Sistemas agrarios mixtos: ganadería y cultivos

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Focus Group Mixed Farming systems

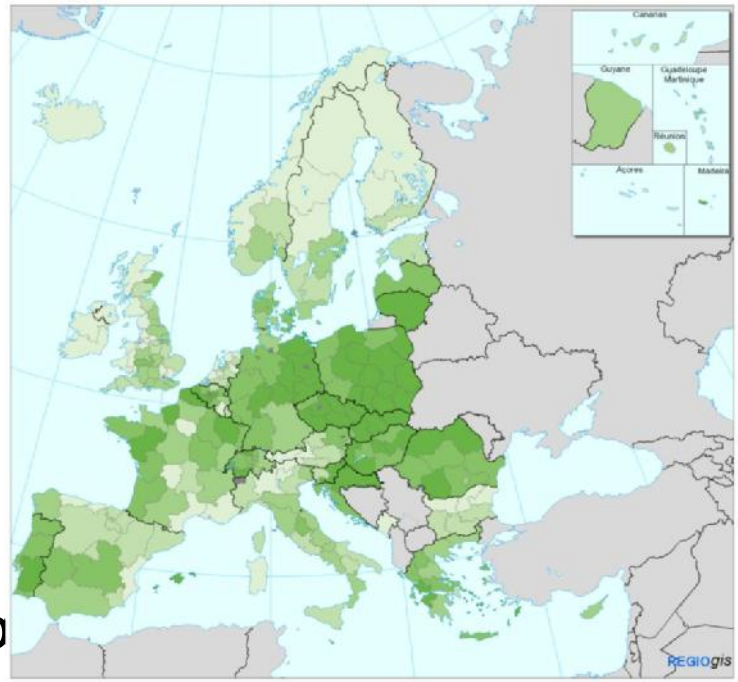
- 20 expertos: Dublin, Italia
- Definición
  - Combinación de sistemas de producción (arables y ganadería) a escala explotación y regional
- Objeto
  - Aumento del uso de los recursos naturales (evite su degradación)
  - Aumento de la resiliencia en cuanto a cambios globales
  - Disminuir dependencia de mercados globales

Objetivos

- Analizar los sistemas agrarios mixtos
- Identificar estrategias que promuevan la sostenibilidad de los Sistemas Agrarios Mixtos en Europa (casos de estudio)
- Describir impactos económicos, sociales y ambientales
- Identificar las prioridades de Investigación y necesidad de Innovavión

Analizar los sistemas agrarios mixtos

- <14% Sistemas agrarios actuales
- > Países del este
- Nivel de especialización depende:
  - Contexto socioeconómico
  - Disponibilidad de mano de obra
  - Condiciones pedoclimáticas
- En relación a la productividad (output/inp
  intensivos



Barriers

Environmental

- Lack of knowledge on innovative use of local resources and managing alternative crops
- Lack of technical and economic references to make use of locally-adapted practices in combining livestock and crops

Economic

- Low short-term profitability at MFS farm level, low remuneration of labour in particular
- High cost and lack of logistics to transport and store feed and manure between farms

Social

- Labour organisation and skills to manage both crops and livestock
- Farmers“ willingness to cooperate to establish direct exchanges of feed and manure
- ”Vertical’ organisation of advising and education (top-down knowledge transfer)

Opportunities

Environmental

- Increase self-sufficiency in animal feeding through multiple use of local resources/ efficient use of nutrients
- Recouple nitrogen and carbon cycle through legumes/grasslands in arable rotations
- Improve soil quality through organic manure and crop diversification

Economic

- Added-value for local/sustainable quality branded products
- Valuing ecosystem services (landscape mosaic, PES...)
- Creating a market for a diversity of alternative crops

Social

- Promote rural development (diversified jobs; link farming, food, tourism)
- Social and knowledge exchange between farmers at the regional level

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Identificar estrategias que promuevan la sostenibilidad de los Sistemas Agrarios Mixtos en Europa (casos de estudio)

- Piensa Globalmente, actúa localmente
- Mejora de la eficiencia unida a la sinergia entre componentes
- Mejora de la eficiencia técnica vinculada a:
  - Diversificación en la rotación de cultivos (adaptada a condiciones edafoclimáticas)
    - Venta
    - Alimentación animal (empleo de rastrojos)
  - Reciclaje de purines para fertilización
    - Gestión de purines (numerosas opciones)
- RETO: Gran número de combinaciones potenciales (leguminosas)

Successful examples of integrated practices in MFS improving technical efficiency

Agricultural practices	Examples of synergies	Associated benefits on sustainability/efficency
Manure used as fertiliser	Making the best use of self-produced manure through improved understanding of nutrient release to match crops' needs	a) Reduced use of external inputs as fertilisers b) Lower levels of water pollution (N and P loss) and soil improvement
Crop diversification and rotation design to feed the animals	a) Utilisation of self-produced feed (e.g. locally produced peas and beans, cereals and forages, including legumes) b) Selection of crop varieties with specific properties (e.g. stubble suited to aftermath grazing, species with anthelmintic properties for animal health, ...)	a) Improved product yield and quality (livestock health)/ lower reliance on feed inputs b) Reduced reliance on external inputs
	Accounting for pre-crop effects in rotation	a) Improved soil structure via range of rooting depth, residue returns, etc. b) Reduction in fertiliser inputs.

Casos de estudio

- Se seleccionaron 20 (14 a escala explotación) > LFA
  - Factores de éxito:
    - a) Mejora de autosuficiencia
    - b) Enlace con la cadena de valor (marketing / información al consumidor)
  - Problemas
    - a) Necesidad de mayor planificación de mano de obra
    - b) Mayor organización de la mano de obra
    - c) mayor número de toma de decisiones
- Ej explotación: Polonia:
  - Aumento autonomía en sistemas lecheros (base en pastos)
  - Introducción de técnicas de conservación
  - Creación de una granja escuela
- Ej Regional: Tyrol
  - Intercambio productores de leche y viñedo
  - Mejora digestión de purín (transporte y aplicación)

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Indicadores

Table 4: Indicators suggested to evaluate the economic dimension of sustainability of MFS

Criteria	Possible indicators	Relevance of the indicators for MFS
Long-term sustainability	1.Net income (farm level, share of cash crops and livestock) 2. Rate of diversification *(respective Gross Margins in livestock and in crops)* 3.Level of debt 4. Frequency of investments	MFS could balance risks between crops and livestock (specialised farm gets often better results but higher variability of income over years) ➔ *MFS are supposed to be more resilient as they could diversify product and be thus less sensitive to market fluctuation for one product* MFS invest more but could develop economies of scope (equipment, buildings, ...) MFS needs a long term view
Short-term sustainability	1. Cash flow 2. Short-term debt (overdraft) 3. Labour productivity	Less sensitivity to the global market due to diversification of products sold (crops, livestock products,...) Farmers invest more in MFS (for both crops and livestock) If well-managed, farmers could have a great labour productivity in MFS in combining tasks over the year
Input use efficiency	1. Resource use efficiency (*input/output)*	MFS are supposed to better recycle N,P and C so to have a greater resource use efficiency and lower use in inputs (feed/fertilisers)

Table 5: Indicators suggested to evaluate the social dimension of sustainability of MFS

Criteria 	Possible indicators	Relevance of the indicators for MFS
Labour management	1. Hours of free time (labour balance evaluation) 2. Number of jobs created on-farm/locally	The multi-task labour organisation is higher in MFS More jobs are created in MFS both on-farm as more tasks have to be considered, and locally as diversified local products could be sold in the area
Cooperation between farms at regional level	1.Transactional costs (Time spent) *(including time spent helping others, in planning meetings, in training, ...)*	Farmers collaborating for regional MFS need to share workload, planning and knowledge. Time spent in the establishment of regional MFS should be assessed to consider the involvement of the farmer.
Knowledge exchange	1. Time spent in training *(discussion/training groups, with adviser, internet/books, intergenerational exchange)*	Knowledge exchange is particularly needed in MFS as farmers have to develop diversified skills and knowledge As this could be achieved between farmers or through more conventional training or alone on the internet looking through references, different categories of knowledge exchange should be considered.

Criteria	Possible indicators	Relevance of the indicators for MFS
Soil quality	1. Soil compaction 2. Soil texture 3. Soil organic matter 4. Carbon sequestration in grasslands 5. Share of soil covering (crops, grasslands, cover crops)	Key to measure the positive impacts of MFS on soils through arable-grasslands rotations and grazing (limiting erosion, ...)
Water quality and quantity	1. N and P content of water 2. Quantity of water use by year and by crop	MFS are supposed to limit water pollution through arable-grasslands rotations and to have a lower use of water
Biodiversity **Landscape (proxys)**	1. Number of species 2. Number of habitats (agroecological elements, ...) 3. Diversity of the landscape structure – (Shannon/Simpson index) or land cover	MFS are expected to encourage biodiversity MFS contribute to diversify landscape elements
Energy efficiency	1. Energy balance at the farm and regional levels	Energy balance is supposed to be better in MFS, as less energy is needed to import feed and fertiliser
Nutrient efficiency & climate change mitigation	1.Farmgate nutrient balance (N,P) 2.Carbon footprint	MFS are supposed to better recycle N,P and C so to have greater resource use efficiency and lower inputs use

Recomendación 1.- Adaptación de los sistemas de consultoría, educación y entrenamiento a las especificidades de los sistemas agrarios mixtos

- Favorecer el intercambio y el aprendizaje para promover las capacidades de los agricultores
- Desarrollar sistemas de enseñanza y consultoría más holísticos
- Desaarrollar el conocimiento de los agricultores en la gestión estratégica de los sistemas agrícola smixtos para motivar los jóvenes agricultores

Recomendación 2.- Promoción de la integración regional entre cultivos y ganadería

- Considerar los sistemas agrarios mixtos como una opción para la gestión del paisaje que promueve las regulaciones biológicas y promueven los servicios ecosistémicos
- Fomentar la cooperación entre agricultores que favorezca la integración entre sistemas agrarios mixtos a escala regional
- Considerar la multifuncionalidad y múltiples productos derivados de los sistemas agrarios mixtos para añadir valor a los productos

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Mas información

- Minipapers
- **Minipaper 1: How farmers deal with complexity of MFS**
- **Minipaper 2: Improving technical efficiency of MFS**
- **Minipaper 3: The perspective of specialised farmers**
- **Minipaper 4: Adding value to products from MFS**
- **Minipaper 5: Landscape management through MFS**

Table 8: Needs for research around MFS

Main topic	Needs for research
Evaluation of MFS sustainability	**Multicriteria evaluation of economic and environmental benefits of adopting MFS as compared to specialised systems** *Consider the temporal scales of MFS exploring long-term effects through environmental-economic models, FADN databases and case-study approaches (multidisciplinary approach). Compare technical performance of MFS with specialised farms, building on the FADN analysis provided by the FP7 Cantogether project and decline these to specific case-studies with different MFS (based on a mapping of MFS in different pedo-climatic contexts and considering both economics and policies). Analyse trade-offs between profitability and long-term economic viability and environmental benefits to reconsider relevant options for MFS as compared to specialised systems.*
Labour organisation and complexity management	**Identify and adapt tools for the analysis of labour requirements throughout the year and time spent in management** *Develop management models for farmers for different MFS. Knowledge mapping (sources of info to deal with complexity) and development of web based tools. Develop approaches for understanding how farmers have achieved (or failed) dealing with complexity. Capitalise on 'story telling' by farmers and consider temporal trajectories of change of practices and decision making to maintain or make more sustainable their MFS. Capitalise on skills developed by farmers in MFS that could be needed to manage complexity.*
Mapping of technical efficiency of MFS	**Mapping different MFS models across EU to identify pedo-climatic and economic conditions where MFS can have the highest economic and environmental benefits as compared to specialised systems** *Identifying through mapping common success factors and successful combinations of practices locally adapted to different areas. Build a typology of MFS according to their orientation (environmental/sustainability or productive/marketing) and link these to specific contexts. Analyse the different benefits and possible efficiency gains of MFS in high productive areas and in less productive areas.*
Soil quality	**Research on nutrients and carbon cycling efficiency through MFS** *Explore innovative and traditional combinations of practices to recouple nitrogen and carbon cycles. Diversification of arable-grasslands rotations should be explored to achieve feed autonomy, provide soil organic matter and limit the use of water and mineral fertilisers. Mixed cropping, cover crops and manure management technologies (e.g. methanisation, manure treatment ...) should be explored as well as the advantages of implementing them.*
Animal feeding efficiency	**Research on how farm by-products, cover-crops and dual-purpose crops could be efficient for animal feeding** *Specific research should be dedicated on the valorisation of diversified by-products, cover-crops and dual-purpose crop for animal feeding (e.g. beet or maize residues grazed by cattle or used as feed for monogastrics). Some cover crop or dual-purpose crop could be seeded to cover soil and limit soil erosion and valorised by the animals if needed. Specific combinations of mixed crops, cover-crops or residues should be tested in specific soil-climatic areas and for different types of livestock.*
Knowledge exchange	**Explore the knowledge aspects involved in maintaining or developing MFS** *Identify the management skills and competences to be developed for MFS (for example looking at how complexity and risk is managed in other business and industries) and the role of the agricultural knowledge and innovation systems. Explore the possibility of implementing knowledge exchange through participative approaches on case-studies and digital platforms.*
Cooperation between farms	**Indentify management strategies to organise exchanges of crops and manure between farmers and counter risks** *Quantify risks of different MFS models and their resilience. Explore logistics, organisational levers to favour the development of successful cooperation (case-studies, on-farm surveys, implementation of contractual agreements, insurance schemes ...)*
Marketing and labelling the MFS "multifunctional product basket"	**Develop marketing and labelling strategies for MFS products aimed at raising consumers' and farmers' awareness on the benefits of MFS** *Combine already existing added-value chains and labels to the specificities of MFS, analyse the "multifunctional product basket" or "bundle of services" provided by MFS and develop communication strategies to communicate and attract people towards MFS.*
Landscape	**Evaluate the benefits of MFS at landscape level (landscape mosaic as alternative to specialisation) to provide multiple ecosystem services** *Such as biodiversity enhancement and water quality and quantity regulation. Considering in particular the interest of including woody vegetation, conservation agriculture and permanent grasslands to improve existing MFS and their impacts on landscape mosaic.*

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- **Grupos operativos**

Table 7: Ideas for Operational Groups

Key issue	Ideas for Operational Groups
Labour-management	**Test new managerial solutions found by farmers to deal with complexity and risk in MFS** *Analyse existing case-studies of well-managed MFS; develop a labour-balances analysis based on farm surveys; develop participative approaches with groups of farmers to consider their management strategies and develop scenarios; identify management tools to assess MFS labour requirements and associated costs so as to facilitate integration between farms.*
Soil quality	**Identify best MFS practices in real farms to optimise soil quality** *A case-study approach would allow good practices to be considered, linking surveys on practices and soil analysis; mapping of soil quality and its evolution could be the base for discussions with farmers. In particular, identify proper use and optimisation of organic fertilisers (manure) in different pedo-climatic areas.*
Technical efficiency	**Develop locally-adapted multicriteria evaluation of MFS** *Identify and validate existing case-studies of MFS practices that generate positive impacts and increase farm profitability. Adapt multicriteria evaluation framework together with local actors; define the right balance in a multipurpose system (arable – grasslands – livestock – perennial crops) to achieve farmers' objectives and provide ecosystem services. Test the technical efficiency of mixed farming variants under several pedo-climatic conditions to enable more informed decision making.*
Technical efficiency	**Identify best practices to optimise energy/nutrient cycles including combination of already existing practices** *Consider and analyse technical and economic data in MFS developing arable-grasslands rotations including cover crops to feed the animals; explore new techniques and technologies (mixed crops, methanisation,...); consider for instance grazing systems based on grass or immature crops and mixed crops, arable-grasslands rotations, crop residues, etc.*
Marketing	**Develop marketing strategies to add value to MFS products and integrate specificities of MFS into already existing value chains** *Develop new products and analyse diversified bundles of services provided by MFS so as to diversify production and increase farm resilience. Develop new business models to make profit out of multifunctional approaches (for example, creating riparian buffers to prevent pollution, erosion etc.)*