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Resilience to Global Catastrophes

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14 Nov 2024

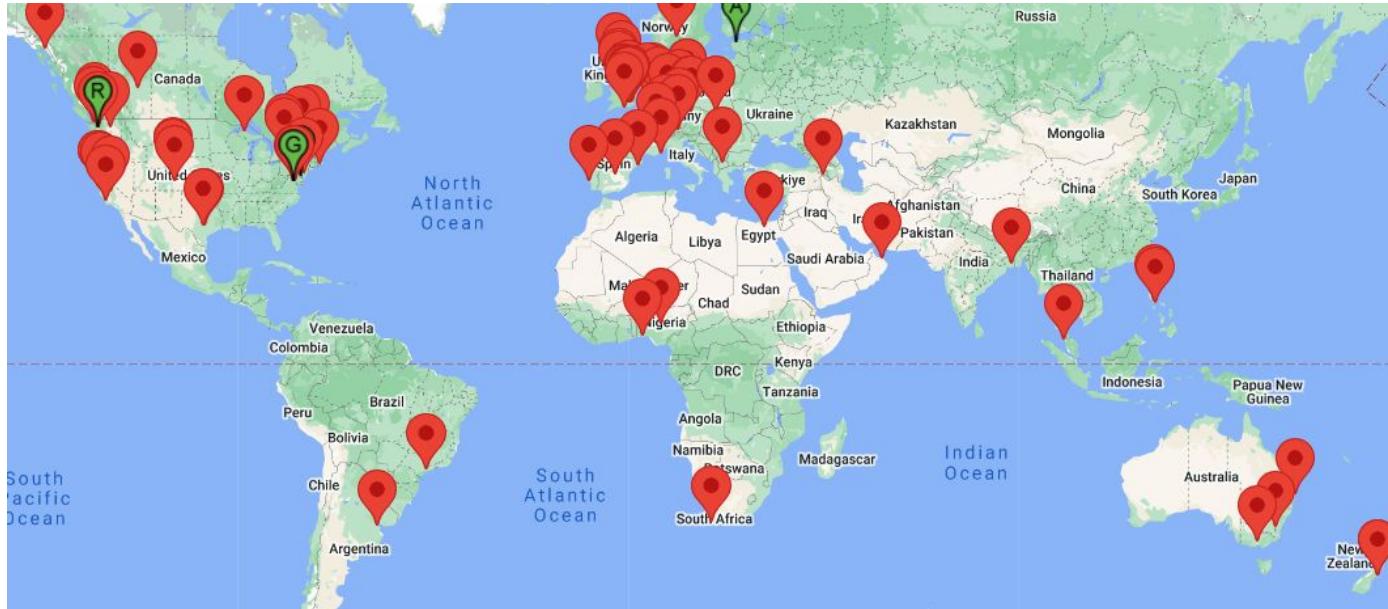


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What is ALLFED's Mission/Vision?



ALLFED Team: All Continents Except Antarctica



Global Catastrophic Food Failure



In 1816, the Tambora volcano caused famines around the world: "the year without summer".

"A Global Catastrophic Food Failure (**GCFF**) is an **extreme, widespread food supply shortage beyond the capacity** of national governments, international institutions, and the private sector to manage through **ordinary means**. It is **abruptly triggered**, either by an exceptional natural or human-caused event such as a volcanic eruption or a nuclear attack, or by a more gradual systemic crisis"

12 Scenarios That Could Cause >10% Food Shortfall

~80% probability this century ¹



¹UK government report: Extreme weather and resilience of the global food system

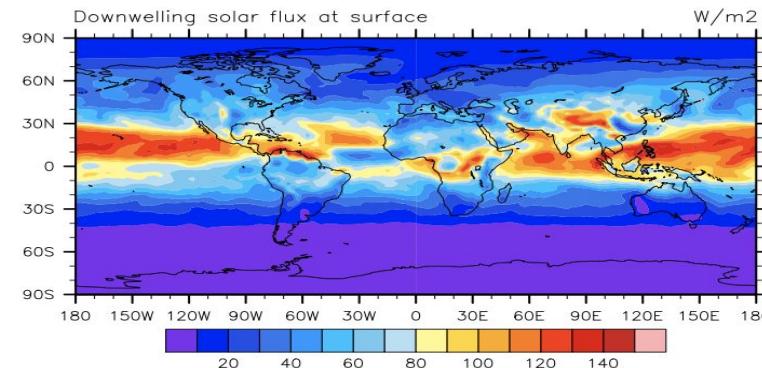
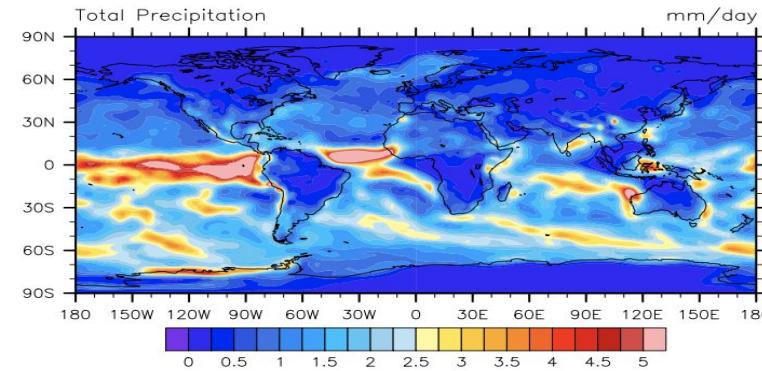
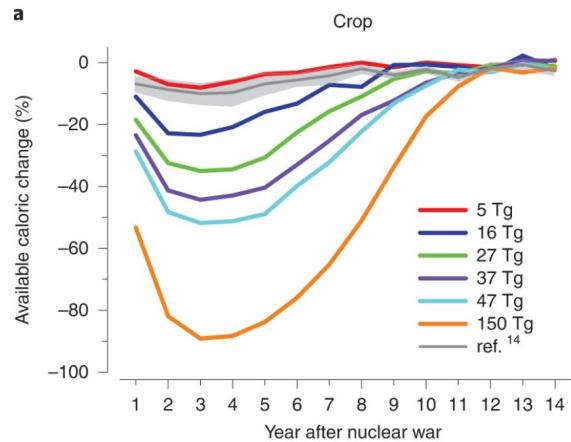
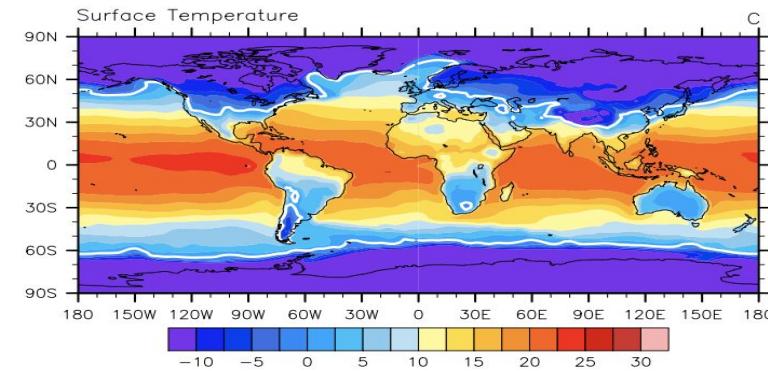


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Abrupt Sunlight Reduction Scenarios

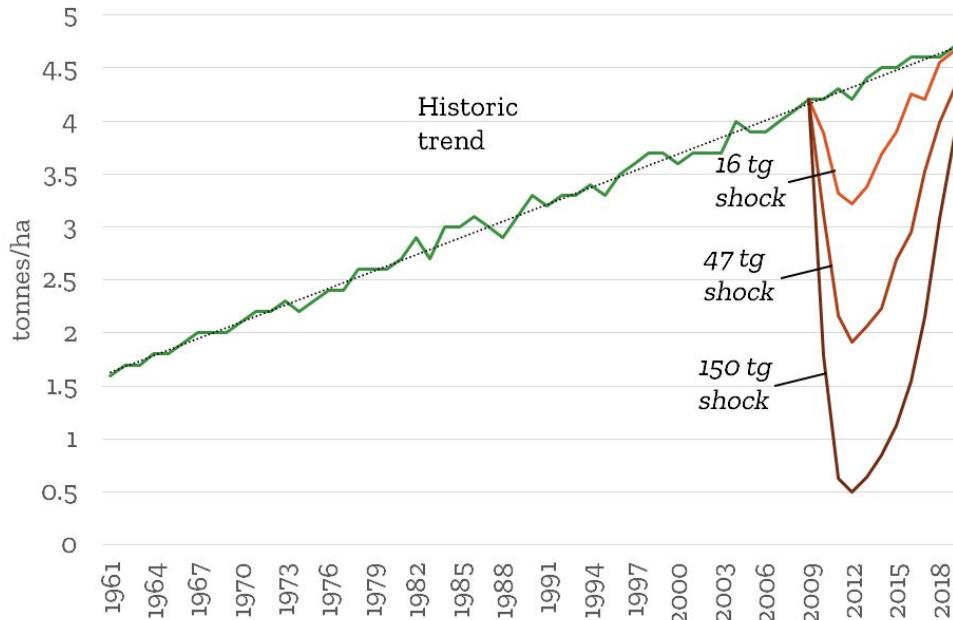


Predicted Growing Conditions - 150 Tg Nuclear Winter



Source: Xia, Lili, et al. Nature Food 3.8 (2022): 586-596.

Putting An ASRS Into Context - Yields



Based on Xia et al - assumes no response

Resilient Food Solutions

Canola oil



Barley



Wheat



Turnips



Milk



Mushrooms



Potatoes



Cellulosic sugar



Simple Greenhouses



Fermentation



Leaf Protein



Seaweed





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Critical Infrastructure Collapse Scenarios



Risks of Global Loss of Electricity/Industry

- Extreme **solar storm**, perhaps size of events in first millennium AD (much bigger than Carrington Event)
- Multiple **HEMPs**
- AI-enabled **cyberattack**
- Extreme **pandemic** + absenteeism

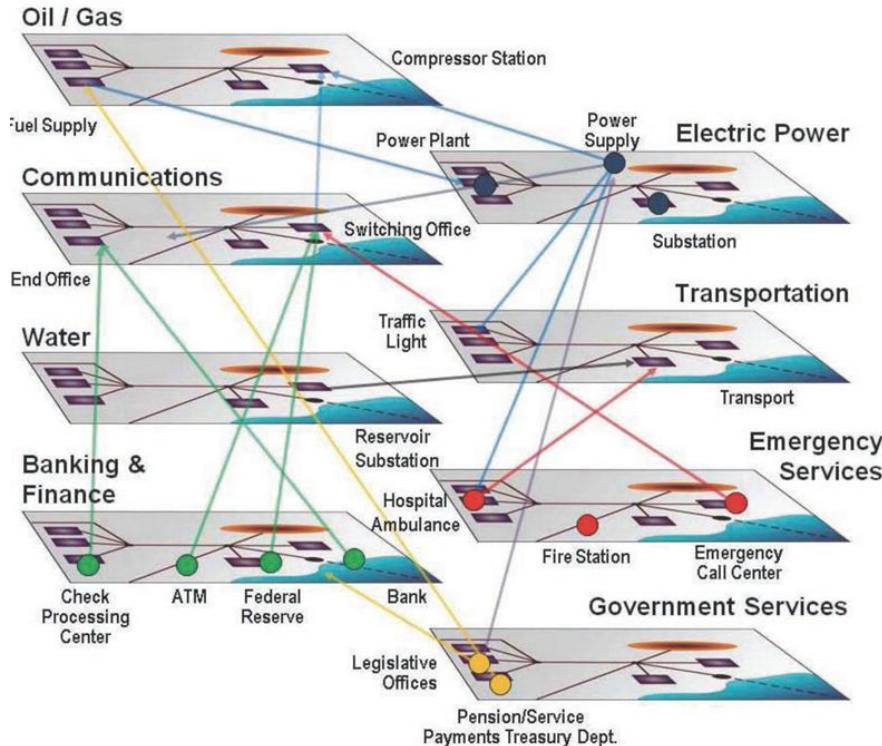


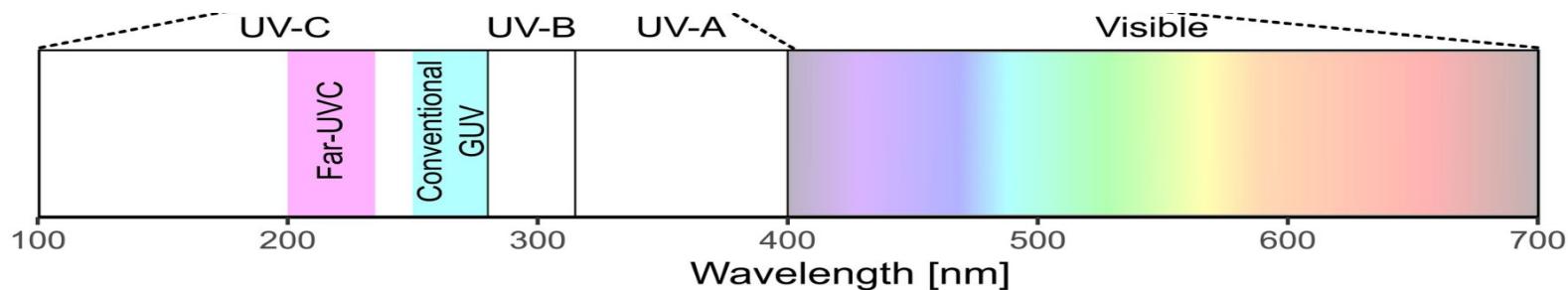
Illustration by Havlin et al. - Challenges in network science: Applications to infrastructures, climate, social systems and economics

Pathways to Infrastructure Loss: Catastrophic Pandemics



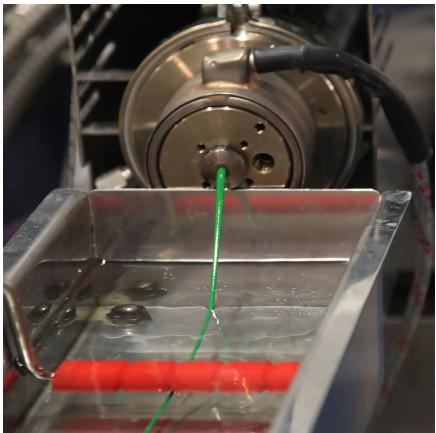
1. Future pandemics could be far more transmissible and deadly than COVID-19
2. Current preparations are inadequate to keep key workers safe, especially in LMICs
3. Worker shortages could result from illness, death, quarantine, and fear
4. Without key staff, vital industries unable to meet basic needs
5. Interdependent vital industries may collapse, requiring back-up to meet basic needs

Emergency Air Quality Interventions



- Relocating existing germicidal UV (GUV) devices.
- Ramping up GUV production, e.g. from fluorescent.
- In room filtration to achieve ~100 air changes per hour.
- Massive ventilation from windows and interventions to support thermal comfort.
- Sequestering workers onsite.
- High cost-effectiveness due to low costs of preparing response plans.

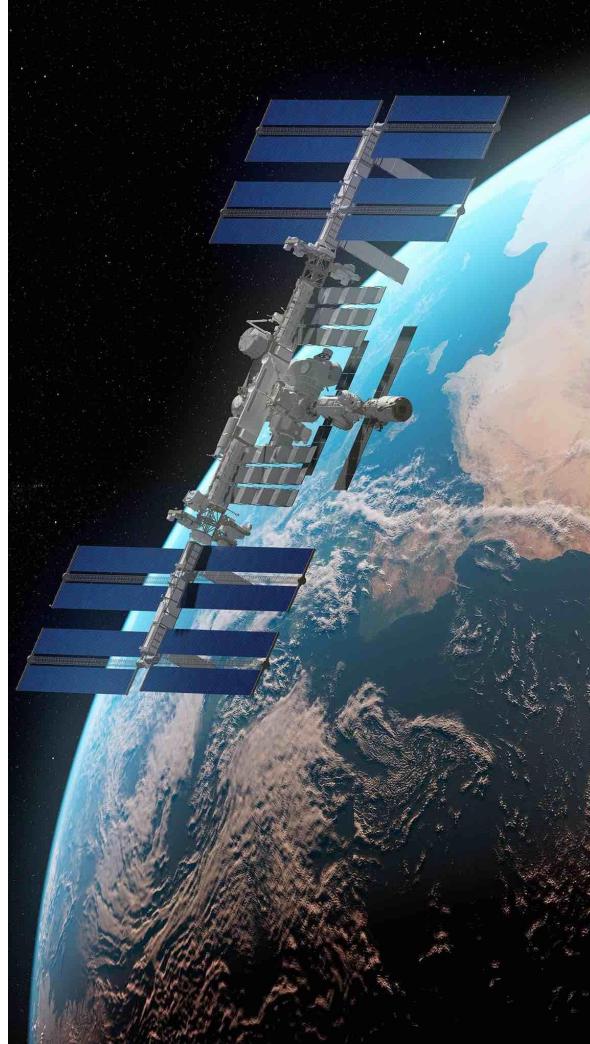
Technology Development



Photos: unsplash

Resilient Satellite

- Companies are now launching satellites that can enable two-way communications with regular cell phones.
- Much easier is one way communication to regular cell phones.
- Should be resilient to solar storm and HEMP.
- One satellite in polar orbit could communicate to all areas of the world at least once a day.
- Remaining fuel in vehicles could keep cell phone charged for months to years.



Food Resilience DAO and how Ethereum ecosystem could help



Communication of crucial information

- Decentralized hosting and No internet scenario



Coordination of stakeholders such as policy makers, academia, non-profits, industry etc.

- Pluralistic decision-making, Funding allocation, Prediction markets for informed policy-decisions.



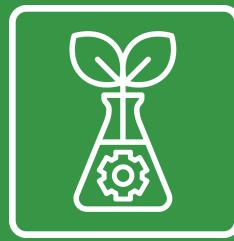
Community owned resilient satellites

Food Resilience DAO and how Ethereum ecosystem could help



Food resilience DAO: Build and govern food resilience at a planetary scale.

Is a DAO structure suitable for this?



Fund resilience directly through Ethereum: ALLFED.ETH

Some examples:

- Food resilience tech-tree development.
- Research on precision fermentation, e.g. fats from microorganisms.
- Simulate nuclear winter conditions in the Australian interior.

If you are interested to contribute/help, get in touch (Signal: @Yesh.88)



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How Can You Contribute?

We are looking for volunteers/collaborators with:

- Good knowledge in spatial analysis in Python and Linux, e.g. crop modeling
- Experience with agricultural economics
- Procurement and construction of pilots
- All kinds of physical engineers for PhD

Funding

We also have a wide variety of projects that touch on other fields.

If you would like to know more let's talk after this presentation,

or connect with us at: **allfed.info/contact**

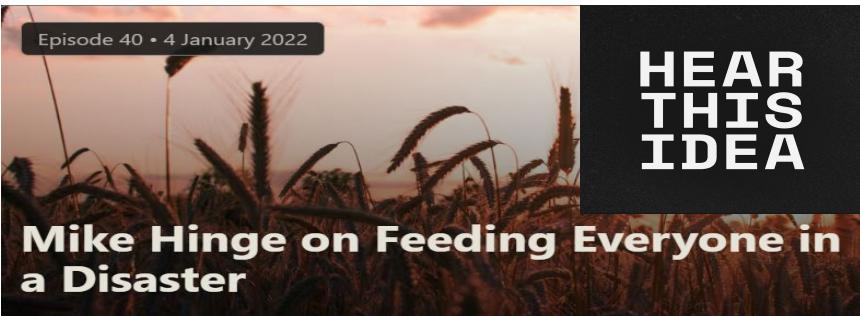


Photo by Melany Rochester/ Unsplash

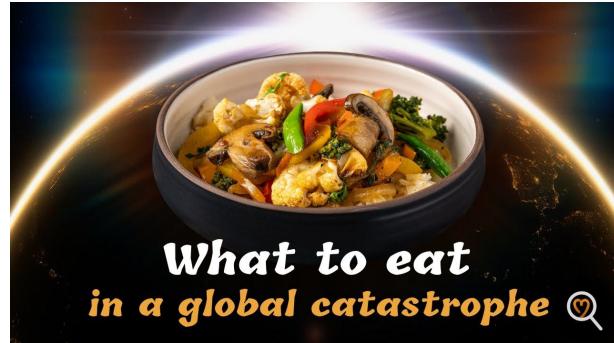
Further Resources: bit.ly/ALLFED-recursos



[80,000 hours podcast](#)



[Hear This Idea podcast](#)

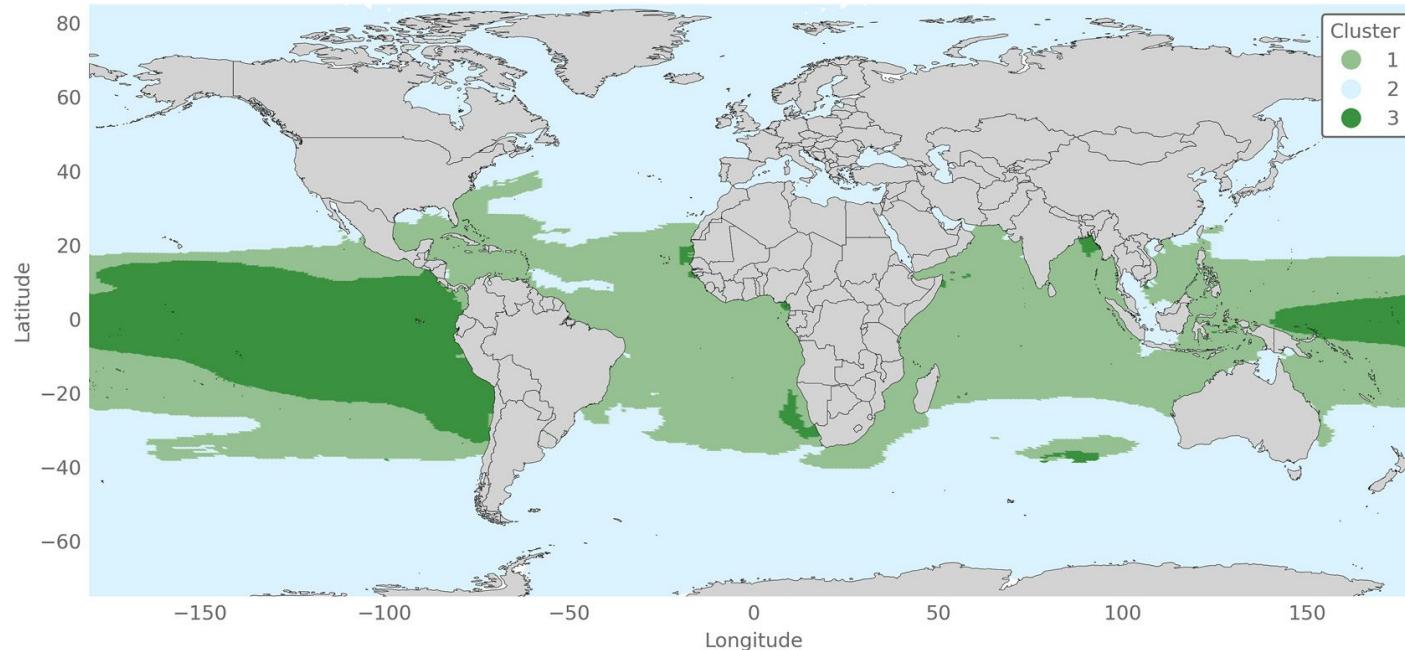


[Youtube mini-documentary](#)



[High-Impact Engineers podcast](#)

Seaweed: Cultivation Areas In ASRS



- Dark Green:
very suitable
- Light Green:
Somewhat suitable
- Blue:
Unsuitable

Decentralized Food Production from Inedible Plant Fiber



Mushrooms



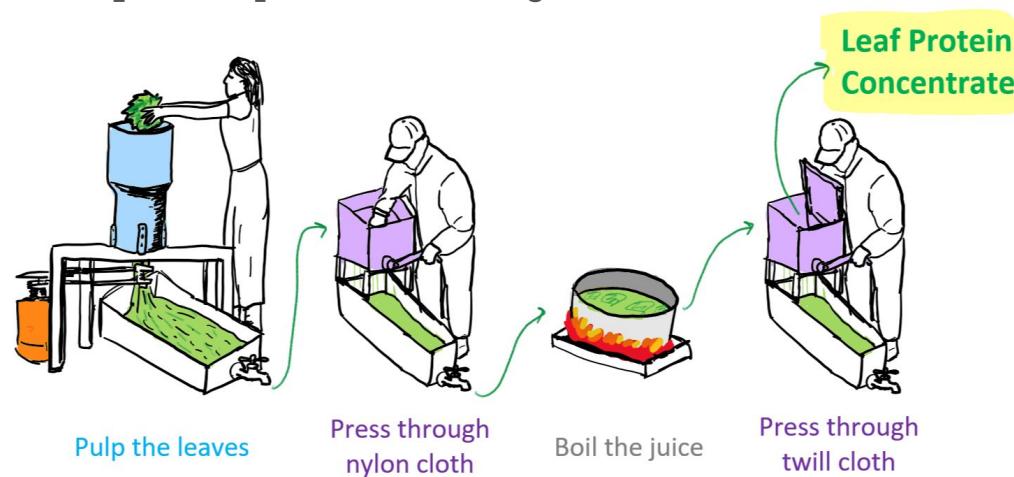
Milk



Fiber-eating insects

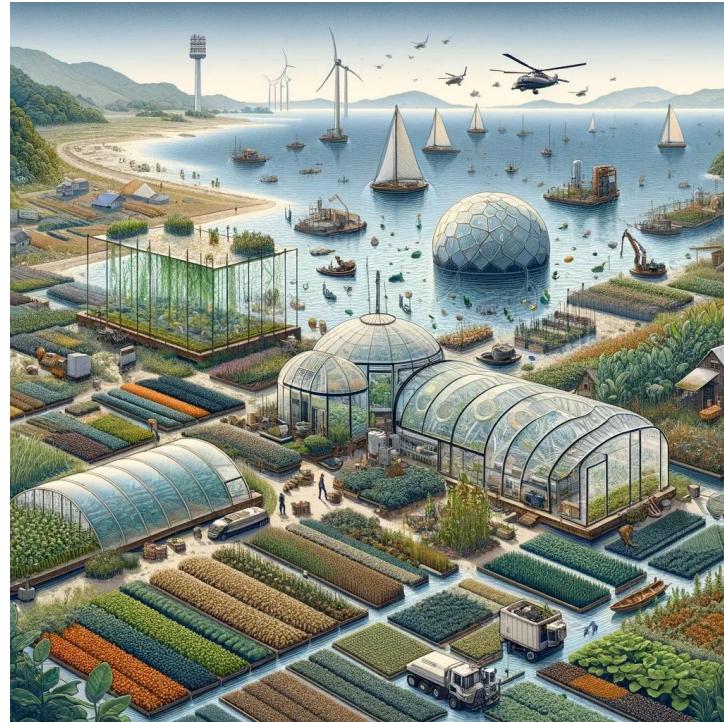
Decentralized Food Production - Leaf Protein Concentrate (LPC) Production

- Rapid solution based on dead leaves
- Can be produced on a **small scale with household kitchen supplies**
- Or **scaled up** with open source designs shown below



Food Resilience DAO

Can we make use of a DAO structure build resilience to global food catastrophes?



Food Resilience DAO - How Can Ethereum Help?

Access to emergency disaster resilience guides

Easy Solution (Step 1): Information Decentralization

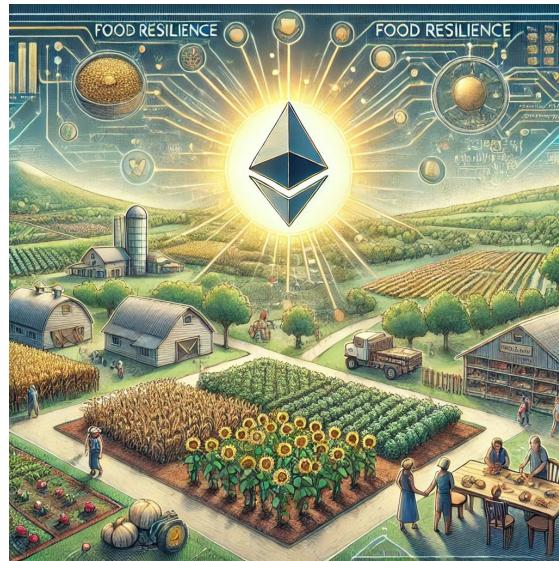
- Disaster Resilience Guides on IPFS: By distributing guides and response plans via IPFS (interplanetary file system), data is accessible from multiple nodes, minimizing single points of failure.

Challenge: Access Without Internet

- In a no-internet scenario, IPFS nodes rely on external networks, leaving communities cut off from vital resources.

Potential solution

1. Local Mesh Networks: community-based mesh networks
2. Local IPFS Infrastructure: Deploy localized IPFS nodes to distribute data



Food Resilience DAO - How can Ethereum help?

Coordination is required across many stakeholders:

Policy Makers, Farmers, Researchers, Technologists, General Public.

- **Resilient Messaging:** Reliable, adaptable channels for real-time communication during crises.
- **Informed Policy Decision:** Pluralistic decision-making using diverse voices of multiple stakeholders.
- **Voting and Funding allocation:** Allocation of funding to projects that will have the most impact.
- **Decentralized PolyMarkets:** Develop accurate information on probabilities of GCRs happening.
- **Forecasting + Response:** <https://sentinel-team.org/#team>.

Food Resilience DAO - How can Ethereum help?

Communities can govern and own resilience: Resilient Satellite

- Hardened satellite shielding and circuit designs to withstand solar storms and high-altitude electromagnetic pulses (HEMPs).