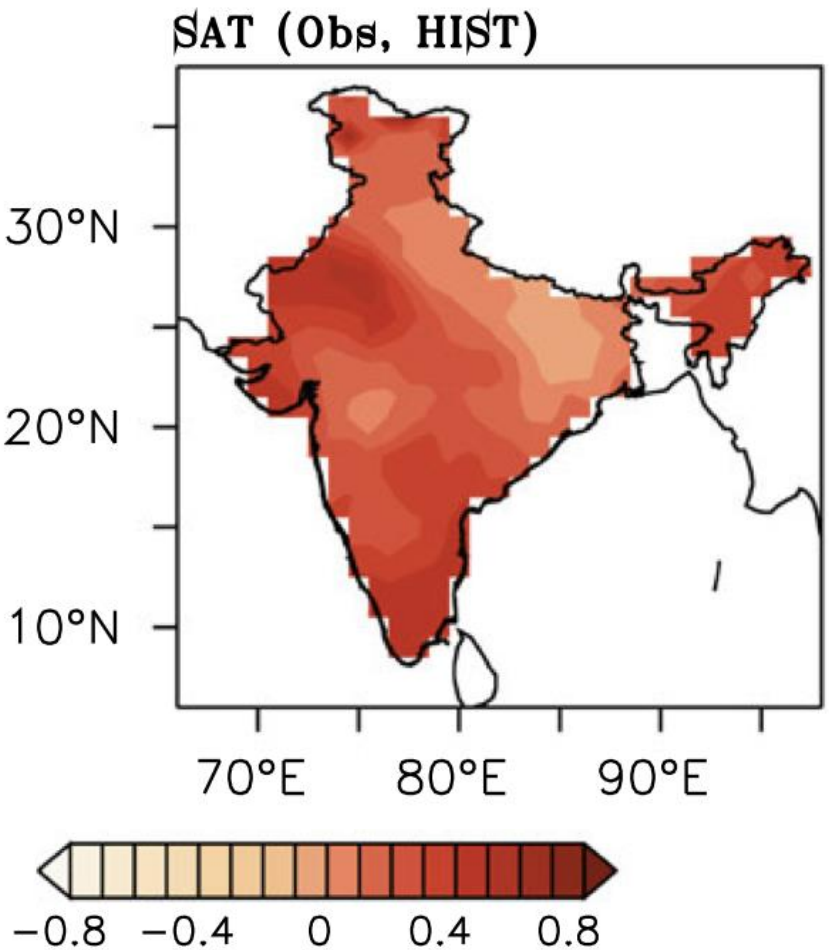
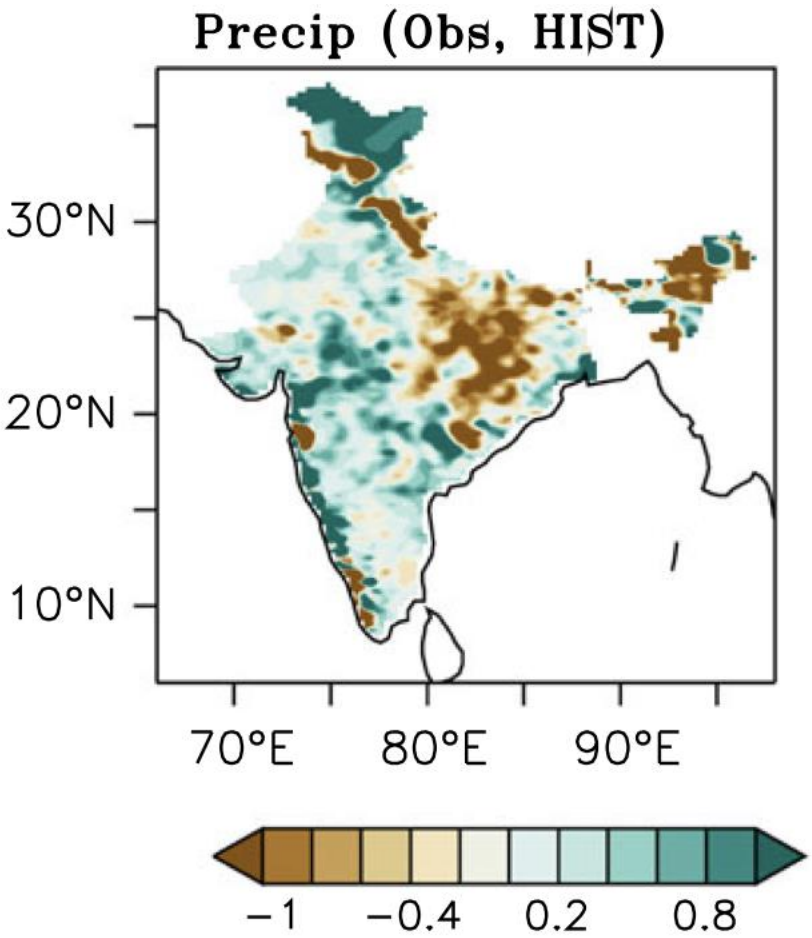
A Ready-Set-Go Framework for Health and Agriculture: India is a Perfect Petri dish





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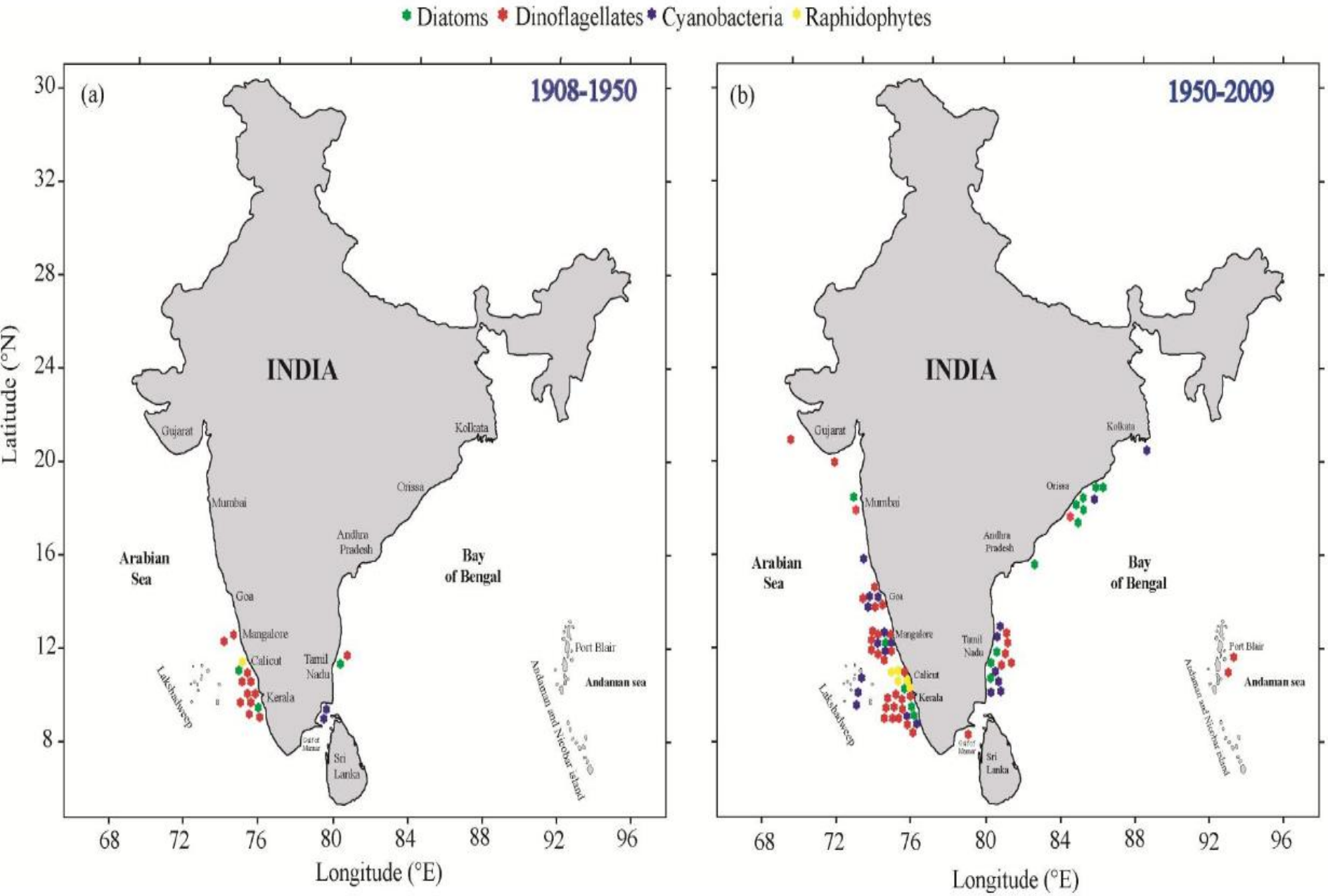
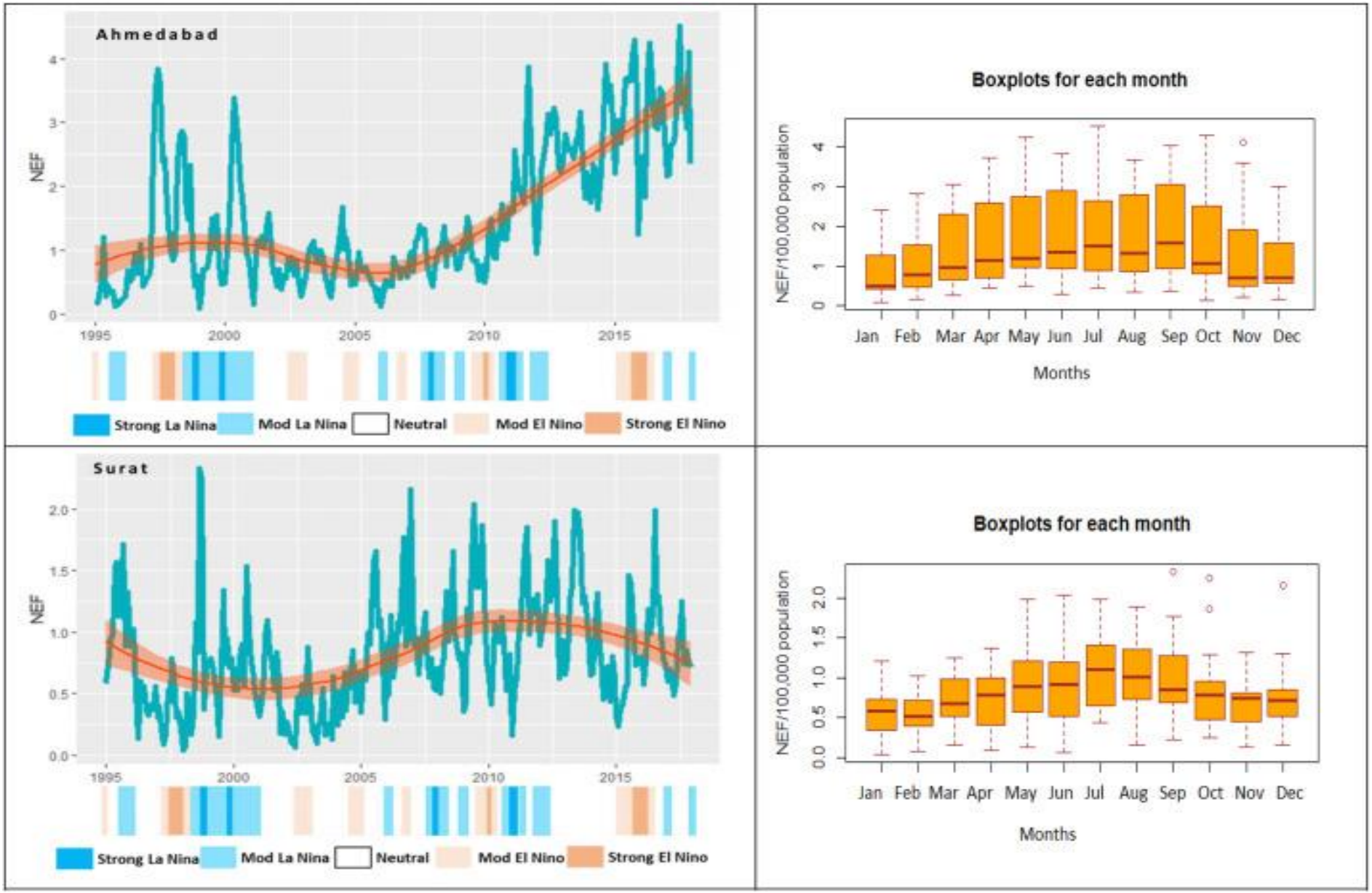


https://link.springer.com/article/10.1007%2Fs11069-012-0190-9

Health Data?



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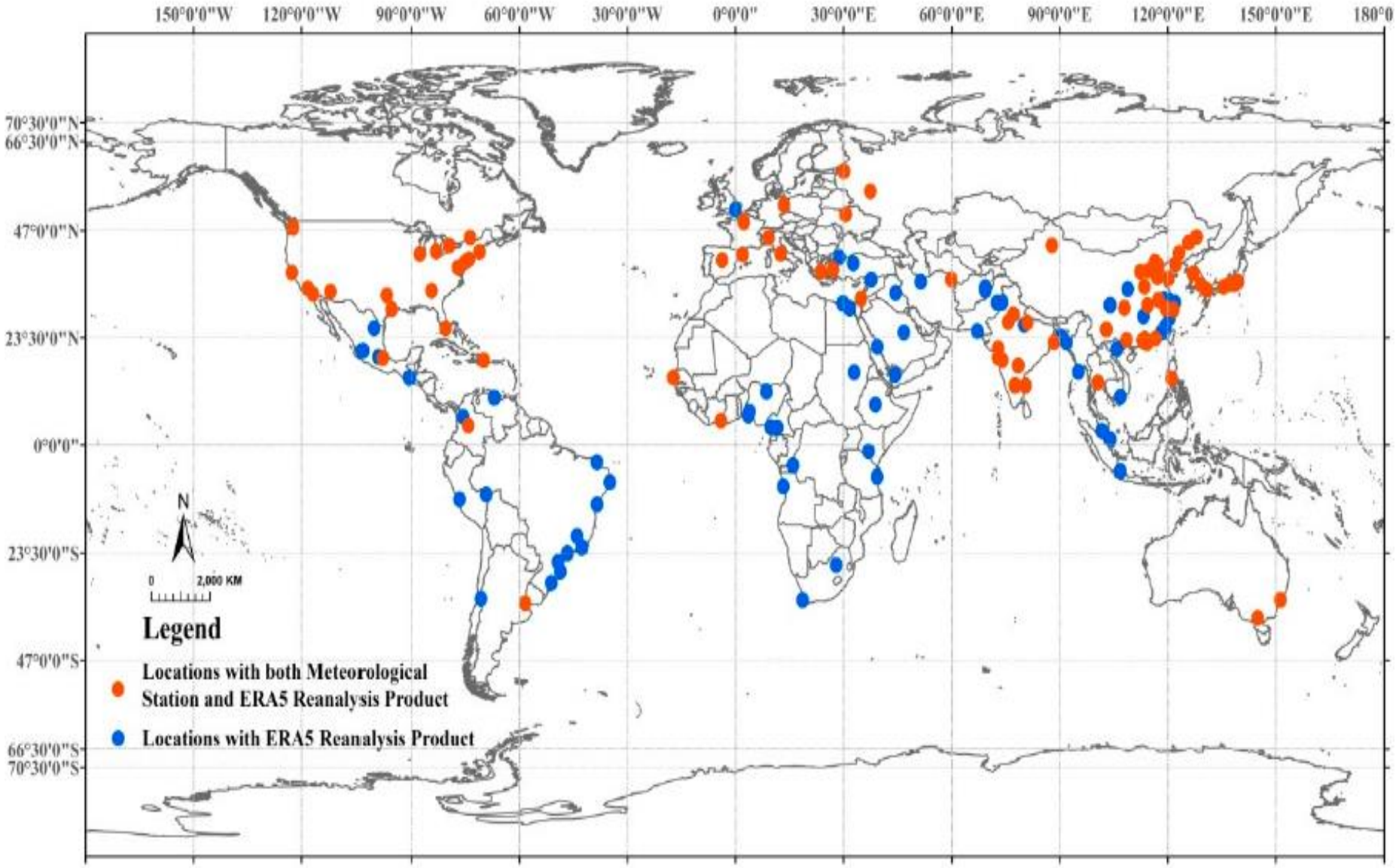


Figure 1. Global distribution of the 150 most populated metropolitan locations.

https://www.mdpi.com/1660-4601/18/3/1293

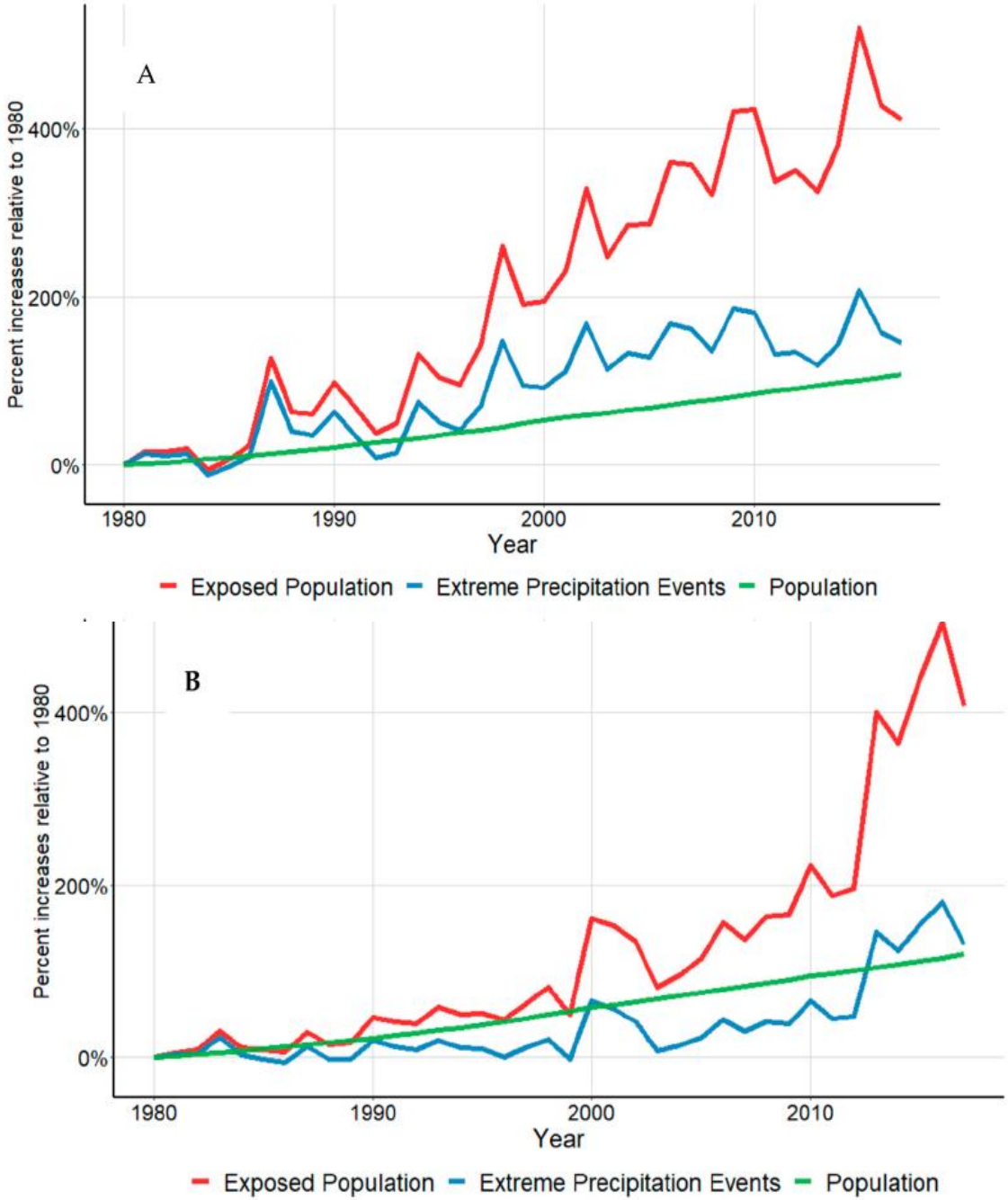
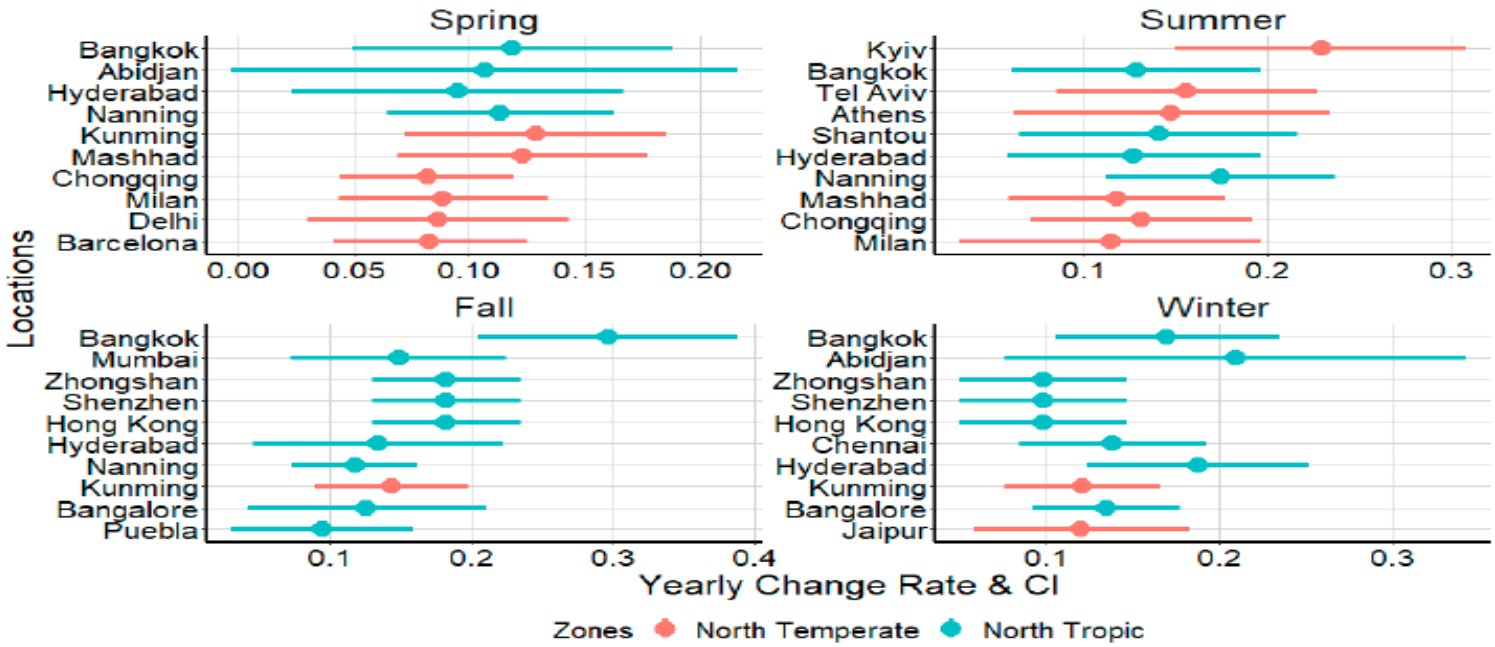
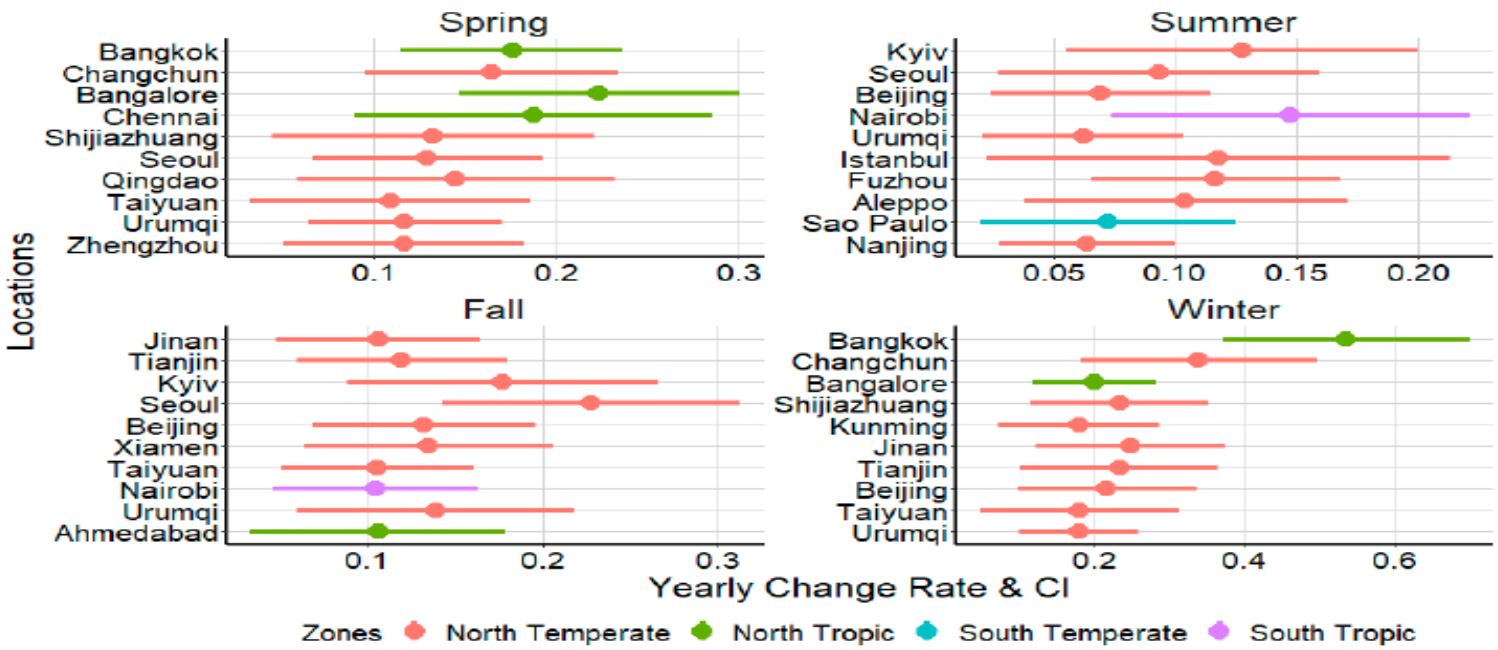


Figure 2. Changes in EHE (**A**) and EPE (**B**) exposed populations during the last four decades.



(A) Seasonal Increases in EHE



(B) Seasonal Increases in EPE

Can we minimize irrigation water application based on weather forecasts without affecting the yield?

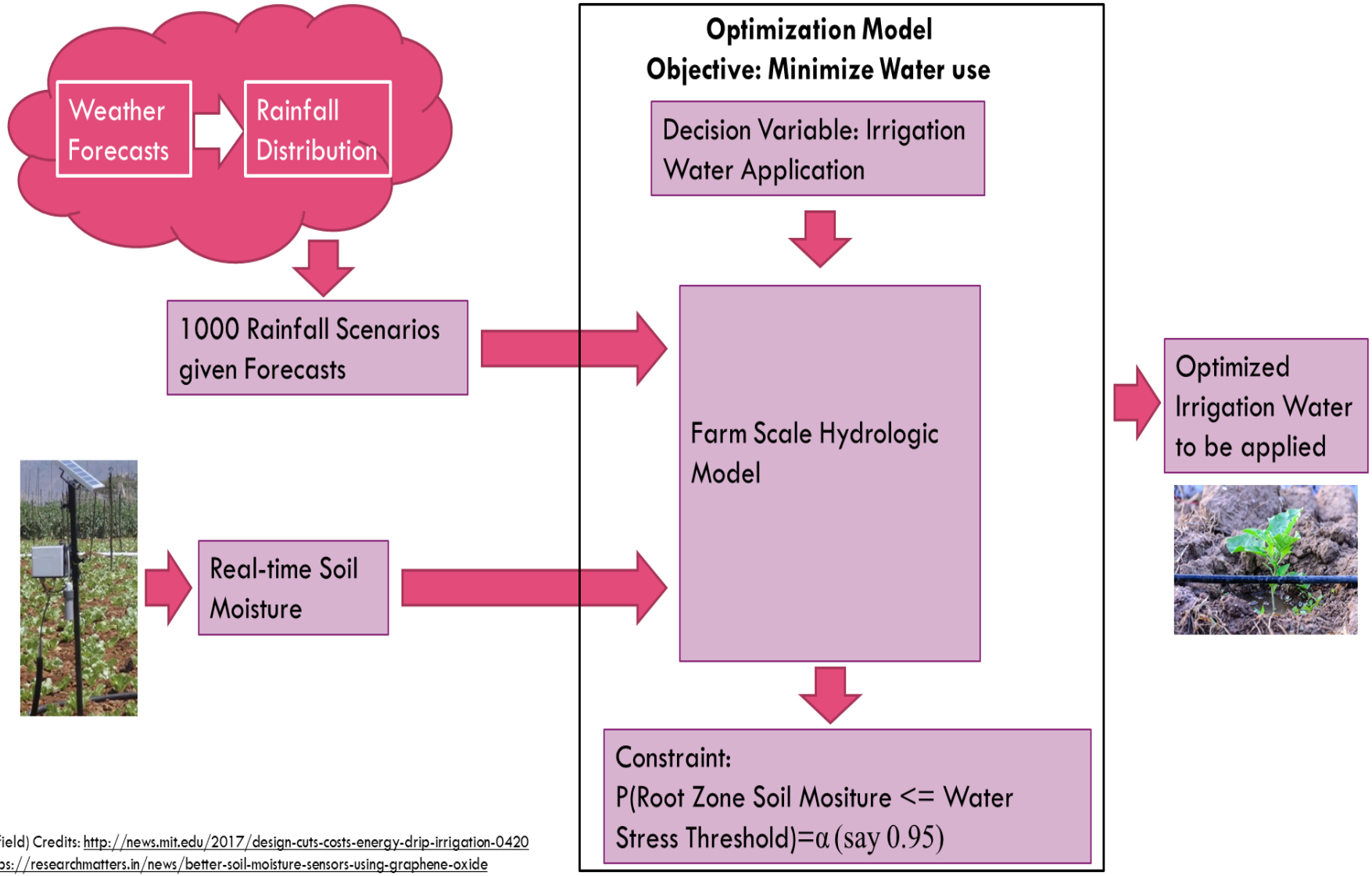
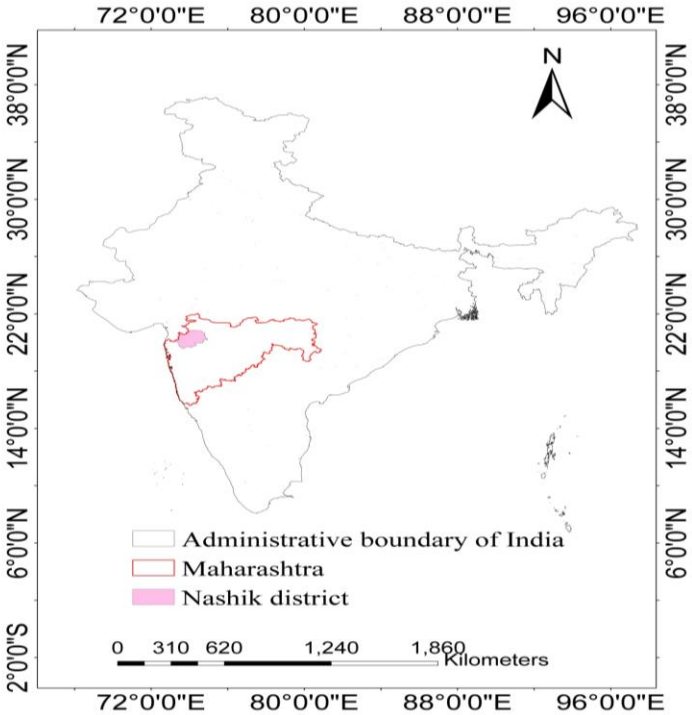
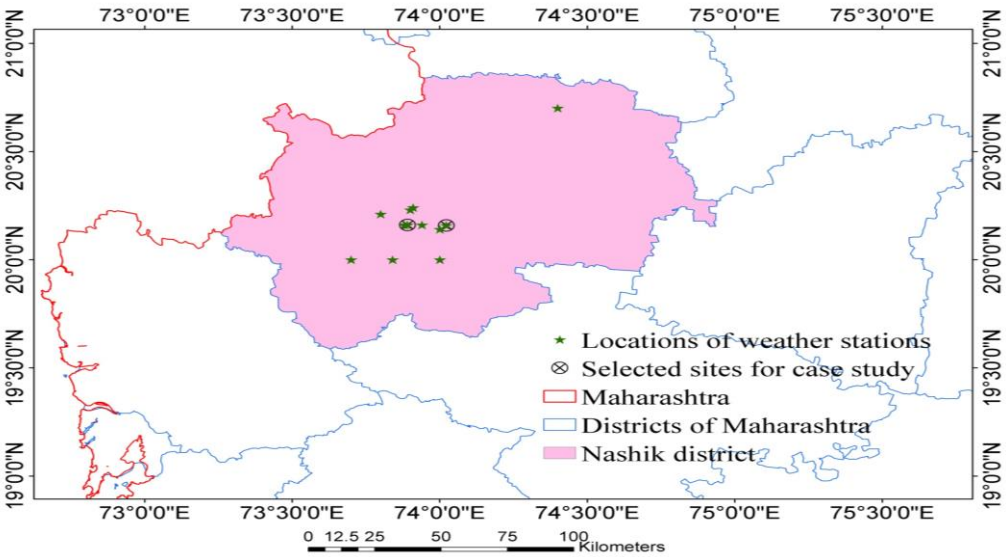
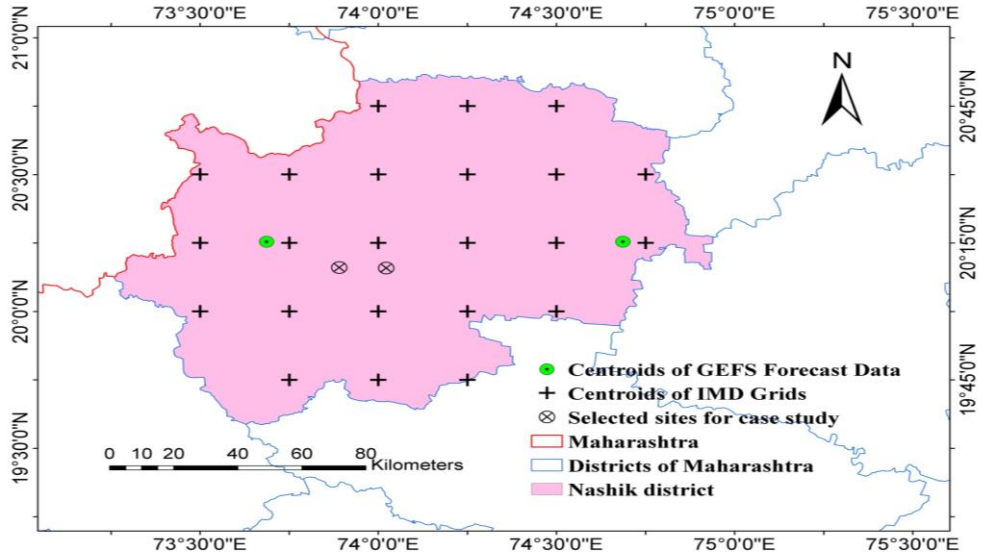


Photo (field) Credits: http://news.mit.edu/2017/design-cuts-costs-energy-drip-irrigation-0420 and https://researchmatters.in/news/better-soil-moisture-sensors-using-graphene-oxide

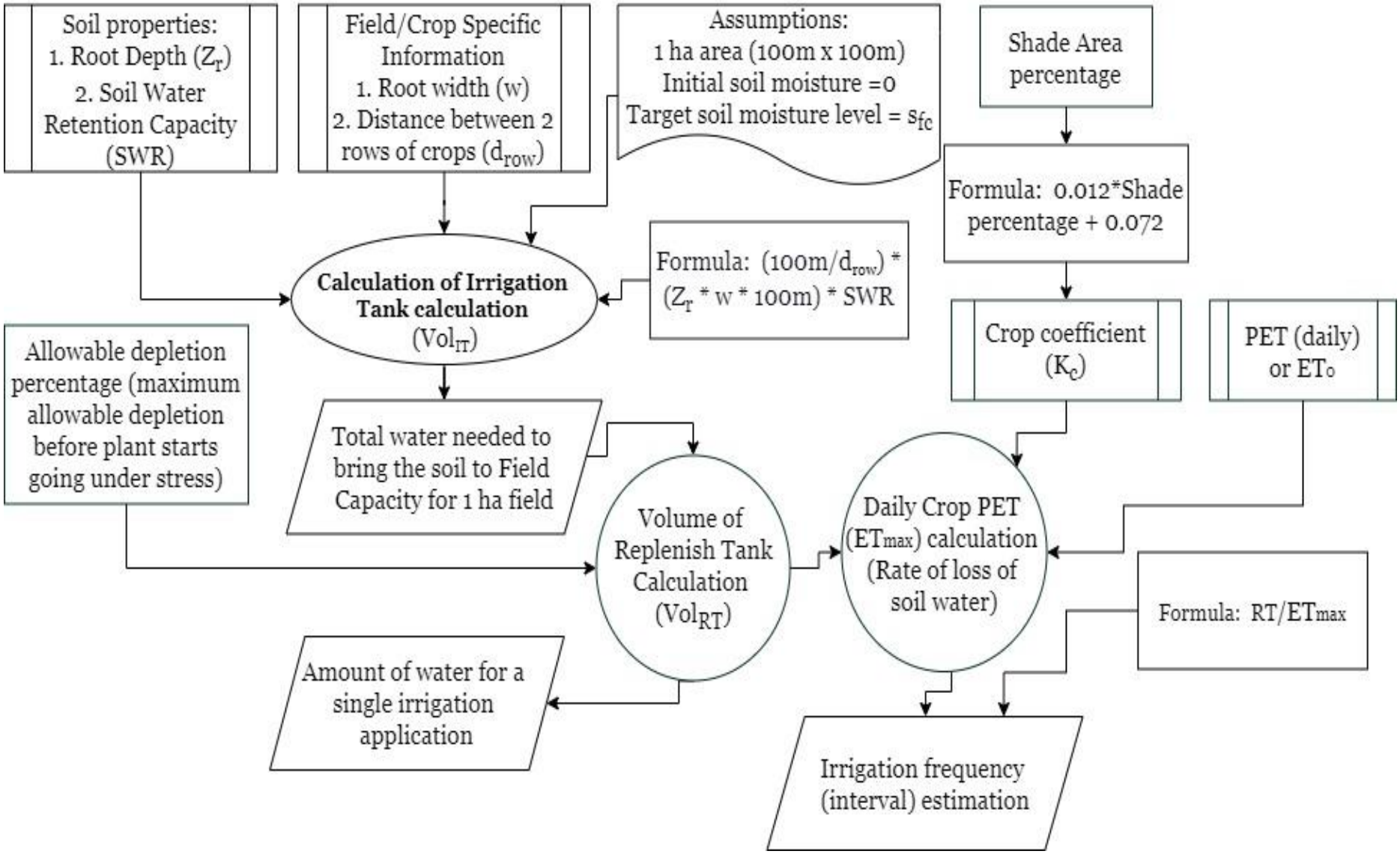
Study Region



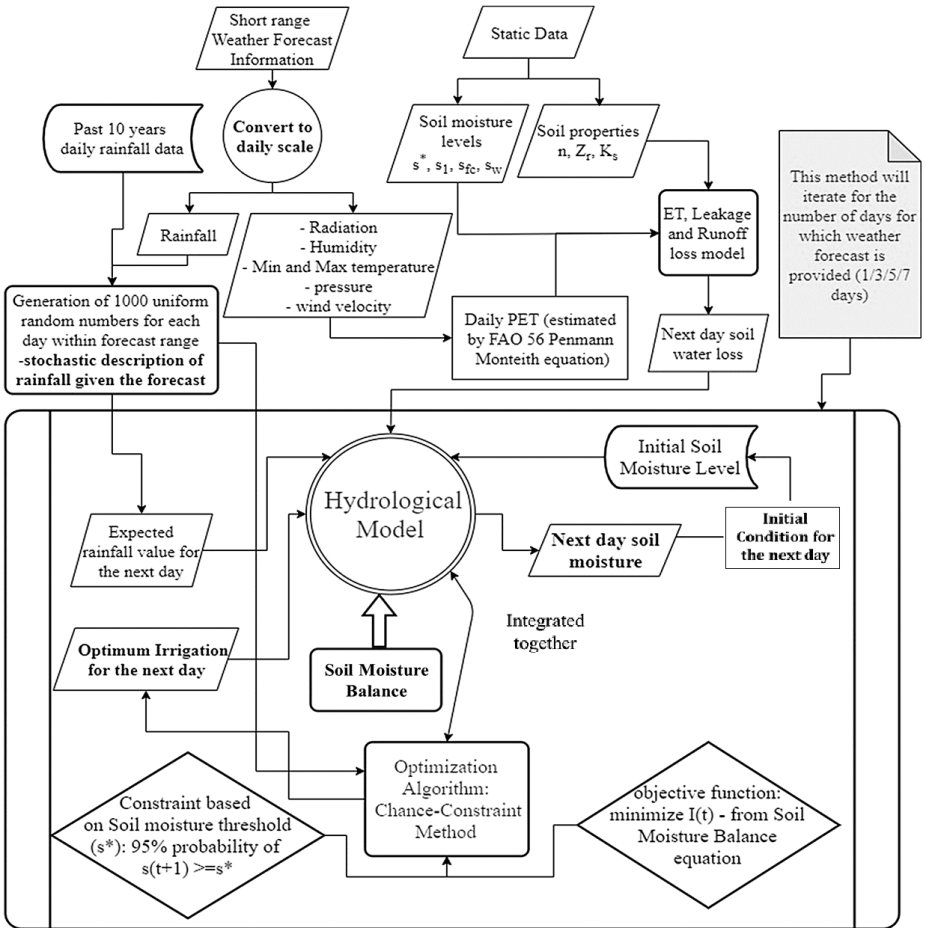




Farmer's method



Developed Model



$$minimize \sum_{i=1}^{N} I_{t+i}, \qquad (1)$$

Subject to:

$$P(s_{t+i} \geq s^*) \geq \alpha \qquad \forall\ t \in T_{seas},\ i = 1,2,3, \dots N, \qquad (2)$$

$$0 \leq I_{t+i} \leq I_{max} \qquad \forall\ t \in T_{seas},\ i = 1,2,3, \dots N, \qquad (3)$$

$$s_{hs} \leq mean(s_{t+i}) \leq 1 \qquad \forall\ t \in T_{seas},\ i = 1,2,3, \dots N. \qquad (4)$$

$$f_{S_{t+i}}(s_{t+i}) = f^{hyd}\{F_{H=h_{t+i}|FS=f_S}(h_{t+i}), I_{t+i}, s_{t+i-1}\}$$

Roy et al. (2019), Patent filed

Results

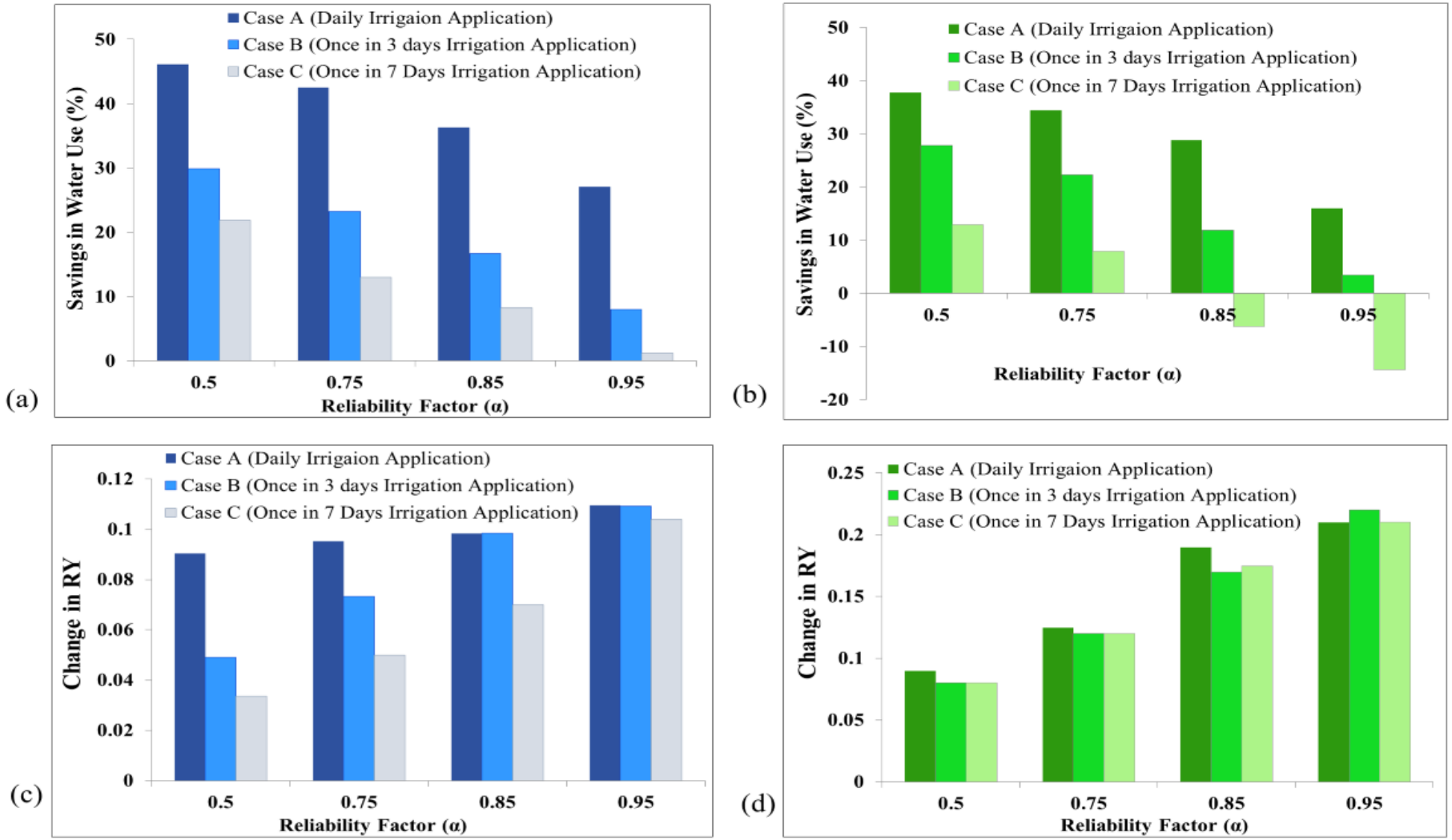


Figure 9. Change in Minimization of Irrigation Water Use for varied Reliability Factor during (a) Kharif Season and (b) Rabi Season. Change in Relative Yield for varied Reliability Factor during (c) Kharif Season and (d) Rabi Seasons. All the 3 Cases of Irrigation (Case A, B and C) are presented

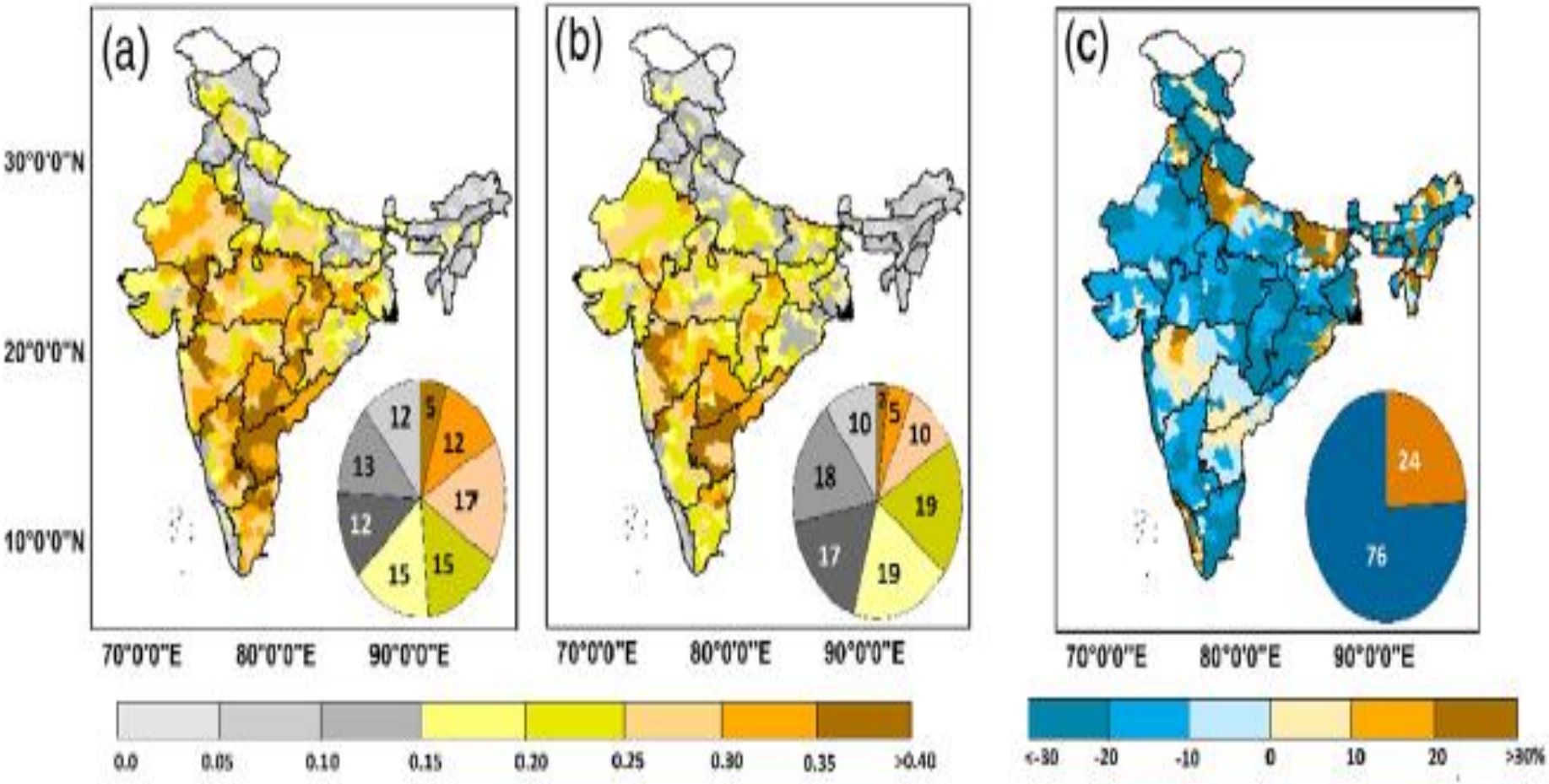


Figure 1. Social vulnerability computed through a robust data envelopment analysis (DEA) framework for the census years 2001 (a) and 2011 (b) district level demographic data, where the DEA value close to one represents the districts which are more socially vulnerable. The inset Pie charts represent the distribution of the vulnerability values. (c) shows the changes in social vulnerability between two decades. We note that almost 76% of the total districts exhibit negative changes in social vulnerability.