



## Reconciliation and trade-offs, productivity – ecosystem services

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*Panel: The bio-economy – new demands for research organizations in agro-food and life-science sectors  
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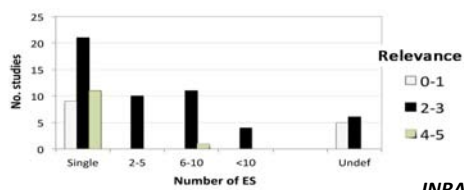
### From world food security to agro-ecosystem services (ES)

- **World food security: an unprecedented challenge for both demand (demography, urbanization, westernization of food diets) and supply (agricultural and food systems are not sustainable and not resilient) reasons + climate change (adaptation and mitigation)**
- **Consumption- and production side levers (food waste and losses, meat consumption, non-food uses of agricultural products...)**
- **Increasing agricultural production and productivity: one lever among others**
- **Increasing agricultural production and productivity and simultaneously reducing negative impacts on the environment, reducing GES from agricultural origin and adapting to CC effects, protecting natural resources...**
- **Agricultural and food systems should be simultaneously productive, sustainable and resilient**
- **Delivering simultaneously provisioning, regulating, support and cultural services (MEA, 2005)**



### From world food security to agro-ecosystem services (ES)

- A huge challenge for research
- Most papers on a single ES (Graph) and multiple ES analysed mainly by proxies
- Need of a conceptual framework allowing to address simultaneously multiple ES and to manage agro-ecosystems on the basis of ES
- Taking into account synergies and trade-offs: not only between services, but also between stakeholders
- Services are most often site-specific (functioning of ecosystems, levels of services...) and they depend on local conditions : experimentations and modelling



INRA, 2016, Flagship program EcoServ



### Conceptual framework: linking agro-ecosystems and social systems

