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HAL Id: hal-02867846
https://hal.inrae.fr/hal-02867846v1

Submitted on 15 Jun 2020

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Abstract (300 words):

Ecosystem services (ES) provided to farmers are now well-considered as natural-capital-based production factors. Developing them is a way to reduce use of anthropic inputs and so to develop a more sustainable agriculture. However, it is still a scientific challenge to evaluate quantitatively part of ES relatively of anthropic inputs in agricultural production.

Based on literature review, we develop a generic assessment method based on operational indicators to describe ES bundles provided to farmer according to field, farm and landscape characteristics. Application of this method in 30 contrasted farms in terms of agricultural practices enable to assess their relationships with 4-ES dimensions, their role and relative weight in the production of agricultural goods.

According to the spatiotemporal configuration of cropping systems (rotations, cover crops, semi-natural habitats etc.) and landscape complexity in which they are embedded, we assessed the level of (i) ES capacity (potential) available to farmer. Further, we evaluate to which extent ES capacity is (ii) modulated due to beneficial or detrimental agricultural practices and forward the impact on sustainability of (iii) the natural capital. Then, we determine (iv) how much farmer use actually ES capacity instead of relying on anthropic inputs (for example, use of biological regulation instead of pesticides) to produce.

Based on this first diagnostic, we identified (i) the main ESs limiting agricultural production, and (ii) the ways to enhance their furniture both using current ecosystem capacity and through its development and assessed (iii) the weight of ES (vs. exogenous inputs) in the agricultural production.

In conclusion, this ES assessment method enable user to categorize farms in a new way according to the level of ES and their role in agricultural production process. It allows to finely determine the biotechnical functioning of farming systems and overcome coarse classification like conventional vs. organic farming.

Keywords (5 words): ecosystem services, ecosystem capacity, natural capital, farming system, landscape