

# Connecting seasonal forecasts and crop models to help on-farm decisions

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The Africa Climate Conference 2013 (ACC-2013)  
15-18 October, 2013 - Arusha, Tanzania



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# Rationale

- Agriculture is sensitive to climate variables/variability
- Operational decisions are made according to weather forecasts (*e.g.* TV) – *short term*
- Strategic decisions are made according to climate projections – *long term*
  
- Tactical decisions could certainly benefit from seasonal forecasts – *medium term*

# Objective

(How) Can we use seasonal forecast information to identify *efficient* agricultural decisions?

# Methodology

- APSIM crop model
- Hindcast as a *perfect* forecast
- Sowing date window (end OCT until end JAN)
- Fertilisation amounts (0 to 150 kg/ha)
- Optimise yield (want more) and esw (want less)

# Forecasts (*Hindcasts*)

- Seasonal forecasts (3-4-ish months)

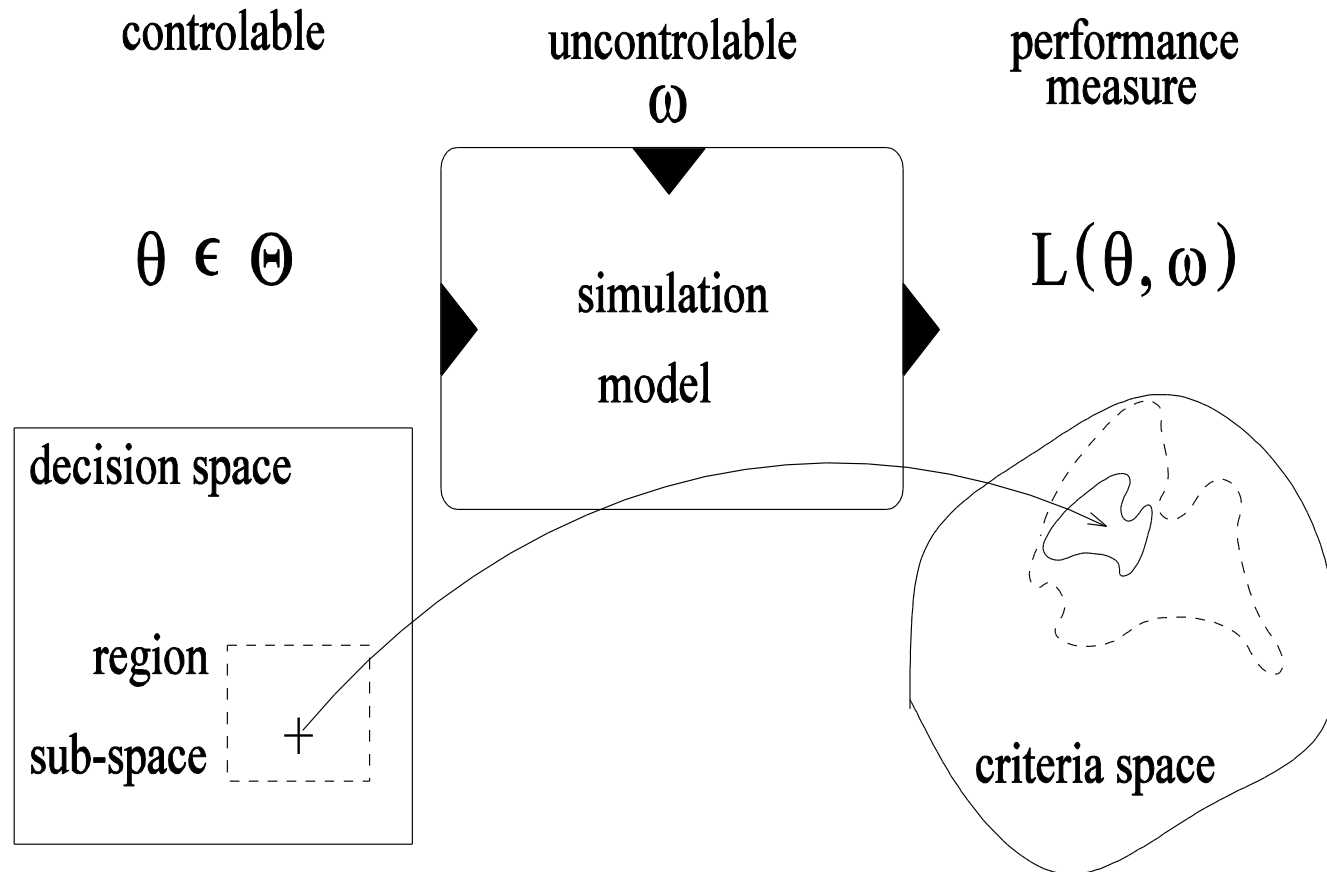
Projected SSTs force a climate model

Skill is obviously critical, but

our focus here is the usefulness of seasonal forecast for agricultural decision making

- Let's use seasonal forecasts based on *observed* SSTs
- 10 different initial condition sets

# Crop model simulation

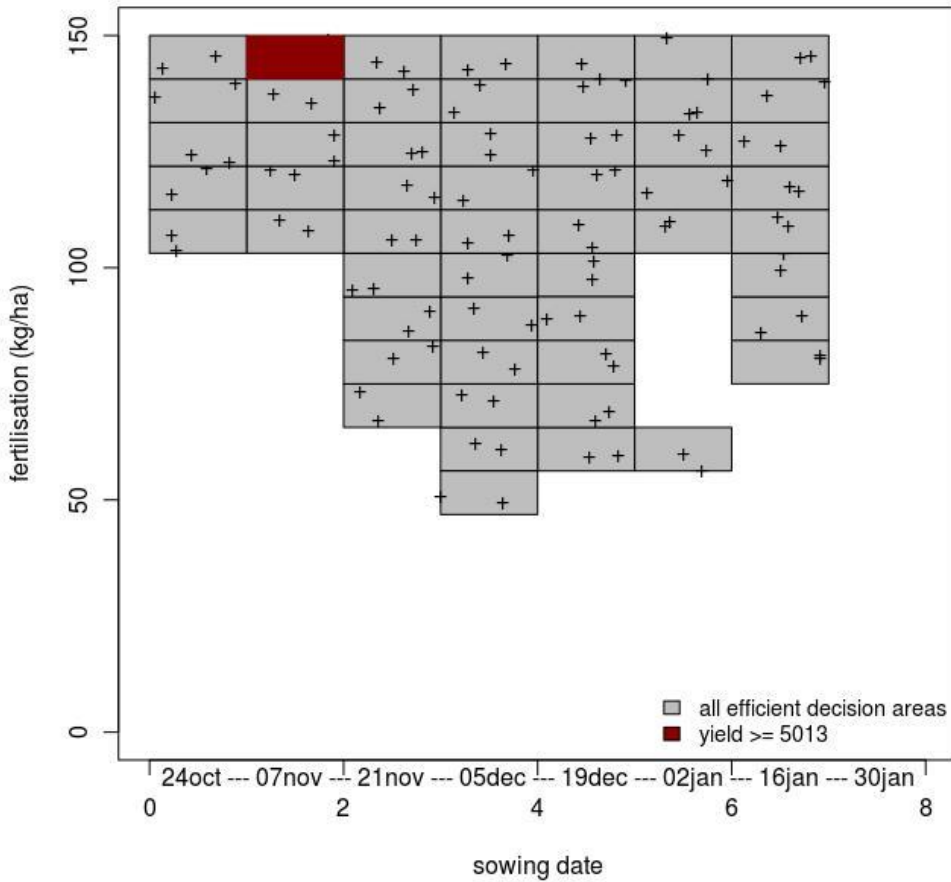


# In a perfect (simulated) world

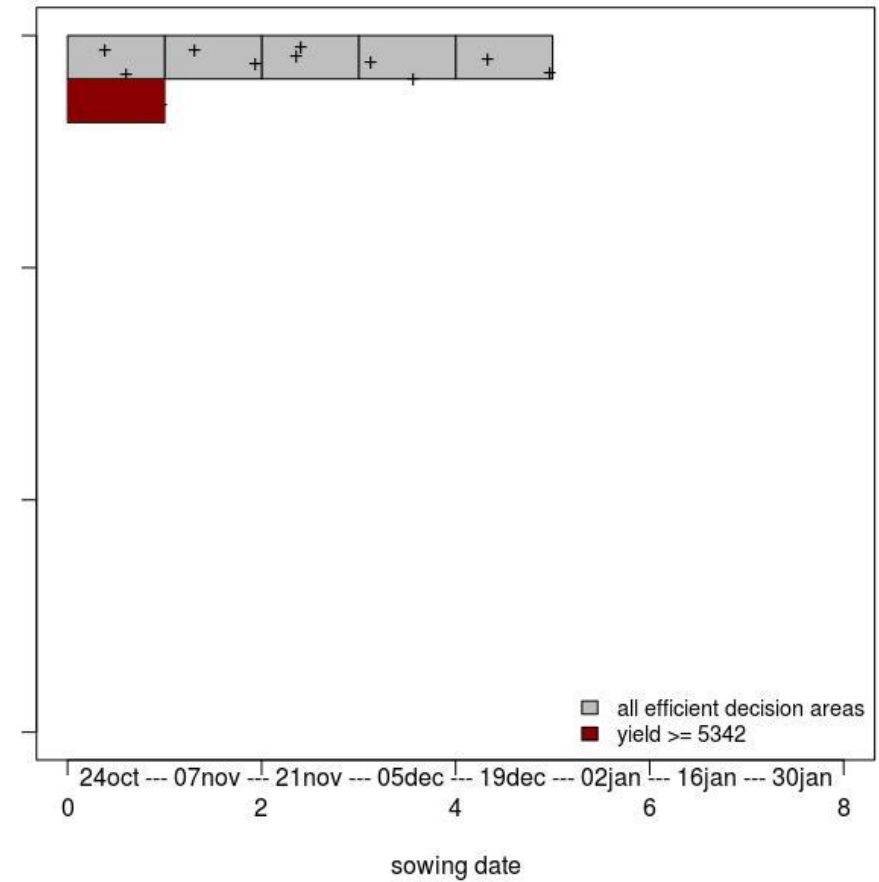
- We have a crop model satisfactorily set up for our farm
- We have seasonal forecast information for the coming season (3-4-ish months)
- We wonder about sowing date and fertilisation
- We push the button, and ...

# Approach outputs

Bethlehem 1993



Bethlehem 1994





# Assessing usefulness

	N Fert.	150 kg/ha		100 kg/ha		50 kg/ha		0 kg/ha	
year		Y	ESW	Y	ESW	Y	ESW	Y	ESW
<b>Bethlehem</b>									
1993	OCT	5246.6	110.5	5232.6	112.0	3831.4	238.6	774.3	239.7
	NOV	4663.3	76.5	4559.3	137.1	2808.4	193.4	292.0	209.0
	DEC	4900.2	70.4	4854.3	115.5	3177.6	152.6	937.6	194.9
	JAN	0.0	136.5	0.0	153.8	0.0	158.7	0.0	191.7
1994	OCT	5197.9	158.3	5139.2	158.6	3649.0	222.1	412.1	231.3
	NOV	4377.2	79.2	4353.7	159.7	2816.4	208.4	158.7	234.7
	DEC	4819.1	34.5	4164.2	99.5	2462.5	145.8	119.5	210.0
	JAN	258.2	133.3	252.2	134.1	243.1	140.5	4.9	183.9

# Conclusions

- Crop model simulations are sensitive to seasonal forecast information
- Results suggest that simulated *efficient* decisions can take part in the crop decision making process

**But beware:  
actual forecasts come with  
lack/seasonInconsistent/ifAny... skills.**

Thanks for the opportunity to come  
and speak in Arusha today :



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