Change management – upgrading experimental designs, biometrics and data management at CIP-NARS SweetGAINS breeding network

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CIP INTERNATIONAL POTATO CENTER

CGIAR

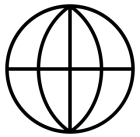
SweetGAINS

70% of organizational change attempts Fail

(McKinsey, 2008)

Creating a climate for change

- Create a sense of urgency
- Build a guiding coalition
- Creating a vision



Engaging and enabling the whole organization

- Communicate the vision
- Empowering others to act
- Generate short-term wins

Implementing and sustaining change

- Sustain acceleration
- Institute change

(John Kotter, Harvard University)

The five behaviors of high-performing teams

Creating a climate for change - Create a sense of urgency

Experimental designs

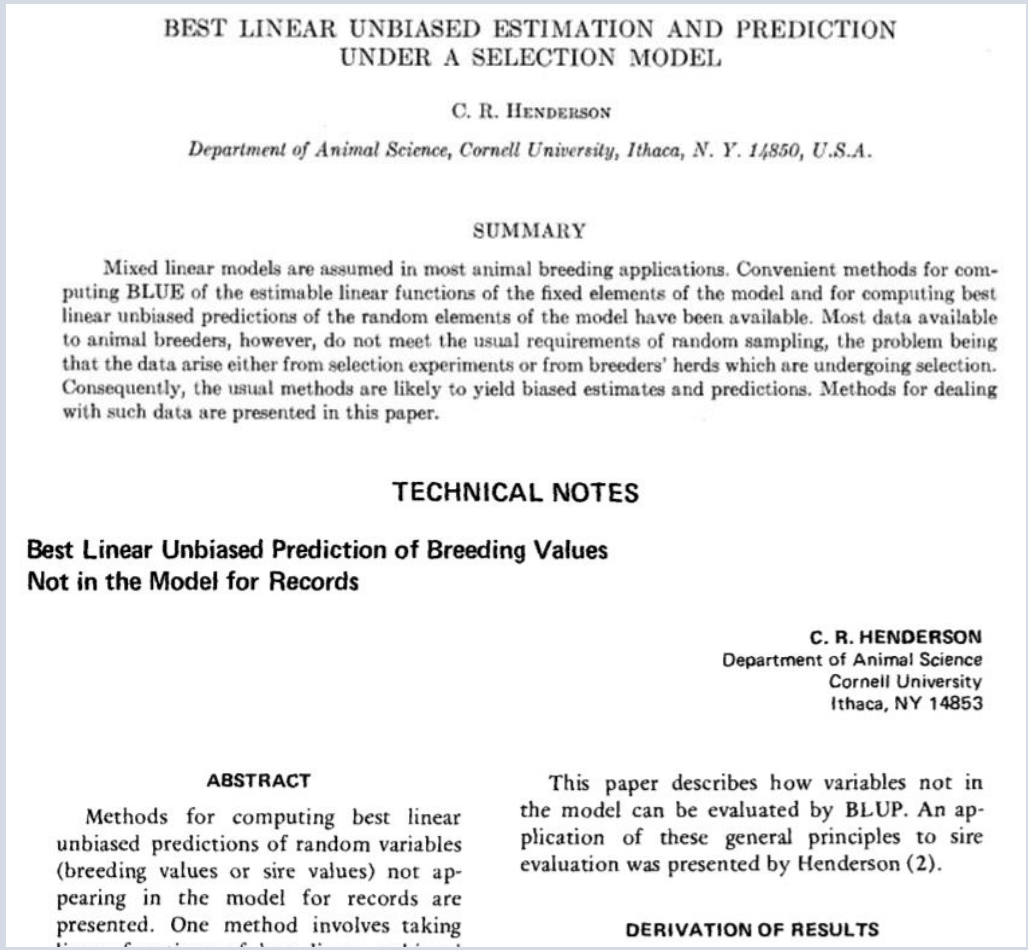
- RCBDs for large replicated experiments
- Westcott design for unreplicated experiments

Data analysis

- ANOVA – Least Square Means
- No spatial adjustments
- Compound symmetry V/COV by default

Breeding data management

- No naming convention for genotypes
- No global data curation rules
- Inconsistent trait ontology
- Plot row/column coordinates not recorded
- No global data management system



BEST LINEAR UNBIASED ESTIMATION AND PREDICTION
UNDER A SELECTION MODEL

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SUMMARY

Mixed linear models are assumed in most animal breeding applications. Convenient methods for computing BLUE of the estimable linear functions of the fixed elements of the model and for computing best linear unbiased predictions of the random elements of the model have been available. Most data available to animal breeders, however, do not meet the usual requirements of random sampling, the problem being that the data arise either from selection experiments or from breeders' herds which are undergoing selection. Consequently, the usual methods are likely to yield biased estimates and predictions. Methods for dealing with such data are presented in this paper.

TECHNICAL NOTES

Best Linear Unbiased Prediction of Breeding Values Not in the Model for Records

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ABSTRACT

Methods for computing best linear unbiased predictions of random variables (breeding values or sire values) not appearing in the model for records are presented. One method involves taking

This paper describes how variables not in the model can be evaluated by BLUP. An application of these general principles to sire evaluation was presented by Henderson (2).

DERIVATION OF RESULTS

Creating a climate for change - Build a guiding coalition

Standard operating procedures for sweetpotato breeding data management

COP Breeding Data Management SweetGAINS

2020
SEPTEMBER

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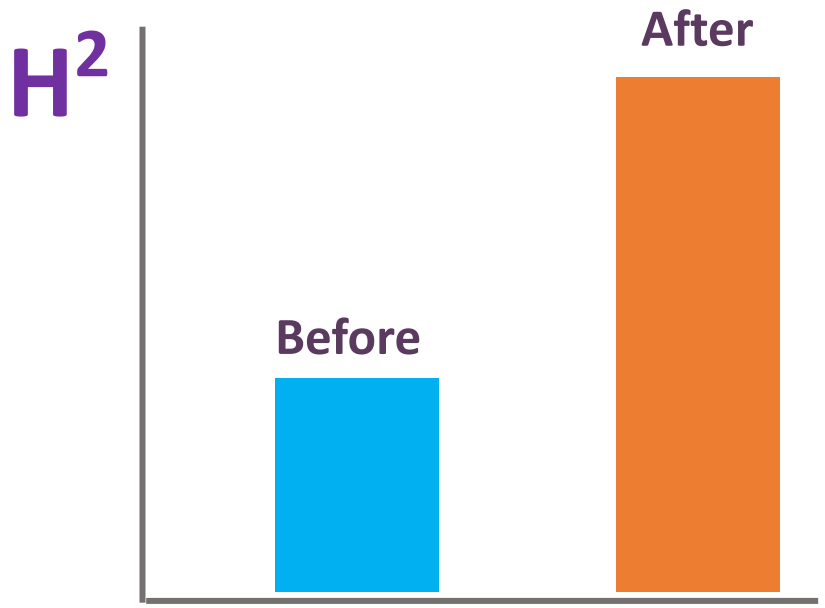
Creating a climate for change - Creating a vision



To increase the likelihood of success, and impact, of CIP-NARS SweetGAINS sweetpotato breeding network

Engaging and enabling the whole organization

- Communicate the vision & Empowering others to act

NaCRRI · NC STATE UNIVERSITY · IIAM · SARI · ZARI Zambia Agriculture Research Institute · TARI · INERA · RAB · MICHIGAN STATE UNIVERSITY · BTI BOYCE THOMPSON INSTITUTE · THE UNIVERSITY OF TENNESSEE KNOXVILLE · KEPHIS · CSIR Crops Research Institute Ghana

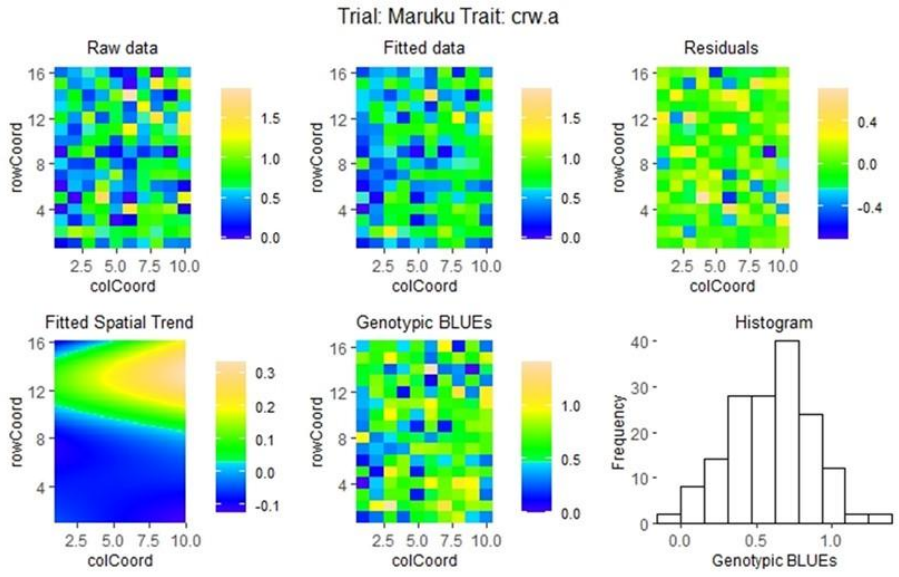
IITA Transforming African Agriculture · IRRI

Alliance
Bioversity International · CIAT · ICRISAT

CIMMYT International Maize and Wheat Improvement Center

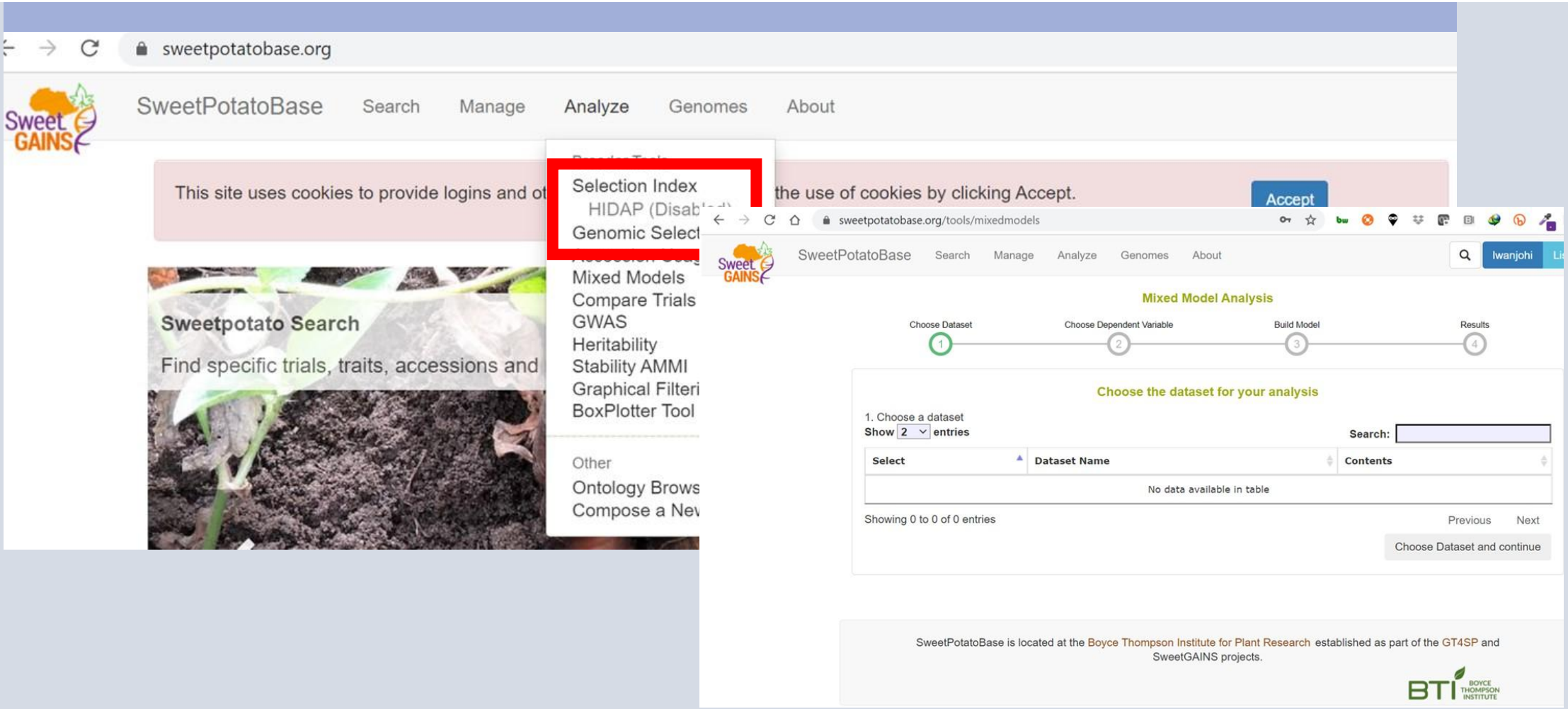
Engaging and enabling the whole organization

- Generate short-term wins



Breeding program	Row and column coordinates recorded	Augmented row-column designs	Augmented p-rep design	Resolvable row-column designs
NaCRRI (Uganda)	12	0	0	12
CIP (Uganda)	7	1	6	0
Mozambique (CIP + NARS)	25	0	0	25
Malawi	3	0	0	3
Zambia	3	0	0	3
Zimbabwe	6	0	0	6
Tanzania	10	5	0	5
Rwanda	4	0	0	4
Total # trials	70	6	6	58
Percentage of total # trials	100%	9%	9%	82%

Implementing and sustaining change - Sustain acceleration



Implementing and sustaining change - Institute change

- From 2022 onwards, **100% of breeding trials** using modern designs
- From 2022 onwards, **100% of advancement decisions** based on BLUPs
- Piloting **sparse designs** begins in 2022
- **Technical support** to designs trials, analyze datasets, and data management
- **Sustain and institutionalize** through EiB's BRIN

Change is hard,

but it is within reach

BILL & MELINDA GATES foundation

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CGIAR RESEARCH PROGRAM ON Roots, Tubers and Bananas

CGIAR Excellence in Breeding Platform