QUESSA

Quantification of ecological services for sustainable agriculture

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Collaborative Project

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Deliverable D5.7

A web-based tool to measure ecosystem service provision at the farm scale will be active on the project website.

Due date of deliverable: Month 46

Actual submission date: Month 50

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In 2015 the Agriculture and Environment Research Unit (AERU) at the University of Hertfordshire in the UK developed a software application for the European Commission's Joint Research Centre (JRC) known as the Ecological Focus Areas (EFA) Calculator (Tzilivakis *et al.*, 2015 & 2016). This application calculates the potential impact on ecosystem services and biodiversity of different EFAs on a farm. Given the compatibility of QuESSA outputs with the EFA Calculator tool, the QuESSA partners agreed that a greater impact would be achieved by utilising the EFA Calculator software as a delivery vehicle for the QuESSA project outputs. AERU were commissioned to conduct this integration and this was successfully achieved.

Table 1 lists the QuESSA impact categories that have been integrated in the EFA Calculator. As a priority, impacts on soil erosion, pollinators, pest control and aesthetics were calculated/assessed. Carbon sequestration was not a priority but has also be included. QuESSA also had techniques that could be used to assess impacts on biodiversity. This is not an ecosystem service in itself, but clearly impacts upon and/or is related to some ecosystem services. However, to avoid confusion with the biodiversity indicators that are already in the EFA Calculator (and which look at species groups) and as the diversity index was calculated using SNHs, this impact category has been titled 'Habitat diversity'. A full description of the integration process and calculations is available in Deliverable 4.5.

The EFA Calculator acknowledges the contribution of QuESSA and EU funding on the home page and includes QuESSA branding where appropriate.

Table 1. QuESSA Impact categories

Impact category	Units
Soil erosion	Tonnes of soil per hectare (t ha^{-1})
Pollinators	Functional Plant Cover Index pollinators (FPCIpoll)
Pest control	Functional Plant Cover Index pest control (FPCIpest)
Aesthetics	Landscape attractiveness (unitless)
Carbon sequestration	Tonnes of carbon per hectare (t C ha^{-1})
Habitat diversity	Shannon index of SNH diversity

Table 2 shows progress with developing the QuESSA outputs for all the features that are available within the EFA Calculator software. This will continue to be developed as more outputs become available.

Table 2. Features available in the EFA Calculator and those that for which QuESSA Ecosystem Sevice outputs have been incorporated.

Feature	SNH	Soil erosion	Pollination	Pest control (aerial-boundary)	Pest control (ground-boundary)	Pest control (ground-crop)	Aesthetics	Carbon stock (biomass)	Carbon stock (soil)	Habitat diversity*
Agroforestry	Cropland	✓	✓	✓	NA	✓	✓			O
Ancient monuments										
Ancient stones										
Arable land	Cropland	✓						✓	✓	O
Archaeological sites										
Catch crops or green cover	Cropland	✓	✓	✓	NA	✓				O
Ditches	Herbaceous linear	✓	✓	✓	✓	NA	✓	✓	✓	Yes
Fallow land	Cropland	✓	✓	✓	✓	NA	✓	✓	✓	O
Garrigue										
Grassland	Herbaceous area	✓	✓	✓	✓	NA	✓	✓	✓	Yes
Hedges or wooded strips	Woody linear	✓	✓	✓	✓	NA	✓	✓	✓	Yes
Isolated trees	Woody area	P	✓	✓	P	NA	✓			Yes
Land strips (adjacent/parallel to water)	Herbaceous linear	✓	✓	✓	✓	NA	✓	✓	✓	Yes
Land strips (other)	Herbaceous linear	✓	✓	✓	✓	NA	✓	✓	✓	Yes
Natural monuments										
Nitrogen fixing crops	Cropland	✓	P		NA	✓				O
Ponds										
Short rotation coppice	Cropland	✓			NA	✓				O
Terraces										
Traditional stone walls										
Trees in line	Woody linear	✓	✓	✓	✓	NA	✓	✓	✓	Yes
Woodland	Woody area	✓	✓	✓	✓	NA	✓	✓	✓	Yes

* = Whether the feature/SNH is included within the habitat diversity calculation.
✓ = Complete
P = Partial
NA = Not Applicable
O = Optional

Website access

The EFA calculator is active and freely available at http://sitem.herts.ac.uk/aeru/efa/

References

Tzilivakis, J., Warner, D.J., Green, A. and Lewis, K.A. (2015) *Guidance and tool to support farmers in taking aware decisions on Ecological Focus Areas*. Final report for Project JRC/IPR/2014/H.4/0022/NC, Joint Research Centre (JRC), European Commission.

Tzilivakis, J., Warner, D.J., Green, A., Lewis, K.A. and Angileri, V. (2016) An indicator framework to help maximise potential benefits for ecosystem services and biodiversity from ecological focus areas. *Ecological Indicators*, **69**, 859-872. DOI: 10.1016/j.ecolind.2016.04.045.