



**Impact of climate change on chilli (*Capsicum annum* L.) yield
in major chilli growing districts of Tamilnadu**

**KOWSHIKA N, PANNEERSELVAM S, GEETHALAKSHMI V,
ARUMUGAM T AND JAGADEESWARAN R**

Tamil Nadu Agricultural University

Introduction



Christopher Colombus

America → Europe → India



Vasco Da Gama



International hot and spicy foods day - January 16th

Americans – Last Thursday of February is celebrated as National Chilli Day (February 28, 2019)

- India - 18 popular - Byadagi, Nalachetti, Tadappally, Ellaichipur sannam, Hindpur, Sangli sannam, Jwala, Kashmiri chilli, Nagpur, Madhya Pradesh Sannam, Kanthari white, tomato chilli, Guntur sannam, **Sattur Mundu, Madras Puri and Ramnad Mund**
- Vietnam, Thailand, Sri Lanka, Malaysia, USA, UAE, Indonesia, Mexico, UK, Bangladesh, Singapore, Nepal, Saudi Arabia, Qatar, Canada, China, Australia, Oman and South Africa
- Tamil Nadu holds ninth position during 2017 in chilli production with an area of 44,200 ha, production of 21,500 tonnes and productivity of 0.48 t/ha (Spices Board, 2017).
- Major chilli growing districts are Ramanathapuram, Tuticorin, Tirunelveli, Virudunagar, Sivagangai, Dindigul.



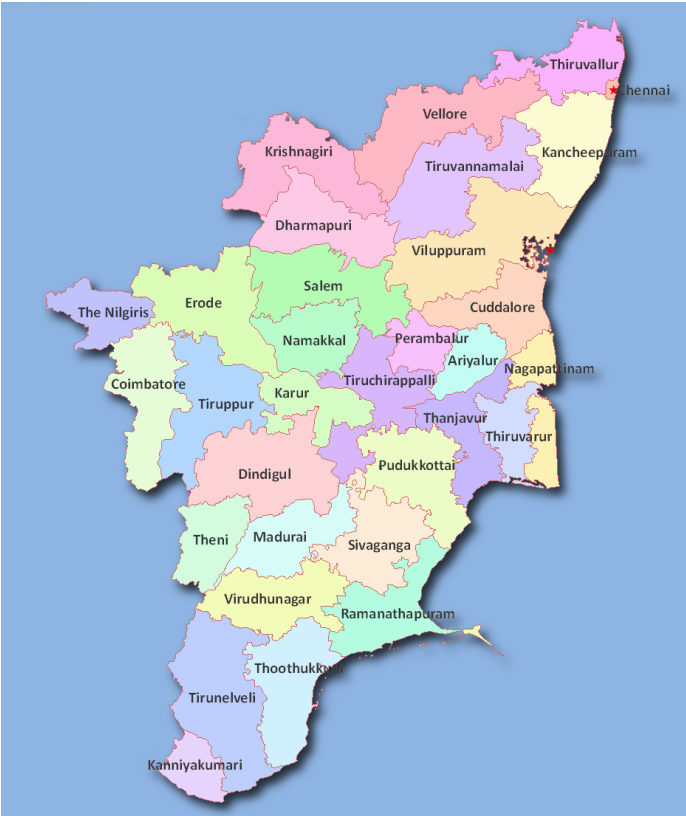


- **Spices- “high value-low volume” - climate change.**
- **Chilli - spice and vegetable**
- **Extremities in temperature and precipitation - major production reducers of chilli crop (Hwang and Tae, 2001).**
- **Chilli - rainfed – profitable to sustain the dry land production.**

Materials and Methods

Impact of climate change on chilli crop yield of major chilli growing districts of Tamilnadu

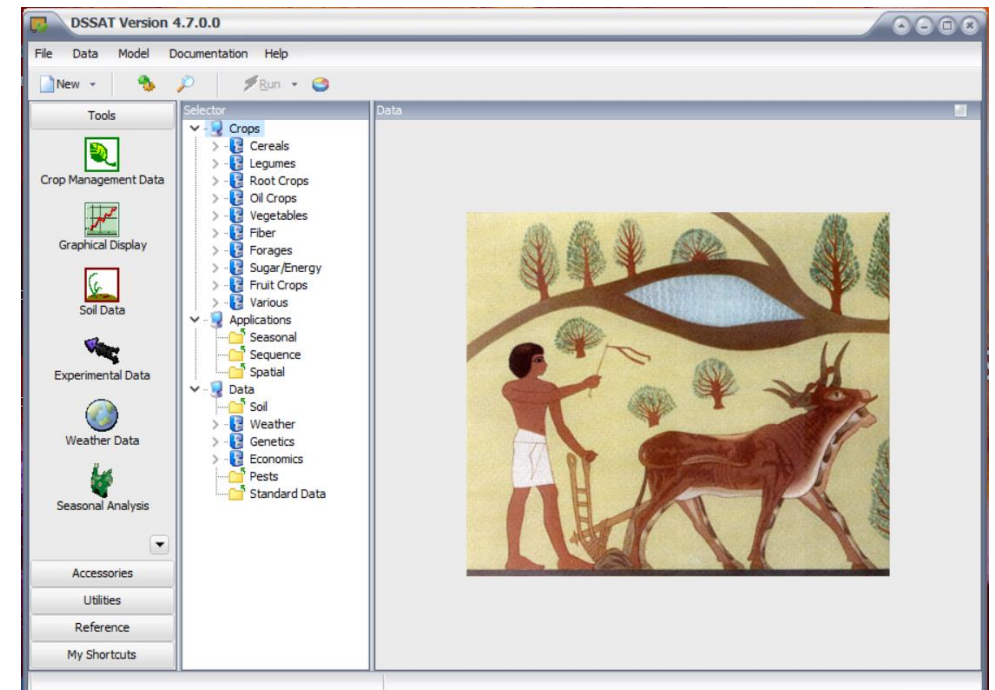
- **Weather Data – IMD**
- **Study period: 1983 - 2012**
- **Season: October - April**
- **Crop Simulation: K1 variety**
- **Major chilli growing districts: Ramanathapuram, Tuticorin, Tirunelveli, Virudhunagar, Sivagangai, Dindigul**



Ramanathapuram, Tuticorin, Tirunelveli, Virudunagar, Sivangai, Dindigul

Crop Simulation Model

- **DSSAT (Decision Support System for Agrotechnology Transfer) CROPGRO module - impact of climate variability and climate change**
- **Weatherman tool - Maximum temperature (°C), Minimum temperature (°C), Solar radiation (MJ m⁻² day⁻¹) and Rainfall (mm)**
- **Soil database of Tamil Nadu - Department of Remote sensing and GIS, TNAU**
- **X Build tool in DSSAT- Experimental file**



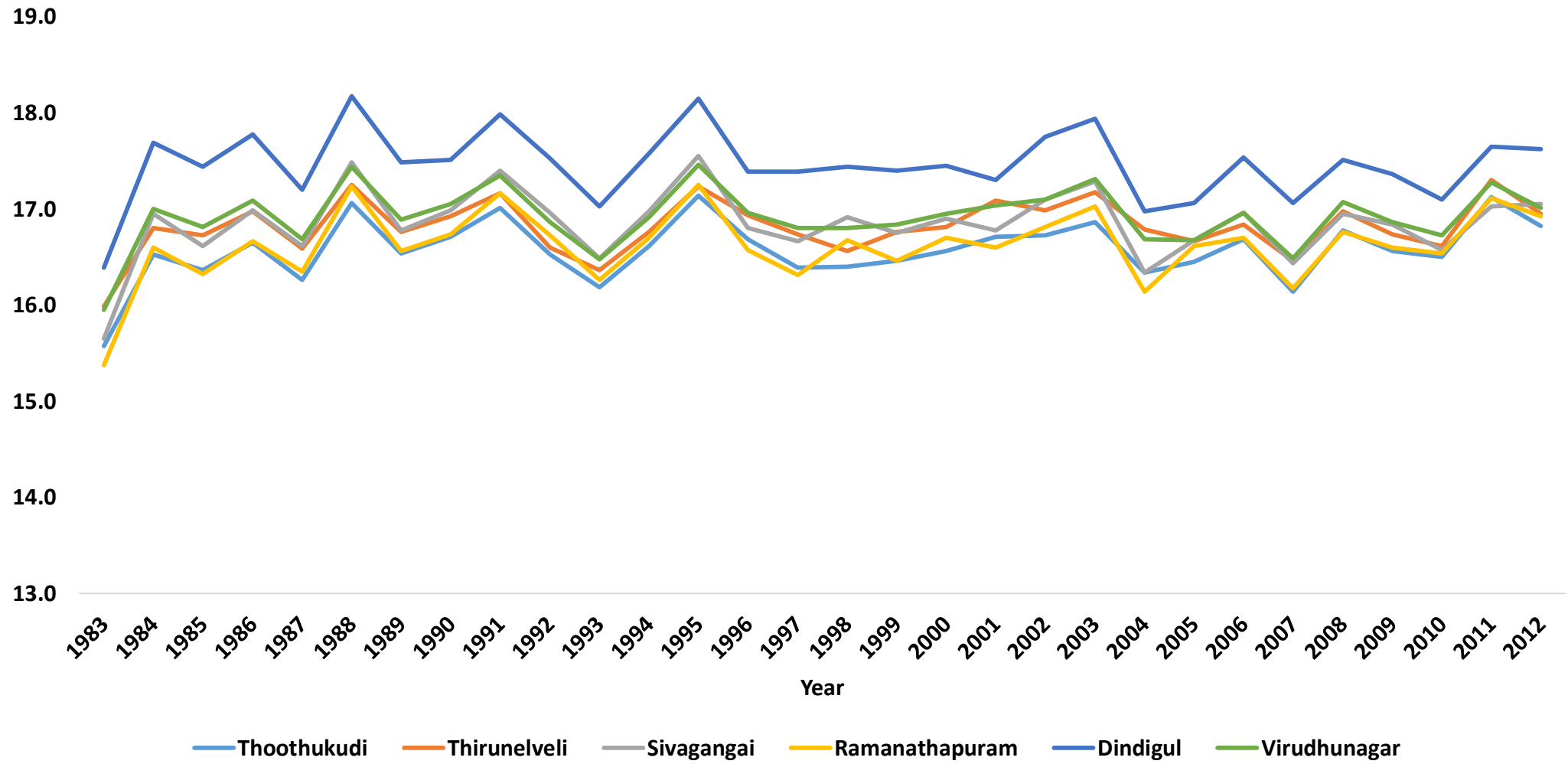


K1 Variety

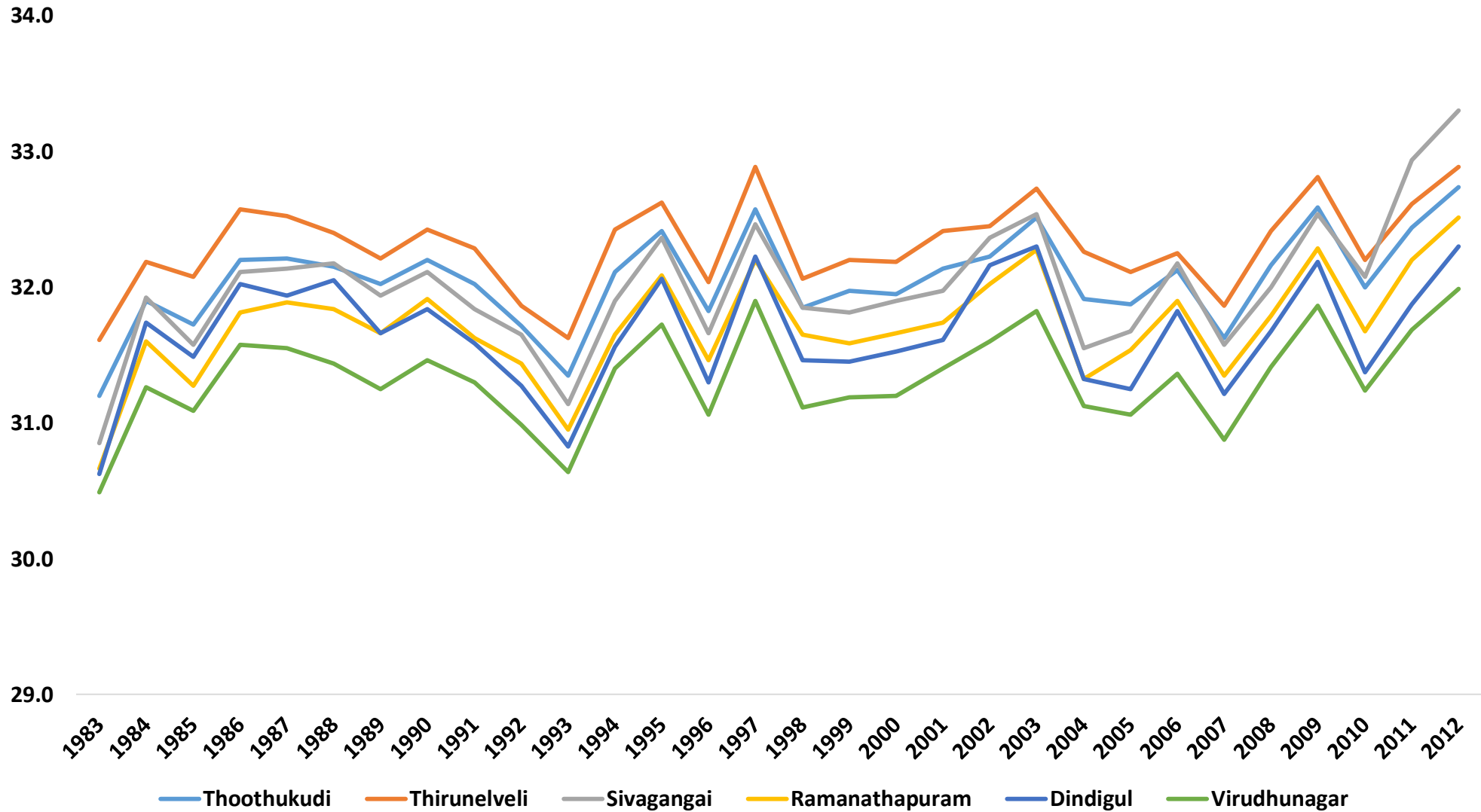
Variety name	Parentage	Year of release	Duration (days)	Dry fruit yield (t/ha)	Special features
K1 Variety	Pure line selection from an Assam type B 72 A	1964	210	1.8	Suitable for rainfed cultivation.

Results

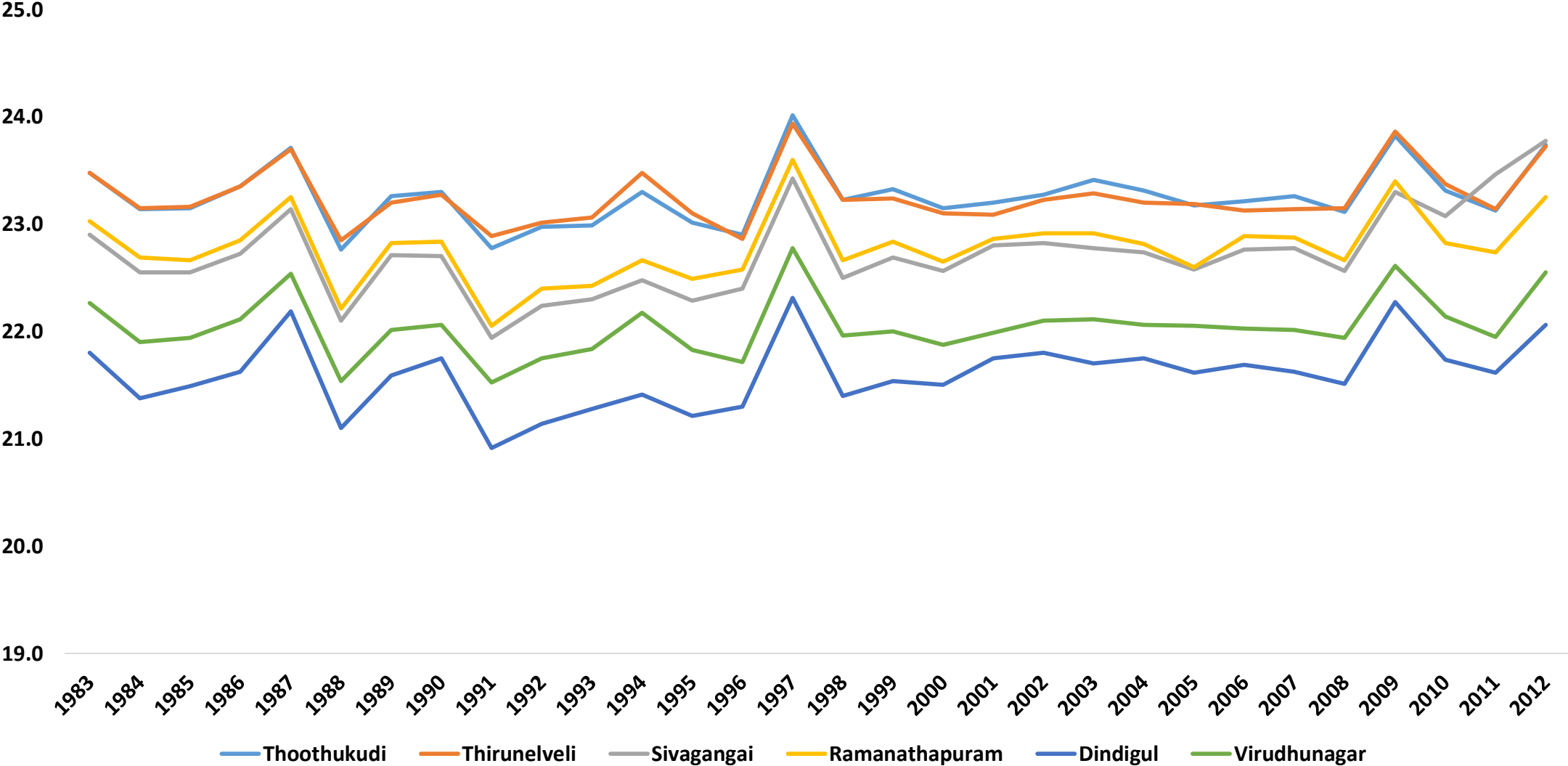
Average Solar radiation (MJ/m²/d)



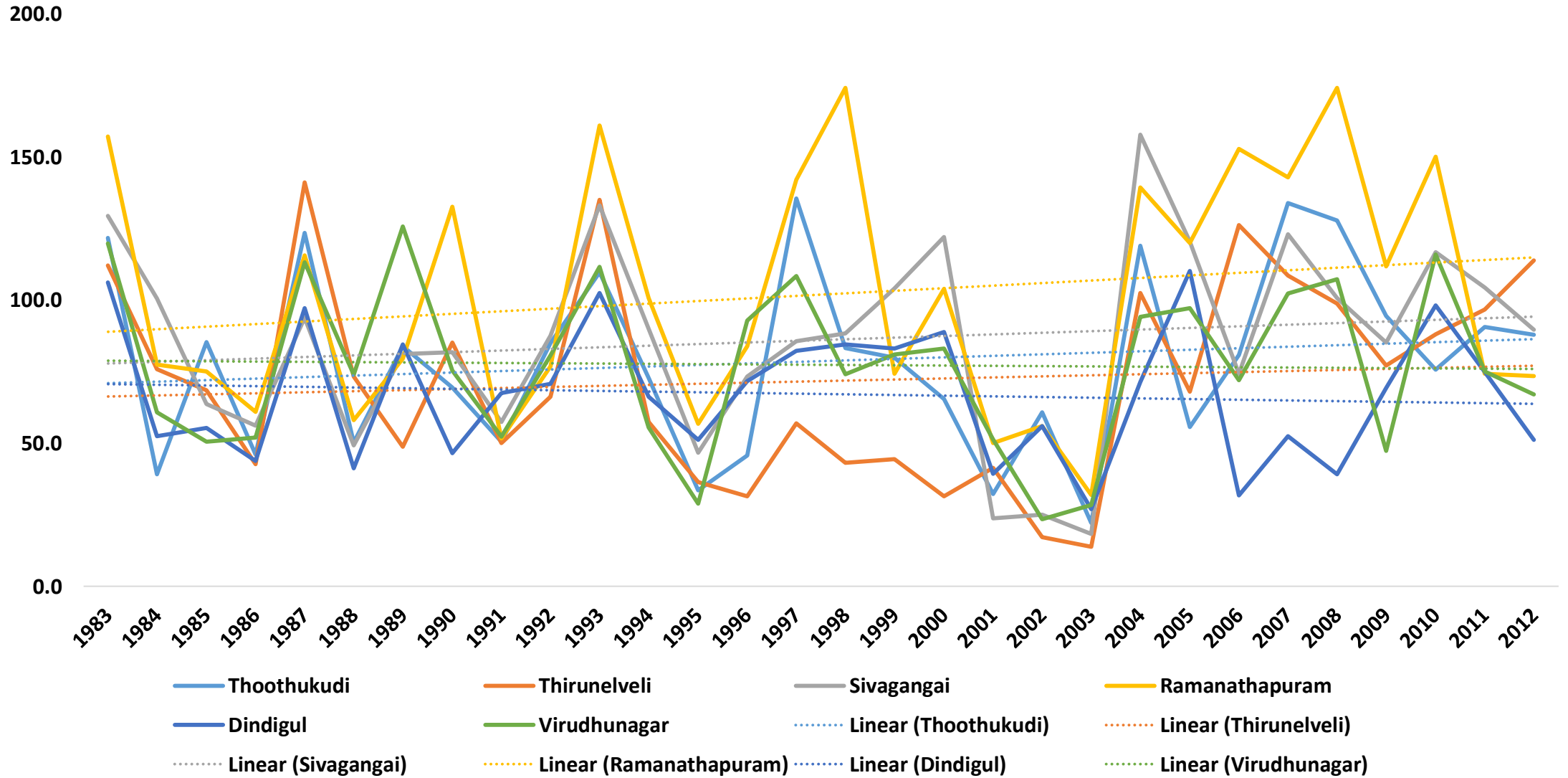
Average Maximum Temperature (°C)



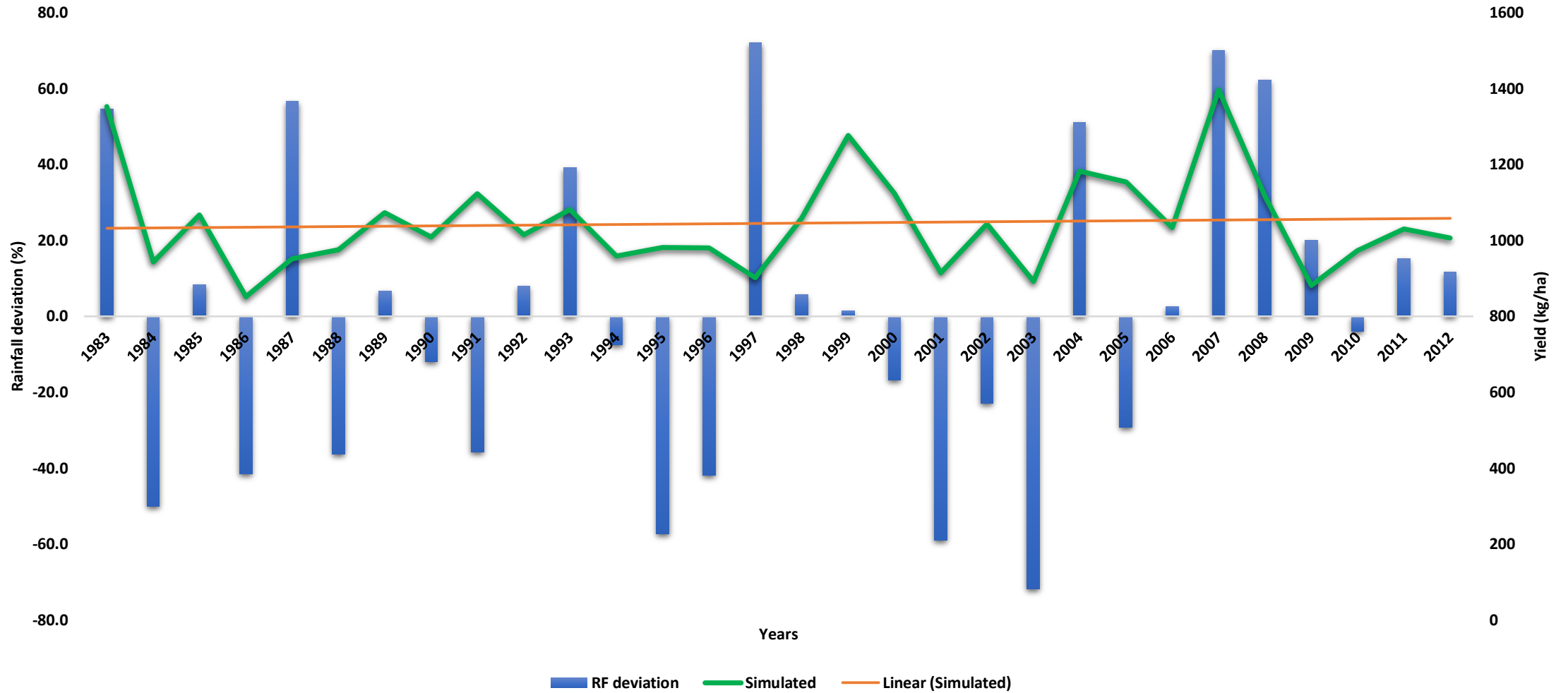
Average Minimum Temperature (°C)



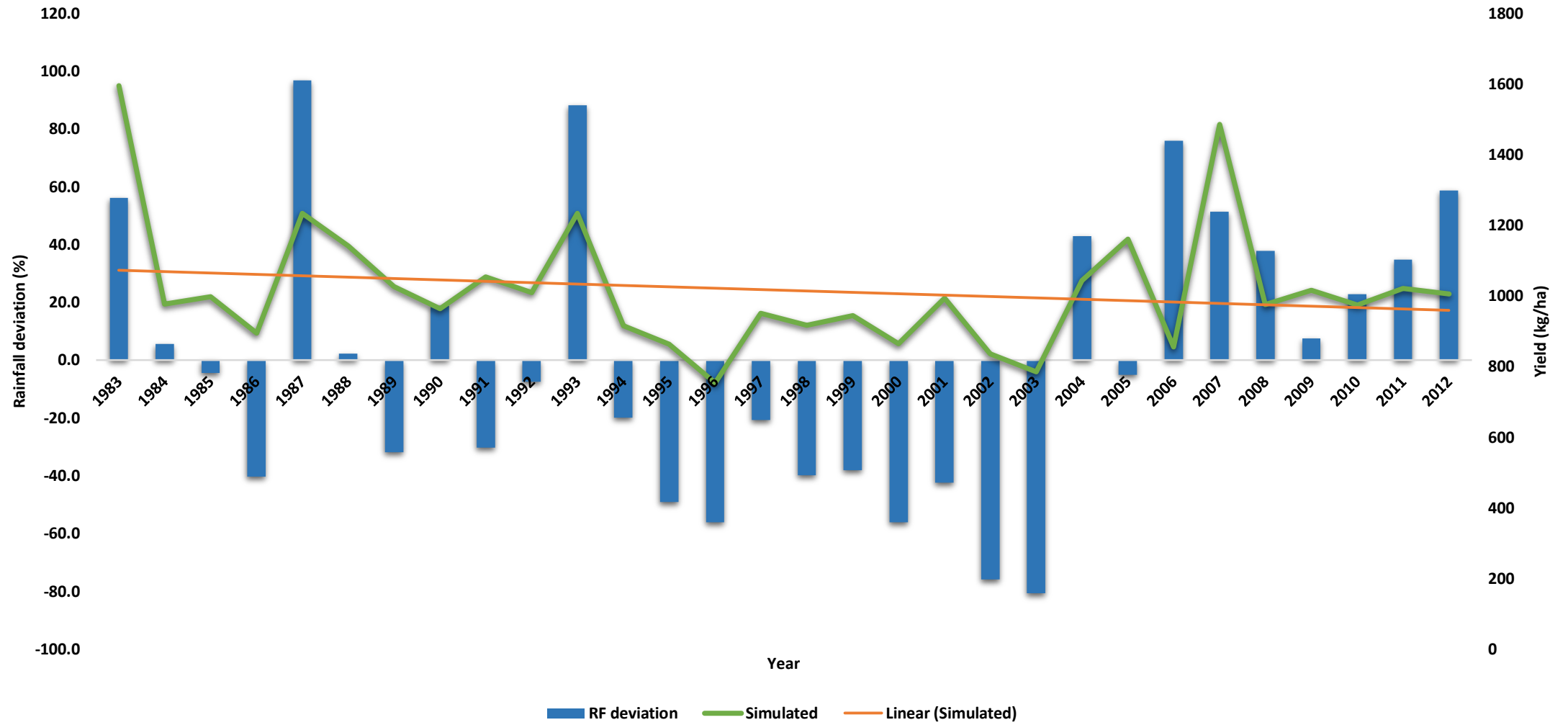
Seasonal Rainfall (mm)



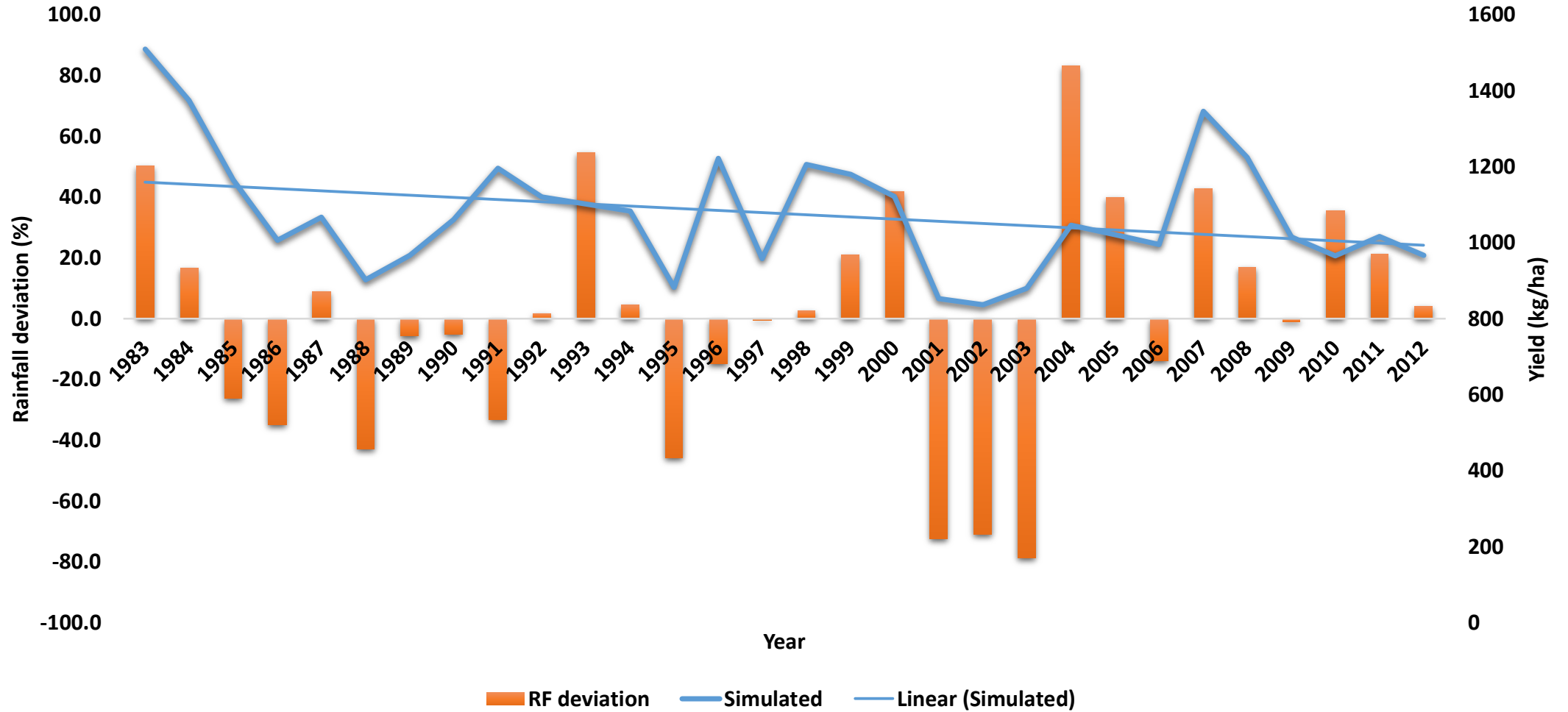
Influence of seasonal rainfall variability on chilli yield in Thoothukudi district



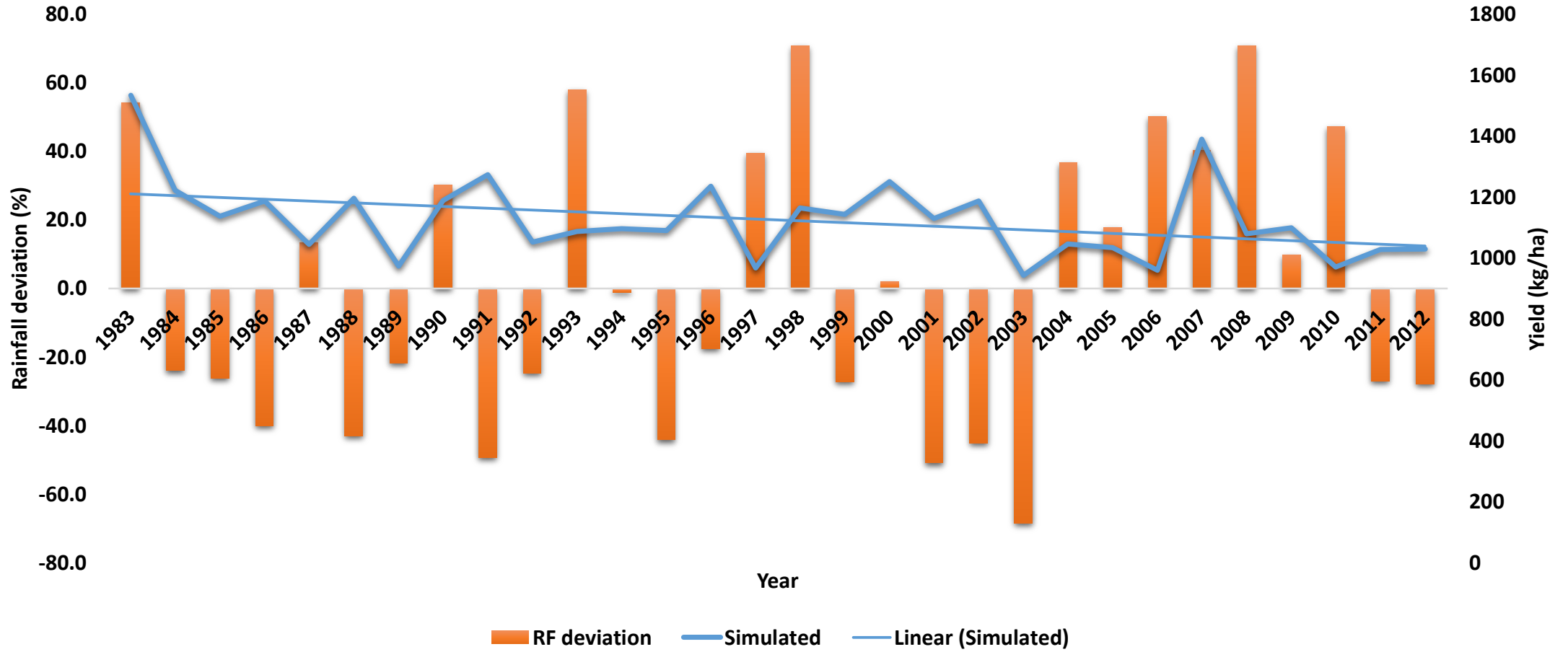
Influence of seasonal rainfall variability on chilli yield in Thirunelveli district



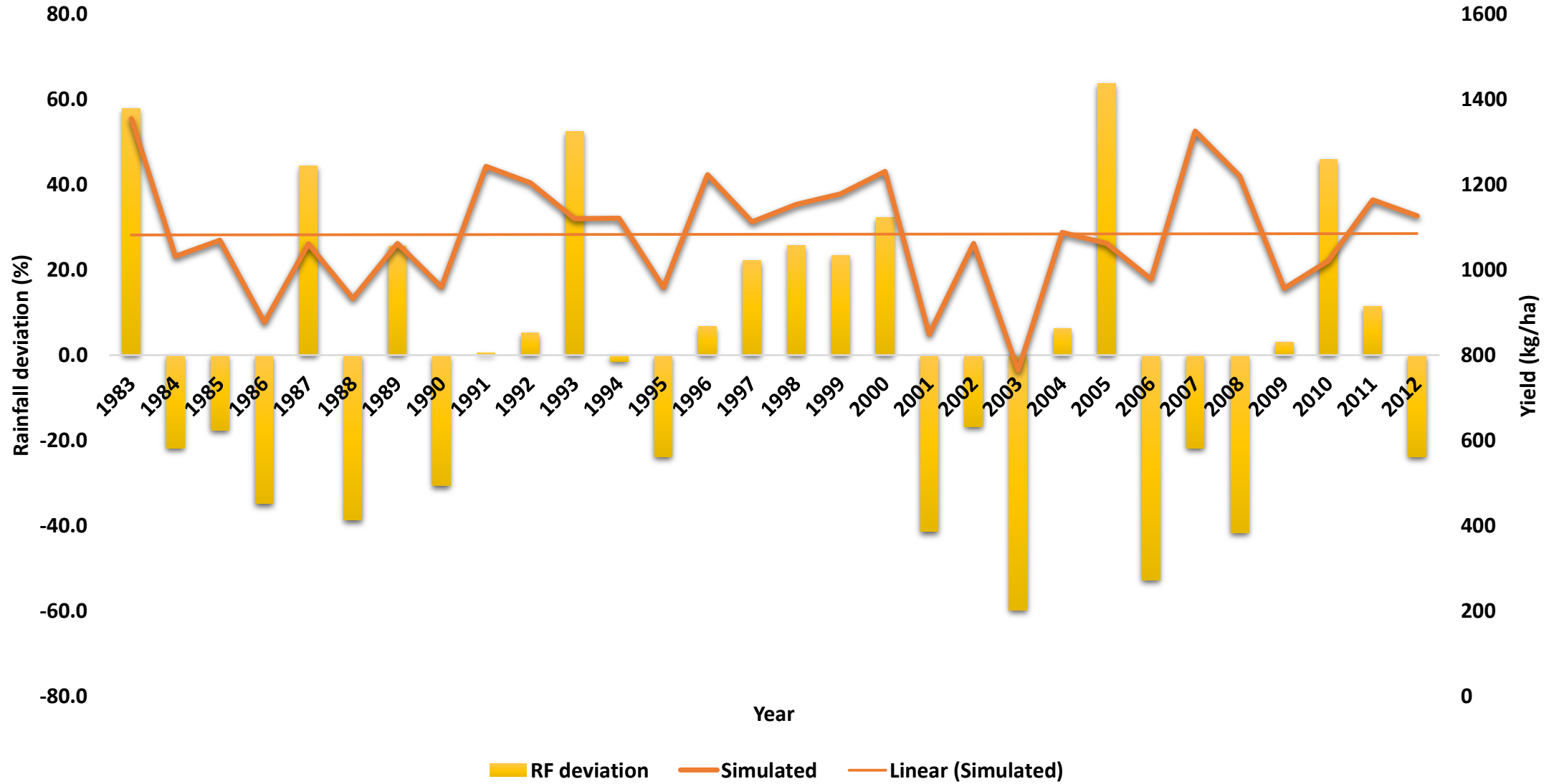
Influence of seasonal rainfall variability on chilli yield in Sivagangai district



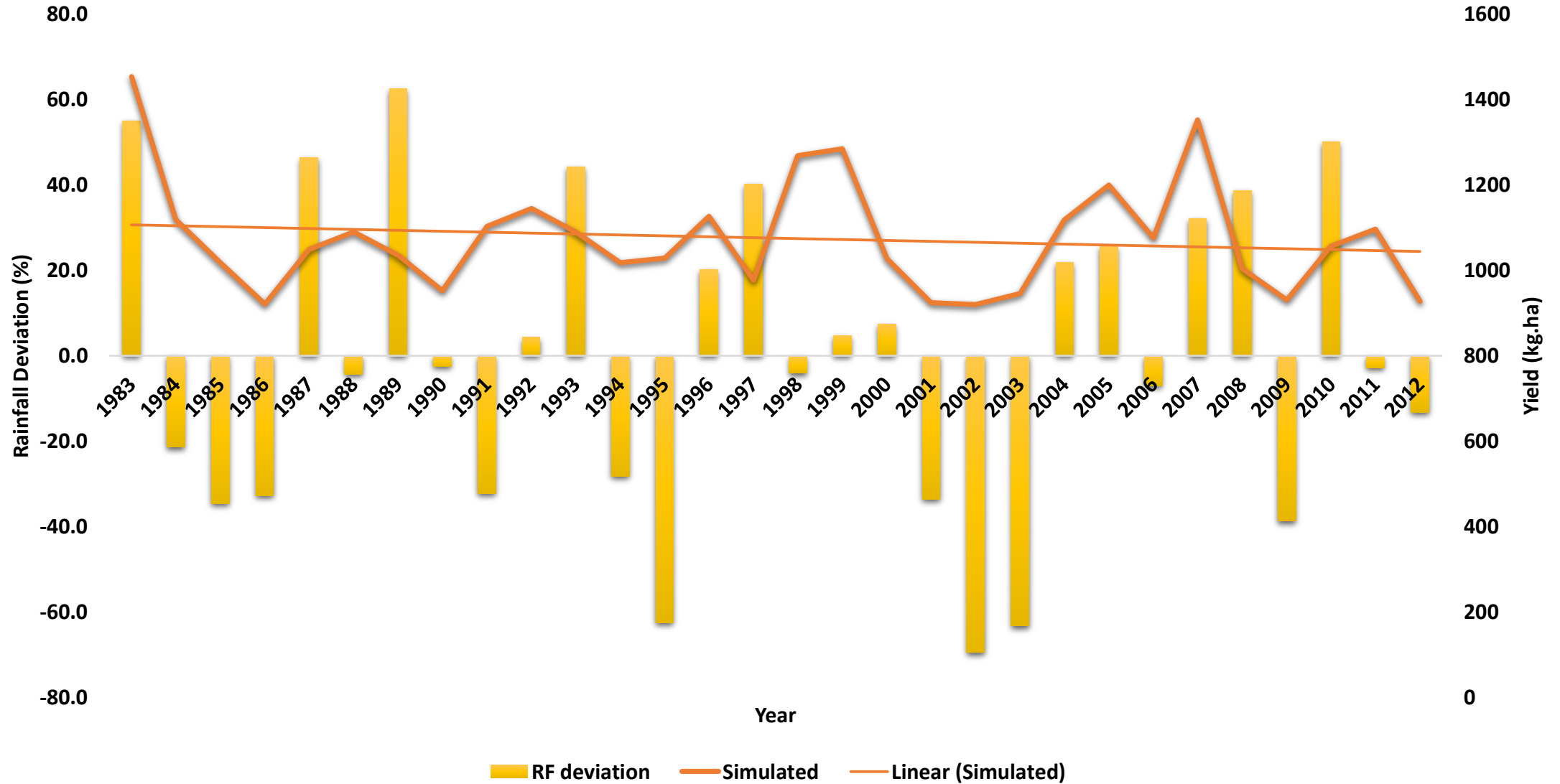
Influence of seasonal rainfall variability on chilli yield in Ramanathapuram district



Influence of seasonal rainfall variability on chilli yield in Dindigul district



Influence of seasonal rainfall variability on chilli yield in Virudhunagar district

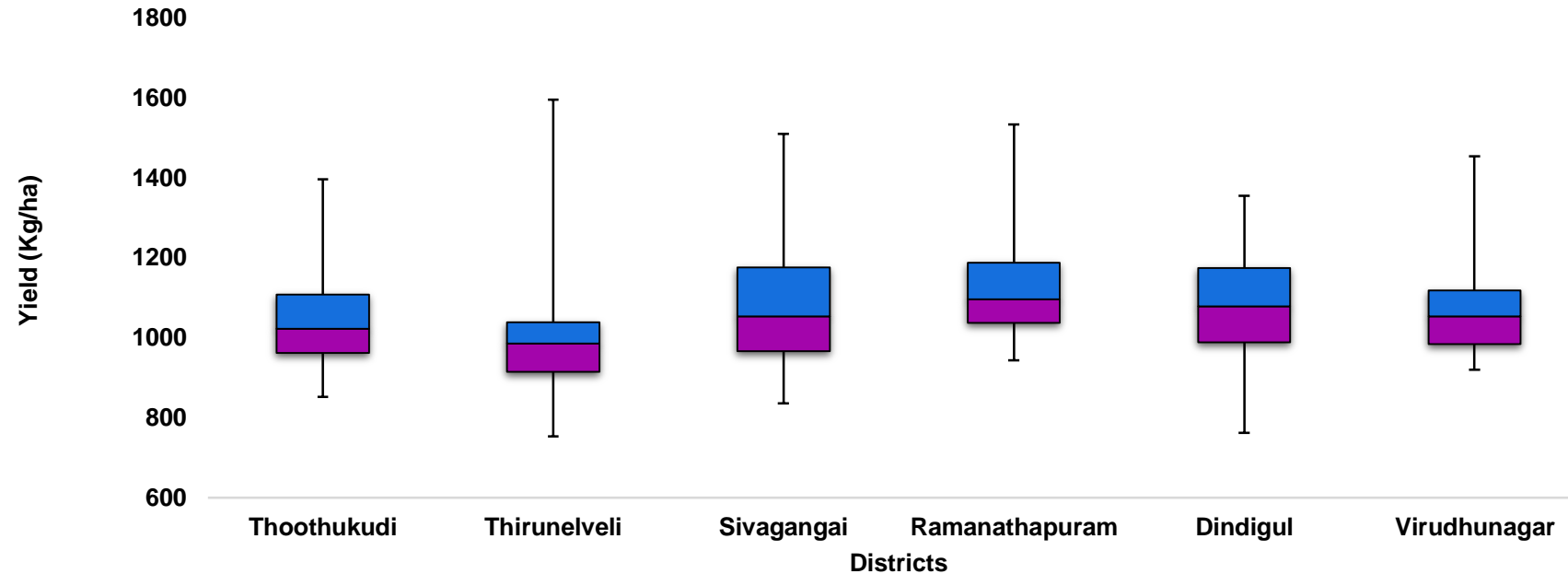


- The rainfall deviation percentage gave an insight on classifying the study into **Dry**, **Wet** and **Normal** rainfall years.
- **Ramanathapuram** and **Thirunelveli** districts have resulted in more dry years with 14 and 13 years, respectively.
- 11 wet years have been in **Virudhunagar** district followed by 10 wet years in **Thirunelveli**, **Ramanathapuram** and **Dindigul** districts.
- **Thoothukudi** and **Sivagangai** districts have experienced normal seasonal rainfall in 13 years, being the highest.

Association between seasonal weather parameters and the simulated crop yield

District	Pearson correlation coefficient, r			
	Between seasonal weather parameters and simulated yield			
	Rainfall	Solar radiation	Maximum Temperature	Minimum Temperature
Thoothukudi	0.5	-0.5	-0.6	-0.2
Thirunelveli	0.6	-0.6	-0.5	0.1
Sivagangai	0.5	-0.5	-0.6	-0.2
Ramanathapuram	0.1	-0.4	-0.5	-0.2
Dindigul	0.5	-0.4	-0.6	-0.2
Virudhunagar	0.5	-0.6	-0.7	-0.2

Impact of climate change on chilli crop yield of major chilli growing districts of Tamilnadu



- Sivaganga and Dindigul - **good yield.**
- Ramanathapuram, Thoothukudi and Virudhunagar districts - **moderate performers**
- Tirunelveli - **least.**
- Northern part of Ramanathapuram, Sivaganga, Virudhunagar under medium rainfall events
- Central and Southern parts of Ramanathapuram, Sivaganga, Virudhunagar, Thoothukudi and Tirunelveli districts were indicated a low rainfall events (Pandian *et al.*, 2016)
- Dwindling monsoon and improper irrigation facilities - lower productivity in the dry tracts.

Conclusion

Impact of climate change over chilli production in major chilli growing districts of Tamilnadu:

- **Sivagangai and Dindigul districts - performed well in 30 years (1983-2012).**
- **Ramanathapuram, Thoothukudi and Virudhunagar districts - moderate performers**
- **Tirunelveli - least.**

Questions?



**Be weather wise; Otherwise; Not wise.....
-Agro Climate Research Centre, TNAU**

Thank you.....