Supergen Bioenergy

Sustainable Biomass Supply for Future Needs

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Structure

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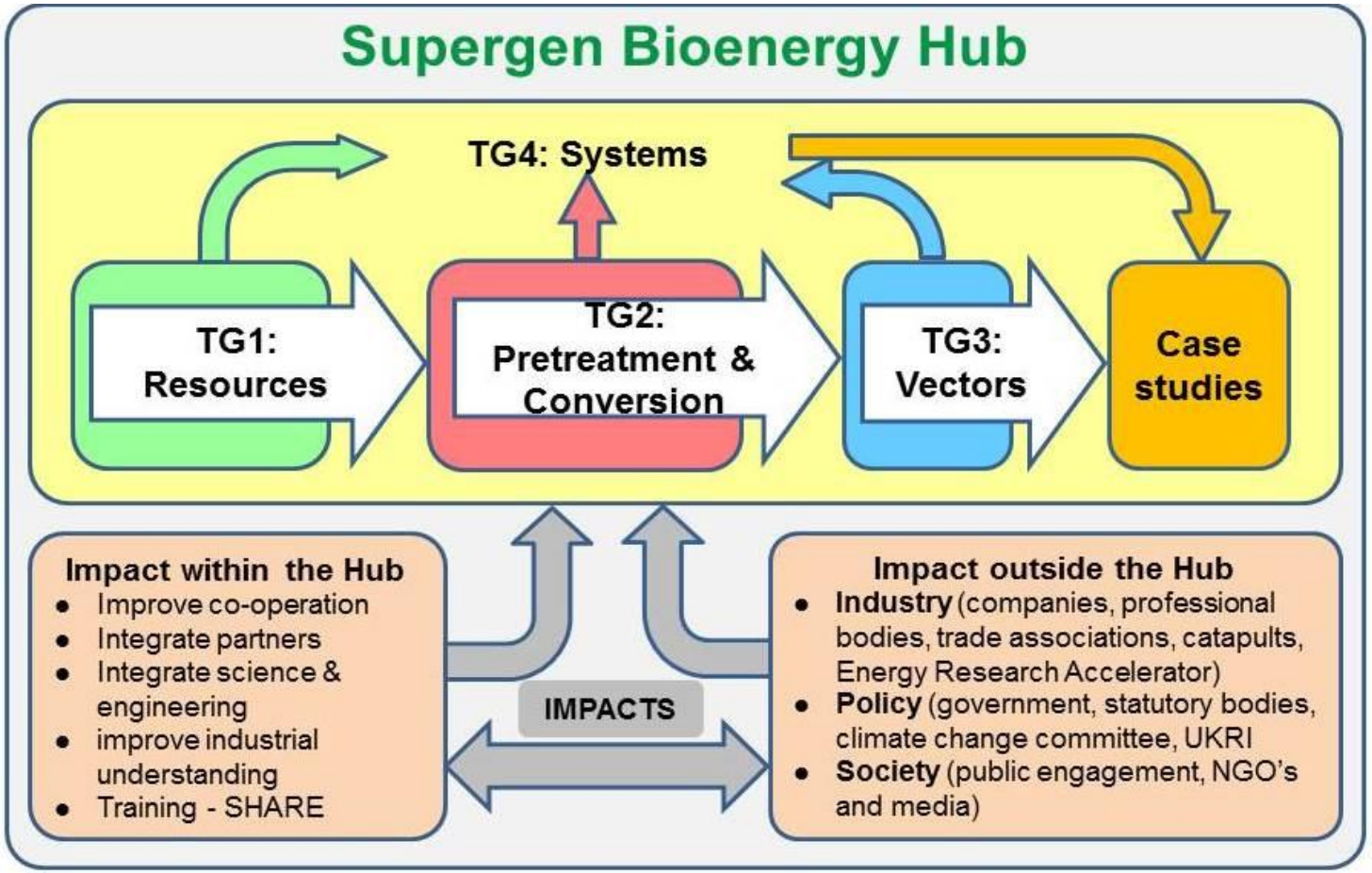

Structure

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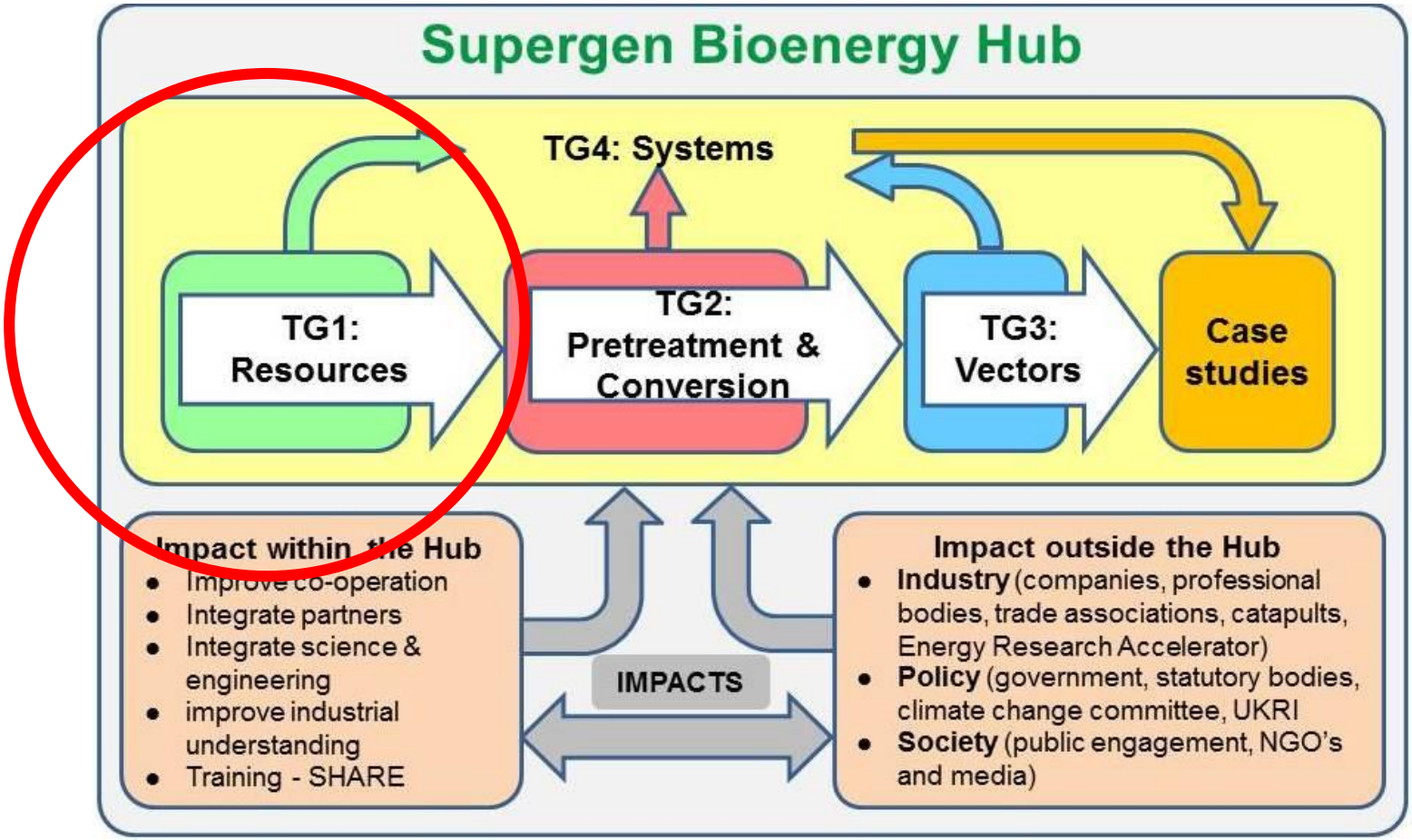

UK Bioenergy Vision

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- Up to 45% of UK bioenergy demand[1]
- 10% electricity (baseload)
- 50% heat (industrial, district, gas)
- 20% liquid fuels (aviation, shipping, heavy duty/mobile plant)

1. Welfle A., Gilbert P., Thornley P., Securing a bioenergy future without imports, Energy Policy, vol 68, 2014

UK Bioenergy Vision

Supergen Bioenergy

- 10% electricity (baseload)
  - 4.92% [1] (of 7.9%)
- 50% heat (industrial, district, gas)
  - 3.91%[1] (of 4.90 %)
- 20% liquid fuels
  - 0.83%[2] (2.95%)

1. BEIS, Digest of UK Energy Statistics, 2016 (table 6.1, 6.6)
2. DEFRA (2017) Crops grown for Bioenergy in England and the UK:2016, Nonfood Statistics.

UK Biomass Mix

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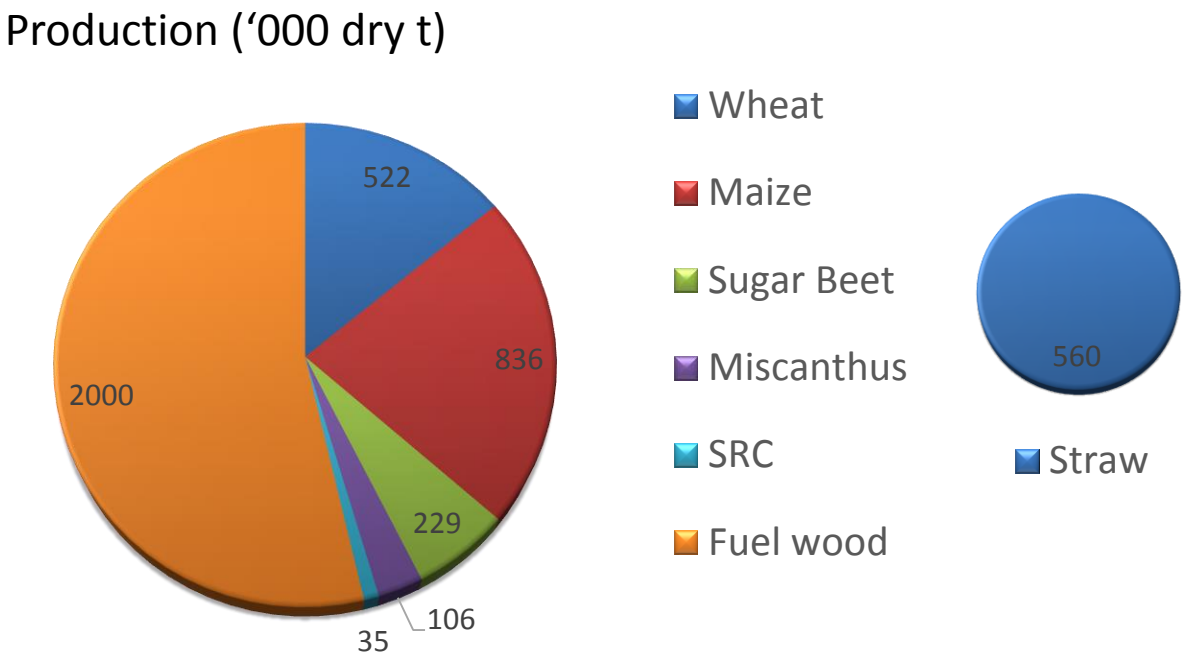
- UK grown bioenergy crops are predominantly 1st generation and Forestry



1. DEFRA (2017) Crops grown for Bioenergy in England and the UK: 2016
2. Forestry commission (2018) UK Wood Production and Trade: provisional figures 2017






1st v 2nd Generation

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- Lower input requirements per unit biomass
- Higher energy ratio (x30)
- Ability to grow on low quality land
- Higher land use efficiency
- Wider ecosystem service delivery






Sustainable Biomass

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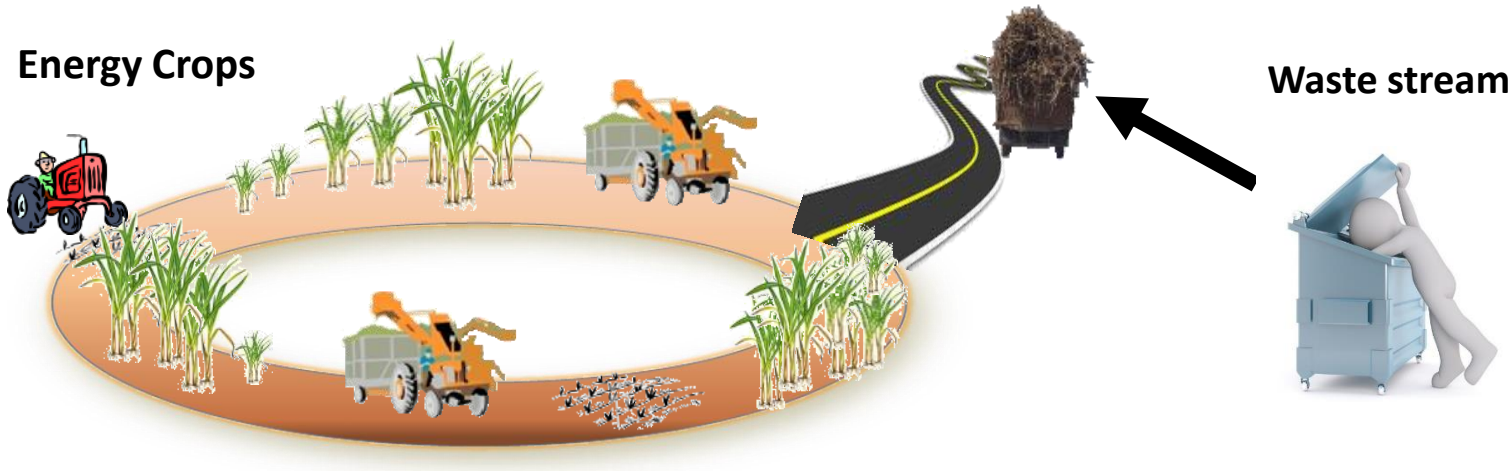
Research Questions: how can we grow biomass on lower grade land, make crops more resilient to extreme weather events, and deliver ecosystem services?

More specifically how can: **1)** energy crop establishment costs be reduced, yields be reliably increased, and waste streams be mapped and valorised; **2)** biomass be matched to end user requirements; and **3)** positive environmental benefits of energy crop cultivation, and waste management, be maximised and negative impacts be minimised?



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Task 1.1 ***Assessment of marginal land***. This task will assess the potential of marginal land beyond current agricultural policy, new crops, new varieties and agronomic practices that will validate new science and breeding targets for example by using geo-statistical modelling and linear regression models. ***Deliverable: Report, month 12.***

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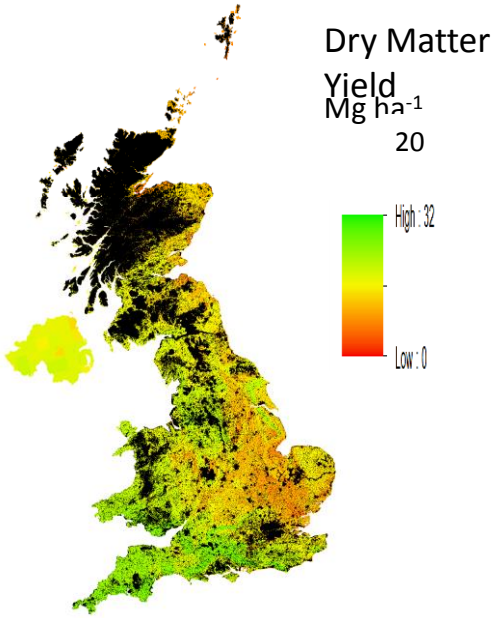
Task 1.2 Soil and climate heterogeneity. This task will improve our understanding of local soil and climate heterogeneity on crop performance by using a mixture of process based and data driven models, collating field data and exploring scales (from pot to field) and model robustness, to help inform future smart energy crop agriculture. ***Deliverable: Journal paper, month 24.***





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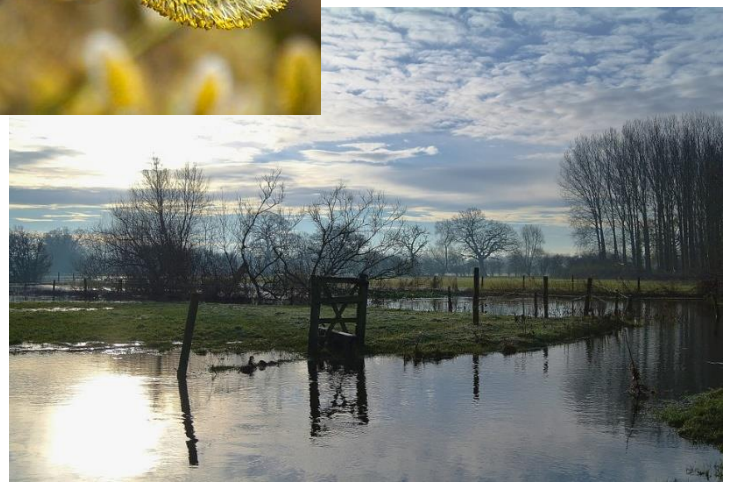
Task 1.3 Modelling eco-system impacts. Spatial models will be applied for mapping the effect of varying crop and genotype on eco-system impacts including flood mitigation, soil quality, carbon sequestration and biodiversity by building on measurements from projects such as the Supergen Challenge project MAGLUE, NERC CarboBio-Crop, and EPSRC Water Energy Food: Vaccinating the Nexus.





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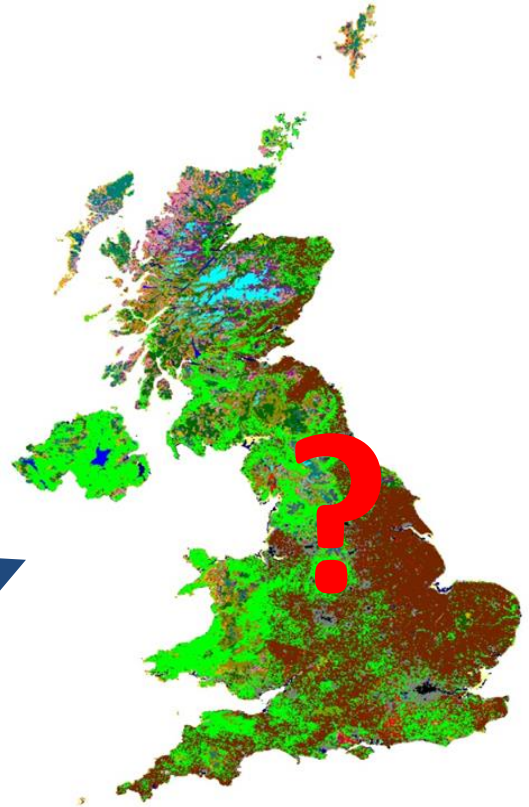
Task 1.4. Opportunity mapping. The combination of yield data, anticipated genetic improvements and climate modelling will allow us to develop opportunity maps for energy crops. Agricultural residues, landscape management and other wastes will also be mapped using data from sources such as farm business and land owner surveys, local government and industry partners. ***Deliverable: Set of maps, month 42.***



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More information

www.supergen-bioenergy.net

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