DEFINITION OF A 'YEN':

Practical – Measured – Shared – Trusted – Reasoned – Dynamic

1. **A YEN**[1] is a network of stakeholders (both individuals and organisations) jointly striving to enhance yield or another aspect of farm performance through 'action research' i.e. measurement and manipulation of performance at the scale of farm decision-making e.g. field-by-field. Performance targets may include crop yields, environmental impacts (like GHG emissions), crop quality, or crop health.
2. **Membership** is usually open to any stakeholder, and primarily to commercial practitioners (farms, farm staff and their support industry), who agree to share data relevant to the common aim. Anyone ceasing membership may require erasure of recent personal data that they have shared with the YEN.
3. **Common rules, protocols and communications** (usually digital) are developed to establish mutual trust in all data, and to facilitate and automate data collection, proofing, aggregation, analysis and reporting. Trust and engagement may be assisted by establishing a competition for awards according to pre-agreed rules. Data providers may also record confidence levels in data items.
4. **Scientific principles** are employed to explain variation in the performance target, hence to define explanatory metrics. These principles are those most widely adopted in contemporary college teaching and in supporting peer-reviewed science journals.
5. The scientific principles are summarised in **a quantitative explanatory framework or model**, and this is used to give data providers an estimate of their theoretical site-specific biophysical potential performance, for comparison with their actual performance.
   - Parameters (e.g. in YENs addressing crop yields: resource conversion coefficients, harvest indices) used to estimate bio-physical potentials are set to reflect foreseeable future limits with all relevant technologies i.e. plant breeding[2], agro-chemistry, engineering, farm design and husbandry systems. Parameter values are usually set near to maxima observed in recent research.
6. **Reports** are derived from the data principally for the benefit of data providers, but also for scientific purposes. Reports to each data provider benchmark their own results against other entrants after suitable anonymisation and, if available, against industry standards. As well as relating results to management decisions, reports include a set of explanatory metrics.
   - E.g. crop yields are reported along with estimates of the availability, capture and conversion of light energy, water and nutrients, and estimated shortfalls or gaps from their theoretical limits (see above).
7. **YENs support and coordinate participants** in (i) analysing and sharing their results, (ii) sharing uncertainties or surprises in the data and in developing promising ideas about enhancing practices, and (iii) robustly checking, testing or experimenting on these ideas.
8. Participants include some who are motivated to **identify, publish and teach any advances in scientific understanding** of performance arising from the network's data (e.g. academics). If necessary, publication is delayed for a modest period (e.g. 6 months) to allow commercial partners time to react.
9. The **YEN's data** are held (by ADAS or its licensee, as pre-agreed between ADAS and all the YEN's initiators) to be shared with the YEN's participants, and then after pre-agreed periods, more widely, without exclusivity, suitably anonymised, and with appropriate data access fees paid to the data holder(s). Three sharing scenarios include: (i) with participants in YENs in other regions, on other species or addressing other targets, (ii) for academic and other non-commercial purposes, and (iii) for commercial applications or public good.
10. **ADAS creation and ownership** of the YEN concept and brand is recognised, as follows:
    - Unless expressly agreed otherwise, ADAS collaborates in the YEN's operations, supported by pre-agreed remuneration, including a return on its investment in YEN principles, protocols, etc.
    - YEN branding (as specified by ADAS) is used on all ensuing reports and presentations.
    - YEN and ADAS are acknowledged in any ensuing primary publications in whatever form.

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[1] Originally 'Yield Enhancement Network' but YENs now may also have other objectives.

[2] For crops, note that the widely used 'genetic potentials' (see http://www.yieldgap.org/) exclude impacts of plant breeding on future crop performance; hence YENs use more theoretical biophysical potentials.