Transforming Responses to Disaster-Related Displacement through Artificial Intelligence

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THE WORLD BANK
IBRD • IDA

Global stressors increase risk of instability and the vulnerability of the poorest

Shocks drive people into poverty & migration

**Climate change**

↓

Displacement

↓

Increased risk of violence

Timeline of Events
Prior to the 2011 Uprising

2003-2010: Iraqi and Syrian Refugees and Internally Displaced Persons (IDPs) Net Urban Influx [in Millions]

Syrian IDPs

Iraqi Refugees

1970s-1990s
Agricultural policies promote production of staple crops, leading to increase in number of groundwater wells and use of inefficient and outdated irrigation methods

Drought (1988-1993)   Drought (1998-2000)

Drought (2005-10)
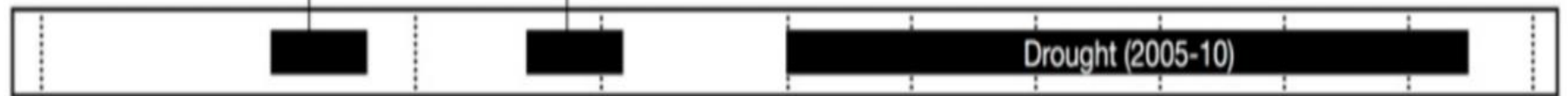
1971   1995   2000   2005   2006   2007   2008   2009   2010   2011

12 March, 1971
Hafez al-Assad becomes president of Syria

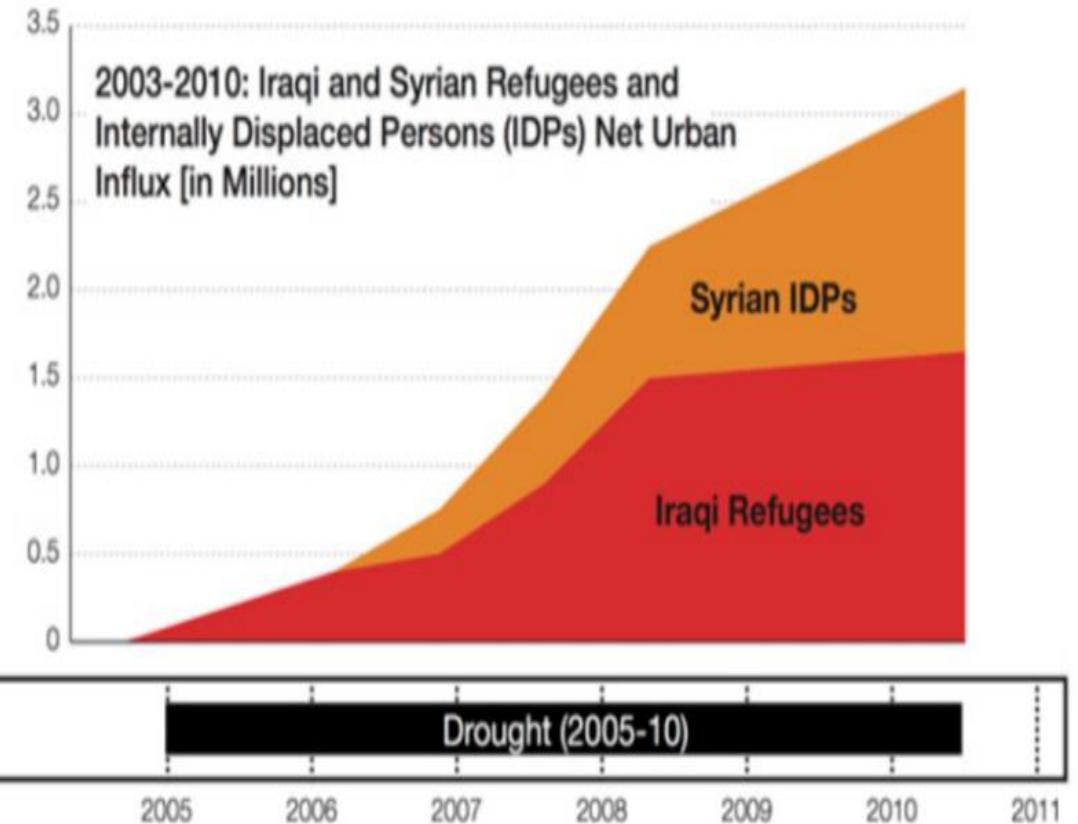*Syria achieves self-sufficiency in wheat production*

Drying of the Khabur River in NE Syria

Since 2005
Apartment prices in Damascus have more than doubled

Winter 2007-08: Driest in observed record

Since 2007
Wheat, rice, and feed prices have doubled

March 2011
Uprising in Syria

The Pacific is **Vulnerable** to similar stressors

Honiara, Solomon Islands

Preventing violence is cheaper than responding to it

TABLE 1 Modeling the Returns on Prevention under Three Scenarios

	Scenarios		
	Optimistic	**Neutral**	**Pessimistic**
Assumptions:			
Lost GDP growth per conflict year (percent)	5.2	3.9	2.5
Cost of prevention (US$, millions)	100	500	1,000
Effectiveness of prevention (percent)	75	50	25
Prevented damage (US$, millions)	68,736	34,251	9,377
Saved costs (US$, millions)	1,523	1,176	698
Additional cost (US$, millions)	−352	−2,118	−5,247
Net savings per year (US$, billions)	**$69,6**	**33,3**	**4,8**

Note: Prevented damage is the prevented economic damage and deaths; saved costs are the saved costs from late intervention costs related to peacekeeping and humanitarian assistance that become unnecessary with prevention; and additional costs are the additional costs needed for prevention efforts.

# World Bank FCI GP pilots displacement response mechanism

*"... a big new focus on **adaptation**, for which we will be heavily reliant on securing **additional international public finance.**"*

Hilda C. Heine, President of The Republic of The Marshall Islands

To truly fight climate change, we need to set our sights higher - Opinion (CNN October 2018)

'Need' is informed by access to services:
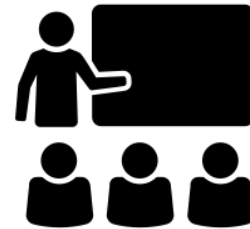
Increasing key services during displacement is critical

The need of displaced and host communities is difficult to determine

Available data is often inconsistent, easily manipulated, and difficult to check.

Artificial Intelligence,
satellite-generated imagery,
and big data can change this.

Combined technology enables clarity and time-sensitivity in observing complexity ('need')

Satellite-generated imagery
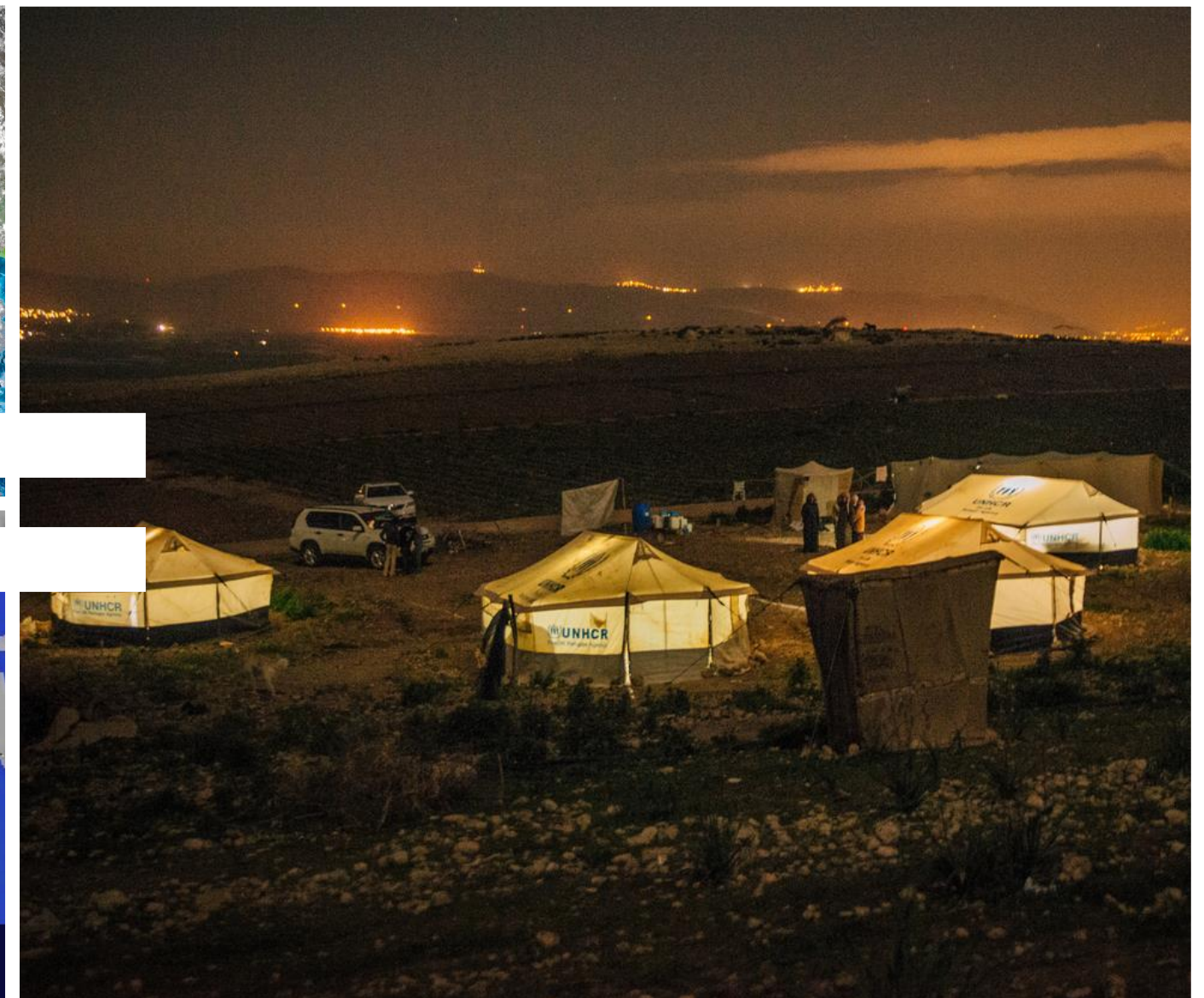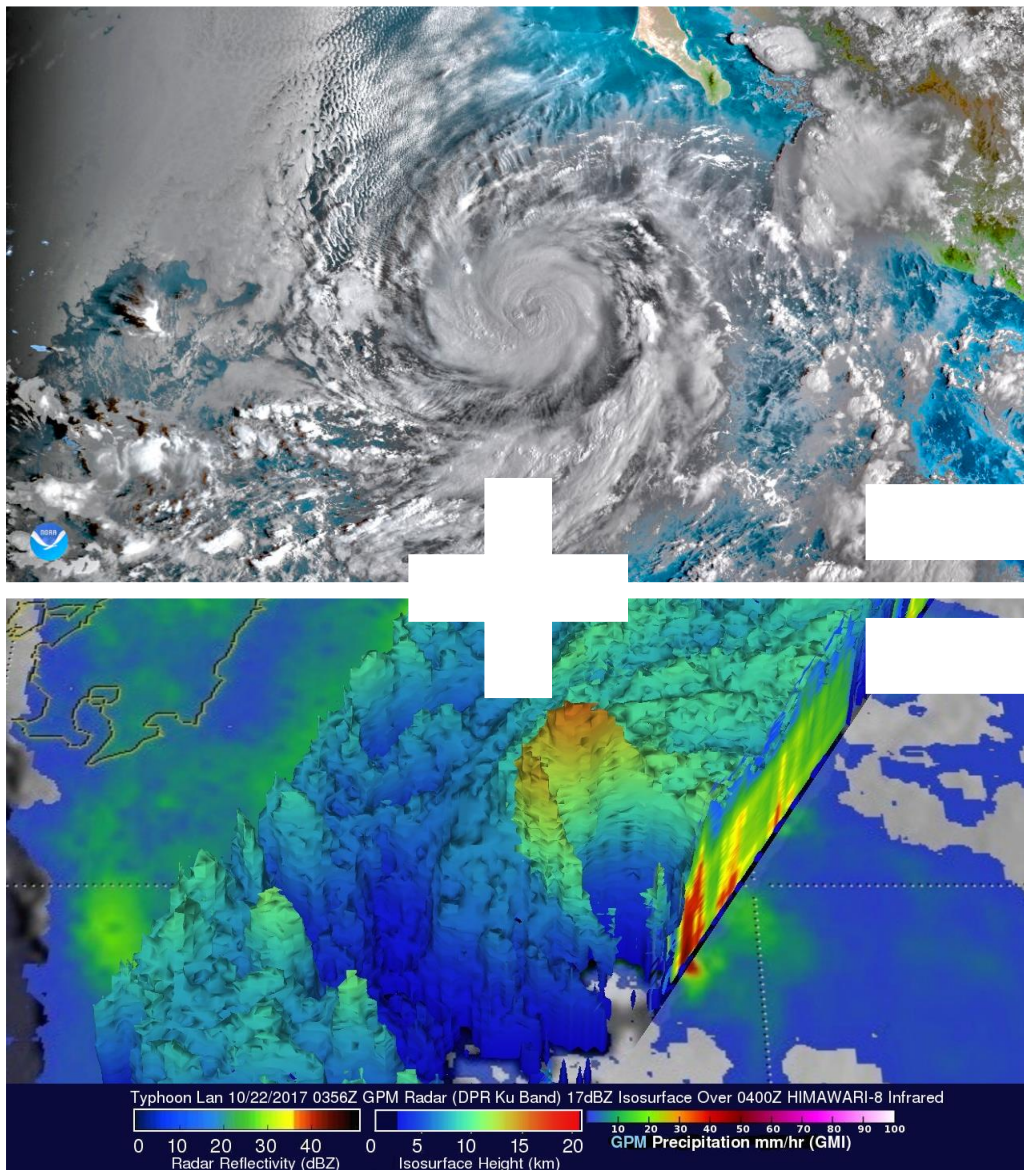
Identification of number of ...

Typhoon Lan 10/22/2017 0356Z GPM Radar (DPR Ku Band) 17dBZ Isosurface Over 0400Z HIMAWARI-8 Infrared

Radar Reflectivity (dBZ): 0 10 20 30 40
Isosurface Height (km): 0 5 10 15 20
GPM Precipitation mm/hr (GMI): 10 20 30 40 50 60 70 80 90 100

image recognition software

... affected persons and & levels of need

Specialist expertise needed to access data

The Open Geospatial Consortium

World Wide Web Consortium (W3C)

Example: Assessing Water Availability

Publishing and Using Earth Observation Data with the RDF Data Cube and the Discrete Global Grid System

W3C Working Group Note 28 September 2017

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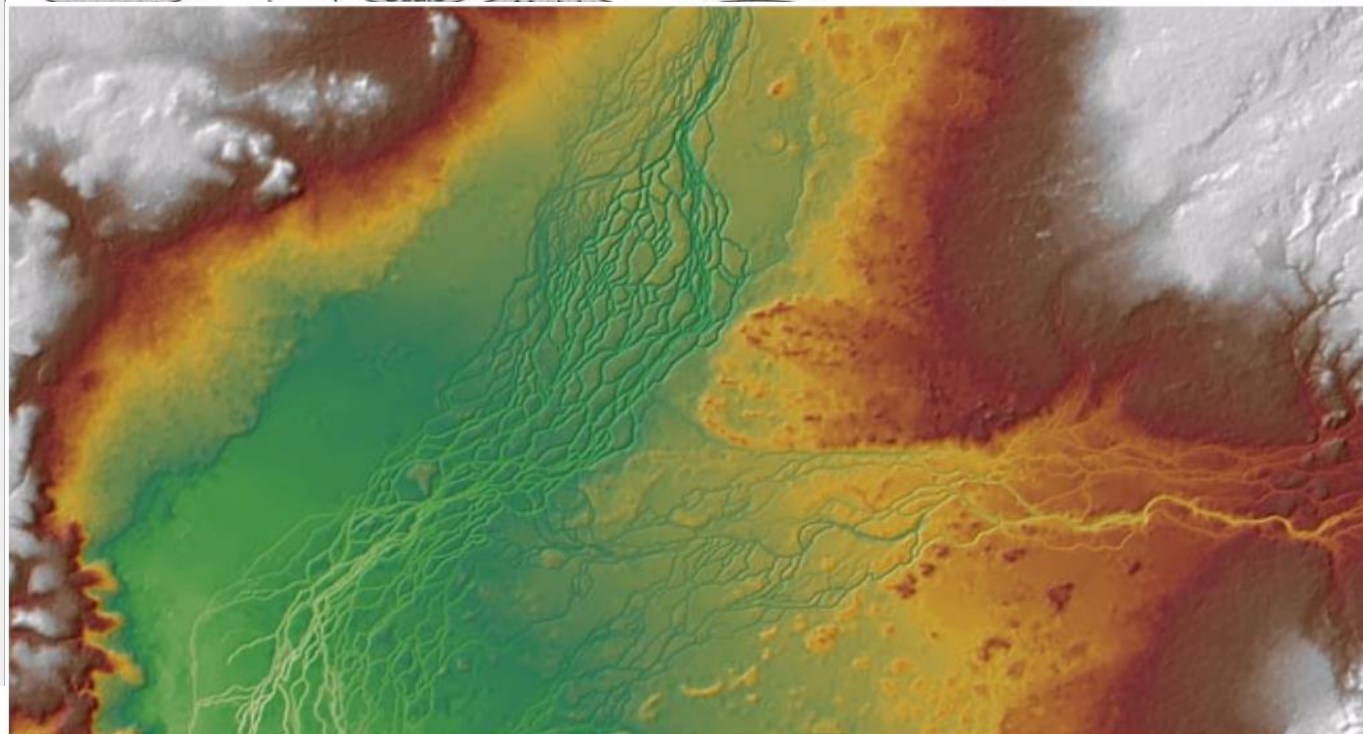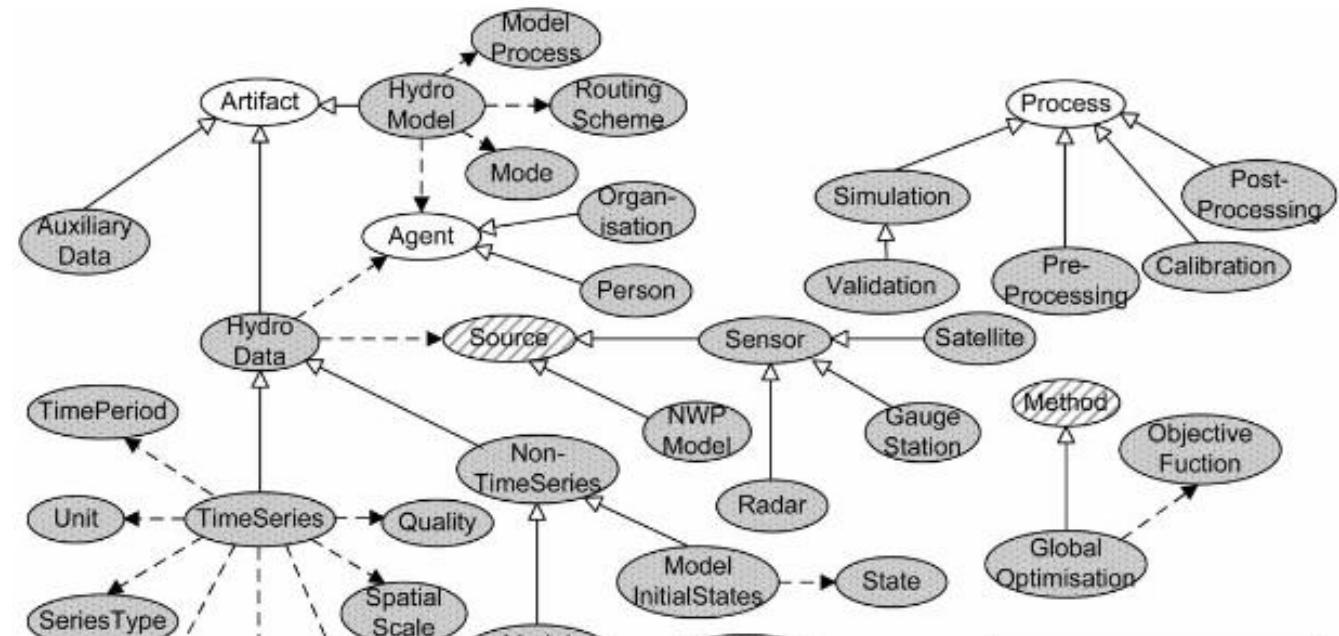**Contributors:**
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Abstract

This document describes how dense geospatial raster data can be represented using the W3C RDF Data Cube (QB) ontology [vocab-data-cube] in concert with other popular ontologies including the W3C/OGC Semantic Sensor Network ontology (SSN) [vocab-ssn], the W3C/OGC Time ontology (Time) [owl-time], the W3C Simple Knowledge Organisation System (SKOS) [skos-reference], W3C

https://www.w3.org/TR/eo-qb/

Top: Shu et al, Journal of Hydroinformatics 14.4 2012

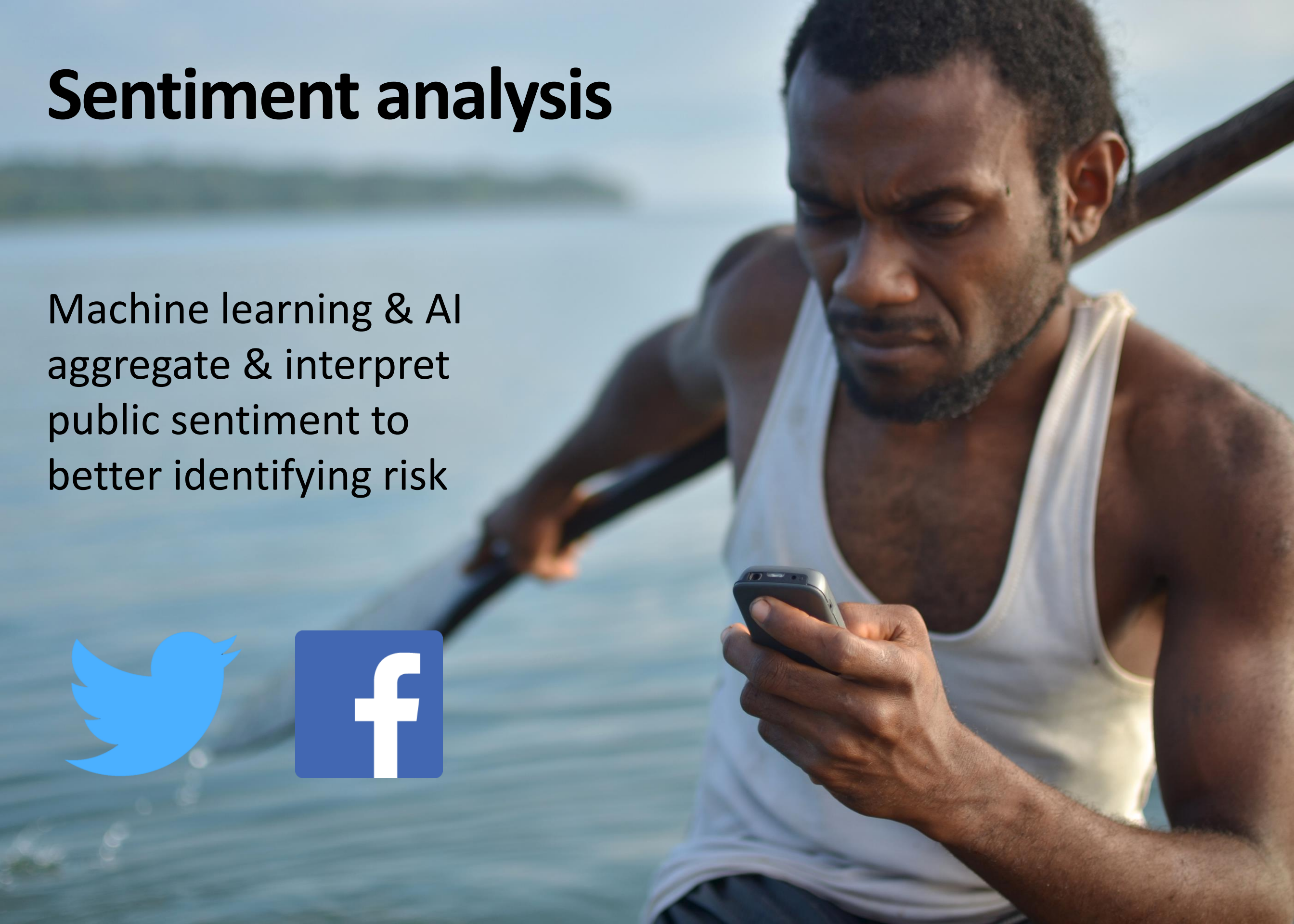Bottom: http://www.clw.csiro.au/publications/waterforahealthycountry/wirada/factsheets/wfhc-WIRADA-factsheet-DEM.pdf

Biometrics

Sentiment analysis

Machine learning & AI
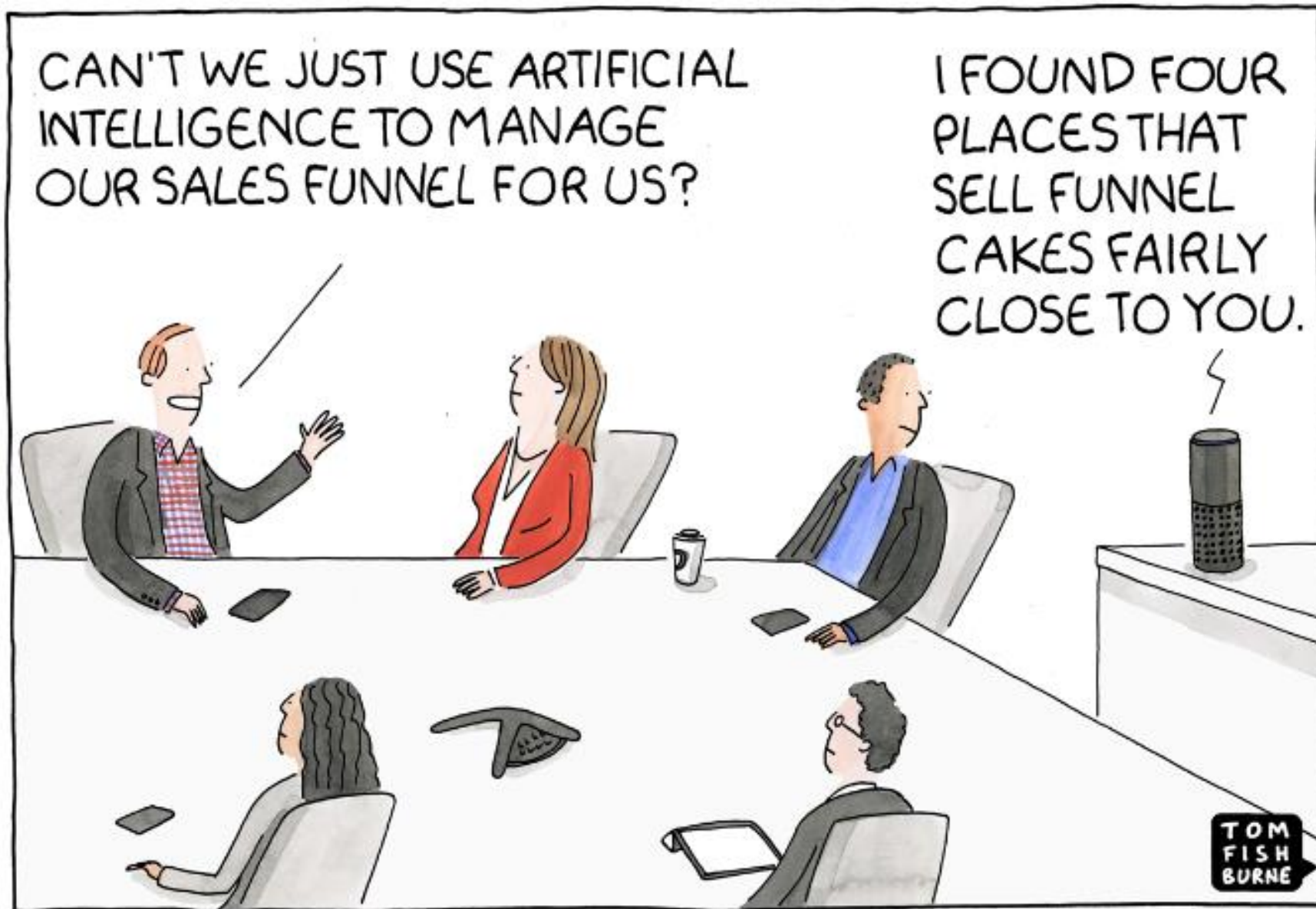aggregate & interpret
public sentiment to
better identifying risk

... **modern AI methods must be tuned for minor languages**

AI can embed prejudice and brittleness

Tom Gauld, New Scientist 9 September 2017

AI algorithms need to explain their reasoning to make their prejudice explicit

Chris Mahony

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Science), Australian
National University

Edward Vrkic

Senior Climate Change Advisor,

UNDP

3.30pm, 17 October

Pacific Ballroom II

URf **Understanding Risk**
Finance Pacific
16-19 October 2018 | Port Vila, Vanuatu