPE WITH DISASTER RELATED ROAD STRUCTURE FAILURE	1355
<i>Akvan Gajanayake, Hessam Mohseni, Guomin Zhang, Jane Mullett, Sujeeva Setunge</i>	
Author Index	