In need of a FRIEND: Implications of a rehabilitated hydrometric network in southern Somalia

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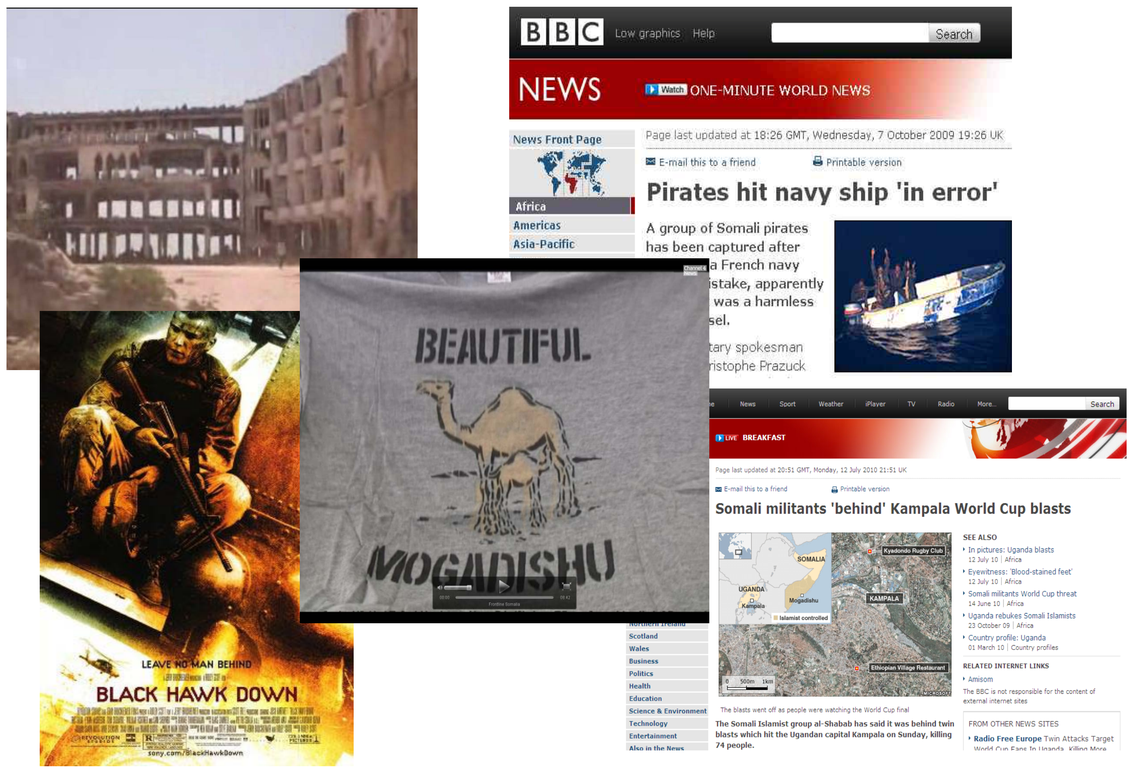
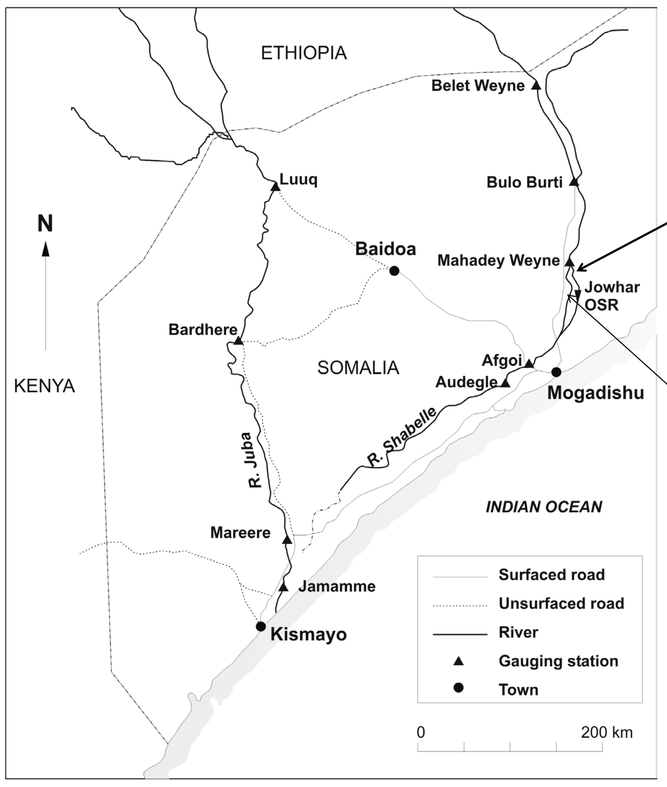
1. Somalia in the Horn of Africa has a largely arid to semi-arid climate which limits rain-fed agriculture and causes a heavy reliance on irrigation. The water resources of the Juba and Shabelle rivers in southern Somalia are very important for food security and national development. A hydrometric network successfully operated by the Somali Ministry of Agriculture was neglected and abandoned at the outbreak of civil war in 1991, resulting in an enforced cessation of data collection. Effective water and land management are both essential to ongoing relief and rehabilitation efforts, and require good quality information on the country's land and water resources.



Acknowledgements clockwise from top right: BBC News x2, Columbia Pictures, Channel 4 News x2.

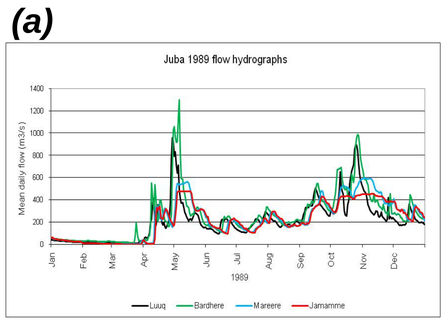


Southern Somalia showing Juba and Shabelle rivers, locations of past and present river gauging stations, and Jowhar Offstream Storage Reservoir.

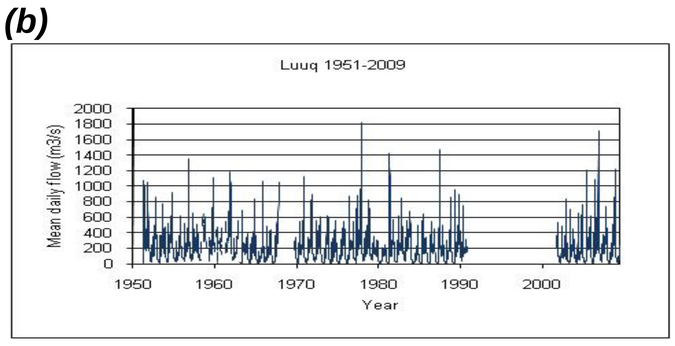
2. Current flow data are needed for a flow forecasting model and for day-to-day water management. Long flow records are important for detecting changes in flow regime and designing water-related schemes. Since 2001, parts of the Somali pre-war hydrometric network have been reinstated by the FAO Somalia Office, based in Nairobi. NGO staff in Somalia have been trained to read staff gauges daily, record measurements and transmit data by radio, phone or email. The stations are all natural, rated sections positioned on or near bridges. Annual flow hydrographs show two distinct flood seasons (Figure ***(a)*** below left). Frequent shifts in the ratings may be anticipated, but it was not possible to commence discharge measurement (which was not made on a regular basis even before the war) until 2009.

3. The challenge is to assess the implications of the 11-year hiatus in data collection, and the now much reduced monitoring network, with respect to emerging needs for assessing and managing water resources. *How legitimate are the new flow data derived using pre-war ratings? To what extent are the longer pre-war data representative of present conditions?* The post-2001 flow data appear to be reasonably consistent with the pre-war data ***(b)***, but reveal shifts in the relationship between adjacent stations on the same river ***(c)***, most likely caused by changes in datums/ratings. However, the % errors in estimation of key flow statistics from the new data are decreasing quickly ***(d)***.

(a)



(b)



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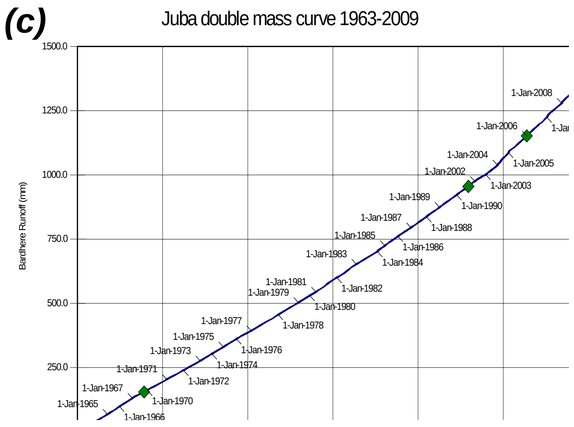
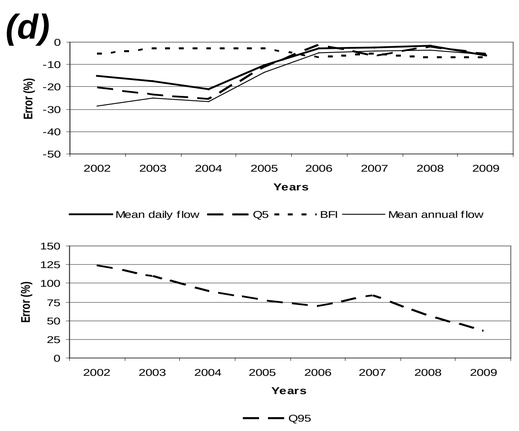
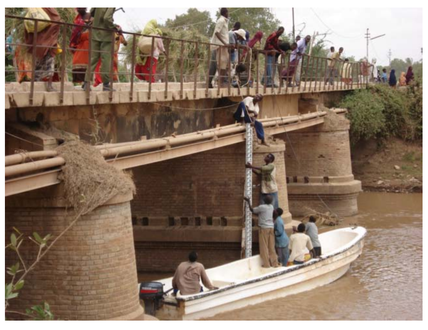


(d)



Juba river: (a) 1989 flow hydrographs. (b) Luuq 1951-2009 flow series at Luuq. (c) Luuq v Bardhere double mass plot. (d) Luuq variation of %error with time in key flow statistics from new data v long-term values.



New staff gauge installations. Clockwise from top right: Juba at Bardhere (2001), Shabelle at Jowhar, at Afgoi, at Audegle (all 2008).

4. Initial work focused on systems and standards for collating, validating and archiving the new data; recent work has been directed towards analysis and comparison. The quality and length of record make the pre-war dataset a valuable resource. There is no indication that these data are no longer representative and, once queries about datum adjustments and ratings of the new data are resolved, the two series can be usefully amalgamated. The problems faced in Somalia have relevance to other situations where there has been a similar decline in data collection.

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