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A preliminary post-event investigation of disasters: A case study of the 2008 Ghardaia (Algeria) flood and debris flow

Djillali Benouar, Hamoud Zelloum and **Fouad El Hadj**
University of Science and Technology Houari Boumediene, Algeria

This paper attempts, as a case study, to investigate, in a forensic style, the Ghardaia (Algeria) floods and debris flows of 1st October 2008 of which the official assessment of the catastrophe is very significant. Eight of the 13 districts of the surrounding Ghardaia province have been affected by the floods and 600 homes have been inundated in the town. However, considering the scale of the disaster– eight willayas were affected in a diameter of 30 kms along the River M'Zab and approximately 2,000 families in need. The floods also left about a 1,000 of people homeless and many other people are missing. Hundreds of people had to be rescued by helicopters and up to 600 houses are estimated to be destroyed in the rains of Tuesday, Wednesday and Thursday. It was reported in the press that 80% of human and material losses, caused by the flood, are mainly due to human error. It affirms, in this connection, it is the collapse of the walls of the dam of El Djarref Adira, 25km distant from the town of Ghardaia, which caused the death of 44 people and the disappearance of dozens of other. Heavy rains have caused the accumulation of water on over two kilometers in the dam. The water pressure caused a 70 meter opening in the dam and the flood run at more 1200 m^3/s on Ghardaia city. This is a huge quantity of water. It was an exceptional flood as it reached sebkhet Sefioune which is over 180km far from Ghardaia city. At Metlili city, a height of 6 m was recorded, while downstream of Ghardaia city, it was just under 8 m. It is recommended to make a detailed analysis to determine the causes and reasons that led to the collapse of the walls of the dam of El Djerraf built there barely ten years. Regarding flooding of the river, it was reported that the enterprise which made the development works of the river has seriously damaged the natural course of the river and its banks, without any preliminary planning made. Furthermore than the dam failure, the M'Zab Valley has to be considered in its entirety in order to explain the combination of failures that produced this scale damage. There is also the fact that all the rivers operated at full capacity this: rivers Labiod, Erguedane, Laadiret, Noumirt and Nssa. At the time of the surge, the waters in their have encountered sewage system filled of garbage, tree trunks, plastic bottle and bags, etc. Urban fabric has been involved seriously in the amplification of this disaster as well as the lack of a warning system as the huge amount of water came from the city of Hassi Rmel at 126 kms of the site of Ghardaia. A catastrophe of such a scope cannot have a single cause. It can be only the result of several failures and thus need a forensic style of investigations to determine the root causes of the disaster.

Biography

Djillali Benouar is Professor of Earthquake Engineering and Disaster Risk Management at the Faculty of Civil Engineering USTHB. He obtained his PhD at Imperial College, University of London (England) and his Master's in Stanford University, California (USA) and completed his Postdoctoral studies at the University of Tokyo (Japan). He received two international awards for his research from UNESCO and Thomson Reuters. He has published 40 publications in internationally reputed journals and has over 100 papers in international conferences. He is a founding member of the Algerian Academy of Science and Technology (AAST).

dbenouar@gmail.com

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