



Note 1: A typology of demonstration farming

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Overview

As part of the PLAID project, we explored the current level of diversity in European agricultural demonstration by developing a typology of demonstration farm types. This Information note outlines an analysis conducted from a database of 1177 farmers and organisations conducting demonstration events across Europe. The analysis used two key dimensions: “sustainability” and “institutional setting” to conduct a cluster analysis of the database. This process divided farmers into seven demonstration types.

Types of Demonstration

The typology identified 7 main types:

1. Professional commercial livestock extension. (247 farmers/organisations)
2. Farmer-led commercial development. (171 farmers/organisations)
3. Environmentally sustainable horticulture/orcharding. (1517 farmers/organisations)
4. Farmer-led community development. (147 farmers/organisations)
5. Research-based innovation extension. (135 farmers/organisations)
6. Externally funded community development. (143 farmers/organisations)
7. Small informal crop demonstrations. (137 farmers/organisations)

Key Findings

- Clusters differed in their objectives, ranging from promoting the development of economic capital (profitability) (clusters 1 and 2), to promoting environmental and social capital (clusters 3 and 4).
- The two clusters that showed more involvement of women (clusters 3 and 4) had a higher emphasis on social and environmental objectives.
- Demonstration types organised by farmers rather than external organisations appear to have higher engagement (participation) of women.
- Some demonstration approaches focus on different production types. For example, the focus on environmental sustainability was mainly in the horticulture/orcharding sector.
- Demonstration types were not evenly distributed across Europe. For example, 64% of Swedish demonstration activities were in cluster 7 (small informal crop demonstrations), while 50% of German demonstrations were in cluster 4 (farmer led community development).

Introduction

While the origins of the concept are earlier (see Information Note 2), the term demonstration farm was first used in the early-1900s by the US Department of Agriculture to denote a farm where departmental demonstration activities were undertaken and, later, any farm “wholly worked according to the department’s instructions”. Dr. Seaman Knapp, widely credited with developing the concept, described the aim of demonstration farming as,

“to place a practical object lesson before the farm masses, illustrating the best and most profitable methods of producing the standard farm crops, and to secure such active participation in the demonstrations as to prove that the farmers can make a much larger average annual crop and secure a greater return for their toil.” (Knapp, 1909, 160)

By working with farmers on their own farms Knapp contended it was possible to set an example for neighbours to imitate. In this way, information could be taken from experimental stations and put into general usage in a way that had not been achieved through the use of bulletins.

The diversified nature of today’s agriculture has led to demonstration farming to be applied in a wide variety of situations. While some demonstrations are conducted on private farms, others are held on established demonstration plots of agricultural institutions, and yet others on “monitor farms” – where groups of farmers monitor the effects of innovation within a benchmarked environment. At the same time, as agriculture has become more complex and the interests of extensionists have turned from purely economic to wider environmental and social objectives, the range of topics covered in demonstration farming has expanded along with the structures of the organisations that hold demonstration events.

As part of the PLAID project, we explored the current level of diversity in European agriculture by developing a typology of demonstration farm types. This Information note outlines an analysis conducted on a database of 1177 farmers and organisations conducting demonstration events across the European Union. The analysis divided farmers into seven demonstration types and helps us understand how issues such as gender and focus on sustainability vary across European demonstration.

Developing a theoretical typology

Typologies can provide a simple illustration of the structure within farming communities and practices. To understand the types of demonstration activity PLAID began by developing an “a priori” typology where researchers use their knowledge to create a theoretically informed division. Using a “matrix approach” (Meert et al., 2005) we selected two important dimensions of demonstration based on the initial H2020 call, namely:

- (a) **Sustainability:** Whether the demonstration is only to meet commercial objectives and benefit private organisations (private goods) or promote public goods (e.g. environmental improvement, community development).
- (b) **Institutional setting:** Whether the demonstration activities are administered from the bottom up (i.e. by farmers) or top down (i.e. by the government).

The sustainability dimension was selected to identify the extent to which the demonstration farming addressed narrow single goals (generally exclusively commercial) or broader goals (economic, social, environmental, cultural) that may lead to more sustainable agriculture. This is based on the assumption that organisers that promote a wide range of objectives are more likely to promote sustainable agriculture than those that support a single or narrow range of objectives. Objectives can be classified according to the three pillars of sustainability (social, environmental, economic) along with an additional cultural/human capital pillar increasingly associated with sustainability (Birkeland et al., 2018). For example:

- Local economic development (Economic pillar)
- Monetary/Financial (Economic pillar)
- Competitiveness/Productivity (Economic pillar)
- Strengthen the farming community (Social pillar)
- Assist farm families (Social pillar)
- Knowledge creation and sharing (Cultural/human pillar)
- Educational and training activities (Cultural/human pillar)
- Improved environmental conditions (Environmental pillar)
- Nature conservation (Environmental pillar)

This mixed approach is necessary because whether a farm is more or less sustainable is not dependent on a single measure – e.g. economics or environment – but on achieving a balance across the farm system. Thus, we contend demonstrating for a variety of different objectives is likely to produce a more sustainable regional agriculture in the long term.

The institutional dimension emphasises the extent to which the demonstration is organised “peer-to-peer” or institutionally managed – a key PLAID concept. A basic classification can be drawn around two main groups:

1. **Institutionally governed demonstration activities:** established by a research centre, special interest group (e.g. conservation charities), agribusiness or agricultural educational organisation. The goals and objectives are often determined by those involved in the industry, not the farming community itself.
2. **Farmer-led demonstration activities:** established by farmers or groups of farmers to meet their own needs. Examples include ‘monitor farms’, established in New Zealand and subsequently adopted in

Europe. A group of farmers agree to meet at established intervals to propose and assess innovations for adoption on-farm. Decisions on which innovation to investigate are made by the group.

The PLAID typology – what does our data say?

The a priori typology provided a theoretical framework to explore the farm types. The final typology however, was developed from the data collected as part of the Plaid/AgriDemo database.

Measuring sustainability: To measure aspects of sustainability items from the online database question “What are the 5 most important reasons why you (the farmer) first decided/agreed to host these demonstration activities on your farm?” were used. For analysis, the 17 options were classified into four types of “capital” – social, economic, environmental, and cultural – representing how the demonstrations were aimed at strengthening different aspects of agriculture. The measure used for each capital type was simply the number of times the items were mentioned in responses. An additional question included was whether the demonstrators focused on single farm practices or a whole farm approach (“multiple practices linked to the overall farm management”) – in order to assess whether the demonstrators were taking a broad or narrow view on farm management practices. This was under the premise that whole farm approaches offer a more sustainable option.

Social Capital	Strengthen the farming community Social recognition Assist farm families Networking
Economic Capital	Innovation development Technology promotion/Product sales Monetary/Financial Competitiveness/Productivity Local economic development
Environmental Capital	Nature conservation Improved environmental conditions Regulatory compliance/Policy implementation
Human/cultural Capital	Knowledge creation Innovation uptake Information gathering/sharing Research implementation Educational and training opportunities

Figure 1. Classification of responses into social, economic, environmental and human capital.

Measuring the institutional dimension:

Three variables were used to measure the institutional dimension

1. Was the demonstration event organised by your organisation or an external one? (5 point scale)
2. Number of demonstrations that involved non-farm based primary organisers
3. Number of demonstrations that involved farm based primary organisers

Factor analysis

The first stage in the cluster analysis was to conduct a factor analysis. For the Plaid typology we used SPSS 25 to conduct an unrotated Principal Components Analysis (PCA). In terms of the suitability of the data for factor analysis the KMO test suggested it was marginally suitable (a measure of .472 – with .500 generally regarded as an acceptable level). The Bartlett’s Test (Chi-square = 829, d.f. = 28, p. < .000) suggested the data met the sphericity criteria for analysis.

Cluster analysis

Cluster analysis is a technique for grouping cases (such as demonstrations) on the basis of similarity. To do this, first a principal components analysis was used to ensure that the constructs are evenly weighted. Factors from the principal components were then used to conduct the cluster analysis rather than the raw data. Ward’s method was chosen as the clustering algorithm. Having identified 7 potential clusters, the validity of the clusters was examined by conducting tests on external variables that should theoretically be related to the clusters (Ketchen & Shook, 1996). This showed that the relationship between the clusters and the external variables was significant 76% of the time.

Result – a typology for sustainable farmer-led demonstration?

Figure 2 displays the farm types as detected in the analysis. It is important to note that different clustering techniques would have led to different clusters being detected (i.e. there is no single definitive division of demonstration farming types). The key strength of this particular typology is that it can assist in understanding the relationship between demonstration farming, direct farmer involvement, and the aspects of sustainability being addressed in the demonstration.

Cluster description	Organisations	Farmer organised?	Social	Cultural	Economic	Environmental	Whole farm
Cluster 1. Professional commercial livestock extension	247	No			High	Low	
Cluster 2. Farmer-led commercial development.	171	Yes		Low	High		
Cluster 3. Environmentally sustainable horticulture/orcharding.	157	Both				High	
Cluster 4. Farmer-led community development.	147	Yes (strongly)	High				High
Cluster 5. Research-based innovation extension.	135	No	Low	High			
Cluster 6. Externally-funded community development.	143	No	High		Low	Low	
Cluster 7. Small informal crop demonstrations.	137	Both		Low	Low		Low

Figure 2: Farm demonstration typology

The farm types were further elaborated by exploring the relationships between the clusters and additional information gathered in the database.

Cluster 1. *Professional commercial livestock extension.*

Cluster 1 consisted of externally organised demonstrations, often funded by advisory/extension services, that primarily sought to develop the profitability of agriculture and had a minimal focus on promoting environmental measures. Events for this cluster are held on research farms rather than commercial farms and are generally based around livestock rather than field crops. They attract an audience with a relatively high proportion of participants working directly with agriculture (livestock), however, they attract relatively low numbers of female attendees.

Cluster 2. *Farmer-led commercial development.*

As with Cluster 1, organisations in Cluster 2 are focused predominantly on the development of farm profitability. However, unlike Cluster 1 this cluster is driven by the farming community itself. Activities tend to be self-funded, farmer-led, and held on ordinary commercial farms – while their reliance on individual contacts as a means of promoting events suggests they are well embedded within farming

communities. Their lack of engagement with a network and low levels of formal promotion suggests demonstrations operate largely independently.

Cluster 3. Environmentally sustainable horticulture/orcharding.

Cluster 3 has a relatively high proportion of female attendees and a focus on environmental capital. Organisations in this cluster were likely to take a broad sustainability approach, with motivations covering multiple sustainability pillars (social, economic and environmental)¹. Demonstrations tend to focus on horticulture and orcharding and the number of non-farmer attendees is relatively high.

Cluster 4. Farmer-led community development.

As with cluster 2, cluster 4 showed a strong tendency towards farmer organisation, commercial farm activities, and self-funding, but this time focused on the development of social capital and the use of a whole farm approach. Demonstration activities tend to be based on animal husbandry or are general demonstrations (not on any specific crop or animal). The fact that this category has a relatively low proportion of farming related visitors combined with the focus on social capital suggests these demonstrations have a community development function. High numbers of demonstration events, high levels of attendees, and membership of large networks suggests this is an important type of demonstration activity. The proportion of female visitors is relatively high.

Cluster 5. Research-based innovation extension.

Cluster 5 organisations are predominantly externally organised, and likely to be funded by external organisations such as public funding, research institutes or supply chain organisations. The focus here is on the development of human capital, i.e. the creation of new knowledge, innovation uptake, information gathering, research implementation, and education and training. Large numbers of attendees, wide use of promotional approaches, and many demonstration types suggest that, as with Cluster 1, Cluster 5 has a strong focus on formal extension. However, the key differences are that in this case the focus is on extending research, education and innovation, rather than directly on the potential commercial outcomes – and it is publicly funded rather than funded by advisory services. Attendance is predominantly male.

Cluster 6. Externally funded community development.

Cluster 6 comprises highly networked and externally funded organisations focused on the development of rural communities. It is difficult to define this category in part because a high proportion of organisations within it suggested they were funded by “other” organisations – perhaps reflecting a weakness in the closed format categories in the questionnaire. The relatively high number of attendees per demonstration, high use of remote promotion techniques (mailing, website, twitter, leaflets) and low level of promotion through individual contacts suggest an extension objective.

Cluster 7. Small informal crop demonstrations.

Cluster 7 is typified by lower outcomes than other clusters with the only case where the cluster shows a higher tendency than other clusters is in the likelihood of the demonstration involving field crops – matched by a very low likelihood of the demonstration activities involving livestock. The fact that there is a low level of emphasis on the whole farm approach and a low number of sustainability features suggests these are very targeted infrequent cropping demonstrations – and consequently show low numbers of demonstration events, attendees, and small networks.

The distribution of these demonstration farm types across Europe is illustrated in Figure 3.

¹ Note that this is in part attributable to the fact that, unlike the other clusters, this group shows higher levels of engagement with environmental capital.

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6	Cluster 7	Total
United Kingdom	25*	6	17	9	12	27*	0	96
Czech Republic	4	5	6*	5	2	3	4	29
Serbia	1	2	1	1	0	1	0	6
Austria	0	1	2	3	2	2	0	10
Ireland	38**	0	5	2	14	16*	1	76
Latvia	4	1	2	0	3	1	0	11
Bulgaria	24*	10	6	6	12	6	10	74
Slovakia	7*	8*	2	2	4	2	8*	33
Norway	1	1	1	5	1	2	1	12
Italy	7	7	7	1	6	3	1	32
Germany	4	4	6	35**	5	9	8	71
Belgium	3	5	8*	7*	8*	1	0	32
Malta	0	0	1	2	1	0	1	5
Romania	5	4	4	11*	4	6	6	40
France	24*	5	17*	2	13	9	4	74
Finland	2	10*	6*	6*	2	2	2	30
Netherlands	6	4	3	2	10	15*	19*	59
Poland	34*	55*	32*	5	13	6	22	167
Sweden	1	4	4	7	0	1	31**	48
Spain	14*	16*	7	11	1	7	4	60
Hungary	7	4	9*	7	3	4	4	38
Croatia	7	1	1	1	4	1	0	15
Portugal	3	0	0	0	4	0	3	10
Denmark	3	1	0	1	2	4	2	13
Slovenia	3	3	4	2	2	1	0	15
Lithuania	10*	8*	3	4	1	1	2	29
Estonia	5*	5*	0	9*	0	1	3	23
Switzerland	3	1	0	1	4	10**	1	20
Greece	1	0	3	0	2	1	0	7
Cyprus	1	0	0	0	0	1	0	2
Total	66	69	79	79	127	75	79	1137

Figure 3: Distribution of demonstration types over surveyed countries. Marked figures are only for countries with more than 20 respondents. * indicates 20% to 40% of the farms for this country fall into this cluster, ** indicates 40%+ of the farms fall into this cluster.

Analysis

The analysis of the empirical data identified a number of issues concerning demonstration agriculture in Europe.

Objectives

More demonstration activities are focused around profitability objectives (37%) than generating other forms of capital, and these can be separated into those that are led by research centres seeking to extend their experimental work (Professional commercial livestock extension – Cluster 1) and demonstrations that originate from the farmers themselves and are held on ordinary commercial farms (Farmer-led commercial development – Cluster 2). Clusters 3 and 4 (Environmentally sustainable horticulture/orcharding and Farmer-led community development) address higher numbers of sustainability pillars, i.e. their objectives are not focused on a single aspect of sustainability (e.g. farm profitability in Clusters 1 and 2). These demonstration types also have the highest attendance of people not working directly in agriculture (e.g. policy-makers, consumers, the public, etc.).

Gender

These two clusters (Clusters 3 and 4) also show relatively high numbers of female attendees. The focus of these demonstration types on a range of non-economic objectives suggests there is a gender division in the types of demonstrations that are attended by male and female participants. It may also reflect a greater focus by women on sustainability. Most of the other demonstration types showed low numbers of women attending. However, an interesting exception is the farmer-led commercial development which, while not favouring female attendees, was not as male dominated as the other clusters. Given that the demonstration types most attended by women were largely farmer organised (Clusters 2, 3 and 4), this raises a question concerning whether non-farmer organised demonstration is showing a gender bias (either in the way the event is organised or the topics covered).

Production types

Interestingly, some of the groups were predominantly related to particular forms of production in particular livestock (Cluster 1), horticulture/orcharding (Cluster 3) and crop demonstrations (Cluster 4) – despite the fact that production type was not one of the variables used as an input to the cluster analysis. This suggests that demonstration types are, or can be, related to specific productions and also the possibility of exploring the use of these types of demonstration to other production types in order to promote aspects such as greater sustainability or inclusion of more women.

Country distribution

Some interesting patterns emerged from the country analysis (Figure 3). 64% of Demonstration activities in Sweden, for example, were small informal crop demonstrations, while almost 50% of demonstration activities recorded for Germany were farmer-led community development – self-funded demonstrations with a focus on the development of social capital and a relatively high proportion of non-farmers attending. Ireland's focus on externally driven demonstration – professional commercial livestock extension (50%) and externally funded community development (21%) suggests a lack of direct farmer involvement in demonstration activities (possibly through an effective state-run system). Finally, at least half of the demonstration activities in Lithuania (62%), Poland (53%) and Spain (50%) are focused on economic objectives, falling into the professional commercial livestock extension and farmer-led commercial development categories.

Conclusion

This information note details one way of clustering demonstration activities in Europe. The demonstration farm types developed are useful from the perspective they allow us to explore the data in more detail, but do not represent the only way of grouping the data. Further analysis of the data or a more comprehensive study focused specifically on some of the issues could provide us with further insights into the different types of demonstration and how effective they are at promoting sustainable agriculture.

References

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