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From flood management systems to flood resilient systems: integration of flood resilient technologies

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Flooding has always been a major risk world-wide. Humans chose to live and develop settlements close to water (rivers, seas) due to the resources water brings, i.e. food, energy, capacity to economically transport persons and goods, and recreation. However, the risk from flooding, including pluvial flooding, often offsets these huge advantages. Floods sometimes have terrible consequences from both a human and economic point of view. The permanence and growth of urban areas in flood-prone zones despite these risks is a clear indication of the choices of concerned human groups. The observed growing concentration of population along the sea shore, the increase of urban population worldwide, the exponential growth of the world population and possibly climate change are factors that confirm flood will remain a major issue for the next decades.
Flood management systems are designed and implemented to cope with such situations. In spite of frequent events, lessons look to be difficult to draw out and progresses are rather slow. The list of potential triggers to improve flood management systems is nevertheless well established: information, education, awareness raising, alert, prevention, protection, feedback from events, ... Many disciplines are concerned which cover a wide range of soft and hard sciences. A huge amount of both printed and electronic literature is available. Regulations are abundant.
In spite of all these potentially favourable elements, similar questions spring up after each new significant event:
• Was the event forecast precise enough?
• Was the alert system efficient?
• Why were buildings built in identified flood prone areas?
• Why did the concerned population not follow instructions?
• Why did the dike break?
• What should we do to avoid it happens again?
• What about damages evaluation, wastes and debris evacuation, infrastructures and buildings repair, activity recovery, temporary relocation of inhabitants, health concerns, insurance concerns, water-resistant materials, vulnerability assessment ?

Flood resilient system (FReS) concept has been proposed as a new framework to address flood situations. Such systems intend to better approach such situations from a holistic point of view. FReS encompass ecologic, spatial, structural, social, disaster relief and flood risk aspects. FReS design and implementation conditions have been addressed by the FP7 SMARTeST (Smart Resilience Technology, Systems and Tools) project. The focus of this Project on the use of available and innovative communication, forecasting and flood protection technologies leads to an original contribution which highlights both the scope and the limits of this technology driven approach. These reflexions contribute to the elaboration of guidelines for the design of FReS.