



UNIVERSITY
OF WARSAW



FACULTY OF GEOGRAPHY
AND REGIONAL STUDIES
UNIVERSITY OF WARSAW

3rd Disaster Risk Reduction Conference 2017

ABSTRACT AND PROGRAMME BOOK

Warsaw, 12th-13th October, 2017

Editors:

Dorota Rucińska *University of Warsaw*

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Dear Friends,

The first conference "For the Society - Disasters Risk Reduction" was held on February 24, 2014, in Warsaw. Now, we are opening the 3rd Disaster Risk Reduction Conference (3rd DRR) and we are very pleased that the conference is again receiving honorary support from Professor Maciej Palys, Rector of the University of Warsaw with contribution of the Association of Polish Hydrologists, the Association of Polish Climatologists, and the Association of Polish Geomorphologists, as well as distinguished researchers from around the World.

Natural meteorological, hydrological, and geological processes can have an extreme magnitude. The intensity of phenomena of estimating their occurrence lays in their random nature. Earth sciences have worked out their own metrics of extreme natural phenomena. In meteorology, rare phenomena have the recurrence interval of 10 years or less. In hydrology and oceanology, we use recurrence interval of 100 years. There is no absolute threshold values separating extreme from normal phenomena.

Extreme natural phenomena, which do not create losses to infrastructure or crops, are important for the proper functioning of ecosystems. Peak flows in rivers are important for the transport of sediments and nutrients, they also dilute the pollution load. Storms at sea create a circulation pattern which refreshes the deep waters, and improves the biotic conditions.

The economic losses created by extreme natural phenomena are estimated with the use of a risk term. Risk can be defined as a combination of probability with potential losses expressed in monetary units. Risk can be decreased by reducing exposure to dangers or by taking adaptation measures. A new approach is the natural risk management which is a multidisciplinary task comprising the knowledge from the natural sciences and social sciences (economy, sociology, psychology).

State services undertake responses resulting from the organization of the public administration, both the national government and the local government. Studies indicate a need to implementing various strategies to reduce the number of affected people and minimize the resulting damages. These strategies should be implemented at various levels of management, using the best international experiences, including the diversification of these strategies. These strategies should be also: take care of communication with the local community, take care of education, support bottom-up activities, and favour solutions that can be implemented by both individuals as well as companies. It also seems necessary to verify the principles of insurances and risk rating as well as spatial planning in natural hazard areas.

The Sendai Framework for Disaster Risk Reduction (SFDRR) (2015-2030), which has been embraced by Poland, indicates the need to achieve certain goals, including among others: (i) adaptation of disaster risk reduction plans at local level, (ii) reduction of the number of affected people and activation of local community activities; and (iii) co-operation between the public administration and the universities. Following the Sendai Framework guidance, the 3rd DRR conference will raise important international and domestic issues: Preparedness and Coastal Storm Warnings, communication in emergency services, post-traumatic disorders especially in the context of fireman's service, the EC recommendations on conducting risk assessment, community resilience, vulnerability and coping with disaster, perception of drought and floods by farmers, social communication and ethical challenges in DRR, measuring of risk mitigation and data modelling, climate and hydrological aspects such as flash floods in small towns, distribution of damage by heavy rainfall, climate change and adaptation to it. Case studies and experience in rural and urban areas, as well as in selected states, will be presented, including: Brazil, Canada, Chile, Greece, India, Mexico, Taiwan, Turkey, and the USA.

Dorota Rucińska
Artur Magnuszewski
Faculty of Geography and Regional Studies
University of Warsaw

Welcome to Warsaw!
Scientific and Organising Committees
Disaster Risk Reduction Conference in Warsaw, 2017

The 3rd DRR aims to bring together leading academic scientists, researchers and young researchers to share their experiences, research results and questions about all aspects of Disaster Risk Reduction. It also provides the premier interdisciplinary forum for researchers and practitioners to present and discuss the most recent trends and concerns, practical challenges encountered and the solutions adopted in risk reduction.

Session topics will cover theoretical and practical issues of natural disaster risk reduction, in physical and social aspects, and management of risk reduction in the context of natural hazards.

We encourage promoting the International Day for Disaster Risk Reduction, on October 11, 2017.

Welcome to the DRR 2017!

SCIENTIFIC COMMITTEE

Artur MAGNUSZEWSKI

University of Warsaw

Kazimierz BANASIK

Warsaw University of Life Sciences

Bogdan OZGA-ZIELIŃSKI

Association of Polish Hydrologists / Institute of Meteorology and Water Management, NRI

Zbigniew W. KUNDZEWICZ

Polish Academy of Sciences

Dorota RUCIŃSKA

University of Warsaw

Renata ROMANOWICZ

Institute of Geophysics, Polish Academy of Sciences

Elwira ŻMUDZKA

University of Warsaw

Stanisław LEWIŃSKI

Space Research Centre of Polish Academy of Sciences

Witold F. KRAJEWSKI

University of Iowa

Piotr WERNER

University of Warsaw

Ewa SMOLSKA

University of Warsaw

Jan Franklin ADAMOWSKI

Department of Bioresource Engineering, McGill University

Sharon D. MORAN

State University of New York, Environmental Science and Forestry, Syracuse, NY

Bogdan ZAWADZKI

University of Warsaw

Jorge DIAZ

Instituto Tecnológico y de Estudios Superiores de Monterrey

Anna BARCZ

Institute of Literature Research of Polish Academy of Sciences

Marek DEGÓRSKI

Institute of Geography and Spatial Organization, Polish Academy of Science

ORGANISING COMMITTEE

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Mariusz PORCZEK

Marta KANIOWSKA

University of Warsaw

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Natalia KACHEL

Natalia ŚWIERCZEWSKA

Elżbieta POTOCKA

Paulina SZCZEPAN

Aleksandra RUDOL

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Association of Polish Geomorphologists

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Bezpieczeństwa



Permanent Representative
of the Republic of Poland
to the United Nations Office
in Geneva



José Manuel Palma-Oliveira

*Professor of Environmental Psychology
and Risk Perception and Management
University of Lisbon, Portugal*

Professor of the University of Lisboa past-president of SRA-Europe; Fellow since 2012, and 2016's recipient of the Society of Risk Analysis Presidential

Merit Award “for his humanitarian and scientific contributions ... a distinguished educator and mentor to international students and a leading member of Society in thought and action”. Also is a Distinguished Visiting Scholar of University of Virginia, Department of Systems and Information Engineering. He made significant contributions to environmental and risk policy in Portugal and in the EU. He was the President of Quercus, the most active environmental NGO in Southern Europe. He was President of the Board of the Foundation for the Protection of the Salinas (wetlands) Samouco between 2001 and 2008, and a Board member of the European Federation of Transport and Environment (Brussels–EU advocacy group) from 1997 to 2010. Invited expert in EU policy working groups (air quality, noise). He works currently as a consultant in Portugal, Tunisia and Brazil within conflicts with local communities and/or governments over some type of projects. His unique approach to risk communication is based in an attempt of constructing a shared knowledge base and grounded of this profound knowledge of the logic and the pay-off perceived by the different groups at the different decision levels. He works actively in resilience in EU projects and just published an edited a book with Igor Linkov titled, Resilience and Risk: Methods and Application in Environment, Cyber and Social Domains. Springer.

TOPIC: Predicting Community Resilience in a Changing climate and in a Disaster Prone World

Data will be presented to show that, particularly since the systematic use of agricultural practices (around 6000BC), not only there is a radical change of the ecosystems throughout the globe, but essentially a change in the human societies and their organization. Until now the consequences of the societal changes (i.e., higher chronic stress, total absence of perceived control in a high percentage of the population, power imbalances between genders, etc.) are underestimated. We will present research that shows the negative consequences those changes for human health and well being, particularly when associated with pollution, urban life, and badly designed “places”.

This combined alteration where of particular -negative – importance in moments where climate change is a major threat. It will be predicted that communities' resilience depends upon two main factors: a) the degree to which the ecosystem is dependent of the Human action and b) the degree to which stress and inequality abound. The consequences of that context in predicting resilience to disaster (less time and effort to recover) will be stressed and some avenues for action will be highlighted.



Jorge Diaz

*Dr. of Instituto Tecnológico
y de Estudios Superiores
de Monterrey, Mexico*

Dr. Jorge Diaz is an international consultant in both developing and developed countries: Peru, Mexico, Chile, Ecuador, Argentina, Canada, Switzerland, South Africa, United Kingdom and Poland, on the following topics; Climate Change, Disaster Risk Reduction and Resilience, Involuntary Re-Settlement, Urban Planning and Sustainable Transport Management.

He obtained his BA Architecture in Peru, and his MSc. and Ph.D. degrees in Urban Planning in Mexico, his experience combines research and practice and has been nurtured by self-experiences, before, during and after natural hazards, as the recently earthquake and tsunami in Chile (2010).

Dr Diaz has received research fellowships in Mexico (2004-2006), the Faculty Research Program in Canada (2007), the National Committee for Scientific and Technological Research in Chile (2009-2013) the Fellow Mundus-European Union in Poland (2017) and is currently a referee for research project assessment with the National Committee of Science and Technology in Mexico (CONACYT), the Wessex Institute of Technology in United Kingdom (WIT), and Gravitazz International-Africa amongst the main organizations.

TOPIC: Underlying causes of vulnerability and its impact on Disaster Risk Management

Introductions

From the experiences in Chile and Haiti, we would like to highlight the importance of identifying, assessing and analyzing “underlying causes of vulnerability and its impact on DRM”, and how these previous conditions and usually “long-standing issues” can exacerbate the consequences of natural hazards as earthquakes, tsunamis, floods, etc.

Lessons learned in previous disasters are not always being applied in other communities. Sometimes this is because accurate information is not readily available to policy-makers, officers of international and national development agencies, sectoral government organizations, and local community in general.

Objectives

The purpose of this workshop is :

- a. Provide a comprehensive understanding of the inter-relatedness of DRM along their four stages (response, recovery, mitigation and preparedness)
- b. Identify gaps and strenghts within current local conditions related to the four stages of DRM (response, recovery, mitigation and preparedness)
- c. Provide a tool (Multi-layered-Matrix) that synthetizes the level of vulnerability of a chosen community related to a specific or multi-hazard occurrence. The tool links theory and practice, quantitative and qualitative data, combines a Top-Down and Bottom-Up approach, and its correlated to territory with feasible detail.
- d. Allow Replicability of the tool, be feasible to use for different kind of hazards and globally.
- e. Promote its Spreadness, ease of diffusion, compatibility with digital media and online resources. (GIS software + open source data)

Scope

For us, risk is associated with consequences of a hazard occurrence while vulnerability is related to the causes, so before a risk assessment can be made, the level of vulnerability of specific or multi- hazards must be known.

We can identify five key conditions (underlying causes) that will make a significant difference along the four stages of DRM (Response, Recovery, Mitigation and Preparedness):

1. Science Based Knowledge.
2. Legal Framework.
3. Financial Tools.
4. Stakeholders Engagement.
5. Political Commitment.



Sharon D. Moran

Associate Professor of Environmental Studies, State University of New York Environmental Science and Forestry, Syracuse, New York

Professor Moran is a social scientist (geography) who focuses on the human dimensions of environmental issues, especially water

resources management. She is currently working on a book exploring the ways that stream and river restoration projects support environmental justice goals (Routledge/Taylor & Francis Group). She is the leader of an interdisciplinary Ph.D. program in Environmental and Natural Resources Policy (ENRP). Together with faculty from Syracuse University's Whitman School of Management, she co-leads a graduate certificate program in Sustainable Enterprise. In addition to her academic research, she has worked as an environmental advocate and policy consultant, and served on the boards of several non-profits in education and community development.

TOPIC: Defusing Disasters – Exploring Preparedness and Coastal Storm Warnings

My talk will explain how researchers are essential to the practice of disaster management and risk reduction, especially social science researchers. I will mention some recent disasters, but my main focus will be what we learned from my own study about Hurricane Sandy (NYC area) and the people who *did not* follow directions to evacuate when the coastal storm approached. My comments will explore this in connection with a specific topic: emergency preparedness, coastal cities, and people with disabilities (PWDs). I will present findings from a case study, and explore what this means concerning critical perspectives on resilience. Many coastal communities cope with the threat of flooding and storms; in the context of climate change, with sea level rise and projected increases in the number and severity of storms, planning efforts have become much more urgent. When storms threaten, managers typically issue warnings and evacuation orders, yet in one recent event (Hurricane Sandy, NYC area) record numbers of people disregarded orders. Also, the data show that people with disabilities (PWD) and elders bear disproportionate harms during disasters. People who do not evacuate and instead remain in place, frustrate managers, who label them 'noncompliant.' To help unpack the dynamics of the situation, we studied perceptions of New York City area residents who did not evacuate as Hurricane Sandy loomed. By interrogating people's non-responses to evacuation orders, we looked for insight into ways that larger phenomena are shaping what happens on the ground and how disabilities are produced.

Our study revealed that the experiences of people with disabilities include: misinformation, shelters that fail to accommodate, abandonment, and being left out due to inaccessible communication practices. This case study engages several quintessentially geographic concerns: perceptions of the environment, bodies, space, and movement in the context of a political struggle for more accessible spaces. While institutions have powerful incentives to reinscribe disparities and injustices, new perspectives on the role of design may help animate movement toward more functional and inclusive spaces.



Bogdan Zawadzki

*Professor of psychology
Faculty of Psychology
University of Warsaw*

Ph.D. (1992), Professor of psychology (2007), 130 publications from psychology of individual differences – psychology of temperament, behaviour genetics, cross-cultural psychology, psychological diagnosis, and clinical psychology, including two monographs, four handbooks to personality inventories and four edited monographs/journal special issues. The last publications are devoted to

the problem of factors (including personality traits) influencing the onset of symptoms of posttraumatic stress disorder (PTSD) in victims of natural disasters and technological catastrophes (motor vehicle accidents) as well as effectiveness of therapy of PTSD.

PANEL: Psychological consequences of catastrophes Postraumatic disorders: organizational support, therapy, prevention

SPEAKERS:

Dr. Agnieszka Popiel, SWPS University of Social Sciences and Humanities, Warsaw

TOPIC: Symptoms of posttraumatic disorders and their dynamics in time: The role of organizational and psychological support

Paper will be focused on dynamics of symptoms of posttraumatic disorders in time passing from traumatic event. The role of various forms of organizational and psychological support (including professional therapy), served in different periods of time, for victims of traumatic events will be presented.

Prof. Bogdan Zawadzki, University of Warsaw

TOPIC: Postraumatic disorders: The efficacy of prevention programs

Paper will be focused on efficacy of various forms of psychological prevention of posttraumatic disorders, served within programs of primary, secondary, and tertiary prevention with distinction on universal and selective prevention.

Dr. Ewa Pragłowska, SWPS University of Social Sciences and Humanities, Warsaw

TOPIC: Polish program of prevention of posttraumatic disorders in firefighters: Preliminary results

Paper will be focused on assumptions, methodology and preliminary findings of the program of prevention of symptoms of posttraumatic disorders in firefighters.

TOPIC 1: Risk management in government strategic documents

TOPIC 2: Conclusions and recommendations of the EC to the risk assessment process conducted in Poland

Until recently in Poland the crisis response was an issue of intense consideration. Much of our attention was primarily focused on a quick and effective response only after an incident has occurred.

However, there has been a considerable change over the recent years not only in the way of thinking but also in the approach to the prevention of natural and man-made disasters. Hence, on the one hand, to reduce the likelihood of disasters and on the other hand, to mitigate their effects. A lot of initiatives that related to disaster and catastrophe risk assessment have been recently undertaken.

Government Centre for Security is responsible for coordinating the process of risk assessment (except for issues concerning terrorist threat, which are responsibility of Internal Security Agency). According to Poland's current law, risk assessment conducted for sake of civil planning is being updated every other year as Report on Threats to National Security. Report concerns the most significant threats, which have major influence on the functioning of development of the nation, in particular the threats of primary importance to the security, international position as well as economic and defensive potential, a threat to a considerable number of people's lives, health or environment. Since 2011 Report has been periodically developed. It should be noted that there is a procedure functioning for the purpose of preparation of the above – mentioned Report within which ministers, heads of central offices and provincial governors/voivodes develop possible threat scenarios, then conduct risks assessments and indicate the extent to which they are acceptable.

Although we must not forget that assessment is just a first step in building an efficient risk management system.

There is a need to underline the fact that according to the Decision of the European Parliament and of the Council on the Union Civil Protection Mechanism, Poland is obliged to achieve risk management capability and self-asses in this matter by 2018.

This means adopting an integrated approach to the risk management, including a whole management life-cycle – from risk assessment through plans for managing risk to implementing means of prevention and means of achieving them.

Taking into account a perspective of an upcoming, close-by date of fulfilling this commitment for us, this is one of the most important challenges in the area of civil planning that we now face.

3rd DISASTER RISK REDUCTION Conference, 2017

WARSAW, POLAND

CONFERENCE DAY 01: THURSDAY, OCTOBER 12, 2017

LOCATION: CENTRUM KONFERENCYJNE KOPERNIKA, Kopernika 30, Warsaw
CONFERENCE ROOM 'SALA BALOWA KSIEŻYCOWA'

8:00 am to 2:00 pm	REGISTRATION & CHECK-IN PROCEDURE EXHIBIT TABLES & POSTER INSTALLATION
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8:45 am to 9:00	Morning Coffee
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WELCOME REMARKS & OPENING LECTURE Co-Chairpersons: Dorota Rucińska and Artur Magnuszewski

9:00 am to 9:15 am	Opening Ceremony
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9:15 am to 9:30 am	Lukasz RÓŻYCKI First Secretary, Permanent Mission of the Republic of Poland to the UN Office at Geneva Video conference: <i>Institutions and fora for cooperation in disaster risk reduction within the framework of the United Nations</i>
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9:30 am to 10:15 am	José Manuel PALMA-OLIVEIRA Environment Psychology and Risk Perception and Management, University of Lisbon, Portugal Keynote: <i>Predicting Community Resilience in a Changing climate and in a Disaster Prone World</i>
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PSYCHOLOGICAL PANEL: Psychological consequences of catastrophes Posttraumatic disorders: Organizational support, therapy, prevention

10:15 am to 11:00 am	Agnieszka POPIEL SWPS University of Social Sciences and Humanities, Warsaw Topic: <i>Symptoms of posttraumatic disorders and their dynamics in time: The role of organizational and psychological support</i>
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	<p>Bogdan ZAWADZKI Faculty of Psychology, University of Warsaw, Poland Topic: <i>Posttraumatic disorders: The efficacy of prevention programs</i></p> <p>Ewa PRAGŁOWSKA SWPS University of Social Sciences and Humanities, Warsaw Topic: <i>Polish program of prevention of posttraumatic disorders in firefighters: Preliminary results</i></p>
11:00 am to 11:15 am	Discussion
11:15 am to 11:30 am	Coffee Break

SESSION 01: RISK REDUCTION AND MANAGEMENT
Co-Chairpersons: Kazimierz Banasik and Piotr Werner

11:30 am to 11:45 am	<p>Krzysztof MALESA Government Centre for Security in Poland Presentation: <i>Risk management in government strategic documents</i></p>
11:45 am to 12:00 am	<p>Beata JANOWCZYK Department of Risk Assessment and Civil Planning Government Centre for Security in Poland Presentation: <i>Conclusions and recommendations of the EC to the risk assessment process conducted in Poland</i></p>
12:00 am to 12:15 pm	<p>Anna PRĘDECKA Main School of Fire Service, Warsaw, Poland Presentation: <i>Communication tools and susceptibility of fire-rescue units responding to natural hazards in Poland</i></p>
12:15 pm to 12:30 pm	<p>Paweł GROMEK Main School of Fire Service, Warsaw, Poland Presentation: <i>Fire-rescue units response to natural hazards in Poland – two-dimensional emergency communication approach</i></p>
12:30 pm to 12:40 pm	Discussion

SESSION 02: VULNERABILITY ASPECTS
Co-Chairpersons: Dorota Rucińska and Ewa Smolska

12:40 pm to 12:55 pm	<p>Sławomir WILK Institute of Sociology, University of Rzeszów, Poland Presentation: <i>Social assistance system in the event of mishaps and natural disasters</i></p>
12:55 pm to 1:10 pm	<p>Karolina LISTWAN-FRANCZAK Jagiellonian University, Cracow, Poland Presentation: <i>Risc communication as a part of flood risk management according to existing legislation</i></p>
1:10 pm to 1:25 pm	<p>Irena TSERMEGAS Faculty of Geography and Regional Studies, University of Warsaw, Poland Presentation: <i>Natural hazards in ancient Greek myths: paleogeographic and contemporary context</i></p>
1:25 pm to 1:40 pm	<p>Mirosław KAMIŃSKI Polish Geological Institute – National Research Institute, Poland Presentation: <i>Spatial analysis of the threat of mass movements of the cliff in Jastrzębia Góra (Northern part of Poland)</i></p>
1:40 pm to 1:50 pm	Discussion
1:50 pm to 2:35 pm	LUNCH BREAK
2:35 pm to 2:50	POSTER SESSION

SESSION 03: HUMAN CONTEXT
Co-Chairpersons: Sharon D. Moran and José Palma-Oliveira

2:50 pm to 3:05 pm	Nehir VAROL Ankara University, Turkey Presentation: <i>Vulnerable Groups in Disasters and Coping Mechanisms</i>
3:05 pm to 3:20 pm	Timur GULTEKIN Ankara University, Turkey Presentation: <i>Human and Disasters from Past to Present in Anatolia: an Anthropological Perspective</i>
3:20 pm to 3:35 pm	Monika KACZAŁA Poznań University of Economics and Business, Poznań, Poland Presentation: <i>Factors affecting farmers' drought and flood risk perception</i>
3:35 pm to 3:50 pm	Dorota RUCIŃSKA Faculty of Geography and Regional Studies, University of Warsaw, Poland Presentation: <i>Ethical challenges in Disaster Risk Reduction</i>
3:50 pm to 4:00 pm	Discussion

WORKSHOP
Chairperson: Jorge Díaz

4:00 pm to 6:00 pm	Jorge Angel DÍAZ TEJADA Instituto Tecnológico y de Estudios Superiores de Monterrey, Mexico <i>Underlying causes of Vulnerability and its impact on Disaster Risk Management</i>
5:50 pm	RESUME AND CLOSING: Sharon D. Moran and José Palma-Oliveira

CONFERENCE DAY 02: FRIDAY, OCTOBER 13, 2017

LOCATION: CENTRUM KONFERENCYJNE KOPERNIKA, Kopernika 30, Warsaw
CONFERENCE ROOM 'SALA BALOWA KSIĘŻYCOWA'

8:30 am to 14:00 am | REGISTRATION

8:55 am to 9:10 | Morning Coffee

WELCOME REMARKS & OPENING LECTURE Co-Chairpersons: Artur Magnuszewski and Dorota Rucińska

9:10 am to 9:20 am | **Opening**

9:20 am to 10:10 am | Sharon D. MORAN

Associate Professor of Environmental Studies, State University of New York –
Environmental Science and Forestry, Syracuse, New York, USA

Keynote: *Defusing Disasters – Exploring Preparedness and Coastal Storm Warnings*

SESSION 04: MEASURING AND ADAPTING FOR RISK MITIGATION Co-Chairpersons: Artur Magnuszewski and Dorota Rucińska

10:10 am to 10:25 am | Jie-Ying WU

University of Taipei, Taiwan

Presentation: *The Effectiveness of Urban Flood Mitigation: Applying Low Impact Development Concept in land uses in Taiwan*

10:25 am to 10:40 am | Rajesh Kumar ABHAY

Dyal Singh College, University of Delhi, India

Video conference: *An analysis of indicators for measuring land resilience in agricultural landscape: a case study from northern Odisha, India*

10:40 am to 10:55 am | Agnieszka DUDZIŃSKA-JARMOLIŃSKA

Faculty of Geography and Regional Studies, University of Warsaw, Poland

Presentation: *Adapting modern urban spaces to the negative consequences of natural disasters: the floods*

10:55 am to 11:10 am	Grzegorz DUMIEŃSKI Institute of Meteorology and Water Management – National Research Institute; Presentation: <i>The measurement of the adaptive capacity of the social-ecological system towards flood hazard</i>
11:10 am to 11:25 am	Marek W. JASKÓLSKI University of Wrocław, Poland Presentation: <i>Index based method for heritage vulnerability assessment in case of storm surge – study of UNESCO Candidate Hershel Island, Canada</i>
11:25 am to 11:35 am	Discussion
11:35 am to 11:50 am	Coffee Break

SESSION 05: CLIMATE: URBAN AND RURAL AREA Co-Chairpersons: Jorge Díaz and Stanisław Lewiński

11:50 am to 12:05 pm	Elwira ŻMUDZKA, Krzysztof PIASECKI Faculty of Geography and Regional Studies, University of Warsaw, Poland Presentation: <i>Severe storms as example of natural hazard on urban area – case studies on area of Warsaw, Poland</i>
12:05 pm to 12:20 pm	Rafael GONÇALVES SANTOS Institute of Geography and Spatial Planning, University of Lisbon, Portugal Presentation: <i>The Impact of Land-Use and Land-Cover Changes on Urban Climate of the City of São Paulo</i>
12:20 pm to 12:35 pm	Krzysztof JARZYNA Institute of Geography, Jan Kochanowski University in Kielce, Poland Presentation: <i>Hot and cold weather extremes – urban-rural differences of thermal stress in the Świętokrzyskie region over 2009-2016 period</i>
12:35 pm to 12:50 pm	Mirosław GROCHOWSKI, Sylwia DUDEK-MAŃKOWSKA Faculty of Geography and Regional Studies, University of Warsaw, Poland Presentation: <i>Planning for Urban Resilience: Governance Approaches to Natural Hazards</i>

12:50 pm to 1:05 pm	<p>Kamil LEZIAK</p> <p>Faculty of Geography and Regional Studies, University of Warsaw, Poland</p> <p>Presentation: <i>The influence of horizontal atmospheric circulation on convection and on convection-dependent severe weather phenomena over Poland</i></p>
1:05 pm to 1:20 pm	<p>Anna BARCZ, Kamil BEMBNISTA</p> <p>Institute of Literary Research, Polish Academy of Sciences, Warsaw, Poland Leibniz Institute for Research on Society and Space, Erkner/Berlin</p> <p>Presentation: <i>Cultural Constructions of Floods and Climate Change in Poland and Germany. Literary, Media and Agents Knowledge in Odra River Regions</i></p>
1:20 pm to 1:30 pm	Discussion

SESSION 06: HYDROLOGICAL ASPECTS
Co-Chairpersons: Sharon D. Moran and Renata Romanowicz

1:30 pm to 1:45 pm	<p>Piotr KUSZTAL</p> <p>Institute of Geography, Jan Kochanowski University in Kielce, Poland</p> <p>Presentation: <i>Anthropogenic flash floods on rivers of Holy Cross Mts. region in 20th c. – origin and effects</i></p>
1:45 pm to 2:00 pm	<p>Paweł FRAN CZAK</p> <p>Jagiellonian University, Cracow, Poland</p> <p>Presentation: <i>Flash flood hazard in small towns of the Sudety Foothills in 2010-2016</i></p>
2:00 pm to 2:15 pm	<p>Krzysztof JARZYNA</p> <p>Institute of Geography, The Jan Kochanowski University in Kielce, Poland</p> <p>Presentation: <i>Spatial and temporal distribution of damages caused by heavy rainfalls in the Świętokrzyskie Province (Voivodship) – 2013 case study</i></p>
2:15 pm to 2:30 pm	<p>Abhay Shankar PRASAD</p> <p>Department of Geography, Delhi School of Economics, University of Delhi, India</p> <p>Presentation: <i>Ecological Challenges and Extreme Climatic Events Assessment for Disaster Risk Reduction in High Altitude Region of Himalaya Ecosystem: A Case Study of Alaknanda River Basin, Uttarakhand, India</i></p>

2:30 pm to 2:45 pm	Artur MAGNUSZEWSKI Faculty of Geography and Regional Studies, University of Warsaw, Poland Presentation: <i>Map of the contemporary hydrological hazards in the city of Warsaw</i>
2:45 pm to 2:55 pm	Discussion
2:55 pm to 3:45 pm	LUNCH BREAK
3:45 pm to 4:00 pm	POSTER SESSION

SESSION 07: DATA MODELLING
Co-Chairpersons: Stanisław Lewiński and Artur Magnuszewski

4:00 pm to 4:15 pm	Ewelina SIWIEC Institute of Environmental Protection – National Research Institute, Warsaw, Poland Presentation: <i>Extreme events results ' estimation based on Polish method and Post-Disaster Needs Assessment PDNA</i>
4:15 pm to 4:30 pm	Beata WEINTRIT Astri Polska Sp. z o.o., Warsaw, Poland Presentation: <i>Feasibility study of flood risk monitoring based on optical satellite data</i>
4:30 pm to 4:45 pm	Halina KOWALEWSKA-KALKOWSKA Faculty of Geosciences, University of Szczecin, Poland Presentation: <i>The high resolution PM3D model for flood risk management along the southern Baltic coast</i>
4:45 pm to 5:00 pm	Renata J. ROMANOWICZ, Joanna DOROSZKIEWICZ Institute of Geophysics, Polish Academy of Sciences, Poland Presentation: <i>Flood risk projection in the 21 st century– the Biala Tarnowska case study</i>
5:00 pm to 5:10 pm	Discussion

SUMMARY OF CONFERENCE CONCLUSIONS & RECOMMENDATIONS RESULTS OF COMPETITION FOR THE BEST SCIENTIFIC POSTER

5:10 pm to 5:30 pm	RESUME: Jorge Díaz and Sharon D. Moran
5:30 pm to 5:45 pm	CLOSING

POSTER HALL – 3rd DRR 2017, WARSAW

LOCATION: CENTRUM KONFERENCYJNE KOPERNIKA, Kopernika 30, Warsaw

CONFERENCE ROOM ‘SALA BALOWA KSIĘŻYCOWA’

OCTOBER 12, 2017

2:35 pm to 2:50 pm

OCTOBER 13, 2017

3:45 pm to 4:00 pm

Hong DENG, Yong Zhen HOU

Sichuan University, China

Poster: *Institute for Disaster Management and Reconstruction (IDMR)*

Leyla DERIN

Disaster and Emergency Management Department, Ankara University, Turkey

Poster: *Flood Hazard Mapping by Using Geographic Information System and Remote Sensing*

Paola FONTANELLA PISA

Brandenburg University of Technology of Cottbus, Germany

Poster: *The role of memorialisation in disaster risk preparedness and post disaster recovery*

Paweł FRAN CZAK, Karolina LISTWAN-FRAN CZAK

Jagiellonian University, Cracow, Poland

Poster: *The natural hazards occurring in the eastern part of Beskid Żywiecki and the local communities' sensitivity to these dangers*

Katarzyna GRABOWSKA, Joanna POPLAWSKA

Faculty of Geography and Regional Studies, University of Warsaw, Poland

Poster: *Supercell tornadoes in Poland*

Natalia KACHEL

Faculty of Geography and Regional Studies, University of Warsaw, Poland

Poster: *City development and impact on flood risk - an example of the right-bank Warsaw*

Mirosław KAMIŃSKI

Polish Geological Institute – National Research Institute, Warsaw, Poland

Poster: *Aerial photogrammetric data in a gullies erosion hazard study – an example from the Dzierzkowice area (Lublin Upland, Poland)*

Marta KANIOWSKA

Faculty of Geography and Regional Studies, University of Warsaw, Poland

Poster: *The effects Mount Saint Helen's volcanic eruption in 1980 and proposals for reducing volcanic risk in the region of the USA*

Cagla Melisa KAYA

Department of Geomatics, IKCU, Izmir, Turkey

Poster: *Developing Long Term Regional Flood Damage Reduction Strategies for a Rural Flood Prone District of Turkey*

LI Karen K.Y

Collaborating Centre for Oxford University and CUHK for Disaster and Medical Humanitarian Response CCOUC

Poster: *Community based interventions in HeiHe Village, YingJiang County*

Mariusz PORCZEK

Faculty of Geography and Regional Studies, University of Warsaw, Poland

Poster: *Using raster and vector data to identify objects for flood risk reduction. A case study: Raciborz*

Rafael GONÇALVES SANTOS

Institute of Geography and Spatial Planning, University of Lisbon, Portugal

Poster: *Natural Hazards and Climate Risks in the Brazilian Agriculture: An Overview of High Temperatures*

ABSTRACTS OF PRESENTATIONS

Communication tools and susceptibility of fire-rescue units responding to natural hazards in Poland

Anna Predecka¹, Pawel Gromek¹

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ABSTRACT

Susceptibility of fire-rescue units responding to natural hazards in Poland reflects many different determinants. The object catalogue is comprised by i.a. kinds of threats and self-sufficiency of the units. The first group of factors regards floods, wildfires, strong winds, rainfall, and snowfall which are typical for Polish environment but are characteristic also for many other counties all over the world. Referring to the second one, particular administration units dispose of fire-rescue entities characterizing by different operational potential. Basing on the State Fire Service statistics not all of them are able to response in case of natural hazards materialization without support from other communes, counties and even provinces.

The paper presents results of statistical analysis in terms of fire-rescue units susceptibility in years 2012-2016. Conclusions concerning 388 886 interventions in case of natural hazards materialization and serve as a reference point for carrying out a research focusing on communication potential of fire-rescue entities.

The communication approach is built on SINDBAD project outcome (“Building of IT system supporting communication in Police and other entities subordinated to Ministry of Interior in the aspect of internal security”, DOB-BIO7/03/01/2015), giving a novel research direction at this field of expertise. Referring to the above, most common organizational and technical tools dedicated to internal and external communication are described and analyzed. It allows the authors to identify crucial communication functions as well as carry out their assessment in the light of operational importance. For the purpose of the tools comparison, prioritizing model is elaborated. It is based on peer-compare technique and data structure concerning frequency of particular kinds of natural hazards.

The results show that different threats can have also different influence for identified tools. They state merit-related background for conclusions regarding communication management strategies, raising resistance of fire-rescue units responding to natural hazards in Poland in such functions as planning, organizing, motivating and controlling.

Fire-rescue units response to natural hazards in Poland – two-dimensional emergency communication approach

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ABSTRACT

The National Firefighting and Rescue System operates regarding to many different natural and man-made threats in Poland. Natural hazards state characteristic and resource-requiring circumstances in which fire-rescue units save people life and health. Statistics and operational experiences of the State Fire Service justify a necessity of holistic analysis to improve the object response, making the units much more prepared and flexible as well as less operational susceptible facing cooperation with other natural hazards responders.

Emergency communication in fire-rescue units describes a nervous system of response for floods, wildfires, strong winds, rainfall, snowfall etc. Furthermore, it constitutes holistic and coherent approach for cooperation research. Findings collected during realization of SINDBAD project (“Building of IT system supporting communication in Police and other entities subordinated to Ministry of Interior in the aspect of internal security”, DOB-BIO7/03/01/2015) make foundations for this novel conception.

Two dimensions of the approach are expressed by relations basing on Polish rescue determinants. First of them describes communication between the National Firefighting and Rescue System units and other responders. It correspond with inter-institutional cooperation rules and tasks. The second one reflects self-sufficiency of the system entities that operate in particular administration units.

Statistics from years 2012-2016 collected by the State Fire Service, which is the crucial fire-rescue institution in Poland, are the most suitable background for the object research. Analysis of 388 886 fire-rescue interventions proves that different provinces are characterized by same different emergency communication potential. Additionally, provincial units are not equally prepared for such kind of response facing mentioned floods, wildfires, strong winds, rainfall and snowfall. Using PRINCE2® and PMI® risk management frameworks, proper proceedings can be suggested. Switching to avoidance, transfer, mitigation, acceptance strategies, they can be understood as directions for building better preparation, flexibility and operational resistance of fire rescue units in the light of natural hazards response.

Social assistance system in the event of mishaps and natural disasters

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ABSTRACT

The main purpose of the article is to present the functioning of social assistance centers and social workers in the event of mishaps and natural disasters as well as the forms of assistance provided to the victims.

When a community is affected by a flood, a gas explosion, or a fire, social workers face not only individual or family tragedies, but also the ones affecting the whole community, and in many instances their own family members. How to cope then? What should be known to help the victims effectively? How to coordinate help in such situations?

The 2016 Computer Assisted Telephone Interview (CATI) survey included representatives of 450 randomly selected social welfare centers in Poland. 3 Focus Group Interviews (FGIs) were carried out with social workers providing the assistance.

Social workers were asked whether, over the last five years, i.e., in the years 2012 - 2016, any disaster, catastrophe or major mishap occurred in the area of their social welfare center. The phenomena taken into account included storms, fires, floods, landslides and gas explosions. The results show that 54.5% of municipalities have been affected by such phenomena, while in other municipalities (45.5%) there have been no disaster events, cataclysms or major mishaps in the last five years. Nearly half of the social assistance centers (52.2%) have been supporting the victims in the last five years after disastrous events such as floods, fires, gales, landslides, etc.

In most cases, the victims were provided with financial support which was supposed to meet their basic needs. It applied to more than 92% of the social assistance centers, but very often (in case of almost $\frac{3}{4}$ centers) funds were allocated for the renovation or reconstruction of residential units and farm buildings damaged as a result of disasters or mishaps. In more than 40% of centers where disaster events or hazardous incidents occurred, victims were provided with professional legal and psychological aid, as well as more tangible support which consisted in handing over building materials, equipment, furniture, etc. Temporary accommodation was provided to 22.2% of the victims. According to social workers financial aid addresses the most urgent needs of people in crisis. Another important thing is to offer a wide variety of psychological assistance and social work.

Risk communication as a part of flood risk management according to existing legislation

Karolina Listwan-Franczak¹, Wojciech Biernacki², Jarosław Działek³, Paweł Franczak⁴.

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ABSTRACT

Effective risk and crisis management requires skillful use of human resources, procedures, and technology to verify and integrate all essential information to conduct effective rescue operations. The system of risk and crisis management with its structures and instruments is created by legal framework. The function of legal regulations is to coordinate all undertaken activities. They enable effective action in all phases of crisis management (Sienkiewicz-Małyjurek 2011). One of the issues regulated by law risk and crisis communication.

The authors, bearing in mind the importance of communication process in risk and crisis management, have analyzed the legal determinants of risk communication between institutions and between institutions and inhabitants of areas at risk of flooding.

Selected legal regulations have been analyzed, which in their content relate to broadly understood risk communication activities undertaken before, during and after floods. It should be noted that part of the regulation is universal and refers to communication activities undertaken in the event of a general crisis situation, while some of the regulations are specific and strictly related to communication in the event of a flood.

The purpose of the study is to provide a scientific understanding of the legal basis of risk and crisis communication, the relationships between them, and to identify potential loopholes. The analyzed legal acts allowed to define: (1) the main actors in the risk communication process in the various phases of flood risk management (before, during and after floods); (2) the scope of competence of the various risk and crisis communication stakeholders; (3) risk communication procedures utilised in the case of flood.

Natural hazards in ancient Greek myths: paleogeographic and contemporary context

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ABSTRACT

Many regions of Greece are vulnerable to natural disasters, which can constitute a threat for the inhabitants. Today the most hazardous are earthquakes and flash floods. In the prehistory, the so-called “mythic times”, the inhabitants also suffered from rapid shoreline changes resultant from fast sea level rise connected with glaciers melting, as well as from various infectious diseases associated with wetlands. These phenomena are clearly reflected in Greek mythology.

The death toll of natural catastrophes is inaccurate. In the 20th century about 1100 people died in Greece as a result of earthquakes. The death toll caused by floods was smaller, although there is no precise data. Floods are particularly dangerous in urban areas. Since the end of the 19th century there have been total 110 fatalities in Athens only reported due to flash floods, probably about 150 in the whole Greece.

The most tragic mythical floods affected much larger areas but were not connected with any extreme precipitation event. Resultant from rapid sea level rise, these events are known as the Dardanus' flood and the Deucalion's flood. Mythical description of the fight against hazard associated with wetlands, e.g. malaria, can be found in the myths concerning the labours of Heracles.

“Geomythology” is a discipline which tries to combine mythology with science and to explain the environmental conditions described in myths. Studies on geomythology mainly focus on the reconstruction of the prehistoric paleoenvironments. Having derived from the research, the prospective knowledge can be used to predict similar calamities, especially those connected with global climate change and expected sea level rise, in the future.

Spatial analysis of the threat of mass movements of the cliff in Jastrzębia Góra (Northern part of Poland)

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ABSTRACT

The cliff in Jastrzębia Góra is largely threatened by the development of mass movements, especially landslides. They cause rapid changes in terrain and slope by retreat of the cliff. Digital photogrammetric analysis and electrical resistivity tomography (ERT) techniques were used to identify the structure of landslides and determine its dynamics in Jastrzębia Góra cliff (northern Poland). Two photogrammetric high-resolution models were generated from airborne laser scanning data and compared. The first model came in 2010 while another from 2013. This way, the dynamics of the surface of the landslide was analyzed. The differences between the grid points of digital elevation models were used for determination of vertical movements of the grid points within the landslide area. The differences were visualized as a shaded relief map. Additionally, three geomorphological cross-sections were made. The differential DEMs (2010–2013) for the most dangerous part of the landslide allowed us to recognize the areas that have the biggest deformations. In addition, we developed on the basis of aerial photographs from 2004, photogrammetric digital terrain model. Stereoscopic effect disturbed by the vegetation lush, but in spite of these shortcomings managed to reach the edge of the cliff set was possible to determine. Images were analyzed at different magnifications in order to commit the slightest error. It was found that between 2004 and 2011 the edge of a cliff in the area Jastrzębia Góra retreat to over 19 meters. At the same time the analysis of the digital terrain model derived from airborne laser scanning showed activation of the three landslides that threaten the surrounding infrastructure. Digital model derived from airborne laser scanning can determine the precise extent of landslides, slope and slope primary and secondary data provides many landslides morphometry. The advantage of this method is the ability to filter data and therefore to eliminate the vegetation. Skillful interpretation of terrain can indicate places requiring rapid protection. In order to identify the geological structure of the cliff, and landslides structure we used geophysical method of electrical resistivity tomography. For this purpose, they made five geophysical profiles on the landslide and four profiles in the area of the edge of the cliff. To detect the sliding surface and estimate the thickness of the sliding material, several transversal and longitudinal ERT profiles were collected. The resistivity images of subsurface obtained from ERT data and supported by stratigraphic and lithologic data from boreholes were integrated with the information from the DEMs. As a result geological structure of the landslide was examined and the depth of the slip zone was determined.

Vulnerable Groups in Disasters and Coping Mechanisms

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ABSTRACT

From past to recent, people suffered from different kinds of disasters. It is also a fact that women, children, elderly and disabled people are the most affected groups from disasters. They are determined as vulnerable groups and need of specific protection. Of course vulnerabilities of these groups differ according to their socio-economic status, health status and socio-cultural properties of their countries. Generally, they are afforded less attention and less support in national disaster risk plans in many countries. It is an important issue to protect the disadvantaged/vulnerable people from disaster risks. The present disasters enlighten us about the need to consider the special needs of vulnerable groups. Inadequate preparation for the needs of vulnerable people can lead to another emergency situation.

The aim of this research is to find out what needs to be done in terms of loss of life and drama in the face of probable disasters and to make a map of the roads for the vulnerable people to determine their social and economic needs in Turkey. Within the scope of this aim, present lessons learnt from disasters of different countries and revealing the reactions of vulnerable people and discuss what are the coping mechanisms for improving their conditions.

Human and Disasters from Past to Present in Anatolia: an Anthropological Perspective

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ABSTRACT

Anatolia peninsula is one of the few places in the world that has been continuously inhabited since the dawn of mankind. Many naturel and man-made disaster events have been challenged from the past to the present day in Anatolia. In times when human life did not exist, these disasters came to fruition. Disasters will continue to come to the fore in the future. People should learn to live with disasters in the world. The aim of this research is to reveal the great disasters that have occurred in Anatolia from the past and the reactions given by people to these disasters and to make inferences about the future an anthropological perspective. In this research, the information about the great disasters that have come to Anatolia has been tackled from archaeological, anthropological findings and historical documents. Many of the disasters that have taken place in Anatolia are regional. The disasters that have taken place in Anatolia have caused people to live in great drama. These disasters have resulted in deaths, epidemics and migrations. It is not easy for people to get used to living with disasters because of these dramas. Disasters nowadays are affecting more people and even global effects. For example, a disaster-consequential migration can affect all countries. For this reason, disaster must be on a global scale.

Factors affecting farmers' drought and flood risk perception

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ABSTRACT

Some studies have shown that personal risk perception influences risk attitudes of farmers as well as the type of risk management strategy undertaken. For this reason, identification of the structure of perceived risk and the formation of farmers' risk perception is crucial both for designing a government risk management policy applicable in the agriculture sector and for suppliers of risk management tools as the perception affects demand for insurance. The purpose of this research is to investigate the perception of drought and flood risk among farmers, the factors which have an impact on this perception and the impact of acceptable (normal) and catastrophic event on risk perception. A systematic search of published and unpublished material relevant to risk perception has been conducted. The results were compared to the findings from the Polish market. Statistical analyses were applied in order to investigate the representative poll taken in March 2012 in Poland (750 respondents) with the use of the CATI methodology. Preliminary results show that farmers' flood and drought risk perceptions are affected mostly by location and farmer's loss experience.

Ethical challenges in Disaster Risk Reduction

Dorota Rucińska

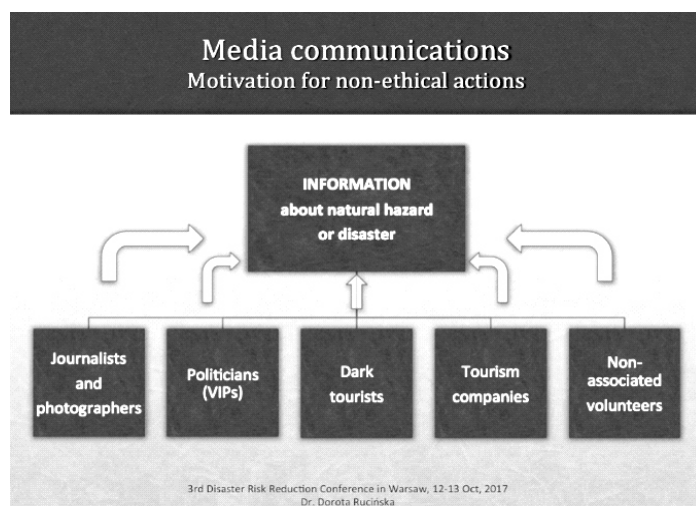
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ABSTRACT

Natural disasters interplay with a variety of decisions taken at the level of government officials, corporations, non-profit organizations, communities, and individuals. These decisions are crucial due to the safety of the population in risk area.

The purpose of this study is to identify sensitive points of disaster risk reduction (DRR), particularly situations of not meeting the ethical standards that indirectly affect the dimension of natural disaster. A descriptive case study of the sensitive points and a review of articles and mass media information are performed. This presentation is partially a theoretical paper supporting further development of the DRR framework.

This study indicates that decisions and actions that, in theory, aim at risk reduction sometimes go beyond ethical principles. These actions are taken at different stages, before and after natural hazards and as a consequence might cause substantial damages, affect the population and its properties. Examples of media communications (the news) as well as politicians, public administration, resident decisions and actions that impair DRR process and increase negative effects of natural disaster are presented.



Non-use of the ethics in the context of natural disasters is present among both, individuals and state institutions, and the benefits of their decisions can create of negative effects. Liquidation of non-ethical decisions is a challenge of DRR following the Sendai Framework for Disaster Risk Reduction (2015-2030).

The Effectiveness of Urban Flood Mitigation: Applying Low Impact Development Concept in land uses in Taiwan

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ABSTRACT

Extreme rainfalls cause frequent urban flooding in Taiwan. Especially, urbanization and over development make impervious surface which short the time of storm water collection. Nowadays the government is currently promoting the Low Impact Development (LID) concept in land uses to work with Rain Water Sewer System to solve the flooding issue. Previous studies of LID were applied in the building site or neighborhood scale. The main purpose of this study is to explore the effectiveness LID applied in land uses in the urban planning areas. The Jhushan urban planning area in Nantou County, Taiwan is selected as the study area. The Storm Water Management Model (SWMM) is used to explore the effectiveness of decreasing the surface peak discharge. This study adjusts seven types of LID in the current land use and use the SWMM model to conduct three flood frequencies of 24 hours of simulation. The results show that the applying LID in land uses in 2 years and 5 years of low rainfall frequency do decrease the peak discharge. However, the frequency of rainfall in 10 years, the LID land uses not only do not reduce the peak discharge, but also increase the peak discharge. This implies that the LID landuse are not suit for the areas with high rainfall frequency.

AN ANALYSIS OF INDICATORS FOR MEASURING LAND RESILIENCE IN AGRICULTURAL LANDSCAPE: A CASE STUDY FROM NORTHERN ODISHA, INDIA

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ABSTRACT

The 21st century is characterised with human-induced disasters. Land degradation is one of them. Land degradation is a function of its susceptibility and resilience. Susceptibility and resilience are measures of the vulnerability of a landscape to degradation. Susceptibility is the degree to which a land system undergoes change due to natural forces, human intervention or a combination of both. Resilience is the property of a land system to absorb change and utilise change, including resistance to a shock. Resilience represents the management efforts in the region from community as well government side. So, with regard to aspects of land degradation, susceptibility refers to how easy it is to degrade the land and resilience refers to how easy it is to restore the land. The objective of the present paper is to analyse the contribution of various human activities which contributes in increasing or decreasing the level of land resilience in the Kendujhar Plateau in Northern parts of Odisha State in India. In Kendujhar plateau of Odisha the process of degradation is active due various factors like unsustainable agricultural practices, deforestation, unscientific mining etc. The negative effects of land degradation are also visible in the form of low agricultural outputs and benefits. At the same time farmers often take a short-term approach to increase land productivity which may decrease land quality and also management steps which increases its quality and level of resilience. Therefore, farming activities can trigger or control land degradation in short or long-term. The objective is mainly based upon primary data sources. To analyse the resilience of land, the primary data has been collected in 16 sample villages through structured questionnaire. Purposive stratified random sampling method is used to select sample villages. Four sample villages are selected based on four economic activities practiced in the respective villages by the villagers. These are: (i) agriculture, (ii) agriculture and mining, (iii) agriculture, mining and forestry, and (iv) agriculture, shifting cultivation or forestry. Thus, a total of 16 villages have been selected for the primary survey. Through the survey, 9 indicators have been chosen which increases the resilience of land with respect to the land problem in the study region. These are also the major management strategies which are adopted by the farmer to conserve land and increases land's resilience capacity. The selected indicators like terracing, land fallowing, local manures, crop rotation, modern farm implements, other soil conservation measures, chemical fertilizers, inextensive agriculture and market-oriented agriculture proved to be very logical in analysing the land resilience in the study region. The results indicate spatial variation in the magnitude of lands resilience due to performance of different indicators. It is concluded that various human activities contribute differently in increasing or decreasing the level of resilience in the study region.

Adapting modern urban spaces to the negative consequences of natural disasters: the floods

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ABSTRACT

In majority of cases, the cities began to rise along the banks of rivers, seas or oceans. Access to water allowed them to grow and to obtain financial success. Nowadays, for many of these cities, water has become a sort of threat due to frequent floods or deluges in urban areas, caused by the dynamic increase of weather phenomenas resulting from global climate change. This has led many cities to seek solutions to counteract negative effects of such disasters, which not only pose a threat to human life and health, but also cause multi-million losses. Hence it is so important to search solutions to counteract such phenomenas or to minimize their impact, so that the inhabitants of a particular area would be as little affected as possible by any kind of damage. It can be achieved through specific outlines of urban spaces and fairly simple design processes consisting of the construction of special retention tanks, modernization of paved surfaces, reconstruction of roads, etc. Such plans and implementations have place in cities like Copenhagen, New York or Hoboken. Moreover, the solutions used are very often easy to introduce, and do not require great financial input nor highly developed technologies. In addition, these actions contribute to the increase of green spaces in the city and the development of green and blue infrastructure, having great influence on the proper functioning of the city. Therefore it is worth getting familiar with these solutions and starting to implement them in Polish cities as well.

The measurement of the adaptive capacity of the social-ecological system towards flood hazard

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ABSTRACT

The adaptive capacity of the social-ecological system (SES) is an ability to limit adverse effects of various types of hazards resulting from changing conditions of SES operation and its ability to transform (in case, the scale of predicted or observed threat requires the change of SES security philosophy). The SES' adaptive capacity creates the resilience of the social-ecological system to different kinds of disturbances. The authors understand the resilience as the SES' *ability to deal* through the ability of adjustment of its particular structures to the changing conditions (e.g. change of climate, flood hazard, etc.) in order to limit the influence of some adverse effects of those changes on the quality of SES, which main goal is the balanced development confirmed by good condition of the local society.

In the report, apart from the definitional considerations regarding terms like: social-ecological system, adaptation, or adaptive capacity of SES some indicators will be presented that will allow to assess the level of SES' adaptive capacity considered in terms of flood hazard. A matrix of indicators, prepared on the basis of an empiric researches and existing data analysis enables, on one hand, the measurement of institutional adaptivity of SES, on the other hand, permanent monitoring of the changes going in this area as a result of introduced actions strengthening the adaptive capacity of SES. The fact that the institutional system being a component of the social-ecological system has been proclaimed as the basic criterion determining the adaptive capacity of SES, is an effect of the legal system existing in Poland, as well as, a division of competences within the field of flood hazard resulting from this system.

This way of presentation within the frames of the report, the research results become a contribution to the preparation of a new logic with a purpose to build and track the institutional changes of municipalities in *dealing* and solving problems connected with different types of natural hazards.

An index based method for heritage vulnerability assessment in case of storm surge – at example of UNESCO Candidate Hershel Island, Canada

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ABSTRACT

A storm surge is a coastal flood commonly associated with extreme weather events. The responsible factor is the unfortunate combination of strong wind, rainfall and tide effect. Hershel Island (*Qikiqtaruk*) is an island in the Beaufort Sea, which lies ca. 5 km of the arctic coast of Yukon in Canada. It is observed that the occurrence of extreme weather events causing potential hazards for infrastructure and environment are increasing in the frequency in the high latitudes. Herschel Island is a good example of hazard for the possible lost of origin cultural heritage. The Island called in the indigenous language *Qikiqtaruk* carries archeological traces of the *Thule*-culture dating approx. 1000 years ago. Thru the century's the island hosted Inuvialuit's, whalers, explorers, missionaries, officials and scientist. Each of the group leaves some prove of their activity at the Island. From dog kennels, trade houses to storage halls, all the remained infrastructure is nowadays law protected in form of Herschel Island Territorial Park. The residues are candidates for UNESCO World Heritage Site. The aim of the presentation is to show an simple index based method for Heritage vulnerability assessment that was constructed by us and tested under real hazard conditions. The HVI (Heritage Vulnerability Index) is using very simple data to detect which infrastructure elements are most vulnerable to coastal flood. The exact knowledge of the most fragile areas allows the administration of the Herschel Island, to prevent the future damage by construction of protection measures. We hope the index can be useful in heritage vulnerability assessment in many other regions.

Index formula:

$$HVI = \sqrt{\frac{(a * b * c * d * e * f)}{6}}$$

Input data:

a = heritage status; b = age of the building; c = state of conservation;

d = % of renovation; e = % flooded; f = human presence

Severe storms as example of natural hazard on urban area – case studies on area of Warsaw, Poland

Elwira Żmudzka¹, Krzysztof Piasecki²

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ABSTRACT

The purpose of the study was to define synoptic conditions and describe the course of selected storm events which caused particularly extensive damage on urban area. To perform researches, three examples of storm events were selected: June 17th and 26th and September 4th, 2016.

During researches, diversified empirical data were used, both from meteorological stations (direction and speed of wind and sum of precipitation – hourly and 10-minute data – from numerous points in Warsaw and contiguous area) and products from meteorological radar and detectors of lightning. Data were acquired from IMGW, ZOM, UW and other sources. Collected data allowed to describe the course of storm episodes, trajectory of storm cells, intensity of accompanying phenomena and to characterize the area which remained under influence of this weather hazard. To characterize weather conditions and synoptic situation which caused development of severe storms, synoptic charts and radiosoundings were used as well. Additionally, National Fire Service made available data about interventions following the occurrence of storm, consisting of treating damage (broken trees, destroyed roofs, cars and parts of infrastructure).

Long-term, 24-hour data (since 1981) allowed to characterize extreme situations for selected meteorological stations. This operation enabled to verify if selected cases were extreme situations, abusing meteorological definition of extreme phenomena, using data from stations.

All of selected storm events were associated with the convergence zones developing ahead of cold fronts. In two of these cases, storms occurred in area of significant convective available potential energy. Selected storms caused powerful wind gusts. According to gathered data, maximum wind speed reached 28.0 ms⁻¹ (6/17/2016, Warszawa-Filtry). Spatial extend of wind which caused damage was verified based on National Fire Service data, and was in accordance with area designated by meteorological radar products. Precipitations in Warsaw urban area were spatially diversified, but not intensive and significant enough to cause material damage. High speed of storm move was the presumable reason for small amount of precipitation.

Natural Disasters and Climate Risks in the Brazilian Agriculture: An Overview of High Temperatures

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ABSTRACT

This article analyses some aspects of effects caused by natural disasters (drought and extreme temperatures) and the impacts in all the regions of the Brazilian agriculture, in characteristic of crops, animal deaths, plants and destruction of productive infrastructure. To achieve this goal, the methodology combined qualitative research tools, with a literature review, field observations and result analysis. The literature review of the occurrence of natural disasters indicates that the impacts of extreme events on the agricultural sector e.g. floods, droughts and floods. In order to assess the impact of weather disaster on agriculture, one must link two fundamental aspects, first, the disaster proper i.e. the destructive power of the event and secondly, the characteristics of the agricultural system which has been hit. The disasters in Brazil that most affect the society are: floods, dry seasons and winds. The impact of disasters on agriculture in Latin America and the Caribbean, indicates that Brazil it the most affected country, resulting in floods and dry seasons. The sustainable strategies must be developed by public strategies to alleviate the impact of natural disasters on crop productivity. Remote sensing satellite information helps to minimize damages e.g. the death of cattle and the damage of agricultural production in time of natural calamities by early warning system. The occurrence of natural threats cannot be avoided, but it is possible minimize their impacts if we better understand how they happen. Some studies already indicate that produce food in a climate change scenario is one of the biggest challenges faced by families in rural areas. Because few crops can withstand average temperature rises (mainly the sugarcane), that could cause significant damage to Brazil, one of the world's biggest suppliers of food crops. The research shows that Brazilian production of rice, beans, maize and soya are all expected to decline, with coffee especially vulnerable.

Hot and cold weather extremes – urban-rural differences of thermal stress in the Świętokrzyskie region over 2009-2016 period

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ABSTRACT

Recent studies have shown an evident increase of heat waves' occurrence frequency and intensity in the Świętokrzyskie region over 1981-2015 period. However no clear tendency was found in the number of cold spells over this period. Moreover a severity of a hot and very frosty weather episodes appeared to vary significantly depending the local climate conditions. The aim of a current study is an assessment of differences between thermal and biometeorological conditions in the downtown of Kielce (the region's main urban center) and in the adjacent rural area during hot weather and very frosty weather episodes which occurred in 2009-2016.

Data sets used in the study derive from: IMGW-PIB weather station Kielce-Suków (rural area) and WIOŚ measurement point in the Jagiellońska Street (Kielce's downtown). Cold spells were defined as at least 3 days with maximum daily air temperature dropping below -10.0°C . Heat waves were defined as at least 3 days with maximum daily air temperature above 30.0°C . WBGT index and WCI index values were used to assess biometeorological condition during heat waves and cold spells respectively.

Two cold spells and ten heat waves occurred in the study area during 2009-2016 period. Cold stress was higher in the rural area as compared to the urban area in the course of cold spells, and, conversely, heat stress was higher in the urban area as compared to the rural area in the course of heat waves. Biggest differences of thermal conditions in rural and urban areas occurred in the nighttime.

As the cold stress is high in rural areas in wintertime partially due to higher wind speed than in the urban areas it is essential to provide shelters from the wind, e.g. in every bus stops. Shelters can be useful during heat waves too, as they stop direct sunlight. They should be accompanied by benches allowing to have a rest.

Planning for Urban Resilience: Governance Approaches to Natural Hazards

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ABSTRACT

Natural hazards bring numerous risks to urban areas. City governments use different approaches and, consequently, various mechanisms and instruments to face challenges related to natural hazards. These approaches depend to large extent on types of threats and former experience with natural disasters and also on competencies and powers of city governments. Threats to urban areas result both from external and internal circumstances. The latter once are usually those of city governments' concern.

The paper will cover themes of risks of economic and social nature as well as risks to urban fabric. Typology of risks will be presented and potential effects for urban economy and society discussed. Both city and individuals / families perspectives will be used to present multi-dimensional effects of natural hazards. The concept of “institutionalizing resilience” will be introduced to analyze types of governance approaches that determine measures used by city governments to deal with problems resulting from climate change. Special attention will be put on methods of programming and planning (including spatial planning) future development. Basic rules will be discussed and recommendations formulated in order to make city governments efforts more effective.

The influence of horizontal atmospheric circulation on convection and on convection-dependent severe weather phenomena over Poland

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ABSTRACT

Atmospheric convection is a process in which air parcels move vertically as the result of differences in their temperature caused by heterogeneous heating; warmer parcels rise while colder ones sink due to different density. Because convection is the primary way of thermal transfer in the atmosphere, it is the main factor determining development of storms and storm-related severe weather phenomena. Floods, downbursts, tornadoes, heavy rain, hail, squall, etc. - all these phenomena originate from convective processes in the atmosphere. Having a better understanding of determinacies of these processes allows us to specify weather conditions preferable for strong, intense convection and for increased occurrence of severe weather phenomena, thus making it possible to forecast dangerous events and mitigate their consequences.

Because horizontal atmospheric circulation (i.e. horizontal movement of air masses) is the main factor differentiating weather conditions in consecutive days, research have been performed to determine its impact on convection development and on possibility of the occurrence of severe weather phenomena. For this purpose, atmospheric circulation types and convective indices for Poland have been calculated, on the basis of atmospheric soundings data from years 2000-2015. Relations between values of convective indices (showing, among other things, potential for convection development, strength and intensity of convection, potential for storm development or heavy rain, etc.) in various types of atmospheric circulation (cyclonic, anticyclonic or indistinct), with various directions of advection (inflow) of air masses have been determined and differences calculated.

It has been discovered that there are statistically significant relations between the strength of convection (and risk of the occurrence of severe weather phenomena) and the occurrence of specific types of atmospheric circulation. Achieved results make it possible to determine, for specific regions of Poland, types of circulation and directions of advection of air masses that are related to the increased risk of intense convection, storm development, heavy rain, etc. It means that, by monitoring current circulation conditions and their change over time, it is possible to forecast and asses the risk of the occurrence of convection-dependent severe weather phenomena, and to undertake relevant warning procedures for loss mitigation.

Cultural Constructions of Floods and Climate Change in Poland and Germany. Literary, Media and Agents Knowledge in Odra River Regions.

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Gabriela Christmann, Thorsten Heimann, Kamil Bemnista
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ABSTRACT

Ways of dealing with flood and climate change risks differ worldwide. Even similar climate scenarios from the natural sciences are treated differently. Thus to address suitable coping strategies for cities and regions, cultural characteristics need to be taken into account. What is required is empirical and conceptual work on cultural “orders of knowledge” in the social construction of floods and climate change.

The aim of our project is to investigate in how far local perceiving and coping with potential vulnerabilities and resiliencies – related to floods and climate change – is tied to and influenced by complex socio-cultural knowledge constructions of literature and public media discourse. Consequently, we ask: How are vulnerability and resilience constructions structured empirically in specific socio-cultural contexts and how are they rooted in cultural knowledge orders of societies?

To answer these questions we use three different modules bound by a triangulative research design: A literary discourse analysis (module 1) explores the historical genesis of core conceptions of flood and climate change related knowledge. A media discourse analysis focuses on knowledge constituted by public media (module 2). Finally, we explore how knowledge constructions of literature and public media discourse are shared and influence perceptions and action of local agents. Therefore we use qualitative interviews and a standardized quantitative questionnaire (module 3).

The research focus will be on selected Odra regions in Germany and Poland, where floods have become a hot topic at the very latest since the severe floodings of the last decades. The German-Polish research team comprises scholars from literary studies, cultural science and sociology. It is funded by the joint DFG and NCN “Beethoven” program.

Anthropogenic flash floods on rivers of Holy Cross Mts. region in 20th c. – origin and effects

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ABSTRACT

The research area is located in the northern part of the Holy Cross Mountain region (central Poland). This region is characterized by large industrialization (mining and metallurgy), which started in the Middle Ages (the Old Polish and later the Central Industrial District).

The iron ore resource base and water power allowed for the development of many smaller towns, where forges, smelters, and water wheel mills were functioning. This has resulted in the creation of numerous ponds, riverbed regulations and the construction of channels in order to provide sufficient energy. At the turn of the 19th and 20th century, the forges activity, and in the middle of the 20th century water mills were finally stopped. Some ponds were drained and their infrastructure destroyed, while others changed their functions to retention and recreation.

While the anthropogenic small retention from the Middle Ages had a beneficial effect on the regulation and rate of water circulation in the catchments, in the 20th century the deteriorating technical infrastructure was conducive to the catastrophic events formation not previously occurred in the Holocene. In the flood periods, break in the shafts and dams, resulting in rapid drainage of the ponds lead to create the flash floods downstream from the reservoirs. This kind of event took place at Czarna Konecka river in 1903 (Wąglów), 1939 (Wąsosz, Janów), the 70s (Małachów), 1976 (Janów), 1997 (Janów, Małachów) and at Kamionka river in 1939 (Rejów) and 1974 (Suchedniów).

The geomorphological effects of these flash floods were very large, even bigger than effects of secular processes. In Czarna Konecka valley at Wąsosz Stara Wieś few hundred meters downstream of the broken dam was accumulated very coarse channel sediments (pebbles, gravels and sands) mixed with the slags as a remain of the forge activity. The thickness of this cut-fill within the upper floodplain reaches 2 m, while on the lower step of it is about 30 cm thick layer of these sediments covered older alluvium. Alluvial bodies or layers of such coarse alluvia are not known from the older cut-fills of the Holocene floodplain. Recurring catastrophic floods have resulted in an incision of the riverbed downstream of Małachów about 2.5 m per 25 years. After 1997 the deposits eroded from this section has been accumulated (700,000 m³) in the Sielpia reservoir which the surface has decreased from 60 to 44 ha. In Kamionka valley downstream of Suchedniów reservoir, where in 1974 took place a break of the dam just after finished the construction work, in regulated riverbed accumulate large concrete elements of dam and embankments and even a 1 m in diameter sandstone boulder. Water management of reservoir also cause anthropogenic floods (eg 2010), that influence a texture of the floodplain alluvia. Grain size analysis of gravel bars on about 300 m section downstream of the pond indicated the fining sequence of deposits along with an increase distance from the dam. The finest sediments accumulated on the river bend, where the water speeds is decreasing during water discharge from the lake. Construction and the subsequent collapse of small anthropogenic retention led to create catastrophic floods in the valleys of the Holy Cross Mts. region, which had not previously occurred in the Holocene. They have transformed the morphology and alluvia of the flood plains.

Flash flood hazard in small towns of the Sudety Foothills in 2010-2016

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ABSTRACT

Mountainous areas are one of the most vulnerable areas to natural hazards. Among various types of disasters affecting these areas, flash floods are the most destructive phenomena (Barredo 2007). In continental Europe, typical flash floods result from locally confined, heavy rainstorm zones. According to studies of flash floods conducted in the Carpathian Mts. the zone of rainfall is usually less than 100 km² and most frequently even less than 25 km² (Lenart 1993; Bryndal 2015). Floods generated by this type of precipitation usually affect small catchments with area of less than 40 km² (Bryndal 2014, 2015).

Although local flash floods are among the most destructive disasters, relatively little is known about these natural phenomena occurring in the Sudety Mts. and Sudety Foothills.

Our paper focuses principally on flash floods that were generated in several tributaries (Kaczawa and Olszówka) of the Odra river system on August 5–6, 2012, after an extraordinary rainstorm in the area of the Kaczawa Mountains, Kaczawa Foothills and Izera Foothills. Main goals of our study is to analyse: (1) the meteorological setting of this heavy rainfall and the hydrological response of the catchment; (2) certain aspects of the flood risk management process. Additionally, smaller floods in the Sudety catchments in 2010, 2013 and 2016 were examined as well.

The meteorological settings were described using a synoptic map developed by the Institute of Meteorology and Water Management-Polish Research Institute (IMGW-PIB) and by daily summary of the synoptic situation. The precipitation was reconstructed based on telemetry-type rainfall network stations managed by the IMGW-PIB. In addition, Precipitation Accumulation (PAC) and SRI (Surface Rainfall Accumulation) data were used to obtain more detailed picture of the precipitation. Hydrological analyzes were base on data from the hydrological stations located at the Kaczawa river (Świerzawa) and Kwisia river (Lwówek Śląski). The flood peaks in the Kaczawa catchment and the Olszówka catchment were calculated after the flood. Hydrological modeling: Soil Conservation Service-Curve Number (SCS-CN) was also used in the study.

Flash floods in catchments under study were caused by sudden precipitation, however their course and impact was influenced and modified by morphological characteristics of the catchment area and human development within catchments. The impact of spatial planning practices on the course of floods was studied.

Hot and cold weather extremes – urban-rural differences of thermal stress in the Świętokrzyskie region over 2009-2016 period

Krzysztof Jarzyna

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ABSTRACT

Recent studies have shown an evident increase of heat waves' occurrence frequency and intensity in the Świętokrzyskie region over 1981-2015 period. However no clear tendency was found in the number of cold spells over this period. Moreover a severity of a hot and very frosty weather episodes appeared to vary significantly depending the local climate conditions. The aim of a current study is an assessment of differences between thermal and biometeorological conditions in the downtown of Kielce (the region's main urban center) and in the adjacent rural area during hot weather and very frosty weather episodes which occurred in 2009-2016.

Data sets used in the study derive from: IMGW-PIB weather station Kielce-Suków (rural area) and WIOŚ measurement point in the Jagiellońska Street (Kielce's downtown). Cold spells were defined as at least 3 days with maximum daily air temperature dropping below -10.0°C . Heat waves were defined as at least 3 days with maximum daily air temperature above 30.0°C . WBGT index and WCI index values were used to assess biometeorological condition during heat waves and cold spells respectively.

Two cold spells and ten heat waves occurred in the study area during 2009-2016 period. Cold stress was higher in the rural area as compared to the urban area in the course of cold spells, and, conversely, heat stress was higher in the urban area as compared to the rural area in the course of heat waves. Biggest differences of thermal conditions in rural and urban areas occurred in the nighttime.

As the cold stress is high in rural areas in wintertime partially due to higher wind speed than in the urban areas it is essential to provide shelters from the wind, e.g. in every bus stops. Shelters can be useful during heat waves too, as they stop direct sunlight. They should be accompanied by benches allowing to have a rest.

Ecological Challenges and Extreme Climatic Events Assessment for Disaster Risk Reduction in High Altitude Region of Himalaya Ecosystem: A Case Study of Alaknanda River Basin, Uttarakhand, India

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ABSTRACT:

This paper has describes the socio-economic characteristics and ecological challenges for sustainable development. Anthropogenic activities are continuously disturbing the natural system of the Garhwal Himalaya and its impact on extreme hydrological events. Factors causing these changes have been attempted to be understood through the use of GIS and Geospatial techniques. Human interference, unscientific developmental activities, agriculture extension, tourism activity and road construction are creating the hydrological hazards. Soil erosion and landslide have been recognized as major hazards in the high altitude region of Himalaya. This Paper has analyses and evaluate the Climate and Livelihood Vulnerability assessment and its adaptation for sustainable development in the near district headquarter (NDH) & away district headquarter (ADH) determined mainly by a weighted matrix index. Qualitative research methods included participatory research approaches (PRA) at village level has been used for ecological challenges assessment. The present study attempts to formulate sustainable development strategy and disaster risk reduction techniques/methods. This paper has examines the possible ways to improve their living standards through ecotourism for sustainable development.

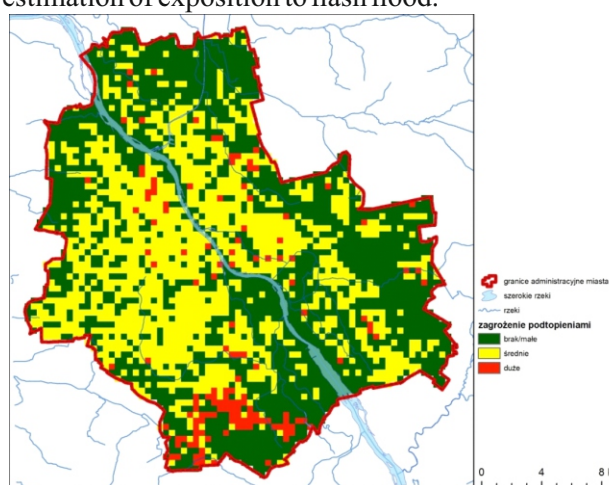
Map of the contemporary hydrological hazards in the city of Warsaw

Maciej Lenartowicz, Artur Magnuszewski

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ABSTRACT:

Map for the City of Warsaw was prepared for the project: LIFE13 INF/PL/000039 LIFE ADAPTCITY PL “*Preparation of a strategy of adaptation to climate change with use of city climate mapping and public participation*”. Two types of hydrological hazards had been taken in to account: flood from the Vistula River and flash floods from intensive rainfall. In this presentation we present method of GIS estimation of exposition to flash flood.



Exposition to flash flood is evaluated by the determination of local terrain depressions with a high proportion of impermeable surfaces, and located in the area of high precipitation totals. The area of the city with highest exposition to flash flood makes 4 % of the total city area, with average exposition 41 %, and low exposition 55 %. All terrain with the dense building coverage is in the class of average exposition. Southern area of the city with a moderate density of the buildings coverage has a high exposition to flash floods due to

a relief with a local depressions and impermeable soils made of clay and boulder clay. Map had been verified by the comparison to Fire Department reports from their 3130 interventions from the period 2008 – 2013.

Extreme events results ' estimation based on Polish method and Post-Disaster Needs Assessment PDNA

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ABSTRACT:

The aim of my speech is concentration on drawbacks of Polish method of estimation damage and loss caused by extreme events. The collected during research material indicates that there is no one, universal way of estimation damage and loss. Because of this, the choice of method should be considered individually and conditioned by the type of extreme events, the scale of its influence and sectors which have been affected the most. Nevertheless, there are methods, which are more often taken advantage of in assessment of disaster results than other ones. In the speech, there will be characterized one of them - Post-Disaster Needs Assessment (PDNA).

PDNA establishes combines the macroeconomic loss assessment and the identification of social needs related to recovery based on information from the public. On the base of carried out documents ' analysis it was proved that the method PDNA works in the case of natural disasters covering significant territory of the country. In turn, the Polish method successfully can be used during assessment of extreme events' results of local range.

Nevertheless, the existing in Poland method of estimating damage and loss, does not allow to obtain reliable picture of extremes ' impact, because it comes down mainly to results 'assessment in two sectors : agriculture and infrastructure. In this situation there arises a question: in what way it can be improved to make the conducted estimations to reflect real results of extreme events . On the base of conclusions from the analysis of PDNA in the speech there will be suggested some solutions, which realization will allow to improve the way of estimation of damage and loss applied in Poland.

What is interesting, some the part of them, can be used at once and does not demand significant involvement from the objects taking part in the process of estimation of damage. The speech will be supplemented with conclusions from direct interview with the members of commission of damage ' estimation. The determination of “bottlenecks” related to the existing method for collecting information and recommendation in the range for its improvement are a first step toward comprehensive assessment climate change to the extreme events.

Feasibility study of flood risk monitoring based on optical satellite data

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ABSTRACT

This article presents an extensive feasibility study of using optical satellite data for flood risk monitoring. The research presented was conducted as part of the SAFEDAM project – “Advanced assistive technologies to prevent threats associated with floods” financed by NCBiR. The aim of the SAFEDAM project is to develop an innovative system enabling monitoring the risk of floods from rivers in Poland using inter alia unmanned aerial platform, satellite and aerial imagery. For this purpose different photogrammetric and remote sensing techniques were tested and used in monitoring of flood phenomenon and the condition of levees. A review of existing and archival satellite systems will be shown. The capabilities and restrictions of usage of earth observation data will be presented regarding to the identified threat and taking account the size, genesis and cause. The initial results of the studies demonstrate a potential of very high and high resolution satellite imagery for operational detection of damage and risk areas. The analysis shows that it is clearly possible to detect damage in turf on the levees of not less than 0.1 m. Minor changes of a few or dozens of centimeters are impossible to recognize. Only significant changes can be detected using satellite imagery with a resolution of 5 m or more. Examples of such damage may be those related to human activity, with approximate dimensions of 10-15 meters. Sentinel-2 can be used to identify such large area changes. The automatization of satellite data processing (from different satellite systems) gives opportunities for hydrological services and crisis management professionals to access the accurate and actual information about the levees condition for early detection of flood risk.

The high resolution PM3D model for flood risk management along the southern Baltic coast

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ABSTRACT

The new parallel version of three-dimensional hydrodynamic model of the Baltic Sea (PM3D), developed at the Institute of Oceanography, University of Gdańsk in Poland was used to simulate storm-related sea level variations along the southern Baltic coast in 2010-2015. The high resolution grid (0.5 NM) applied to the modelling of the southern Baltic hydrodynamics resulted in a much better description of the coastline and the area's bathymetry, and in an improved fit between the modelled and the observed distributions of water level series. During the examined 6-year period, the correlation coefficients between the simulations and readings from water level gauges located along the southern Baltic coast exceeded 0.93 and the NRMSEs decreased to below 4%. The highest rate of simulations matching the observed readings within the range of ± 0.15 m was found in Ustka (more than 95%). The PM3D performed slightly worse for stations with larger ranges of water level oscillations.

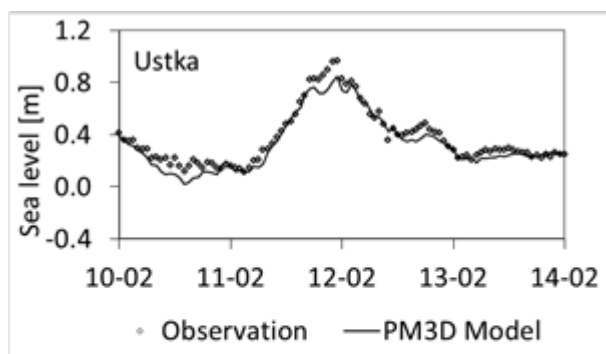


Fig. 1. Observed and modelled sea levels in Ustka during the February 2011 storm surge (in m, relative to mean sea level).

The evaluation of the model's performance during storm surges that occurred in 2010-2015 showed a good representation of events characterised by rapid water level fluctuations. When the water level varied extensively (e.g., as observed during the February 2011 storm surge, Fig. 1), the PM3D generated relatively good simulations, properly predicting the timing and extent of maximum values with errors usually not exceeding 0.15 m.

A quick website access to daily hydrological forecast within the SatBałtyk System (<http://satbaltyk.iopan.gda.pl>) provides potential users with an opportunity of predicting the magnitude and duration of storm surges. Therefore, the PM3D may prove of assistance in flood risk management in the coastal and river mouth areas of the southern Baltic Sea.

Flood risk projection in the 21st century– the Biala Tarnowska case study

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ABSTRACT

The aim of this study is to present the projections of flood-risk for the 21st century based on a semi-distributed emulator of a distributed flood routing model MIKE11 for the Biała Tarnowska catchment used as a case study. The methodology applied follows the modelling chain including GCM/RCM based future climate model projections, hydrological precipitation-runoff models and flow routing model. The MIKE11 model emulator, based on a Stochastic Transfer Function model, is used to derive the distributions of maximum flood inundation area at the Tuchów meander in Biala Tarnowska for an ensemble of seven climate model projections of temperature and rainfall in the 1971-2100 period.

The sensitivity of the maximum inundation area at the Tuchow meander to changes in temperature and precipitation projections is assessed. It is demonstrated that the application of the emulator allows the predictive uncertainty of the model to be taken into account during the derivation of probabilistic flood risk maps. The discussion of the implications of the approach presented on the flood risk management is given.

ABSTRACTS OF POSTERS

Flood Hazard Mapping by Using Geographic Information System and Remote Sensing

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ABSTRACT

Since the earliest recorded civilizations humans have tended to settle near streams because of the advantages of favorable climatic conditions and proximity of water supplies. Most of floodplain areas are multiple urban settlements in the World. As a result, considerable percentage of global population live in the floodplain. According to UNDP (2004), between 1980 and 2000, in more than 90 countries throughout the world, about 196 million people have been exposed to flood disaster. The Disaster cause great loss of life and property in the worldwide and it is hardly possible to avoid the impacts of a flood completely, but its effects can be reduced with structural and non-structural approaches. Furthermore, United Nations (UN), Federal Emergency Management Agency (FEMA) and World Meteorological Organization (WMO) underlined the deficiencies against floods and stated that it is possible to minimize the flood-based losses with “Sustainable Flood Management” approach.

These approaches require good quality data on topography and proper representation of features that might be affected by floods. High spatial resolution Remote Sensing (RS) images make it possible to obtain accurate, reliable and up-to-date spatial information. This study investigates the potential advantages of using flood modelling tool coupled with Remote Sensing (RS) data in the production of flood maps within Geographical Information Systems (GIS) environment in Flood Management approach. Guneyisu creek and its basin in Rize province is selected for this study and flood maps were produced for this study area. Along Guneyisu Creek, the zones that might be affected by a potential flood are delineated using the flood modelling and the buildings, roads and land use types within these zones are determined with the integration of GIS and RS.

Developing Long Term Regional Flood Damage Reduction Strategies for a Rural Flood Prone District of Turkey

Cagla Melisa KAYA¹, Leyla DERIN², Emre AKCALI³

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ABSTRACT

Floods are the leading natural disasters affecting the human life in so many negative ways by causing small/large-scaled socio-economic disasters. Apart from the human life and property, the floods damage the living spaces, irrigation networks, transmission lines, sewer systems, transportation networks, trade zones and cultivated areas. Like many other natural disasters, complete protection from risk of flood is often unrealistic and unsustainable, but can be limited by flood adaptation strategies. Flood adaptation strategies includes structural (dams, flood levies, ocean wave barriers, evacuation shelters etc.) and nonstructural (flood forecasting, risk reduction strategies, emergency planning, land use planning etc.) measures taken to reduce flood vulnerability.

Flood vulnerability is a complex issue because of the nature of the river ecosystem and other parameters (climate, demographic and socio-economic characteristics, infrastructure, population, presents measures, topography, land coverage of region etc.). It varies topographically even in closed regions. For this reason, local risk reduction strategies are also crucial as well as regional and national ones, and these strategies should be determined by considering the characteristics of the place. This study investigates that flood damage reduction approaches describing the determination of the potential areas vulnerable to a one in 25 years flood event in the Taslidere Creek using a flood spreading model (HEC-RAS). The zones which are likely to be affected by a potential flood and elements under potential flood risk zones have been determined with the integration of Geographic Information System and Remote Sensing. Finally, based on the results Flood Damage Reduction Approach are proposed considering the regional characteristics of the region.

The role of memorialisation in disaster risk preparedness and post disaster recovery

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ABSTRACT

At 2:46 in the afternoon of the 11th March 2011, one of the strongest earthquakes registered in the last century stroke Japan's East Coast with a magnitude of 9.0. The shake induced a tsunami that hit all the coast from North to South and a nuclear fallout at Fukushima Dai Ichi Nuclear plant. The disaster caused an overall of 18,703 casualties, the displacement of 282,000 people, and incredible damages to buildings and infrastructures

Despite Japan's advanced measures in disaster risk reduction, such an outcome has pointed out a lack of preparedness at certain levels of management. Based on the lessons learned from this disaster, numerous reports with suggestions on improvements for resilience and recovery have been published. Collocated in this research field, the presentation aims to investigate the role of memorialisation, proposed as a tool of disaster risk preparedness to raise awareness among the local communities and avoid the oblivion. To do so, the history and effectiveness of the memorialisation of disasters previous the Great East Japan Earthquake and Tsunami (GEJET) will be stressed and analyzed in comparison with some examples of memorials of the GEJET. There are records of ancient warning systems located along the Japanese coast, consisting in stones describing the likelihood of that area to be inundated by tsunamis and warning not to build around there. Another example are dialectal common sayings, reminders of how to behave in case of tsunamis. Despite the terrible outcomes of the triple disaster of the GEJET, these measures have in some cases served their warning purpose. In parallel with this discourse, the role of memorialisation as a tool to strengthen the affected community in the recovery process will be addressed. As mentioned above, entire cities have been entirely or almost entirely washed away by the tsunami, whereas some others have been evacuated because of the danger of radiations. Together with the cities, also their cultural heritage and their related intangible heritage have been destroyed, leaving local communities without a local identity. Memorialisation of the disaster can in some cases represent a starting point for the creation of a new *genius loci* of the urban area, as it would represent the creation of new heritage. However, it has to be acknowledged that in this situation the focus would not be on the disaster itself, but on the efforts of the community to recover. Some examples concerning the intangible heritage will be provided, such as memorial ceremonies or new traditions.

The case study of Japan aims to serve as an example of memorialisation that can be applied in other post disaster scenario, as an additional community centred tool to recover and raise awareness.

The natural hazards occurring in the eastern part of Beskid Żywiecki and the local communities' sensitivity to these dangers

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ABSTRACT

The research was conducted in the eastern part of Beskid Żywiecki which is amongst the regions that are significantly exposed to natural hazards.

The most important danger for the region are natural disasters associated with lack of water (droughts) or excess of it (floods). Because of prolonged, intense rainfall old landslides become active again, and the new ones occur. Moreover, strong wind also poses a great danger, resulting in economic losses especially in woodlands (vast windbreaks and windfalls). However, these are not the only natural hazards that occur in the area. These involve also hailstones and violent storms with thunderbolts. Cold winters, during which the minimum temperature locally drops below -30°C. are also a major inconvenience for the region's inhabitants. During disastrously snowy winters, the thickness of snow in valleys achieved nearly 2 meters.

The main aim of research was to analyse natural hazards occurring in the eastern part of Beskid Żywiecki and the local communities' sensitivity to these dangers.

During the research, field and site-specific works were conducted. The field research comprised geological mapping of landslides and areas threatened with floods. There was also geological mapping of vast post-windbreak areas conducted. The analysis of historical events was performed on the basis of literature and archive works, for the period 1801-2015. Furthermore, meteorological (sum of precipitation, maximum and minimum temperatures, snow depth, maximum wind speed) and hydrological (peak discharge, yearly minimum flow) data of the IMGW-PIB (Institute of Meteorology and Water Management - National Research Institute) were used, for the period 1961-2015. The study of sensitivity of local communities to particular natural hazards was conducted in a form of surveys of the people inhabiting all the towns and villages in the research area.

Supercell tornadoes in Poland

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ABSTRACT

In recent years were noted no more than ten cases of supercell tornadoes in Poland. Unfortunately, due to the lack of basic emergency warning system, even those few events happen to be highly destructive and pose threat to human life or well-being. This is mainly the outcome of selective monitoring of tornadoes performed in our country and no practical application of radars to detect them.

The aim of this study is then to specify potential meteorological conditions characteristic for that day when supercell tornado occurred in Poland, as well as to evaluate the possibility to detect it by means of available methods and devices. The article presents the course of tornadoes in Poland and analyzed in detail three selected cases of tornadoes.

Based on ESWD reports, a set of tornado-type occurrences was selected. Several radar products were analysed in time intervals of 10 minutes. The following parameters were considered: maximum values of reflectivity, values of reflectivity at a height of 1-2 km above sea level, vertical wind profile, vertical wind shear, as well as echo height. Based on the damage in the forest stand, witnesses and film or photographic documentation, recreated the path of tornadoes in that day. Moreover, the type of storm formation and the altitude of storm cloud tops, was defined. Additionally, satellite images, synoptic maps and vertical aerological soundings were used. Among others the convective parameters and wind shear indications were calculated.

City development and impact on flood risk - an example of the right-bank Warsaw

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ABSTRACT

The main aim of the study is to show the variability to the flood hazard, depending on the functional changes of the Warsaw right-bank area. Historical maps and city plans (from years: 1790, 1867, 1924, 1932/33, 1945), aerial photographs and laser scanning images (years: 1982, 2001, 2010, 2016) are used in the analysis of development changes. Selected materials are rich in the content and come from the reference periods of the city expansion.

In the ArcGIS program version 10.5 all maps and images were imported and registered to a common coordinate system. There are 8 basic forms of land use designated (low buildings, high buildings, roads, meadows and pastures, farmlands, forests or parks, waterways, others). At first, their statistical characteristics were calculated. Then the value of the share of particular forms of development will be calculated within the boundaries of the current floodplain of the city and the appropriate weights of the roughness coefficient, which are one of the components of the Manning formula used to compute the average fluid velocity in the open channel flow conditions. The resulting inundation volumes will also be presented in several random compilations to investigate the impact of changes in the valley's development on the extent of the flood risk.

The second method of estimating the predicted flow is to reuse ArcGIS program. In this approach buildings location at historical maps will be analyzed in respect to the valley forms. The results will allow us to assess changes in the development, flood threat and flood risk in Warsaw at the turn of the last century.

The presented results are a part of the MSc thesis entitled 'Historical changes in the development of floodplains of the right-bank Warsaw', supervised by Barbara Nowicka, PhD. at the Institute of Hydrology, Department of Physical Geography at the Faculty of Geography and Regional Studies of the University of Warsaw.

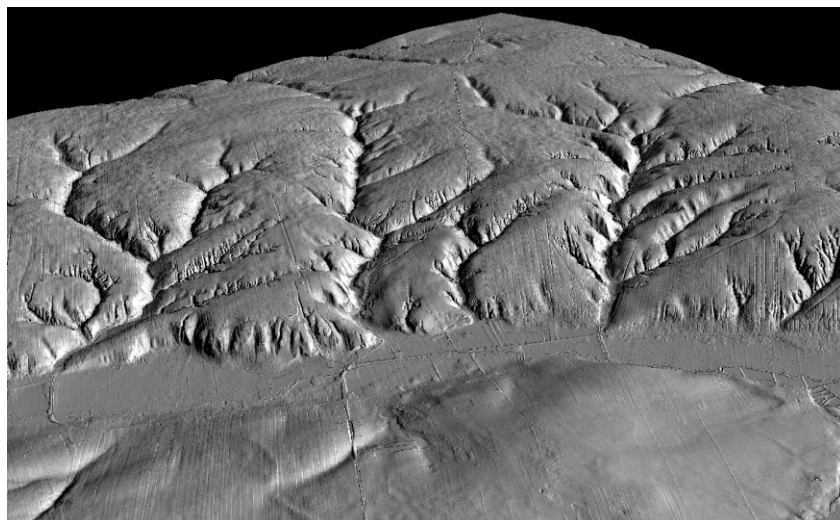
Aerial photogrammetric data in a gullies erosion hazard study – an example from the Dzierzkowice area (Lublin Upland, Poland)

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ABSTRACT

Gully erosion is a process which shaping loess relief upland areas. Mastering the gullies through the forests greatly reduced their further development. However, they are still the most active slope forms, which are influenced by anthropogenic conditions, especially the use of land cover. Loess areas are particularly vulnerable to erosion. Due to their considerable predisposition to the development of linear erosion, they belong to areas particularly vulnerable to the development of gullies. It is an upland nature that is cut into river valleys and numerous gullies. The terrain is characterized by the long valleys of Wyżnica. It is characterized by asymmetrical slopes. The left side is higher and more steep than the right. The methods of aerial



Network of the gullies

photogrammetry have been used to study changes in the course of gullies. Altitude data from Aerial Laser Scanning (ALS) and aerial photography were used. Aerial photographs and ALS elevation points generated digital terrain models. The final result was the generation of differential models that allowed us to evaluate changes in the course and extent of the gullies.

The effects Mount Saint Helen's volcanic eruption in 1980 and proposals for reducing volcanic risk in the region of the USA.

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ABSTRACT

On 18 May 1980 occurred volcanic eruption in Mount Saint Helen in the west of the USA, which was caused by earthquake with estimated M 5.1. That volcano made self-destructed by shooting part of its peak causing the biggest landslide recorded in history of USA and also it caused the deaths of 57 people, including geologist David A. Johnston. It should be added that in the past, all eruptions of this volcano were at its peak, but this time it was different – it was the lateral blast off. It has caused almost 400 meters shot down of the crater, turning it into a huge avalanche of debris. After the eruption of the volcano in the 1980s, major changes occurred in the natural environment. Eruption of the volcano caused the existing ecosystems to be destroyed. Eruption of the volcano has also effected changes in tourism, e.g. changes in values (especially anthropogenic) and changes in the number of tourists before and after the eruption of the volcano.

In the case of next eruptions in that area, we can try to reduce the disaster risk by many preventative mechanisms such as: education of local people, monitoring techniques, making hazard maps or evacuation plans and developing communication system like National Volcanic Early Warning.

The main aim of this analysis is to answer the following questions: which zone around the volcano had the greatest destruction and how big was destruction? What actions should be taken to improve the safety of people living in the area and how to protect the environment from the effects of another volcanic eruption? The effect of this analysis is a destruction zones map and proposals actions how to reduce the disaster risk. The methods that have been used are: statistics analyses and literature or reports analyses. Also will be created a map which shows: -range of eruption (destroyed woods, glaciers, bridges, ways, lakes) with created equidistant lines which shows the scale of destruction in each zone.

There are 10 created zones (equidistant line) 0 on the map (one has 6.5 km width) and they shows that: the biggest number of destroyed lakes was in the 2nd zone, woods and ways in 3rd zone, glaciers in 1st zone, fire of woods in 4th zone. The biggest differences in the type of damage were in zones number 2, 3 and 4 - there were destroyed bridges, roads, forests and lakes.

A poster is based on BS thesis (2013) related on The Faculty of Geography and Regional Studies, University of Warsaw.

Community based interventions in HeiHe Village, YingJiang County

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ABSTRACT:

The purpose of this project is to conduct health needs assessment in an ethnic minority, poverty based disaster prone area. HeiHe Village is situated in YingJiang County, which is known to be a very active seismic zone, with earthquakes above the magnitude of 5.0 hitting the zone in 2008, 2009 and 2011. As a poverty stricken area, not only are villagers poorly prepared, but the weak infrastructure and precarious livelihoods negatively impact the villagers' resilience, thus magnifying the disastrous effects of the earthquakes. The analysis conducted not only evaluates figures and stories individually, but also integrates them to capture how this contradiction is what truly highlights the unspoken. 96.6% of the surveyed households believe disaster risk reduction is important, yet majority of households could not describe the pack's contents, nor could they provide proof that they had one currently prepared. This contradiction captures the village's unspoken challenges, barriers and attitudes towards risk reduction, and is indicative of how knowledge of disaster risk does not always equate to action. The poster will also explore the value of community based needs assessment



and intervention, as well as the importance of integrating risk reduction activities into internal developmental goals in HeiHe. Ultimately, through highlighting the contradiction between disaster risk knowledge and active risk reduction in HeiHe, the poster will explore the multi-faceted obstacles behind practicing disaster risk reduction and is important in evaluating and synthesizing an effective scheme to empower disaster prone communities such as this.

Using raster and vector data to identify objects for flood risk reduction. A case study: Raciborz

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ABSTRACT

The severe flood of 1997, which seriously affected Polish, Czech and German territories, gave impetus to research into the management of flood-prone areas. The material losses caused by the “Flood of the Millennium” totalled billions of Polish zloty. The extent of the disaster and of infrastructure repair costs changed the attitude of many branches of the economy, and of science. This is the direct result of consideration of the introduction of changes into spatial management and crisis management. At the same time, it focused the interest of many who were trained in analysing the vulnerability of land-use features to natural disasters such as floods. Research into the spatial distribution of geographic environmental features susceptible to flood in the Odra valley was conducted at the Faculty of Geography and Regional Studies of the University of Warsaw using Geographic Information Systems (GIS).

This study seeks to examine the possibility of adapting vector and raster data and using them for land-use classification in the context of risk of flood and inundation damage. The analysed area of the city and surrounding area of Raciborz, on the upper Odra River, is a case study for identifying objects and lands susceptible to natural hazards based on publicly available satellite databases of the highest resolution, which is a very important factor in the quality of further risk analyses for applied use.

The objective of the research was to create a 10×10-m-pixel raster network using raster data made available by ESA (Copernicus Land Monitoring Service) and vector data from Open Street Map.

Natural Hazards and Climate Risks in the Brazilian Agriculture: An Overview of High Temperatures

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ABSTRACT

This article analyses some aspects of effects caused by natural disasters (drought and extreme temperatures) and the impacts in all the regions of the Brazilian agriculture, in characteristic of crops, animal deaths, plants and destruction of productive infrastructure. To achieve this goal, the methodology combined qualitative research tools, with a literature review, field observations and result analysis. The literature review of the occurrence of natural disasters indicates that the impacts of extreme events on the agricultural sector e.g. floods, droughts and floods. In order to assess the impact of weather disaster on agriculture, one must link two fundamental aspects, first, the disaster proper i.e. the destructive power of the event and secondly, the characteristics of the agricultural system which has been hit. The disasters in Brazil that most affect the society are: floods, dry seasons and winds. The impact of disasters on agriculture in Latin America and the Caribbean, indicates that Brazil it the most affected country, resulting in floods and dry seasons. The sustainable strategies must be developed by public strategies to alleviate the impact of natural disasters on crop productivity. Remote sensing satellite information helps to minimize damages e.g. the death of cattle and the damage of agricultural production in time of natural calamities by early warning system. The occurrence of natural threats cannot be avoided, but it is possible minimize their impacts if we better understand how they happen. Some studies already indicate that produce food in a climate change scenario is one of the biggest challenges faced by families in rural areas. Because few crops can withstand average temperature rises (mainly the sugarcane), that could cause significant damage to Brazil, one of the world's biggest suppliers of food crops. The research shows that Brazilian production of rice, beans, maize and soya are all expected to decline, with coffee especially vulnerable.

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