

BUNDLES OF JOY?

USING THE ERA DATABASE TO EXPLORE THE OUTCOMES OF CSA PRACTICE INTERACTIONS

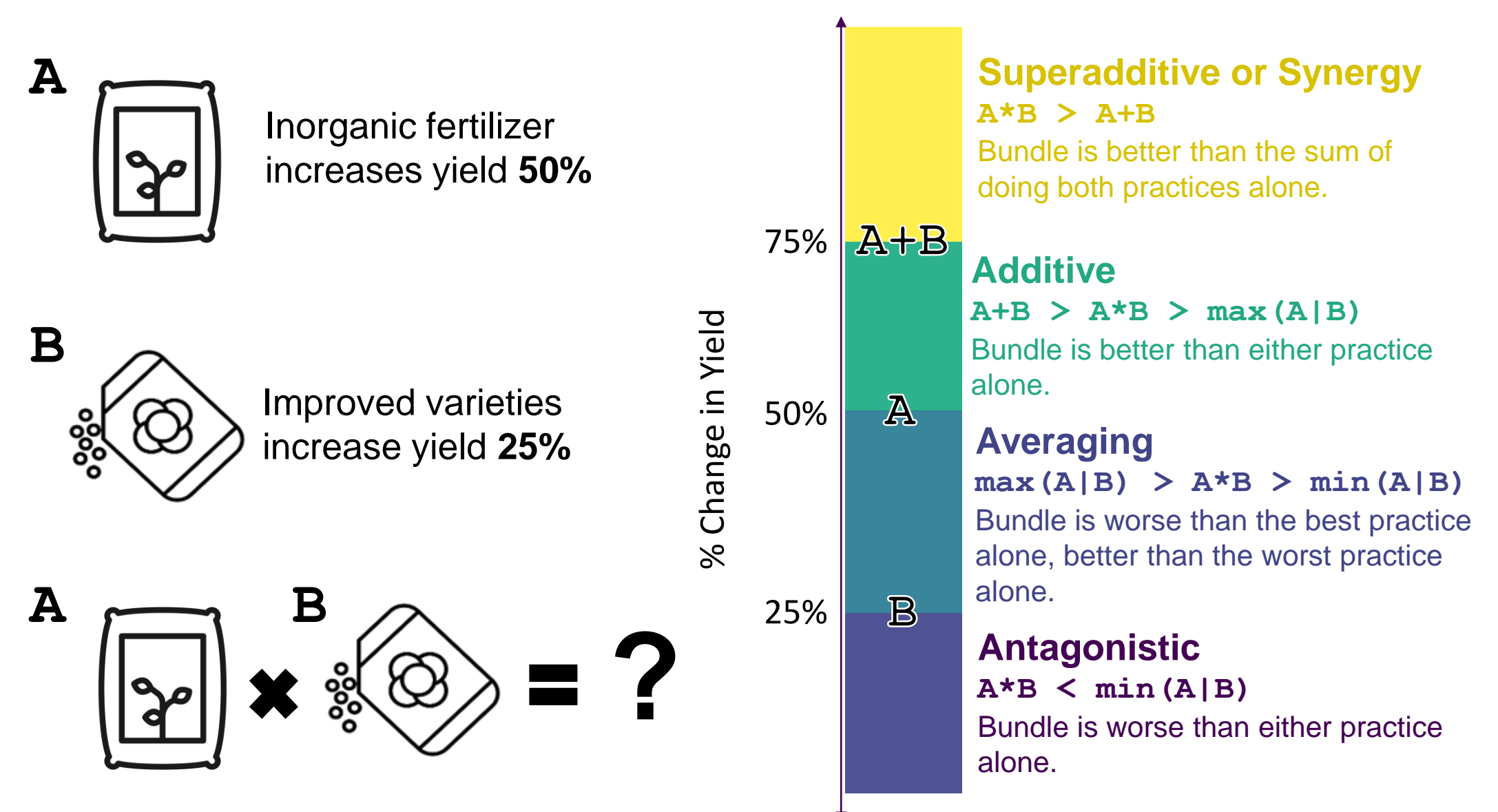
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Are two practices better than one?

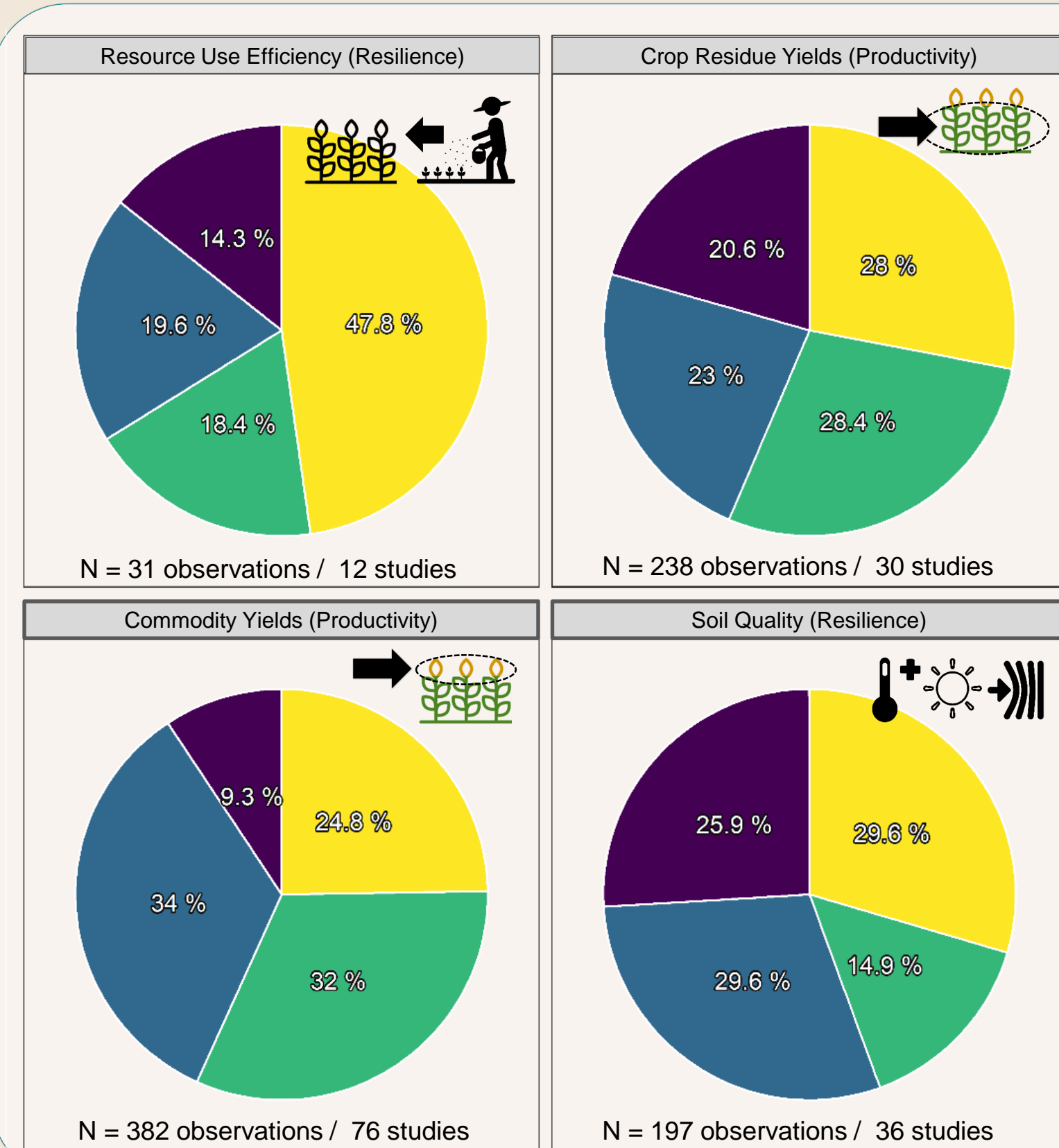
Farmers rarely apply CSA technologies in isolation and there is a strong demand for evidence about which bundles of practices work together to enhance outcome performance. The ERA database brings together thousands of African CSA studies giving us unprecedented power to explore trade-offs when bundling a diverse suite of practices together across a diverse range of outcome indicators. We have developed a range of analytical algorithms and plotting functions to assess performance of technology bundles to be integrated as apps on the ERA website.

A typology of practice interactions



Testing the performance of CSA practice bundles

The big picture: CSA outcomes

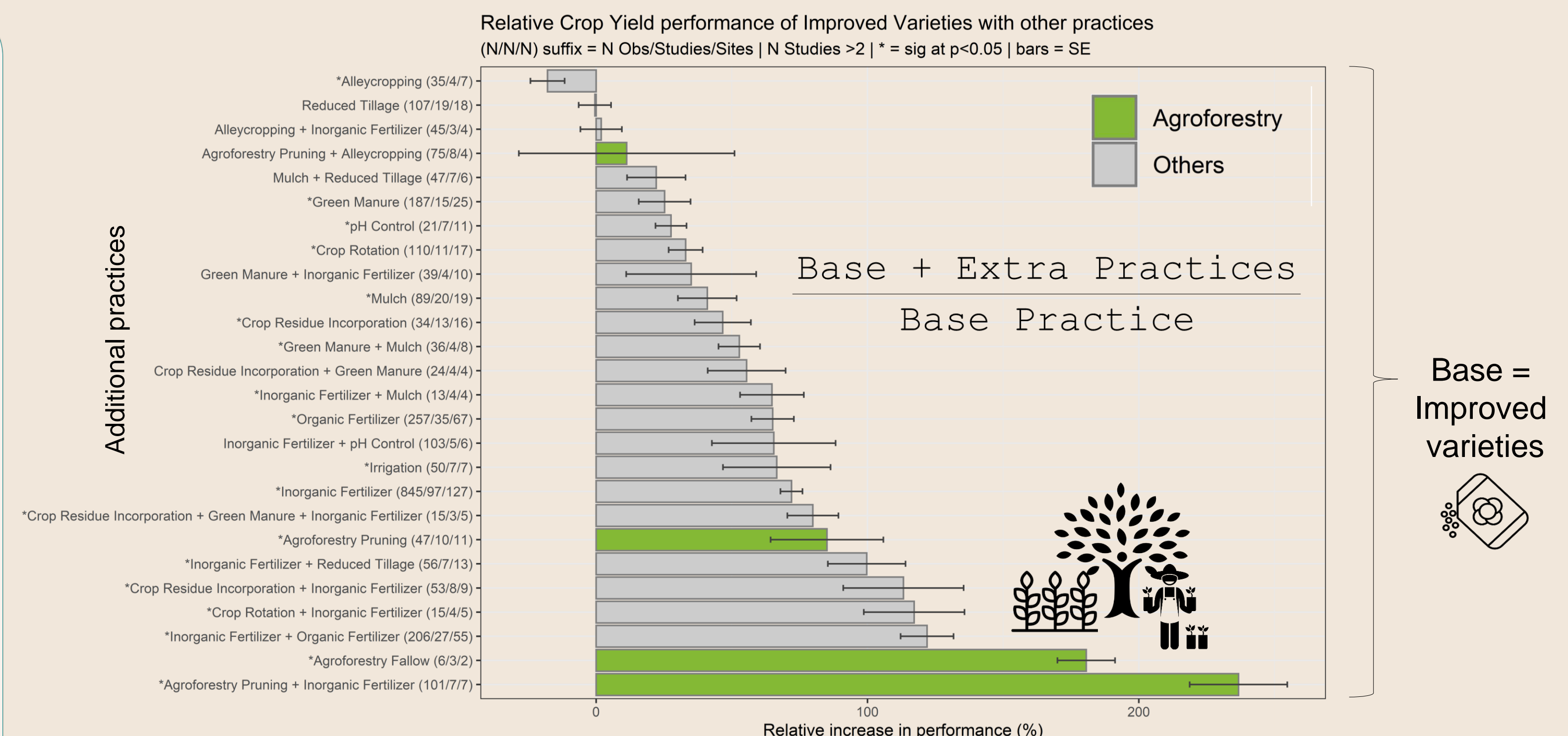


Using "gold standard" data from studies reporting all combinations of practices A & B (A only, B only, & A*B) we explore how interaction types vary across different outcomes.

Bundling two practices works well for resource use efficiency (RUE, top left) where synergies and positive (i.e., synergistic or additive) results were shown 48% & 66% of the time. Crop productivity showed fewer synergistic results than RUE (bottom left & top right), but still gave positive results over half the time.

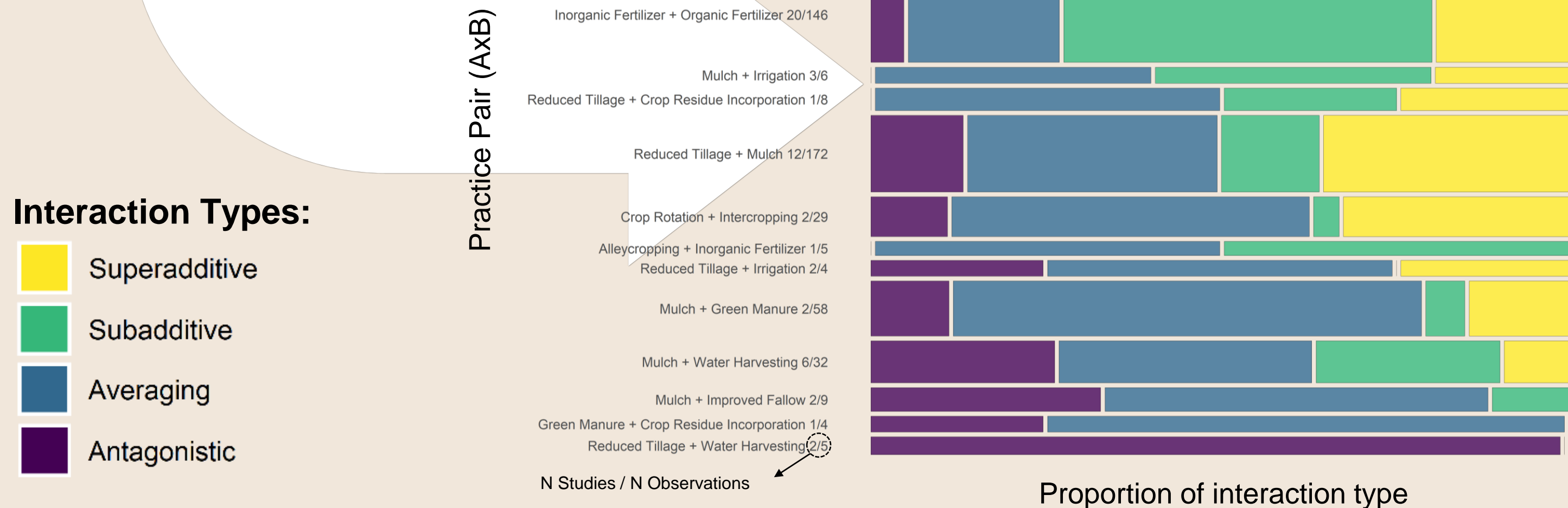
Across all outcomes a large proportion of A*B practice bundles show no benefit or a negative effect compared to doing the best of practice A or B alone (averaging or antagonistic). In particular, soil quality (bottom right) shows poor results more than half the time.

There's more than one way to test a bundle:



Another way of exploring practice interactions is the relative change in outcome performance for a base practice compared to the base practice with additional practices. The figure above shows how bundling different practices with improved varieties (IV) changes performance relative to IV alone.

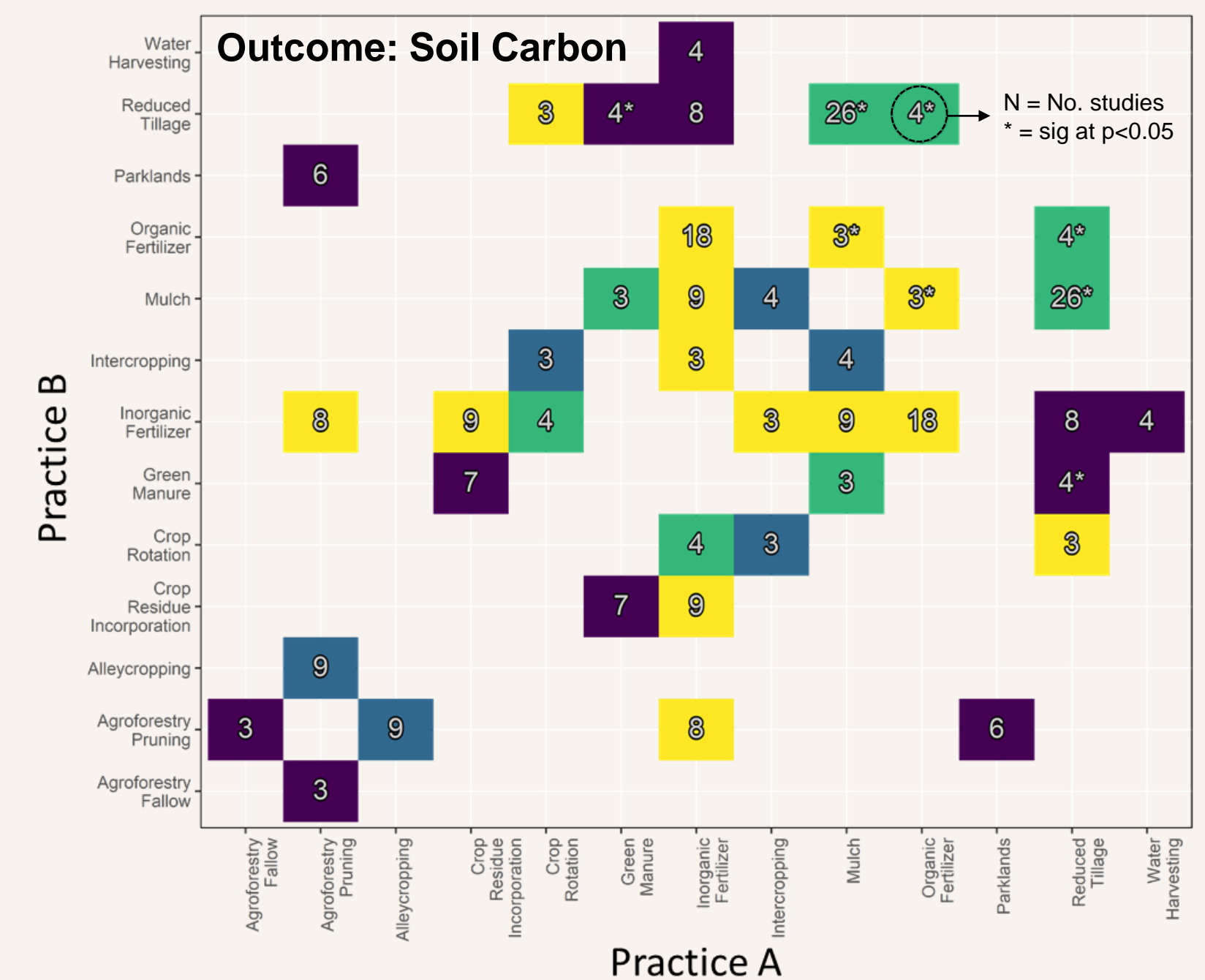
What practice bundles are driving the commodity yield results?



Using "bronze standard" data, comparing A only, B only and A*B across studies rather than within studies, provides more data at the cost of precision.

For each practice pair a bootstrapping approach averages the result of A*B - A only - B only from 10,000 resamples. The statistic then is mapped onto the interaction typology and used to populate a grid plot of A*B (right).

There would be insufficient data from "gold standard" data to produce the soil carbon figure to the right.



Implications

- ➔ We have the structured CSA database (ERA) and tools required to record and analyse the multi-outcome performance of practice bundles for CSA research. The tyranny of the single practice is over!
- ➔ We expected practice bundle data to reflect additive/superadditive results from research looking for win-wins. However, for a given outcome **bundling two practices is often no better than doing the best practice alone.**
- ➔ The next steps are to create a single metric to summarise practice bundle performance across multiple outcome priorities and to graduate to A*B*C.

*What is ERA?

ERA, *Evidence for Resilient Agriculture*, is a systematic review and meta-analysis of potential climate-smart technologies in Africa. It contains information from more than 1400 peer-reviewed studies of nearly 100 technologies. To find out more and use the data go to:

<https://era.ccafs.cgiar.org>



Questions? Contact: p.steward@cgiar.org

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RESEARCH PROGRAM ON
 Climate Change,
 Agriculture and
 Food Security

