Evaluation of current and future water requirements, under climate change scenarios from cocoa crops in Nilo Cundinamarca, Colombia

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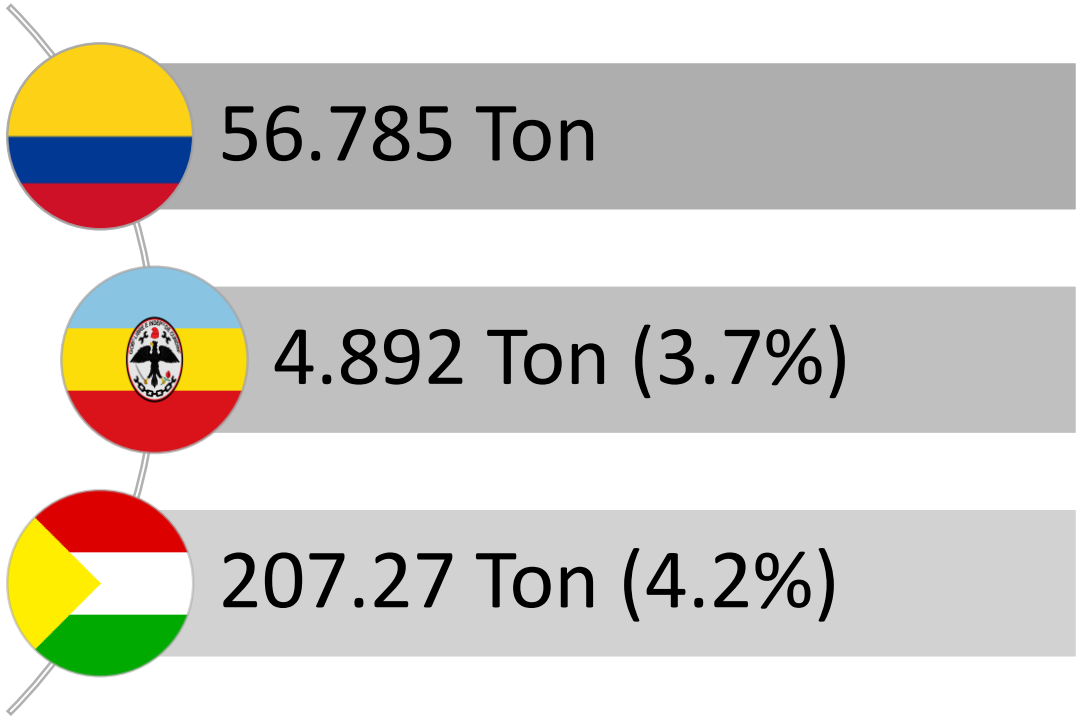
Colombian cocoa: recognized for being fine in taste and aroma (IICO, 2017).

Cocoa´s productivity 2016

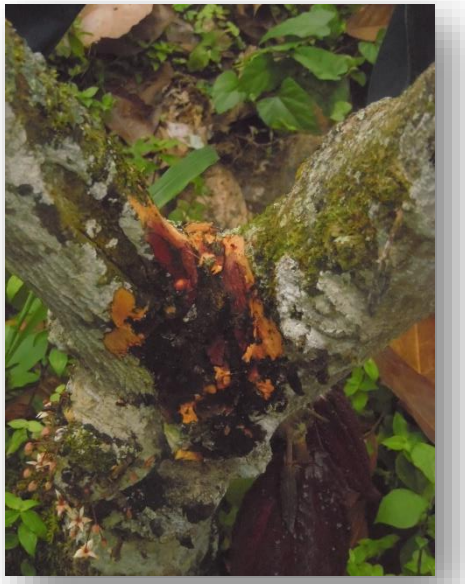


FAO, 2016; MADR, 2016

Water requirements are unknow

- Water (rainfall) is one of the most influential environmental factor in cocoa production.

- Between 2015 and 2016 the municipality of Nilo lost 20% of cocoa plants (Barrientos, 2016).



Aim

To evaluate current and future water requirements under climate change scenarios of Cocoa crop in Nilo, Colombia

Materials and methods

Current

Base line (1975-2005, Ideam data): Tmax, Tmin, Tavg, PCP, Rn, U_2 → ETo (FAO, 2009), LI, WAI y WB: Def, Exc, Sto, ETR

$$IL = \frac{Rn}{T_{avg}}$$

$$WAI = ((ETR + (Exc/4))/ETo) * 100$$

Almorox, 2013; IDEAM, 2015

Future

Climatic scenarios models (11) × 2050 and 2070 (2) × RCP´s 2.6, 4.5, 6.0, 8.5 (4) = 88

→ ETo, LI, WAI y WB: Def, Exc, Sto, ETR (Projected)

Rn: rainfall, U_2 : wind, ETo: Reference Evapotranspiration, LI: Lang Index, WAI: Water Availability Index, WB: Water Balance; Def: Deficits, Exc: Surplus; Sto: Water storage in soil, ETR: Real evapotranspiration.

Materials and methods

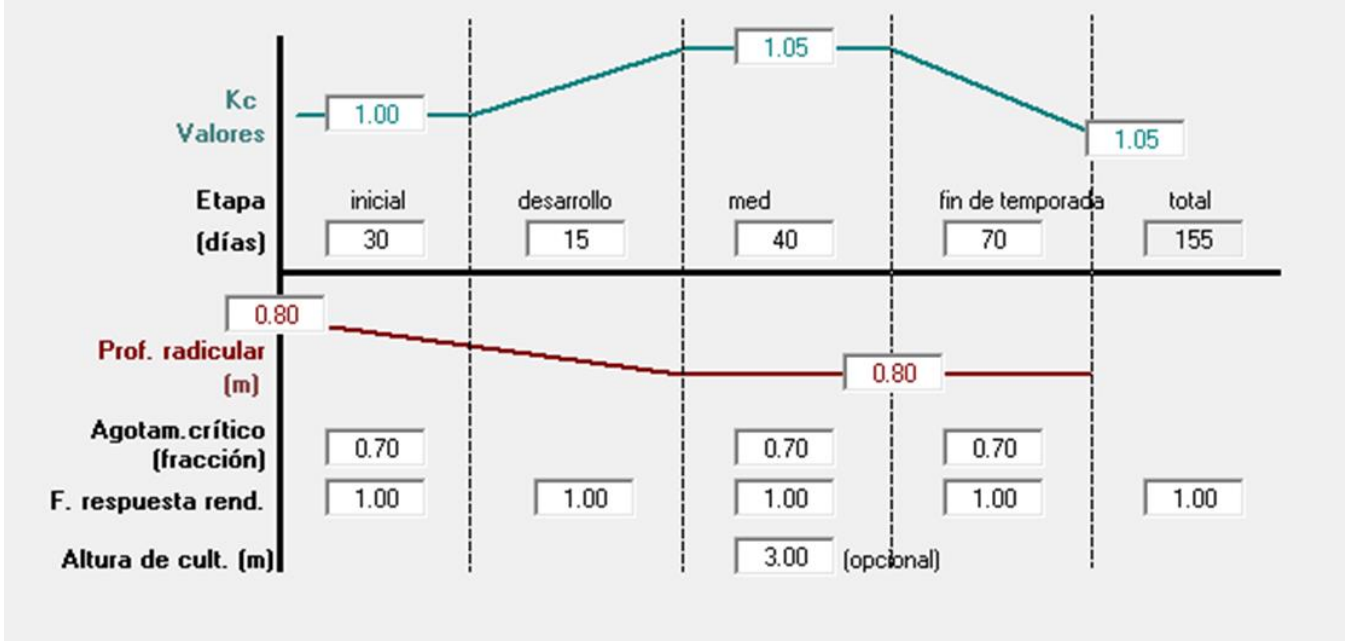
Water requirements

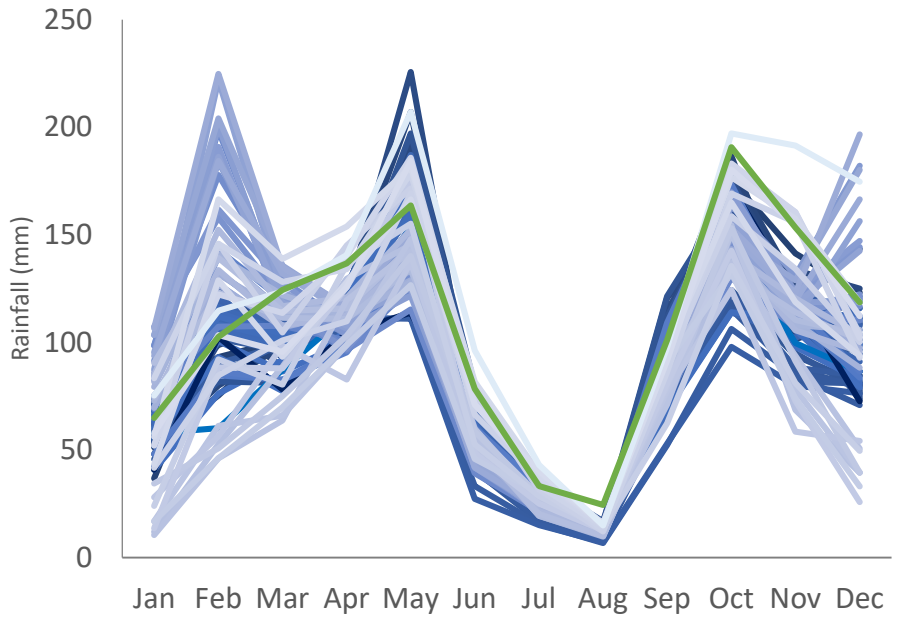
Climatic data

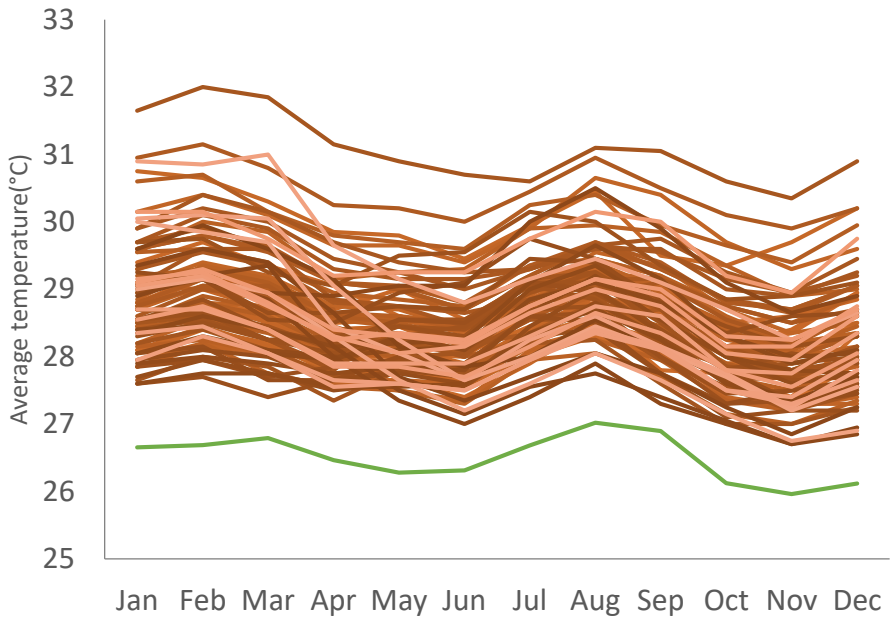
Crop

Soil

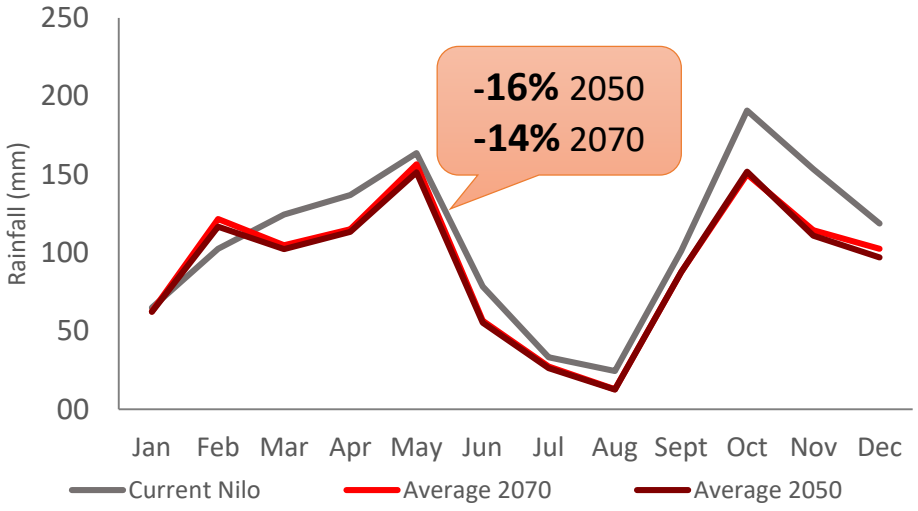
Current and future water requirements for the crop

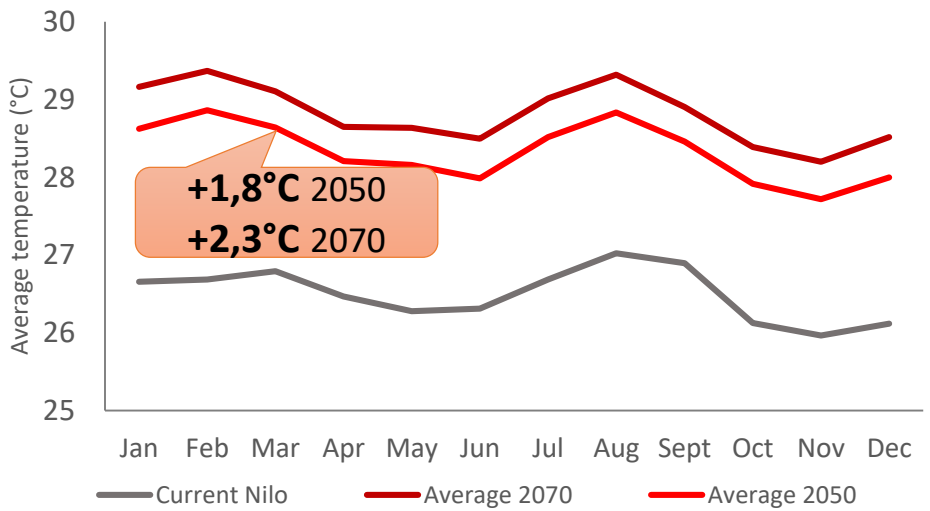






Rainfall -10 to +10% (Ideam, 2016)





Temperature will increase at least 1.8 °C

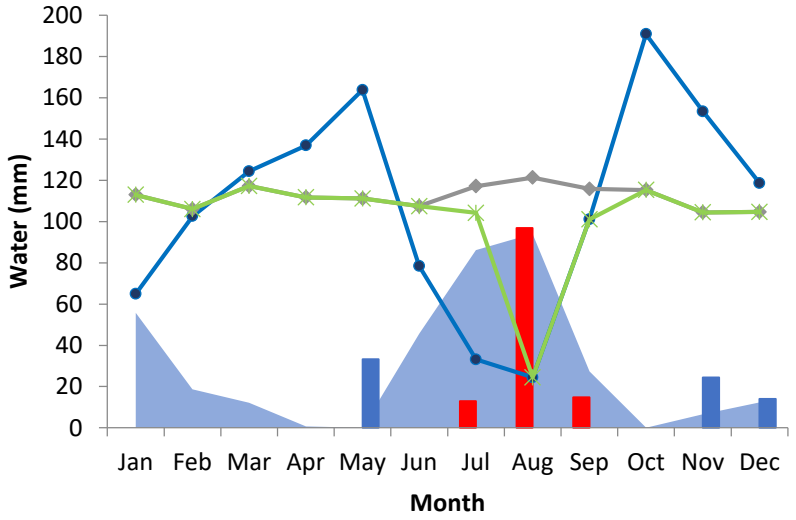
Index	Current	Pessimistic scenario 2050	Optimistic scenario 2050	Average 2050	Pessimistic scenario 2070	Optimistic scenario 2070	Average 2070
LI Nilo	Semiarid	Arid	Semiarid	Arid	Arid	Semiarid	Arid
WAI Nilo	Right	Dry	Dry	Dry	Very dry	Dry	Dry

$$IL = \frac{Rn}{T_{avg}}$$

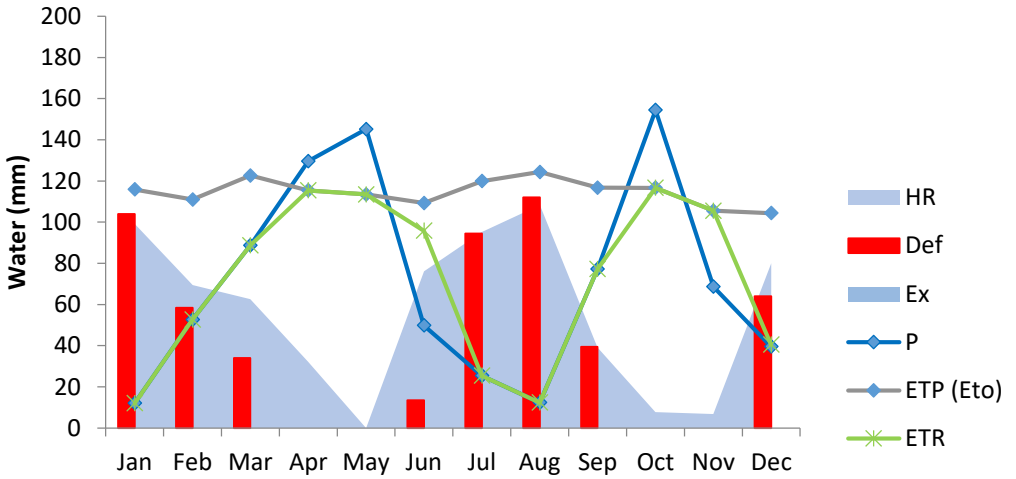
$$\text{WAI} = ((ETR + (Exc/4))/ETo) * 100$$

Almorox, 2013; IDEAM, 2015

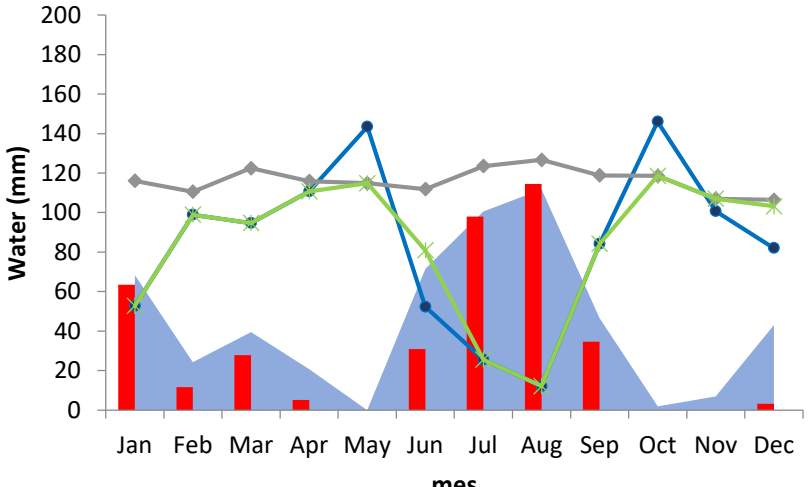
Current Nilo



Pessimistic scenario MG8550



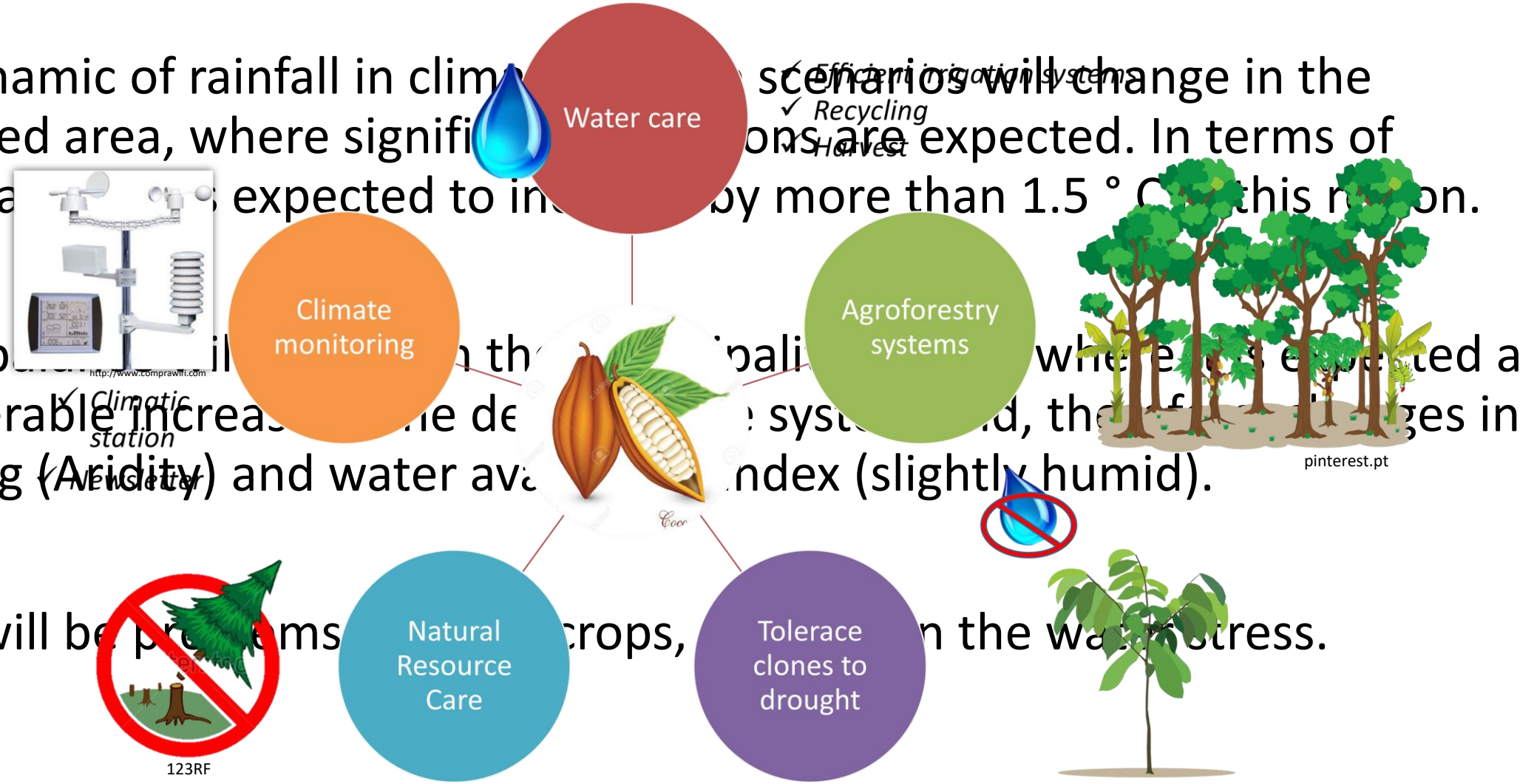
Average 2050



	Requirements (mm)
Current	359
Avg 2050	535
Pessimistic scenario	677

P: Rainfall, ETP: Potential evapotranspiration, Def: Deficits, Exc: Excess; ETR: Real evapotranspiration.

- The dynamic of rainfall in clim[illegible] scenarios will change in the evaluated area, where signifi[illegible]ons are expected. In terms of tempera[illegible] expected to in[illegible]by more than 1.5 ° C[illegible] this r[illegible]on.
- Water b[illegible]il[illegible]th[illegible]pali[illegible]where[illegible]s e[illegible]ted a considerable increas[illegible]he de[illegible]e syst[illegible]d, th[illegible]ges in the Lang (Aridity) and water ava[illegible]ndex (slightly humid).
- There will be pr[illegible]ems[illegible]crops,[illegible]n the wa[illegible]stress.



Thank you!

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Do you have any question?

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