

# Incorporating weather indices into early warning systems for emergency response and social protection: Ethiopia



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# AGENDA

- **Emergency System and PSNP**
- **WFP**
- **Concept: Livelihood Protection**
- **WFP Context: Prevention is Strategic Objective**
- **Ethiopia I: Pilot Weather Risk Insurance (2006)**
- **Ethiopia Context: Shifting from Crisis Management to Risk Management**
- **Ethiopia II: Livelihood Risk Management Framework (2008)**
- **LEAP indices and Contingency Financing Needs**



# Previous emergency system

- Emergency appeals for over 20 years
- Since 2000 numbers in need ranged between 5 – 14 million a year
- Relief Costs: upward of \$1 billion in worst year and around \$700m on average
- Saved lives - not livelihoods
  - *Resources arrived late, not enough,*
  - *Inappropriate: Traditionally met with food assistance,*
  - *Asset depletion & increasing chronic caseload*
- Bulk of needs chronic & predictable
  - *But all met with the same relief response*

# The Productive Safety Net Programme


- PSNP for the chronically food insecure
- PSNP Objectives
  - *Consumption smoothing, asset protection*
  - *Creation of community assets*
  - *Ultimately achieve food security and graduation when PSNP combined with other programmes*
- Implementation modalities:
  - *'Able to work' undertake public works*
  - *'unable to work' receive direct support*
- Transfer modalities:
  - *About 55% cash, 45% food*
  - *Progressive move to cash expected*
- National programme not donor project
  - *Delivered through government food security structures and financial systems*

# Moving towards risk financing

- Recognition of the need to reform response to transient food insecurity
- PSNP represents a predictable instrument
  - Need to develop predictable financing (contingent grant)
  - Need to develop independent, quantifiable, early....early warning indicators.
- Part of developing long-term integrated risk financing system
  - Use of indices potentially important for layering risk



# WFP Strategic Objectives

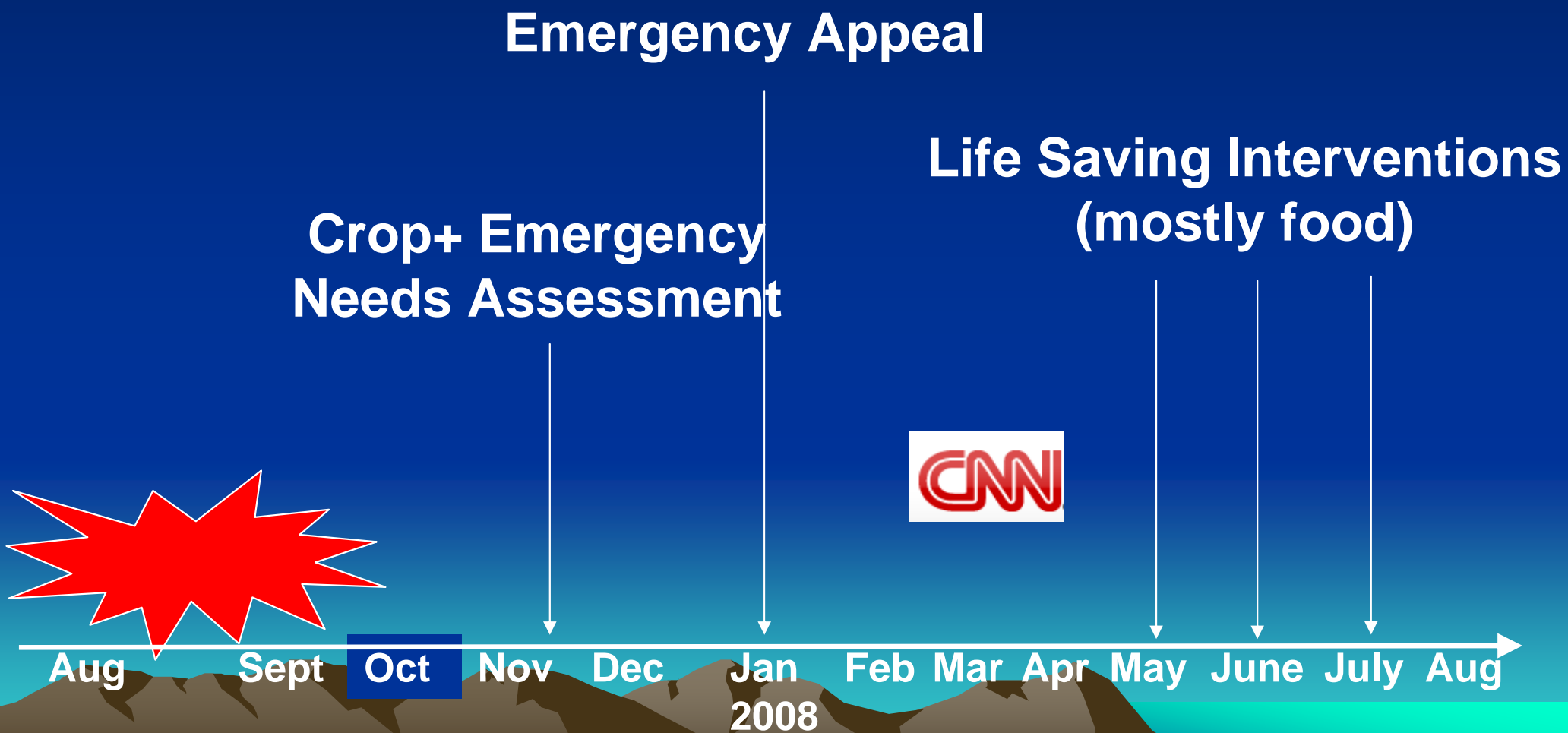
- Save lives and protect livelihoods in emergencies
  - **Prevent acute hunger and invest in disaster preparedness and mitigation measures**
  - Restore and rebuild lives and livelihoods in post-conflict, post-disaster or transition situations
  - Reduce chronic hunger and undernutrition
  - Strengthen the capacities of countries to reduce hunger, including through hand-over strategies and local purchase
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# WFP Operations

- Operations in 78 countries around the world
  - 90 relief operations
  - 22 development projects and 34 country programmes in 48 countries
- **Direct expenditures: USD 2.9 billion**
  - Due to recent price increases, the 2008-2009 budget was revised from USD 5.7 billion to USD 7.3 billion
- **Total number of employees: 10,587**
  - 92% of WFP staff serve in the field



# Concept of Livelihood Protection – The Problem (cont.)

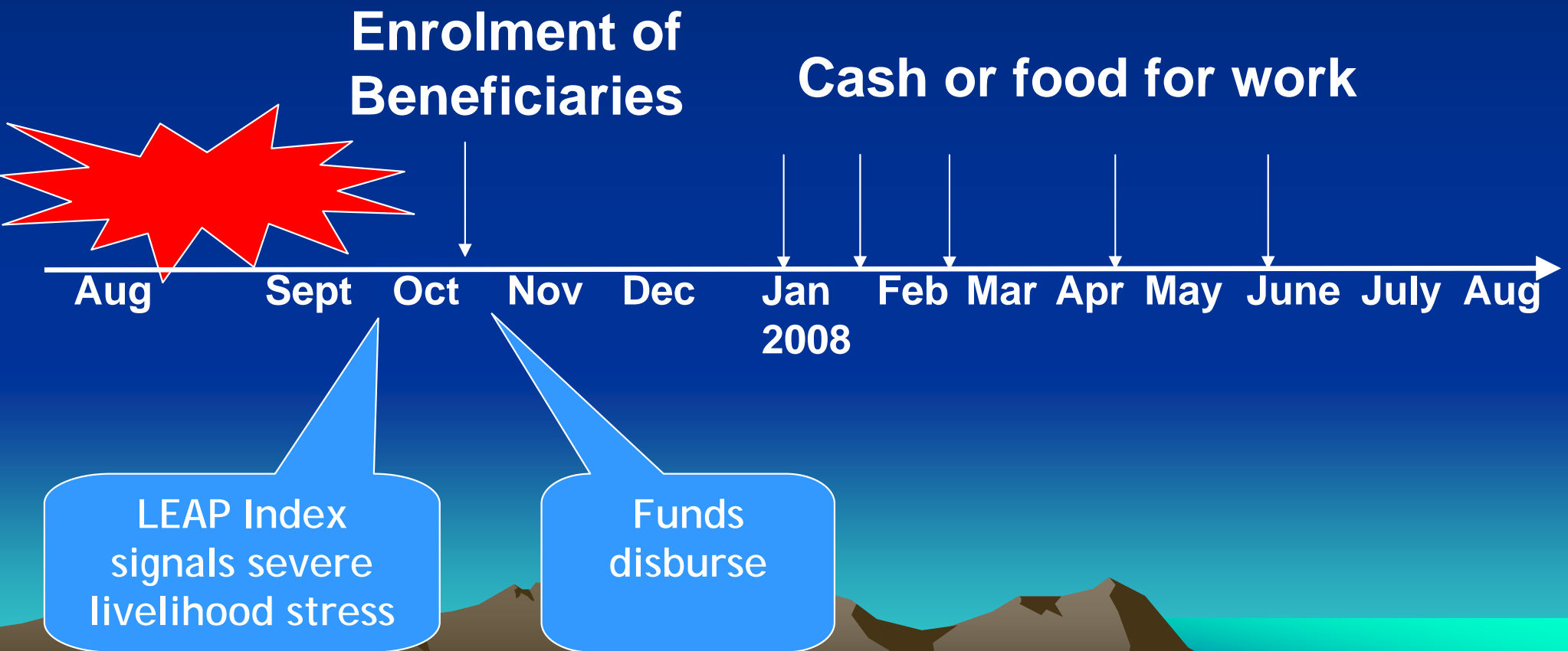


# **Concept of Livelihood Protection – Approaching a Solution**

- **Understand vulnerability**
- **Targeting the vulnerable with livelihood support following shocks**
- **Linking early warning with timely and appropriate response thanks to contingent financing**
- **Accountable and transparent contingency planning**



# RATIONALE (I): EFFECTIVENESS - PROTECT LIVELIHOODS FIRST



# Context: WFP Draft Strategy

- **WP Strategic Objective Two: Prevent acute Hunger and Invest in Disaster Preparedness and Mitigation measures**



# **Ethiopia I: Pilot Weather Risk Insurance (2006): Objectives**

**Pilot tested the possibility of leveraging donor contributions to secure a reliable, timely and cost-effective way of funding livelihood protection operations**



# Ethiopia I: Transaction

**WFP was the counterparty (buyer of option) on behalf of the Gov of Ethiopia**

## **Competitive Tender Process**

- **Official UN WFP procurement process**
- **9 companies invited to tender, 5 participated**
- **Tender Winner (seller of option): AXA Re, Paris**

## **Final Transaction:**

- **Premium: \$930,000, paid by USAID mainly**
  - **Max Payout: \$7,100,000**
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# Ethiopia I: Lessons Learnt

- Feasible to use market mechanisms to finance drought risk in Ethiopia
- Possible to develop objective, timely, accurate indicators that serve as a proxy of funding needs
- Weather data satisfies international standards



# Context: Shifting from Crisis Management to Risk Management

- More focus and commitment to Disaster Risk Management
- Linking Early Warning with timely and appropriate response
- Multi-hazard approach
- Clear delineation and demarcation of duties and responsibilities at all levels
- Improved decision making mechanism
- Rigorous mechanism for accountability
- Concerned about the likely impact of climate change on sustained economic development



# ETHIOPIA PHASE II – RISK MANAGEMENT FRAMEWORK

I. Early Warning  
System + Index: LEAP

II. Develop budgeted  
contingency plans

Early Warning  
System

Contingency  
Planning

Contingent  
Financing

Capacity  
Building

IV. Establish timely  
emergency  
financing through  
use of contingency  
financing

III. Help to build  
planning and  
implementation  
capacity at  
regional level

# I. Livelihoods – Early Assessment

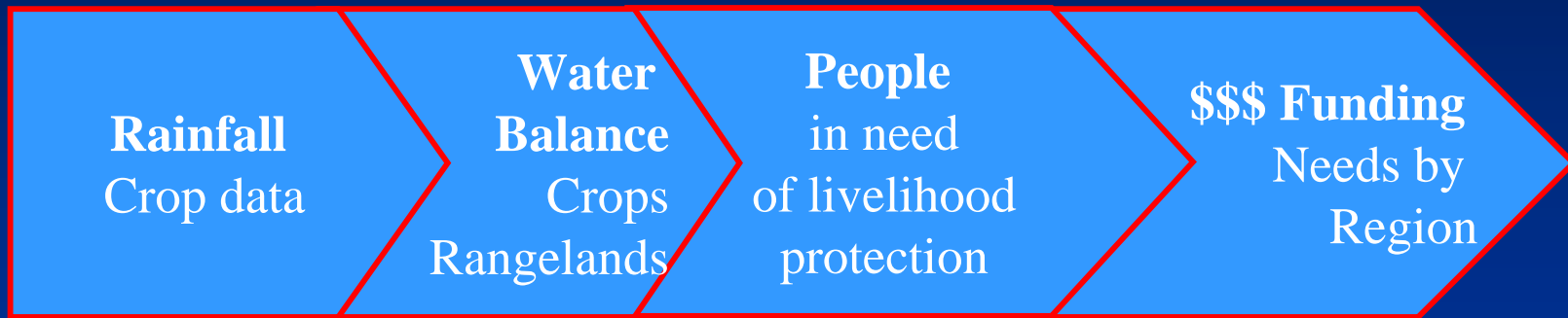
## – Protection (LEAP): Principles

- Estimates potential costs of intervening against acute (crop failure related) livelihood stress
- LEAP indices are
  - Weather parameter driven
  - Objective
  - Transparent
  - Real time
- LEAP indices are NOT
  - Food emergency need indicators
  - About other (Man-made) disasters
  - Price shock indicators (yet)
  - Flood risk indicators (yet)



# Challenge

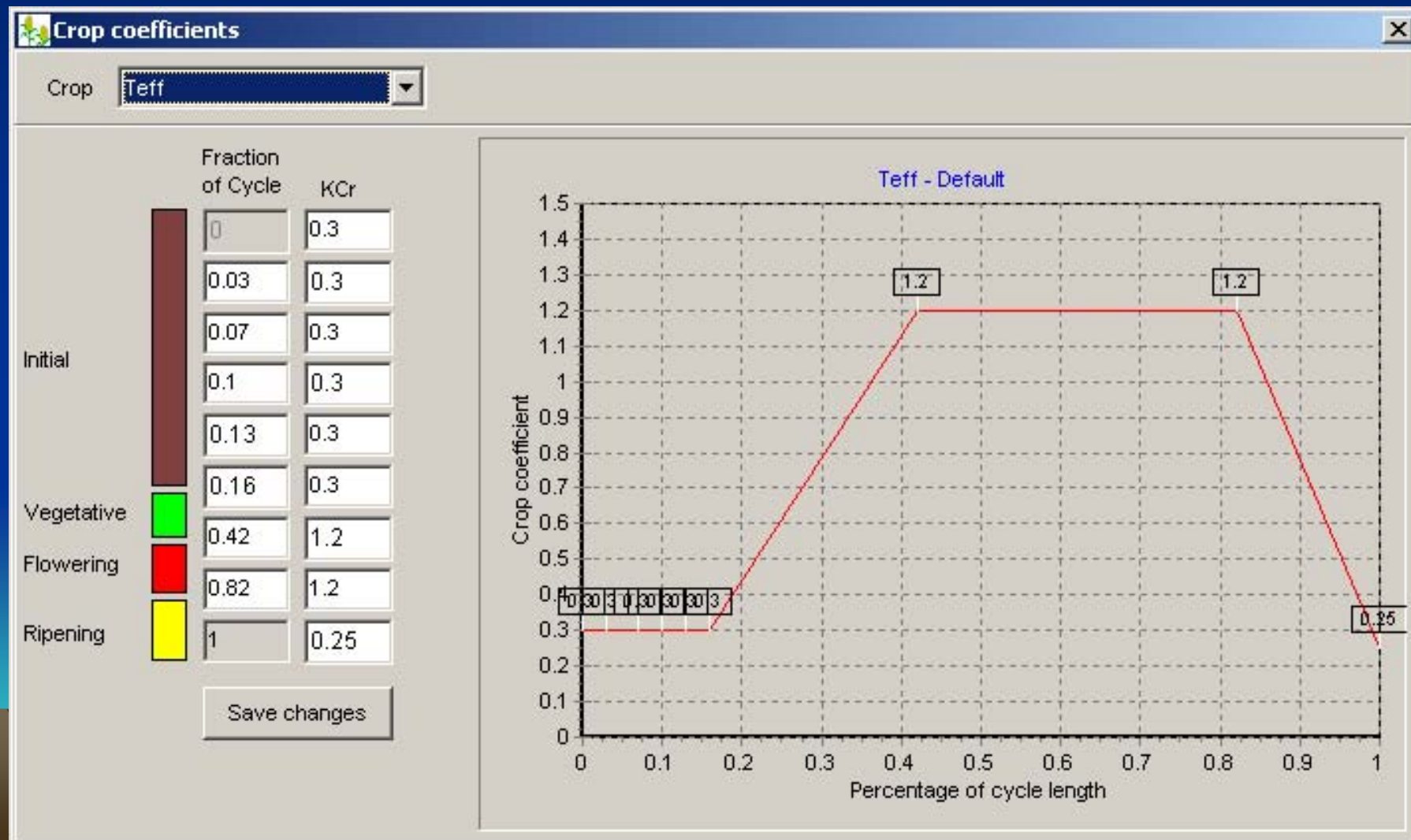
- To create an objective index that can be used to trigger **early** Livelihood Protection costs to regions for PSNP and non-PSNP **drought** needs



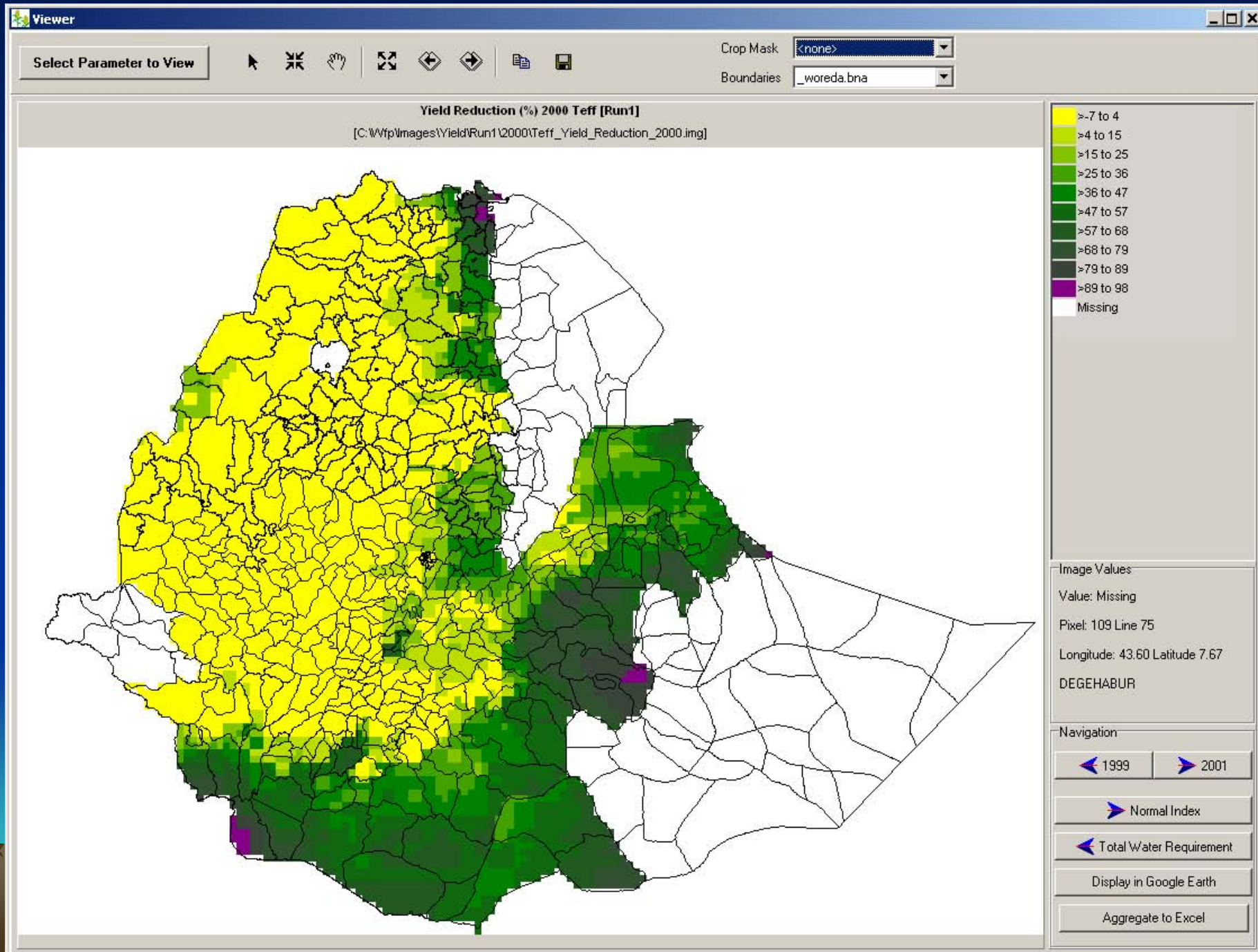
- **Water Balance:**
  - Objective estimates of crop yield deviations due to water stress
- **People:**
  - A methodology that relates water balance calculations to beneficiary numbers per region
  - Fixed at the beginning of the season
- **\$\$\$ Funding Needs:**
  - Livelihood Protection Costs per region

# A water balance model drives the index

- Index based on just rainfall too crude.
- Water balance model: bookkeeping on crop water use



# LEAP



# Approach

- **Simple, transparent and robust – *and legitimate!***
- To establish the calculation methodology we compare LEAP water balance output to historical beneficiary numbers
- Woreda-level data needed:
  1. LEAP water balance output specified for locally grown, dominant crops,  $WBI_{woreda}$ 
    - E.g. adjusted for local varieties, soil type etc.
    - Take into account Belg and Meher yields where appropriate
    - 1995-2007
  2. Historical DPPA data
    - 1994-2004: Total Emergency Beneficiary Numbers
    - 2005-2007: PSNP + Emergency Beneficiary Numbers

➤ **Output data is only as good as inputs used!!**



# Calculation Methodology

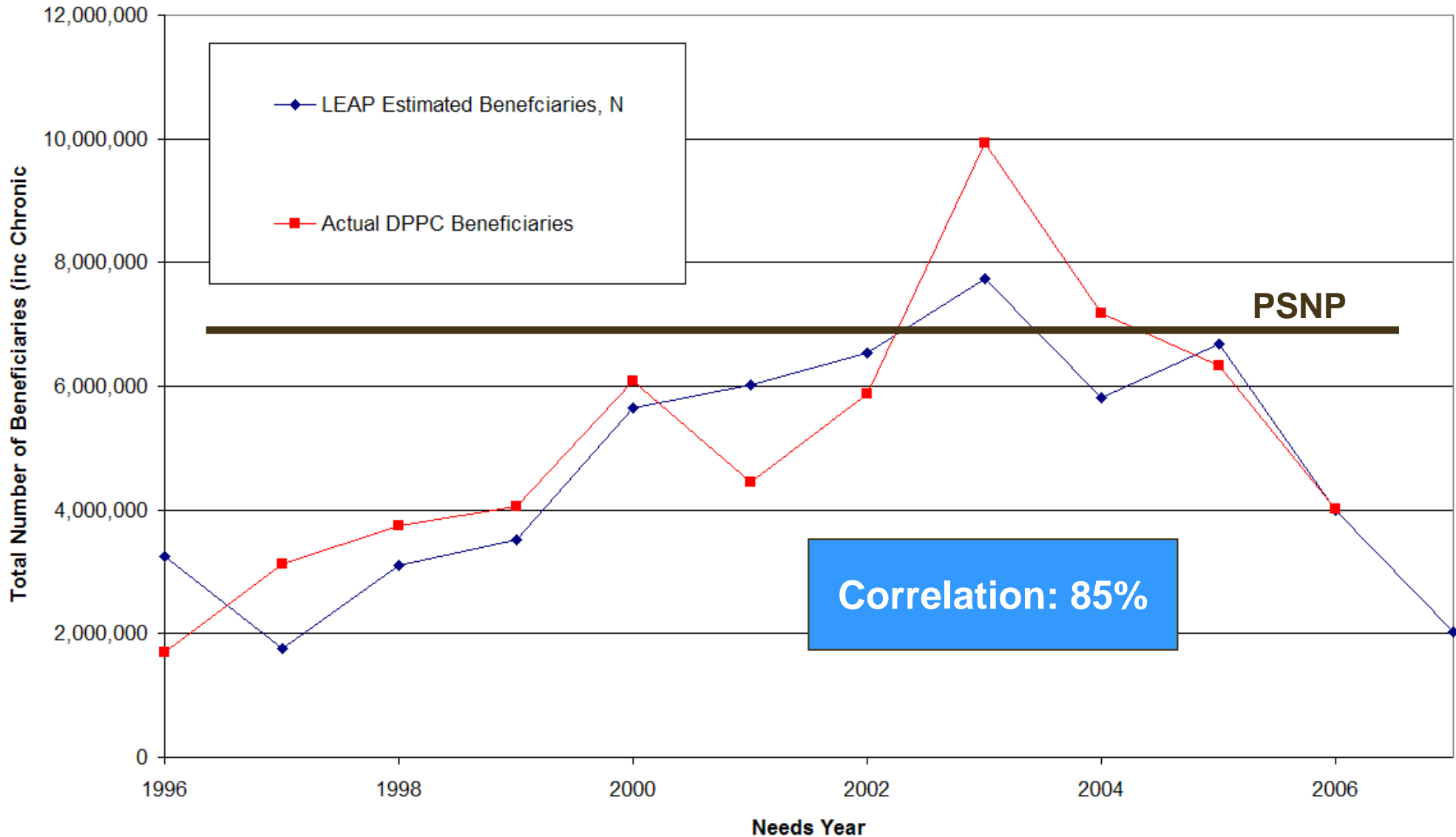
- A simple linear regression to relate a historical **Regional Drought Index** ( $Y$ , independent variable) to a **Regional Total Beneficiary Estimate** ( $N$ , dependent variable), i.e.

$$N = a * Y + b$$

- The intercept and slope,  $b$  and  $a$ , are estimated by the intercept and slope of the least-squares regression line
  - Historical  $Y$  values against historical DPPA data per region (adjusted for population growth), for 1995-2006 rainfall seasons
- $N$  gives the estimated total number of beneficiaries (chronic + transient) in the region
- Benefits: Confidence bands can be statistically calculated; least amount of assumptions about underlying data

# LEAP Index vs. people in need

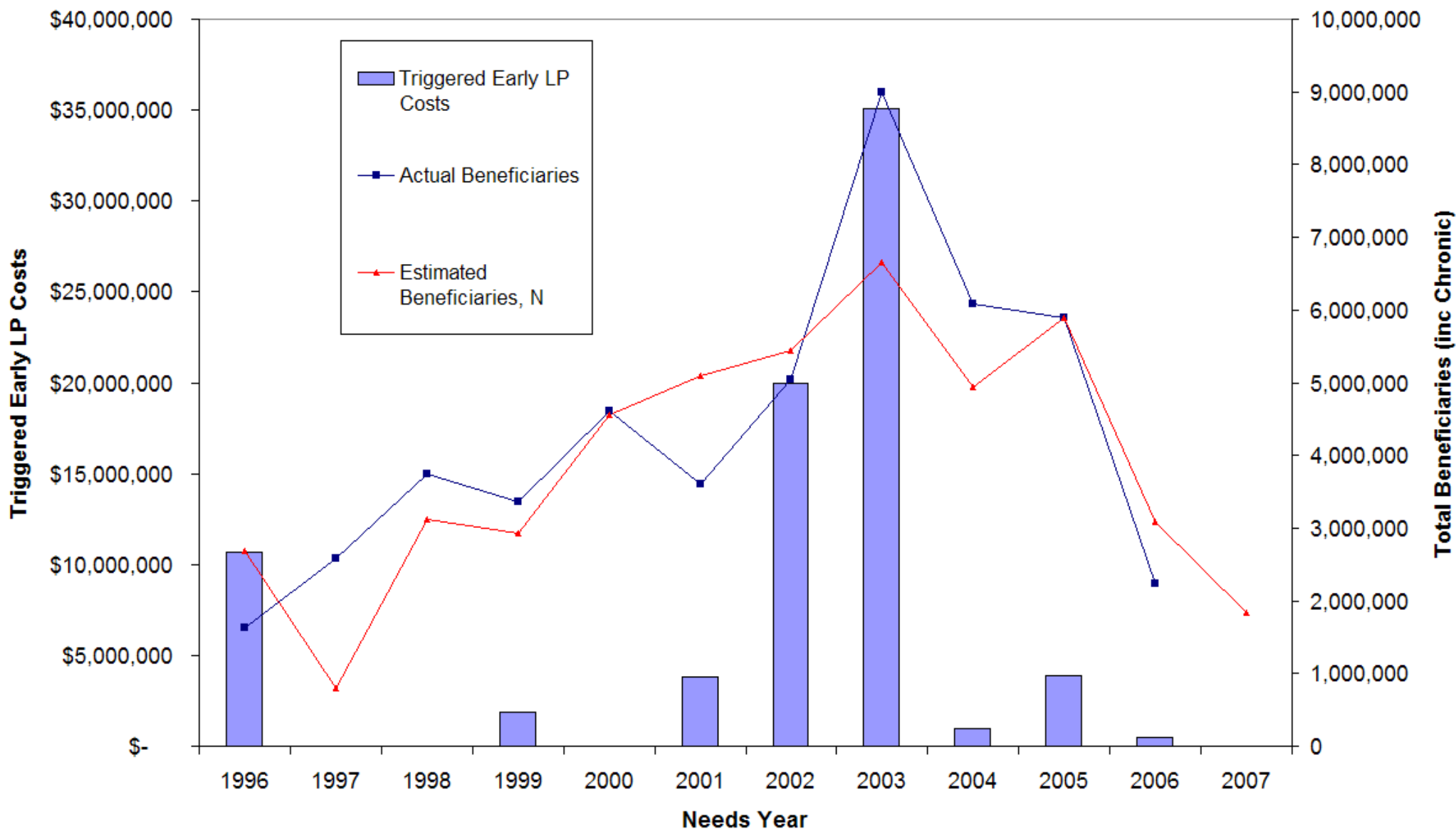
Actual vs LEAP Estimated Beneficiaries in Need (Chronic + Transient)



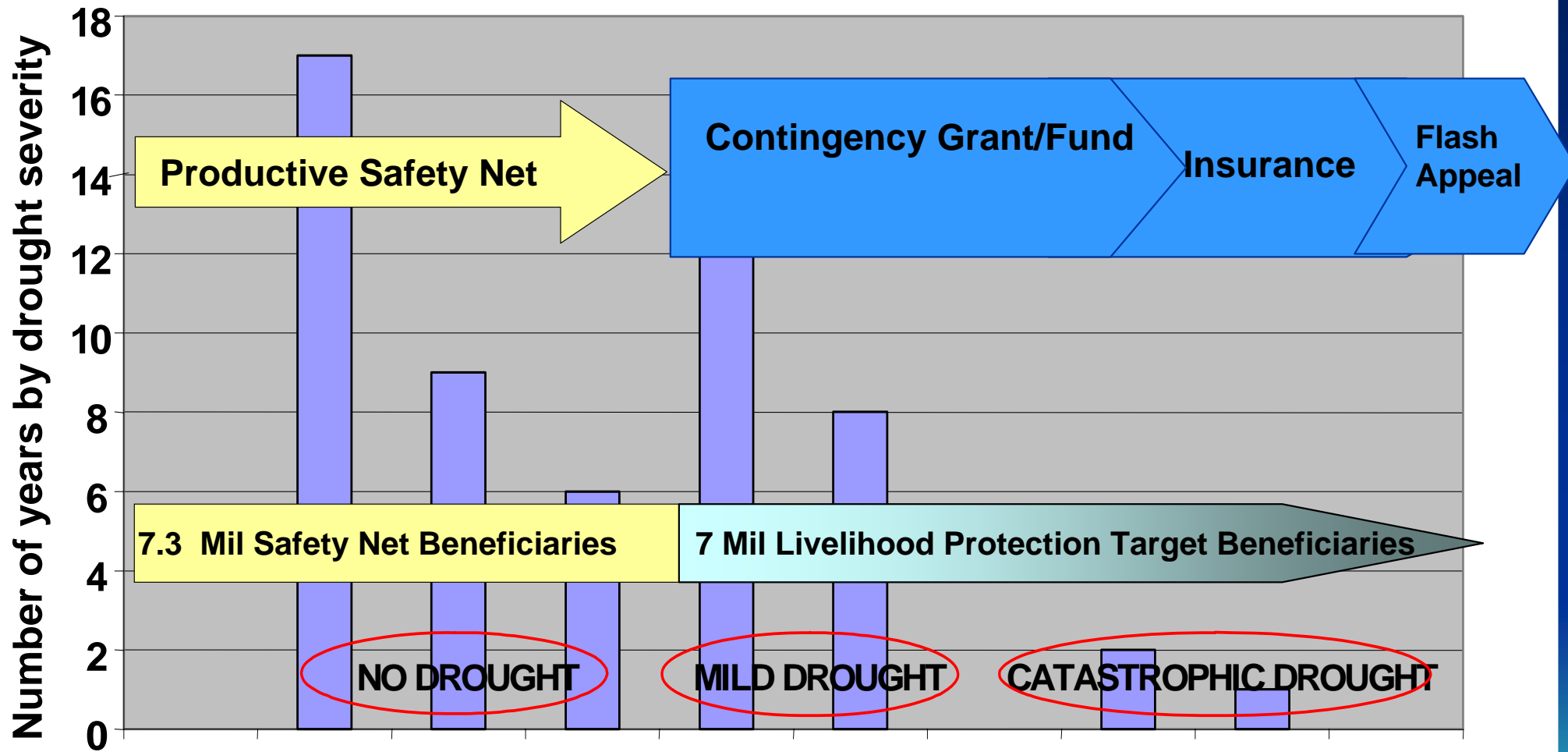
# “Triggered” Early LP Costs for PSNP Regions

Assuming current PSNP existed in the past

**Example of Historically “Triggered” Early LP Costs in All PSNP Regions**



# IV. Contingency Financing



Total Risk Financing Needed for 7 million vulnerable people:

\$US 300million

# CONCLUSION

- **Destitution**
- **Dignity**
- **Cost**



# THANK YOU

- Ethiopia LEAP Tool download:

<http://vam.wfp.org/LEAP>

Free software download.

- For questions:

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Creating Pathways out of Poverty in Rural Areas:  
Managing Weather Risk with Index Insurance

