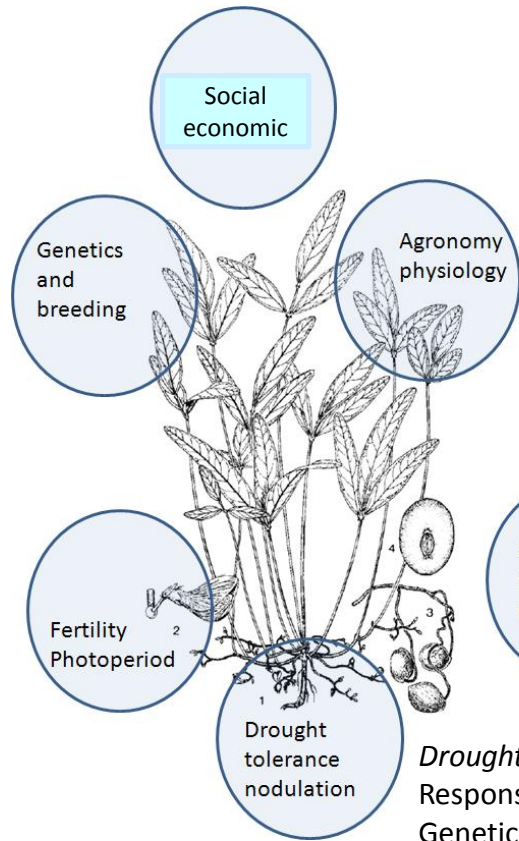
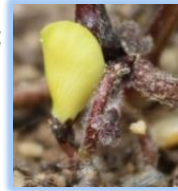


African genetic diversity; Stadler
African genetic diversity; Molojiwa
Indonesian genetic diversity; Redjeki
 Genetic mapping and domestication;
 Ahmad
Bam1-006; MAGIC breeding

Photoperiod requirement;
 Kendabie
**Bam1-009 Fertility in
 bambara groundnut**



Heat tolerance; Al-Shareef
Cold tolerance; Noah
Bam1-001; productivity and N₂ fixation
Bam1-003; adaptation to different environments;
Cleasby
Bam1-008; Canopy modelling for ideotypes

Machinery
 and
 processing

[Proposals in development;
 Perlis and UNMC]

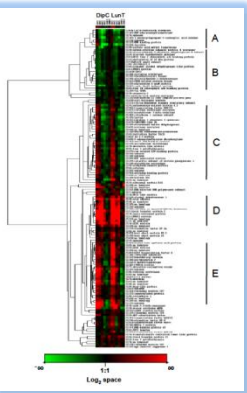
Drought response expression; Stadler
 Responses to drought; Muhamamd
 Genetical genomics of drought; Chai

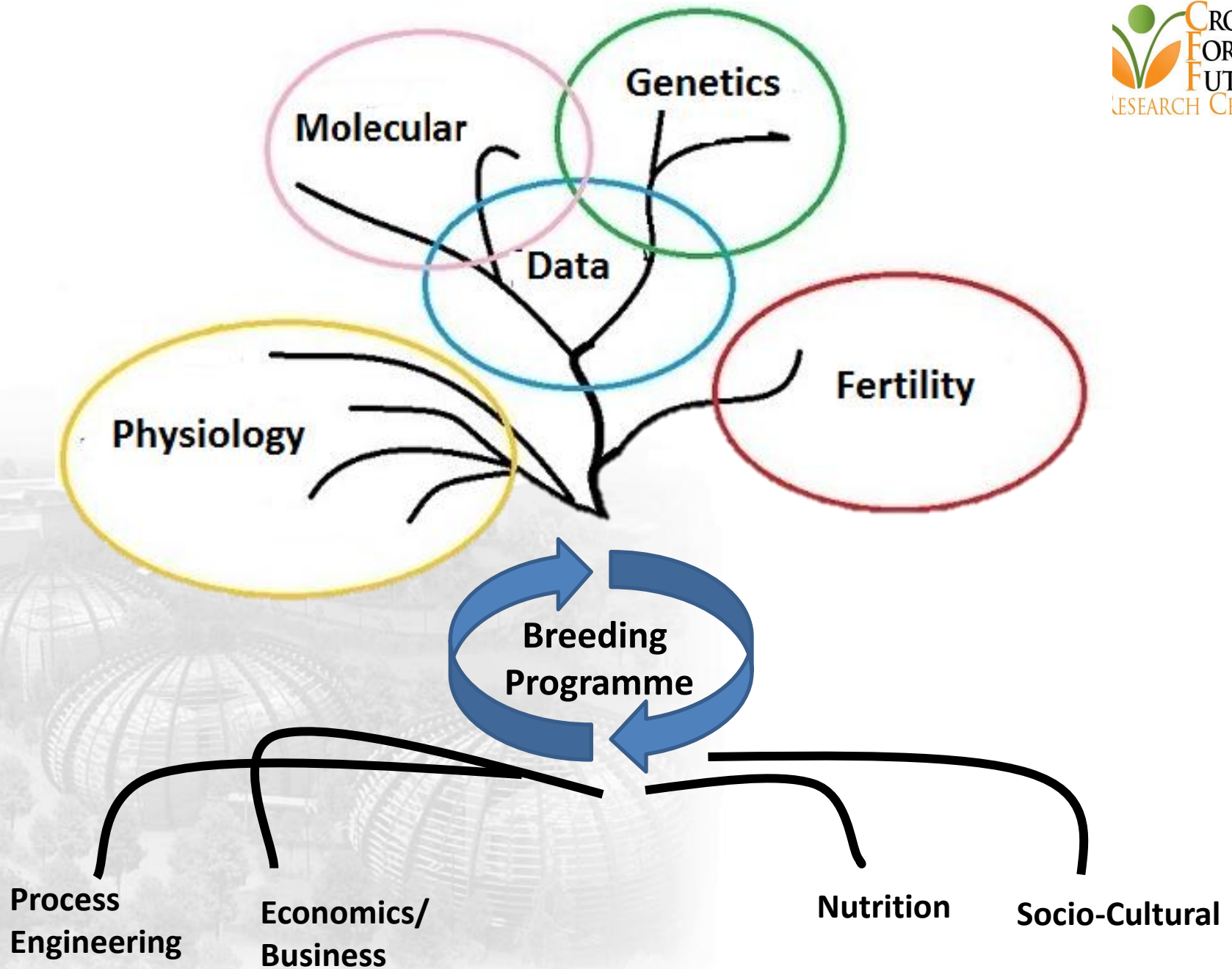


Translation projects

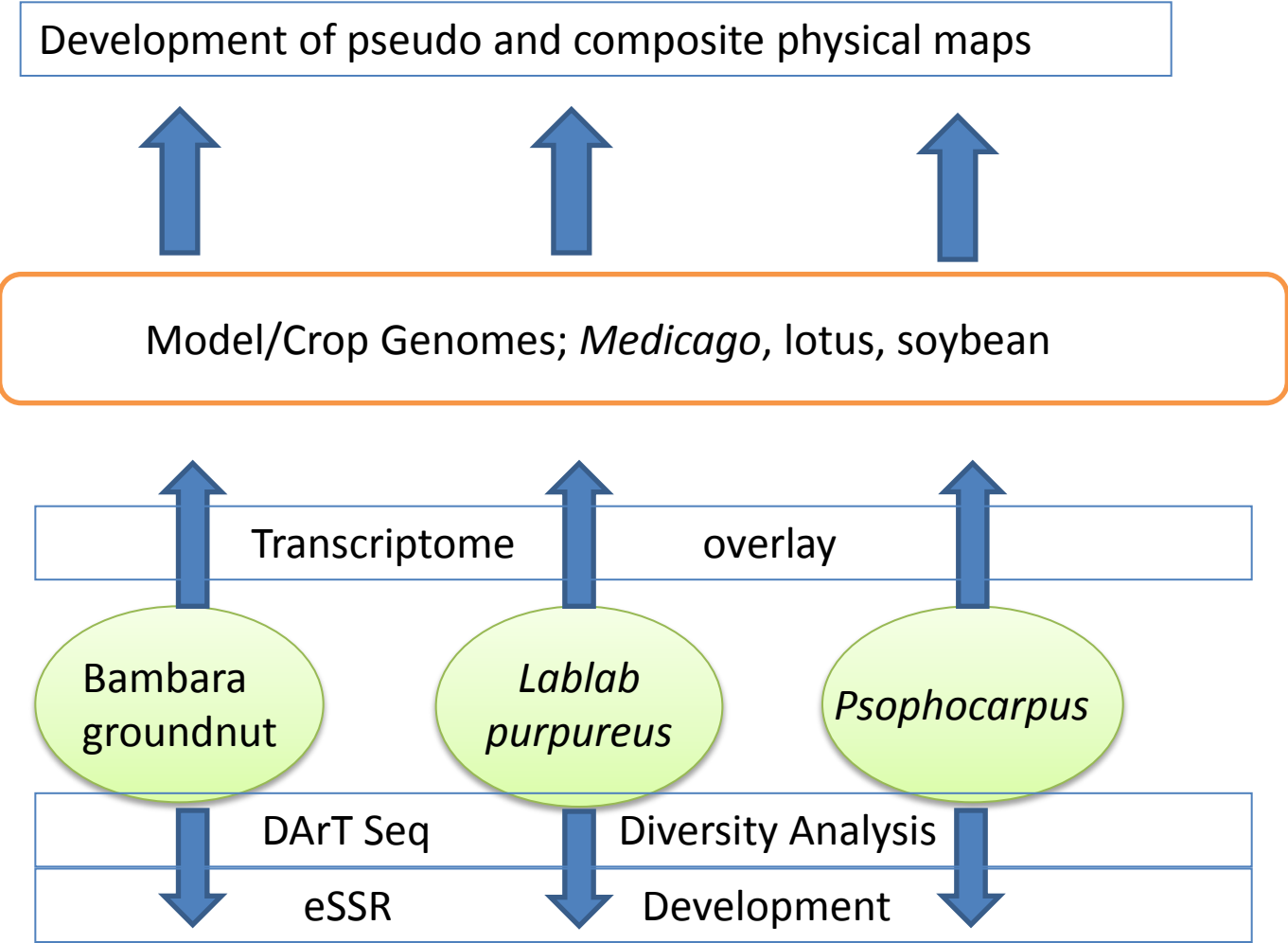
*Overlaying the BG transcriptome onto
 Soybean (MSc); Khan*
 Linking genetic maps of BG with physical
 maps of Soybean; Chai
**Bam1-004 Machine Learning to detect
 drought tolerance pathways**
Bam1-007 Combining multiple data types; Khan

Recent completed projects
 Current on-going projects
BamYield agreed projects



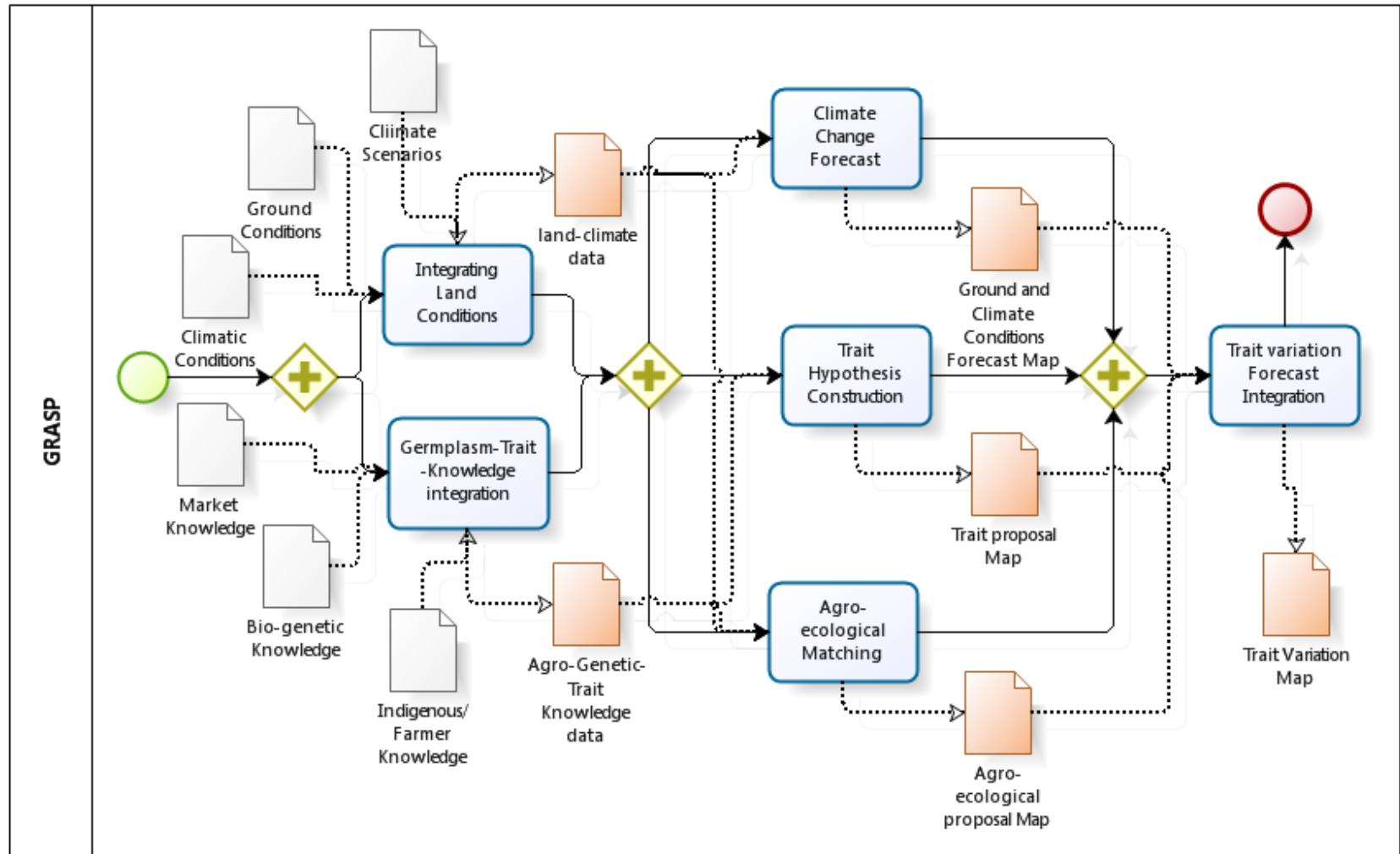


Species cluster approach to working in underutilised crops



“Geospatial Resource for Agricultural Species and Pests with integrated workflow modelling to support Global Food Security (GRASP-GFS): a prototype”

BBSRC TRDF call 2 Support for Development of Bioinformatic Tools and Computational Approaches to the Biosciences; 18 months £127K



Bamyield; Bioinformatics, translation and data mining for minor crops;

Bam1-007

Combining Affymetrix, RNAseq and physical genome data - a multidimensional approach to transfer data from major crops to minor crops for Global Food Security.

PhD stipend and consumables only (Vice-Chancellor Fees Scholarship)

Mr Faraz Khan

Bam1-004

Mining the gene networks in water-stress response in bambara groundnut: a machine learning approach to translating traits in model species to minor crops

PhD

Candidate identified

Bam1-008

Mathematical Modelling of the bambara groundnut canopy

PhD 50% matching funding with Reading EPSRC DTC

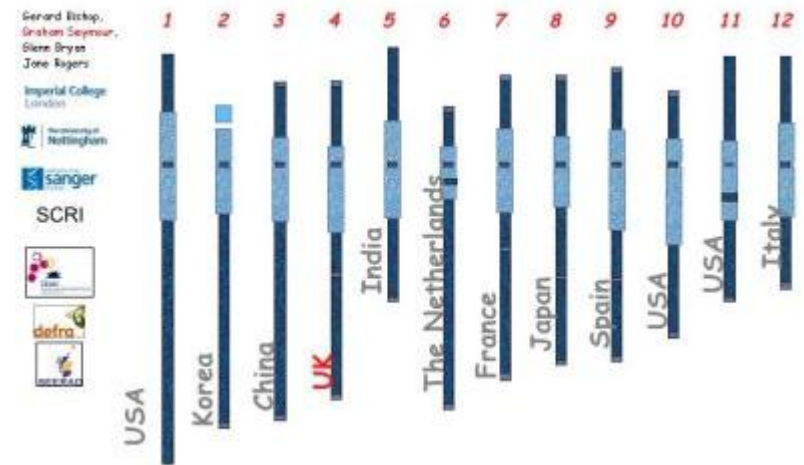
Advertised

Bam1-007

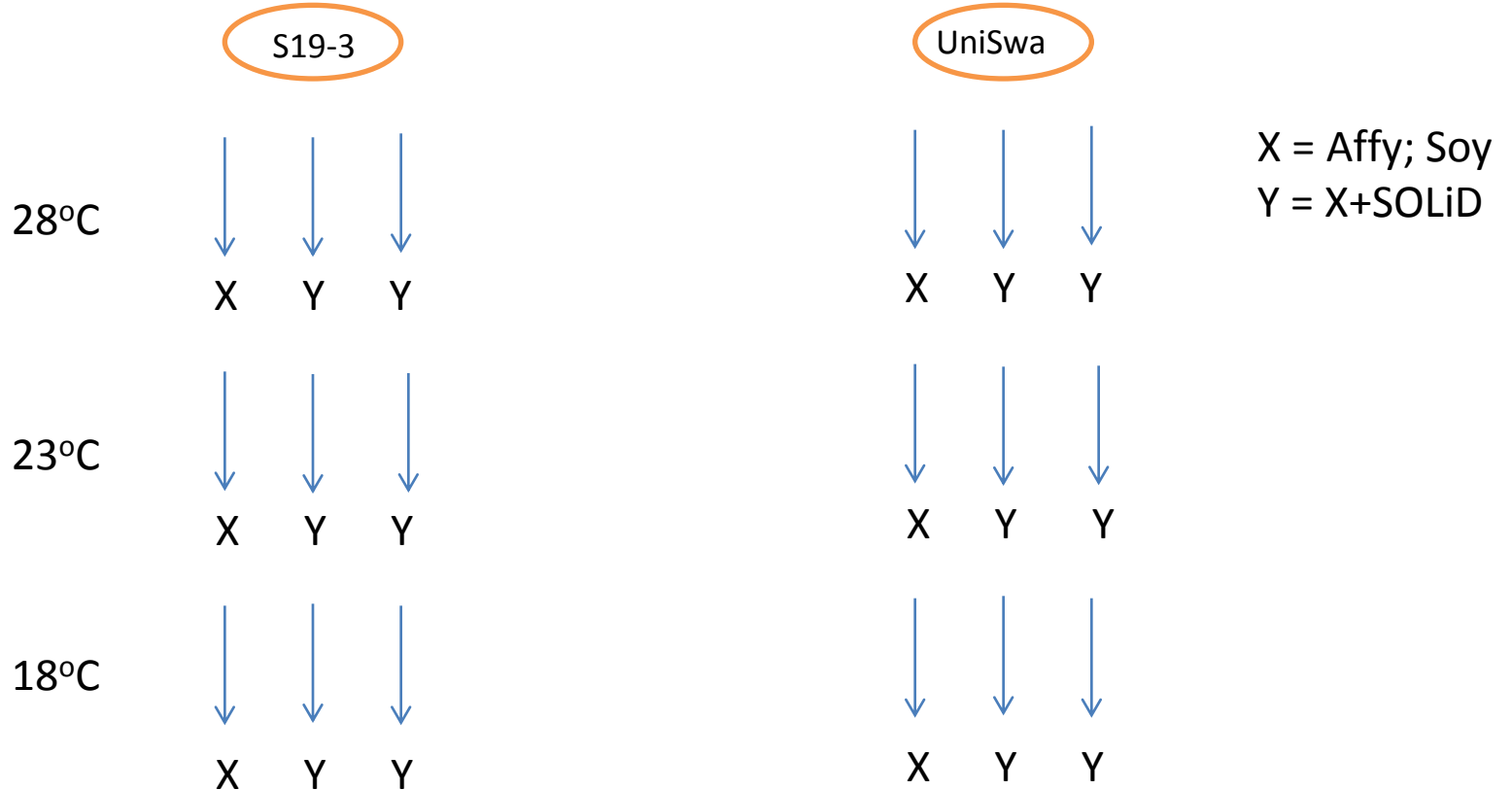
Combining Affymetrix, RNAseq and physical genome data - a multidimensional approach to transfer data from major crops to minor crops for Global Food Security.

PhD stipend and consumables only (Vice-Chancellor Fees Scholarship)

Mr Faraz Khan



Temperature response in single genotypes of bambara groundnut by column transfer;
Noah, Al-Shareef, Mayes, Chai



1 plate 454 leaf transcriptome (16000 gene models), over layed on Soybean genome, with Soybean Affy oligos.

Research questions:

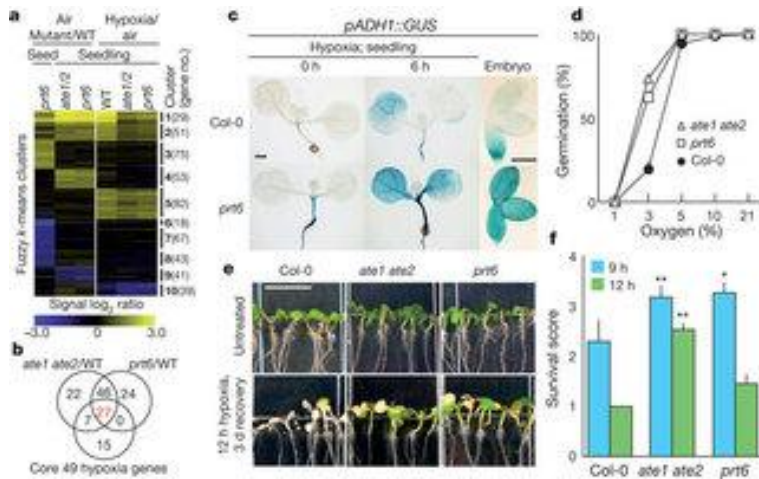
1. How do the different data types relate?
2. How do we translate from models to subject crops?
3. What elements do we actually need to work in a crop and how can we do this efficiently and cheaply?
4. Can we work on 'clusters' of species at the genome level, rather than single species.
5. Can we develop/identify suitable software to make this work?

Bam1-004

Mining the gene networks in water-stress response in bambara groundnut: a machine learning approach to translating traits in model species to minor crops

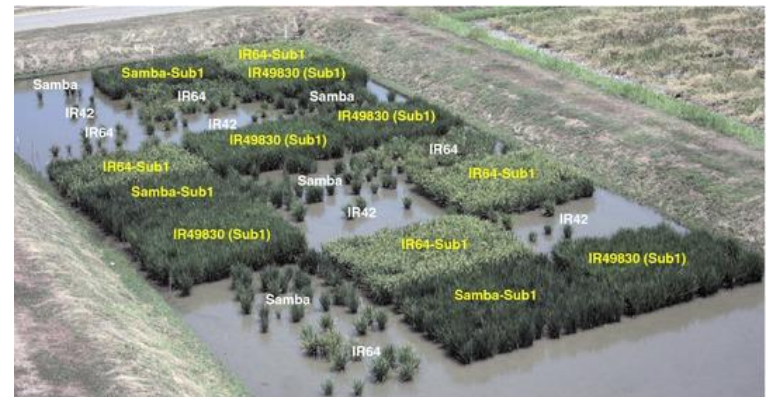
PhD

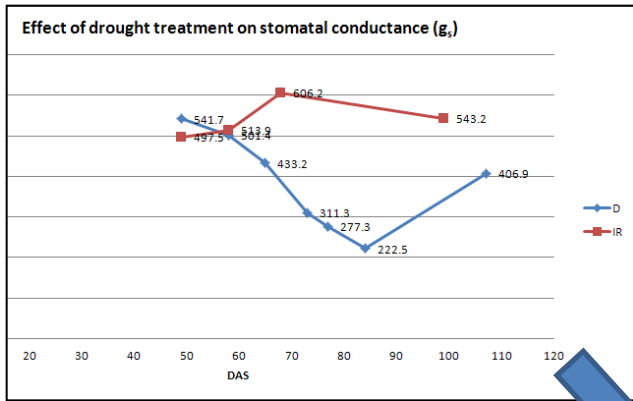
Candidate identified



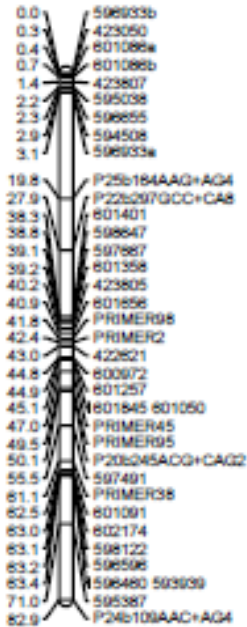
-Mike Holdsworth's group (UoN) have understood how plants sense anoxia stress
-The sub1 mutant of rice is explained by the pathway they have uncovered and this offers an opportunity to see whether a similar pathway is active in Bambara groundnut

- Bambara groundnut landraces can survive in rain levels between <400mm/year and >2500 mm/year
- Crosses have been made between S19-3 (Namibia) and Gresik (Indonesia)
- What are the mechanisms involved in such broad ranges of adaptation.
- Bambara groundnut is very sensitive to standing water





Clustered groups



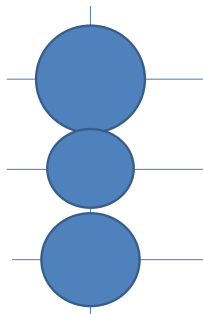
Machine Learning:
 Do the same pathways exist as in models species?
 Can we mine datasets to find other important pathways?
 Can we potentially address flooding sensitivity in bambara groundnut?

Bam1-008

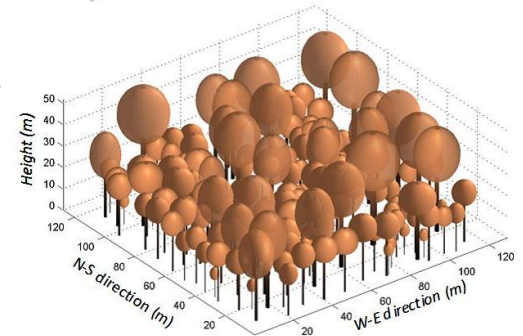
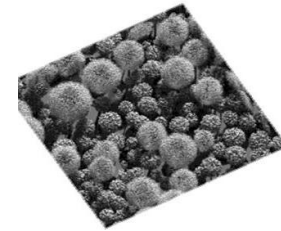
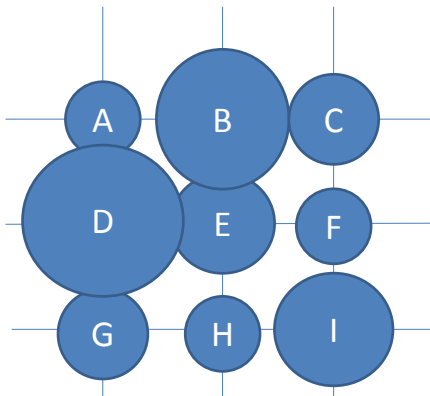
Mathematical Modelling of the bambara groundnut canopy

PhD 50% matching funding with Reading EPSRC DTC

Advertised



$$\frac{ds_i}{dt} = bs_i(a - s_i) - H\left(c\left(\frac{s_i + s_{i-1}}{2}\right) - d\right) - H\left(c\left(\frac{s_i + s_{i+1}}{2}\right) - d\right),$$



Mangrove modelling

- Analysis of single plants is not the same as growing a canopy
- These interaction between plants are one reason that translation from lab to field often works poorly
- If we can model these factors, we can potential use them to guide breeding and management practice and gain a deeper understanding of crop traits.