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Information Notes on Demonstration Activity, Learning, Innovation

WP2 : Conceptual framework and typology

PLAID
PEER-TO-PEER LEARNING:
ACCESSING INNOVATION
THROUGH DEMONSTRATION

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ABSTRACT

This deliverable comprises three information notes addressing the conceptual underpinnings of demonstration and the theoretically informed typology of types of demonstration:

Note 1: A typology of demonstration farming
Note 2: How does demonstration work?
Note 3: The role of demonstration in promoting innovation

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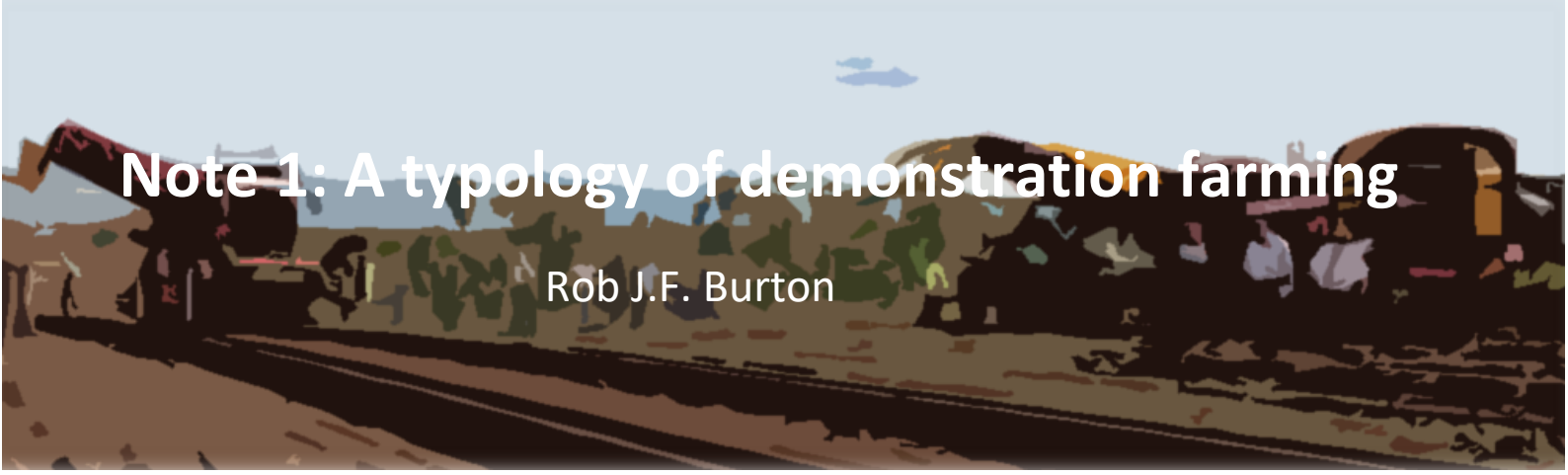

Note 1: A typology of demonstration farming

Rob J.F. Burton

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	*Organsiations*	*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

Birkeland, I., Burton, R.J.F., Para, C., Siivonen, K. (2018) Cultural Sustainability and the Nature-Culture Interface: Livelihoods, policies, and methodologies. Taylor & Francis, London.

Ketchen, D.J.; Shook, C.L. (1996) The application of cluster analysis in strategic management research: an analysis and critique. Strategic Management Journal 17: 441-458.

Knapp, S.A. (1909) The farmers' cooperative demonstration work. Yearbook of the Department of Agriculture. USDA, Washington.

Meert, H. Van Huylenbroeck, G.; Vernimmenc, T.; Bourgeoisa, M.; van Hecke, E. (2005) Farm household survival strategies and diversification on marginal farms. Journal of Rural Studies 21: 81–97

Note 2: How does demonstration work?

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Overview

Understanding how and why demonstration is an effective means of changing behaviour is an important step to good demonstration farming. This information note is based on the conceptual framework. It outlines basic principles from key behavioural theories in social psychology that explain why demonstration farming is an effective means of encouraging farmers to adopt innovations. It also suggests, from a behavioural theory perspective, what key components are required and why.

Key Findings

- The concept of demonstration farming was developed in the 18th Century to show farmers the new scientific principles for agriculture. Written means of transferring knowledge had proved ineffective as farmers could not afford to risk untried innovations.
- Creating new beliefs about an innovation through knowledge transfer is important because it leads to attitude change.
- Confirmation from the peer group is often, but not always, important for changing behaviour.
- The farmer must believe that he/she has control over the process in order to implement an innovation. Changing attitudes by knowledge transfer alone is not enough to ensure change.
- Getting farmers to think deeply about the innovation will result in strong and long-lasting attitude change.
- Features of the presenter such as institutional authority, likability, expertise and credibility can promote behavioural change.
- Features of the message such as personal relevance and wording are also important.
- Providing interactive experiences in the demonstration is important because it makes the attitudes stronger and more accessible. This in turn leads to greater consistency between attitudes and behaviour.
- Experience also increases control beliefs, i.e. “I know I can because I’ve done it before” or “I know it will work because I’ve seen it work”.
- Peer to peer involvement works by increasing social congruence. Similarities between the message giver and receiver make it easier to communicate knowledge.
- Peer to peer involvement also assists by enhancing the validity of the information when received from farmers in a similar position.

Introduction

Why demonstrate and not educate?

The origins of demonstration agriculture go back to the second half of the 18th Century – a time when "scientific farming" was gradually replacing inefficient customary practices. Agricultural Societies had formed across Europe to try to improve farming practices. Their members experimented on their farms and reported their results in Society Proceedings. This publication was to be the "principal cause of the diffusion". However, the approach proved to be ineffective as many farmers had "barely the wherewithal to stock their farms" – let alone risk investment in new, unpractised and untested innovations from books. As a result, by the end of the century, many were advocating that the best way of getting farmers to change their practices was for Agricultural Societies and landlords to directly demonstrate to neighbouring farmers and tenants that the scientific innovations would work. Farmers would thus able to see the innovations in a local context and learn from their neighbours' successes how to improve their agriculture. This principle still holds true today.

This information note presents results from the conceptual framework, outlining how behavioural change can be encouraged through learning, and how this relates to demonstration farming. It offers a theoretical perspective, but one that is useful for understanding how demonstrating innovations to farmers can lead to famers adopting the innovations. For further information on learning through demonstration based on our case studies, see PLAID output 5.2. "Good Practices for Successful Demonstrations: Findings from 24 European case studies".

What makes farmers change their behaviour?

Attitude change - persuasion

The Elaboration Likelihood Model is a well-established theory in social psychology. It addresses the issue of how communicators are able to create permanent attitude change and thus behavioural change. The theory suggests that if the demonstrator is able to get farmers to think deeply about an issue ("central route processing"), the result will be the development of attitudes that are strong, enduring and resistant to change. In contrast, if farmers cannot be encouraged to think deeply enough about the subject, the attitude change is less likely to be permanent. However, when a farmer is *not* interested in the subject he/she may be convinced by the "peripheral route". In the peripheral route, factors such as (a) the authority of, liking of, expertise of, or credibility of the speaker, or (b) the way the message is presented (such as its ability to convince the farmer that they will be able to reach their goals) encourage the farmer to believe the message without necessarily engaging in deep thinking on the issue.

Behavioural change

The Theory of Planned Behaviour – one of the main behavioural theories in social psychology – shows that attitude change is not the only factor necessary to encourage behavioural change. Over the years this model has been "a reference model in the literature on innovation diffusion".

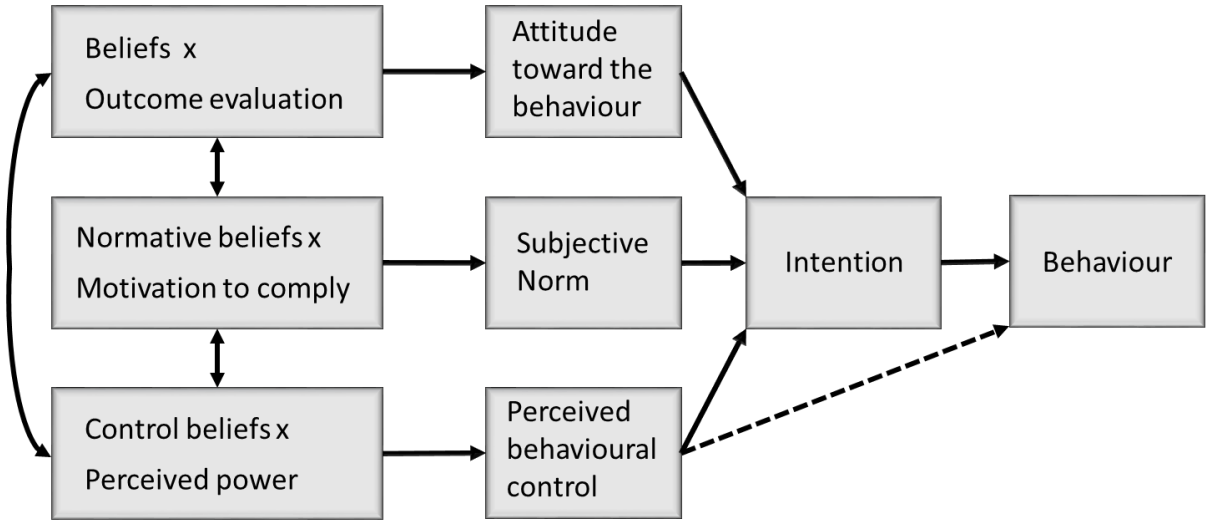

Figure 1: Ajzen's (1991) Theory of Planned Behaviour

Figure 1 illustrates the basic components of the theory. To place this in terms of a farmer attending a demonstration event, if a farmer:

(a) develops new beliefs (based on new knowledge) about an innovation,
(b) considers that these could have a positive result for his/her farm,
(c) finds other farmers with a good reputation confirm the accuracy of these beliefs,
(d) believes that it is possible to implement the innovation on his/her farm,

then the farmer is likely to form the intention to adopt the innovation. In the many thousands of applications of the theory it has been found that in some cases the opinion of others has no significant influence while in others it does. However, in the key message from this theory to demonstration farming is that more than a transfer of knowledge and attitude change is required to promote adoption.

The importance of experience

One of the key differences between demonstration farming and other ways of providing knowledge is that demonstration is a means of teaching by providing experience – sometimes by simply showing the result of the practices and, at others, by allowing hands on experience of the innovation. But why is providing farmers with experience important?

Experience is important for two reasons:

1) Attitudes formed by direct personal experience are known to be stronger than other attitudes – meaning that they are more accessible (are more likely to come to mind) and, thus, are more likely to lead to a change in behaviour. Many studies have shown that the consistency between attitude and behaviour is higher when the person (in this case, farmer) has direct behavioural experience.

2) Experience can strengthen the control beliefs. Beliefs in one's own ability to apply the innovation (self-efficacy) and beliefs that nothing prevents successful application of the innovation (perceived behavioural control) are made stronger when the farmer has direct experience with the innovation, i.e. "I know I can because I've done it before" or "I know it will work for me because I've seen it work". Experienced people also require lower levels of instruction, making the application of the innovation easier.

Some studies have suggested that when a person has no experience in a behaviour, the influence of the peer group is stronger. For demonstrations the presence of the peer group (other farmers) *combined* with direct experience with the innovation is likely to lead to strong consistency between attitudes and behaviour. Consequently, changes in attitude are more likely to lead to changes in behaviour.

Peer to peer learning

The importance of neighbours for transferring information about innovations in farming communities is well established. Discussions about innovations within farming communities often occur in environments where farmers socialise – including at demonstration events – rather than formal educational programs. But why is peer to peer learning effective?

1) One of the reasons communicating peer to peer is a good means of learning is "social congruence". This means that the "teacher" and the "pupil" are often similar in terms of their backgrounds and educational levels – and, in turn, their ways of thinking, knowledge, education, and so on, are similar. This enables them to better understand how to communicate knowledge to the other person and builds trust.

2) A second reason is that farmers generally live in a similar geographical context as their neighbours in terms of the soils, climate, access to markets, crop types, and so on. As a result, for many problems, the neighbours offer the best source of tried and tested information. Studies have shown that information is frequently transferred from peer to peer both voluntarily (e.g. through informal farm discussion groups or seeking a neighbour's advice) and incidentally (e.g. through looking over the hedge or "hedgerow farming").

While farmers are technically in competition, information on what works and does not work is often shared. Tapping into this form of learning for promoting the uptake of innovations is something demonstration farms can do both through promoting peer to peer discussions at the event, engaging respected local farmers for the events, and ensuring that respected local farmers are encouraged to take up the innovation.

Conclusion

This information note has outlined the theory of how demonstration farming changes behaviour. Learning through demonstration differs from other forms of learning mainly because demonstration increases the strength of any attitude formed (also engaging in more “central route processing”), increases the beliefs that farmers can affect a positive outcome, and provides a peer environment within which information can be exchanged. Demonstrations can best encourage change by enabling farmers to obtain direct experience (as much as possible), getting farmers to think deeply about the issue, ensuring that speakers have the appropriate authority, and directly addressing the issue of how farmers can achieve their goals by providing practical advice.

A key message here is that knowledge transfer alone is not sufficient, something also revealed in our case studies. The case study report (5.2) found that demonstrations focus on knowledge transfer and providing farmers with new knowledge on various innovations. This addresses farmers’ beliefs (both changing old beliefs and creating new ones) and is an important function of demonstration that was highly valued by the visitors. However, to stimulate farmers to actually change things on their own farm, other necessary preconditions for change also need to be addressed.

Note 3: The role of demonstration in promoting innovation

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Overview

Innovations in agriculture emerge from numerous different sources – from innovative farmers, experimental farms, scientific research organisations and private companies. As well as coming from different sources, the audience targeted by demonstrations is varied and has multiple different needs. How innovations are demonstrated to farmers is thus an important issue that guides the success of demonstration activities. In this information note we use the conceptual framework and the PLAID European case studies (D5.2) to look at how demonstration contributes to promoting new innovations. While Information Note 2 looked at the theory of learning from demonstration, this note focuses on how differences in the nature of the innovation affect its uptake.

Key findings

- Demonstration can be “problem driven” (resolving an issue that may require multiple innovations) or “innovation driven” (promoting a new innovation).
- The source of the innovation affects both how it is likely to be viewed by farmers and the approach to demonstration.
- High readiness innovations appeal to the average farmer, but more innovative farmers may not adopt it as there is “nothing new about it”.
- Low readiness innovations will appeal more to innovative farmers who have the resources to experiment. For the average farmer, demonstration of low readiness innovations increases awareness but is less likely to lead to adoption.
- Demonstration of innovations to promote sustainable agriculture need to consider the whole farm, or even broader context such as the wider agri-food system.
- Because sustainability covers the whole farming system, demonstrations of sustainability innovations need to connect with farmers in a variety of situations and with a variety of motivations.
- Farmers generally do not immediately adopt the innovation demonstrated.
- When there is an urgent problem to be fixed (such as drought), however, innovation adoption can be rapid. Speed of adoption is thus dependent on the urgency with which the issue needs to be addressed.

Introduction

In Information Note 2 we presented the theory behind learning by demonstration. But what happens when an organisation has an innovation it wishes to encourage the farming community to use? In this information note we use a combination the conceptual framework and the PLAID European case studies (D5.2) to present an analysis of how demonstration contributes to promoting innovations. This covers the issues of the difference between "problem driven" and "innovation driven" demonstration, the importance of the source of the innovation for demonstration, the importance of the readiness of the innovation, problems associated with demonstrating sustainable agriculture as an innovation, and the timing of the uptake of the innovation.

Innovation features that affect the demonstration approach

Problem driven or innovation driven demonstration?

Motivations for holding a demonstration activity can be grouped into two general categories.

"Problem driven" demonstration occurs when specific problems with current farming practices have been identified and a solution is desired. In this case demonstration is intended to help farmers identify solutions to the problem but does not focus on any single innovation. Demonstration of activities designed to address environmental problems or strengthen rural communities often fall into this category.

"Innovation driven" demonstration shows novelties that might be of use to farmers, but, while improving agricultural practices, do not address any specific problem. Demonstrations driven by, for example, machinery or seed companies would generally fall into this category.

Although there appears to be a clear-cut difference between these categories, the difference is not always that obvious. All innovations address, to some extent, a "problem" – even though it may be relatively minor (e.g. offering a small improvement in productivity) and not recognised as a problem. In general, demonstration visitors need to both recognise a problem *and* believe that the potential innovation addresses it – as well as being able to assess the relevance to their own farm.

Where does the innovation come from?

Innovations can come from a variety of different sources.

- Innovative farmers
- Experimental farms
- Scientific research
- Private companies

The source of the innovation has an impact on how it is likely to be viewed by the visiting farmers and thus the way the innovation is demonstrated.

In the case of farmer-based innovation, the barriers to innovation will be relatively low while "social congruence" (social similarities between the demonstrator and attending farmers – see Information Note

2) means that transferring information is relatively easy. Farmer innovators are expected to understand the practical considerations farmers will experience when adopting the innovation.

Innovations that emerge from outside of the farming community do not have these advantages. Scientific research innovations are often seen as complicated, untested, and overlooking the practical considerations that are important to farmers. In some cases – for example, environmental innovations in response to policy measures – they may be seen as not in the farmer's best interests. In the case of commercial companies, a suspicion that the innovation is designed more to improve the profit margins of the company than those of the farmers may need to be overcome.

In many cases trust in the source is essential to the early uptake of the innovation. For scientific innovations, getting experienced farmers to demonstrate can assist by providing assurances that the practical considerations have been considered as well as providing social congruence for message transfer.

How ready is the innovation to be adopted?

The extent to which the innovation is ready for application also influences the demonstration process. In many cases innovations need to be "fine-tuned" by being practically implemented and then adjusted as problems emerge. While it is desirable that this is done within the experimental and development stages, overlap can occur with the early implementation stages as early adopters identify practical problems and innovators seek to resolve them. Factors such as the level of upskilling farmers require and the farm adjustments that need to be made to make the innovation function in a practical setting are often only learned after the innovation has been implemented.

There is a difference between high and low readiness innovations in terms of who is likely to adopt and when:

High readiness innovations: If readiness is high the 'average' farmer may be more interested in the innovation (that has by now been thoroughly tested) whereas the more innovative farmers may be less willing to adopt as there is "nothing new about it" (as indicated in the Belgium case study – BE1). High readiness innovations tend to come from innovative farmers and commercial companies.

Low readiness innovations: If the readiness is low, the situation is reversed. Innovations in this state are more likely to be adopted by 'innovative' farmers who have the capacity to risk economic loss if the innovation fails, have the time to experiment, and see the innovation as presenting an interesting challenge. However, low readiness innovations can also be of interest to average farmers who wish to see possible future developments – even when not intending to adopt it immediately. In this case, demonstration can help to raise awareness and assist in possible future adoption – as occurred in the case of new leek harvesters in the early 2000s in the Netherlands case study (NL1). Innovations from experimental stations and research tend to fall into this category.

The readiness of the innovation can thus affect the types of farmers targeted in the demonstration as is illustrated in Table 1:

Readiness level	Average farmer	Innovative farmer
High	Consider it for application	Low relevance
Low	Stimulate awareness on possible future new developments	Consider it for application and further development

Table 1: Type of farmer targeted for innovations with 'low' and 'high' readiness levels

Demonstrating sustainable agriculture as an innovation

Demonstrating sustainable agriculture as an innovation is somewhat problematic. Sustainability is not something that is often targeted by single innovations – which tend to have a very narrow focus - but rather by a range of innovations aimed at economic (income), social, and environmental improvements. Thus, an innovation aimed to increase profitability could also increase sustainability, while focusing only on innovations for profitability could make the farming system ultimately less sustainable. Demonstrations of innovations to promote sustainable agriculture thus need to consider the whole farm, or even broader context such as the wider agro-food system.

Innovations are often implemented in order to meet sustainability objectives. In particular, farmers may need to innovate to mitigate the "side effects" of agricultural production. Examples include decreasing soil health as a result of monoculture, increased plant or animal diseases due to intensification, improving animal welfare to meet changing public expectations, the adoption of CO_2 mitigation measures, or the need to control nitrate release into water bodies.

These pressures to change are often difficult to address as farmers are embedded within a system where adopting a new innovation to address, for example, environmental sustainability could affect the economic sustainability of the farm. As each farmer is in a different position, to account for sustainability the demonstration activities need to attempt to connect with farmers in a variety of situations and with a variety of motivations. This could be done in a variety of ways including:

- Offering a range of demonstration activities that may appeal to different subgroups of farmers.
- Interacting with farmers at the demo to better connect the information that is provided with what individual farmers need.
- Offering information that is relevant for a range of farmers, for example relevant market or political developments.

This implies that the demonstration should not only seek to address the direct farming issues related to the demonstrated innovation, but also the farming context of the individual farmer and relevant aspects of the wider context in which a farmer operates.

When will the innovation be adopted?

In many cases a demonstration does little more in the short term than increase awareness. When farmers in the PLAID study were asked whether they were considering changing their practices after visiting the demonstration, a substantial number answered 'yes' (in cases in Switzerland, Belgium and Latvia (CH2, BE3, LAV2) 50% or more). However, when asked to specify what it was they would change, only a few were able to do so. Focus groups held one to two months later indicated that farmers were still thinking of making changes and had looked further into their options but had not taken any action. This suggests that the link between innovation adoption and demonstration activities is relatively diffuse. Farmers do not, in general, make immediate changes after attending a demonstration – even when the topic is of interest to them – but rather use it as part of a broader information gathering and testing process.

However, in some cases, significant changes in the farmer's situation can lead to more rapid implementation of innovations – in particular, when the demonstration is problem driven and the problem requires urgent attention. In a Croatian case, the accumulative effect of a succession of droughts on yields (and consequently on revenues), sped up the decision to apply the new drought-resistant varieties of wheat and barley that were presented at the demonstration event (CRO1).

Conclusion

The type of approach used to demonstrate new innovations depends on whether the demonstration is driven by the innovation or by a problem that needs to be solved, the source of the innovation (innovative farmers, experimental farms, scientific research, or private companies), and how ready the innovation is to be adopted. Special consideration also needs to be taken of how to demonstrate sustainability innovations. It should not be expected when demonstrations are innovation based that there will be any immediate adoption of the innovation as farmers often use demonstration as part of a broader information gathering process.