

# Pesticide Risk Reduction Programme – Ethiopia

## Data gathering: Meteo and soil data

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joint collaborative programme on pesticide registration and post-registration



MoA



ALTERRA



**Towards a sustainable use of pesticides in Africa**

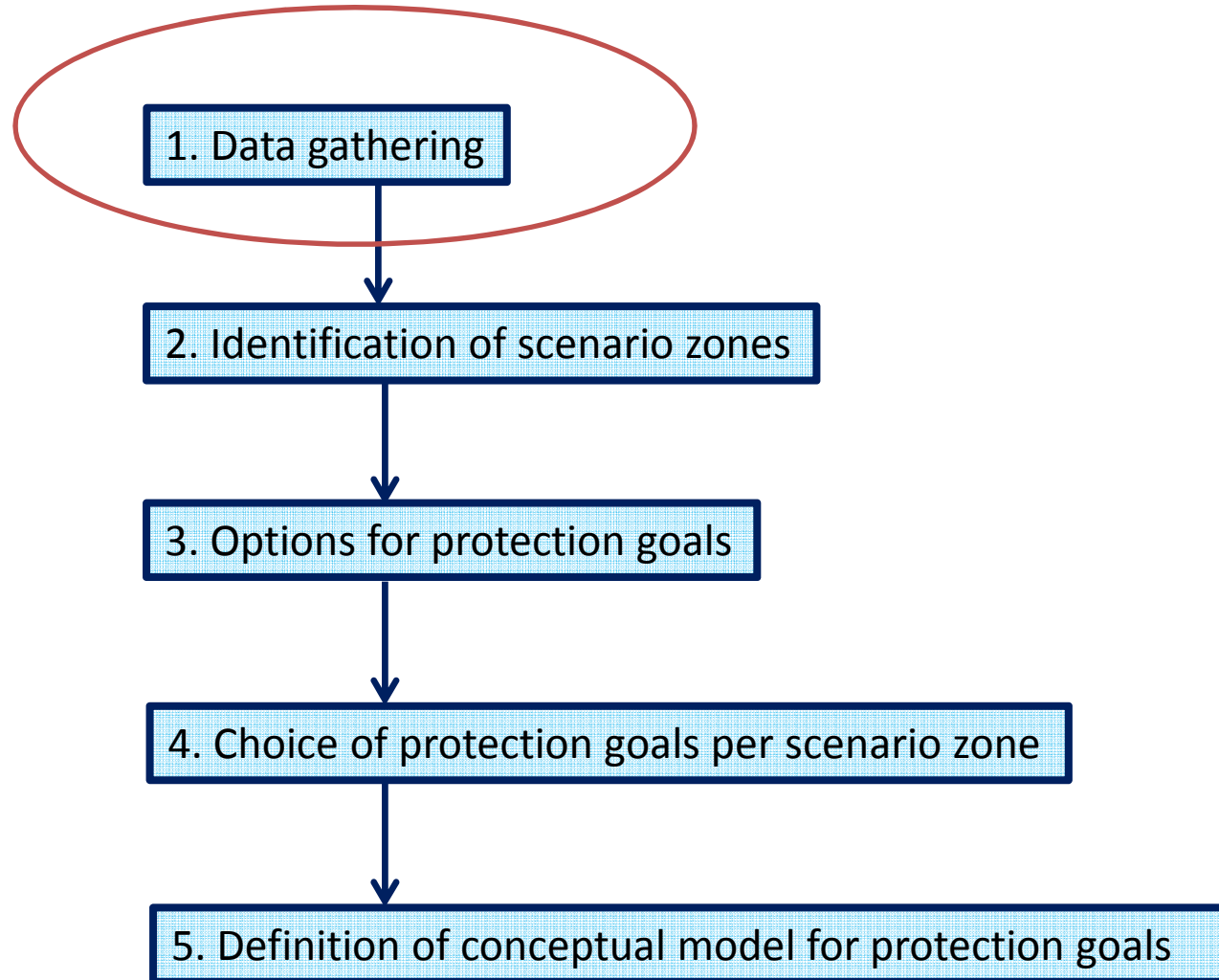
# Definition of gw protection goals

## Outline

- Meteo data
- Soil data



# Data gathering





# Data gathering: Meteo data for Ethiopia

## Available data (daily)


- Measured data (stations) →
  - NNDC climate data online (GSOD)
    - Freely downloadable
    - among others: precipitation and temperature
    - **problem: not all data necessary, no uninterrupted series (20 years needed)**

# Data gathering: Meteo data for Ethiopia

## Available data (daily)

- Measured data → not adequate, therefore model data
- Model data:
  - CRU\_ERA40 0.5° 1961-1990 only precipitation and temp
  - CPC-RFE 0.1 ° 1983-now only precipitation
  - TRMM3B42 0.25 ° 1998-now only precipitation
  - ERA-interim 0.75 ° 1998-now precipitation less accurate

# Data gathering: Meteo data for Ethiopia

- ERA-interim → bought from 
- Familiar with ERA-interim -> partner in the MARS project (Monitoring agricultural resources world wide)
  - Both colleagues from Alterra and Joint Research Centre in Italy referred to MeteoConsult for the meteo data
- Located in Wageningen
- They calculated from the basic data:
  - Evapotranspiration
  - Open pan evaporation
  - Annual precipitation sum
  - Annual average precipitation over ca 30 years

# Data gathering: Meteo data for Ethiopia

- ERA-interim for each gridpoint:

- id, longitude, latitude, altitude

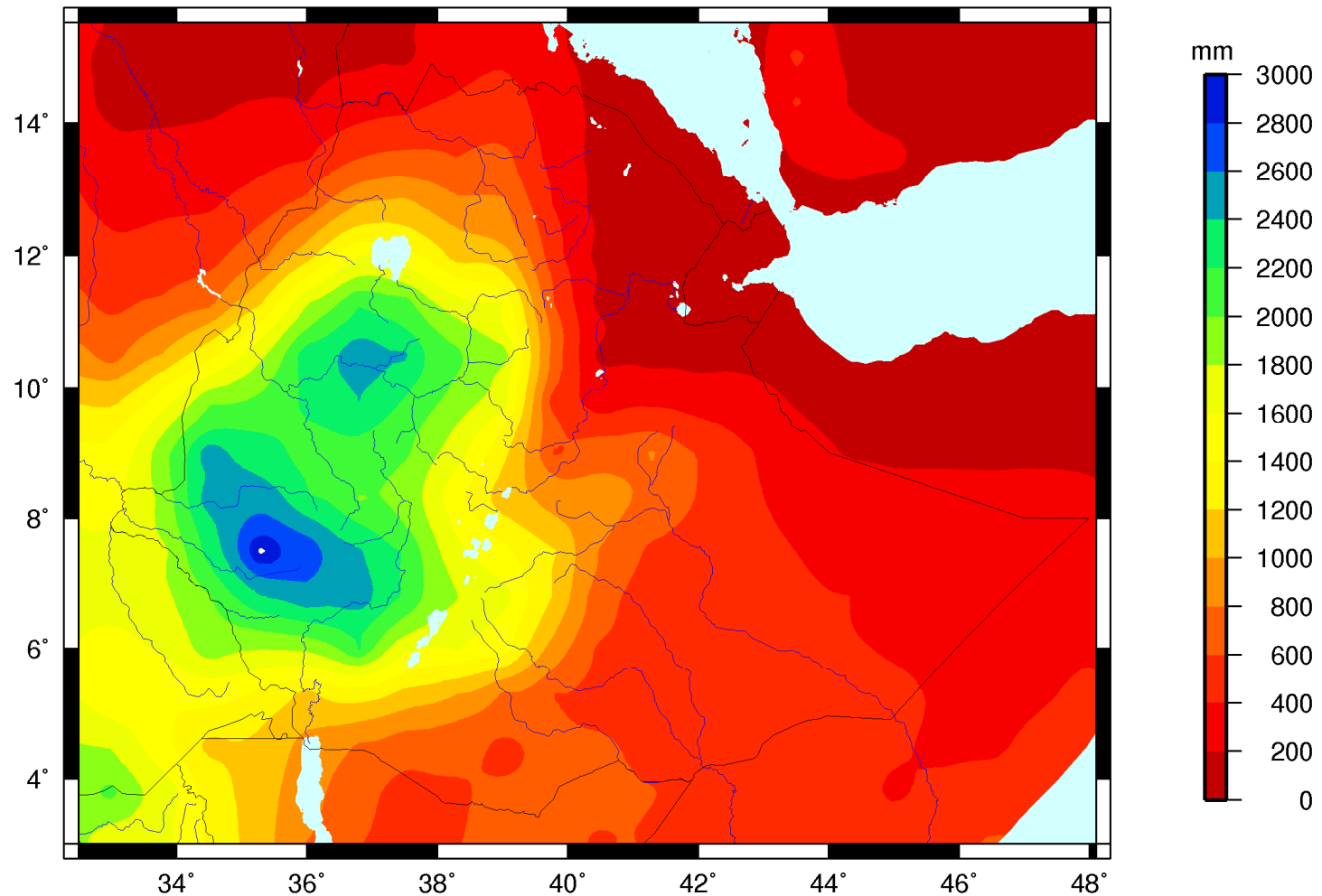
- daily data of:

Precipitation	(mm d <sup>-1</sup> )
Reference evaporation	(mm d <sup>-1</sup> )
Open pan evaporation	(mm d <sup>-1</sup> )
Global radiation	(kJ m <sup>-2</sup> d <sup>-1</sup> )
Humidity	(kPa)
Wind speed	(m d <sup>-1</sup> )
Air temperature (daily avg, min and max)	(°C)
Volumetric soil water layer 1-4	(m <sup>3</sup> m <sup>-3</sup> )
Runoff	(mm d <sup>-1</sup> )
Annual precipitation sum	(mm y <sup>-1</sup> )
Annual average precipitation	(mm y <sup>-1</sup> )

- 3 hourly data of precipitation

# Data gathering: Meteo data for Ethiopia

- Annual average precipitation



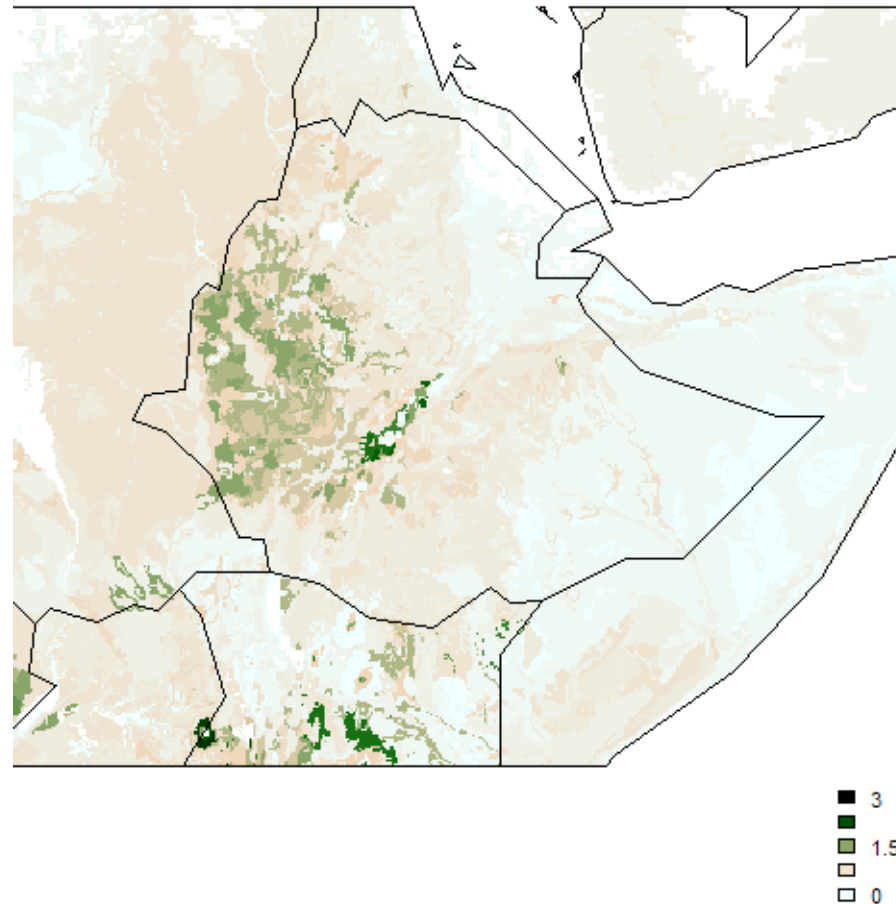


## Data gathering: Soil data for Ethiopia

- GIS expertise needed for this workshop to make overlays in ARC-GIS.
- ISRIC - World Soil Information is an independent foundation, located in Wageningen
- Willing to help on a short notice
- Data used: Harmonized World Soil Database images (5.6 km resolution )

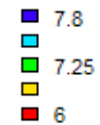
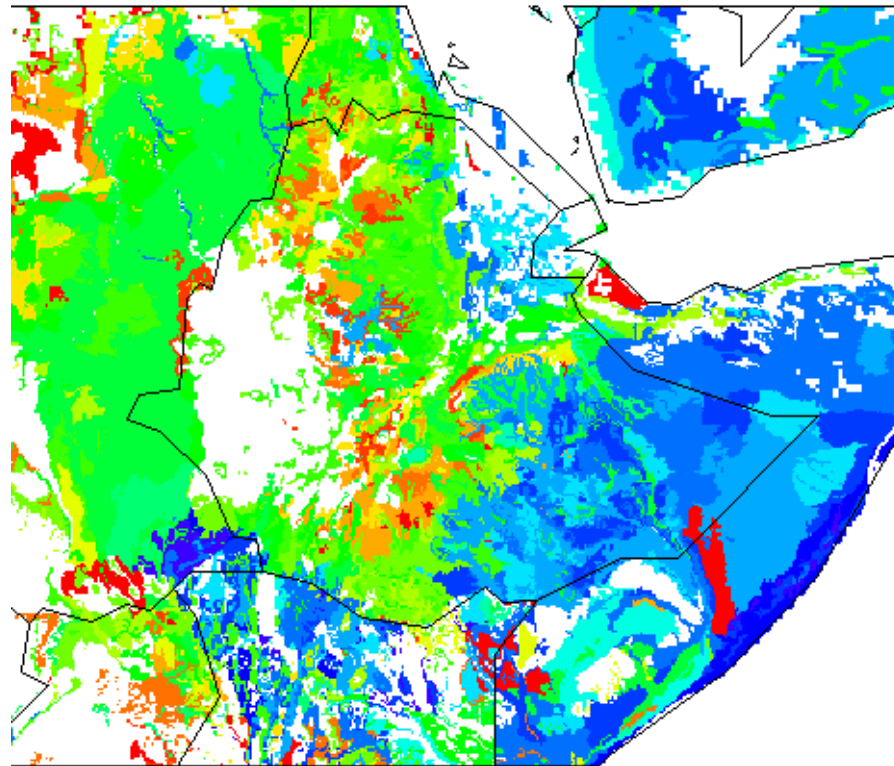
# Data gathering: Soil data for Ethiopia

Harmonized World Soil Database  
Organic carbon (from 0 – 3%)



# Data gathering: Soil data for Ethiopia

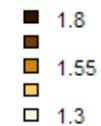
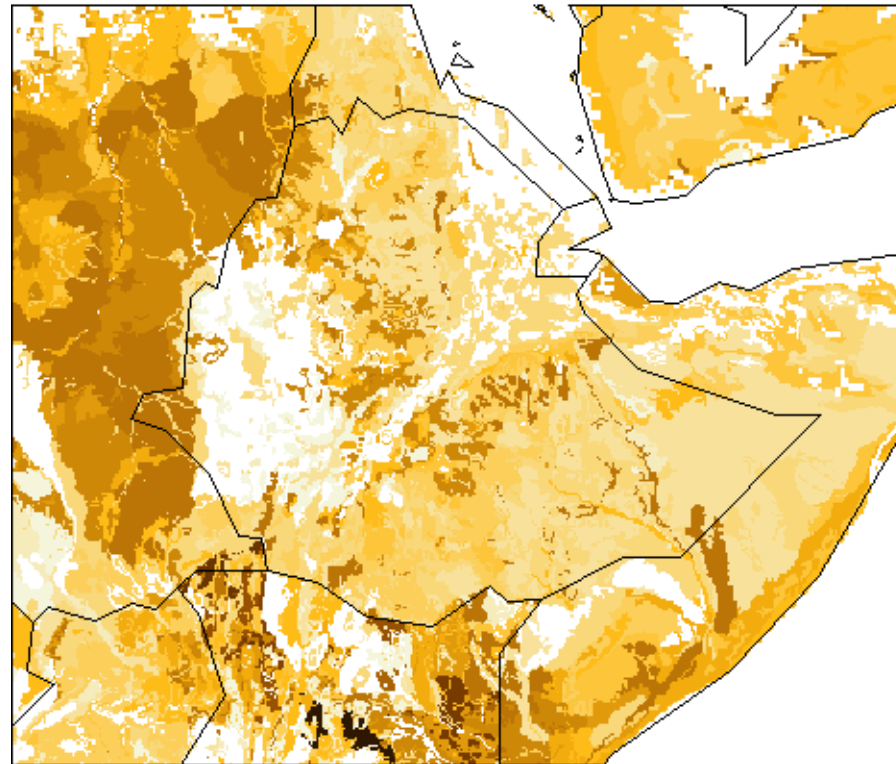
Harmonized World Soil Database  
pH (from 6 – 7.8)



# Data gathering: Soil data for Ethiopia

Harmonized World Soil Database

Bulk density (from 1.3 – 1.8 g/cm<sup>3</sup>)



# Data gathering





# Meteo data for Ethiopia

## ERA –interim background

- Soil
  - Four layers (0.07m, 0.21m, 0.72m, 1.89m)
  - Bottom boundary condition: free drainage
  - $\Theta_{\text{sat}} = 0.323 \text{ m}^3\text{m}^{-3}$        $\Theta_{\text{wp}} = 0.171 \text{ m}^3\text{m}^{-3}$
- Soil water flow
  - Richards equation
- Runoff
  - if throughfall > max. infiltration rate → excess precipitation = runoff
  - Only runoff when soil is saturated

# 3. Meteorological data

Annual rain fall distribution of Ethiopia (Source: AERE, 2006)

