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AGROFORESTRY

# Land Equivalent Ratio modelling at Wakelyns

More yield from the same space through intercropping

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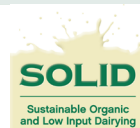
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- SOLID



The land equivalent ratio (LER)<sup>1</sup> is a measure of productivity in mixed cropping systems. It is based on an equation, which can be explained by giving some values of the ratio and what they mean in real terms.

If we consider a field with two crops in it, an LER value of 1 means that crop 1 and crop 2 have yielded about half as much from the field as they would have done grown across the same space in monoculture. There is no overall loss, but most farmers would likely be unimpressed by an LER of 1.

LER values above 1 generally mean that you are getting more yield overall from your two crops planted together than you would if you planted either across the whole field in monoculture.

An LER value above about 1.4 is rare and indicates a very productive mixed cropping system. Consider a theoretically possible but unlikely ratio of 2. Here you would have to use two fields of monoculture to get the same yield as you are getting from your single mixed crop field. You can imagine how the higher values of LER might be reached by looking at the picture of French wheat/nut/poplar agroforestry systems. Here you essentially have a regular wheat field with a woodland/orchard placed within it, with no space wasted even for tree understory strips. The trees use the third dimension (height) as growth space, so the wheat takes very little hit in yield and vice versa.



Mediterranean silvoarable

Research by ORC at Wakelyns Agroforestry, Suffolk, within the EU SOLID<sup>2</sup> project calculated an LER of 1.44 for a mixed coppiced willow/herbal ley system<sup>3</sup>. Impressive. More recent economic modelling by ORC has shown that coppiced hedgerows used for home wood fuel have a net present value (NPV) to the farmer of £1,156 per 100m of hedge<sup>4</sup>. Herbal leys can be used to fatten livestock and to improve soil fertility in arable rotation. Mixing compatible crops with a high LER can be functional and profitable for the farm.

## FURTHER READING

1. Mead and Willey (1980) [doi.org/10.1017/S0014479700010978](https://doi.org/10.1017/S0014479700010978)
2. SOLID project website: [solidairy.eu](https://solidairy.eu)
3. Smith & Westaway (2020) [tinyurl.com/y64ugjts](https://tinyurl.com/y64ugjts)
4. CPRE and ORC (2021) [tinyurl.com/nre9wb58](https://tinyurl.com/nre9wb58)