The New Zealand Institute for Plant & Food Research Limited

How do these field trial results apply at a regional scale?

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Using computer models to produce maps

- Computer models are helpful for estimating crop yields in areas where there is no experience growing the crop
- Computer models are helpful for long term planning for biogas production

Predicting potential sorghum yield for Hawke's Bay

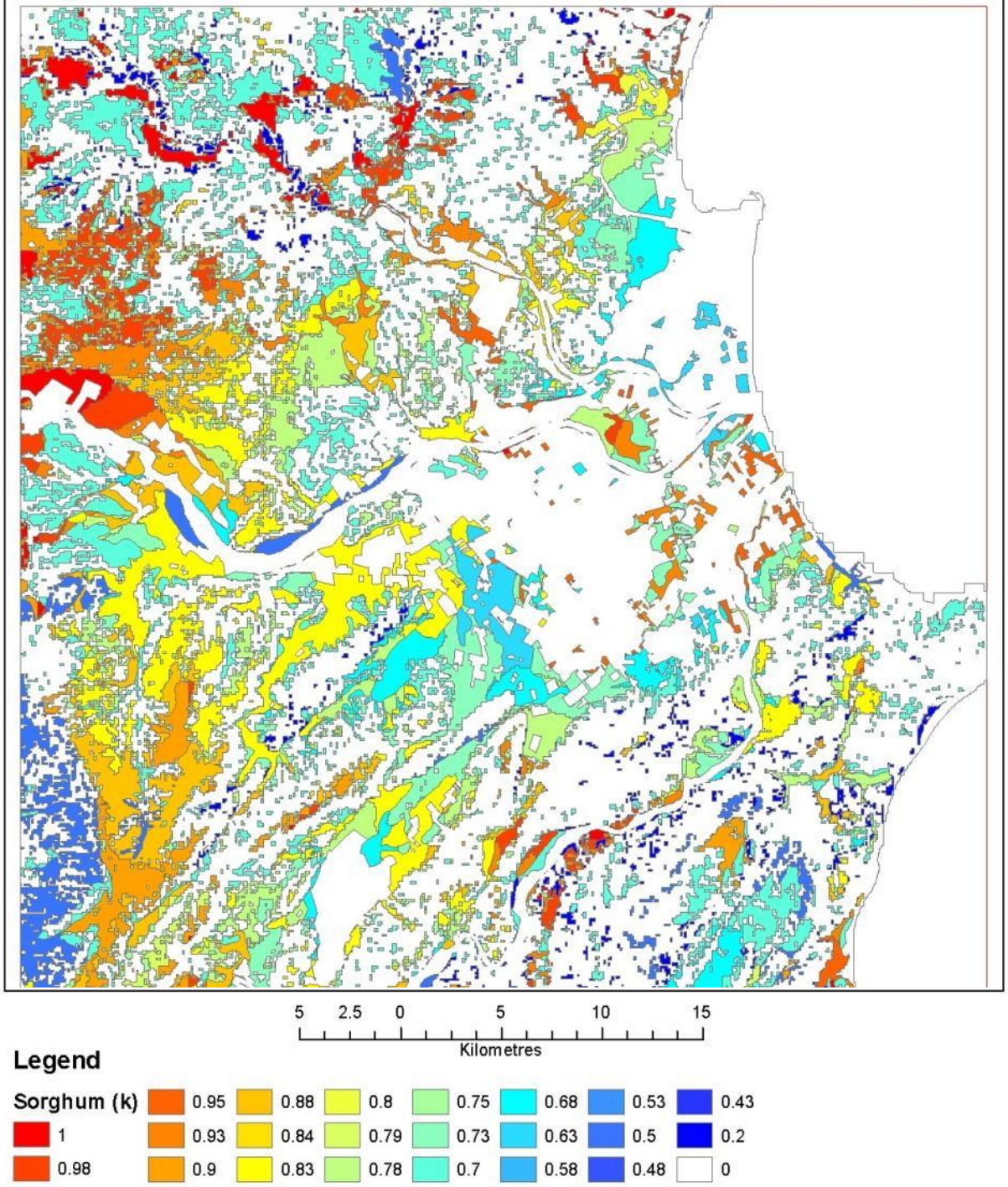
- Use APSIM (a computer model developed in Australia, and modify it to suit New Zealand conditions)
- Use long-term weather data and run simulations over 21 years
- Plant 17th Nov, harvest 22nd March.
- Predicted yields ranging from 18 – 32 tDM/ha
- Long-term average yield was 26tDM/ha

Converting potential yields into a regional map

- We know the potential yield that can achieved in good soil. To estimate how these yields apply across a range of environments we use the Land Resource Information System (LRIS) database
- The LRIS database has information on
  - Current land use
  - Growing degree days
  - Soil water-holding capacity
  - Erosion risk
  - Slope
  - Stones and rocks
  - Drainage
  - Salinity and pH
- From this information we make up rules about how much these factors reduce potential yield. We call this a crop suitability co-efficient, k. The lower k, the less suitable the land.

Map of suitability of Hawke's Bay for sorghum

The average suitability co-efficient for the region is 0.72



Converting potential yields into a regional map

Scaling the potential yield of 26 tDM/ha for sorghum by 0.72 gives 19 tDM/ha as an average regional yield.

Adding in 10t/ha for tick beans gives 29 tDM/ha/year

Using the figures from Huub's talk of 8,000 m^3 methane/ha (from a 27 tDM/ha) we get a net energy gain of 210 GJ /ha

Assuming Hawke's Bay farmers put 10% of their suitable land area in biofuels crops, that's enough for 12% of rural New Zealand's transport fuel requirements

Nitrogen use

	Sorghum with 100 kgN/ha	Sorghum with 200 kgN/ha	Maize silage*
Yield (tDM/ha)	27	27	28
N content (%)	0.75%	1.2%	0.96%
N uptake (kgN/ha)	203	300	270

*Source: Lincoln Farm technical manual

We didn't need more than 100 kgN/ha to grow a large crop

Comparing digestate with ammonium sulphate

Average of 100kgN/ha and 200kgN/ha plots

	Digestate	Ammonium sulphate
Yield (tDM/ha)	25	25
N content (%)	0.79%	0.96%
N uptake (kgN/ha)	195	237

Uptake of digestate was **82%** of that of ammonium sulphate