FRONTIERS OF CHANGE

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A HOLISTIC EARLY WARNING–EARLY ACTION SYSTEM FOR TRANSBOUNDARY THREATS

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Suomi NPP Satellite Captures Detailed Imagery of Hurricane Sandy Intensification
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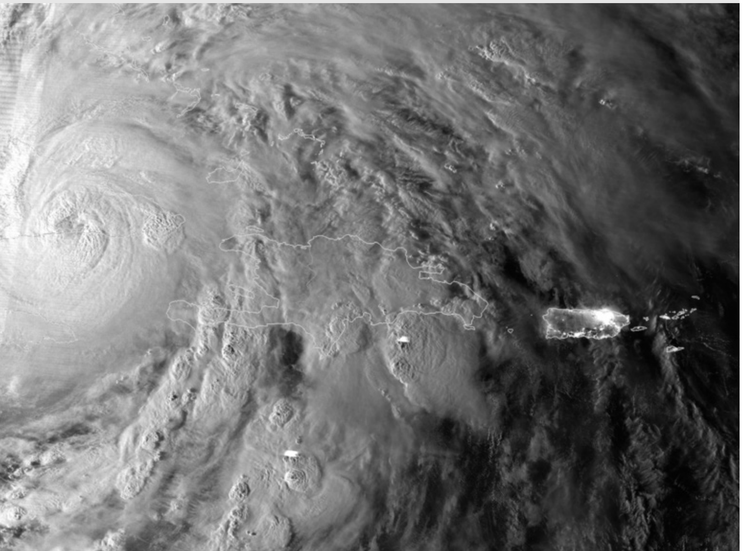

Severe weather events, borne out of the climate crisis, are becoming more frequent and intensified, constituting the major driver of disaster risk for agrarian-based economies typified by those in the Horn of Africa, where households are heavily dependent on rainfed agriculture and pastoralism for livelihoods and food security, yet crops and pastures are barely equipped for irrigation. Meanwhile, access to, and the availability of formal risk management tools are limited. Consequently, those most at risk resort to extreme coping strategies with potential irreversible effects; namely, distress sales of livestock, land and other productive assets; and curtailing expenditures on health and education, thereby placing households on a vicious cycle of poverty and food insecurity.

In this regard, the Horn is arguably at the global forefront in crisis exposure. This is nowhere more evident than in the subregion enduring its fifth consecutive failure in seasonal rains (now, its worst drought in 40 years) as well as bearing the brunt of the desert locust upsurge of 2019–2022, during which

> “Human-caused climate disruption is now damaging every region. The most recent report of the Intergovernmental Panel on Climate Change (IPCC) details the suffering already happening. Each increment of global heating will further increase the frequency and intensity of extreme weather events…
> We must invest equally in adaptation and resilience. That includes the information that allows us to anticipate storms, heatwaves, floods and droughts.”
>
> **UN Secretary-General, António Guterres**

food security and livelihoods were imperilled, while as a 'last line of defence', millions of litres of toxic pesticides were unleashed into the biosphere. The IPCC put out a high alert on the increased likelihood of further outbreaks.

At the current rate of global warming – just 1.2°C, our planet is already bearing testament to the utter destructiveness of climate change, but with the abject lack of progress in reducing global emissions, no climatologist expects warming to be capped at such a modest level. Never has the need for an **early warning-early action systems (EWS)** been so pressing. Indeed, a recent analysis of the scientific linkages between climate change and pest and disease outbreaks from TMG and IGAD's Climate Prediction and Applications Centre (ICPAC) reveals how global warming changes the dynamics of pest population and expansion. For instance, abnormal cyclonic activity in hitherto arid areas can trigger destructive outbreaks of desert locusts. Other pests show increasing potential for survival and migration owing to warmer winters and rapid evolutionary adaptation, thereby threatening the world's major breadbaskets situated in temperate latitudes.

Yet, new and nascent technologies can now pre-empt many of the most destructive anthropogenic-induced disasters, and are at the design and operational core of novel EWS, with artificial intelligence (AI) endlessly improving our predictive capabilities.
By utilizing big data from new satellites engaged with weather intelligence, and monitoring the planet's ever-changing landscapes and edaphology, science can now look far into the future. For illustration, the dynamics of **drought** incidence and duration, involving the interfaces between the atmosphere, land and oceans, are just too difficult to be captured by traditional computational models. However, by using petabytes of satellite-captured data, AI can disentangle this complexity and generate robust predictions of severe dry spells, e.g., **from one to 12 months ahead**. AI can also excel in the prediction of **desert locust outbreaks**, with the location of breeding grounds forecast **70 days in advance with 90% probability**.

Early warnings, however, must be followed by sound **early action**. Concerning a predicted drought, heatwave or flood, farmers would be prompted to cultivate less water intensive crops, or harvest early in the case of floods; pastoralists would move their livestock away from drought (or flood) epicentres; while verified desert locust breeding grounds would be eradicated, negating the need for ecosystem-destroying pesticides. More investment in 'pre-programmed' early action, parallel and in conjunction with early warning is needed.

The Global Commission on Adaptation's 2019 flagship report found that EWS provide more than a **tenfold return on investment**. The stakes are indeed high.

- With the nature and dimensions of risks forever changing, EWS need to be highly responsive and holistic, acknowledging the interconnectedness and cascading feature of crises.
- In the absence of EWS, increasingly the world will be faced with humanitarian catastrophe, notwithstanding a downward spiral of communities into the depths of extreme poverty and famine. Their absence also leads to the material prospect of a disturbing number of 'climate refugees' – either internally (2021 registered 2.5 million climate-displaced persons in sub-Saharan Africa) or internationally.
- Ultimately, for EWS to succeed, they will need to be cast within a framework of an agile and receptive governance model.
- Crises invariably transcend borders, requiring intergovernmental coordination and international collaboration.

In these contexts, the role of the Intergovernmental Authority on Development (IGAD) is of paramount importance in bringing member states together under the auspices of its intergovernmental mandate, and convening power. Only by working together can we adapt and de-risk food systems, and safeguard their much-needed transformation in the face of the unprecedented crises of our times.

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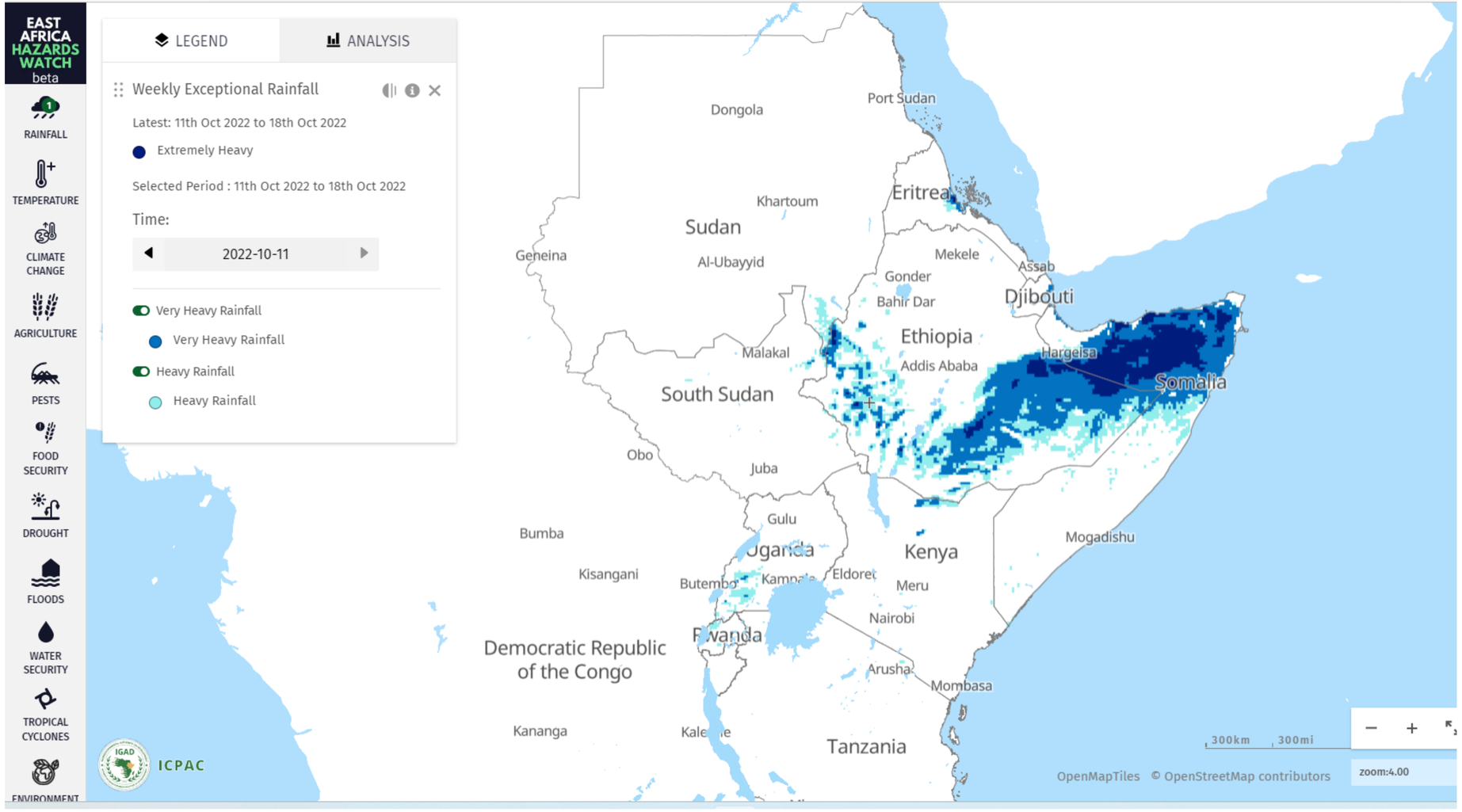
Desert Locust monitoring system at ICPAC

Systems and tools

East Africa Hazards Watch

https://eahazardswatch.icpac.net



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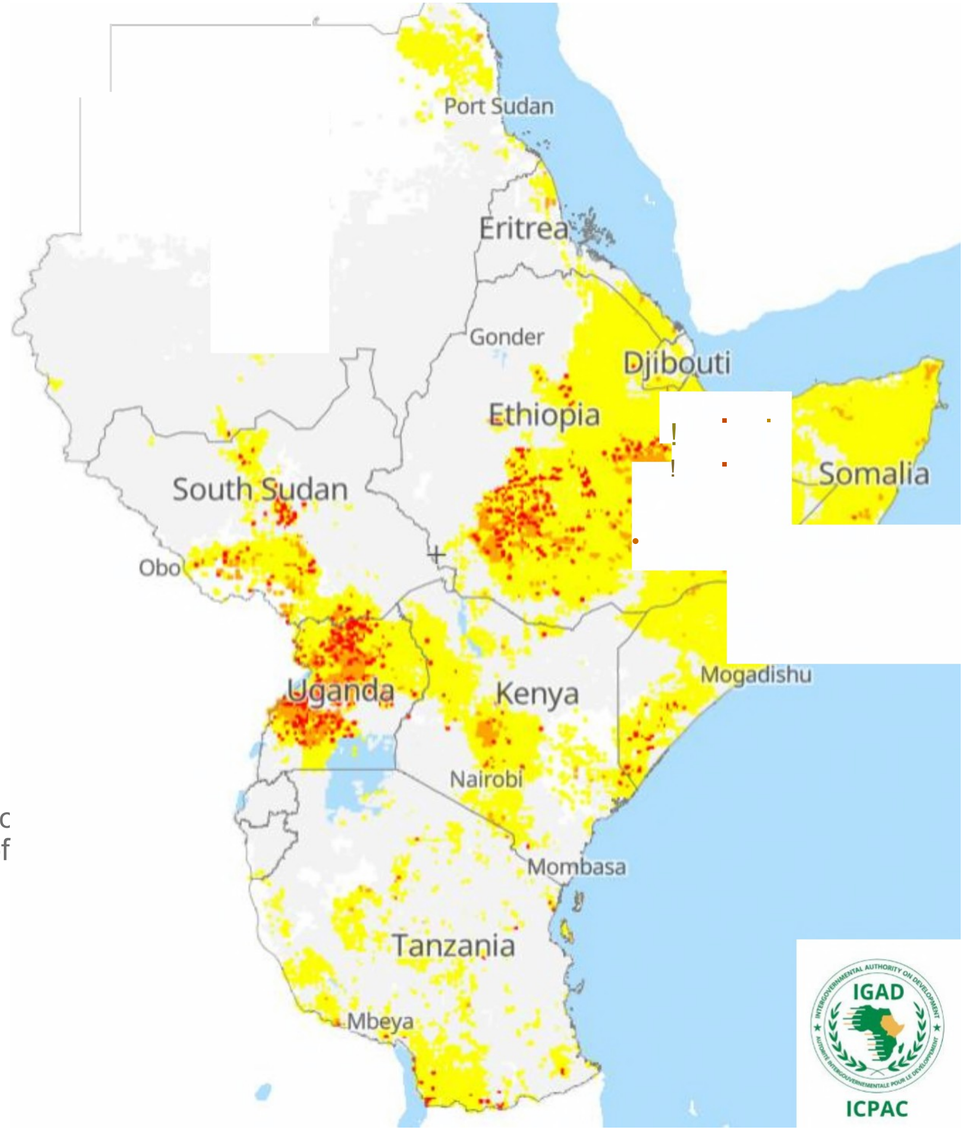

EAST AFRICA HAZARDS WATCH

FOOD SECURITY

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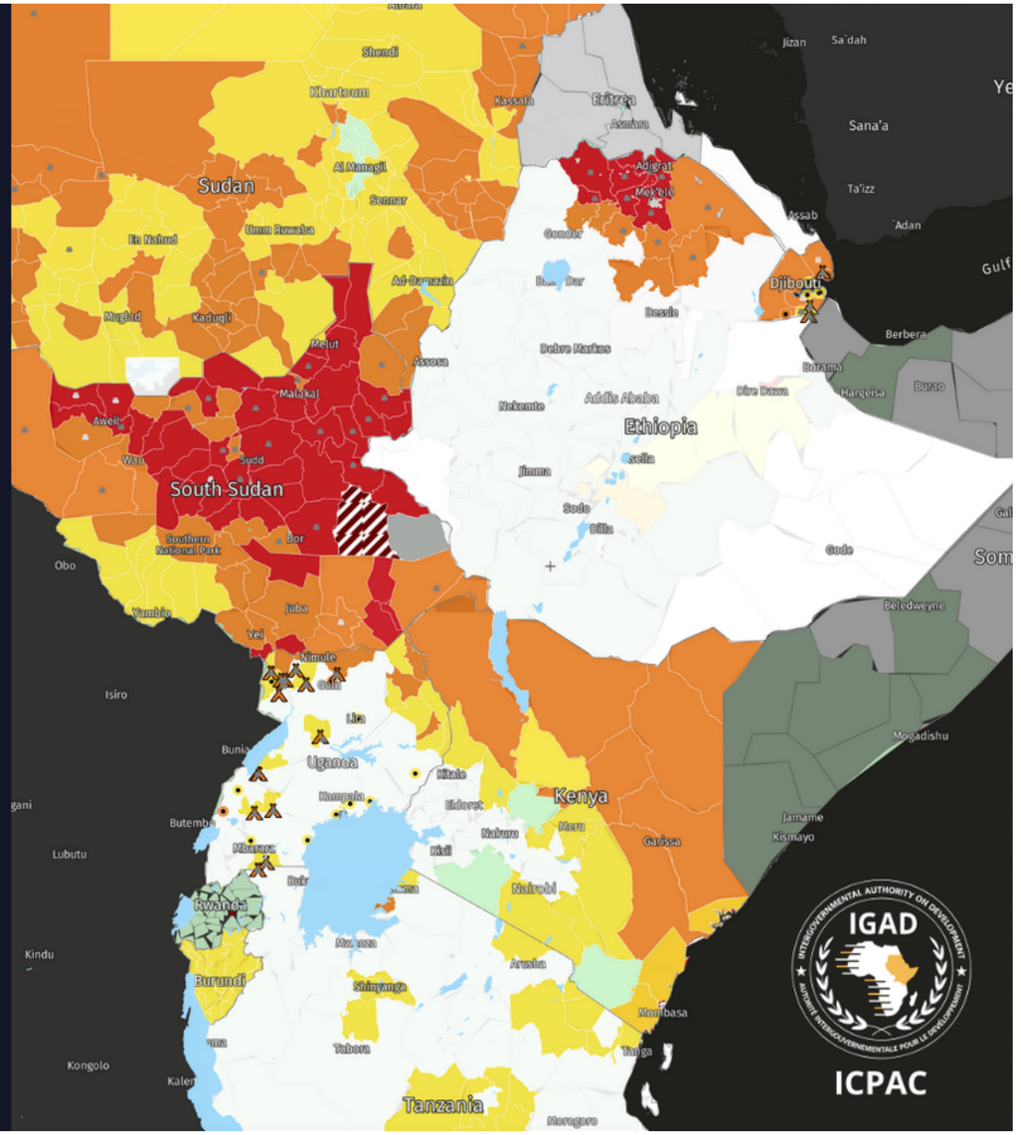

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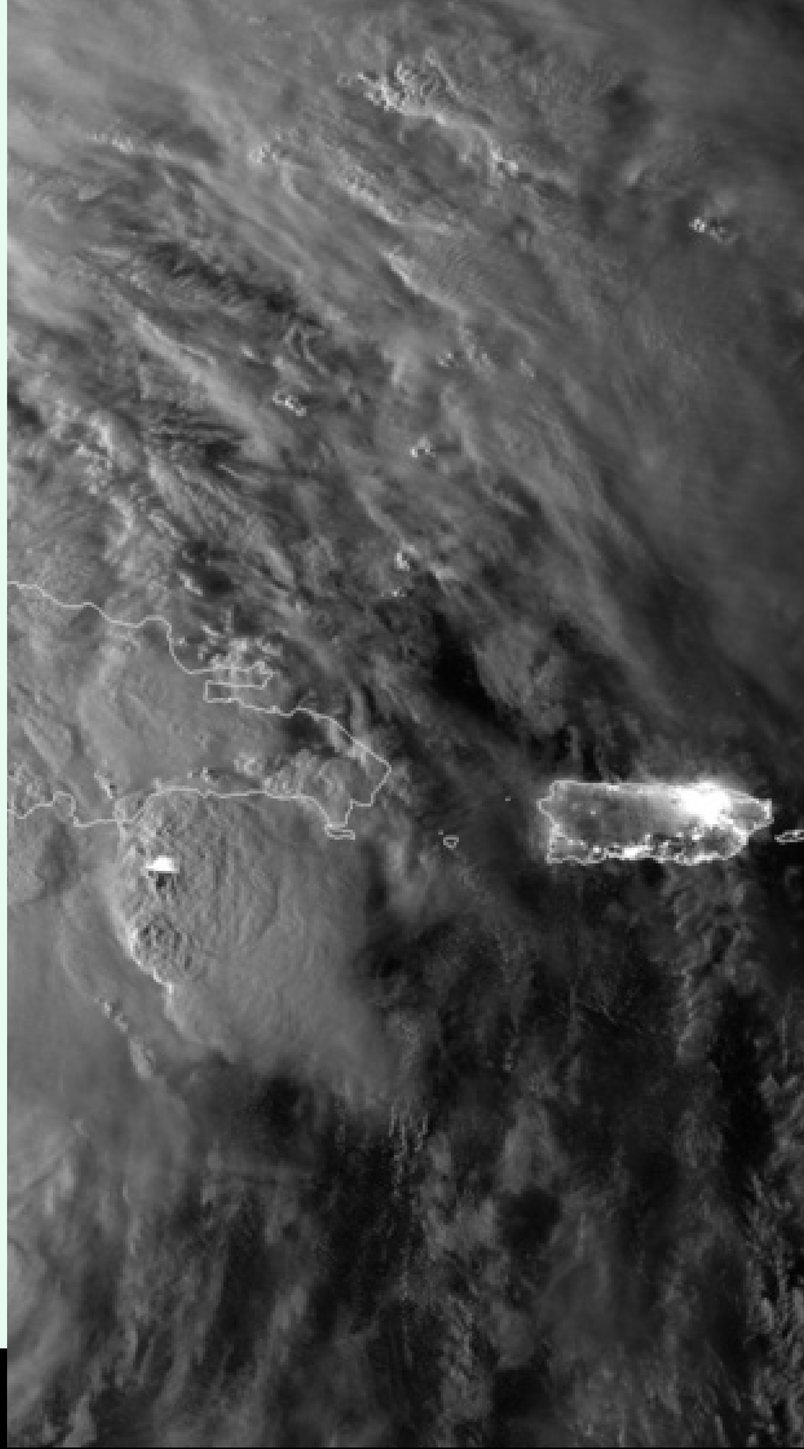

GLOBAL LANDSCAPES FORUM

The Global Landscapes Forum (GLF) is the world's largest knowledge-led platform on integrated land use, dedicated to achieving the Sustainable Development Goals and Paris Climate Agreement. The Forum takes a holistic approach to create sustainable landscapes that are productive, prosperous, equitable and resilient and considers five cohesive themes of food and livelihoods, landscape restoration, rights, finance and measuring progress. It is led by the Center for International Forestry Research (CIFOR), in collaboration with its co-founders UNEP and the World Bank and Charter Members.

Charter Members: CIAT, CIFOR-ICRAF, CIRAD, Climate Focus, Conservation International, Crop Trust, Ecoagriculture Partners, The European Forest Institute, Evergreen Agriculture, FAO, FSC, GEF, GIZ, ICIMOD, IFOAM - Organics International, The International Livestock Research Institute, INBAR, IPMG, IUFRO, Rainforest Alliance, Rare, Rights and Resources Initiative, SAN, TMG-Think Tank for Sustainability, UNCCD, UNEP, Wageningen Centre for Development Innovation part of Wageningen Research, World Farmer Organization, World Bank Group, World Resources Institute, WWF International, Youth in Landscapes Initiative (YIL)

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