Mixed farming and the sustainability of beef production systems in Wales, UK.

P.K Nicholas-Davies (Aberystwyth University)
Ana Mª Olaizola and Olivia Barrantes (UNIZAR)
Cantogether project

- Objective: to design innovative sustainable mixed farming systems
  - Look at the environmental, economic and social viability of the systems developed
- 27 academic and SME partners from 10 countries
- Network of 24 experimental and commercial mixed farms including Celtic Pride in Wales, UK
Introduction

• Celtic Pride and IBERS/UNIZAR - joint project to develop a method for evaluating the sustainability of farming businesses.

• Objectives are to:
  – Help farmers to identify the strengths and weakness of their own systems (financial, environmental and social performance)
  – Compare mixed vs specialised farming
  – Identify where support to farmers is best targeted to improve overall sustainability
  – Build closer relationships with farmers supplying Celtic Pride
Case: Celtic Pride

- Quality beef brand
- supplied by approximately 50 mixed and specialised farmers.
- assurance standards of husbandry and welfare.
- Recognised branded beef (PGI status) and premium price paid for their livestock.

Geographical Context:
Area: Wales, UK
Climate: Cloudy, wet and windy but mild
Terrain/Soil: Mix of upland, hill and lowland
Demography: Predominantly rural
Aim

• To assess the sustainability of a group of Welsh case study farms by means of farm typologies and to explore the relationship between farms sustainability and types of mixed farming systems.
Sustainability assessment

• A wide diversity of tools/frameworks has been developed to evaluate sustainability.
• Binder et al., (2010) highlight sustainability shortcomings:
  – multi-functionality in agriculture has been poorly addressed
  – ecological aspect favoured instead balance between the three dimensions of sustainability
  – neglected the step towards utilisation and implementation of this knowledge
MESMIS

- Organised around sustainability attributes (productivity; stability, reliability and resilience; adaptability; equity and self-sufficiency)
- Bottom up, participatory and interdisciplinary process - sustainability expressed in comparative terms between two or more systems or between different stages of the same system after improvements have been implemented
MESMIS method

General attributes of sustainable systems
Productivity  Stability  Adaptability  Equity  Self-reliance

Critical points for the systems sustainability

Evaluation areas: environmental, economic, social

Diagnostic Criteria

Indicators

Workshops

Expert opinion – 42 indicators

Measuring and monitoring of indicators – direct survey of 38 producers
Method continued

• Indicators were weighted to by experts to reflect the different relative importance they have in explaining the sustainability of the system.
• Values were transformed into a scale from 0 to 100, corresponding to the worst (0) and the best (100) indicator value.
• These indicator values and their weight were used for calculating sustainability attributes of farms studied.
Farm typology based on sustainability

- **Group 1 (n=10). Highest equity.** This group obtained the highest mean score for equity (51.6%) adaptability and stability. They also showed a high value for self-sufficiency attribute (79.5% on average).
- **Group 2 (n=10). Best productivity.** This group scored the best for productivity (72.8%) on average (but not significant). Regarding the stability and adaptability attributes they presented intermediate values. However, these farms showed a low value for equity (37%).
- **Group 3 (n=8). Least self-sufficient.** The average value for self-sufficiency of this group was the lowest (56.8%). Besides for the stability and adaptability attributes presented comparatively low values. Contrarily they obtained a high productivity (71.7%).
- **Group 4 (n=8). Least stability and adaptability.** These farms obtained the worst mean score for stability (18.6%), adaptability (23%) and equity (31.2%). In contrast they had a high degree of self-sufficiency (74.6%).
Sustainability performance

• Groups 1 and 2 more sustainable than the farms of Groups 3 and 4.

• Group 1 “Highest equity” and Group 2 “Best productivity” scored higher for economic and environmental sustainability than Groups 3 “Least self-sufficient” and 4 “Least stability and adaptability”.

• Groups 3 and 4 showed on average a lower social sustainability. In contrast the most socially sustainable were the farms of Group 1.
Mixed farming and sustainability

• Most Celtic Pride case study farms had mixed livestock (cattle and sheep) but only 44% of farms could be considered as mixed beef farming systems (i.e. crops and livestock).

• Types of beef farming systems were established according to the definition of mixed farming systems proposed in Cantogether

• 1. Specialised grassland beef farming systems (7 farms).
• 2. Fodder cropping beef farming systems (13 farms).
• 3. Mixed beef farming systems (16 farms).
### Distribution of types of mixed beef farms in sustainability groups

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<thead>
<tr>
<th></th>
<th>Group 1</th>
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<th>Group 2</th>
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<th>Group 3</th>
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<th>Group 4</th>
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<td>42.9</td>
<td>0</td>
<td>0.0</td>
<td>4</td>
<td>57.1</td>
<td>7</td>
<td>19.4</td>
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<tr>
<td>2. Fodder cropping beef farming systems</td>
<td>1</td>
<td>7.7</td>
<td>3</td>
<td>23.1</td>
<td>7</td>
<td>53.8</td>
<td>2</td>
<td>15.4</td>
<td>13</td>
<td>36.1</td>
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<tr>
<td>3. Mixed beef farming systems</td>
<td>9</td>
<td>56.3</td>
<td>4</td>
<td>25.0</td>
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<td>6.3</td>
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<tr>
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<td>27.8</td>
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<td>22.2</td>
<td>8</td>
<td>22.2</td>
<td>36</td>
<td>100</td>
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Chi-square: 23.261, df: 6, p=0.001.
Conclusions

• Mixed beef farms could obtain the highest equity and high productivity – highest sustainability.
• Specialised grassland beef farming systems could also obtain the highest productivity but could also be less stable and adaptable.
• Sustainability performance closely linked to land quality – mixed beef systems tend to be on lowland, less LFA. Specialised grassland high proportion of LFA with limited options to change the system.
Thank you for listening