Measuring Energy Sustainability in Global and Local Agricultural Systems:

Sustainable Winegrowing New Zealand assessed by the SAFA framework

Can GLOBAL sustainability assessment frameworks provide guidance towards more energy-sustainable LOCAL production?

Sustainability Assessment of Food and Agriculture Systems (SAFA) is a framework currently in development created by the *United Nations Food and Agriculture Organisation* (FAO) to harmonise sustainability assessments throughout global food systems.

A preliminary test of the SAFA prototype was performed in Sustainable Winegrowing New Zealand (SWNZ) to:

1) examine its applicability and practicability for NZ conditions, and
2) further develop the sustainability-metrics methods for SWNZ.

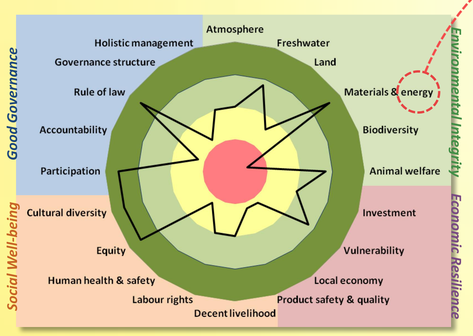

Figure 1. Visualization of the SAFA sustainability performance polygon of a hypothetical case.

Methods:

The energy-sustainability indicators proposed by SAFA (Figure 2) were applied to the 153 SWNZ wineries. Energy use and production characteristics data were collected from the certification application forms completed annually by each winery.

Results:

SAFA framework evaluation

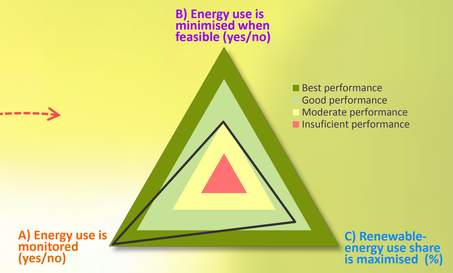

Figure 2. Average energy-sustainability performance of SWNZ wineries according to SAFA

- Indicator B and Indicator C (Figure 2) do not allow an objective quantification of the winery energy-sustainability performance, as the concepts "minimising"/"maximising" are presented without a benchmark that sets a specific target and enables performance comparison.
- The different performance boundaries (best, good, moderate, insufficient) are not benchmarked taking into account winery management capabilities and environmental limitations, and hence do not provide realistic guidance towards more energy-sustainable production.

Benchmarks practicability study

- Production size influences electricity use (Figure 3). Other variables such as regional/seasonal temperatures may also influence electricity use (ongoing study).
- Energy-sustainability benchmarks should accommodate differences with regards to features such as production size, that influence the relative sustainability performance and are to some extent independent of winery management, to enable valid comparisons among wineries and to set realistic performance targets.

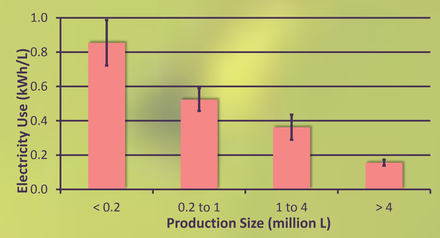

Figure 3. Average electricity use by production size of SWNZ wineries

Conclusions:

- SAFA is likely to provide a reliable base-framework for the sustainability assessment of different crops and social-ecological conditions around the world, and to build trust among **global** food systems stakeholders.
- SAFA needs framework extensions with locally tuned metrics and benchmarking to effectively guide **local** production management.

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