We face a future of increasing peril from disasters. One reason is climate change; another is that more people live in coastal areas where risks are especially high.We're currently seeing the results of climate change in the California fires, and we saw both factors at work in last year's flooding in Houston after Hurricane Harvey. FEMA is on the front line for dealing with these risks.Unfortunately, it isn't ready for what it awaits it.

FEMA's most prominent mission is disaster response. But it also has other important roles in connection with disasters. Society faces increasingly grave risks, with climate change amplifying extreme weather and more and more people crowding into high-risk zones. In short, FEMA's role is only going to get larger. Here are some of its many roles and critical needs for improvement.

Disaster Response.

When people think of FEMA, they envision rescuers finding victims and taking them to safety. FEMA does provide emergency assistance, temporary housing and other services. But its main job is to coordinate the response of many parts of the federal government. And the federal government's role itself is mostly supportive, with the main job of emergency response falling on state and local governments.

President Carter created FEMA in 1978 by combining the functions of several different government agencies. Today, its work is governed by the Post-Katrina Emergency Management Reform Act of 2006. It charges FEMA with assisting the President in carrying out his function s under the core federal disaster law, the Stafford Act. FEMA is also charged with "leading and supporting the Nation in a risk-based, comprehensive emergency management system."

FEMA follows a national response framework it issued in 2013. The framework emphasizes that disaster response requires "layered, mutually supporting capabilities of individuals, communities, the private sector, NGOs, and governments at all levels." Efforts are coordinated through the Incident Command System, including multiple agencies. There are no fewer than fourteen agencies that can be involved in post-disaster response.

First responders are rarely federal — instead, they are state and local personnel who are already on the scene. When the National Guard is deployed to the scene, it too is often under state rather than federal control. Private entities like utility companies also play a key role in restoring power, water, and communications in

the aftermath of a disaster.

After Hurricane Katrina, about the only two things that worked well were the Coast Guard and something called EMAC. EMAC stands for Emergency Management Assistance Compact. It's an interstate agreement that allows other states to shift resources into the impacted state, supplementing that state's own resources. Much of the work of checking houses for survivors after Katrina was actually performed by these out-of-state workers.

Still, FEMA's work is essential after a major disaster. Not since Katrina has it faced a challenge like this one. FEMA has improved a lot since the days when President Bush told "Brownie" he'd done "a heck of a job," just before things really fell apart. By the time of Hurricane Sandy, the agency had learned from Katrina the importance of pre-positioning assets before the storm actually struck and having an early presidential declaration of national emergency. Those lessons were also followed with Harvey.

FEMA's post-mortem after Sandy indicated areas of strength and weakness. That was also GAO's conclusion. In particular, GAO raised questions about whether the agency had followed up on indications of gaps in the response capabilities of some agencies or had sufficiently improved logistics such as its ability to track the location of supplies. The agency had also found room for improvement in several areas such as coordination of federal senior leadership, implementing the incident management system, and connecting planning efforts with operational decision making.

There is little doubt, however, that the response to Sandy was far superior to the federal response to Katrina. FEMA also did well in its response to Hurricane Sandy. But Hurricane Maria was another story. As I wrote in an earlier post, the delayed federal response can be tied to the 500-1000 deaths that occurred in the months following the hurricane due to inadequate access to medical care and failures of critical infrastructure. As the Washington Post reported, FEMA's after-action report candidly admits that

> "[FEMA] experienced personnel shortages, was caught with a critical lack of aid supplies, had trouble coordinating logistics and found itself struggling to do the work of the territorial government. . . . Resources that had been redirected to deal Hurricane Irma in the U.S. Virgin Islands

> left few supplies for Puerto Rico when the hurricane hit — and communication lapses, transportation challenges and a lack of situational awareness caused major delays in help for those living on the island."

In an era where catastrophic weather events are likely to increase in frequency, we cannot afford to have lapses like these in our disaster response.

Rebuilding Requirements.

FEMA also plays an important role in disaster recovery through its role in the federal flood insurance program. This program, as currently designed, provides subsidies to many property owners to develop or maintain structures in unsafe areas. But that's Congress's fault, not FEMA's. But FEMA also plays an important role in rebuilding, through requirements imposed on local governments and property owners in return for disaster funding.

In reauthorizing the FEMA until July 1, 2018, Congress made an effort to improve resilience of local public infrastructure.For instance, in Puerto Rico and the US Virgin Islands, FEMA's Public Assistance (PA) program will pay for public facility and infrastructure repairs up to current nationally accepted codes and standards regardless of local codes at the time of the storm. Also, the Stafford Act will now include incentives for communities to increase the federal share of disaster funding from 75 percent to 85 percent if they take steps to plan for and mitigate against future disasters.

Flood Mapping.

Flood mapping defines the boundaries of flood zones, setting the parameters for flood insurance requirements and for community land-use planning. Unfortunately, there are significant issues regarding the reliability of existing flood maps. Flood maps are variable in quality and age, with some now approaching forty years in age.Updating is important for several reasons. Land use patterns may have changed, affecting the amount and speed of run-off. Land in some areas may also have subsided. And climate change will also impact precipitation patterns and sea levels.The effects of climate change may be subtle. For instance, a recent study showed that it could increase heavy floods caused by rain falling on mountain snow in many years areas but decrease them in some.

There does not seem to be a clear policy on updating flood maps:

> “There is no consistent, definitive timetable for when a particular community will have their maps revised and updated. FEMA uses a process called the Coordinated Needs Management Strategy to prioritize, identify, and track the lifecycle of mapping needs of Risk MAP.22 Generally, flood maps may require updating when there have been significant new building developments in or near the flood zone, changes to flood protection systems (e.g., levees and sand dunes), and environmental changes in the community. Because of the variability in how and when a FIRM is updated, for example, one community may be undergoing the process of updating its map while a neighboring community is not, and one community may have had its map last updated in 2010 while a neighboring community had its last revised in 2002, etc”

Communities and affected individuals have many opportunities for input, which is fine in the abstract, but can lead to lengthy delays due to resistance by individuals who fear new maps will result in changes in insurance requirements or trigger the need for more stringent landuse controls. As a result, the “FEMA mapping process, and some NFIP flood maps, have been criticized for being out of date, using poor quality data or methods, or not taking account of changed conditions

In the past, FEMA has passed on the cost of mapping to flood insurance policy holders.Pending legislation would allow states and localities to develop their own flood maps subject to federal oversight and would require private insurers to contribute to funding the mapping program.

The mapping system is badly in need of reform. The Congressional Research Service observes that:

> A 2013 report on the impact of climate change and population growth on the NFIP concluded that by 2100, the 1% annual-chance fluvial floodplain area is projected to grow nationally by about 45%.. . . In the populated areas of most interest to the NFIP, about 30% of these increases may be attributed to increased runoff caused by the increase in impermeable land surfaces caused by population growth and development, while the

remaining 70% represents the influence of climate change.

If you've gotten this far in today's blog post, you can see that there is a lot of work to do in order to make FEMA ready for what lies ahead in this century. To be blunt, FEMA isn't ready for the current level of risks, let alone what's down the road. Some of the problems are internal to FEMA, but some are going to require presidential or congressional action.