Background
“more disasters but dearth of information on damages and losses in agriculture”

I. FAO’s Methodology for D&L Assessment in Agriculture
   Purpose, Method, Components

II. Applying the Methodology
    Typhoon & Drought

III. Upcoming FAO Report
    Impact of Disasters on Agriculture
**Background**

Growing occurrence of natural disasters

- Between 2005-16: average of **260** natural disasters per year (in developing countries)
- Taking an average of **54'000 lives & USD 27 billion** in economic losses and every year
- Most of the increase is driven by climate and weather-events

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**Assessing Damage and Loss in Agriculture**

FAO’s methodology

- Steady trends of increasing economic impact & damages
- Annual economic loss from **climate and weather-related events** has been growing disproportionately
II. FAO’s Methodology for DL Assessment in Agriculture

Purpose, Method, Components

The methodology developed by FAO includes the measuring of the value of *production damage and losses* attributed to disasters in the crops, livestock, fisheries, aquaculture and forestry sectors, together with the *value of damaged agricultural assets and infrastructure*.

Methodology will be used to track progress of:

- SFDRE indicator C2 – *Direct agricultural loss attributed to disasters*
- SDG indicator 1.5.2 – *Direct disaster economic loss in relation to GDP*
This indicator is calculated based on five sub-indicators:
- C2(C): Impact to crops
- C2(L): Impact to livestock (and apiculture)
- C2(FO): Impact to forestry
- C2(AQ): Impact to aquaculture
- C2(FI): Impact to fisheries

\[
\text{Impact to Agriculture: } C_2 = C_2(C) + C_2(L) + C_2(FO) + C_2(AQ) + C_2(FI)
\]

**Assessing Damage and Loss in Agriculture**
FAO’s methodology

**DL Assessment Methodology**
Contribution to SDG monitoring

**Damage and loss**

**Damage** is defined as the replacement/repair cost of totally or partially destroyed physical assets and stocks in the disaster-affected area.

**Loss** refers to changes in economic flows arising from the disaster (i.e. declines in output in crops, livestock, fisheries, aquaculture and forestry).

**Production and assets**

Each sub-sector is sub-divided into two main sub-components, namely \textit{production} and \textit{assets}. The production sub-component measures both damage and loss from disaster on production inputs and outputs, while the assets sub-component measures damage on facilities, machinery, tools, and key infrastructure related to agricultural production.
### Assessing Damage and Loss in Agriculture

**FAO’s methodology**

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<th>Damage Components</th>
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**Difference between expected and actual value of crop production**
- Short-run post-disaster maintenance costs

**Crop damage and loss** =
- Annual crop production damage + Perennial crop production damage + Annual crop production loss + Perennial crop production loss + Crop assets damage (complete and partial)

#### C2-C (Crop damage and loss)

- **Annual crop production damage**
  - 1) Pre-disaster value of destroyed stored annual crops and inputs

- **Perennial crop production damage**
  - 1) Replacement value of fully damaged perennial trees; 2) Pre-disaster value of destroyed stored perennial crops and inputs

- **Annual crop production loss**
  - 1) Difference between expected and actual value of crop production in non-fully damaged harvested area in disaster year; 2) Pre-disaster value of destroyed crops in fully-damaged areas; 3) Short-run post-disaster maintenance costs

- **Perennial crop production loss**
  - 1) Difference between expected and actual value of crop production in non-fully damaged harvested area in disaster year; 2) Pre-disaster value of destroyed standing crops in fully-damaged areas; 3) Short-run post-disaster maintenance costs

- **Crop assets damage**
  - 1) Repair cost of partially destroyed assets and the replacement cost of fully destroyed assets at pre-disaster price.
Follows formula for Perennial crops

C2-FO (Forestry damage and loss) = Forestry production damage + Forestry production loss + Forestry asset damage (complete and partial)

C2-L (Livestock damage and loss) = Livestock production damage + Livestock production loss + Livestock asset damage (complete and partial)

- **Livestock production damage**
  - 1) Pre-disaster value of stored inputs (feeds, fodder and forage) and stored livestock (aquaculture) products destroyed by the disaster; 2) Pre-disaster net value of dead livestock (fish) (minus any obtained revenue from dead livestock sold)

- **Livestock production loss**
  - 1) Difference between expected and actual value of production (of livestock and fish products) in disaster year; 2) Short-run post-disaster maintenance costs

- **Livestock assets damage**
  - 1) Pre-disaster value of partially or fully destroyed assets (boats, machinery, equipment, storage)

**Any obtained revenue from dead livestock (fish) sold should be subtracted**
C2-FI (Fisheries damage and loss) = Fisheries production damage + Fisheries production loss + Fisheries asset damage (complete and partial)

- **Fisheries production damage**
  - Pre-disaster value of stored inputs and stored capture destroyed by the disaster

- **Fisheries production loss**
  - Difference between expected and actual value of fisheries capture in disaster year

- **Fisheries assets damage**
  - Pre-disaster value of assets used for fisheries partially or fully destroyed by disaster (vessels, fishing boats, tools, equipment, cold storage, etc.)

III. Applying the Methodology

*Typhoon & Drought*
Typhoon Haiyan hit central Philippines in Nov 2013
- At over 300 km per hour -- strongest wind speed recorded in the country for the landfall of a cyclone
- Storm surges up to 5.3 meters in height, causing devastation and loss of lives in affected coastal areas
- Over 6,300 deaths recorded (Nov ’13), estimated 16 million people affected, over 1.1 million houses damaged/destroyed, overall damage to public infrastructure and agricultural land across 41 provinces

**Key Results**

- **Total D&L in Agriculture**: USD 1.4 billion – in line with government assessment (but different distribution of damage vs loss)
- **Most affected sub-sectors**: crops, followed by fisheries and livestock
- **Loss is almost 80 percent higher than damage** – in government assessment the shares of damage and loss are almost equal (different computation methods)
“Drought is not a rarity in Ethiopia. Over the past 40 years, the country has seen both the severity and frequency of drought increase and its associated impacts expand.”

Unfolding of 2011 Drought in Ethiopia:

- failure of two consecutive rainy seasons in 2011; La Niña-triggered
- delayed seasonal rains and erratic distribution, but also highly reduced rainfall – less than 30% of 1995-2010 avg in some areas
- Areas most affected: southern highlands & arid and semi-arid lowlands in southeast
- Far-reaching consequences:
  - water scarcity and depletion of groundwater reservoirs
  - reduced local crop and livestock production
  - deteriorating food security conditions
  - livestock mortality rates reported at 15-30% (local)
  - mortality levels for cattle and sheep at 40-60% (local)

Rainfall anomalies during the 2011 belg and meher seasons; Source: FEWSNET, 2011.

Assessing Damage and Loss in Agriculture

FAO’s methodology

Drought in Ethiopia: Crop damage and loss, by year

Key Results

- Total loss in crops sector: USD 34 million
- Total damage in crops sector: USD 3 million (in line with government assessment)
- Most affected crops: teff, wheat and coffee
- Loss comprises 90% of all impact: drought causes little impact on assets
- Damage consisted on impact of perennial crops, such as coffee
Key Results

- Total loss in livestock sector: USD 757 million
- No damage in livestock sector
- Most affected livestock types:
  - cattle (12 million deaths or 11% of national cattle herd),
  - sheep (8 million deaths or 35% of national sheep count)
- Overall, Ethiopia lost 21% of livestock count in 2008 and a further 16% in 2011

*Calculated in terms of the difference between expected and actual value of livestock production*
A clear understating of disaster impact on the sector is crucial for effective DRR policy, targeting investment and strengthening resilience

→ However, the impact of disasters on agriculture remains insufficiently documented and under-analysed

The Upcoming 2017 Report on Impact of Disasters in Agriculture presents:

- An improved assessment of damage and loss from natural hazards in the crops and livestock sector
- A scope beyond natural hazards: food chain crises & conflict and protracted crises
- A holistic view of agriculture: first look into forestry, fisheries & aquaculture

DAMAGE AND LOSS IN AGRICULTURE AS SHARE OF TOTAL DAMAGE AND LOSS IN ALL SECTORS (2006-2016)

- Disaster damage in agriculture, share of total: 16%
- Disaster loss in agriculture, share of total: 31%
- Disaster damage and loss in agriculture, share of total: 23%
Assessing Damage and Loss in Agriculture

FAO’s methodology

Upcoming FAO report
Main findings

Production loss by region and per disaster, 2005 - 2015

- Earthquakes / Landslides / Mass movements
- Drought
- Extreme temperatures
- Floods
- Crop pests / Animal diseases / Infestations
- Storms
- Wildfires

Thank you for the attention