



Food and Agriculture
Organization of the
United Nations



INTERNATIONAL DAY FOR
**DISASTER RISK
REDUCTION**

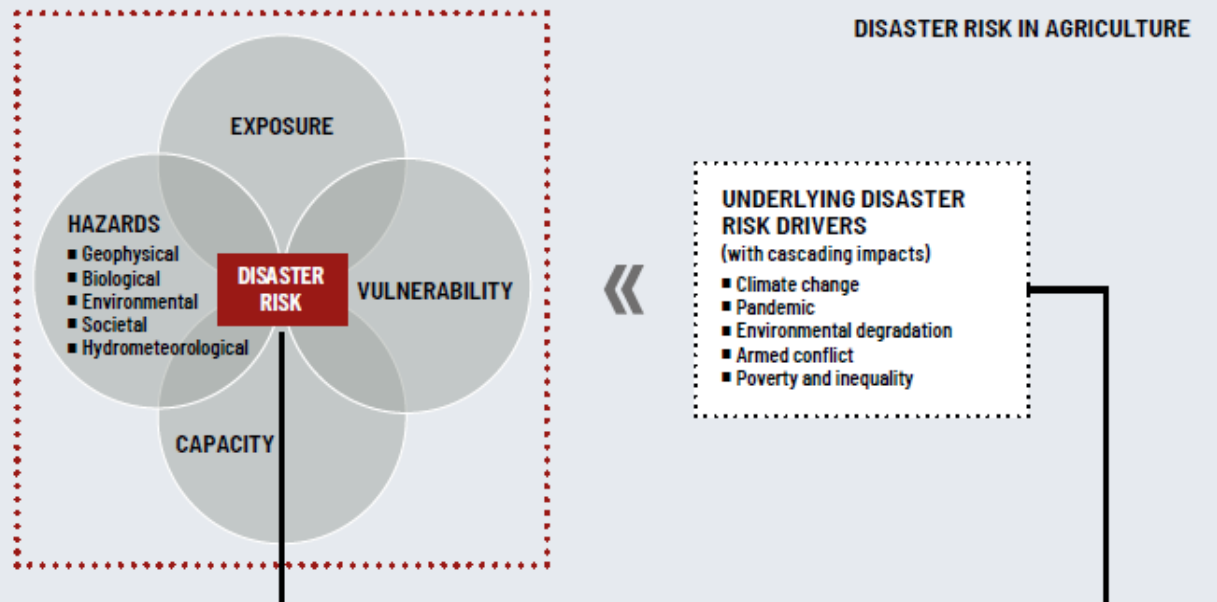
THE IMPACT OF **DISASTERS ON AGRICULTURE AND FOOD SECURITY**

**AVOIDING AND REDUCING LOSSES
THROUGH INVESTMENT IN RESILIENCE**

2023

Better production, better nutrition, a better environment, and a better life.

DISASTER RISK IN AGRICULTURE



RESILIENCE

IMPACT OF DISASTERS ON AGRICULTURE

STRUCTURE OF THE REPORT

PART 2 IMPACT OF DISASTERS

- CROPS (counterfactual model)
- LIVESTOCK (counterfactual model)
- FORESTRY (qualitative assessment)
- FISHERIES (qualitative assessment)

PART 3 IMPACT OF UNDERLYING DISASTER RISK

- CLIMATE CHANGE (counterfactual model)
- EPIDEMIC (case study)
- PANDEMIC (qualitative assessment)
- ARMED CONFLICT (qualitative assessment)

PART 4 DISASTER RISK REDUCTION MEASURES TO ENHANCE RESILIENCE

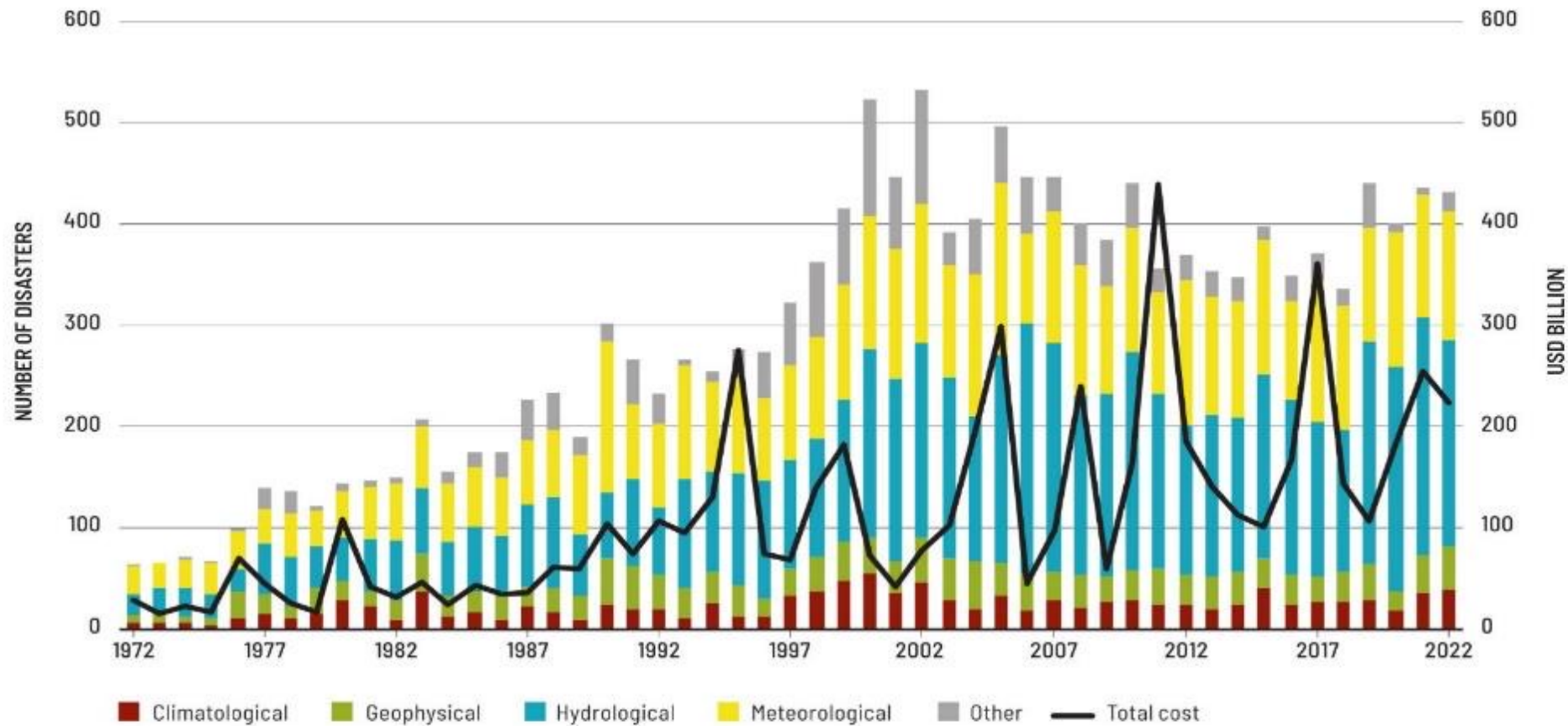
- FARM-LEVEL DISASTER RISK REDUCTION (cost-benefit approach)
- ANTICIPATORY ACTION (return on investment approach)
- PREVENTATIVE CONTROL OF BIOLOGICAL HAZARD (return on investment approach)

CONCEPTUAL FRAMEWORK:

Impact of disasters on agriculture and solutions to enhance resilience

An increasing severity and frequency of disasters threatens agrifood systems

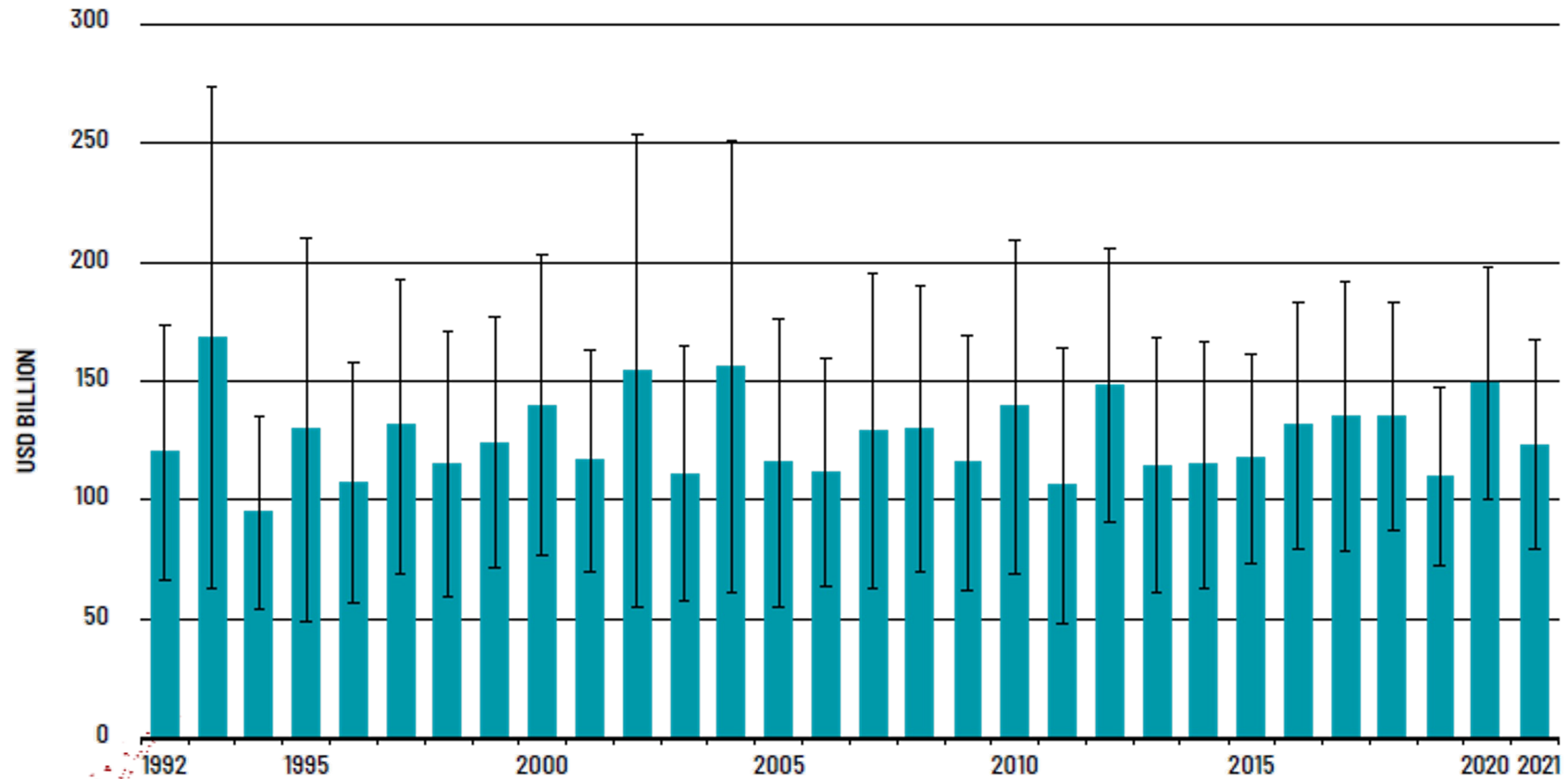
NUMBER OF DISASTERS BY EM-DAT HAZARD GROUPING, AND TOTAL ECONOMIC LOSSES 1971-2022



Source: EM-DAT

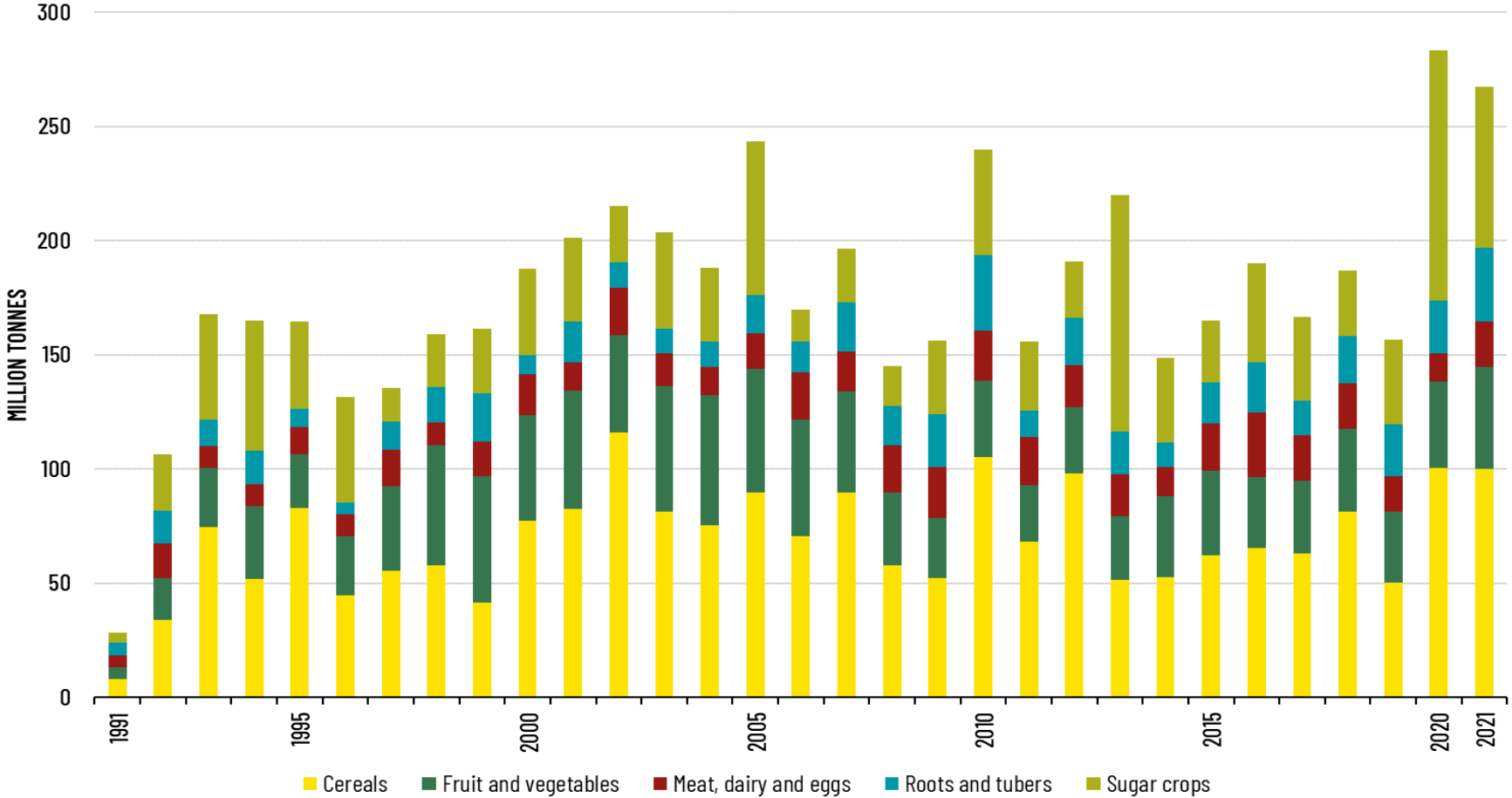
Estimated losses in crops and livestock are USD 3.8 trillion PPP 2017 in last three decades, or USD 123 billion/year or 5 percent of agricultural GDP

TOTAL ESTIMATED AGRICULTURAL PRODUCTION LOSSES



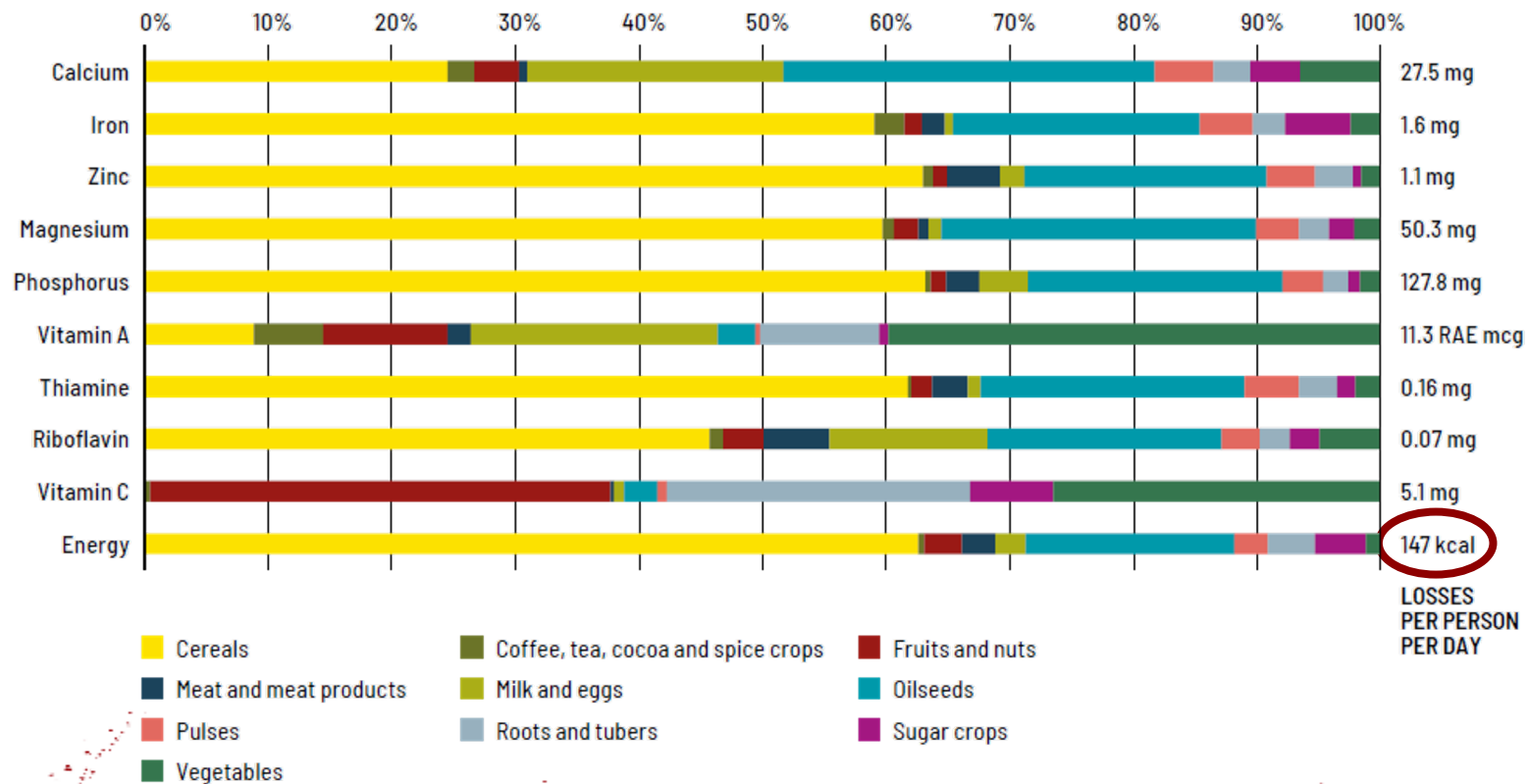
For main product groups, losses from disasters in tonnes display increasing trends

ESTIMATED LOSSES IN MAIN PRODUCT GROUPS



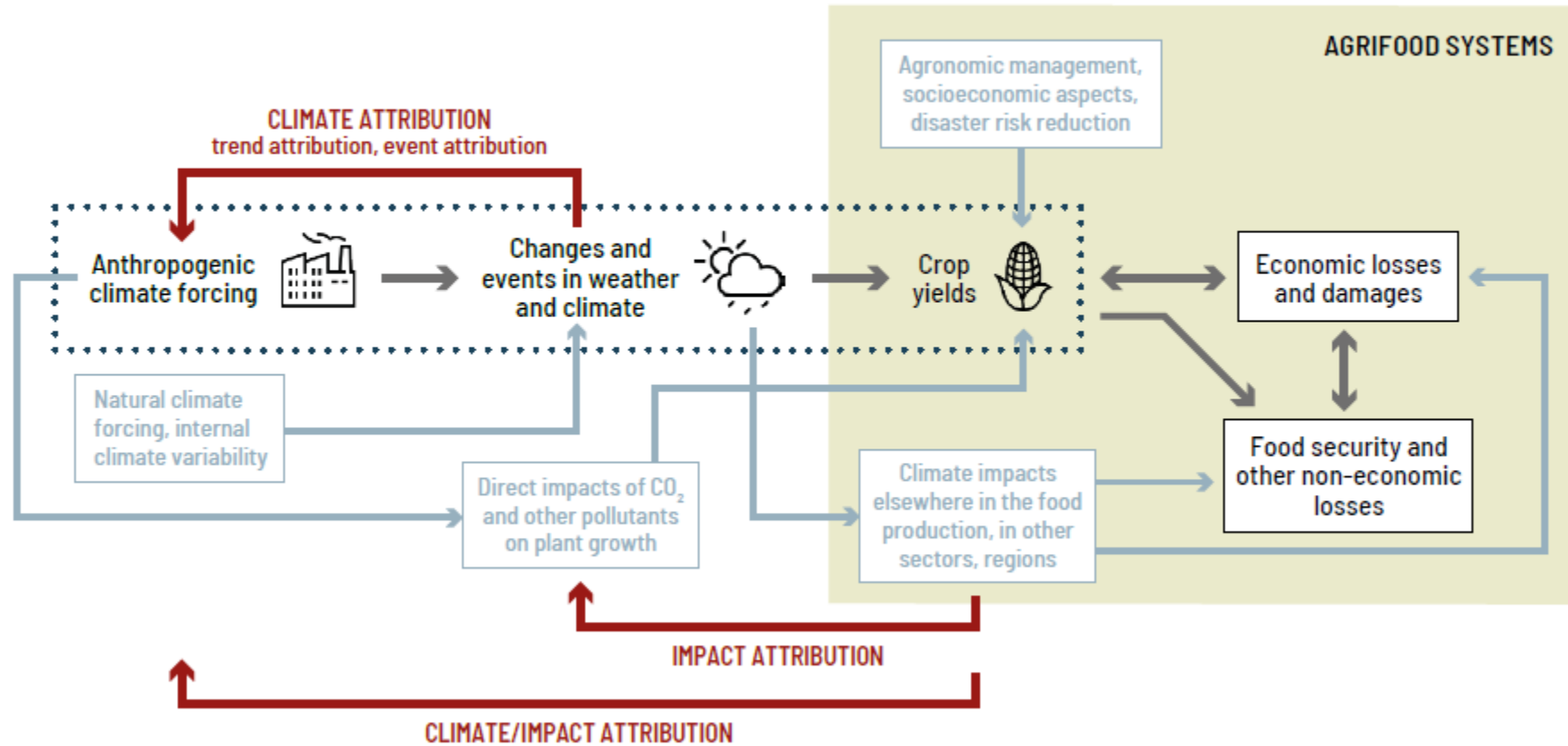
Losses in terms of availability of energy and nutrients are around 147 kcal, equivalent to daily energy requirements of roughly 400 million men or 500 million women

TOTAL ESTIMATED DAILY LOSSES OF ENERGY AND NUTRIENTS PER PERSON PER DAY BY FOOD GROUP, AS A PERCENTAGE (1991-2021)



Attribution science shows mostly negative impacts of climate change on the production of selected crop yields

CLIMATE IMPACTS ON AGRIFOOD SYSTEMS AND RELEVANT ATTRIBUTION CONCEPTS



Estimates for four country-crop pairs show mostly negative impacts on yield that range from 2 to 10 percent.

Country	Crop	Historical attribution	Event attribution
Argentina	Soy	Annual soy production during 2000-2019 may on average have increased by about 3 percent due to climate change.	With CC, yield anomalies in Argentina as low or lower than those derived for 2018 are estimated to be approximately half as likely in 2000-2019 due to CC.
Kazakhstan	Wheat	Annual wheat production during 2000-2019 may on average have decreased by more than 10 percent due to climate change.	With CC, yield anomalies in northern Kazakhstan as low or lower than those derived for 2010 are estimated to be approximately two and a half times more likely in 2000-2019 due to CC.
Morocco	Wheat	Annual wheat production during 2000-2019 may on average have decreased by about 2 percent due to climate change.	With CC, yield anomalies in Morocco as low or lower than those derived for 2019 are estimated to be slightly more likely in 2000-2019 due to CC.
South Africa	Maize	Annual maize production during 2000-2019 may on average have decreased by more than 5 percent due to climate change.	With CC, yield anomalies in South Africa as low or lower than those derived for 2007 are estimated to be more than approximately 10 times more likely in 2000-2019 due to CC.

The impacts of disasters and crises cascade and compound, pointing towards the need to address underlying disaster risk drivers simultaneously

- In today's interconnected world, overlaying and compounding risks lead to both indirect and direct impacts on agriculture. Other chapters on the impact of disasters on agriculture and food security include sections on pandemics, epidemics, and armed conflict:
 - **Pandemics:** COVID-19 affected farmers' access to input and output markets and led to a shortage of labour and a reduction of area planted up to 50%.
 - **Epidemics:** Outbreaks of African swine fever in 2019–2020 led to knock-on effects on production and prices beyond the directly affected countries.
 - **Armed Conflicts:** At their highest level since WWII, case studies on Somalia, the Syrian Arab Republic and Ukraine demonstrate their increasing toll.
- These chapters provide evidence on the systemic nature of risk, pointing to the need for approaches that can address the risk of multiple hazards.

Solutions Exist: Farm-level DRR good practices can proactively prevent and reduce disaster risk in agriculture, thus building resilience



- Farm-level DRR good practices perform on average 2.2 times better than usual practices under hazard conditions (low intensity, high frequency hazards).
- DRR good practices also provide added benefits in the absence of hazards.
- The benefit cost ratios (BCRs) are USD 3.6 under hazard conditions and USD 4.3 under non-hazard conditions for each USD invested.

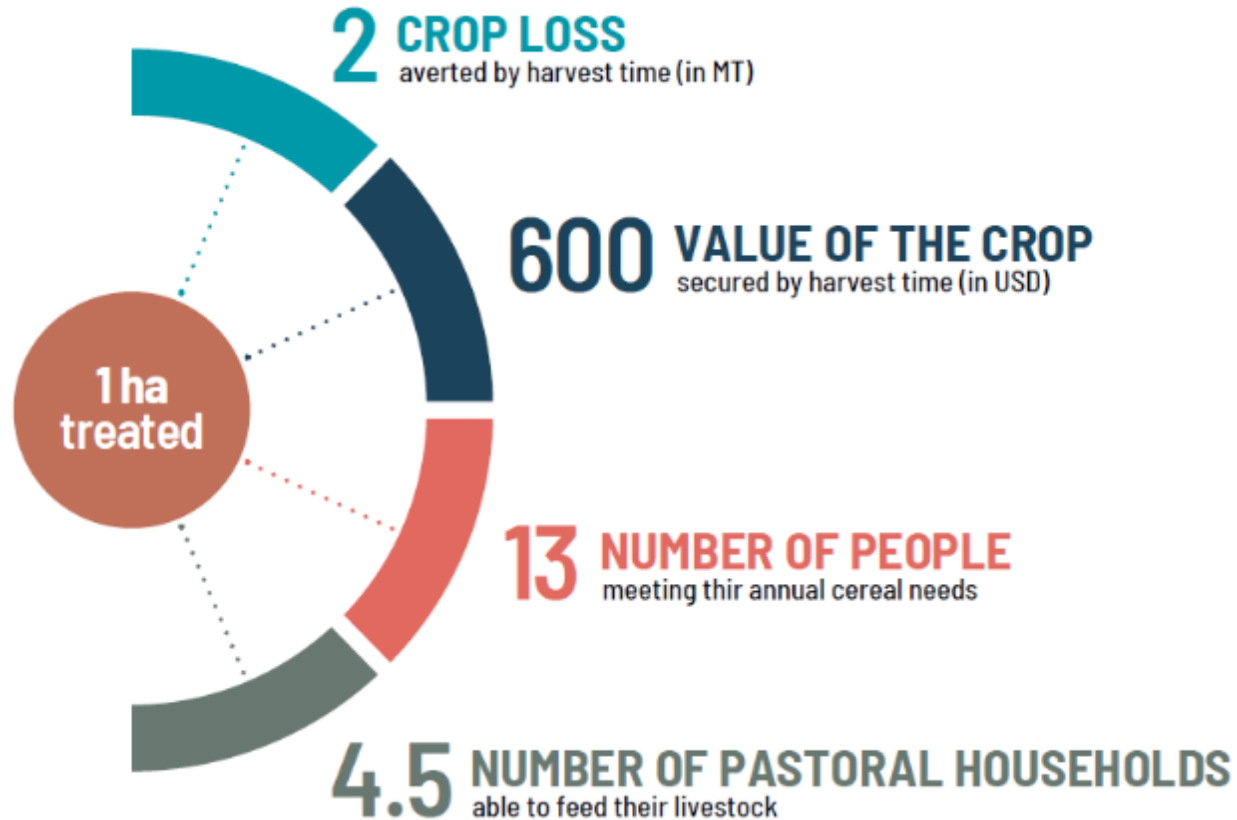
For every USD 1 invested in anticipatory actions, rural families can gain up to USD 7 in benefits and avoid agricultural losses

SCALE OF RETURNS ON INVESTMENTS CALCULATED FOR FAO'S ANTICIPATORY ACTION INTERVENTIONS

COUNTRY	BCR
Afghanistan	1.42
Bangladesh	0.83
Colombia	2.6
Kenya	3.5
Ethiopia	7.0
Madagascar	2.5
Mongolia	7.1
Philippines	4.4
Sudan	6.7
Viet Nam	0.46 ³⁹

- Anticipatory action is a proven cost-effective measure for mitigating the impact of disasters with significant resilience dividends.
- Since 2016, FAO has implemented more than 50 Anticipatory Action (AA) projects aimed at anticipating and mitigating the impact of hazards and shocks.

A combined preventative control and anticipatory action approach showed significant benefits in the case of the desert locust



- The desert locust upsurge that occurred in the greater Horn of Africa in 2020 and 2021 was among the worst such crises to strike the region ever recorded.
- The intervention averted losses of 4.5 million tonnes of crops and 900 million litres of milk, securing food for nearly 42 million people in the aftermath of this outbreak.

TAKE AWAY MESSAGES

Available evidence shows that the impact of disasters in agriculture is substantial, as are the benefits from investing in resilience and disaster risk reduction.

In order to make a difference we have to:



Improve data and information on the impacts of disasters in agriculture.



Develop and mainstream multisectoral and multihazard disaster risk reduction approaches into policy and decision making.



Invest in disaster risk reduction for resilience, which provides substantive benefits for agrifood systems, and improves agricultural production and livelihoods.



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Thank you

Contact us at FAO-DRR@fao.org