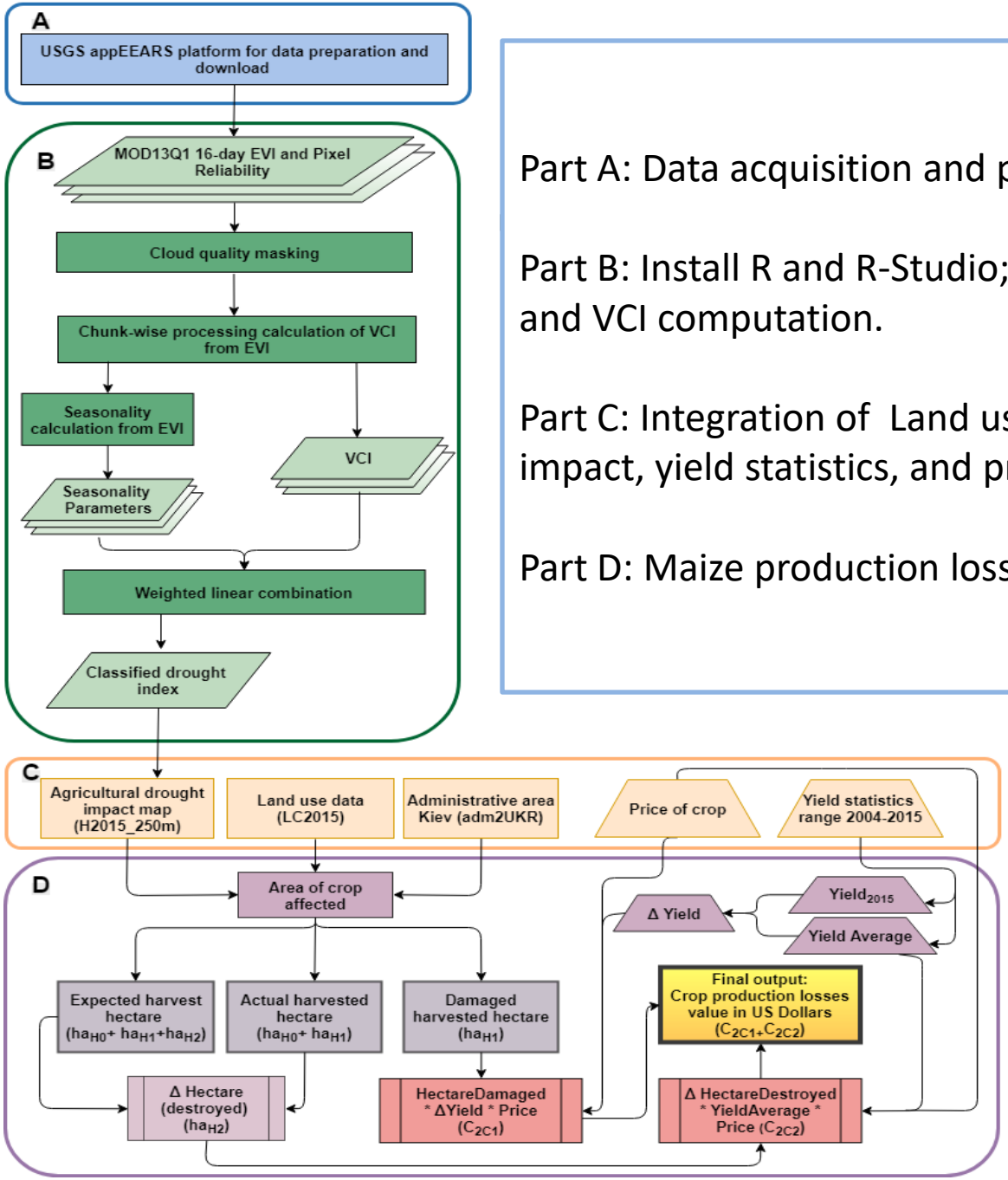
UN-SPIDER

Workflow

Meeting details: EvIDENz 2nd User Workshop

UNITED NATIONS
Office for Outer Space Affairs

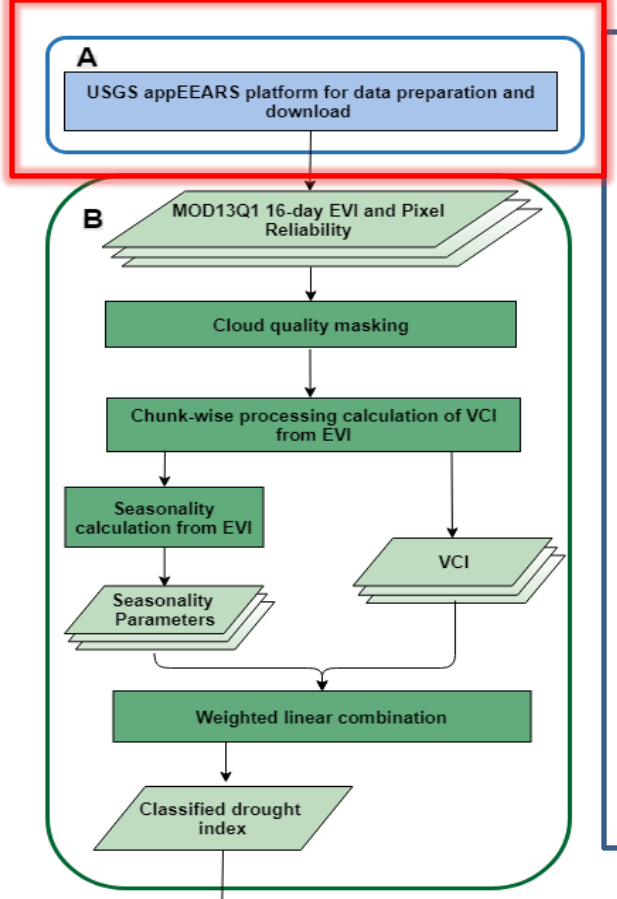


Part A: Data acquisition and preparation

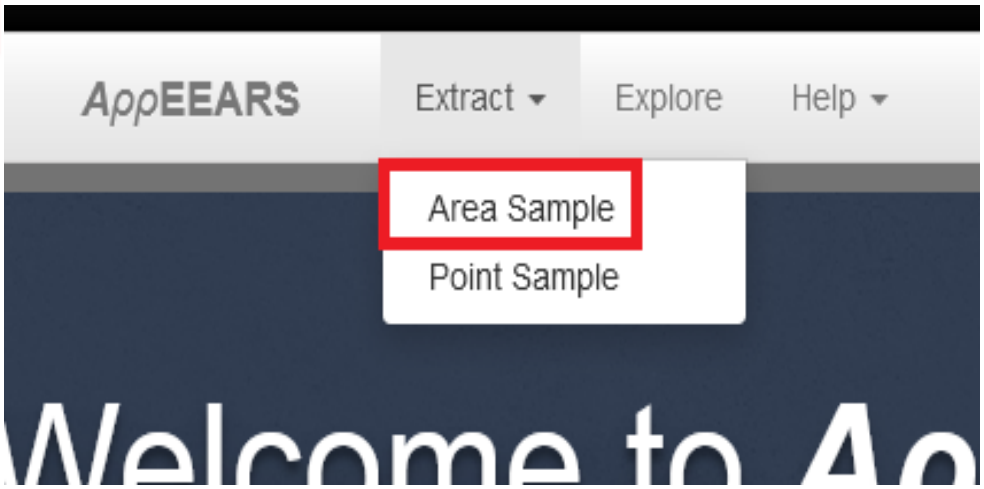
Part B: Install R and R-Studio; EVI phenology and VCI computation.

Part C: Integration of Land use, drought impact, yield statistics, and prices.

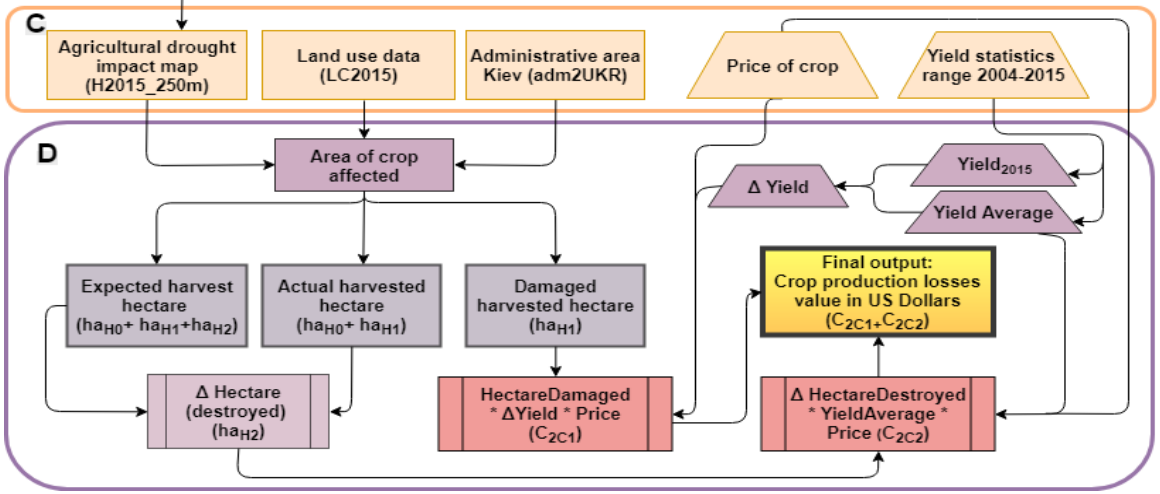
Part D: Maize production losses estimation

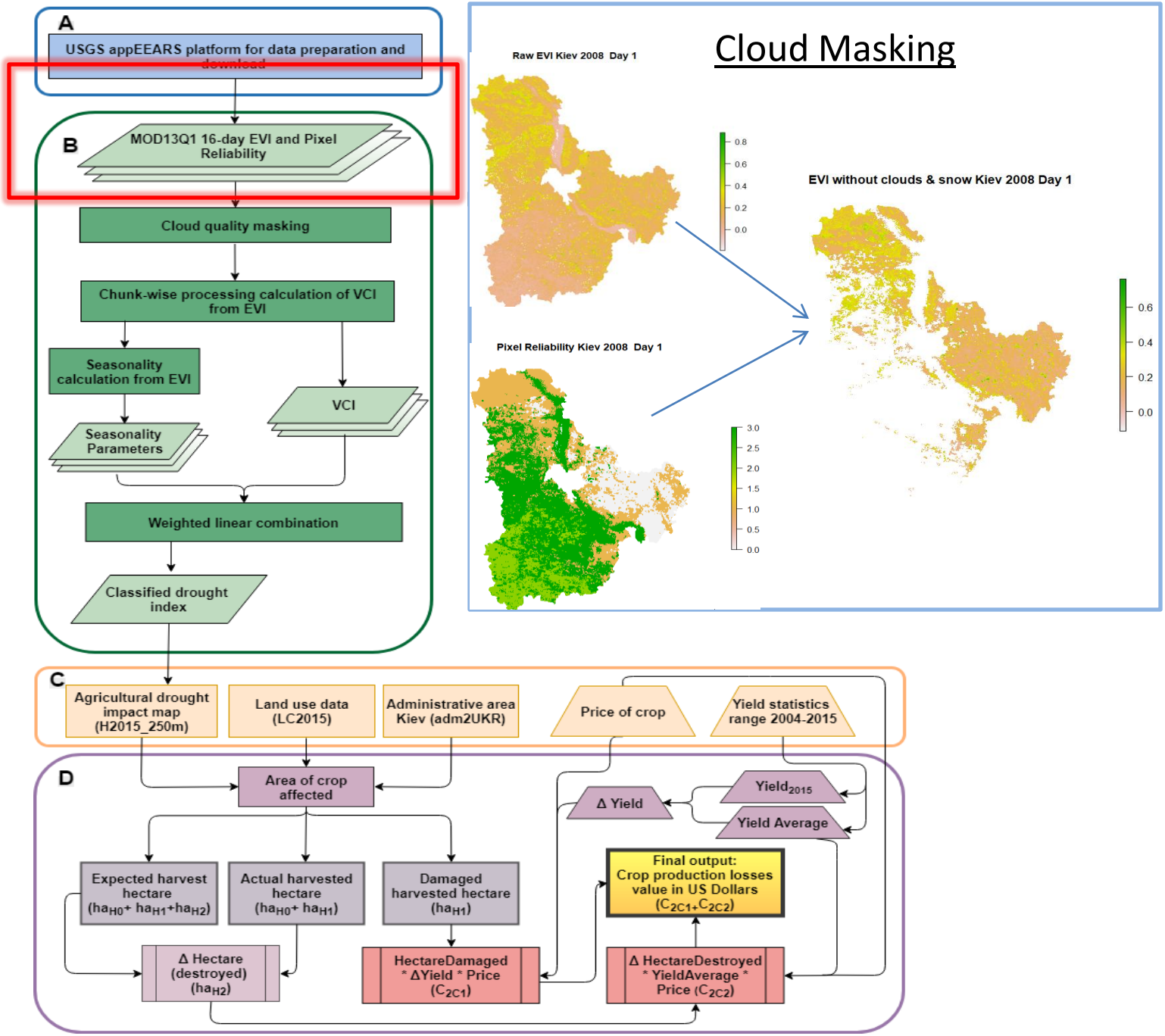


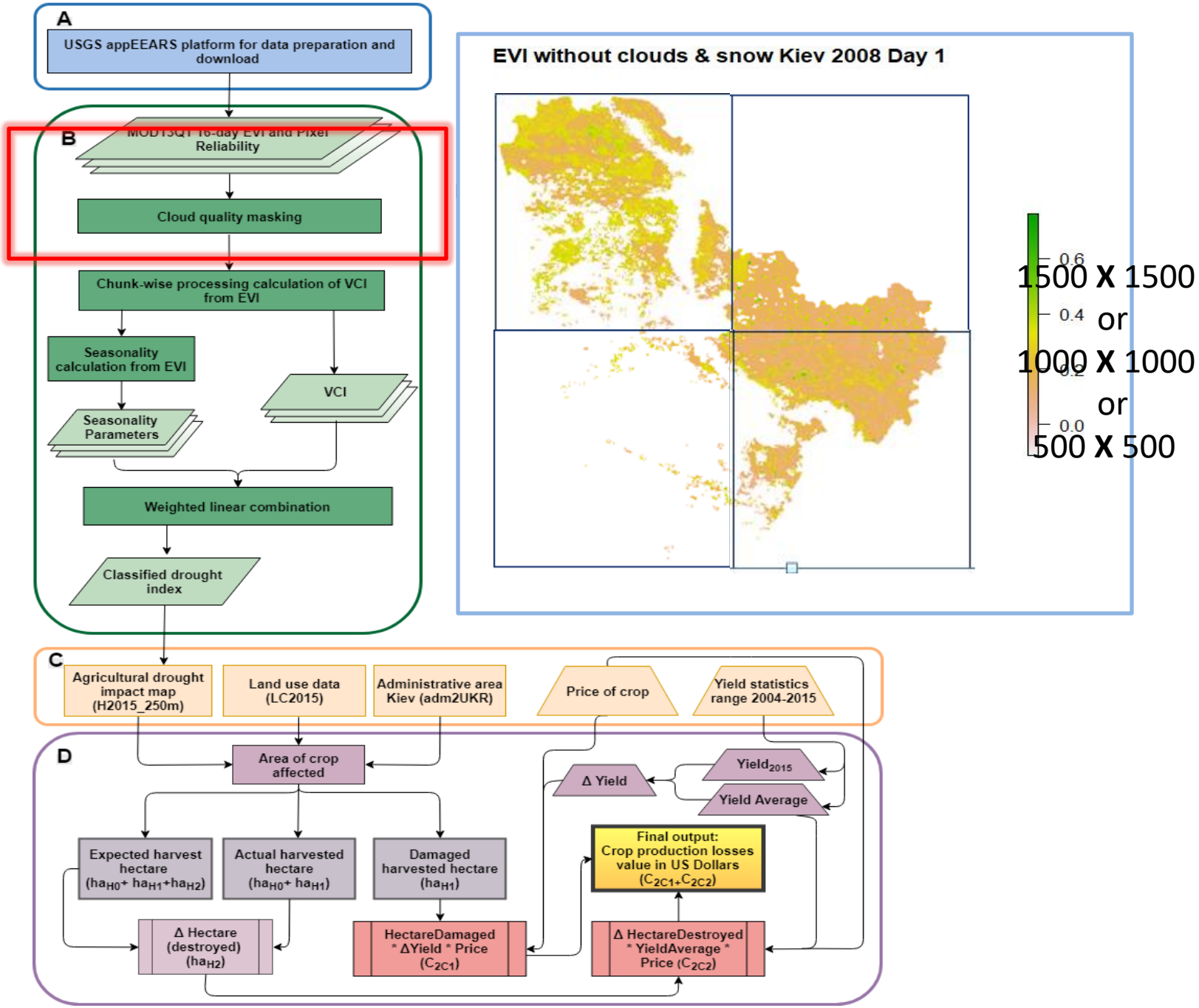
Data Acquisition



MOD13Q1 V006 Data EVI
MOD13Q1 V006 Data Pixel Reliability




A
USGS appEEARS platform for data preparation and download
B
MOD13Q1 16-day EVI and Pixel Reliability
Cloud quality masking
Chunk-wise processing calculation of VCI from EVI
Seasonality calculation from EVI
VCI
Seasonality Parameters
Weighted linear combination
Classified drought index
Cloud Masking
Raw EVI Kiev 2008 Day 1
Pixel Reliability Kiev 2008 Day 1
EVI without clouds & snow Kiev 2008 Day 1
C
Agricultural drought impact map (H2015_250m)
Land use data (LC2015)
Administrative area Kiev (adm2UKR)
Price of crop
Yield statistics range 2004-2015
D
Area of crop affected
Δ Yield
Yield2015
Yield Average
Expected harvest hectare (haH0+ haH1+haH2)
Actual harvested hectare (haH0+ haH1)
Damaged harvested hectare (haH1)
Final output: Crop production losses value in US Dollars (C2C1+C2C2)
Δ Hectare (destroyed) (haH2)
HectareDamaged * ΔYield * Price (C2C1)
Δ HectareDestroyed * YieldAverage * Price (C2C2)


A
USGS appEEARS platform for data preparation and download
B
MOD15QT 16-day EVI and Pixel Reliability
Cloud quality masking
Chunk-wise processing calculation of VCI from EVI
Seasonality calculation from EVI
VCI
Seasonality Parameters
Weighted linear combination
Classified drought index
EVI without clouds & snow Kiev 2008 Day 1
0.6
0.4
0.2
0.0
1500 X 1500
or
1000 X 1000
or
500 X 500
C
Agricultural drought impact map (H2015_250m)
Land use data (LC2015)
Administrative area Kiev (adm2UKR)
Price of crop
Yield statistics range 2004-2015
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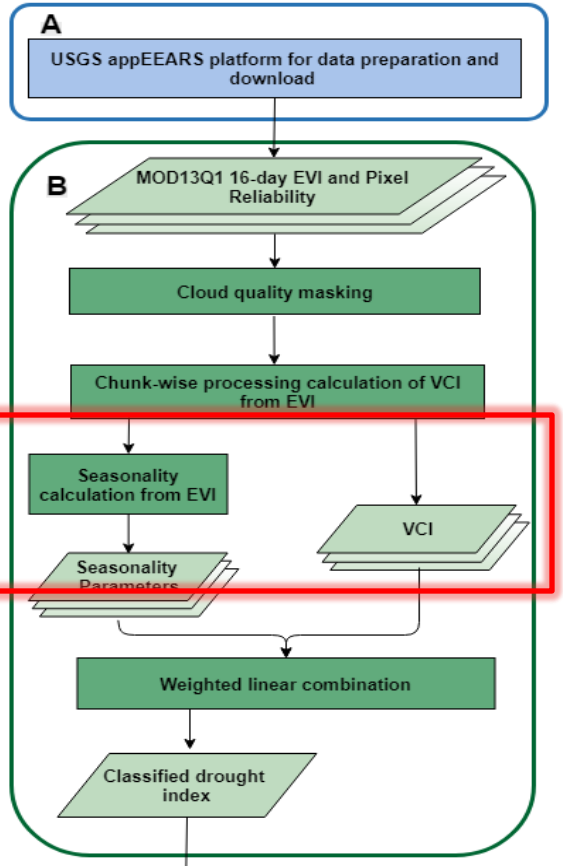
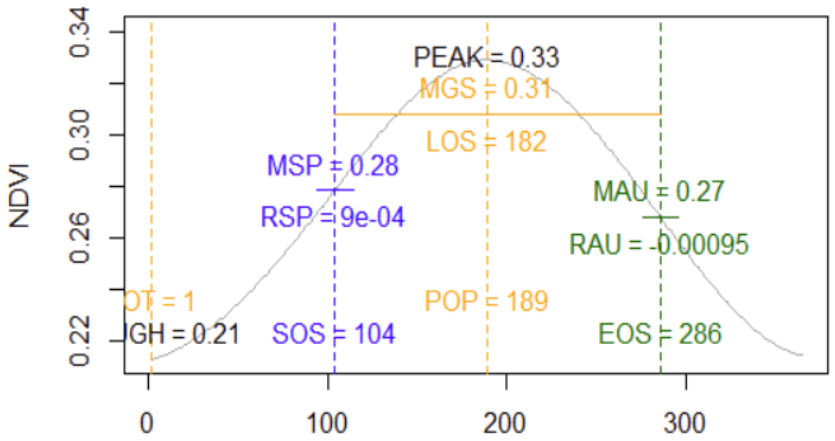


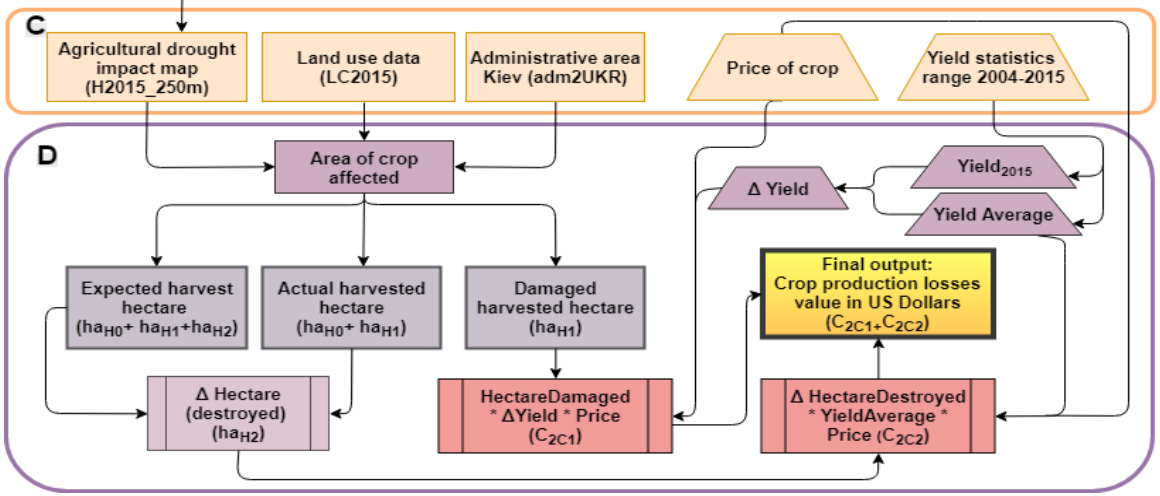
Phenology / Seasonality [Matthias Forkel]



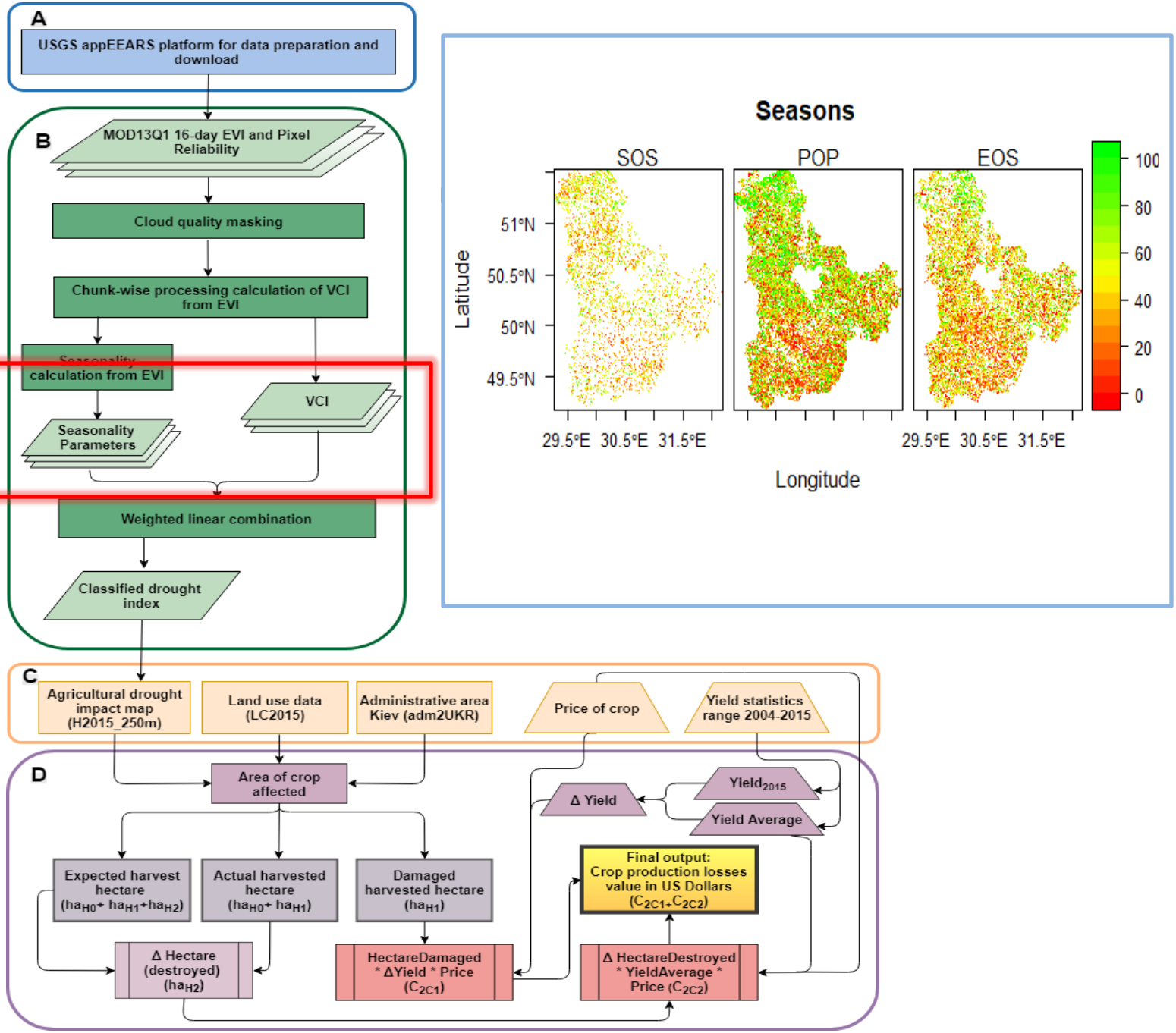
Vegetation Condition Index [Kogan]

$$VCI_j = \frac{(EVI_j - EVI_{min})}{(EVI_{max} - EVI_{min})} \times 100\%$$

NDVI~EVI



SOS: start of season
EOS: end of season
LOS: length of season
POP: position of peak value
POT: position of trough value
MGS: mean growth season value
PEAK: peak value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Classified drought index
Seasons
SOS
POP
EOS
51°N
50.5°N
50°N
49.5°N
Latitude
29.5°E 30.5°E 31.5°E
29.5°E 30.5°E 31.5°E
Longitude
100
80
60
40
20
0
C
Agricultural drought impact map (H2015_250m)
Land use data (LC2015)
Administrative area Kiev (adm2UKR)
Price of crop
Yield statistics range 2004-2015
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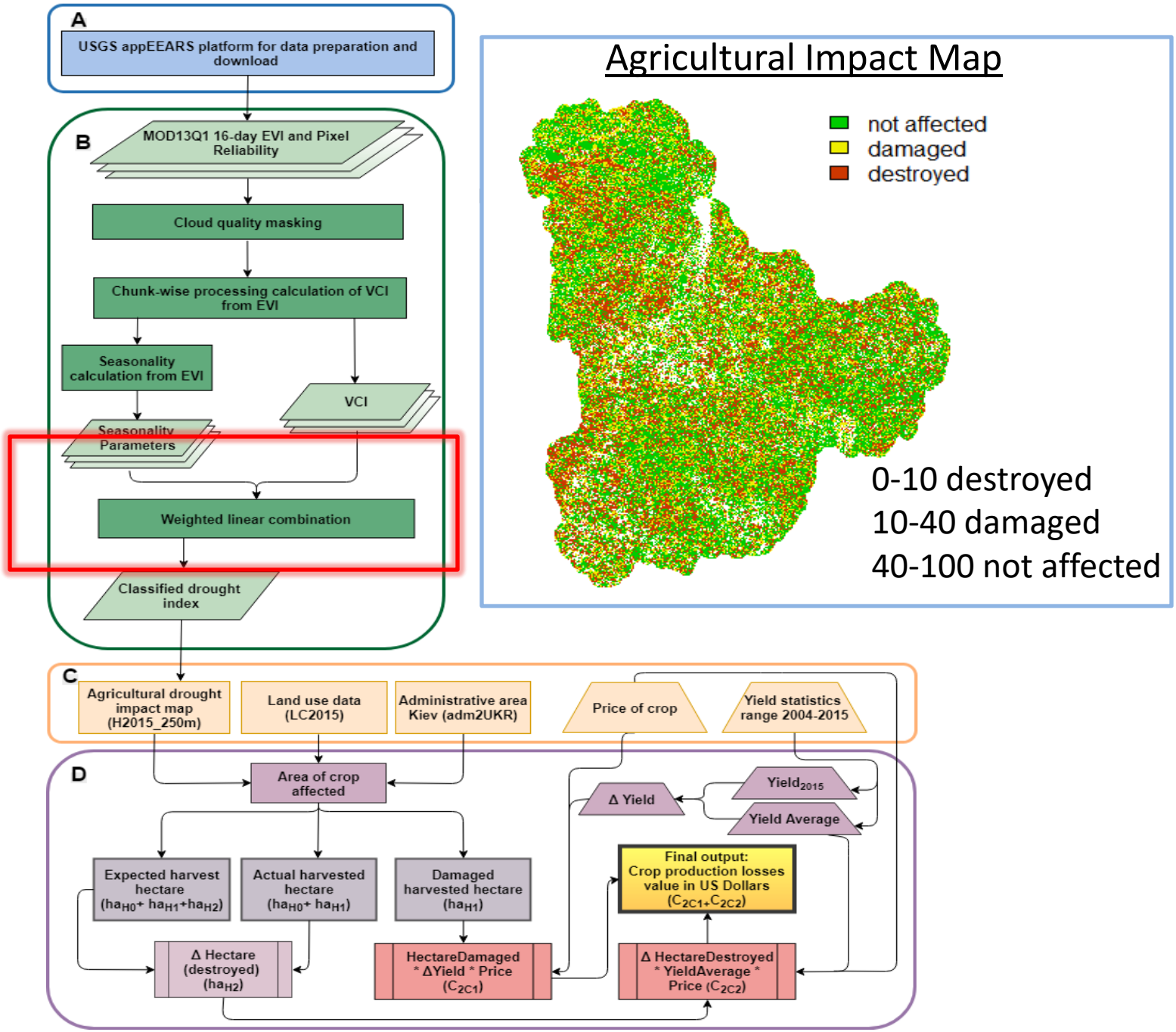
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Agricultural Impact Map
not affected
damaged
destroyed
0-10 destroyed
10-40 damaged
40-100 not affected
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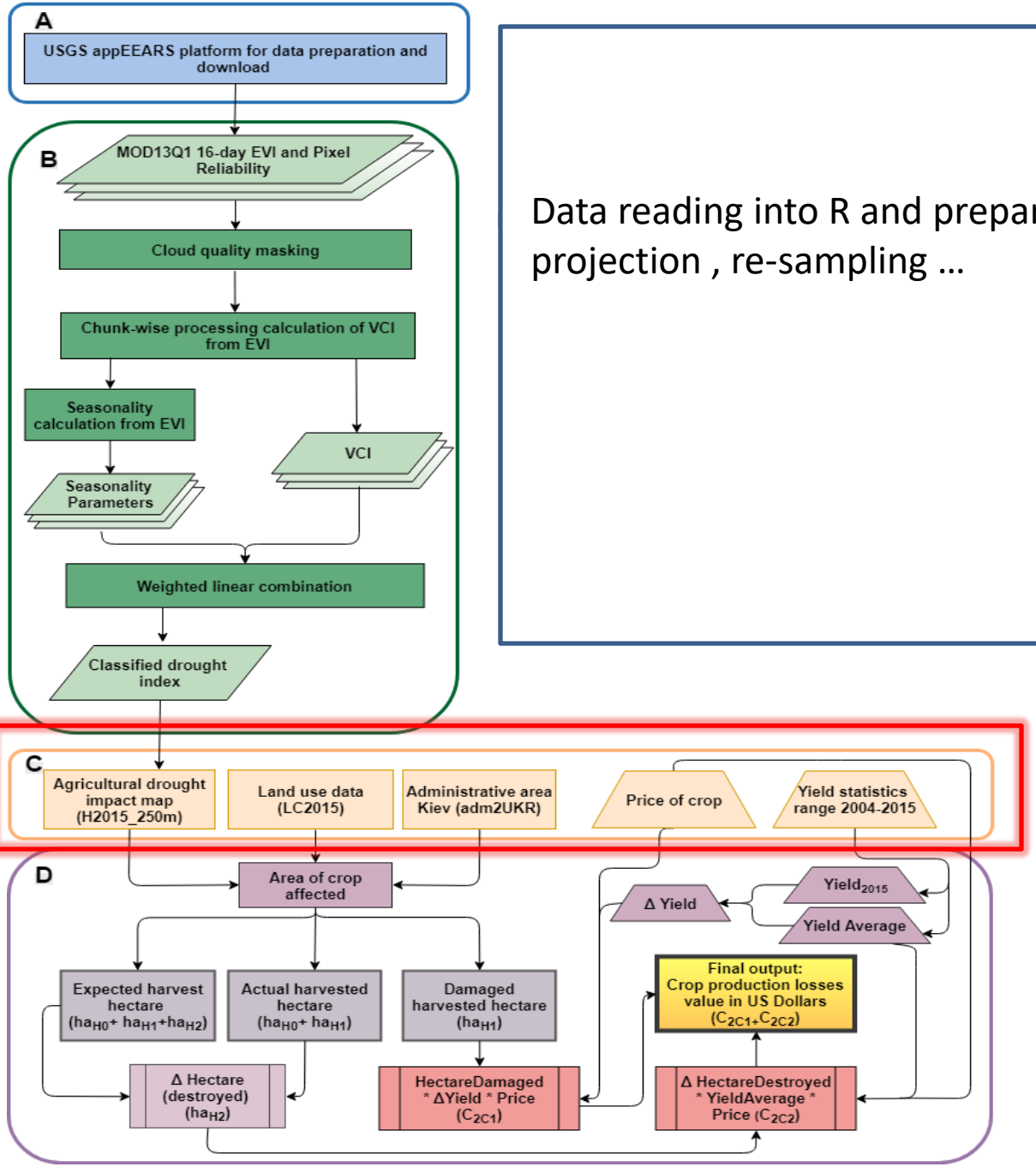
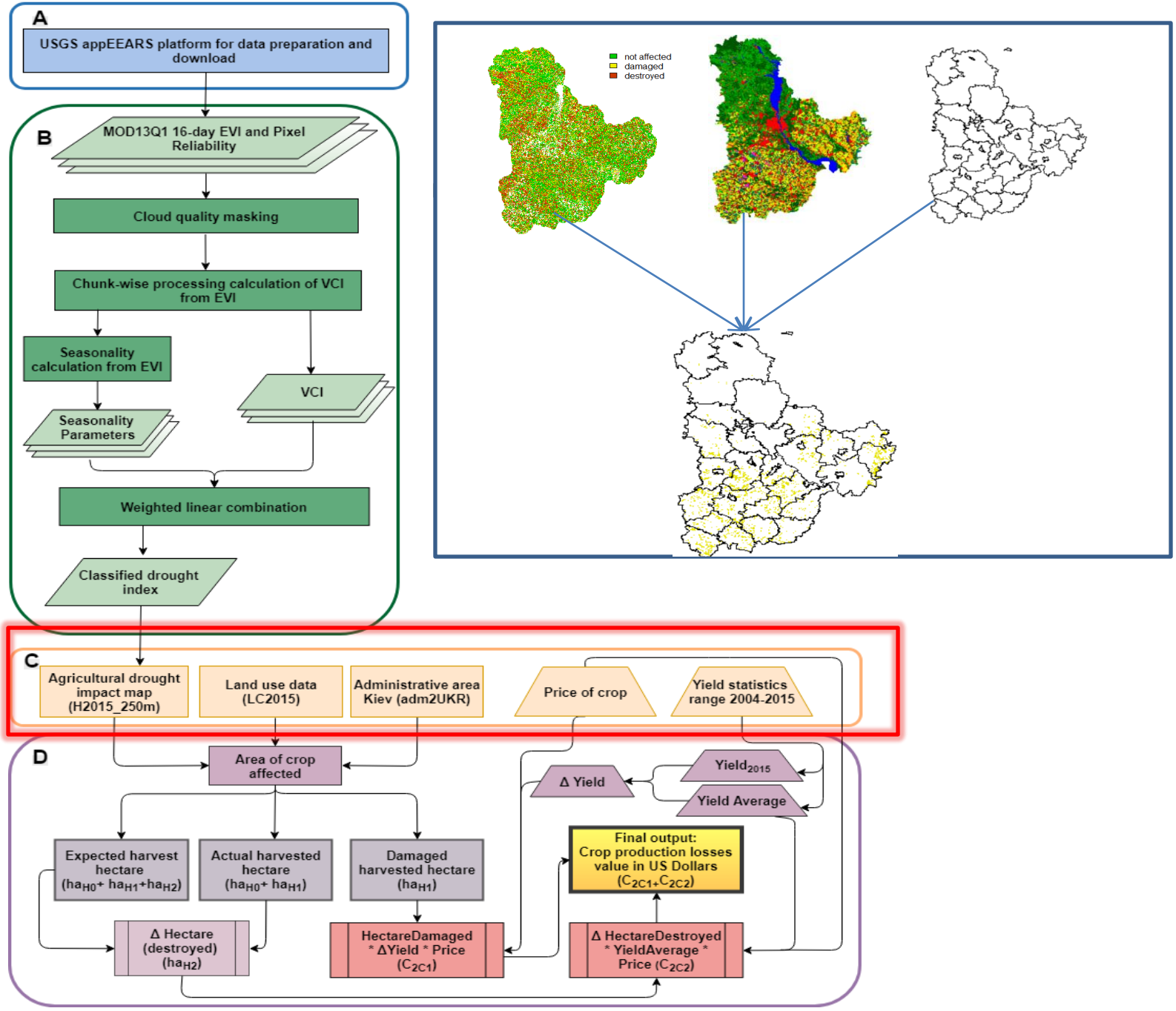


Data reading into R and preparation:
projection , re-sampling …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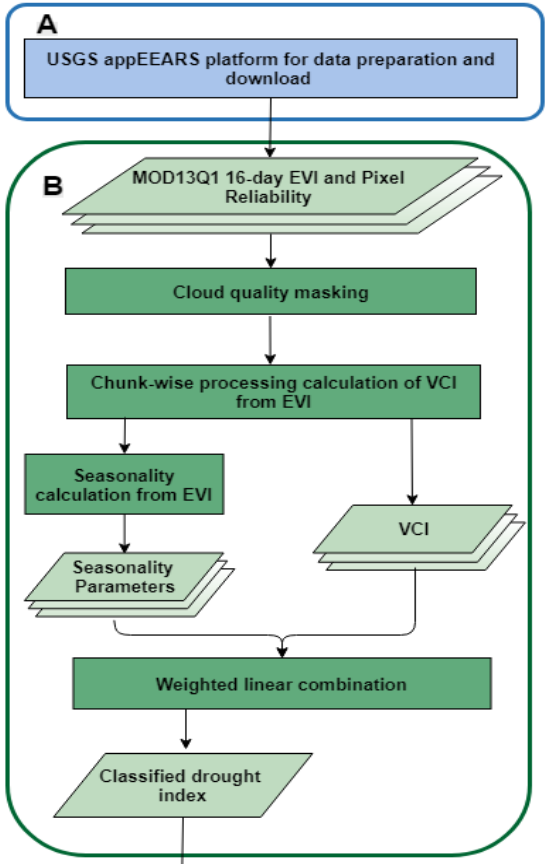
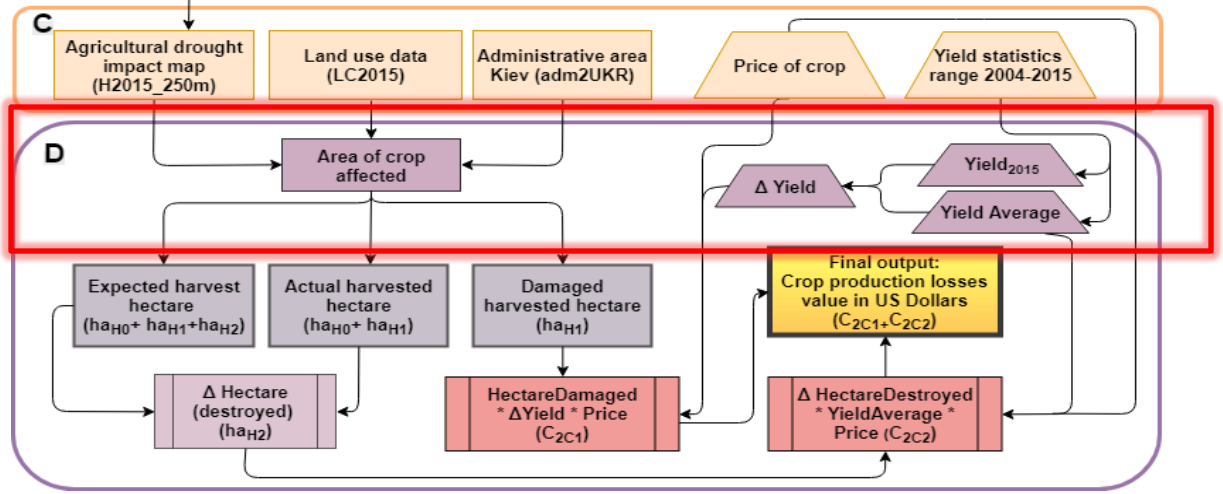
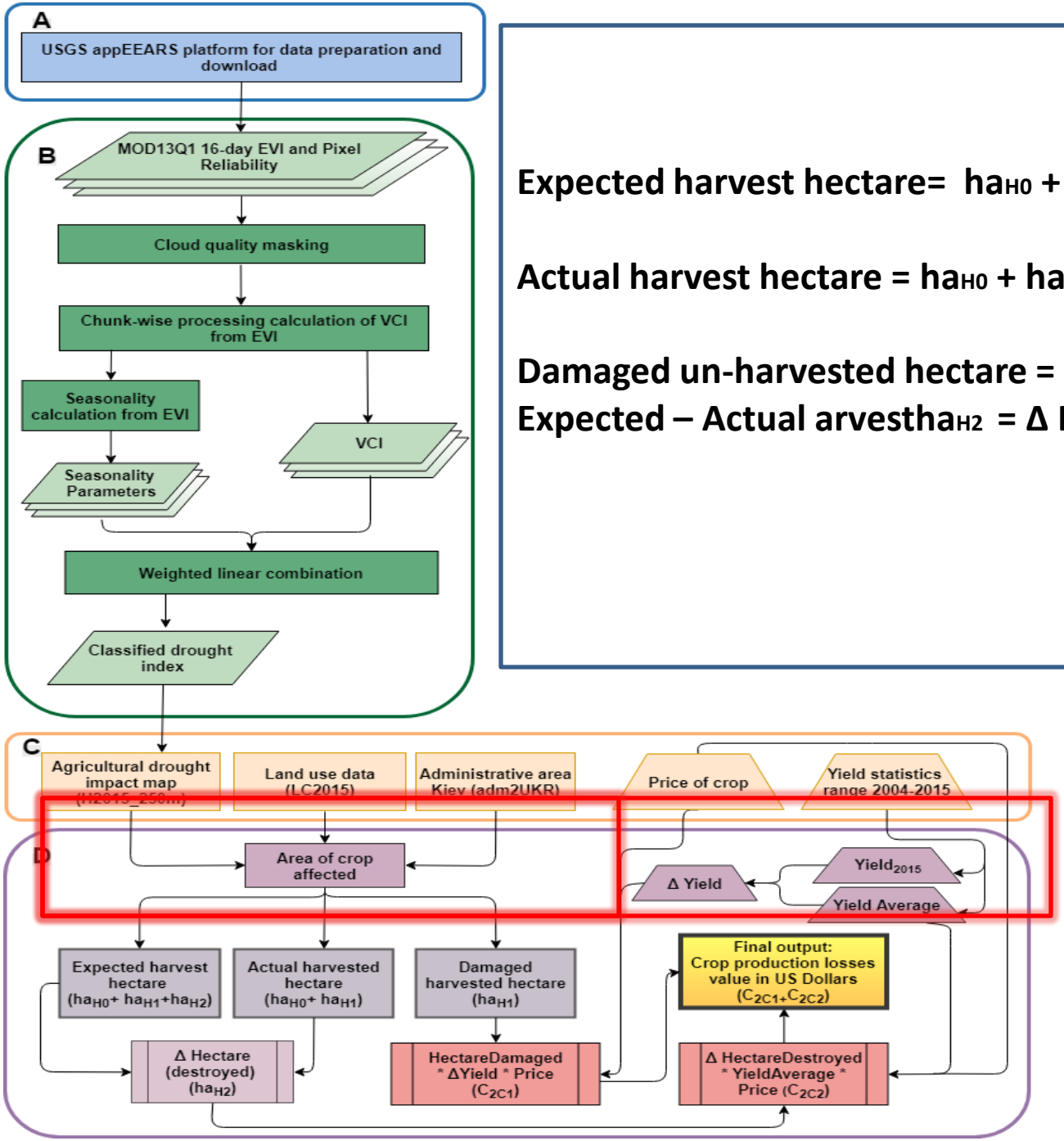


Damaged & Destroyed maize hectares

Yield statistics (2015) & yield avg

Maize price (2015)

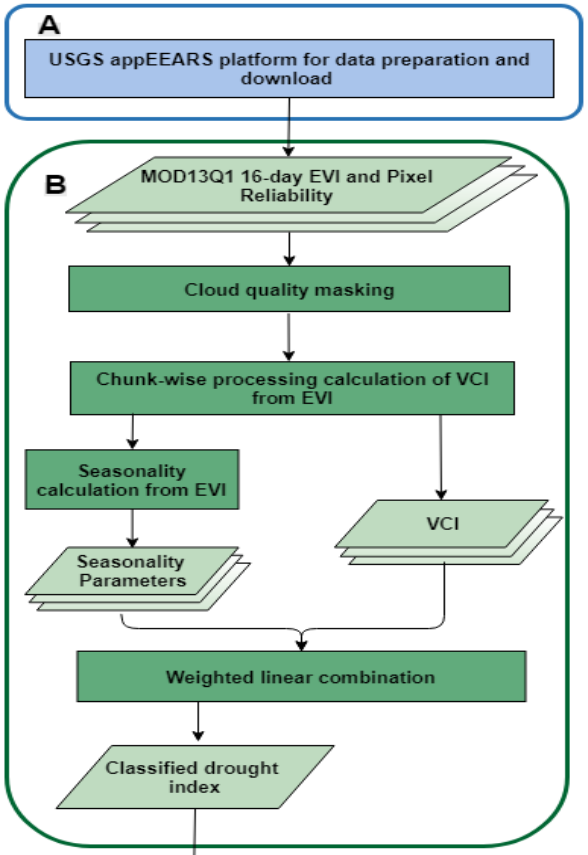




Expected harvest hectare= $ha_{H0} + ha_{H1} + ha_{H2}$

Actual harvest hectare = $ha_{H0} + ha_{H1}$

Damaged un-harvested hectare =
Expected – Actual arvestha_{H2} = Δ Hectare

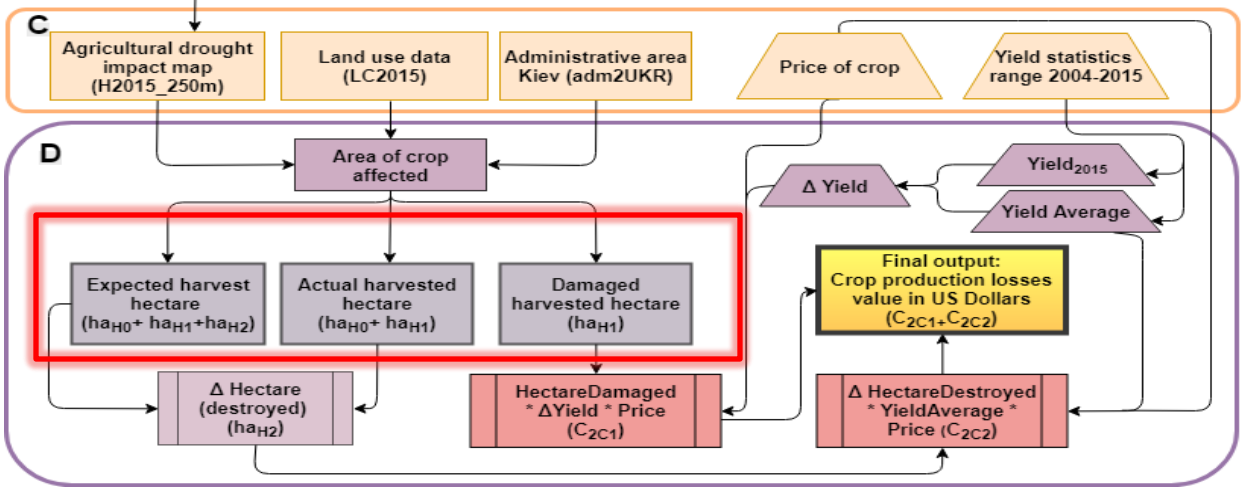


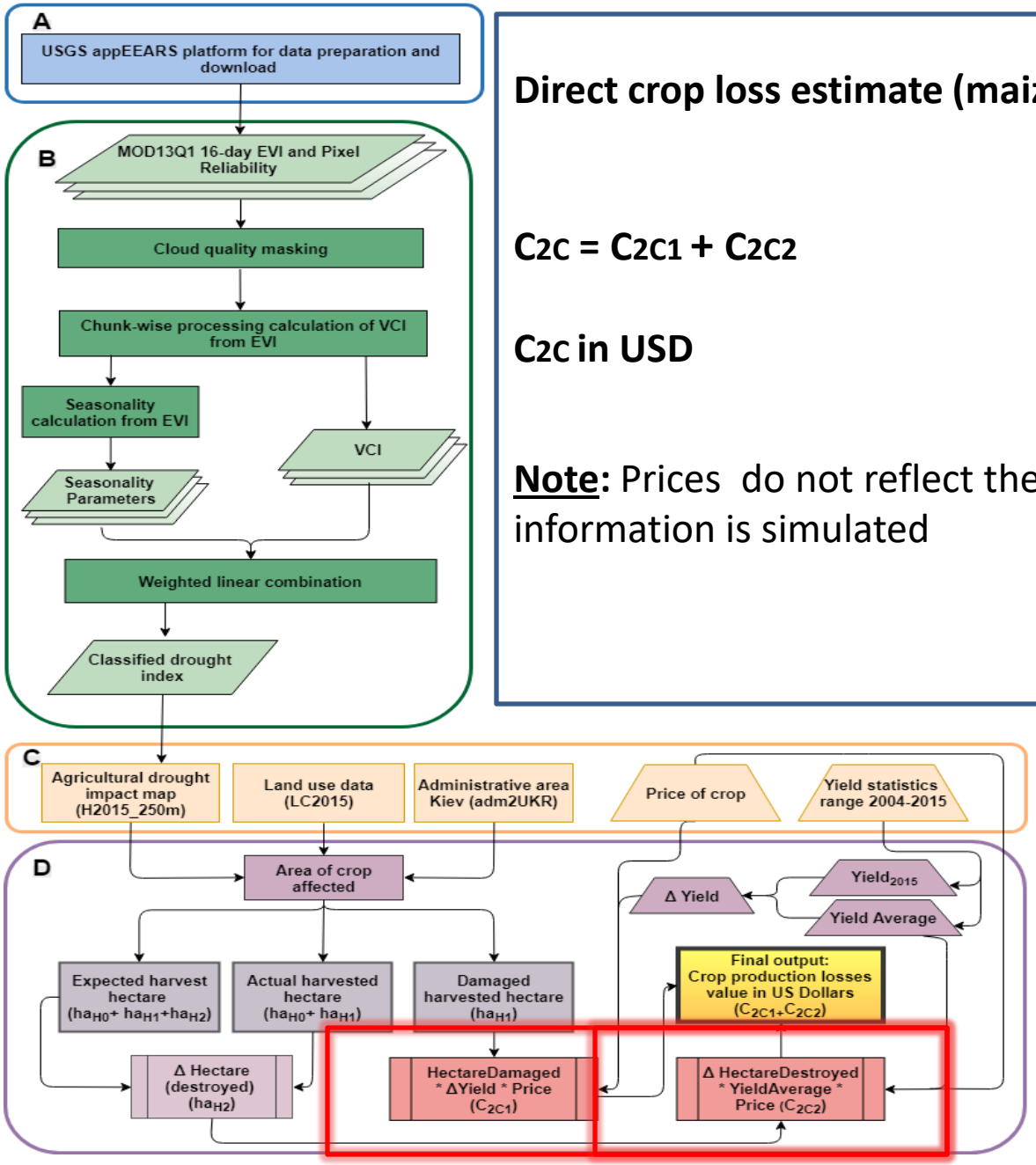
C_{2C1} = Hectare damaged(ha_{H1}) * Δ yield * Price

C_{2C1} in USD

C_{2C2} = Δ Hectare destroyed (ha_{H2}) * Yield average * Price

C_{2C2} in USD





Direct crop loss estimate (maize)

$C_{2C} = C_{2C1} + C_{2C2}$

C_{2C} in USD

Note: Prices do not reflect the actual losses as yield information is simulated

Thank you