Comparing Farm Sustainability: Sustainable Intensification (SI) Benchmarking Tool

Paul Wilson, Mark Reader, Ben Lang, Ian Hodge, Rachel Lawrence and Stephen Ramsden

Context

- Sustainable Intensification (SI) concept different to SI implementation, assessment or management

- Multiple metrics and indicators – can lead to greater complexity = greater data demands

- Management of activity, within a scientific field, requires metrics

- Measure everything (run-off, emissions, bird numbers, £, NPK)?

- Measure some things – and augment from known data / approaches?

- Concept – how can we measure, and manage, while reducing data burden for managers?

- Benchmarking = objective comparison with others – identity areas to change

Augmentation Approach

- Used Farm Business Survey (FBS) data, SIP partner models *e.g.* Farmscoper and IPCC Tier 1 coefficients

- Results from example FBS data set show considerable variation across the indicators from Farmscoper

- The approach is not perfect, but a (modelled) simplification of reality [all models are wrong – some are more useful than others]

- Unit of Measurement (UoM) or **Functional Unit** (FU) matters – **per ha, per kg, per calorie**?

- GHG – per kg or calorie?; Nitrate leaching – per ha?; Biodiversity – per farm?

- SI Benchmarking site based on experience from www.farmbusinesssurvey.co.uk

SI Benchmarking

benchmarkmyfarm.co.uk :

• Allows you or your group to identify Sustainable Intensification (SI) opportunities that exist and are appropriate to you:

– **environmental**

– **social**

– **economic**

• Uses key metrics for SI derived in SIP1

• Uses high quality source of data from the Farm Business Survey (FBS)

• Allows group members to share data

Metrics of SIP

Headline results:

(Peer match)

- Carbon (related to output)
- Ecology (features and techniques)
- Land use (diversity index)
- Fertiliser (related to output)
- Social (mainly opportunities for meeting people)

Peer Benchmarking

- Enter cropping, stocking and county, to 'define your farm'

- SIP Benchmarking searches 2000 farms in the FBS dataset

- And identifies similar farms - Calculates peer results

  - Results within 1 standard deviation of my farm or

  - Minimum of 25 farms

- Comparison is unique to your farm

- This method avoids simplistic farm classifications

Match to Similar Farms

Visitors see averages of 'all FBS' – without any data entry

Visitors see number of farms in FBS with this measure present

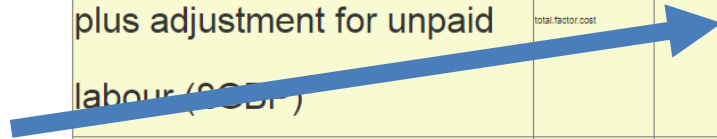**Sustainable Intensification Benchmarking**   Dashboard   About/Contact   Hello, mark.a.reader58@gmail.com!   Log off

SIP: Match to my peers   Select Results   ▾ | *The Peer Match section identifies the group of farms within the Farm Business Survey that are most similar to your farm business. These are selected mainly on the basis of cropping and stocking. This method has the advantage of accommodating and comparing a very wide range of farm businesses without imposing artificial classifications that may not be relevant to your farm.*

Sustainability Measure	[code name]	Average of Comparison Farms	Graph my Performance	Number of Farms With	My new value	MyFarm
Winter wheat area (ha)	winter.wheat.area	26		560		0
Winter barley area (ha)	winter.barley.area	6.39		337		0
Spring barley area (ha)	spring.barley.area	5.62		330		0
Oat; rye; triticale area (ha)	other.cereals.area.cam	3.91		250		0

Complete details

- Land use
- Stocking (if any)
- Inputs/Outputs
- Social/Ecosystem

Visitors see results for 'closest matches in FBS' – without committing any data

Total farm business costs plus adjustment for unpaid labour (SOBI)	total.factor.cost	144,624		33	140,000
Diesel (litres)	FuelOil_litres	11,985		32	12,000
Petrol (litres)	PetrolUL_litres	2,310		30	2,000
Gas (kWh)	Gas_kWh	†		5	0
Electricity (kWh)	Electric_kWh	11,580		33	12,000
Straw off farm (t)	StrawOffFm_t	†		3	0
Cereal production (t)	CerProd_t	501		33	600
Pea & beans production (t)	PeaBnProd_t	17		16	20
Oilseed production (t)	OilseedProd_t	57		21	80

Progress bar gives indicators

View Summary and/or Explore dropdowns

Alert if you're in extreme quartiles (except in 'Social')

Feasible to view "histogram" of where you fall in distribution of peers (non-disclosive / censored)

Sustainability Measure	[code name]	Average of Comparison Farms	Graph my Performance	of Farms With	My new value	MyFarm
Fuel CO2 equivalent emissions (tonnes/year)	FUEL_CO2eqT	43		33		41
CO2 equivalent emmissions from N fertiliser (tonne/year)	NitrogenFert_CO2eqT	119	💡📊?	31		200
Electricity CO2 equivalent emissions (tonnes/annum)	ELECTRIC_CO2eqT	6.37		33		6.60
Grazing livestock CO2 emissions equivalent (tonnes/year)	GLU_CO2eqT	†		6		0
Performance ratio (£Output/£Input - for farm)(%)	performance.ratio	96%	💡📊?	33		107

Conclusion

- SI Benchmarking = multiple opportunities

- Peer benchmarking novelty

- Data quality / validity crucial – room to improve (IPCC Tiers 2 or 3)

- UoM or FU matters (**a lot**!) – different ones for different metrics

- The SIP site is sitting there – only modest investment needed to update each year from FBS data / further investment to refine and calculate (e.g. by calories / bioavailable calories).

- Thank you for your attention

benchmarkmyfarm.co.uk

Benchmarking Project Team:

Mark Reader mar58@cam.ac.uk

Paul Wilson paul.wilson@nottingham.ac.uk

Ben Lang bgal2@cam.ac.uk

Rachel Lawrence

Ian Hodge idh3@cam.ac.uk

Steve Ramsden Stephen.Ramsden@nottingham.ac.uk

Thanks to Defra and the
Welsh Government

Email Questions To

paul.wilson@nottingham.ac.uk