Food Security

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04/14/2023

HNEE and Munich Re Foundation

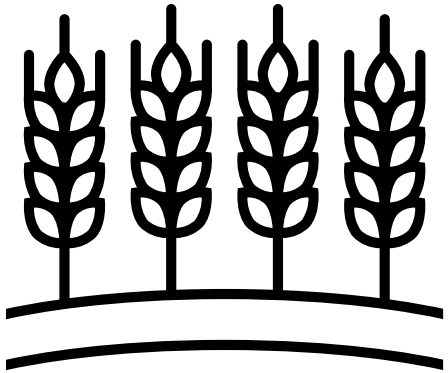
Outline

1. Definition
2. Drivers
3. Current state and development
4. Positive Example Food Security
5. Our own project region

1.a Definition: Food Security

"Food security exists when **all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food** which meets their dietary needs and food preferences for an active and healthy life"

(*World Food Summit 1996)*



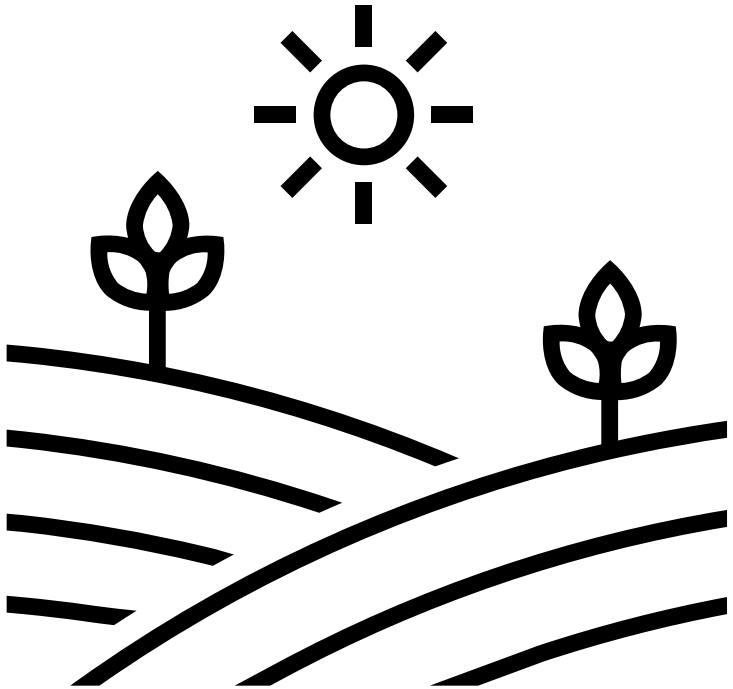
The 4 factors of food security

Food Availabilty

Food Access

Utilization

Stability
(Resilience)



1.b Definition: Food Sovereignty

"Food sovereignty is the peoples', Countries' or State Unions' ***RIGHT to define their agricultural and food policy****, without any dumping vis-à-vis third countries"*

(*Viacampesina)*

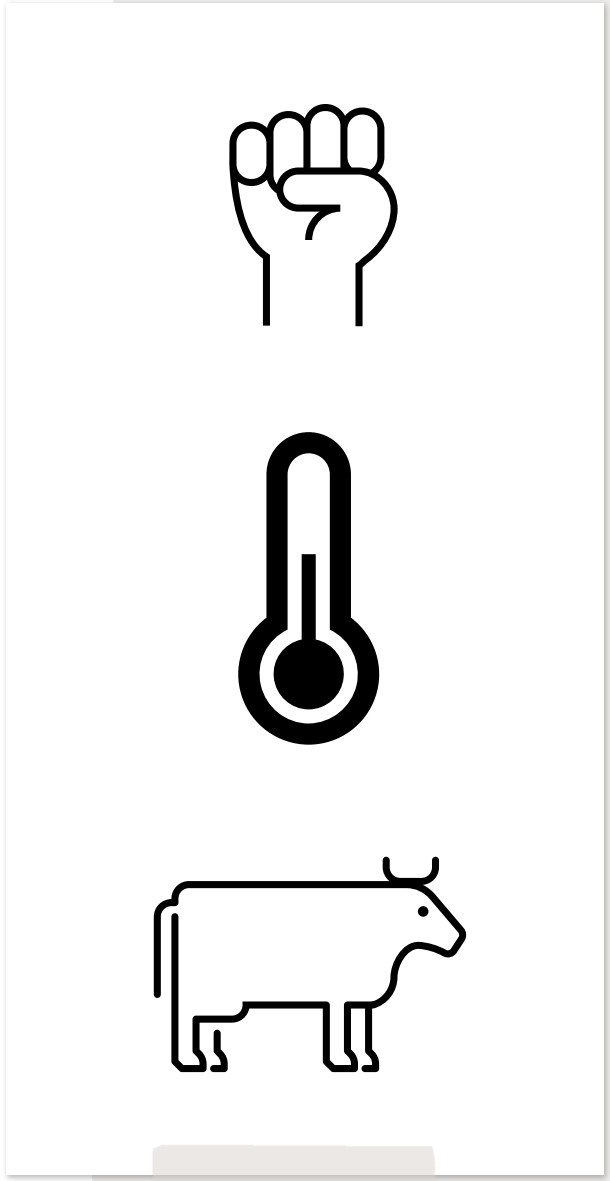
04/14/2023

2. Main Drivers of **Food Insecurity** Globally

1. **Violent Conflicts**

2. **Climate Change**

3. **Semi-Arid-Regions: Political Disadvantages of Cattle Herders**
   a) Restrictions on Usage
   b) Steady reduction in the size & productivity of pastures (grasslands)
   c) Growing Number of Animals
   d) Land-Grabbing by Agricultural Companies

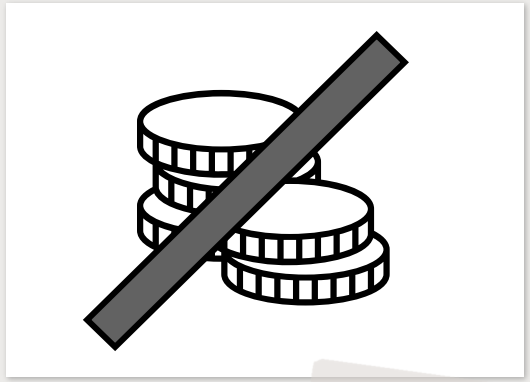


2. Main Drivers of **Chronic Hunger**

1. **Structural poverty** (esp. in Semi-Arid Regions like Sahel)
   Simultaneously: High population Growth

2. **Seasonal Changes**
   Smallholder families suffer from hunger, especially in the form of seasonally recurring phases. These phases occur mainly in the inter-harvest period, when their own supplies are used up or sold, but it is still several weeks or months before the next harvest

3. **Climate Change & weather fluctuations**
   During weather fluctuations, a lot of Farmers buy more than they sell



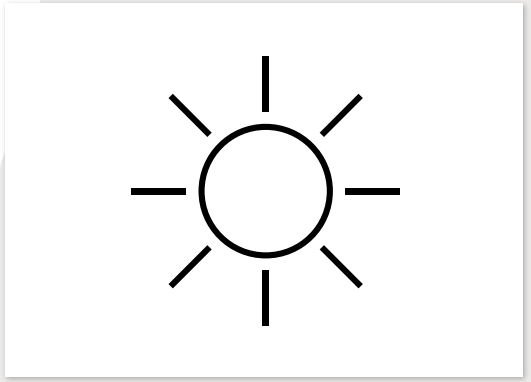
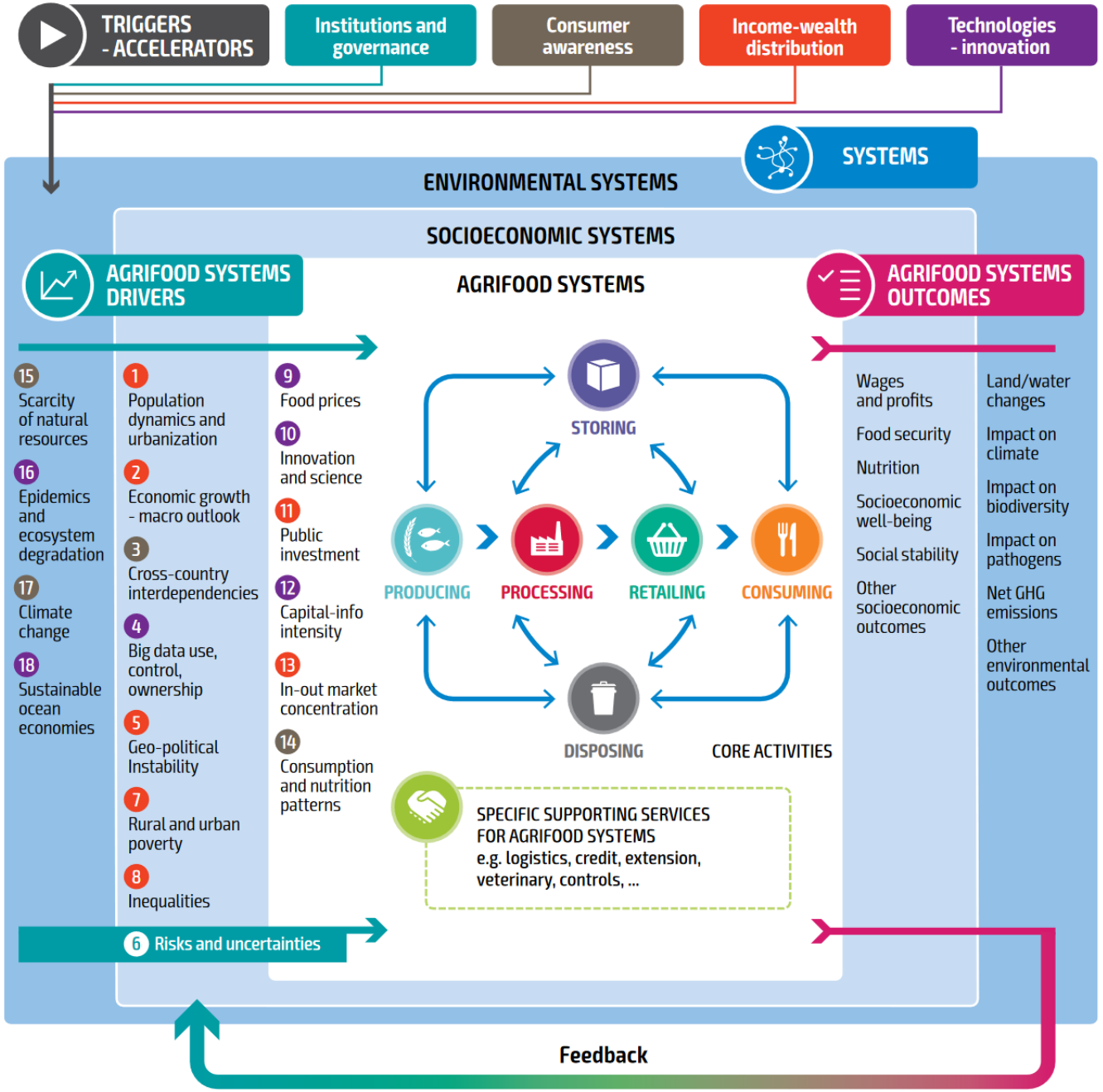


Figure 1.1 Agrifood systems: key drivers, activities, outcomes and priority triggers for transformation



Source: FAO (2022)

3. Food Security - Facts

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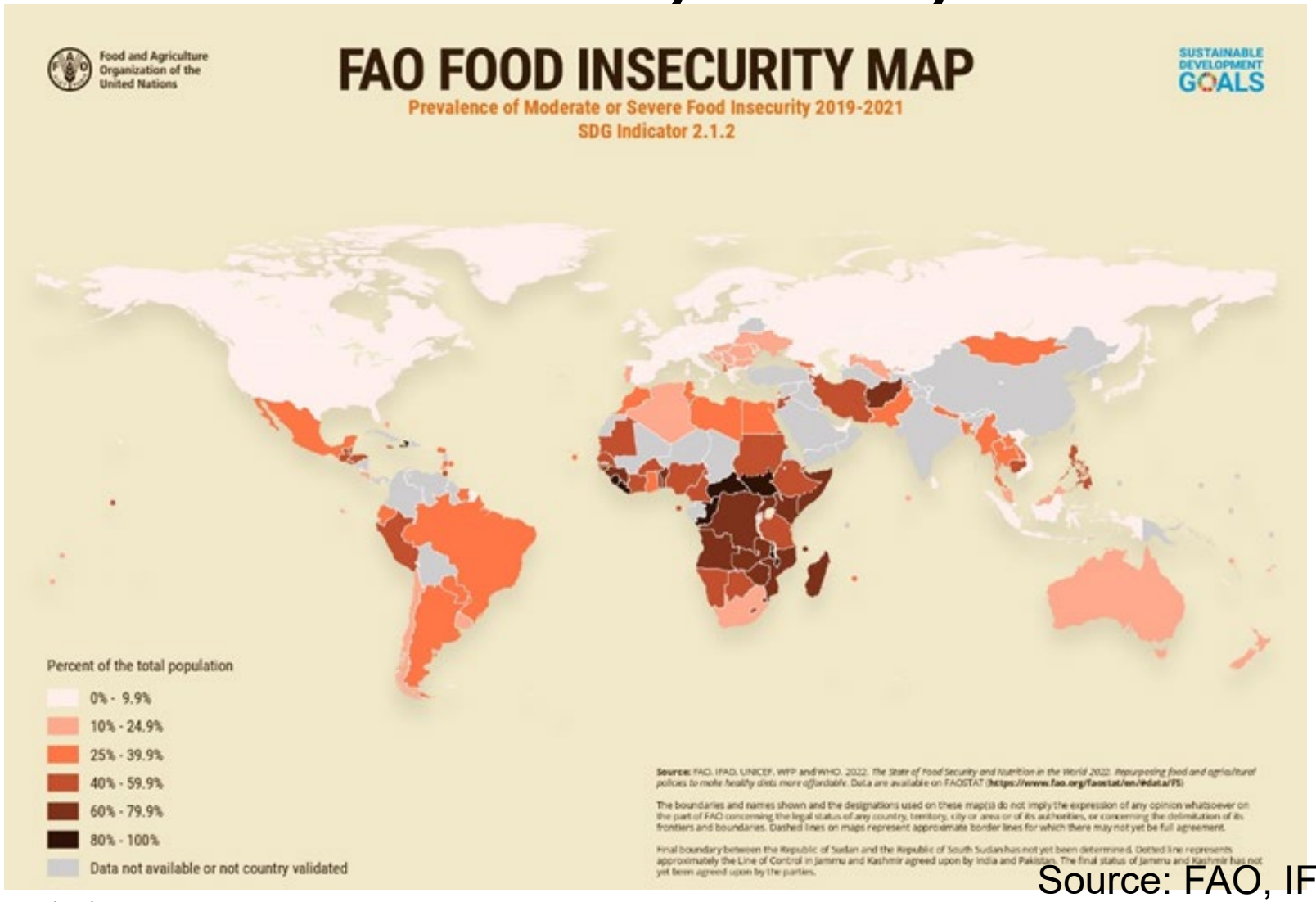
828 million people are hungry worldwide

3.1 billion people cannot afford a healthy diet

70% of freshwater withdrawal are used in food systems

25% of crop yields are threatened by climate change

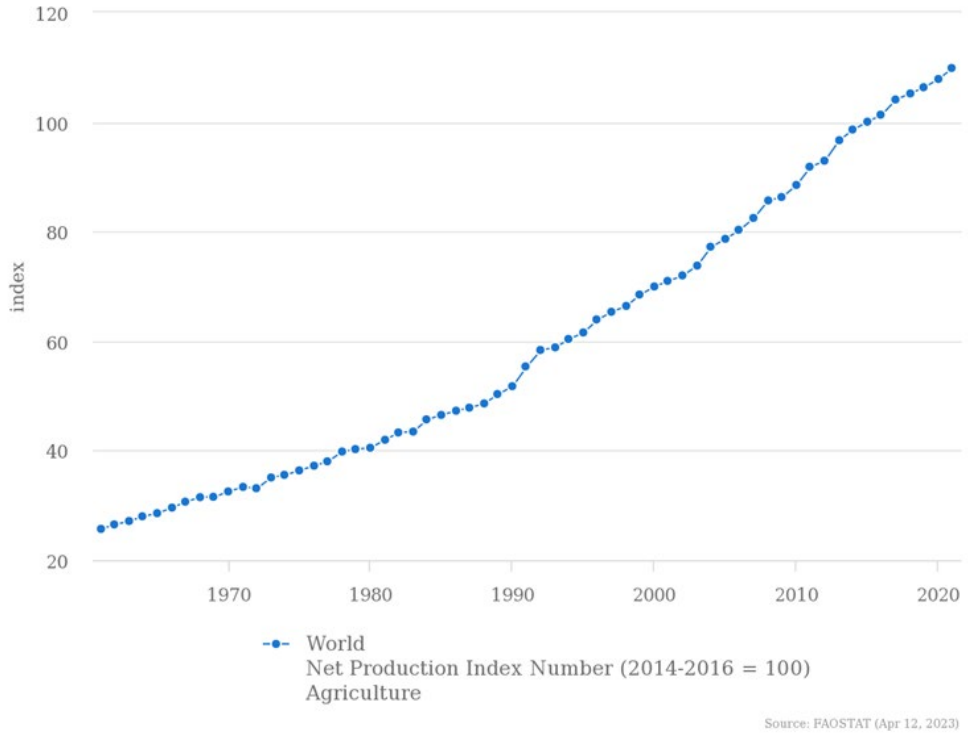
3. Food security today

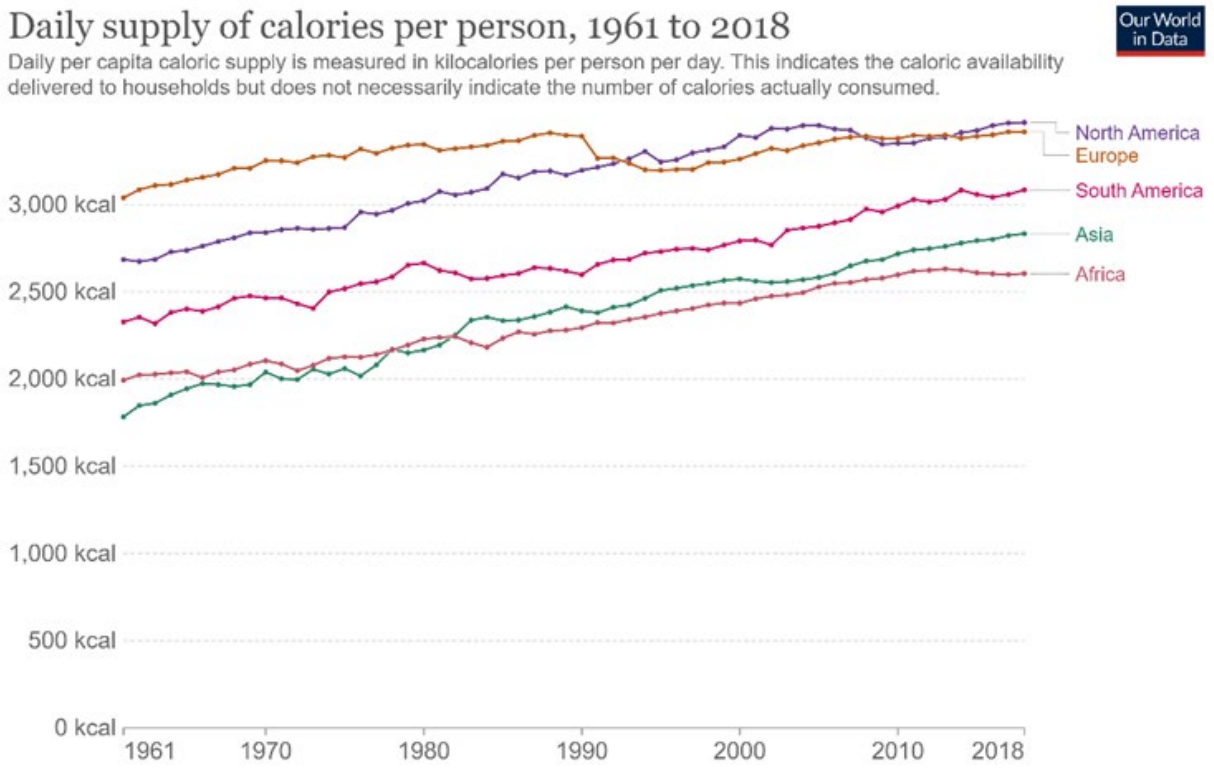


Source: FAO, IFAD, UNICEF, WFP, WHO (2022)

3. Development of food security

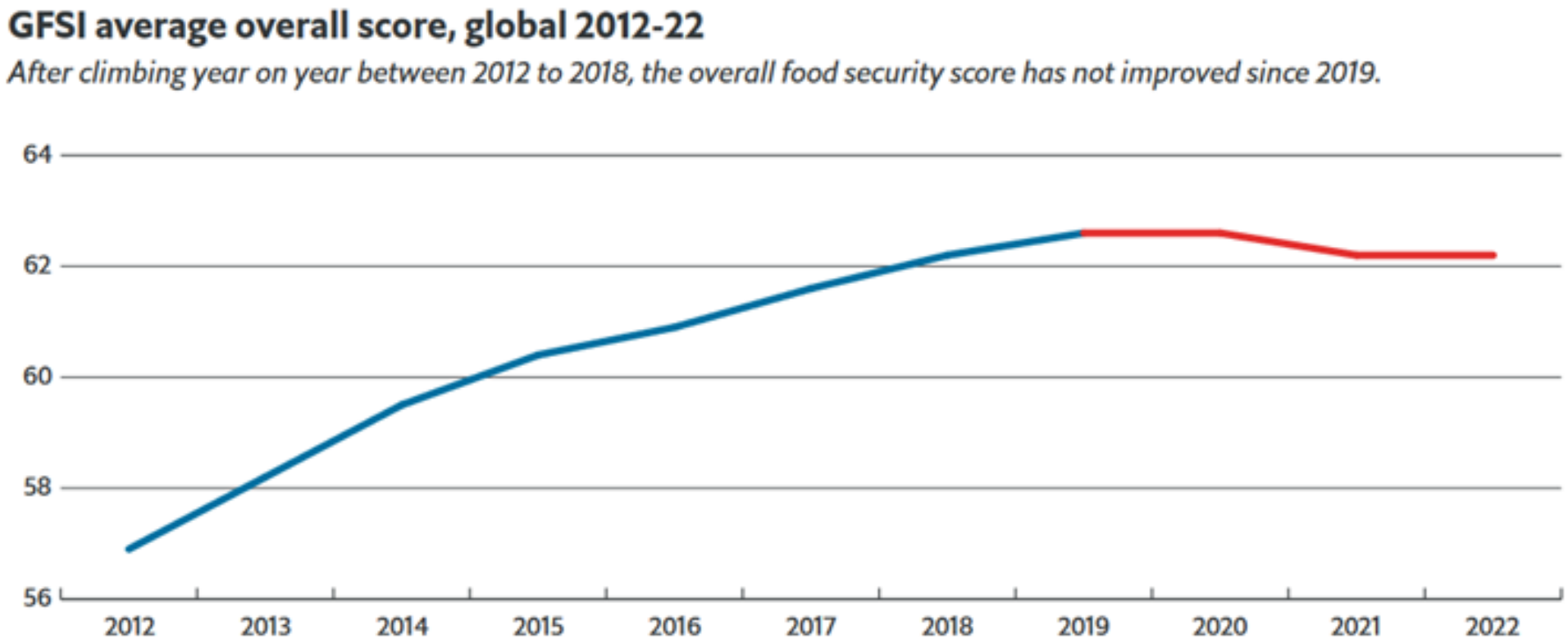
World Net Production Index (1961-2020)





Source: FAO (2023)

3. Current trend of food security



Source: Economist Impact (2022)

4. Positive Example: Costa Rica

4. Costa Rica

https://www.alamy.de/fotos-bilder/map-of-costa-rica.html?sortBy=relevant

- 5 Million people
- Long-standing and stable democracy
- Access to free education
- Guaranteed state pension and universal health coverage
- Access to electricity and source of drinking water

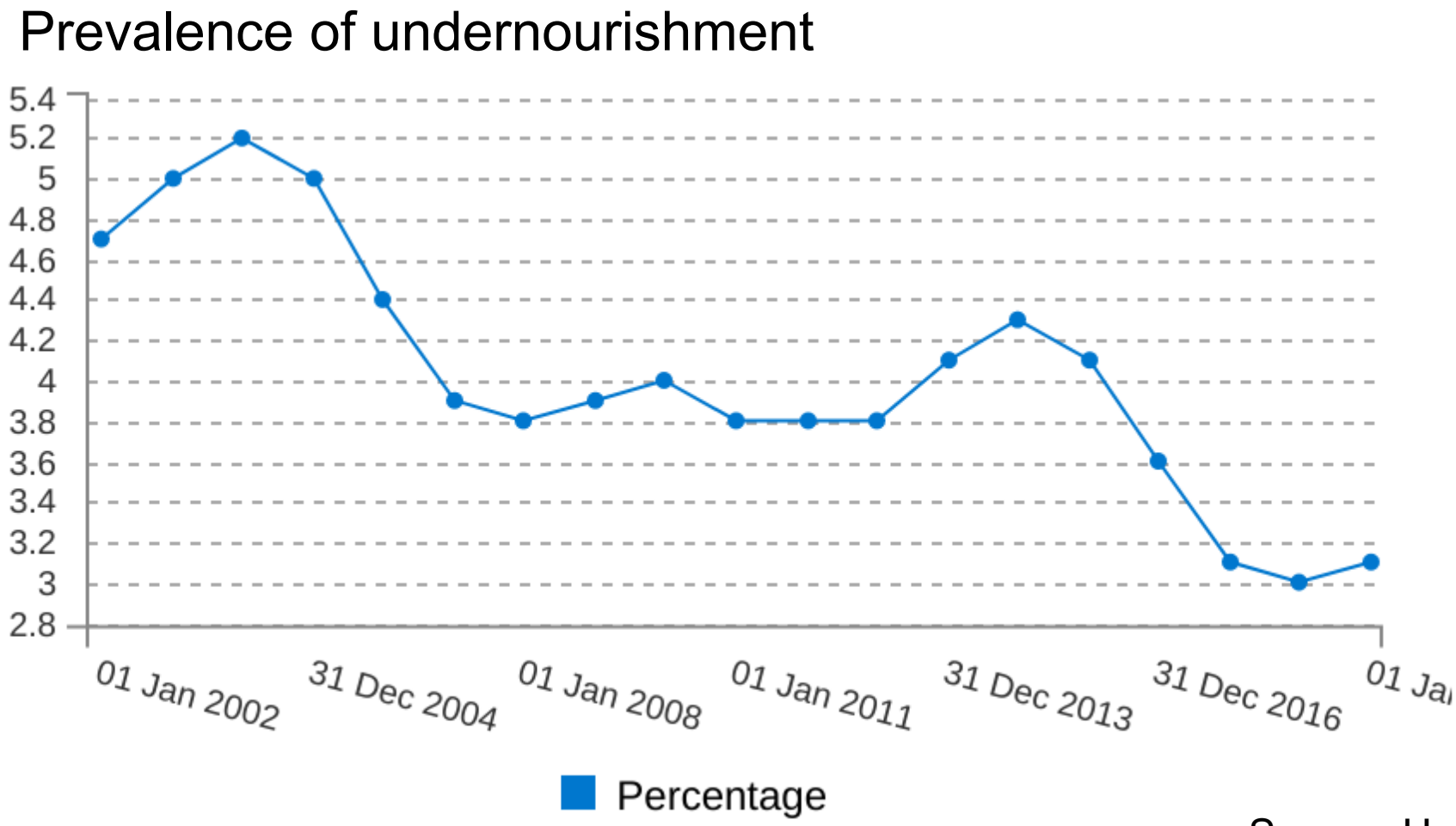
4. Positive Example: GFSI Costa Rica

Global Food Security Index

Rank (113 countries)	Overall score	Affordability	Availability	Quality and Safety	Sustainability and Adaptation
18th Costa Rica	77.4	83.0	73.0	79.2	73.3
19th Germany	77.0	87.9	67.0	79.9	70.8

Source: Economist Impact (2022)

4. Positive Example: Costa Rica



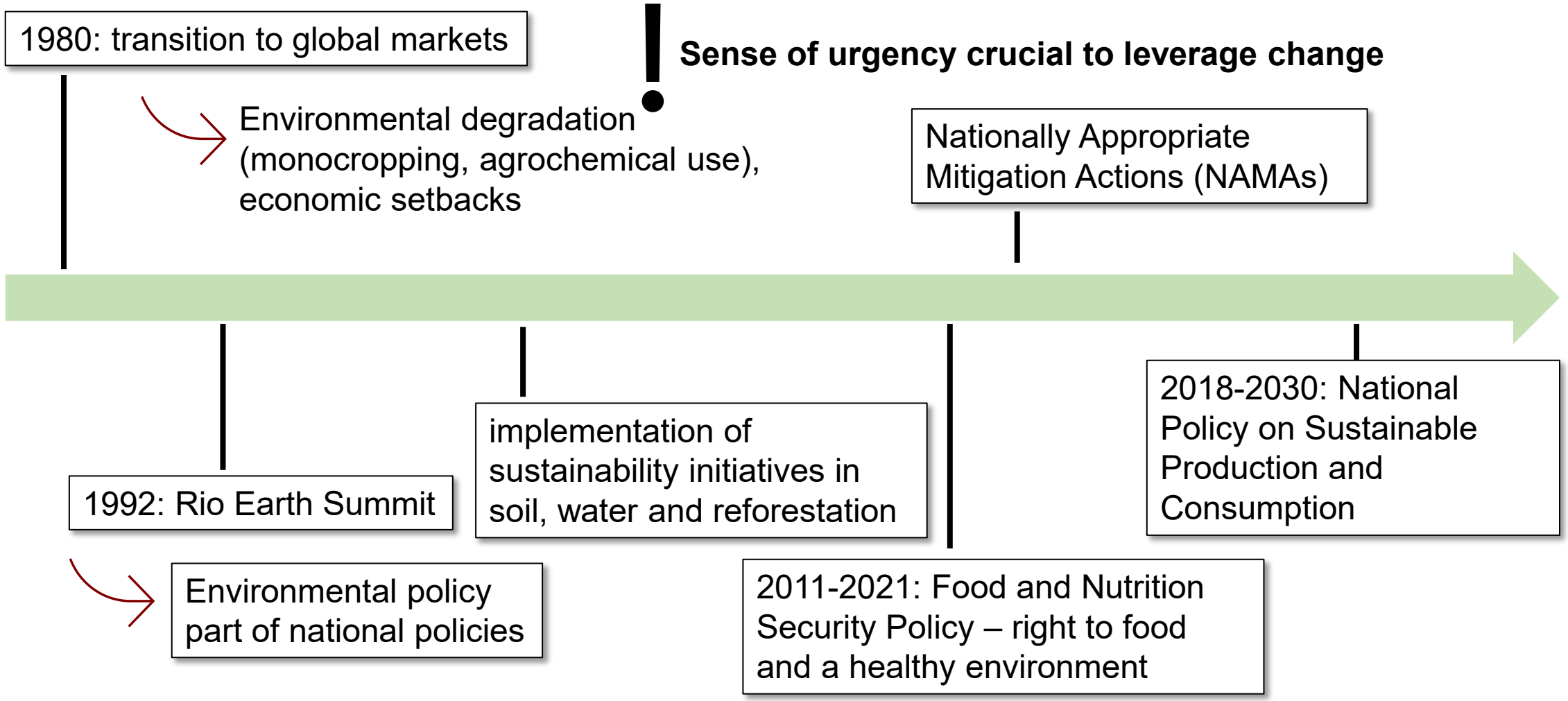
Source: Humdata (2020)

4. Positive Example: Costa Rica

→ First tropical country to halt and even reverse the deforestation trend caused by the expansion of agricultural land

https://www.costaricarios.com/best-sustainable-costa-rica-farm-experiences/

4. Costa Rica: History & Strategy



Source: Rosendaal et al (2021)

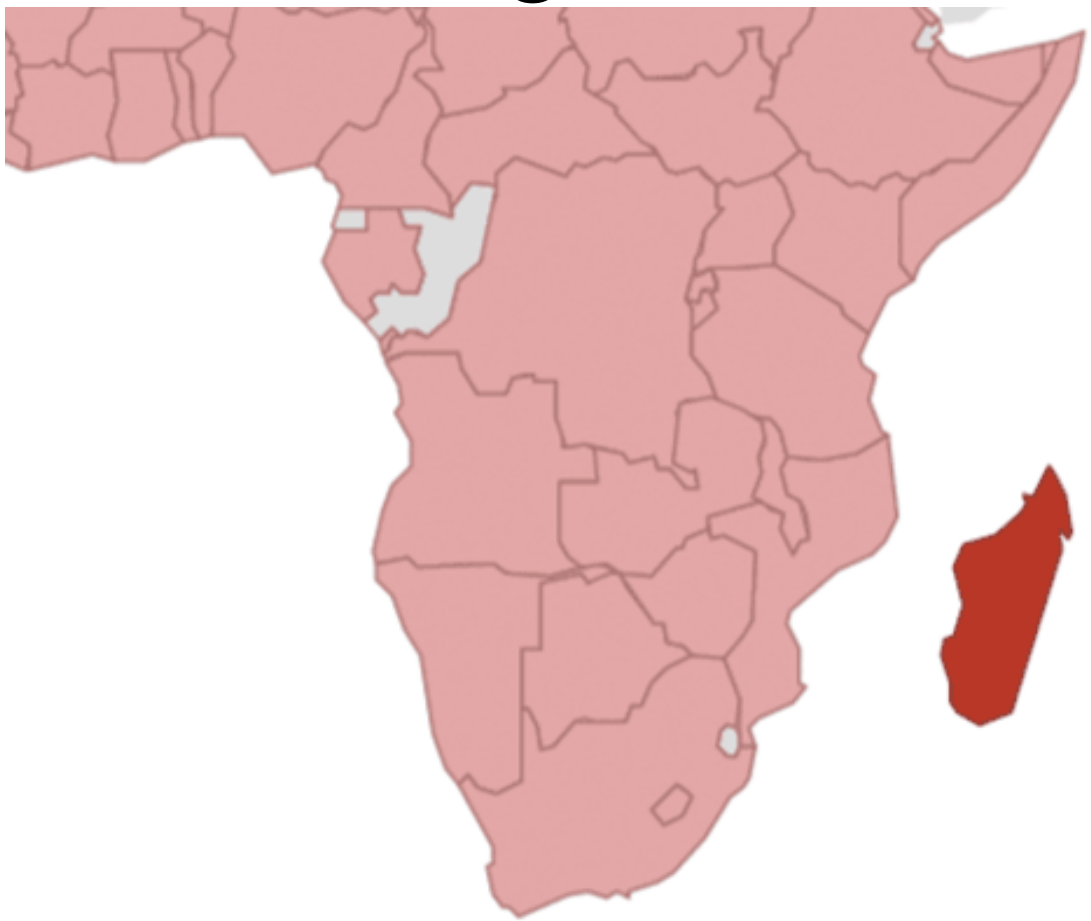
Summary Costa Rica

- **Culture of collaboration** across levels and domains
- **Public investments** in key system structures
- **Strong civic space**
- Costa Rica's **comparative advantage**
- Environmental sustainability **commitments and standards**
- The role of **cooperatives**
- Political stability, continuity and **peace**

Source: Rosendaal et al (2021)

5. Food Insecurity in Madagascar

5. Madagascar: Situation



- World‘s fourth largest island
- One of the world’s **poorest countries**
- Population is expected to double to 50 million in the next 30 years → more **pressure on natural resources**

5. Madagascar: Global Food Security Index

Rank (113 countries)		Overall score	Affordability	Availability	Quality and Safety	Sustainability and Adaptation
=108th	Burundi	40.6	32.5	41.4	52.4	38.6
=108th	Madagascar	40.6	39.5	43.0	34.9	44.9
110th	Sierra Leone	40.5	36.6	35.5	41.8	49.8
111th	Yemen	40.1	46.4	26.9	48.7	37.8
112th	Haiti	38.5	32.8	49.6	37.9	34.2
113th	Syria	36.3	32.0	26.6	50.8	38.4

Source: Economist Impact (2022)

5. Madagascar: Acute Food Insecurity Classifications

Chronic malnutrition
almost **half of all children under 5** – the world's tenth highest

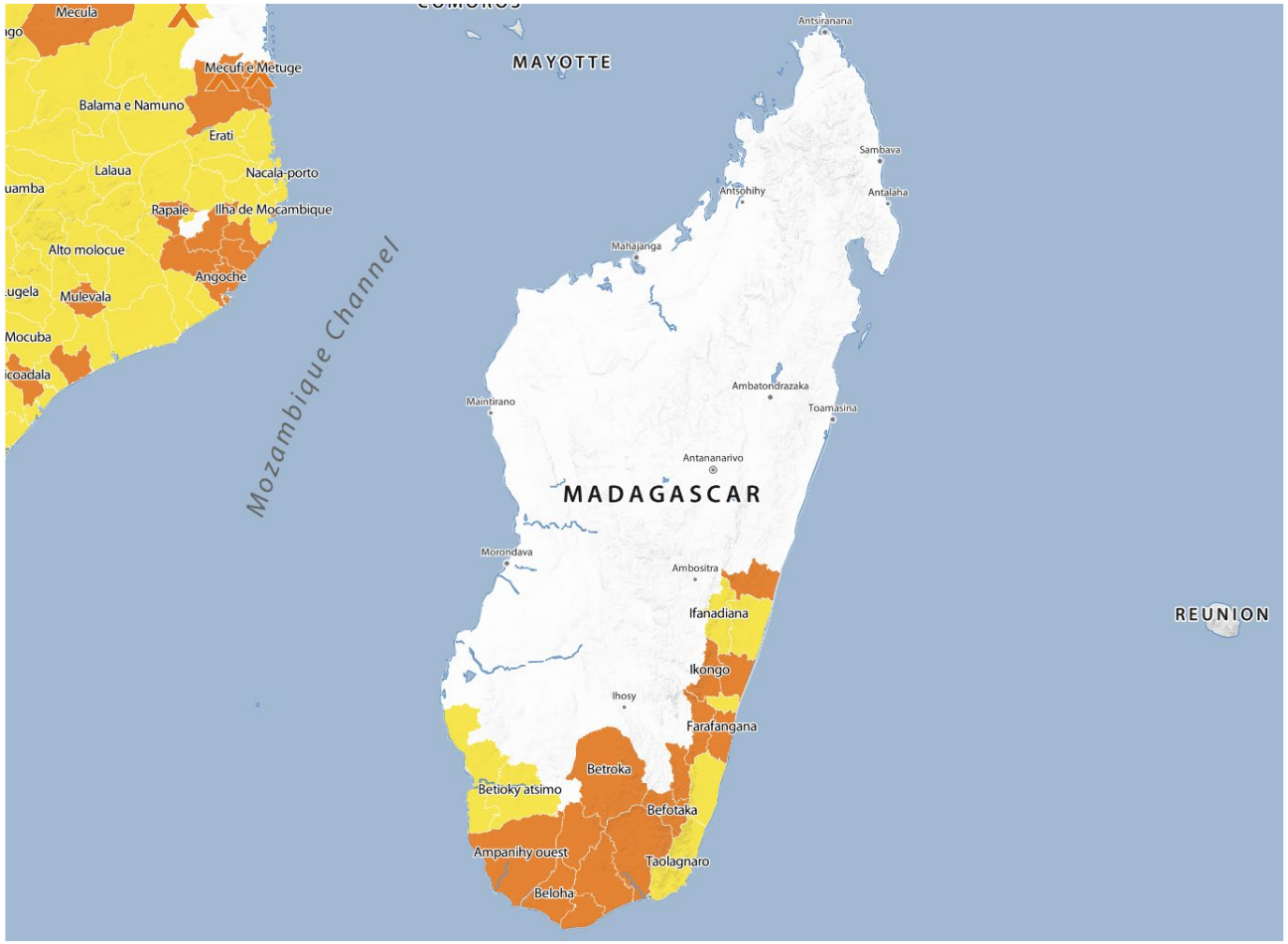
!

1.64 MILLION
people are food insecure and need humanitarian assistance

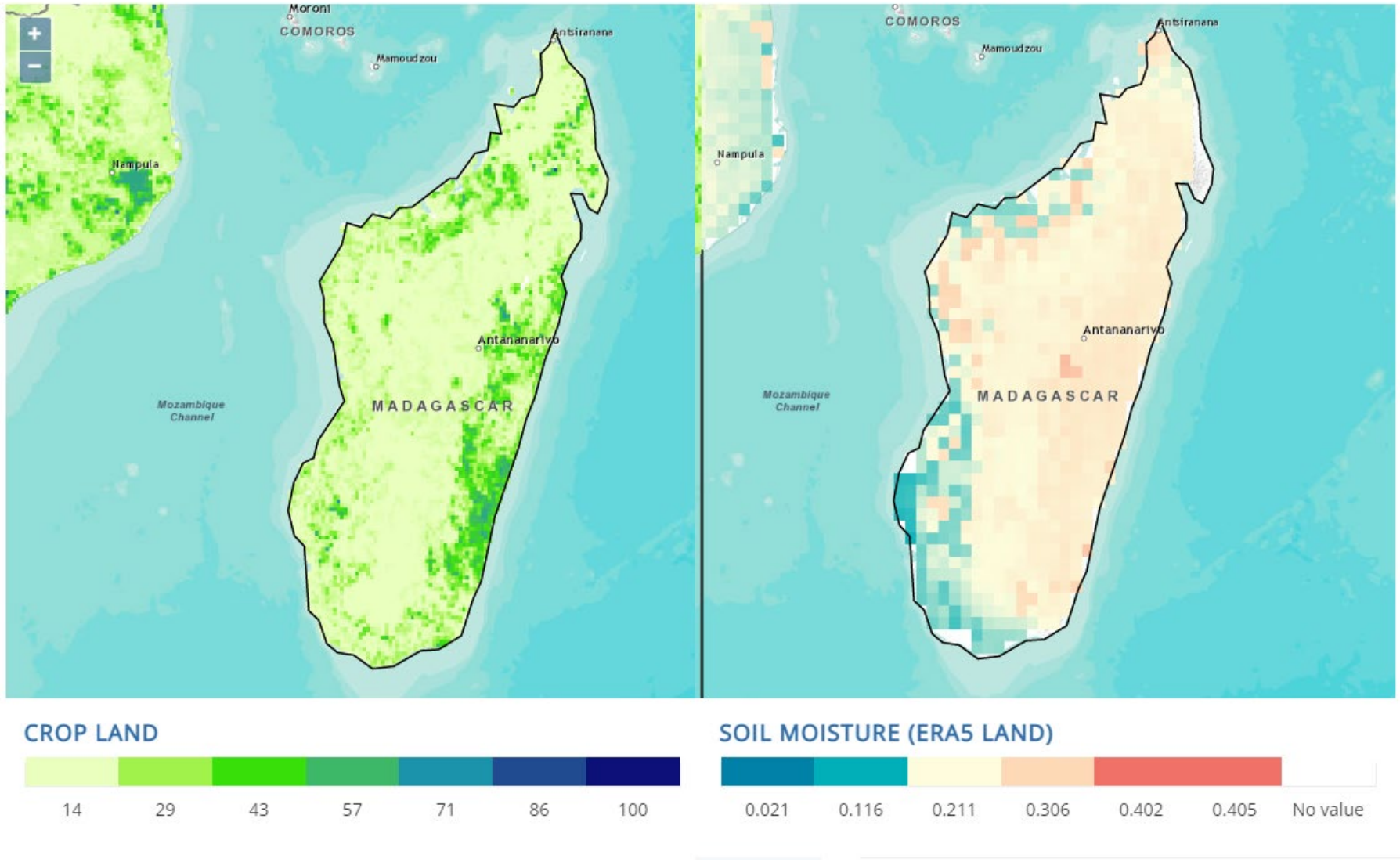
334,000
people in the Grand Sud are facing emergency level of food insecurity

25.6 MILLION
population

Source: IPC (2023)



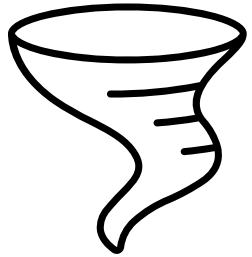
5. Madagascar: Cropland in the east, soil moisture in the west

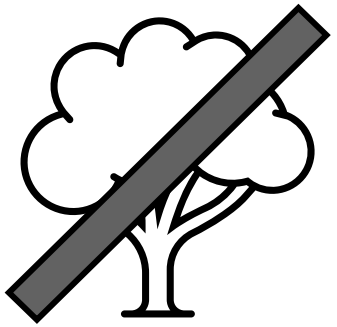


Source: Worldbank (2020)

5. Main drivers: Droughts, deforestation, fragile ecosystems and agriculture

- 2016: **75% drop in rainfall = 95% of the crops were lost**
- Rainy seasons 2019/2020 and 2020/2021: The **Grand Sud** region has been struck **by back-to-back droughts**
- **Most cyclone-exposed country in Africa**: 1/4 of the population lives in areas highly prone to cyclones, floods or drought
- **Fragility of the ecosystem** intensifies **vulnerability to shocks and food insecurity**
- **Deforestation** has become a major concern: **90 % of original rainforests have been lost** to logging, charcoal-making, slash-and-burn agriculture, livestock grazing and invasive species





5. Economy: Farming, Fishing and Forestry

- **Farming, fishing and forestry** form the backbone of the Malagasy economy
- Agriculture is dominated by **rain-fed small-scale subsistence farming**: seven out of 10 smallholder farmers own no more than 1.2 hectares of land
- **Rice** is the **main staple food** and the island's main crop, but **not enough is produced to satisfy the national demand**
- Agricultural production remains low due to factors such as:
  - limited access to agricultural productive assets
  - credit and markets
  - gender inequality limiting women and girls' access to land
  - poor post-harvest techniques
  - inadequate natural resources management
  - lack of adequate access to markets for smallholder farmers

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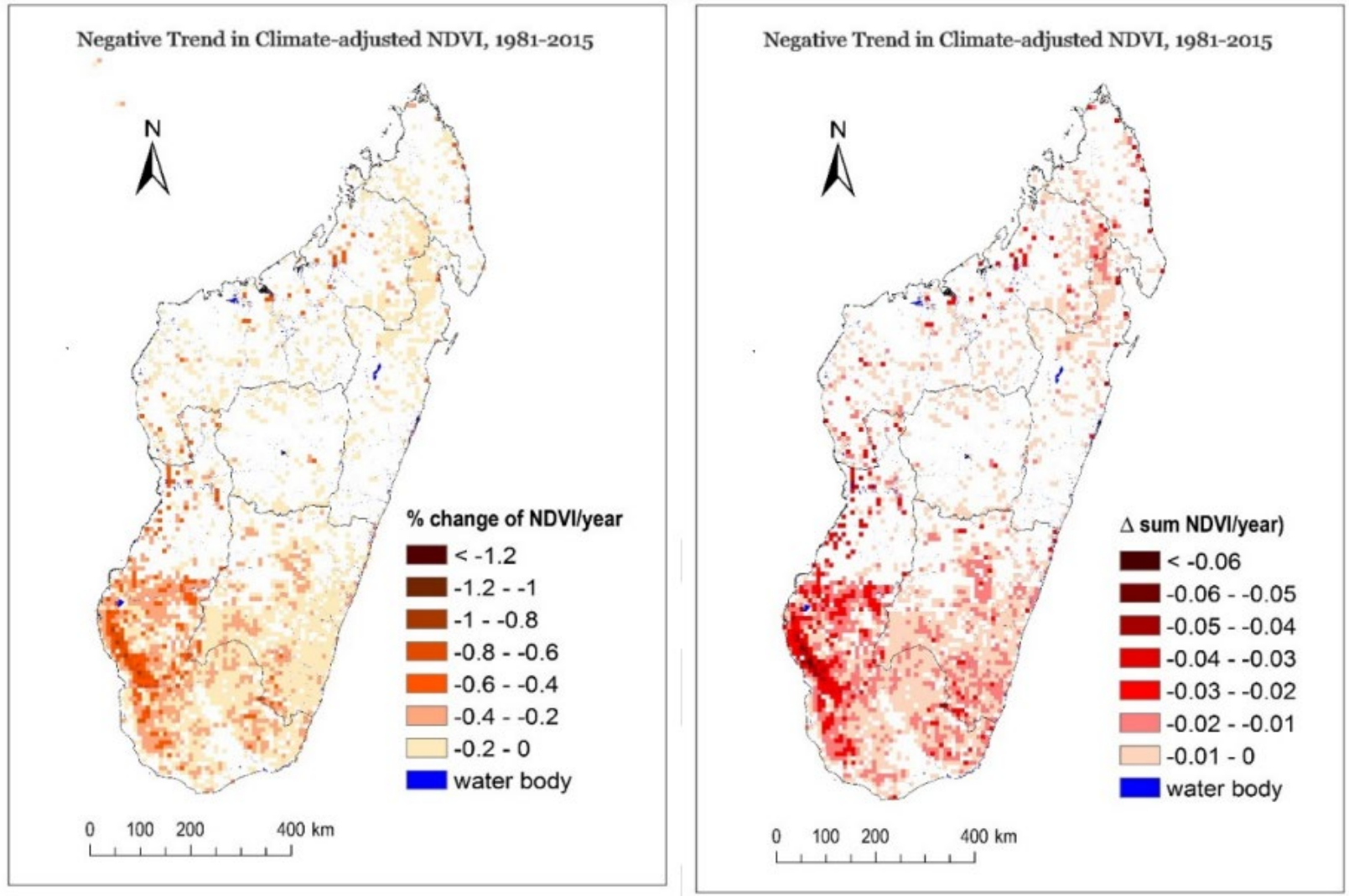
5. Slash-and-Burn Agriculture for Rice

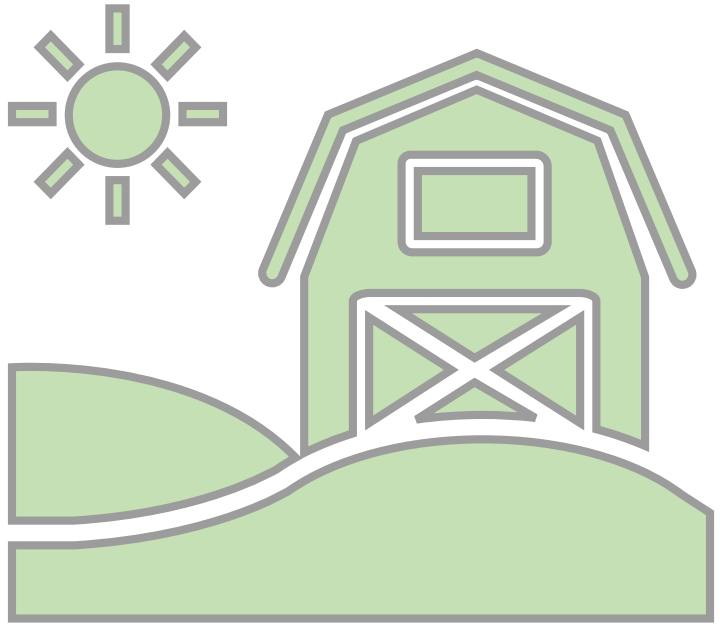
- Used for **converting tropical rainforests in Madagascar into rice fields**
- Typically, an **1-2 acres of forest** is cut, burned, and then planted with rice
- After several years of production **the field is left fallow** before the process is **repeated**
- After two or three such cycles, the **soil is exhausted of nutrients** and the land is likely **colonized by scrub vegetation or alien grasses**
- On slopes, the new vegetation is often **insufficient to anchor soils**, making **erosion** and **landslides** a problem



Map 1: Land degradation hotspots in Madagascar identified by climate-corrected NDVI changes (left: relative change; right: absolute change).

5. Objectives

- Inspire and facilitate farmers in adapting agroforestry
- Increase their farm's climate resilience
- Increase productivity
- Increase fertility
- Regenerating degraded land



5. Partners

- Local communities
- University of Antanarivo (PhD Students)
- Local authorities
- renature
- GIZ
- FAO
- HNEE
- Hydrology & Water Experts

5. Regenerative Farming: Milestones

- Identify local edible drought resistant plant species with good nutrient profile
  - Local Nitrogen Fixing Plant: Lojy Be cowpea
  - Nutrient dense plant: Moringa Oleifera
- Introduction of Seedbanks+Nurseries
  - Free supply of Seeds
  - Farmers cultivate Seeds and share them in the banks

Lojy Be Cowpeas: Able to grow through the dry season so that the nitrogen and biomass would be available to fertilize the next year's crops

5. Lojy Be Cowpeas

- Among the three most widely consumed grain legumes in Africa
- Leaves: Good supply of proteins, vitamins and minerals all 12 months of the year
- The Lojy Be variety can grow right through a whole 6-month dry season, providing both the fertility and drought-resistance
- continuous harvest from about 3 to 6 months after planting
- cover the ground almost completely from about 45 days after planting until they die, which means soils retain more moisture
- can be intercropped with virtually any other crops

5. Moringa Oleifera

- Multiple uses in food, cosmetics, medicine, forage for livestock and water purification
- The leaves are high in nutrients like vitamin C, vitamin A, calcium, iron, potassium, and proteins
- Powdered leaves successfully used in West Africa for decades in infant formulas
- The entire seedpods can eaten like beans at a young stage, or bigger and more mature added to soups
- The ripe seeds can be replanted or used to extract high quality oil
- Fast growing, the trees need to be cut constantly to easily reach the leaves, providing much needed sustainable wood for cooking or biomass for fertility

Oct. 2010: checking with students on the Moringa

Environmental Impact of Agroforestry

- Trees will produce shade
- Regulating the local micro-climate
- Increase Water Infiltration
- Restore Water Cycles
- Increase Soil Moisture
- Decrease Erosion

Social Impact of agroforestry

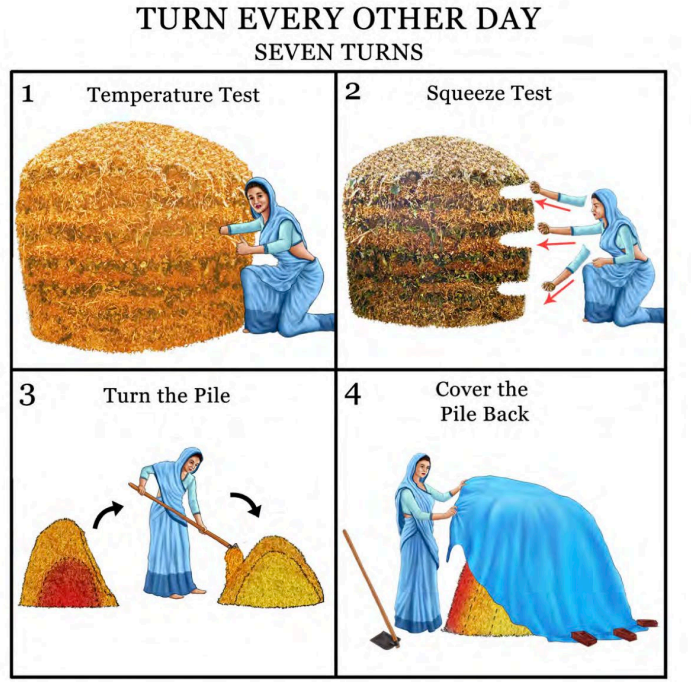
- Increasing farm's resilience
- secure yields against climate change and degradation
- enhance food security
- source biomass from their own farms reducing the time needed to fetch firewood which specifically benefits women.
- Availability of drinking water
- More diverse diets

5. Food Sovereignty: Milestones

- Mutual Support among farmers
  - Mutual insurance
  - Community farms

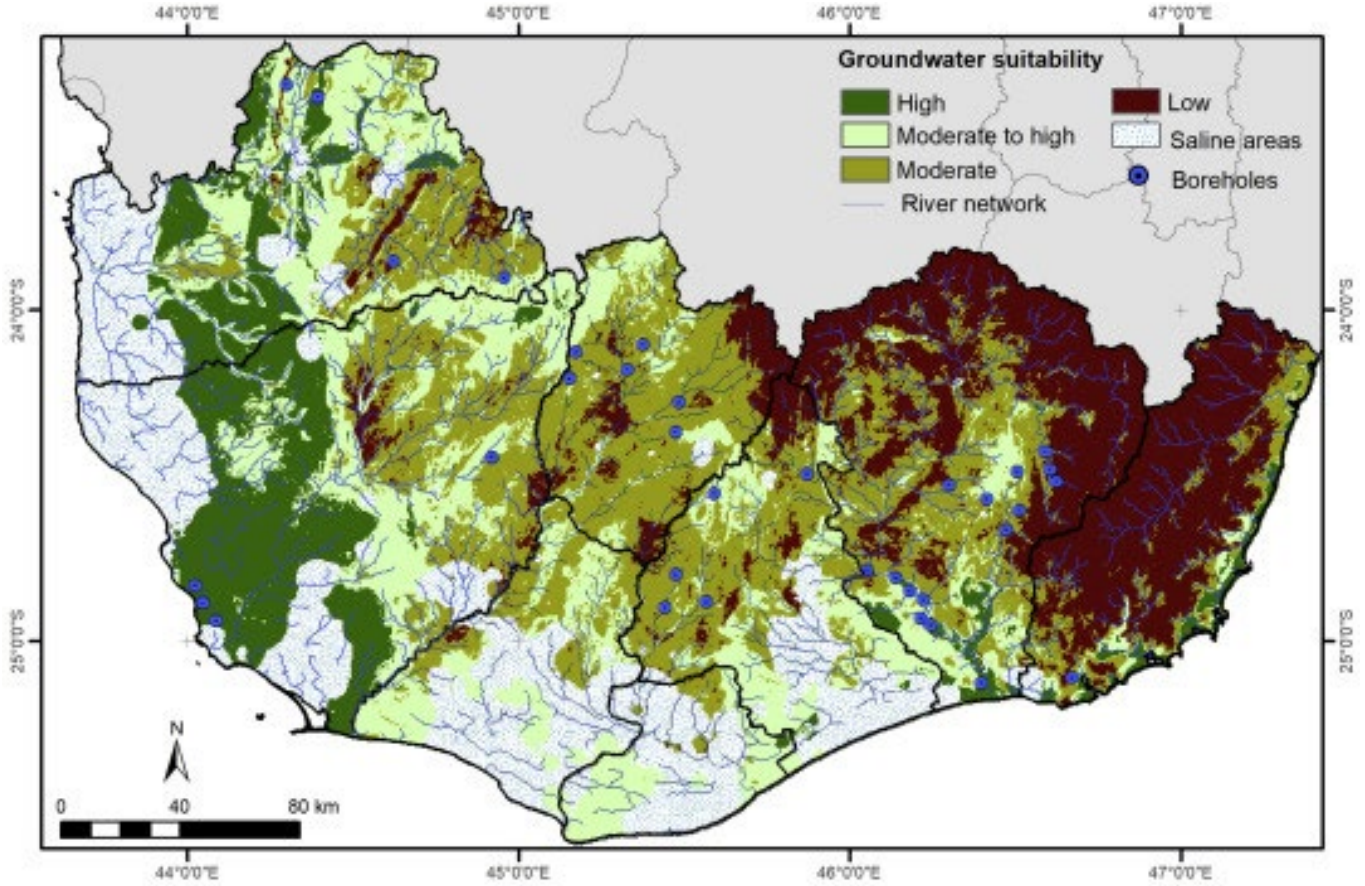
- Training Program for Farmers
  - Climate Smart Agriculture techniques
  - Agroforestry
  - systems for rational water management in the context of climate change
  - Diversifying Food Production (Rich nutrient profile)
  - Farmers become teachers

5. Shivansh: Self-made Fertilizer in 18 days from agricultural waste + cow dung

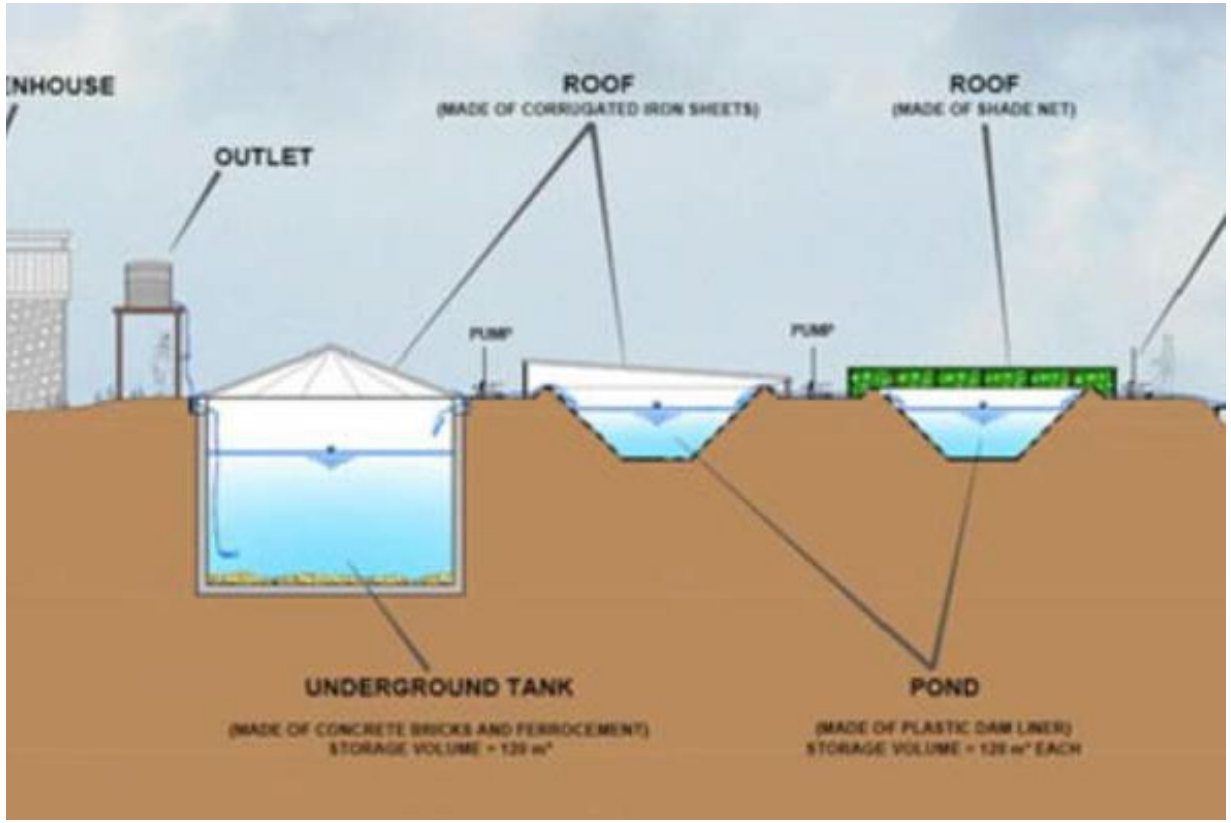


M	T	W	T	F	S	S
1	2	3	4	5	6	7
Build				Turn		Turn
8	9	10	11	12	13	14
	Turn		Turn		Turn	
15	16	17	18	19	20	21
Turn		Turn		Ready		

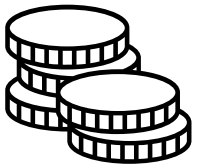
Water Team: Trees & Bushes along the slopes for Ecosystem Services



Water-Team: Floodwater Harvesting & Fog Harvesting

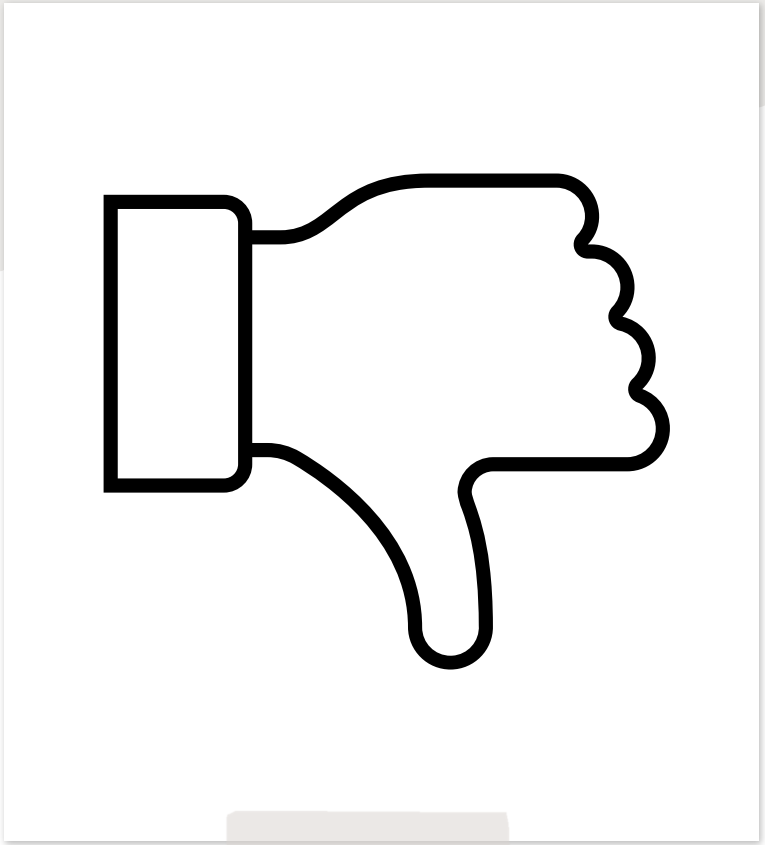


5. Budget



MILESTONE	ACTIVITY	BUDGET	MAIN PARTNER	SUPPORTERS
Preliminary assessment	preliminary investigation	100.000,00 €	University of Antanarivo	HolSol
	publication and distribution of the results	20.000,00 €	University of Antanarivo	HolSol, local authorities
Access to seeds	tree nursery and seedbank	500.000,00 €	HolSol NGO	local authorities
	seed supply and distribution	200.000,00 €	HolSol NGO	local communities
Education & Materials	Training programs for farmers + Materials, Tools, etc.	400.000,00 €	HolSol NGO	University of Antanarivo
Support network creation	Community engagement workshops	20.000,00 €	HolSol NGO	local authorities
	MARISCO workshops + monitoring	50.000,00 €	HNEE	HolSol NGO
		1.290.000,00 €		

5. Downsides



- Long time before seeing the first results, long-term commitment required
- Storm damage will still be possible due to the high cyclone incidence
- Conversion to more food crops might go against the preferences
- More locally produced food

TRADE OFF *(-)*

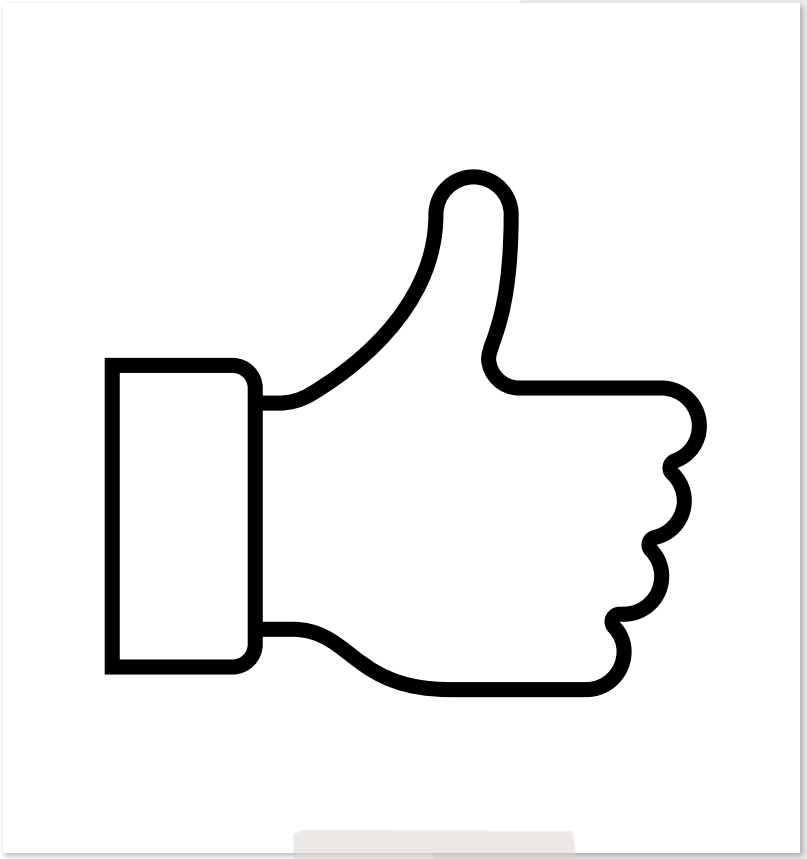
less income due to the reduced cash crop production

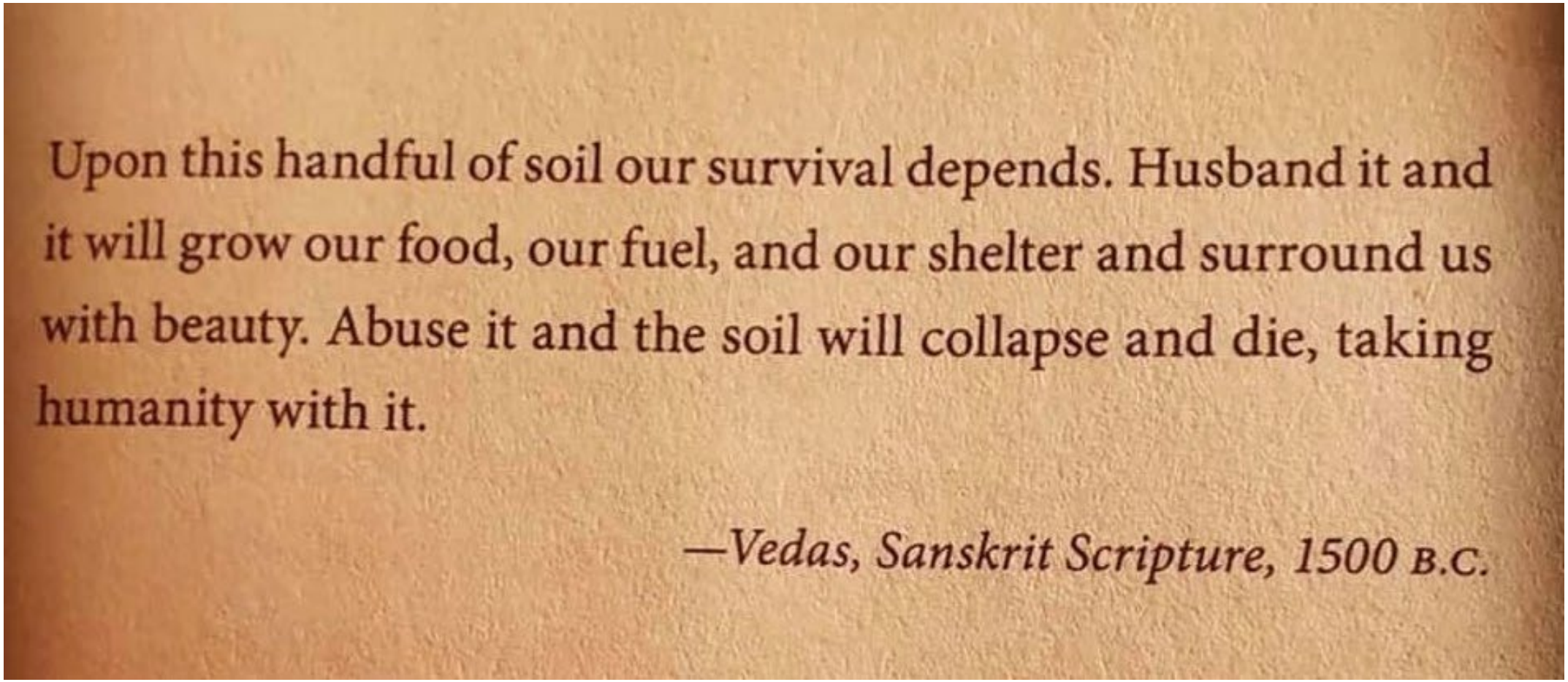
5. Consequences

- Better resilience after intense storm events
- Better soil health and higher water retention
- Improved food sovereignty
- More locally produced food

TRADE OFF (+)

more food crops locally consumed




Upon this handful of soil our survival depends. Husband it and it will grow our food, our fuel, and our shelter and surround us with beauty. Abuse it and the soil will collapse and die, taking humanity with it.
—Vedas, Sanskrit Scripture, 1500 B.C.


Thank you for listening

Literature

World Food Summit 1996, Rome, Declaration on World Food Security.

Roosendaal, L., Brouwer, H., Garcia-Campos, P. & Prado-Rivera, F. (2021). Costa Rica's journey towards sustainable food systems – The processes and practices that made a difference. Rome, FAO. https://doi.org/10.4060/cb5997en

Shimokawa L. (2017). Dr. Albie Miles publishes article in the Journal of Agroecology & Sustainable Food Systems. Online available at https://westoahu.hawaii.edu/ekamakanihou/?p=5767, last accessed 13.04.2023.

European Commission (2023). COMISSION STAFF WORKING DOCUMENT. Drivers of food security. Online available at https://commission.europa.eu/system/files/2023-01/SWD_2023_4_1_EN_document_travail_service_part1_v2.pdf, last accessed 13.04.2023.

„Fleischatlas 2021: Daten und Fakten über Tiere als Nahrungsmittel". 2021. Heinrich-Böll-Stiftung, Bund für Naturschutz Deutschland und Le Monde Diplomatique. https//www.boell.de/de/fleischatlas-2021-jugend-klima-ernaehrung/?dimension1=ds_fleischatlas_2021#Beirtr%C3%A4ge.

Food and Agriculture Organization of the United Nations (FAO) (n.d.). Hunger and food security. Online available at https://www.fao.org/hunger/en/, last accessed 13.04.2023.

FAO (2023). FAOSTAT. Online available at https://fenix.fao.org/faostat/internal/en/#compare, last accessed 13.04.2023.

Integrated Food Security Phase Classification. Online available at https://www.ipcinfo.org/ipc-country-analysis/ipc-mapping-tool/, last accessed 13.04.2023.

Worldbank (2020). Climate Change Knowledge Portal. Madagascar. Online available at https://climateknowledgeportal.worldbank.org/country/madagascar/vulnerability, last accessed 13.04.2023.

Literature

Food and Agriculture Organization of the United Nations (FAO) (2022). The future of food and agriculture. Drivers and triggers for transformation. Rome. Online available at https://www.fao.org/3/cc0959en/cc0959en.pdf, last accessed 13.04.2023.

FAO, IFAD, UNICEF, WFP and WHO. 2022. The State of Food Security and Nutrition in the World 2022. Repurposing food and agricultural policies to make healthy diets more affordable. Online are available on FAOSTAT (https://www.fao.org/faostat/en/#data/FS)

Holt-Giménez, E. (2002). Measuring farmers' agroecological resistance after Hurricane Mitch in Nicaragua: A case study in participatory, Sustainable Land Management Impact Monitoring. *Agriculture, Ecosystems & Environment*, *93*(1-3), 87–105. https://doi.org/10.1016/s0167-8809(02)00006-3

Humdata (2020). Costa Rica – Food Security Indicators. Online available at https://data.humdata.org/dataset/faostat-food-security-indicators-for-costa-rica, last accessed 13.04.2023.

Hendrickson, H., Howard, P.H., Miller, E.M. & Constance, D.H. 2020. The food system: concentration and its impacts. A Special Report to the Family Farm Action Alliance. http://dx.doi.org/10.13140/RG.2.2.35433.5232

IPC Integrated Food Security Phase Classification, (2023). *Madagascar: Acute food insecurity situation for November 2022 to March 2023 and projections for April to July 2023 and August to October 2023 : IPC - Integrated Food Security Phase Classification*. IPC Portal. Retrieved April 13, 2023, from https://www.ipcinfo.org/ipc-country-analysis/details-map/en/c/1156133/?iso3=MDG

Economist Impact (2022). Global Food Security Index 2022. Online available at https://impact.economist.com/sustainability/project/food-security-index/, last accessed 13.04.2023.

Uplink (n.d.). Sustainable Development Goal 2: Zero Hunger. Online available at https://uplink.weforum.org/uplink/s/topic/0TO2o000000AVgXGAW/food-systems, last accessed 13.04.2023.