

Project ANR- 13-RURA-0001-01

TRUSTEE

**Towards RUr al Synergies and Trade-offs between Economic
development and Ecosystem services**

Program: Transnational research linking agricultural, rural and sustainable
development aspects

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A IDENTIFICATION

Acronym of the project	TRUSTEE
Title of the project	Towards RUrAl Synergies and Trade-offs between Economic development and Ecosystem services
Project coordinator (institution)	CESAER, AgroSup Dijon, INRA, Université Bourgogne-Franche-Comté, 21000 Dijon, France
Project lifetime (project start – project end)	36 months + 6 month extension (September 1, 2013 – February 28, 2017)
Project website	https://www.trustee-project.eu/

Writers of this report	
Title, surname, name	Ms. Cécile Détang-Dessendre*, senior researcher at INRA and Ms. Aleksnadra Barczak, research assistant at INRA
Phone	+33.6.47.54.88.62
Email	cecile.detang-dessendre@inra.fr
Date of writing	February 2017

*corresponding author

List of Partners			
Partner Number	Partner Organisation Name	Partner Short Name	Partner representative Contact person
1	CESAER, AgroSup Dijon, INRA, Univ. Bourgogne Franche-Comté, F-21000 Dijon, France	INRA CESAER	Cécile Détang-Dessendre
2	Thünen-Institute for Rural Studies, Braunschweig, Germany	Thünen-Institute	Alexander Gocht
3	UMR SADAPT, INRA, AgroParisTech, Université Paris-Saclay, 75005 Paris, France	INRA SADAPT	Muriel Tichit
4	Economie Publique, INRA, AgroParisTech, Université Paris-Saclay, 78850 Thiverval-Grignon, France	INRA ECOPUB	Jean-Christophe Bureau
5	Laboratoire ThéMA - UMR 6049 CNRS et Université de Franche-Comté, 25030 Besançon, France	ThéMA	Daniel Joly
6	Department of economics, Swedish University of Agricultural Sciences, Lund – Uppsala, Sweden	SLU	Yves Surry
7	UMR SMART INRA, 35011 Rennes, France	INRA SMART	Carl Gaigné
8	ODR, INRA, F-31326 Auzeville, France	INRA ODR	Eric Cahuzac
9	UMR7204 CESCO, Sorbonne Universités-MNHN-CNRS-UPMC, Paris, France	MNHN	Frédéric Jiguet
10	Department of Agriculture, Food, and Environmental Sciences, University of Perugia, 06121 Perugia, Italy	UNIPG	Marco Vizzari
11	European Centre of Agricultural, Regional and Environmental Policy Research GmbH, Bonn, Germany	EuroCARE	Peter Witzke
12	International Institute for Applied Systems Analysis, Laxenburg, Austria	IIASA	Petr Havlík
13	University of Latvia, Department of	LU	Ainārs Auniņš

	Zoology and Animal Ecology, Riga, Latvia		
14	University College Dublin, School of Agriculture and Food Science, Dublin, Ireland	UCD	James Breen
15	Technical University of Madrid, Department of Agricultural Economics, Madrid, Spain	UPM	Maria Blanco
16	Forest Sciences Centre of Catalonia (CTFC), Barcelona, Spain	CTFC	Lluís Brotons

B PUBLIC CONSOLIDATED SUMMARY

B.1 PUBLIC CONSOLIDATED SUMMARY (FRENCH)

Comment libérer le potentiel des espaces ruraux pour promouvoir un développement régional équilibré, associant croissance économique et services écosystémiques

Vers les bénéfices réciproques pour le développement rural et la fourniture des services écosystémiques

L'objectif du projet TRUSTEE était de décortiquer les relations complexes entre le développement économique, les dynamiques d'usage des sols et les services écosystémiques à différentes échelles spatiales. Ces relations soulèvent trois grandes questions:

- Existe-t-il une organisation spatiale optimale des activités conduisant au développement économique rural, tout en assurant la fourniture de services écosystémiques ?
- Comment peut-on combiner les mécanismes de marché et l'action publique pour atteindre une répartition spatiale durable des activités ?
- Sous quelles conditions les services écosystémiques constituent-ils des opportunités pour le développement rural ?

Interdisciplinarité et dialogue entre chercheurs internationaux et diverses parties prenantes

Pour atteindre nos objectifs, nous avons développé une approche interdisciplinaire impliquant des économistes, des écologues, des géographes et des agronomes. Nous avons combiné différentes approches scientifiques, telles que modélisation théorique, analyse de grandes bases de données et études de cas. A toutes les étapes du processus de recherche nous avons impliqué les chercheurs, les experts et diverses parties prenantes afin de renforcer la capacité de multiples décideurs, intervenant à échelle locale, nationale ou européenne, à concevoir des stratégies durables pour les espaces ruraux.

Quelques résultats majeurs de TRUSTEE

Grâce au projet TRUSTEE des progrès considérables ont été réalisés en vue de relever trois grands défis de la recherche qui était au cœur du projet. Pour illustrer nos résultats nous présentons ici quelques exemples particuliers.

1- Analyse des déterminants multi-échelles du développement économique et des services écosystémiques

Lors de l'analyse de la **performance des marchés du travail locaux**, nous avons mesuré le rôle des migrations économiques interrégionales. Alors que les marchés du travail en Europe et en France en particulier, ont généralement été considérés comme moins flexibles que les marchés nord-américains, les ajustements à des chocs d'emploi fonctionnent assez rapidement. Ce sont donc d'autres obstacles structurels qui seraient à l'origine de relativement faible performance du marché du travail. Nous avons aussi confirmé l'importance des caractéristiques de la main d'œuvre pour la performance économique et l'innovation des firmes installées dans les espaces ruraux.

Nous avons réussi à **cartographier les services écosystémiques et la biodiversité** en mobilisant une gamme d'indicateurs à différentes échelles, de la locale à l'europpéenne. Cela a permis de rechercher des corrélations spatiales entre les différents services écosystémiques et de cartographier les "points chauds" et les "points froids" multifonctionnels.

Un progrès a été réalisé dans le domaine de la **modélisation géographique des séquences paysagères** le long du gradient Urbain - Rural - Naturel, avec un zoom particulier sur la détection des formes d'étalement urbain.

2- Connaissance des liens entre le développement économique des espaces ruraux et les services écosystémiques

A l'échelle du paysage, nous avons étudié les conséquences des stratégies spatiales de protection environnementale sur les compromis entre les rendements agricoles et la conservation des espèces. Les scénarios explorés ont montré que l'hétérogénéité paysagère de l'agroécosystème est un facteur clé en faveur des compromis entre la conservation de la biodiversité et la production agricole. Nous avons cherché à savoir si l'optimisation de l'allocation de l'intensité agricole pourrait améliorer simultanément la production alimentaire et la biodiversité. Nous avons révélé des solutions «gagnant - non-perdant» permettant d'augmenter la biodiversité sans pertes de production. Nous avons démontré qu'une répartition optimale de l'intensité peut être un moyen puissant pour concilier les impératifs de conservation et de production à l'échelle nationale. Toujours en explorant **le lien entre l'agriculture et la biodiversité**, nous avons montré que la diversité des cultures améliorerait la résilience de la production en grandes cultures.

En étudiant les **effets de différents usages des sols sur les écosystèmes d'eaux douces**, nous avons conclu que, comparés à d'autres usages, les usages urbains exerceraient le plus fort impact négatif sur les populations de poissons d'eaux douces.

3- Identification et évaluation de mécanismes de gouvernance et d'instruments de politique publique en faveur d'une vitalité rurale durable

À l'aide du modèle CAPRI, nous avons évalué l'impact d'une mesure politique qui viserait l'expansion des prairies pour **atténuer les émissions de gaz à effet de serre (GES)** issus de l'agriculture. Notre objectif était de savoir si dans ce cas il est judicieux d'utiliser une **mesure unique à l'échelle de l'UE**. Nous avons constaté que le potentiel d'atténuation des GES et les coûts de réduction dépendent des caractéristiques régionales (taux de séquestration du carbone, marchés fonciers et structure de la production agricole). Nous avons conclu qu'une telle politique portant sur les prairies ne devrait pas être mise en œuvre

dans le cadre du premier pilier de la PAC, mais pourrait être conçue comme une “mesure agroenvironnementale climat” (MAEC) ciblée.

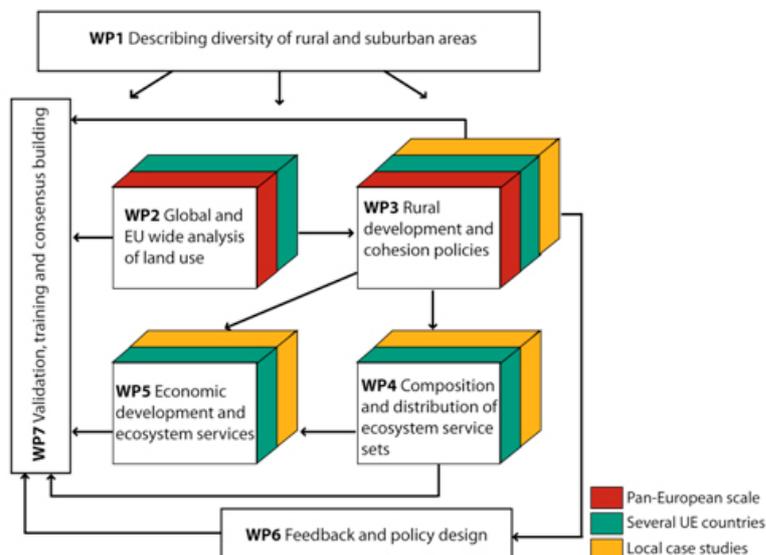
Dans une analyse comparative, nous avons étudié la mise en œuvre d'un outil de gouvernance emblématique, à savoir **le programme LEADER**. Nous avons identifié le processus LEADER comme étant une approche de gouvernance « down-up » résultant d'une part d'une démarche descendante (« top-down ») par la déclinaison local d'un dispositif européen et d'une démarche ascendante (« bottom-up ») permise par la définition d'une stratégie locale à partir de la mobilisation des acteurs du territoire. Nous avons décrit différentes formes de sa conception et mise en œuvre, qui dépendent du cadre institutionnel régional et national. Dans ce travail, nous montrons que LEADER en mobilisant les acquis des territoires, ne renouvelle pas profondément la conception du développement rural au niveau local comme attendu par la Commission européenne qui à travers cet outil souhaitait encourager l'innovation dans le champ de la gouvernance.

Nous avons analysé le fonctionnement du **processus d'évaluation des programmes de développement rural de l'UE** et nous avons interrogé la possibilité pour les États membres d'apprendre les uns des autres. Notre conclusion principale est que les évaluations ne semblent pas affecter la conception des politiques futures. Cela peut s'expliquer par des recommandations vagues ou trop générales, par l'absence de données pertinentes qui entravent sérieusement les possibilités d'utiliser des méthodes d'évaluation scientifiquement fondées et la mauvaise accessibilité des documents d'évaluation.

Production scientifique

Nos activités de recherche ont abouti à la publication d'environ 30 articles scientifiques à paraître ou déjà publiés dans des revues à comité de lecture, dont la plupart proviennent de collaborations internationales. D'autres sont en cours de préparation. Plus de 40 présentations de résultats de TRUSTEE ont été discutées lors de conférences et dans des colloques internationaux. La valorisation académique de nos recherches a été complétée par des interactions avec diverses parties prenantes - chefs d'entreprise, décideurs politiques à l'échelle locale, nationale ou européenne, agences gouvernementales, ONG - à l'occasion d'ateliers, de séminaires d'échange de connaissances et de séances de formation internationales que nous avons organisés.

La démarche



TRUSTEE - Informations factuelles

Intitulé: Towards Rural Synergies and Trade-offs between Economic Development and Ecosystem Services - Vers des synergies et des compromis entre le développement économique et les services écosystémiques dans les espaces ruraux

Financement: ERA-NET "Transnational research linking agricultural, rural and sustainable development aspects" (RURAGRI) 2013, 7ème Programme Cadre de la Commission européenne

Référence du projet: 235175 RURAGRI (ANR- 13-RURA-0001-01)

Coût total: 2.6 M€

Date de début du projet: 1er septembre 2013 pour 42 mois

Consortium: 16 partenaires issues des universités, des établissements scientifiques et autres organismes de recherche, originaires de 8 pays européens (Allemagne, Autriche, Espagne, France, Irlande, Italie, Lettonie et Suède)

Coordinateur de project : Cécile Détang-Dessendre - CESAER, AgroSup Dijon, INRA, Univ. Bourgogne Franche-Comté, F-21000 Dijon, France

Mots clés: espaces ruraux, espaces périurbains, développement économique, services écosystémiques, dynamique des usages des sols, dynamique rurale - urbaine, développement rural, aménités naturelles, politiques publiques, gouvernance locale, performance économique, recherche de consensus

Pour en savoir plus: <http://www.trustee-project.eu/>

B.2 PUBLIC CONSOLIDATED SUMMARY (ENGLISH)

How to unlock the rural potential to foster the balanced regional development linking economic growth and ecosystem services?

Towards mutual benefits for rural development and provision of ecosystem services

TRUSTEE aimed at disentangling the complex relationships between economic development, land use dynamics and ecosystem services at different spatial scales. Three major questions raised by these relationships were in the core of the research:

- Does an optimal spatial organisation of activities, leading to rural economic development while ensuring the provision of ecosystem services, exist?
- How does one combine market mechanisms and public action to reach sustainable spatial allocation of activities?
- Under which conditions do ecosystem services constitute opportunities for rural development?

Interdisciplinarity and synergies among international researchers and stakeholders

To reach our goal, we developed an interdisciplinary approach that involved four disciplines: economics, geography, ecology and agronomy. Varied scientific approaches, such as theoretical modelling, analysis of large databases and case studies, were combined. At every step of the research process, we involved scientists, experts, and stakeholders to strengthen the capacity of a range of local, national and European decision-makers to design sustainable strategies for rural areas.

Some major results from TRUSTEE

With TRUSTEE, a substantial progress has been made in addressing three major research challenges being in the core of the project. To illustrate our achievements we present here some specific examples.

1- Analysis of multi-scaled determinants of economic development and ecosystem services

When analysing **performance of labour markets in rural areas**, we measured the role of interregional economic migration. Although labour markets in Europe and especially in France have generally been viewed as not as flexible as those in North America, adjustments to employment shocks are relatively fast. Thus, other structural impediments are behind relatively poor labor market performance. We also confirmed the importance of characteristics of labour force for economic performance and innovation of firms located in rural areas.

We succeeded in **mapping ecosystem services and biodiversity** using proxies and indicators at different scales, from local to European. This allowed to look for spatially implicit and explicit correlations between different ecosystem services and to map multi-functionality hotspots and coldspots.

An improvement was done in **geographical modelling of landscape** sequences along with the Urban - Rural - Natural gradient, with a special focus on detecting patterns of urban sprawl.

2- Understanding of links between economic development in rural areas and ecosystem services

At the landscape scale, we investigated the consequences of spatial conservation strategies on the trade-offs between yield and conservation. Explored scenarios showed that landscape heterogeneity of agroecosystems is a key driver of the trade-offs between biodiversity conservation and agricultural production. We explored whether the optimization of allocation of intensity could improve food production and biodiversity outcomes. We revealed “win-no loss” solutions, increasing biodiversity without production losses, and we demonstrated that optimal allocation of intensity can be a powerful means of reconciling biodiversity and agriculture at the national scale. Still exploring the **link between agriculture and biodiversity**, we showed that crop diversity improve resilience of major crop production.

Investigating **effects of alternative land uses on freshwater ecosystems**, we concluded that the urban land has the greatest adverse impact on freshwater fish populations related to all other land uses.

3- Identification and assessment of governance mechanisms and policy instruments that enhance sustainable rural vitality

Using the CAPRI model we assessed the impact of a policy measure for grassland enhancement aimed at **mitigation of greenhouse gas (GHG) emissions** from agriculture. Our objective was to know how sensible it is to use a **one-fits-all policy measure in the EU**. We found that the GHG mitigation potential and the abatement costs in the end depend on regional characteristics (carbon sequestration rates, land markets and structure of agricultural production). We concluded that such a grassland policy should not be implemented through the first pillar of the CAP but could be designed as a targeted Agri-Environment Climate Scheme (AECS).

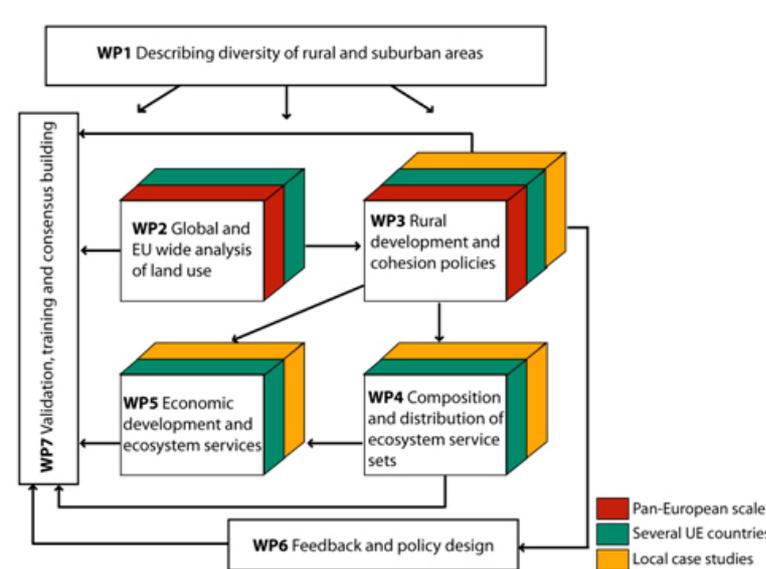
In a comparative analysis, we investigated implementation of an emblematic multi-level policy system, which is **LEADER approach**. We identified LEADER process as a “down-up” governance approach as it is a mix of top-down and bottom-up approaches. We described differentiated LEADER governance design forms, which depend on regional and national institutional framework. In this work, we show that LEADER, mobilising experiences and advantages of territories, doesn't deeply renew the conception of rural development at local level, as expected by the European Commission, by promoting innovation towards this procedure.

We analysed the functioning of the **evaluation process of EU Rural Development Programmes** and the possibility for member states to learn from each other's experiences. Our main finding is that the evaluations do not seem to affect future policy design to any discernible degree. This may be explained by their vague or too general recommendations, lack of relevant data which severely impedes the possibilities of using scientifically well founded evaluation methods and poor accessibility of evaluation documents.

Dissemination

TRUSTEE research activities resulted in 30 scientific articles, forthcoming or already published in peer-reviewed journals, majority of which resulted from international collaborations. Others are in preparation. Over 40 presentations of TRUSTEE results were discussed in a number of international symposiums and conferences. Academic outcomes were supplemented by interactions with various stakeholders through workshops, knowledge exchange seminars and international training sessions.

Research scheme



TRUSTEE Facts

Title: Towards Rural Synergies and Trade-offs between Economic Development and Ecosystem Services

Funding scheme: ERA-NET Transnational research linking agricultural, rural and sustainable development aspects (RURAGRI) 2013, European Commission 7th Framework Programme

Grant Agreement: 235175 RURAGRI (ANR- 13-RURA-0001-01)

Total Cost: 2.6 M€

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Key words: rural area, suburban area, economic development, ecosystem services, land use dynamics, rural-urban dynamics, rural development, natural amenities, public policies, local governance, economic performance, consensus building

Read more: <http://www.trustee-project.eu/>

C SCIENTIFIC REPORT

Confidential scientific report: no

C.1 SUMMARY OF THE REPORT

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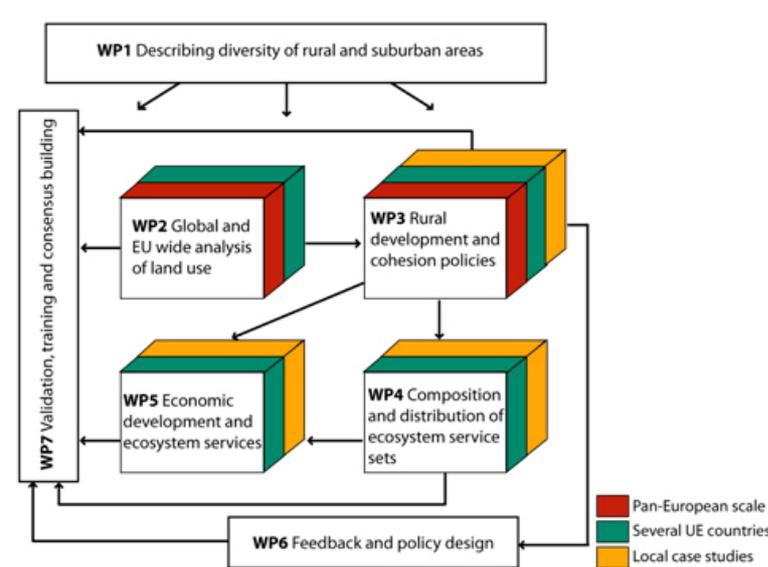
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C.2 MAJOR CHALLENGES, PROBLEMATICS AND STATE OF THE ART

In Europe and the United States, developmental paths of rural areas are believed to be plural (Edora, 2011). As early as Thünen (1826), regional and urban economists began analysing spatial and regional disparities through three drivers: (i) natural-resource advantages, (ii) economies of agglomeration, and (iii) costs of transport and communication (Hoover and Giarratani, 1984). Even though natural amenities have been introduced into numerous economic studies, their inclusion remains quite limited. National and international assessments show that ecosystems are and often continue to be degraded; therefore, ecosystem services (ESs) and public goods are now considered a part of policy and have become increasingly important within the European context (European Commission, 2010).

In regional development analyses, a fundamental concept is that the interplay between physical geography, different scale economies, and transport costs has critical impact on the way space-economy is organised at the various spatial scales (e.g., rural areas, cities, regions). Accordingly, land use and economic development are inherently linked through zoning, transportation, infrastructure, sprawl, and the environmental attributes that jointly affect business productivity and household utility. Nevertheless, Partridge and Rickman (2014) stress that the interactions between regional analyses of economic development and land use economics are limited. The development of the “New Economic Geography,” following Krugman (1991), helps explain spatial concentrations of production and population; however, the canonical NEG model neither explains the persistence of attractive and dynamic peripheral areas (Dijkstra et al. 2013) nor accounts for the role of natural amenities in local development. Recent frameworks developed from NEG theory, however, take into account different and fundamental natural and institutional aspects of urban development, particularly as they impact natural amenities, use of resources, and the food chain (Gaigné and Thisse, 2014).

Land use modelling includes: (i) Aggregated models, which adequately explain land dynamics and predict transitions but perform poorly in policy simulations, often due to lagged variable inertia; and (ii) Disaggregated models, which include more economic determinants and perform better for simulations, but which have difficulty accounting for spatial correlation effects, limiting their predictive capacity (Plantinga and Irwin, 2006). Explicit introduction of land markets in regional economic development models is possible in general equilibrium (CGE) models (Partridge and Rickman, 2014) and, with ad hoc assumptions on those land uses that are not at the focus of the study, in partial equilibrium models such as CAPRI and GLOBIOM. Empirically, the CAPRI-RD consortium has also constructed regional CGE models and has integrated them into a full-blown EU application that illustrates the frontier of economic modelling and associated complexity limits. Complete modelling of a land market

that deals with environmental issues is still needed. In their survey on a century of research on rural development and regional issues in the United States, Irwin et al. (2010) found that the consumption of natural amenities is becoming one of the primary determinants of rural growth. Numerous studies on urban-rural migrations have introduced these natural amenities as drivers in spatial equilibrium models (Greenwood, 1997). Spurred by the famous “job versus people” engine for regional growth (Muth, 1971), natural amenities were introduced as control variables in the early 2000s (Duffy-Deno, 1998). Several studies empirically showed positive impacts of natural amenities on rural growth (Wu and Gopinath, 2008). Nevertheless, natural amenity measures in these analyses are simplistic, with the exception of collaborations between economists and geographers who produced advancements in landscape modelling (Cavaillès et al. 2009). More recently, Irwin et al. (2014) show that constraints associated with the presence of water bodies and some types of open space preservation have contributed to higher housing prices offsetting local demand for these natural amenities. Several high profile reviews and meta-analyses highlight the need for a more effective multi-service approach (Foley et al. 2005; Kareiva et al. 2007; Bennett et al. 2009), yet trade-offs and synergies among ecosystem services at different scales and across various landscapes remain poorly documented and poorly understood. Most research has focused on either one service or a discrete set of services. Recent meta-analysis reports show that 50% of the studies that have previously analysed ecosystem services considered neither interrelationships nor feedback (Seppelt et al. 2011). Prioritising a single ecosystem service risks failure to protect biodiversity as a whole (Naidoo et al. 2008). Indeed, Raudsepp-Hearne et al. (2010) suggest that multiple ecosystem services can interact and that sets of ecosystem services (or bundles) are jointly provided across space and/or time. Beginning in 2013, and at the same time step than TRUSTEE, a large assessment programme of ecosystem services (EFESE) has been initiated by the French ministry of environment. The general framework points out the importance of sets of ESs (Puydarrieux, 2015). EU biodiversity policy introduced the concept of ecosystem services as a means for mainstreaming biodiversity into other policies. Analytical tools that incorporate scenarios and policy instruments (Fisher et al. 2009) are rarely considered in studies (i.e., 29% of those studies evaluated in meta-analysis by Seppelt et al. 2011). Despite substantial experimental evidence that biodiversity underpins ecosystem services, critical questions about whether biodiversity loss causes impaired ecosystem services in simplified landscapes remain unanswered (Cardinale et al. 2012). Key to this debate is the need to define biodiversity within a larger framework than what species richness and relative abundance do, such as adopting a broader definition that is based on functional traits of species (Bianchi et al. 2006). Bird population trends are an accepted proxy for wider-scaled biodiversity, yet some suggest that the role of birds needs to be expanded into a broader framework of ecosystem function that includes key ecosystem services (see review in Wenny et al. 2011). Birds provide regulative ecosystem services (e.g., seed dispersal, pollination, consumption of carrion, and predation/pest control; Civantos et al. 2012; Mäntylä et al. 2011). Birds also provide human cultural services that likely vary across society and regions (i.e., different categories of stakeholders may establish different priorities). Several researchers suggest birds could act as proxies for provisioning and supporting cultural services, but they lack the empirical evidence to show a positive relationship between bird population trends and flow of ecosystem services. A crucial question is: Where and how can birds be indirect indicators of service provisions?

Our state-of-the-art work highlights the importance of holistic, interdisciplinary research that responds to the joint challenge of creating economic development and ecosystem services in rural areas. It calls for the development of analytical tools that explicitly integrate (i) market and policy drivers of economic development, (ii) land use decisions, (iii) local decision processes, and (iv) ecosystem services. We believe these tools can both explicitly assess the relative importance of natural amenities for rural development, and account for the scale mismatch between ecosystem services and economic activities, particularly since mismatch can lead to feedback failure (i.e., gains emerge at one scale but costs are incurred at another).

C.3 SCIENTIFIC AND TECHNICAL APPROACH

The continuing degradation of ecosystems is confirmed by national and international assessments. Therefore, ecosystem services and public goods have gained in importance within the European policy context. However, relationships between ecosystem services and their determinants are still little documented. In the same time, rural economies have undergone several changes over past decades. Drivers and preconditions of a sustainable socio-economic development of those highly complex systems are still little understood.

To raise thematic and methodological challenges we developed an interdisciplinary approach bringing together economists, geographers, agronomists and ecologists. We articulated various scientific approaches, such as theoretical modelling, analysis of large databases and case studies and we made them complementary and mutually supporting.

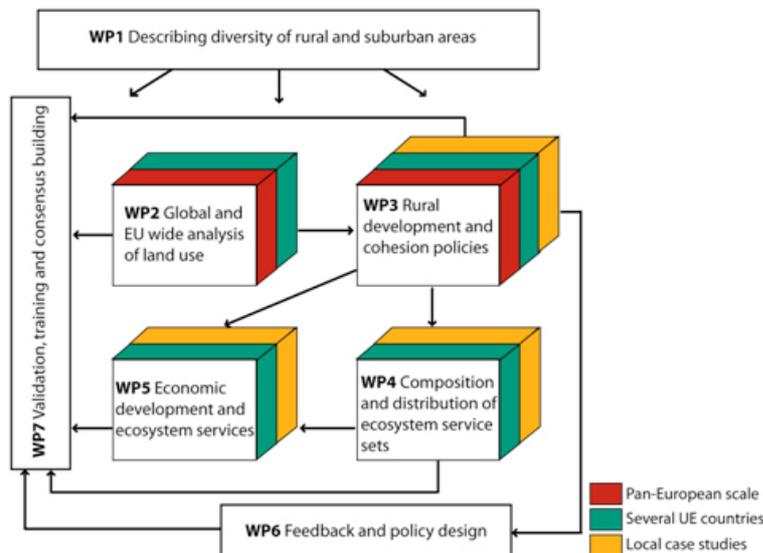
Our research strategy consisted in structuring the work in seven interrelated scientific work packages (WPs) delimited accordingly to their knowledge domains and their spatio-temporal scales. One specific work package was dedicated to the project management (Tab. 1 and Fig. 1).

Table 1. Structure of the project

WP	Title	Leader
WP0	Project management	Cécile Détang-Dessendre, INRA CESAER
WP1	Describing diversity of rural and suburban areas	Eric Cahuzac, INRA ODR
WP2	Global- and EU-wide analyses of land use	Yves Surry, SLU
WP3	Rural development and cohesion policies	Anne Margarian, Thünen Institute
WP4	Composition and distribution of ecosystem service sets	Muriel Tichit, INRA SADAPT
WP5	Economic development and ecosystem services - some specific links	Jean-Christophe Bureau, INRA ECOPUB
WP6	Feedback and policy design	Ewa Rabinowicz, SLU
WP7	Validation, training, and consensus building	Alexander Gocht, Thünen Institute

WP1 was dedicated to elaborate data strategy needed to capture the diversity of rural situations at different scales of governance, from local to global. Research teams involved in WP2-6 took benefit from data expert knowledge and data management techniques developed by INRA ODR. WP2 focused on exogenous drivers of land use dynamics at different scales. It provided the framework for WP3, which was evaluating human capital impacts on economic development in peripheral areas, taking into account local economic structure. It evaluated the implementation and impact of rural development policies. WP4 was dealing with the characterization and modelling of the distribution of ecosystem services at different spatial (from local to European) and temporal (current and future) scales. WP5 made a first attempt to use starting point inputs from WP3 and WP4 to explore specific links between economic development and ecosystem service bundles. WP6 revisited policy concerns by examining potential impacts to specific objectives and investigating how policymakers can use the effects from earlier programs to design new ones. WP7 was a transverse action based on the outputs of most WPs and played a federative role to create synergy among researchers, experts, and stakeholders.

Figure 1. Research scheme



C.4 RESULTS

TRUSTEE research activities aimed at giving a better insight into the complex relationship between economic development and ecosystem services. More specifically, our objectives were to:

- analyse the multi-scaled determinants of economic development and ecosystem services on a large European gradient of rural - urban areas,
- increase our understanding of how to achieve mutual benefits for economic development in rural areas and ecosystem services,
- identify and assess the governance mechanisms and policy instruments that enhance sustainable rural vitality in very diverse contexts, and
- produce synergies among international researchers of varied disciplines and between researchers and various stakeholders at different governance scales.

To aim that objectives, we needed data at different spatial scales, from different disciplines and countries and the challenge was real. To deal with these issues, we developed a common strategy to improve **data availability** for researchers, which resulted in acquisition and pooling of several databases, such as a broad set of variables from European Farm Accountancy Data Network (FADN) or a set of indicators on ecosystem services provided by Joint Research Center of European Commission¹. **New methodologies** in data management have been developed to improve the use of these datasets. For instance, matching techniques were applied to the French Agricultural Social Security (FASS) dataset and the French FADN, so as to build a coherent dataset on major crop production (Donfouet et al. 2017). **New spatial indicators** for models of ESs and economic development determinants were also produced. Concerning scientific results regarding to our 4 objectives:

1- **Multi-scaled determinants of economic development and ecosystem services:**

Modelling land use changes (LUC) is at the core of this project because it is a major channel for the public policies and exogenous drivers that affect both ecosystem services and rural development. To quantify drivers of land use dynamics and provide prospective scenarios of future land use changes in the EU at different scales, **global, regional and local models have been articulated** (respectively, GLOBIOM, CAPRI, as well as individual and aggregated econometric models of LUC based on TERUTI dataset). Predictive accuracy at an aggregated level of individual and aggregated econometric land use models was compared. The results showed that modelling spatial autocorrelation allows to obtain more accurate predictions with aggregated models when the appropriate predictors are used (Ay et al. 2016a). Implementation and development of a variety of scenarios in a global economic land use model showed the role of climate change and macroeconomic drivers on LUC and its impacts in terms of agricultural production, GHG emissions, as well as prices and consumption trends (Frank et al., 2014a). A regional land use model implemented at the pan European scale using global land cover forecasts and local estimations of land transitions elasticities was developed to explicitly model gross transitions between land cover classes. The land transitions make it useful for modelling carbon sequestration in agriculture, which open new avenues for further research (Frank et al. 2014b; Witzke and Janson, 2017).

Local European labor markets have generally been viewed as not as flexible as those in North America, leading to greater fluctuations in local wages, labor force participation and unemployment rates. Using a host of novel identification approaches and French employment zone data dating back to the early 1980s, our results detect surprising amounts of **economic migration** in that most new jobs are eventually taken by new migrants or outside commuters. We conclude that other structural impediments besides relative local labor market inflexibility are behind relatively poor labor market performance (Détang-Dessendre et al. 2016). We also investigated linkages between local labor markets characteristics and firm innovation strategies in the food processing sector in France and Germany. We showed that local executive turnover positively influences innovation probability (Barczak et al. 2016a).

Mapping and modelling ecosystem services (ESs) and biodiversity were performed using proxies and indicators (i.e., variables based on land cover, land use, geography and climate), from landscape to continental scales. ESs maps allowed to look for **spatially implicit and explicit correlations** between different ESs and to observe multifunctionality hotspots and

¹ These indicators were developed in CAPRI project and are described in "A European assessment of the provision of ecosystem services", EUR 24750, 2011 (Maes et al. 2011).

coldspots based on the Simpson diversity index (Morelli et al. 2016). A special focus was given on **biodiversity using the data on birds and butterflies**. Different biodiversity metrics were explored at the scale of France, and spatial correlations were checked. No spatial congruence, neither positive association between ESs and multifunctionality was found. However, a significant negative association was found between community evolutionary distinctiveness and hotspots of ESs (Jiguet et al., 2016). The role of changes in land uses as a driver of changes in biodiversity and a positive effect of European environmental policies on biodiversity were confirmed using original indicators (Cardador et al. 2014; Gamero et al. 2016; Herrando et al. 2014; Herrando et al. 2015; Titeux et al., 2016).

A broadly applicable methodology for **classification and analysis of the landscape** sequences occurring along the Urban-Rural-Natural (URN) gradient was developed starting from widely available land use and land cover data (Vizzari et al., forthcoming; Vizzari and Sigura, 2015; Vizzari et al., 2015). Still following a geographic approach, a new method was proposed for characterising different patterns of the urban sprawl by accounting for the proximity of built and non-built land (Caruso et al., 2014; Caruso et al., forthcoming). Then, the impact of urbanisation and peri-urbanisation on visual structure of landscapes was evaluated for different **urban morphologies** and according to the city size (Joly et al., forthcoming).

2- Links between economic development in rural areas and ecosystem services: Modelling the dynamic interactions between components of socio-ecological systems was performed by running exploratory and target-seeking scenarios. Relationship between food production and biodiversity was modelled and optimal allocation of agricultural intensity or land use revealed win-no-loss solutions (Teillard et al., 2015, 2016; Dross et al., 2014a, 2014b, 2015, Accatino and Tichit 2016a, 2016b). Modelling the relationship between agriculture and wader biodiversity based on the French case study (Marais Poitevin area) showed that high diversity of farming practices which contribute to high compositional heterogeneity is a key driver of the trade-offs between biodiversity conservation and agricultural production (Sabatier et al., forthcoming; Sabatier et al. 2016). Investigating reverse linkages between production of major crops and crop diversity showed the positive role of the latter for enhancing the agricultural resilience (Donfouet et al. 2017).

Taking human choices (such as land use) into account when modelling natural species distribution is a challenging task. In a multi-disciplinary and methodologically original work, carried out in France (Ay et al. 2016b), we have corrected the widely used statistical analysis about species distribution by an econometric model of land-use choices applied to four widespread European tree species. The results constitute a step forward accounting for the economic forces shaping species distribution in anthropized areas and pave the way for a direct assessment of trade-offs and opportunities that may arise in a context of global change. To measure the effects of alternative land uses on freshwater biodiversity, we estimated a spatial panel data model at the national level. The results suggest that ecological status of surface water is more degraded by the urban development than by the other land uses (Bayramoglu et al. 2016).

Assessment of landscape liveability based on the perceived importance of both ESs and urban services (USs), according to stakeholders' views, was conducted on the Italian case study (Perugia region). The results showed that this original methodology can support landscape planning and policy making through superior ESs and USs integration and

through more effective assessments of their perceived relevance (Antognelli and Vizzari, 2016, 2017).

We investigated the relation between agricultural production and rural-urban dynamics in setting a theoretical model, which demonstrates that urbanization not only affects the land allocation between traditional and high value crops, but also changes relative input and output prices for the two types of crops. Our empirical analysis on a wide range of EU metropolitan areas show that **increasing population density increases farm returns**, while increasing land **fragmentation** may have a detrimental effect in the beginning but a positive effect for high levels of fragmentation (Oueslati et al. 2014). Regarding the linkage between urban forms, food production and GHG emissions, we found that "**pure local food systems**" do not necessarily reduce transport-related GHG emissions, even if production technologies and yields are homogeneous in space. We found that optimal spatial allocation of food production is driven by distribution of population within the region (city size). Thus, social benefit from alternative farming and local provisioning is optimal for intermediate city size (De Cara et al. 2017; Fournier A., 2014, 2016)

Seeking conciliation between **residential development and ecosystem services preservation**, we provided a theoretical analysis of the optimal city comparing two patterns: compact city with large open spaces at the outskirts and more spread one with small intra-urban open spaces. We show that the choice between these two patterns depends on the type of biodiversity under scrutiny, the habitat provision capacities of landscapes and on the decision-maker's valuation of this ecosystem service (Regnier and Legras, 2017; Regnier, 2016). Our empirical analysis confirm households' positive willingness to pay for green landscape in close proximity of their residence (Détang-Dessendre et al. 2017).

3- The governance mechanisms and policy instruments that enhance sustainable rural vitality: We investigated the **effect of training policies and human resources strategies on food-processing firms performance seen through the lens of innovation**. We showed that labour recruitment, skill development and attraction of young people for vocational training are important concerns of local labour market stakeholders, which involve activities at the firm level and beyond, which require considerable coordination effort and adequate governance approaches (Barczak et al. 2016a; Margaritan et al. 2017).

A cross-country, case study based analysis of an emblematic example of local governance innovation, that is **LEADER implementation**, revealed differentiated local forms of governance taking into account national and regional framework of public policies. Different forms of LEADER process can range from its use in a redistributive perspective as in Italy to an allocative logic in the case of France. Multi-level LEADER process could be identified as a "down-up" approach, as it results on the one hand from a top-down approach by a local declination of a European tool and on the other form a bottom-up approach where a local strategy is defined on the basis of mobilization of local stakeholders. We show that LEADER has positively supported strategies to strengthen the decentralisation and territorialisation of public policies, especially in France. However, we concluded that LEADER doesn't deeply renew the conception of rural development at local level as expected by the European Commission (Berriet-Solliec et al. 2016). The results concerning the implementation of rural development policies were complemented by an econometric analysis of the **impact of LEADER on rural development**. Results show a positive effect of LEADER on further rural development spending, on the number of beneficiaries from rural development measures and on residential attractiveness contributing to a more balanced migration. Nevertheless, no

positive effects of the measure on economic development could be identified if LEADER is implemented alone (Védrine and Lépiciér, 2016).

Using a bio-economic model applied to France, we compared different **optimal public strategies**. We showed that, when the biodiversity objectives are either very limited or very demanding, grassland subsidies are the best instruments from both green and sustainable points of view. However for medium objectives, reducing crops subsidies is the cheapest way to green the CAP, while subsidies on grasslands are the only strategy from a sustainability perspective (Mouysset, 2014).

We assessed the **impact of an EU-wide policy** to expand grassland areas and promote carbon sequestration in soils. We used **CAPRI-RD** model to gauge how sensible it is to use a one-fits-all policy measure in the EU for grassland enhancement and to calculate the abatement costs in the end. The analysis showed that the local specific effects of measures might contradict the globally intended impacts (Gocht et al. 2016).

Exploratory scenarios of climate change and of policies aimed at the reduction of GHG emissions from agriculture were run to assess their impacts on agriculture and forestry in France. Simulation results show that agricultural expansion involved by the climate change could be curtailed by **greenhouse gas emissions tax mitigation policy**. By doing so, the effects of climate change on land use changes could be counteracted and the associated abatement costs would be reduced (Lungarska and Chakir, 2016).

Simulation techniques were also used to develop dynamic models of land use explaining the conditions of land development and the existence of **passive farming** in Sweden (Di Corato and Brady, 2016; Di Corato, 2016). We found that, even if delaying land development, paying passive farmers increases the value of the land. When bargaining for the lease of land, we show that the agreement between the parties is conditional on an underlying development project passing a threshold level in terms of profitability. We also showed that, as uncertainty increases, the impact of option value considerations leading to the postponement of land development is slower under hyperbolic time preferences.

To validate the baseline of the agro-economic model CAPRI we have carried out a **review of the methodologies used to generate and validate agricultural baselines**, relevant for partial equilibrium analysis of agricultural and trade policies, from global to regional scale (Blanco and Martinez, 2014). Furthermore, as a part of the validation process, we have compared CAPRI results from the current baseline (calibrated to DG-AGRI baseline 2013) with the national baseline for Ireland, as well as the official GHG inventory statistics with results from CAPRI with a particular focus on Germany (Schroeder et al., 2014; Bubbico and Breen, 2016; Marquardt and Gocht, 2016). We also made use of the CAPRI model to assess the **environmental and economic impacts of the CAP 2020 green payment** in Spain (Martinez and Blanco, 2015) and the effects of greening measures across farming systems by comparing the case studies of Ireland and Spain (Bubbico et al. 2016).

The compulsory, standardised, and common for all Member States **evaluation process of the EU Rural Development Programmes (RDPs)** was analysed. Several obstacles to provide consistent RDPs evaluation with an effective feedback on policy design were identified. The most prominent being: (i) the scarcity of relevant data, (ii) very limited possibilities of learning from cross-country experience and (iii) uncertainty of results leading to few recommendations for policy changes, which are seldom followed. We concluded that there is no indication that evaluations affect future policy design to any discernible degree.

Hence, it appears that the evaluation process has been used for strategic purposes, i.e. for legitimisation of the rural development policy rather than for improving it (Andersson et al. 2016).

4- Synergies among international researchers of varied disciplines and between researchers and various stakeholders at different governance scales

For involved research teams, TRUSTEE was an opportunity for opening up at an international level and for implementation of an interdisciplinary approach.

A major methodological investment was provided with bridging the gap between ecological, geographical and economic approaches. As a first step, TRUSTEE enabled researchers to pool ecological and socio-economic indicators, which fed into different modelling approaches. (Teillard et al. 2015, 2016). Afterwards, we made a first attempt to introduce variables related to biodiversity and ecosystem services along with other determinants into models of economic performance (Donfouet et al. 2017; Blancard, 2017). We highlighted that land use was not so often included as a driver in ESs and biodiversity scenarios. We also demonstrated its linkage with ESs and biodiversity. This convergence of approaches resulted from several working sessions bringing together ecologists, economists and geographers.

We succeeded in combining three different strategies in modelling land use change. A variety of climate change scenarios has been developed and implemented in a global economic land use model (GLOBIOM). A broad spectrum of individual and aggregate, spatial and aspatial, short and long run econometric model specifications was also implemented on detailed datasets. Then, market and land use projections at the global scale (from GLOBIOM) and land transition elasticities estimated with econometric models provided input for modelling gross transitions between land cover classes, and features a physical balance for the entire land area on regional level in the EU (in CAPRI, see Witzke and Jansson, 2017).

We combine theoretical and empirical economic approaches and well as qualitative and quantitative analysis supporting the same scientific objective. The analysis of the impact of policy measure on land development and biodiversity is an example of the first point (Di Corato, 2016; Di Corato and Brady, 2016; Surry, 2017). The research on the impact of labor force characteristics on economic performances or the one on the assessment of Leader device and its efficiency are examples of the second combination (Margarian et al. 2017; Barczak et al. 2016a; Védrine and Lépiciér, 2016; Berriet-Sollicé et al. 2016).

Using multivariate lexicometric tools aimed at identifying areas of congruence between rationalistic discourses and preference systems (Lebart et al. 2003), we exploited the results of the consensus survey among TRUSTEE researchers. The analysis revealed differentiation between researchers centered on environmental issues and those focused on productive and territorial trade-offs concerns (Desbois et al. 2017).

All over the project we engaged with various stakeholders: firm leaders, policy makers acting on a local, national or European level, members of the public, governmental agencies, and non-governmental organisations (NGOs). The objective of this engagement was threefold: firstly, to build network of relationships with and between, strongly concerned stakeholders and experts; secondly, to open up dialogue and involve stakeholders in thinking through issues being researched; thirdly, to get feedback on findings and methods, and give to stakeholders a greater ownership over the research outcomes. Exchanges with stakeholders

fell into specific tasks of the project, in the aim to elicit their views and priorities on issues being researched. For instance, some specific objectives concerned:

- prioritisation of Ecosystem and Urban Services in order to understand their influence on liveability (Antognelli and Vizzari, 2016);
- identification of different stakeholder perspectives on the current local skill situation in the food-processing industry and on possible measures to counter perceived labour market shortages (Barczak et al. 2016b);
- local conditions of implementation of the LEADER programme (Laidin et al. 2016).

We also prompted opportunities for sharing field experiences and getting feedback on research findings in larger seminars and workshops, as we did in Information Exchange Workshop among stakeholders and researchers entitled “Providing public goods and ecosystem services” and organised in collaboration with researchers from European research project PEGASUS².

C.5 EXPLOITATION OF RESEARCH RESULTS

TRUSTEE research results are exploited at three different levels, contributing to:

1- Advance scientific knowledge

Our research findings were broadly disseminated to the scientific community. Most outcomes were internationally disseminated in scientific journals and events. Along with other forms of dissemination, TRUSTEE resulted in 20 articles already published in peer-reviewed journals. Over 40 presentations of findings were discussed in conferences, symposiums and seminars. This scientific valorisation of the project is still ongoing with a number of scientific articles and a few chapters in collective books currently under the publishing process; others being in preparation (see, section E).

2- Improve methodological tools and indicators

Methods and spatial indicators produced in TRUSTEE, which refer to mapping of ecosystem services bundles, have fed into the French Assessment of Ecosystems and Ecosystem Services³. Moreover, a set of ecological and socio-economic indicators were made available to a larger scientific community by the means of the Internet platform developed by INRA ODR. Improvements in methodologies of data management developed by this TRUSTEE partner benefit to further research projects currently ongoing. For instance, a comparative study involving several partners from Spain, Sweden and France has been initiated to evaluate the impact of rural development measures on farm labour using the data collected in TRUSTEE. LANDMARK⁴ H2020 Project on the sustainable management of land and soil, as well as a PhD project at AgroParisTech will also benefit from methodologies developed in TRUSTEE.

² Providing public goods and ecosystem services – Information Exchange Workshop among stakeholders and researchers, in collaboration with [PEGASUS](#), H2020 project under Grant Agreement No 633814, September 29, 2015, Dijon (France).

³ The French Assessment of Ecosystems and Ecosystem Services [L'évaluation française des écosystèmes et des services écosystémiques (EFESE)] initiated by the Ministry of Environment in 2012, is the French participation to the MAES initiative (Mapping and Assessment of Ecosystems and their Services), which is an essential part of the EU Biodiversity Strategy to 2020.

⁴ LANDMARK, “LAND Management: Assessment, Research, Knowledge base”, H2020 project under Grant Agreement No 635201, read more: <http://landmark2020.eu/>

The contributions from TRUSTEE for the future potential of CAPRI is crucial, even though the current implementation is still in a pilot phase. So far carbon price policies operating both on the technology choice within agriculture as well as capturing the effects from land use change between agriculture and other land uses could only be represented with severe limitations because land use change (for example afforestation of former agricultural land) was not an explicit variable. The TRUSTEE respecification based on the estimates from Chakir and Ay, 2016 paves the way for an encompassing modelling covering the whole AFOLU⁵ sector.

3- Inform public debate and provide decision-making supports for stakeholders

Supplementary to recommendations for public policies expressed in our research communications, TRUSTEE partners interacted directly (and keep doing it) with various stakeholders and contribute to the public debate on sustainable rural development strategies and paths for efficient conservation of ecosystem services and biodiversity.

In order to promote the use of quantitative tools for policy impact assessment in the field of land use and rural development we proposed a series of training activities bringing together national and European stakeholders and experts with researchers. Based on hands-on approaches and using existing result sets from scenario analysis with CAPRI, training workshops allowed participants to introduce applied methodology, present key assumptions and developments of the baseline models, and discuss the policy background of analysed scenarios.

Workshop with local, regional and national stakeholders involved in implementation of LEADER programme provided an opportunity to share research findings on impacts of this programme and to compare it with the reality on the ground, as well as to encourage sharing of experiences between different Local Action Groups. Specific videos to disseminate experience and discussion have been done and are available on YouTube.

TRUSTEE outcomes provide input for strategic planning at the national and European scale. Specifically, members of consortium are involved in European and national discussions on the CAP post-2020 strategy. They also contribute to the reflection on nature-based solutions in the frame of national and European large interdisciplinary communities and networks, such as AllEnvi⁶ in France.

C.6 DISCUSSION

TRUSTEE was an opportunity to start new interdisciplinary collaborations. However, given the methodological investment necessary to enable a dialogue among disciplines, a number of those collaborations are being extended beyond the lifetime of the project. It concerns especially integration of ecological and economic drivers and / or outputs in a common modelling framework.

More specifically, several activities initiated in TRUSTEE are still ongoing:

- collaboration between economists and ecologists aimed at integration of ecosystem services proxies and indicators into models of rural development and residential mobilities is ongoing; it includes updating indicator of hemeroby based on the methodology developed by Paracchini et al. (2014);

⁵ Agriculture, Forestry, and Other Land Use

⁶ AllEnvi is a national research alliance for the environment aimed at coordinating French research to achieve ecological transition and to address the major societal challenges.

- to explore potential multifunctionality of agriculture, a non-parametric approach for modelling multi-output production frontiers was tested using a dataset on production factors and crop diversity; in collaboration with ecologists, this will be improved using data on ecosystem service sets;
- to complement theoretical modelling aimed at explaining rural land development, an empirical approach based on micro-data at the farm level in Uppsala county (Sweden) is being developed by economists and geographers to analyse the dynamic relationship between passive farming and the level of support among farmers, as well as to carry out geographical analysis of agricultural land use patterns;
- linking different land use change modelling approaches at different spatial scales, from global to regional is in progress. The revised land use specification for European regions needs thorough testing before becoming the standard version of CAPRI. Furthermore, its value may be improved by covering more countries in the underlying European estimation. Finally, the methodology to describe land use change for Europe, basically relying on general dynamic process ignored in agents' optimisation problems, may be transferred as well to the non-European regions in CAPRI.

We initiated cross-country comparisons and pan European analyses, but data availability and long process of data acquisition restricted the spatial extension of our analyses and made them less ambitious than initially expected in this respect. We plan to spatially extend some of our investigations:

- in a comparative perspective, we plan to apply to the German data the novel methodology that we developed to study labour market dynamics;
- to investigate firms' innovation strategies and local labour market characteristics we started analysing quantitatively survey data nationwide, the next step will be to analyse two-nation dataset in a comparative design; the French qualitative survey of coordination in local further education landscapes need to be finalised in order to be compared in more detail with the German case;
- ex-post quantitative analysis of effects of rural development measures was first applied to the French case; data availability restriction prevented as from a broader cross-country analysis; to address this, a first attempt has been done to access the Italian dataset.

Besides pursuing activities started in TRUSTEE, we build on TRUSTEE experience to initiate new collaborative projects, which involves TRUSTEE and external partners:

- Since 2014, INRA SADAPT and INRA ODR are leading the thematic study of agroecosystems carried out in the frame of French Assessment of Ecosystems and Ecosystem Services (EFESE).
- INRA partners are involved in INRA metaprogramme EcoServ focused on establishing a scientific basis for assessment of the services provided by agroecosystems, optimising them through the regional distribution of activities and proposing public policy instruments. In this framework INRA CESAER with external partners proposes two projects:
 - VEEP project intends to propose an economic assessment of an ecosystem service bundle focusing on aesthetic and ecologic value of landscape on city outskirts;

- Bioserv project aims at evaluating the provision of ecosystem services by organic farming using a multi-service approach (biogeochemical cycles, regulation, agricultural production) at the scale of territories;
- Different partners from TUSTEE are conducting an ex-post national assessment of French Rural Development Policy 2007 – 2013 for French Ministry of Agriculture, Agri-food and Forestry;
- Thünen Institute, MNHN, AgroParisTech and JRC initiated a collaboration to update the study on grassland enhancement policy for GHG mitigation by accounting for effects on biodiversity;
- Swedish, Spanish and French partners are willing to carry out assessment of the impact of rural development measures on farm labour using data produced in TRUSTEE.

In TRUSTEE we have been highly successful in spreading our findings among scientific community through publications and presentations in conferences, symposiums and seminars. We also engaged with stakeholders at different governance levels and at every stage of the research process. Except in the case of CAPRI dissemination, in most cases our exchanges with stakeholders were limited to the specific scope of individual research activities and seldom exceeded nationwide actions (in France, Germany and Italy). We were less successful in getting feedback on cross-cutting general issues of the project and in engaging with stakeholders at the European level.

C.7 CONCLUSIONS

TRUSTEE results advanced knowledge and methodological solutions in the field of mapping and modelling of ecosystem services, functioning of rural economies and their many-to-many relationship, in particular taking into account land use problematic. This knowledge was largely spread among scientific community and various stakeholders, and gave guidance and recommendations for public policy makers. Many activities opened new avenues for further research. However, we faced important obstacles related to the quality and availability of the data and still much progress is needed in this respect to enable cross-country and pan European analyses. In the same vein, still much research is needed to provide common modelling framework to deal with ecosystem services and economic development taken together.

C.8 REFERENCES

Accatino, F., Tichit, M., 2016a. Managing the tradeoff between food production and ecosystem services: Optimizing land use allocation in temperate agro-landscapes. In: Ecosummit Conference 2016, August 29 – September 1, 2016, Montpellier (France).

Accatino, F., Tichit, M., 2016b. Managing tradeoffs between food production, biodiversity, and ecosystem services: exploring win-no-loss scenario with an evolutionary technique. In: ScenNet Conference 2016, August 24-26, 2016, Montpellier (France).

Andersson, A., Carlsson, C., Höjgård, S., Rabinowicz, E., 2016. Evaluation of results and adaptation of the Rural Development Programmes. TRUSTEE Technical Report D-6.3, pp. 165.

- Antognelli, S., Vizzari, M., 2016. Ecosystem and urban services for landscape liveability: A model for quantification of stakeholders' perceived importance. *Land Use Policy* 50, 277–292.
- Antognelli, S., Vizzari, M., 2017. Landscape liveability spatial assessment integrating ecosystem and urban services with their perceived importance by stakeholders. *Ecological Indicators* 72, 703–725.
- Ay, J.S., Chakir, R., Gallo, J.L., 2016a. Aggregated Versus Individual Land-Use Models: Modeling Spatial Autocorrelation to Increase Predictive Accuracy. *Environmental Modeling and Assessment*, 1–17, online first.
- Ay, J.-S., Guillemot, J., Martin-StPaul, N., Doyen, L., Leadley, P., 2016b. The economics of land use reveals a selection bias in tree species distribution models. *Global Ecology and Biogeography*, 1–13, online first.
- Barczak, A., Détang-Dessendre, C., Lankau, M., Margarian, A., Tanguy, C., 2016a. A firm centred analysis of labour market regimes and their consequences on innovation. In: 3rd Geography of Innovation Conference, January 28-30, 2016, Toulouse (France).
- Barczak, A., Détang-Dessendre, C., Lankau, M., Margarian, A., Tanguy, C., 2016b. Skill development, recruitment, and innovation practices. A mechanism and institution focused analysis of labour market related development regimes. TRUSTEE Technical Report D-2.2., pp. 87.
- Bayramoglu, B., Chakir, R., Lungarska, A., 2016. Land Use and Freshwater Ecosystems in France. In: EcoMod conference, July 6-8, 2016, Lisbon (Portugal); 18th International BioEcon Workshop, September 14-16, 2016, Cambridge (United Kingdom).
- Bennett, E.M., Peterson, G.D., Gordon, L.J., 2009. Understanding relationships among multiple ecosystem services. *Ecology Letters* 12, 1394–1404.
- Berriet-Sollicec, M., Laidin, C., Lépicier, D., Pham, H. V., Pollermann, K., Raue, P., Schnaut, G., 2016. The LEADER process as a European policy for local development: A comparison of the implementation in three European member states. Working Paper CESAER, WP-2016/1, pp. 34.
- Bianchi, F.J.J.A., Booij, C.J.H., Tschamntke, T., 2006. Sustainable pest regulation in agricultural landscapes: a review on landscape composition, biodiversity and natural pest control. *Proceedings of the Royal Society B* 273, 1715-1727.
- Blancard, S., 2017. Which French agricultural regions moderate ecosystem disservices? TRUSTEE Technical Report D-5.3, pp. 16.
- Blanco, M., Martinez, P., 2014. Baseline validation I. TRUSTEE Technical Report D-7.1-I, pp. 28.
- Bubbico, A., Breen, J., 2016. Baseline validation II. TRUSTEE Technical Report D-7.1-II, pp. 34.
- Bubbico, A., Martinez, P., Blanco, M., Breen, J., 2016. Impact of CAP green payment on different farming systems: the case of Ireland and Spain. In: Agricultural Economics Society of Ireland Conference, January 2016, Dublin (Ireland).
- Cardador, L., De Cáceres, M., Bota, G., Giralt, D., Casas, F., Arroyo, B., Mougeot, F., Cantero-Martínez, C., Moncunill, J., Butler, S.J., Brotons, L., 2014. A resource-based

modelling framework to assess habitat suitability for steppe birds in semiarid Mediterranean agricultural systems. *PLoS ONE* 9(3).

Cardinale, B.J., Duffy, J.E., Gonzalez, A., Hooper, D.U., Perrings, C., Venail, P., Narwani, A., Mace, G.M., Tilman, D., Wardle, D.A., Kinzig, A.P., Daily, G.C., Loreau, M., Grace, J.B., Larigauderie, A., Srivastava, D.S., Naeem, S., 2012. Biodiversity loss and its impact on humanity. *Nature* 486, 59-67.

Caruso, G., Hilal, M., Thomas, I., 2014. Characterising urban sprawl from built-up morphologies using graphs and local spatial association tools. In: The 54th Congress of the European Regional Science Association, August 26-29, 2014, St. Petersburg (Russia).

Caruso, G., Hilal, M., Thomas, I., Measuring urban forms from interbuilding distances: combining MST graphs with Local Index of Spatial Association. *Landscape and Urban Planning*, forthcoming.

Cavaillès, J., Brossard T., Foltête J.C., Hilal M., Joly D., Tourneux F.P., Tritz C., Wavresky P., 2009. GIS-based hedonic pricing of landscape. *Environmental and Resource Economics* 44, 571-590.

Chakir, R., Ay, J.S., 2016. Rural-urban dynamics of land use. TRUSTEE Technical Report D-2.3, pp. 7.

Civantos, E., Thuiller, W., Maiorano, L., Guisan, A., Araújo, M.B., 2012. Potential Impacts of Climate Change on Ecosystem Services in Europe: The Case of Pest Control by Vertebrates. *BioScience* 62, 658–666.

Desbois, D., Barczak A., Bureau J.C., Détang-Dessendre C., 2017. Towards Consensus Building. Cross-Analysis between Controversial Issues and Research Findings, TRUSTEE Technical Report D-7.3, pp. 21.

De Cara, S., Fournier, A., Gaigné, C., 2017. Local food, urbanization, and transport-related greenhouse gas emissions. *Journal of Regional Science* 57, 75–108.

Détang-Dessendre, C., Hilal, M., Legras, S., Régnier, C., Tu, G., 2017. Combining choice experiment and connectivity metrics to compare aesthetic and ecological values of urban landscape. Mimeo.

Détang-Dessendre, C., Partridge, M.D., Piguet, V., 2016. Local labor market flexibility in a perceived low migration country: The case of French labor markets. *Regional Science and Urban Economics* 58, 89–103.

Di Corato, L., 2016. Rural land development under hyperbolic discounting: a real option approach, SLU WP Series 2016:08, Dept. of Economics, SLU, pp. 22.

Di Corato, L., Brady, M., 2016. Passive farming and land development: a real option approach, SLU WP Series 2016:04, Dept. of Economics, SLU, pp. 32.

Dijkstra, L., Garcilazo, E., McCann, P., 2013. The Economic Performance of European Cities and City Regions: Myths and Realities, *European Planning Studies* 21 (3), 334-354.

Donfouet, H.P.P., Barczak, A., Détang-Dessendre, C., Maigné, E., 2017. Crop Production and Crop Diversity in France: A Spatial Analysis. *Ecological Economics* 134, 29–39.

Dross, C., Jiguet, F., Tichit, M., 2014a. Studying relationships between biodiversity and provisioning ecosystem services: the risks of aggregating ecosystem service indicators. In: Ecosystem Service Partnership Conference, September 8-12, 2014, San José (Costa Rica).

- Dross, C., Jiguet, F., Tichit, M., 2014b. Investigating interlinkages between biodiversity and provisioning services in agroecosystems: indicators do matter. In: 7th Annual Ecosystem Service Partnership Conference 2014 - Local action for the common good, September 8-12, 2014, San Jose (Costa Rica).
- Dross, C., Jiguet, F., Tichit, M., 2015. How biodiversity indicators shape the biodiversity/food production relationship. In: 27th International Congress for Conservation Biology (ECCB), August 2-6, 2015, Montpellier (France).
- Duffy-Deno, K., 1998. The effect of Federal Wilderness on County Growth in the Intermountain Western United States. *Journal of Regional Science* 38, 109-136.
- Edora, 2011. European Development Opportunities for Rural Areas. In: Copus, A. (Ed.), ESPON Applied Research 2013/1/2 Final Report.
- European Commission, 2010. Options for an EU vision and target for biodiversity beyond 2010. COM (2010) 4 final, Brussels.
- Fisher, B., Turner, R.K., Morling, P., 2009. Defining and classifying ecosystem services for decision making. *Ecological Economics* 68, 643-653.
- Foley, J.A., Defries, R., Asner, G.P., Barford, C., Bonan, G., Carpenter, S.R., Chapin, F.S., Coe, M.T., Daily, G.C., Gibbs, H.K., Helkowski, J.H., Holloway, T., Howard, E.A., Kucharik, C.J., Monfreda, C., Patz, J.A., Prentice, I.C., Ramankutty, N., Snyder, P.K., 2005. Global consequences of land use. *Science* 309 (5734), 570–574.
- Fournier, A., 2014. Conventional vs. Alternative Farming: Assessing the Sustainability of a Regional Food Supply Pattern. In: The 61th Annual North American Meetings of the Regional Science Association International, November 12-15, 2014, Washington D.C. (USA).
- Fournier, A., 2016. Direct-selling Farming and Urban Externalities: What Impact on Products Quality and Market Size? Working Paper SMART – LERECO 16-05, pp. 34.
- Frank, S., Havlík, P., Valin, H., Deppermann, A., Witzke, P., Surry Y., 2014a. Global drivers of EU land use. TRUSTEE Technical Report D-2.1, pp. 34.
- Frank, S., Witzke, H.-P., Zimmermann, A., Havlík, P., Ciaian, P., 2014b. Climate change impacts on European agriculture: A multi model perspective. In: The 14th European association of Agricultural Economists congress, August 26-29, 2014, Ljubljana (Slovenia).
- Gaigné, C., Thisse, J., 2014. New Economic Geography and Cities. In: Fisher, M.M., Nijkamp, P. (Eds.), *Handbook of Regional Science*. Springer, 539-568.
- Gamero, A., Brotons, L., Brunner, A., Foppen, R., Fornasari, L., Gregory, R. D., Herrando, S., Hořák, D., Jiguet, F., Kmecl, P., Lehikoinen, A., Lindström, Å., Paquet, J.-Y., Reif, J., Sirkiä, P. M., Škorpilová, J., van Strien, A., Szép, T., Telenský, T., Teufelbauer, N., Trautmann, S., van Turnhout, C. A.M., Vermouzek, Z., Vikstrøm, T. and Voříšek, P., 2016. Tracking progress towards EU biodiversity strategy targets: EU policy effects in preserving its common farmland birds. *Conservation Letters* 1–22.
- Gocht, A., Espinosa, M., Leip, A., Lugato, E., Schroeder, L.A., van Doorslaer, B., Gomez y Paloma, S., 2016. A grassland strategy for farming systems in Europe to mitigate GHG emissions – an integrated spatially differentiated modelling approach. *Land Use Policy* 58, 318–334.

- Greenwood, M., 1997. Internal Migration in Developed Countries. In: Rosenweig, M.R., Stark, O., (Eds.), Handbook of Population and Family Economics. Elsevier, Amsterdam, 647-720.
- Herrando, S., Anton, M., Sardà-Palomera, F., Bota, G., Gregory, R.D., Brotons, L., 2014. Indicators of the impact of land use changes using large-scale bird surveys: Land abandonment in a Mediterranean region. *Ecological Indicators* 45, 235–244.
- Herrando, S., Brotons, L., Anton, M., Páramo, F., Villero, D., Titeux, N., Quesada, J., Stefanescu, C., 2015. Assessing impacts of land abandonment on Mediterranean biodiversity using indicators based on bird and butterfly monitoring data. *Environmental Conservation* 43(1), 69–78.
- Hoover, E.M., Giarratani F., 1984. An Introduction to Regional Economics. Knopf, New York.
- Irwin, E.G., Isserman, A.M., Kilkenny, M., Partridge, M.D., 2010. A Century of Research on Rural Development and Regional Issues. *American Journal of Agricultural Economics* 92, 522-553.
- Irwin, E.G., Jeanty P.W., Partridge M.D., 2014. Amenity Values versus Land Constraints: The Spatial Effects of Natural Landscape Features on Housing Values. *Land Economics* 90, 61-78.
- Jiguet, F., Brotons, L., Herrando, S., Titeux, N., Princé, K., Morelli, F., Tichit, M., 2016, Quantitative assessment of bird and butterfly community. TRUSTEE Technical Report D-4.3, pp. 14.
- Joly, D., Hilal, M., Roy, D., Vuidel, G., Visual structures of landscapes in urban and peri-urban areas. *Applied Geography*, forthcoming.
- Kareiva, P., Watts, S., McDonald, R., Boucher, T., 2007. Domesticated nature: Shaping landscapes and ecosystems for human welfare. *Science* 316, 1866–1869.
- Krugman, P., 1991. Increasing returns and Economic Geography. *Journal of Political Economy* 99, 483-499.
- Laidin, C., Aubert, F., Berriet-Sollicec, M., Lépiciér, D., Pham, H.V., 2016. Qui gouverne les programmes de développement rural LEADER dans les territoires ruraux ? Analyse comparée en France et en Italie. In: ASRDLF symposium, July 7-9, 2016, Gatineau (Canada).
- Lebart, L., Piron, M. Steiner, J.F., 2003. La Sémiométrie. Dunod, Paris.
- Lungarska, A., Chakir, R., 2016. Climate induced land use change in France: impacts of agricultural adaptation and climate change mitigation. In: The 3rd FAERE Annual Conference, September 8-9, 2016, Bordeaux (France).
- Maes, J., Paracchini, M.-L., Zullian, G., 2011. A European assessment of the provision of ecosystem services - Towards an atlas of ecosystem services. In: JRC Scientific and Technical Reports, EUR 24750 EN - 2011, Publications Office of the European Union, Luxembourg, pp. 88.
- Mäntylä, E., Klemola, T., Laaksonen, T., 2011. Birds help plants: a meta-analysis of top-down trophic cascades caused by avian predators. *Oecologia* 165, 143–151.
- Margarian, A., Barczak, A., Détang-Dessendre, C., Lankau, M., Tanguy, C., 2017. Adaptability and information processing capacity of further education systems: A comparative

analysis of French and German coordination mechanisms. In: 6th ISCAE Conference, February 16–17th 2017, Würzburg (Germany).

Marquardt, S., Gocht, A., 2016. Baseline validation III– A comparison of GHG accounting balances from 1990-2014. TRUSTEE Technical Report D-7.1-III, pp. 13.

Martinez, P., Blanco, M., 2015. Impact of CAP green payment on Spanish agriculture. In: X Conference of the Spanish Association of Agricultural Economics, September 9-11, 2015, Cordoba (Spain).

Morelli, F., Accatino, F., Tichit, M., 2016. Maps of individual ecosystem services at different spatial resolutions. TRUSTEE Technical Report D-4.1, pp. 10.

Mouysset, L., 2014. Agricultural public policy: Green or sustainable? *Ecological Economics* 102, 15–23.

Muth, R., 1971. Migration: Chicken or Egg? *Southern Economic Journal* 37, 295-306.

Naidoo, R., Balmford, A., Costanza, R., Fisher, B., Green, R.E., Lehner, B., Malcolm, T.R., Ricketts, T.H., 2008. Global Mapping of Ecosystem Services and Conservation Priorities. *Proceedings of the National Academy of Sciences* 105, 9495-9500.

Oueslati, W., Salanié, J., Wu, J., 2014. Urbanization and Agricultural Structural Adjustments: Some Lessons from European Cities. GATE-LSE Working Paper, WP 1442, pp. 35.

Paracchini, M.L., Zuliana, G., Kopperoinen, L., Maesa, J., Schägnera, J.P., Termansenc, M., Zandersenc, M., Perez-Sobad, M., Scholefielde, P.A., Bidoglio, G., 2014. Mapping cultural ecosystem services: A framework to assess the potential for outdoor recreation across the EU. *Ecological Indicators* 45, 371–385.

Partridge, M.D., Rickman, D.S., 2014. Integrating Regional Economic Development Analysis and Land Use Economics. In: Duke, J.M., Wu, J., (Eds.), *The Oxford Handbook of Land Economics*, Oxford University Press, 23-51.

Plantinga, A., Irwin, E., 2006. Overview of Empirical Methods. In: Bell, K., Boyle, K., Rubin, J. (Eds.), *Economics of rural land-use change*, Ashgate Publishing, Aldershot, 113-134.

Puydarrieux, P., 2015. Les attentes en termes de politiques publiques, le programme EFSE. <<https://inra-dam-front-resources-cdn.brainsonic.com/ressources/afile/276985-53078-resource-philippe-puydarrieux-rencontre-sia-2015-ecoserv.html>>

Raudsepp-Hearne, C., Peterson, G.D., Bennett, E.M., 2010. Ecosystem service bundles for analyzing tradeoffs in diverse landscapes. *Proceedings of the National Academy of Science* 107, 5242-5247.

Regnier, C., 2016. Open space preservation in an urbanization context. In: 65th annual congress of AFSE, June 27-29, 2016, Nancy (France).

Regnier C., Legras, S., 2017. Urban Structure and Environmental Externalities. *Environmental and Resource Economics*, 1-22, first online.

Sabatier, R., Brotons, L., Titeux N., Tichit, M., 2016. Scenarios of ecosystem service change. TRUSTEE Technical Report D-4.5, pp. 17.

Sabatier, R., Morelli, F., Tichit, M., Resource-based model of bird population dynamics for two wader species in agrolandscapes. *Biological Conservation*, forthcoming.

- Schroeder, L.A., Gocht, A., Britz, W., 2014. The impact of second Pillar funding – Validation from a modelling and evaluation perspective. *Journal of Agricultural Economics* 66 (2), 415–441.
- Seppelt, R., Dormann, C.F., Eppink, F.V., Lautenbach, S., Schmidt, S., 2011. A quantitative review of ecosystem service studies: approaches, shortcomings and the road ahead. *Journal of Applied Ecology* 48, 630–636.
- Surry, Y., 2017. Societal valuation of land use and land use policy. TRUSTEE Technical Report D-6.1.
- Teillard, F., Jiguet, F., Tichit, M., 2015. The response of farmland bird communities to agricultural intensity as influenced by its spatial aggregation. *PLoS ONE* 10, 1–20.
- Teillard, F., Doyen, L., Dross, C., Jiguet, F., Tichit, M., 2016. Optimal allocations of agricultural intensity reveal win-no loss solutions for food production and biodiversity. *Regional Environmental Change*, 1–12, online first.
- Titeux, N., Henle, K., Mihoub, J.B., Regos, A., Geijzendorffer, I.R., Cramer, W., Verburg, P.H., Brotons, L., 2016. Biodiversity scenarios neglect future land-use changes. *Global Change Biology* 22, 2505–2515.
- Védrine, L., Lépiciér, D., 2016. An econometric evaluation of the impact of LEADER on the effectiveness of rural development policies, 56th ERSAs Congress, August 25-26th 2016, Vienna (Austria).
- Vizzari, M., Antognelli, S., Hilal, M., Sigura, M., Joly, D., 2015. Ecosystem Services Along the Urban--Rural--Natural Gradient: An Approach for a Wide Area Assessment and Mapping. In: Gervasi, O., Murgante, B., Misra, S., Gavrilova, L.M., Rocha, C.A.M.A., Torre, C., Taniar, D., Apduhan, O.B. (Eds.), *Computational Science and Its Applications -- ICCSA 2015: 15th International Conference, Banff, AB, Canada, June 22-25, 2015, Proceedings, Part III*. Springer International Publishing, Cham, pp. 745–757.
- Vizzari, M., Antognelli, M., Sigura, M., Hilal, M., Joly, D., Urban-rural-natural gradient analysis using CORINE data: an application to the French landscape. *Landscape and Urban Planning*, forthcoming.
- Vizzari, M., Sigura, M., 2015. Landscape sequences along the urban-rural-natural gradient: A novel geospatial approach for identification and analysis. *Landscape and Urban Planning* 140, 42–55.
- von Thünen, J.H., 1826. *Von Thünen's Isolated State: An English Edition of Der Isolierte Staat*, In: Wartenberg, C.M., (Trans.), Hall, P., (Ed.), 1966. Pergamon Press, Oxford.
- Wenny, D.G., Devault, T.L., Johnson, M.D., Kelly, D., Sekercioglu, C.H., Tomback, D.F., Whelan, C.J., 2011. The need to quantify ecosystem services provided by birds. *The Auk* 128, 1–14.
- Witzke, H.P., Jansson, T., 2017. Land use change modelling in CAPRI based on fresh empirical evidence. TRUSTEE Technical Report D-2.2.
- Wu, J., Gopinath, M., 2008. What Causes Spatial Variations in Economic Development in the United States? *American Journal of Agricultural Economics* 90, 392-408.

D DELIVERABLES

Submission date	N°	Title	Nature	Partners (responsible partner)	Comments
M1	D-0.1	Kickoff Meeting	Meeting	All <u>INRA Cesaer</u>	
M3	D-0.2	Website	Other	<u>INRA Cesaer</u>	
M12 M24 M36	D-0.3	First Annual Meeting (Braunschweig) Second Annual Meeting (Malmö) Final Meeting (Dijon)	Meeting - report	All <u>INRA Cesaer</u>	
M12	D-1.1	Data base : Stocktaking legal aspects	Other	<u>INRA ODR</u> , <u>INRA Cesaer</u> , <u>EuroCARE</u> , <u>Thünen Institute</u>	
M12	D1.2	Stocktaking policy Condensed tabular	Report	<u>SLU</u> , <u>Thünen Institute</u> , <u>INRA Cesaer</u>	
M36	D-1.3	Extension of the data all around the program	Other	All <u>INRA ODR</u>	
M6	D-1.4	Case study choice	Other	All <u>INRA Cesaer</u>	
M12	D-2.1	Global drivers of EU land use	Report	<u>IIASA</u> , <u>EuroCARE</u> , <u>INRA EcoPub</u>	
M36	D-2.2.	Model for analysis of EU land change	Report	<u>IIASA</u> , <u>EuroCARE</u> , <u>INRA EcoPub</u> , <u>SLU</u>	Initially M24; Rescheduled on M36, because of FADN data acquisition
M36	D-2.3	Rural-urban dynamics of land use	Report	<u>EuroCARE</u> , <u>INRA EcoPub</u> , <u>SLU</u>	Initially M24; Rescheduled on M36, because of FADN data acquisition
M36	D-3.1	Econometric analysis of driving factors of economic performance	Report	<u>INRA Cesaer</u> , <u>SLU</u> , <u>Thünen Institute</u>	
M12 M36	D-3.2	Conceptual foundation of actors' strategies in regional development (D-3.2.1) Best local practices / skills problem (D-3.2.2)	Report	<u>Thünen Institute</u> , <u>INRA Cesaer</u>	
M36	D-3.3	Relation between EU changes, LAG composition and performance	Report	<u>Thünen Institute</u> , <u>INRA Cesaer</u>	
M36	D-3.4	Quantitative Evaluation of impacts of networks in rural development	Report	<u>INRA Cesaer</u>	
M36	D-3.5	Validation of the implementation logic of RD measures in modelling	Report	<u>Thünen Institute</u>	
M36	D-4.1	Map of individual ecosystem services at different spatial resolutions	Report	<u>INRA SADAPT</u> , <u>CTFC</u>	Initially M24; Rescheduled on M36, because of acquisition and treatment of data on ecosystem services
M36	D-4.2	Quantitative analysis of the determinants of ecosystem service bundles	Report	<u>INRA SADAPT</u> , <u>LU</u>	Initially M24; Rescheduled on M36, because of acquisition and treatment of data on ecosystem services
M36	D-4.3	Quantitative assessment of bird community	Report	<u>INRA SADAPT</u> , <u>LU</u> , <u>CTFC</u> , <u>MNHN CERSP</u>	Initially M24; Rescheduled on M36, because of acquisition and treatment of data on ecosystem services
M36	D-4.4	Mapping of promising patterns of ecosystem services	Report	<u>INRA SADAPT</u> , <u>LU</u> , <u>CTFC</u>	
M36	D-4.5	Scenarios of ecosystem service change	Report	<u>INRA SADAPT</u> , <u>LU</u> , <u>INRA EcoPub</u> , <u>MNHN CERSP</u>	

Submission date	N°	Title	Nature	Partners (responsible partner)	Comments
M12	D-5.1	Software and technical report	Prototype	<u>INRA Cesaer</u> , Théma, UNIPG	
M36	D-5.2	Urban forms and ecosystem states	Report	<u>INRA Cesaer</u> , Théma, UNIPG	
M36	D-5.3	Typology of rural areas regarding to ecosystem services provision	Report	<u>INRA Cesaer</u> , INRA EcoPub	
M36	D-5.4	Modelling the relation between regulating services agriculture and sprawl	Report	<u>INRA SMART</u>	
M36	D-5.5	Reverse links between economic development and ecosystem services	Report	<u>INRA Cesaer</u> , INRA SADAPT, INRA ODR	
M36	D-6.1	Societal valuation of land use and land use policy	Report	<u>SLU</u>	Initially M30; Rescheduled on M36
M36	D-6.2	Rural and urban exchanges: policy measures to preserve ESS	Report	<u>INRA SMART</u> , <u>INRA Cesaer</u> , INRA EcoPub	
M24	D-6.3	Evaluation results and adaptation of RDPs	Report	<u>SLU</u> , INRA Cesaer	Initially M24; Rescheduled on M36 because of information compilation
M6 M24 M36	D-7.1	Baseline validation I (D-7.1-I) Baseline validation II (D-7.1-II) Baseline validation III (D-7.1-III)	Report	<u>UPM</u> , Thünen Institute, INRA EcoPub, SLU, UCD	BV II: Initially M18; Rescheduled on M24 BV III: Initially M30; Rescheduled on M36
M12 M24 M35	D-7.2	Training Workshop I (Braunschweig, DE) Training Workshop II (Madrid, ES) Training Workshop III (Dublin, IE)	Other	Thünen Institute, UPM, UCD	
M35	D-7.3	Workshops on consensus building	Other	Thünen Institute, <u>INRA EcoPub</u> , SLU, INRA SADAPT, INRA CESAER, INRA SMART, UNIPG	

E DISSEMINATION AND IMPACT OF THE PROJECT

E.1 IMPACT INDICATORS

Number of Publications and Communications

	Multi-partner publications (results of the common work)	One-partner publications (one partner involved only)
<i>Publications and Communications</i>		
Peer-reviewed journals	Published: 14 Submitted or under revision: 6 In preparation: 4	Published: 6 Submitted or under revision: 5 In preparation: 4
Books or chapters in collective books	0	Published: 1 Submitted or under revision: 2
Published working papers	Published: 3	Published: 3 In preparation: 1
Papers presented at conferences / symposiums	21	23
<i>Dissemination actions</i>		
General-public articles	1	1
Dissemination conferences (for general public)	2	1
Other	3	4

Other elements of dissemination and transfer (to be detailed in section E.3)

International patents obtained	-
International patents - ongoing procedure	-
National patents obtained	-
National patents - ongoing procedure	-
Licenses (obtainment / transfer)	-
Business creation or spinning-off	-
New collaborative projects	6
Symposiums / Conferences	-
Other	5

E.2 LIST OF PUBLICATIONS AND COMMUNICATIONS

1. List of multi-partner publications (results of common work)

1.1 Publications and communications

1.1.1 Peer-reviewed journals

2017

De Cara, S., Fournier, A., Gagné, C., 2017. Local food, urbanization, and transport-related greenhouse gas emissions. *Journal of Regional Science* 57, 75–108. doi:10.1111/jors.12299

Donfouet, H.P.P., Barczak, A., Détang-Dessendre, C., Maigné, E., 2017. Crop Production and Crop Diversity in France: A Spatial Analysis. *Ecological Economics* 134, 29–39. doi:10.1016/j.ecolecon.2016.11.016

2016

Ay, J.S., Chakir, R., Gallo, J.L., 2016a. Aggregated Versus Individual Land-Use Models: Modeling Spatial Autocorrelation to Increase Predictive Accuracy. *Environmental Modeling and Assessment*, 1–17. doi:10.1007/s10666-016-9523-5

Ay, J.S., Chakir, R., Marette, S., 2016b. Distance Decay in the Willingness to Pay for Wine: Disentangling Local and Organic Attributes. *Environmental and Resource Economics*, 1–23. doi:10.1007/s10640-016-0057-8

Ay, J.-S., Guillemot, J., Martin-StPaul, N., Doyen, L., Leadley, P., 2016c. The economics of land use reveals a selection bias in tree species distribution models. *Global Ecology and Biogeography*, 1–13. doi:10.1111/geb.12514

Détang-Dessendre, C., Partridge, M.D., Pigué, V., 2016. Local labor market flexibility in a perceived low migration country: The case of French labor markets. *Regional Science and Urban Economics* 58, 89–103. doi:10.1016/j.regsciurbeco.2016.03.003

Gamero, A., Brotons, L., Brunner, A., Foppen, R., Fornasari, L., Gregory, R. D., Herrando, S., Hořák, D., Jiguet, F., Kmecl, P., Lehtikoinen, A., Lindström, Å., Paquet, J.-Y., Reif, J., Sirkiä, P. M., Škorpilová, J., van Strien, A., Szép, T., Telenský, T., Teufelbauer, N., Trautmann, S., van Turnhout, C. A.M., Vermouzek, Z., Vikstrøm, T. and Voříšek, P., 2016. Tracking progress towards EU biodiversity strategy targets: EU policy effects in preserving its common farmland birds. *Conservation Letters* 1–22. doi:10.1111/conl.12292

Gocht, A., Espinosa, M., Leip, A., Lugato, E., Schroeder, L.A., van Doorslaer, B., Gomez y Paloma, S., 2016. A grassland strategy for farming systems in Europe to mitigate GHG emissions – an integrated spatially differentiated modelling approach. *Land Use Policy* 58, 318–334. doi:10.1016/j.landusepol.2016.07.024

Teillard, F., Doyen, L., Dross, C., Jiguet, F., Tichit, M., 2016. Optimal allocations of agricultural intensity reveal win-no loss solutions for food production and biodiversity. *Regional Environmental Change* 1–12. doi:10.1007/s10113-016-0947-x

Titeux, N., Henle, K., Mihoub, J.B., Regos, A., Geijzendorffer, I.R., Cramer, W., Verburg, P.H., Brotons, L., 2016. Biodiversity scenarios neglect future land-use changes. *Global Change Biology* 22, 2505–2515. doi:10.1111/gcb.13272

2015

Herrando, S., Brotons, L., Anton, M., Páramo, F., Villero, D., Titeux, N., Quesada, J., Stefanescu, C., 2015. Assessing impacts of land abandonment on Mediterranean biodiversity using indicators based on bird and butterfly monitoring data. *Environmental Conservation* 43(1), 69–78. doi:10.1017/S0376892915000260

Teillard, F., Jiguet, F., Tichit, M., 2015. The response of farmland bird communities to agricultural intensity as influenced by its spatial aggregation. *PLoS ONE* 10, 1–20. doi:10.1371/journal.pone.0119674

2014

Cardador, L., De Cáceres, M., Bota, G., Giralt, D., Casas, F., Arroyo, B., Mougeot, F., Cantero-Martínez, C., Moncunill, J., Butler, S.J., Brotons, L., 2014. A resource-based modelling framework to assess habitat suitability for steppe birds in semiarid Mediterranean agricultural systems. *PLoS ONE* 9(3). doi:10.1371/journal.pone.0092790

Herrando, S., Anton, M., Sardà-Palomera, F., Bota, G., Gregory, R.D., Brotons, L., 2014. Indicators of the impact of land use changes using large-scale bird surveys: Land abandonment in a Mediterranean region. *Ecological Indicators* 45, 235–244. doi:10.1016/j.ecolind.2014.04.011

Submitted or under revision

Caruso, G., Hilal, M., Thomas, I., Measuring urban forms from interbuilding distances: combining MST graphs with Local Index of Spatial Association. (submitted and under revision with *Landscape and Urban Planning*)

Joly, D., Gillet, F., Interpolation of temperature under tree cover on a regional scale in the French Jura Mountain. (submitted and under revision with *International Journal of Climatology*)

Joly, D., Hilal, M., Roy, D., Vuidel, G., Visual structures of landscapes in urban and peri-urban areas. (submitted to *Applied Geography*)

Sabatier, R., Morelli, F., Tichit, M., Resource-based model of bird population dynamics for two wader species in agrolandscapes. (submitted and under revision with *Biological Conservation*)

Vizzari, M., Antognelli, M., Sigura, M., Hilal, M., Joly, D., Urban-rural-natural gradient analysis using CORINE data: an application to the French landscape. (submitted and under revision with *Landscape and Urban Planning*)

In preparation

Dross, C., Jiguet, F., Tichit, M., Concave crop production and biodiversity trade-offs curves for taxonomic, functional and phylogenetic biodiversity metrics. (to be submitted to *Ecological Indicators*)

Dross, C., Príncipe, K., Jiguet, F., Tichit, M., Generalist-dominated bird communities in intensive livestock production areas. (to be submitted to *Agriculture, Ecosystems, and Environment*)

Dross, C., Accatino, F., Léger, F., Jiguet, F., Tichit, M., Optimizing agricultural land-use and intensity under production constraints: optimal win-no-loss solution is a mix of land sparing and land sharing. (in preparation)

Margarian, A., Détang-Dessendre, C., Lankau, M., Barczak, A., Tanguy, C., Human resource management, labour mobility and innovation. Relationships in a heterogeneous low-tech sector. (in preparation for *Research Policy* or other)

Martinez, P., Blanco, M., Breen, J., Gocht, A. Economic and environmental impacts of CAP green payment: a comparative analysis of Ireland and Spain (in preparation).

1.1.2 Books or chapters in collective books

N/A

1.1.3 Published working papers

2017

Rais Assa, C., Mouysset, L., Ay, J.S., Jiguet, F., Lorrilière, R., Doyen, L., 2017. Une analyse bio-économique pour l'usage des sols et la biodiversité en France métropolitaine. Cahiers du GREThA 2017 – 05, pp. 33.

2016

Berriet-Sollicie, M., Laidin, C., Lépicier, D., Pham, H. V., Pollermann, K., Raue, P., Schnaut, G., 2016. The LEADER process as a European policy for local development: A comparison of the implementation in three European member states. Working Paper CESAER, WP-2016/1, pp. 34.

2014

Oueslati, W., Salanié, J., Wu, J., 2014. Urbanization and Agricultural Structural Adjustments: Some Lessons from European Cities. GATE-LSE Working Paper, WP 1442, pp. 35. (submitted and under revision with Journal of Economic Geography)

1.1.4 Papers presented at conferences / symposium

2017

Margarian, A., Barczak, A., Détang-Dessendre, C., Lankau, M., Tanguy, C. Adaptability and information processing capacity of further education systems: A comparative analysis of French and German coordination mechanisms. In: 6th ISCAE Conference, February 16–17th 2017, Würzburg (Germany).

2016

Barczak, A., Détang-Dessendre, C., Lankau, M., Margarian, A., Tanguy, C. A firm centred analysis of labour market regimes and their consequences on innovation. In: 3rd Geography of Innovation Conference, January 28-30, 2016, Toulouse (France).

Bubbico, A., Martinez, P., Blanco, M., Breen, J. Impact of CAP green payment on different farming systems: the case of Ireland and Spain. In:

- Agricultural Economics Society of Ireland Conference, January 2016, Dublin (Ireland).
- European Association of Agricultural Economists 148 Seminar, December 2015, Brussels (Belgium).

Laidin, C., Aubert, F., Berriet-Sollicie, M., Lépicier, D., Pham, H.V. Qui gouverne les programmes de développement rural LEADER dans les territoires ruraux ? Analyse comparée en France et en Italie. In: ASRDLF symposium, July 7-9, 2016, Gatineau (Canada).

Pisani, E., Laidin, C. Evaluating project networks in the EU-funded LEADER-Community-led Local Development (CLLD) across Europe: A proposal for Social Network Analysis. In: The 28th Annual EAEPE Conference Industrialisation, socio-economic transformation and Institutions, November 3-5, 2016, Manchester (United Kingdom).

2015

Berriet-Sollicie, M., Laidin, C., Lépicier, D., Raue, P., Pham, H.V., Pollermann, K., Schnaut, G. The LEADER process as an European policy for local development: A comparison of the implementation in three European member states. In: 55th ERSA Congress, August 25-28, 2015, Lisbon (Portugal).

Détang-Dessendre, C., Donfouet, H. P. P., Barczak, A., Maigné, E. Crop Production and Biodiversity in France: A Spatial Analysis. In : 9es Journées de Recherches en Sciences Sociales INRA-SFER-CIRAD, December 10-11, 2015, Nancy (France).

Dross, C., Jiguet, F., Tichit, M. How biodiversity indicators shape the biodiversity/food production relationship. In: 27th International Congress for Conservation Biology (ECCB), August 2-6, 2015, Montpellier (France).

Espinosa, M., Gocht, A., Schroeder, L. A., Leip, A., Gomez y Paloma, S., Lugato, E., van Doorslaer, B. Promotion of grassland as strategy to reduce Greenhouse Gas Emission: results for Spain of the EU-wide analysis with the century and the CAPRI models. In: X Conference of the Spanish Association of Agricultural Economics, September 9-11, 2015, Cordoba (Spain).

Schroeder, L.A., Gocht, A., Espinosa, M., Leip, A., Lugato, E., Van Doorslaer, B., Gomez y Paloma, S. Promotion of grassland as strategy to reduce greenhouse gas emissions? An EU-wide spatial analysis with the CENTURY and the CAPRI model. In: The 150th EAAE Seminar 'The spatial dimension in analysing the linkages between agriculture, rural development and the environment', October 22-23, 2015, Edinburgh (United Kingdom).

Vizzari, M., Antognelli, S., Hilal, M., Sigura, M., Joly, D., 2015. Ecosystem Services Along the Urban--Rural--Natural Gradient: An Approach for a Wide Area Assessment and Mapping. In: Gervasi, O., Murgante, B., Misra, S., Gavrilova, L.M., Rocha, C.A.M.A., Torre, C., Taniar, D., Apduhan, O.B. (Eds.), Computational Science and Its Applications -- ICCSA 2015: 15th International Conference, Banff, AB, Canada, June 22-25, 2015, Proceedings, Part III. Springer International Publishing, Cham, pp. 745–757. doi:10.1007/978-3-319-21470-2_54

2014

Ay, J.S., Chakir, R., Le Gallo, J. The effects of scale, space and time on the predictive accuracy of land use models. In: Statistics Seminar of Toulouse School of Economics, April 2014, Toulouse (France).

Caruso, G., Hilal, M., Thomas, I. Characterising urban sprawl from built-up morphologies using graphs and local spatial association tools. In: The 54th Congress of the European Regional Science Association, August 26-29, 2014, St. Petersburg (Russia).

De Cara, S., Fournier, A., Gaigné C. Urbanization, Agricultural Location, and Greenhouse Gas Emissions. In:

- The 14th European association of Agricultural Economists congress, August 26-29, 2014, Ljubljana (Slovenia) .
- The 5th World Congress of Environmental And Resource Economics congress, June 28 – July 2, 2014, Istanbul (Turkey).

Détang-Dessendre C., Partridge M. D. Piguet V. Labor Market Flexibility in a Low Migration Country: The Case of French Regions. In: 61st Annual North American Meetings of the Regional Science Association International (RSAI) November 12-15, 2014, Washington D.C. (USA).

Dross, C., Jiguet, F., Tichit, M. Studying relationships between biodiversity and provisioning ecosystem services: the risks of aggregating ecosystem service indicators. In: Ecosystem Service Partnership Conference, September 8-12, 2014, San José (Costa Rica).

Dross, C., Jiguet, F., Tichit, M. Investigating interlinkages between biodiversity and provisioning services in agroecosystems: indicators do matter. In: 7th Annual Ecosystem Service Partnership Conference 2014 - Local action for the common good, September 8-12, 2014, San Jose (Costa Rica).

Frank, S., Witzke, H.-P., Zimmermann, A., Havlík, P., Ciaian, P. Climate change impacts on European agriculture: A multi model perspective. In: The 14th European association of Agricultural Economists congress, August 26-29, 2014, Ljubljana (Slovenia).

Frank S., Witzke H.-P., Zimmermann A., Havlík P. Climate change impacts on European agriculture: A multi-model perspective. In: ÖGA Tagung, September 25-26, 2014, Vienna (Austria).

Laidin, C., Berriet-Sollicec, M. LEADER, outil du développement local pour les campagnes littorales ? [LEADER, local development policy for coastal territories], In : 8es Journées de Recherches en Sciences Sociales INRA–SFER–CIRAD, December 11-12, 2014, Grenoble (France).

Oueslati, W., Salanié, J., Wu, J. Urbanization and Agricultural Structural Adjustments: Some Lessons from European Cities. In:

- 8es Journées de Recherches en Sciences Sociales INRA–SFER–CIRAD, December 11-12, 2014, Grenoble (France).

- GATE-LSE Seminar, September 8, 2014, Lyon - Ecully, (France).
- Spatial Economics Seminar GAEL-GATE, June 23, 2014, Grenoble (France).

1.2 Dissemination actions

1.2.1 General-public articles

2017

25 ans après, quels impacts pour le programme LEADER ? Réseau Rural Français.

<<http://www.reseaurural.fr/centre-de-ressources/actualites/25-ans-apr%C3%A8s-quels-impacts-pour-le-programme-leader-%3F>> (accessed 14.02.17.).

1.2.2 Dissemination conferences (for general public)

2016

What can we expect from LEADER programs? Viewpoints of researchers and stakeholders on the impacts of LEADER. Regional seminar, Burgundy – Franche-Comté region, December 6, 2016, Dijon (France).

2015

Providing public goods and ecosystem services – Information Exchange Workshop among stakeholders and researchers, in collaboration with [PEGASUS](#), H2020 project under Grant Agreement No 633814, September 29, 2015, Dijon (France).

1.2.3 Other

Training actions

CAPRI Training Session I for stakeholders and scholars, September 9-11, 2014, Braunschweig (Germany).

CAPRI Training Session II for stakeholders and scholars, September 14-17, 2015, Madrid (Spain).

CAPRI Training Session III for stakeholders and scholars, September 5-8, 2016, Dublin (Ireland).

2. List of one-partner publications (one partner involved only)

2.1 Publications and communications

2.1.1 Peer-reviewed journals

2017

Antognelli, S., Vizzari, M., 2017. Landscape liveability spatial assessment integrating ecosystem and urban services with their perceived importance by stakeholders. *Ecological Indicators* 72, 703–725. doi:10.1016/j.ecolind.2016.08.015

Regnier C., Legras, S., 2017, Urban Structure and Environmental Externalities, *Environmental and Resource Economics*, first online. DOI 10.1007/s10640-016-0109-0

2016

Antognelli, S., Vizzari, M., 2016. Ecosystem and urban services for landscape liveability: A model for quantification of stakeholders' perceived importance. *Land Use Policy* 50, 277–292. doi:10.1016/j.landusepol.2015.09.023

2015

Vizzari, M., Sigura, M., 2015. Landscape sequences along the urban-rural-natural gradient: A novel geospatial approach for identification and analysis. *Landscape and Urban Planning* 140, 42–55. doi:10.1016/j.landurbplan.2015.04.001

2014

Mouysset, L., 2014. Agricultural public policy: Green or sustainable? *Ecological Economics* 102, 15–23.

Schroeder, L.A., Gocht, A., Britz, W., 2014. The impact of second Pillar funding – Validation from a modelling and evaluation perspective. *Journal of Agricultural Economics* 66 (2), 415–441. doi: 10.1111/1477-9552.12091

Submitted or under revision

Andersson, A., Carlsson, C., Höjgård, S., Rabinowicz, E., Evaluation of results and adaptation of the Rural Development Programmes. (submitted 01/2017 to Land Use Policy)

Lungarska A., Chakir, R., Climate induced land use change in France: impacts of agricultural adaptation and climate change mitigation (submitted 01/03/2017 to Ecological Economics)

Martínez, P., Castaño, J., Blanco, M. How does the CAP 2020 Green Payment affect Spanish farms? (submitted 8/2016, under revision with "Revista Española de Estudios Agrosociales y Pesqueros" of the Ministry of Agriculture, Food and Environment of Spain)

In preparation

Abaja R., Aunins A., Rozenfelde M., Sniedze-Kretalova R., Effects of landscape and farming practices to the communities of carabid beetle in moderately intensive Eastern European farmland. (to be submitted to Agriculture, Ecosystems, and Environment)

Accatino, F., Léger, F., Dross, C., Tichit, M., Managing the tradeoff between animal production and ecosystem services at different scales. (in preparation for Agriculture, Ecosystems, and Environment)

Aunins A., Priednieks J., Keišs O., Sniedze-Kretalova R., Field and landscape effects on bird communities and abundance of farmland birds in the Latvian farmland. (to be submitted to Agriculture, Ecosystems, and Environment)

Margarian A., Fachkräfterekrutierung in der Ernährungswirtschaft (in preparation for Zeitschrift für Arbeitsforschung, Arbeitsgestaltung und Arbeitspolitik or other)

2.1.2 Books or chapters in collective books

2014

Cantelaube, P., Carles, M., 2014. Le registre parcellaire graphique: des données géographiques pour décrire la couverture du sol agricole. In: Gavaland, A., Burne, L. (Eds.), GPS et SIG Pour la conduite de dispositifs expérimentaux vers l'émergence de la communauté métier « GéoExpé ». Les cahiers techniques de l'INRA., INRA, Paris, pp. 58-64.

Submitted or under revision

Margarian A., Grenzen der Gestaltbarkeit. Gibt es Erfolgsfaktoren der regionalen Wirtschaftsentwicklung? In: Loccumer Protokolle (forthcoming)

Schroeder, L.A., Marquardt, S., Gocht, A., CAP post 2013: Effects of a shift from Pillar I to Pillar II - Changes on land use and market effects among types of farms. In: Public Policy in Agriculture: It's Impact on Labor Supply and Household Income (submitted 08/2016, under review)

2.1.3 Published working papers

2016

Di Corato, L., 2016. Rural land development under hyperbolic discounting: a real option approach, SLU WP Series 2016:08, Dept. of Economics, SLU, pp. 22. (submitted to the Journal of Economics)

Di Corato, L., Brady, M., 2016. Passive farming and land development: a real option approach, SLU WP Series 2016:04, Dept. of Economics, SLU, pp. 32. (submitted and under review with the European Review of Agricultural Economics)

Fournier, A., 2016. Direct-selling Farming and Urban Externalities: What Impact on Products Quality and Market Size? Working Paper SMART – LERECO 16-05, pp. 34.

In preparation

Margarian, A., Arbeit und Innovation in der Ernährungswirtschaft Niedersachsen, Thuenen Working Paper (in preparation)

2.1.4 Papers presented at conferences / symposium

2016

Accatino, F., Tichit, M. Managing the tradeoff between food production and ecosystem services: Optimizing land use allocation in temperate agro-landscapes. In: Ecosummit Conference 2016, August 29 – September 1, 2016, Montpellier (France).

Accatino, F., Tichit, M. Managing tradeoffs between food production, biodiversity, and ecosystem services: exploring win-no-loss scenario with an evolutionary technique. In: ScenNet Conference 2016, August 24-26, 2016, Montpellier (France).

Antognelli, S., Vizzari, M. LISAM: an open source GIS-based model for liveability spatial assessment. In: Open Source Geospatial Research & Education Symposium (OGRS2016), October 12-14, 2016, Perugia (Italy).

Antognelli, S., Vizzari, M. Liveability services in transitional landscapes: a spatial-MCDA model for assessment and mapping, In: INPUT 2016 - 9th International Conference on Innovation in Urban and Regional Planning, September 14-15, 2016, Torino (Italy).

Antognelli, S., Vizzari, M. Landscape liveability: A spatial-MCDA model for assessment and mapping. In: GIS ODYSSEY 2016 - Geographic Information Systems Conference and Exhibition, September 5-9, 2016, Perugia (Italy).

Aunins A., Field and landscape effects on abundance of farmland birds and bird communities in the Latvian farmland. In: 20th conference of the European Bird Census Council (EBCC) "BirdNumbers 2016: Birds in a changing world", September 5-9, 2016, Halle (Germany).

Bayramoglu, B., Chakir, R., Lungarska, A. Land Use and Freshwater Ecosystems in France. In:

- EcoMod conference, July 6-8, 2016, Lisbon (Portugal).
- 18th International BioEcon Workshop, September 14-16, 2016, Cambridge (United Kingdom).

Lungarska, A., Chakir, R. Climate induced land use change in France: impacts of agricultural adaptation and climate change mitigation. In:

- The 3rd FAERE Annual Conference, September 8-9, 2016, Bordeaux (France).
- The 10th World Conference of the Spatial Econometrics Association, June 13-15, 2016, Rome (Italy).
- The 15th International Workshop on Spatial Econometrics, May 26-27, 2016, Orleans (France).

Regnier, C., Open space preservation in an urbanization context. In:

- 65th annual congress of AFSE, June 27-29, 2016, Nancy (France).
- 9es Journées de Recherches en Sciences Sociales INRA-SFER-CIRAD, December 10-11, 2015, Nancy (France).

Védrine, L., Lépicié, D. An econometric evaluation of the impact of LEADER on the effectiveness of rural development policies, 56th ERS Congress, August 25-26th 2016, Vienna (Austria).

Vīgants V., Auniņš A., Keišs O., Impact of land use change on farmland bird species in Latvia 1980 – 2015. In: 20th conference of the European Bird Census Council (EBCC) "BirdNumbers 2016: Birds in a changing world", September 5-9, 2016, Halle (Germany).

Vizzari M., Antognelli S., Sigura M., Modica G., 2016. Urban-rural-natural gradient analysis using CORINE data: an application to the Italian regions of Friuli Venezia Giulia, Umbria, and Calabria, INPUT 2016 - 9th International Conference on Innovation in Urban and Regional Planning, 14-15 September, 2016, Torino, (Italy).

2015

Fournier, A. Direct-selling farming under urban pollution: what impact on competition, variety and goods quality? In:

- 9es Journées de Recherches en Sciences Sociales INRA–SFER–CIRAD, December 10-11, 2015, Nancy (France).
- 2nd FAERE Annual Conference, September 10-11, 2015, Toulouse (France).
- 21st EAERE Annual Conference, June 24-27, 2015, Helsinki (Finland).

Fournier, A. Direct selling farming under varying spatial externalities. In: 64th annual congress of AFSE, June 22-24, 2015, Rennes (France).

Martinez, P., Blanco, M., Impact of CAP green payment on Spanish agriculture. In: X Conference of the Spanish Association of Agricultural Economics, September 9-11, 2015, Cordoba (Spain).

Raue, P., Pollermann, K., Schnaut, G. The interdependence between local institutional settings and governance arrangements in LEADER. In: The XXVI European Society Rural Sociology Congress. August 18-21, 2015, Aberdeen (United Kingdom).

Vizzari, M., Sigura, M., Antognelli, S. Ecosystem services demand, supply and budget along the urban-rural-natural gradient. In: Actual Tasks on Agricultural Engineering – The 43th International Symposium on Agricultural Engineering, February 24-27, 2015, Opatija (Croatia).

2014

Fournier, A. Conventional vs. Alternative Farming: Assessing the Sustainability of a Regional Food Supply Pattern. In: The 61th Annual North American Meetings of the Regional Science Association International, November 12-15, 2014, Washington D.C. (USA).

Laidin, C. L'innovation promue dans les programmes LEADER, un récit volontariste pour une action limitée. In: Colloque international de géographie rurale, June 2-6, 2014, Nantes (France).

Lilje, A., Margarian, A. Active employment policy in local labour market regimes. In: 7th Summer Conference in Regional Science, June 26-28, 2014, Marburg (Germany).

Margarian, A. A Firm Based Approach to Innovation Based Economics. In: The International Joseph A. Schumpeter Society 15th ISS Conference, July 27–30, 2014, Jena (Germany).

Pollermann, K., Raue, P., Schnaut, G. Multi-level Governance in rural development: Analysing experiences from LEADER for a Community-Led Local Development (CLLD). In: The 54th Congress of the European Regional Science Association, August 26-29, 2014, St. Petersburg (Russia).

Regnier C., Legras S., "Urban structure and Environmental externalities" presented at:

- 7es Journées de Recherches en Sciences Sociales INRA–SFER–CIRAD, December 11-12, 2013, Angers (France).
- 63rd annual congress of AFSE, June 16-18, 2014, Lyon (France).
- 1st Annual Conference of FAERE, September 11-12, 2014, Montpellier (France).

2.2 Dissemination actions

2.2.1 General-public articles

2014

Gocht, A., 2014, Vom Zahlenberg zur Politikempfehlung. *Wissenschaft erleben* 2014/2, pp.19. ISSN1618-9485

2.2.2 Dissemination conferences (for general public)

2015

Vizzari, M., 2015. Landscape gradients: a new and challenging approach to spatial analysis and planning, EXPO Conference "Measuring agriculture and rural planning with advanced methods", August 31, 2015, Milan (Italy).

2.2.3 Other

Posters

Schroeder, L.A., Gocht, A., Britz, W., 2014. Validierung des CAPRI-RD-Modells für die Politikfolgen-abschätzung ländlicher Entwicklungsprogramme. Poster for institute-internal issues (Thünen Institut).

Schroeder, L.A., Gocht, A., Britz, W., 2013. Wie fit ist das CAPRI-Modell für die Politikfolgen-abschätzung ländlicher Entwicklungsprogramme? Poster for institute-internal issues (Thünen Institute).

Draft discussion papers

Di Corato, L., Zormpas, D., 2016. Should I farm or should I not?

Fournier, A., 2015. Conventional vs. Alternative Farming: Assessing the Sustainability of a Regional Food Supply Pattern, pp. 32.

E.3 LIST OF OTHER FORMS OF DISSEMINATION AND TRANSFER

International patents obtained	-
International patents - ongoing procedure	-
National patents obtained	-
National patents - ongoing procedure	-
Licenses (obtainment / transfer)	-
Business creation or spinning-off	-
New collaborative projects	<ol style="list-style-type: none"> 1. Ex-post national assessment of French Rural Development Policy 2007 – 2013 for French Ministry of Agriculture, Agri-food and Forestry Two projects carried out in the frame of INRA metaprogramme EcoServ: 2. VEEP « Quelles Valeurs Esthétiques et Ecologiques des Paysages à la périphérie des villes ? Une évaluation économique d'un bouquet de services écosystémiques » since March 2016 for 18 months 3. Bioserv « Quelle est la contribution de l'agriculture BIOlogique aux SERVICES écosystémiques ? Une analyse multiservices (cycles biogéochimiques, régulation, production) à l'échelle des territoires », 2016 – 2018 4. Participation in the French Assessment of Ecosystems and Ecosystem Services (L'évaluation française des écosystèmes et des services écosystémiques – EFESE) for the French Ministry of Environment, Energy and Sea; coordination of the Thematic Study on Agroecosystems being part of EFESE, since 2014 5. Collaboration initiated between Thünen Institute, MNHN, AgroParisTech and JRC to update the study on grassland enhancement policy for GHG mitigation by accounting for effects on biodiversity, since 2016 6. Collaboration initiated between Swedish, Spanish and French partners to evaluate of the impact of rural development measures on farm labour using the data produced in TRUSTEE, since 2016
Symposiums / Conferences	-
Other (specify)	<ol style="list-style-type: none"> 1. CAPRI server branch: https://svn1.agp.uni-bonn.de/svn/capri/branches/trustee/land_transitions (access requires registration in the CAPRI network) 2. Server branch at the Internet platform of INRA-ODR (access restricted): https://esrcarto.supagro.inra.fr/intranet/carto_joomla/index.php 3. Visiting scholar at Ohio State University (Cécile Détang-Dessendre, November 2014) 4. Hosting 9 Post-Doc researchers 5. Hosting 6 PhD students