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Farmers taking responsibility for herd health development—stable schools in research and advisory activities as a tool for dairy health and welfare planning in Europe

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Abstract Achieving and maintaining a high herd health and welfare status is an important aim in organic livestock farming. The varying farming systems across and within countries call for models that are relevant for different farming types and that can be integrated into local practice. In stable schools, farmers take responsibility for health and welfare planning by identifying issues, setting goals, and acting to improve the health situation based on farm-specific data, e.g. milk production. This paper reviews the results from intervention studies that used a modified 'farmer field school' approach for animal health and welfare planning, providing an overview of ongoing activities and their implementation into advisory situations in selected European countries. Studies on stable schools as an intervention tool showed improvements regarding the specific project aim on the majority of the participating farms. Farmers and facilitators were convinced of the approach and benefits for dairy herds. Farmers' attitude and attention towards their herds and their ownership of the process appear to be crucial success factors for herd health and welfare situations. In some European countries, this method has been implemented in advisory practice, and in other regions, there are relevant and promising opportunities.

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Background

Achieving and maintaining a high herd health and welfare status is an important aim in organic livestock farming. Continuous development is needed within the farm to reach this goal. The different conditions between countries call for models that are relevant for different farming types that can be integrated into local practice (Vaarst et al. 2011b). Beside environment and herd conditions, farmers themselves play a critical role. Several studies have shown the impact of farmers' attitude towards their animals, their goals, and motivation in relation to productivity, health, and welfare (e.g. Breuer et al. 2000; Waiblinger et al. 2002) and the success of interventions (Ivemeyer et al. 2008). Farmers themselves emphasize the importance of observing, monitoring, and handling of animals (Dockès and Kling-Eveillard 2006). However, increasing herd sizes and economic pressure across Europe increase the challenges to these skills and there is a demand for tools that help farmers to deal with these.

A set of common principles for active animal health and welfare planning in organic dairy farming has been developed within the ANIPLAN project group of seven European countries (Vaarst and Roderick 2008). A central principle is that health and welfare planning is a farmer-owned process of continuous development and improvement which may be achieved in many different ways, but common features are that the process needs to be farm-specific, involve external person(s) and knowledge, be based on organic principles (where relevant), be written, and acknowledge good aspects in addition to targeting the problem areas in order to stimulate the learning process (Vaarst et al. 2010). The planning process has to be based on data of the current health and welfare status of the farms like for example milk recording data. The farmer field school (FFS) concept for farmers' learning, knowledge exchange, and empowerment that has been developed and used in developing countries (Sones 2003) is relevant to these requirements. This approach has been modified in Denmark to support farmers in achieving specific health and welfare goals (especially avoiding use of antibiotics; Vaarst et al. 2007). This 'stable school' approach has now been used in several European countries. The development of FFS to Danish stable schools is a form of knowledge transfer from less economically developed areas of the world to those with more developed economies. In stable schools, farmers take responsibility for health and welfare planning by identifying issues, setting goals, and acting to improve the health situation based on farm-specific data, e.g. milk recording data or veterinary treatment incidences. Stable schools are led by an external person taking on the role of facilitation, providing and preprocessing available farm data but not giving specific advice apart from when requested by participating farmers (Vaarst et al. 2011a). Stable schools incorporate health promotion and disease handling, based on a strategy of risk assessment forming the basis for evaluation, action, and review (Vaarst et al. 2010). Using scientifically sound health and welfare indicators as a basis for farmer-to-farmer advice provides the possibility to bridge the gap between scientific knowledge and farm practice.

This paper reviews the results from intervention studies that used this FFS-inspired stable school approach for animal health and welfare planning, providing an overview of ongoing activities and their implementation into advisory situations in selected European countries. European research activities involving stable schools have been reviewed, and information about ongoing advisory activities was collated.

Results

A summary of ongoing and finished research and advisory activities using stable schools for dairy herd health and welfare improvement in several European countries is given in Table 1. This overview raises no claim to completeness but is based on the information of all European countries that had stable school research activities.

Evaluation of effectiveness of stable schools aiming at herd health and welfare

During the original Danish stable school study aiming at minimizing antibiotic use in 23 organic dairy herds, antibiotic mastitis treatments decreased from 20 to ten treatments per 100 cow-years. Somatic cell count (SCC) and scores for acute and chronic intramammary infections remained unchanged. Milk yield (MY) of participating stable school farms increased at the same rate as

Table 1 Research and advisory activities with stable schools in different European countries with number of farms integrated in the activities till the end of year 2014

CC	Research studies	Number of farms	Advisory activities	Number of farms
DK	Danish stable schools (2004–2005)[a]	23	As 1 of 2 options for 'obligatory animal health advisory service' (since 2010)[c]	NA (>150)
	ANIPLAN (2008–2010)[b]	9		
CH	ANIPLAN (2008–2010) [b]	13	PROVIEH, stable schools planned (starting in the end of 2014)[d]	NA
UK	ANIPLAN (2008–2010) [b]	9	ANIPLAN group facilitated by DairyCo and new group started,	>9 58
			Soil Association's Farmer Field Labs (2012–2015)[e]	
AT	Spin-off project from ANIPLAN (2009-2010)[f]	6	Kuhpraktiker (2010–2012; 65 facilitators trained); 1 active stable school[f]	~20 5
	Reduction of concentrate input (2009–2013)[g]	10		
DE	Stable Schools (2010–2013)[h]	19	Stable schools for dairy goats (2014–2016)[i]	35
NL	Network groups (2008-2013)[j]	~100	2 stable school groups (2008–2013)	20
NO			Norwegian health service for dairy cattle (since 2009, 25 facilitators trained for cattle)[k]	~60

CC country code, *NA* not available

[a] Vaarst et al. 2007

[b] Ivemeyer et al. 2012

[c] Vaarst and Fisker 2013

[d] Spuhler 2014

[e] MacMillan and Benton 2014

[f] Cimer et al. 2011a

[g] Steinwidder et al. 2013

[h] March et al. 2014

[i] Georg et al. 2014

[j] Smolders et al. 2011

[k] Vaarst 2010

comparable herds not involved in this process. In conclusion, farmers participating in stable schools reduced antimicrobial use without apparent negative effects on production as well as udder and herd health (Bennedsgaard et al. 2010).

Within the ANIPLAN project in seven European countries, stable schools were adopted for animal health and welfare planning in 27 out of 128 farms (21 %). Although there was no significant effect of planning approach (stable school vs. one-to-one advice), the total number of veterinary treatments as well as the number of udder and metabolic treatments, respectively, was significantly reduced during the 1-year study period. With the exception of somatic cell score, which improved significantly, other parameters such as calving interval and indicators for metabolic imbalances remained stable. MY and average lactation number also remained unchanged (Ivemeyer et al. 2012).

As a spin-off from ANIPLAN, a pilot stable school was initiated in Austria on six farms resulting in improvements in SCC and energy supply of the dairy cows in the first 100 days in milk (DIM). MY increased on average by 500 kg per herd within 1 year (Cimer et al. 2011a). Furthermore, a project aiming to reduce concentrated feed use was conducted on ten farms in Austria using the stable school method. No statistical significantly changes in herd health were observed, but numerically, the percentage of cows with a calving interval of more than 420 days decreased on average from 46 to 29 % (Steinwidder et al. 2013).

In a German pilot study on the implementation of stable schools in 20 organic dairy farms, the average

herd size increased significantly, whilst MY and herd age did not change over the 3-year project. The authors also found a significant reduction in the percentage of cows with dirty udders and bellies. In those nine farms, where measures to improve udder health were implemented as recommended by farmer colleagues within the stable school, SCS improved significantly whilst treatment incidence for mastitis and antibiotic drying-off stayed unchanged. Concurrently, there was a significant improvement in the percentage of healthy cows (≤100,000 somatic cells/ml milk) and cows with a fat-protein ratio ≥1.5 in the first 100 DIM on these farms (March et al. 2014).

In the Netherlands, independently from the ANIP LAN project, network groups were formed, with four groups focussing on limiting antibiotic use, one group focussing on strategic choices, and one group on intuitive farming. The method used was not exactly the same as stable school method. Farmers advised each other occasionally with input of experts. Farmers shared knowledge and benchmarking of data triggered some farmers to achieve a very low antibiotic use (Smolders et al. 2011).

Farmers' and advisors' opinions on stable schools

Within some of the above mentioned studies, farmers and facilitators were asked how they perceived the process of stable schools and to identify the key aspects for future adoption. Most farmers were of the view that the animal health and welfare planning process was valuable for their farms and had led to sound improvements in their herds (Vaarst et al. 2007; Cimer et al. 2011a; Leeb et al. 2011; Goplen 2012). Farmers had the opinion that this method should be continued in local advisory structures or farmer groups. They gave statements such as 'the project helped us to understand our own influence on the cows and how we can be better animal caretakers' (DK) and 'this method is a link between research and practise' (CH) (Leeb et al. 2011). Participants in the German pilot study expressed a positive attitude towards the tool; they appreciated the joint search for effective and feasible measures (considering animal-based indicators) and evaluated the self-determined approach in the stable school as highly motivating. Accordingly, the compliance regarding implementation was very high. Of all recommendations given by the group members, more than two thirds had been implemented within the project period, either completely or partly (March et al. 2014, Brinkmann et al. 2012).

The facilitators pointed to farmer ownership as the most important achievement of the stable schools. Farmers took the lead in the process, decided who were involved and who should take responsibility for changes, and thereby taking ownership of the process. Whilst this may require help to organize the process, only the farmer participants can actually carry out changes in practice. However, in North-Western European farming bureaucracy has increased, along with economic pressure and expectations from different stakeholders which may constrain farmers' motivation to take part in such processes. Increasingly larger farms and herds may have more people involved in herd management (e.g. DE, UK and DK), which may create conflict and thereby underlining the importance of involving all relevant persons and ensuring knowledge exchange among farm employees and not just those participating in a stable school (Vaarst et al. 2011a). According to attendees of facilitator trainings in Austria (38 trainees), special attention should be paid to short travel times for participants and support by the facilitator to encourage implementation of additional stable schools (Cimer 2011b).

Ongoing activities regarding stable schools

Within the Norwegian health service for dairy cattle, 25 advisors have been trained in facilitation in dairy farms (Norwegian dairy herd health service 2013) plus a further 22 involved in sheep farming. The facilitators participate in a yearly telephone meeting for discussions and updates. Precise data on farms participating in stable schools are not readily available, but there are an estimated 60 farms involved. Stable schools in Norway are not restricted to organic farms, with most participating farms being non-organic (Vaarst 2010).

In Denmark, since 2010, stable schools have become one of two options that could be chosen by organic dairy farmer with more than 100 cows as an 'obligatory animal health advisory service' before being allowed to store veterinary medicines on farm. The exact number is unknown, but more than 150 farms took part at this stable school option yet (Vaarst and Fisker 2013).

In Austria, 65 facilitators were trained in 5-day 'Kuhpraktiker' courses, consisting of animal-based assessment, herd health planning, and on-farm stable school training (Cimer et al. 2011a). Within the courses, about 20 farms were integrated in the stable schools.

One stable school with five farms was established originating from course participants.

In the UK, the dairy industry's levy body, DairyCo, has shown an interest in rolling out the FFS concept to its various discussion groups and has continued to facilitate the original ANIPLAN group of farmers plus an additional stable school focussed on voluntary milking systems. Although not only concerned with animal health and welfare, the Soil Association (British organic association) and the Organic Research Centre have adapted FFSs into 'Field Labs', which support farmers to evaluate and experiment with agro-ecological methods (MacMillan and Benton 2014). As well as a facilitator, Field Labs include a researcher to provide advice on research design, existing knowledge, and analysis. Between April 2012 and December 2015, over 650 farmers took part in Field Labs, and the programme continues. A proportion of these have been specifically concerned with animal health and welfare topics (Table 1), including reducing antibiotic use in dairy, strategies for reducing sheep fly strike, fluke control in sheep, grazing chicory and internal parasites, and taking poultry through the moulting period.

In Switzerland, a new advisory activity was initiated by Bio Suisse (Swiss organic farmer organization) together with FiBL (Research Institute of Organic Agriculture) and several cantonal organic advisory services. This project named 'PROVIEH' has started in 2014 and aimed to reach several hundred organic dairy farmers through the next years. Farmer to farmer advising based on the stable school method is one of the key measures and shall lead to improving animal health, avoiding antibiotics, minimizing the use of concentrates, and site-related breeding (Spuhler 2014).

Another recent advisory project 'Stable Schools, an innovative advisory concept for dairy goat husbandry' has started in Germany in year 2014 (Georg et al. 2014). Thirty-five farms will be integrated into this advisory project aiming at improved health and welfare of the dairy goats.

Discussion

In the presented review, an overview of ongoing and finished research and advisory activities using stable schools for dairy herd health and welfare improvement in several European countries has been given. The results of the research projects showed improvements in the majority of the farms regarding the specific project aims. Improving udder health and avoiding the use of antibiotics were the topics most often focussed on in the projects. Mastitis is a multifactorial disease (Dohoo and Meek 1982; Harmon 1994) and is the most common health problems and culling reasons in dairy farming apart from impaired fertility (e.g. VIT 2013). Stable schools seem to be a suitable method to deal with complex health issues where many risk factors are known by the farmers but the effective measures are farm-specific. Supported by the provided health data (e.g. milk recording data or herd's lameness prevalence assessed by researchers before the stable school meeting) and with the external view of farmer colleagues, farm-specific measures to improve the heard health situation can be found. Other diseases that are less known by the farmers might be less suited for this approach. Farmers' attitude, knowledge, behaviour, and management measures have been shown as important factors to achieve a good herd udder health status (Jansen et al. 2009; Jansen et al. 2010b; Ivemeyer et al. 2011). Beside a positive human-animal relationship and a good management, a further human factor for reaching a good udder health status seems to be the farmers' identification of the herd health impairment and the motivation of taking action for improvements (Ivemeyer et al. 2008). Participating in a mastitis control programme or other intervention processes like stable schools may encourage farmers to take action. Also, Whay (2007) stated more generally that intervention programmes to improve animal welfare have to motivate the farmers to make changes to their own behaviour on behalf of the animals.

In several of the stable school projects, not only measurable health and welfare data were used as success indicators but also the farmers' feedback. The feedback was consistently quite positive: Farmers said that the process was valuable for their farms and led to sound improvements in their herds. The participants appreciated the opportunity to exchange experiences in the group very much, highlighting especially the common search for solutions, considering animal-based indicators. They judged the concept of ownership as highly motivating (March et al. 2014). Nevertheless, all farmers participated voluntarily in the projects what might be an important factor to explain the positive results. (Jansen et al. 2010a) found that there are several types of farmers that need different types of advising or extension programmes. If farmers are forced to participate in intervention or advisory processes, this might

impair the farmers' motivation to take action (Vaarst and Fisker 2013). This can be observed in Denmark where participation in a stable school is one of two options for the obligatory animal health advisory service organic farmers have to participate. An evaluation had shown that this obligatory concept had disadvantages for farmers' motivation. The aspect of ownership was impaired when farmers are forced to participate (Vaarst and Fisker 2013).

Implementing a method from a research project into advisory service after the ended project will often be confronted with challenges. The presented collection of advisory approaches using some forms of stable schools showed that the stable school method have been captured and continued in some kind of advisory work in all countries who participated in the ANIPLAN project. But only in some countries, especially in the Scandinavia, this method has reached a broad range of farms by now. In the Netherlands, farmer groups have generally a strong tradition (Leeb et al. 2011). Obstacles may be the willingness to pay for such advisory processes and the different national traditions regarding advisory methods (Leeb et al. 2011). Nevertheless, stable schools can be used as tool under different local conditions because farmers can formulate their individual goals and help each other. Low level of technology is necessary but data generated with high technology can also be used if wanted and available.

Conclusions

Research studies with stable schools as an intervention tool showed improvements regarding the specific project aim on the majority of the participating farms. Farmers and facilitators were convinced of the approach and benefits for dairy herds. Farmers' attitude and attention towards theirs herds and their ownership of the process appear to be crucial success factors for herd health and welfare situations. In some European countries, this method has been implemented in advisory practice, and in other regions, there are promising opportunities.

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