CORE Organic

ANIPLAN

CORE Organic Project Series

Workshop report

The process of researching animal health and welfare planning



Editor(s): Mette Vaarst (DJF) & Stephen Roderick (Duchy College)

CORE Organic project nr: 1903

April, 2009

The author(s)/editor(s) gratefully acknowledge the financial support for this report provided by the members of the CORE Organic Funding Body Network, being former partners of the FP6 ERA-NET project, CORE Organic (Coordination of European Transnational Research in Organic Food and Farming, EU FP6 Project no. 011716), which was finalised in September 2007.

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ISBN: 978-87-991343-4-2

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Foreword

'Minimising medicine use in organic dairy herds through animal health and welfare planning', ANIPLAN, is a CORE-Organic project (Project no. 011716) which was initiated in June 2007. These proceedings include papers based on presentations and discussions taking place at the second project workshop in Fokhol in Norway during April 1st to 3rd 2007.

At the first workshop in Hellevad, Denmark, in October 2007, we confirmed that animal health and welfare planning builds on a process involving analysis of the situation, dialogue between the farmer and somebody from outside the farm – either one or more advisors or fellow farmers – and then evaluation after a well-defined period of time. The project involves analysing the farm and herd situation using recordings and assessments adapted from those developed in the EU Welfare Quality project. The dialogue between the farmer and the person from outside the farm is partly based on data from these assessments. Since these assessments are very comprehensive they describe the herds broadly and will be used in epidemiological analyses which will contribute to an analysis of the influence of the animal health and welfare planning process, but also provide in-depth data about the North-Western European organic dairy production in more general.

Our workshop and proceedings reflect discussions on a broad spectrum of issues: the assessment of animal welfare through animal based as well as system based parameters, the idea of access to natural behaviour as a welfare issue and indicator, research methodologies for use in organic dairy production and the implementation of farmer groups for facilitating the actual planning process.

The organising team from Norway, who made all the practical arrangements related to the workshop (Vonne Lund, Britt I.F. Henriksen and Berit Hansen) are gratefully acknowledged for the good arrangements. Also, we wish to warmly thank our hosts at Fokhol Farm in Norway for providing us with such a convivial atmosphere and for letting us view the farm, particularly the calves, and for the huge amount of wonderful organic, home-made food. Fokhol Farm in Norway was a perfect venue for the many group and plenary discussions and the further development of the project. The workshop was combined with a workshop on calf welfare, which allowed participants to enjoy interesting presentations on a subject of particular relevance to the ANIPLAN project, and to participate in practical sessions assessing calf welfare. The proceedings from this workshop can be found at http://www.vetinst.no/eng/Research/Publications/Report-Series.

Our secretary Mette Holme from the Department of Animal Health, Welfare and Nutrition is acknowledged for hard work on these workshop proceedings.

Tjele and Cornwall, April 2009

Mette Vaarst & Stephen Roderick
Editors

Results of the CoreOrganic-Workshop on animal based parameters in Trenthorst, Germany (04.02.08-08.02.2008) *Solveig March, Lisi Gratzer, Jan Brinkmann, Christoph Winckler*

Objectives and methods

It was the aim of this meeting to train the assessors of several CoreOrganic-Partners (i.e. Austria, Germany, Denmark and Norway) with regard to the methods which are going to be applied in the course of the project on-farm assessments. Training involved animal-based parameters, a resource checklist and a management questionnaire.

After a theoretical and practical introduction, inter-observer reliability (IOR) of the main animal-based parameters was tested. This included gait scoring/lameness, body condition, cleanliness and integument alterations. The scoring systems for gait scoring, cleanliness and integument alterations had been adapted from the WelfareQuality® protocol; body condition was scored according to Metzner et al. (1993).

Subjective scoring systems which are used in many epidemiological studies have the advantage that they do not require any equipment but - due to the subjectivity of the assessment - it is necessary to achieve acceptable inter-observer reliability (IOR) before and after the study to ensure valid data.

To estimate the inter-observer reliability, the prevalence-adjusted bias-adjusted Kappa (PABAK) as well as the proportion of agreements between the "gold standard" of an experienced assessor and all untrained assessors were calculated. The PABAK($= [(k*p)-1]/(k-1)$ where k=number of categories and p=proportion of matchings) is based on the unweighted Cohens kappa test. According to Byrt et al. (1993), the Kappa coefficient measures the agreement beyond what would be expected by chance. The weighted Kappa coefficient also takes into account, that larger disagreement is more important than near disagreement. Finally, the prevalence-adjusted bias-adjusted Kappa (PABAK) is the value that kappa would take if, in addition, the prevalence of each category was equal (Gunnarson et al. 2000).

All coefficients may range between 0 and 1 meaning no agreement between observations if the coefficient is equal to 0 and perfect agreement if the value is equal to 1. Matchings are only counted, if both observers give exactly the same score and PABAK can reach values 0 to 1: values above 0 show a positive correlation between observer's ratings.

Calculations were carried out for the following scoring-systems (see on-farm assessment protocol Aniplan):

- Locomotion-scoring (3-score-system: 0 – Not Lame: Timing of steps and weight-bearing equal on all four feet; 1 – Lame: Imperfect temporal rhythm in stride creating a limp; 2 – Severely Lame: Strong reluctance to bear weight on one limb, or more than one limb affected),
- Body condition scoring / BCS (original 17-score key (min=1.00, max=5.00, 0.25 intervals / modified 5-score-system if accepting a deviation of +/- 0.25),
- Cleanliness scoring of four body regions (lower hind legs, hind quarter and flank, udder and teats): 2-category-scoring-system (acceptable/dirty) and for the teats: 3-category-scoring system (acceptable/any dirt present/large plaques of dirt).Integument alterations of three different categories were counted in four body regions (carpus, tarsus, neck, flank; "hairless patch": area with hair loss or extensively thinned hair as a response to parasites, skin not damaged, hyperkeratosis possible; "lesion": area with damaged skin either in form of a scab or a wound, dermatitis due to ectoparasites or (partly) missing teats; "swelling": overt swellings). For the calculation of IOR a binomial score was used (described alteration present in each location or not present).
- IOR testing was carried out on-farm, except for locomotion scoring, which was also done with video material.

With regard to the acceptability of the level of agreement, Fleiss et al. (2003) described PABAK values > 0.6 – 0.8 as an expression of a good/satisfactory agreement, and values > 0.8 as very satisfactory agreement. Holzhauer et al. (2004) defined Kappa values between 0.4 and 0.5 as moderate, values between 0.5 and 0.6 as sufficient and values between 0.6 and 0.8 as good. Accordingly, PABAK values lower than 0.4 are rated as unsatisfactory; values above 0.4 as acceptable, above 0.6 as good/satisfactory and above 0.8 as very good (Keppler et al. 2004).

Results

Locomotion scoring

For IOR testing of gait scoring in total 53 cows were assessed, out of which 20 "live" on-farm and 33 using video clips. The range of proportion of agreement for all cows was 0.74 to 0.94, and PABAK values ranged between 0.60 and 0.92. Scores from video clips generally showed lower inter-observer agreement (Table 1).

Table 1: Inter-observer reliability of locomotion scoring

	PABAK	proportion of agreement
Total, n=53 (including 33 video clips)	0.71 (0.60 – 0.92)	0.81 (0.74 – 0.94)
without video clips (n=20)	*0.84* *(0.70 – 0.93)*	*0.89* *(0.80 – 0.95)*

Table 2: Inter-observer reliability of body condition scoring

n= 20	PABAK (mean / min – max)
BCS (5 categories: Δ +/- 0.25 tolerance)	0.79 0.69 – 0.94
BCS (17 categories: exact agreement)	*0.35* *0.20– 0.52*

The results of the inter-observer reliability for scoring the other animal based parameters (BCS, integument alterations and cleanliness) are shown in tables 2-4.

Table 3: Inter-observer reliability for scoring integument alterations

	PABAK (mean / min – max)		
n=20	Hairless patches	Lesions	Swellings
Carpus	0.61 0.40 – 0.90	0.69 0.50 – 0.80	0.75 0.50 – 0.90
Tarsus	0.39 0.10 – 0.50	0.73 0.60 – 0.90	0.84 0.70 – 1.00
Neck	0.64 0.40 – 0.90	*Marginal prevalence*	0.90 0.80 – 1.00
Flank	0.79 0.70 – 0.90	0.86 0.70 – 1.00	*Marginal prevalence*

Table 4: Inter-observer reliability of cleanliness scoring

n= 20	PABAK (mean / min – max)
Legs	0.59 0.30 – 0.90
Flank	0.75 0.40 – 1.00
Udder	0.85 0.50 – 1.00
Teats	0.65 0.48 – 0.85

Conclusions

Taking the PABAKs between untrained and experienced assessors (set as "gold standard") into account, at least satisfactory levels of inter-observer reliability were found for all parameters. This was achieved after theoretical and practical introduction into the scoring systems. The observer training will therefore allow for comparable and reliable data sets gathered in all European CoreOrganic subprojects.

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Eliminative behaviour of dairy cows *Lindsay Whistance*

Introduction

Faeces plays a prominent role in the transmission of three major diseases in housed cows, namely, lameness, mastitis and Johne's disease (Amory *et al.*, 2006; Hughes, 1999; Anon., 2002). Cows show no evidence of latrine behaviour and because their eliminative patterns appear to be random, it is assumed that they have little control over it and that they make no attempt to avoid bodily contamination with excreta (e.g., Hafez and Schein, 1962). The cleanliness of housed cattle is therefore considered to be solely a management issue.

At pasture, cattle are known to strongly avoid grazing near dung patches where faeces and the surrounding contaminated grass act as reservoirs for parasites (Marten and Donker, 1964a;b). Michel (1955) found bovine grazing to be highly selective and, when tested, forage selected by cattle contained fewer lungworm larvae than random samples. An area of forage up to six times greater than that covered by faeces can be rejected (Phillips, 1993).

There appears to be an odd dichotomy between the well-documented strong aversion to grazing near faeces as a means of controlling parasite intake and the apparent lack of regard for bodily cleanliness when contamination with faeces also has real health consequences for the cow, suggesting that more research is required to understand if and why this dichotomy exists. Previous studies have looked at the posture of the cow when voiding (Aland *et al.*, 2002), the daily pattern of faeces deposition in different housing systems (Brantas, 1968; Seo *et al.*, 2003; Aland *et al.*, 2002; Hörning and Kramer, 2003), and their lying on clean, freshly-grazed grass when at pasture (Broom *et al.*, 1975). However, relatively little is yet known about whether cattle show any intentional avoidance of bodily contact with excreta or not, or whether there are any specific environmental, social or individual stimuli which influence eliminative behaviour.

The two main types of housing system in the UK are straw yards and cubicles with cubicle systems becoming an increasingly popular choice. Economic advantages of cubicles, compared to straw yards, include a reduction in space requirement per cow, a reduction in the amount of bedding used, a fully-mechanised system for slurry removal, less storage space required for clean and soiled bedding and fewer man hours required to maintain the system. However, the layout of a cubicle system, designed to limit the soiling of bedspace, also has a marked impact on several, unrelated behavioural patterns. For example, cubicles stop play behaviour (Fregonesi and Leaver, 2001), inhibit normal social behaviour (Philips and Schofield, 1994), increase aggressive interactions (Fregonesi and Leaver, 2002) and they provide an uneven distribution of facilities which affects subordinate individuals in particular (Galindo and Broom, 2000). Cubicles also lower comfort levels for cows when lying and rising (Hörning and Krämer, 2003), inhibit both oestrus behaviour (Fregonesi *et al.*, 2004) and post-oestrus recuperative lying (Phillips and Schofield, 1990) and they disturb temporal rumination patterns (O'Connell *et al.*, 1989), as well as herd synchronicity (Nielsen *et al.*, 1997).

The trend in dairy farming has been towards fewer, more efficient cows in larger herds which are kept in more mechanised and rationalised systems. But these systems, whilst placing less emphasis on the comfort of the individual cow or the maintenance of an harmonious social structure or herd synchronicity, have not resulted in a reduced disease incidence. To a degree they can, therefore, be considered to be inadequate as permanent/semi-permanent accommodation. Nevertheless, indoor confinement of cattle cannot be completely avoided because even if cows do not need to be housed in the wintertime for physiological reasons, it is still required to preserve and maintain pastureland and it is then logical for indoor systems to function well from a management point of view. However, we should be aiming to provide cattle with housing systems that allow for the expression of natural individual and social behaviour patterns. Since the control of environmental and bodily contamination of excreta is of high importance, the understanding of cow behaviour at the time of elimination seems pertinent to housing design and could enable the development or improvement of housing styles which facilitate cattle in controlling their own cleanliness levels to a greater degree and also reduce the negative impact of housing design on other, unrelated behaviour patterns.

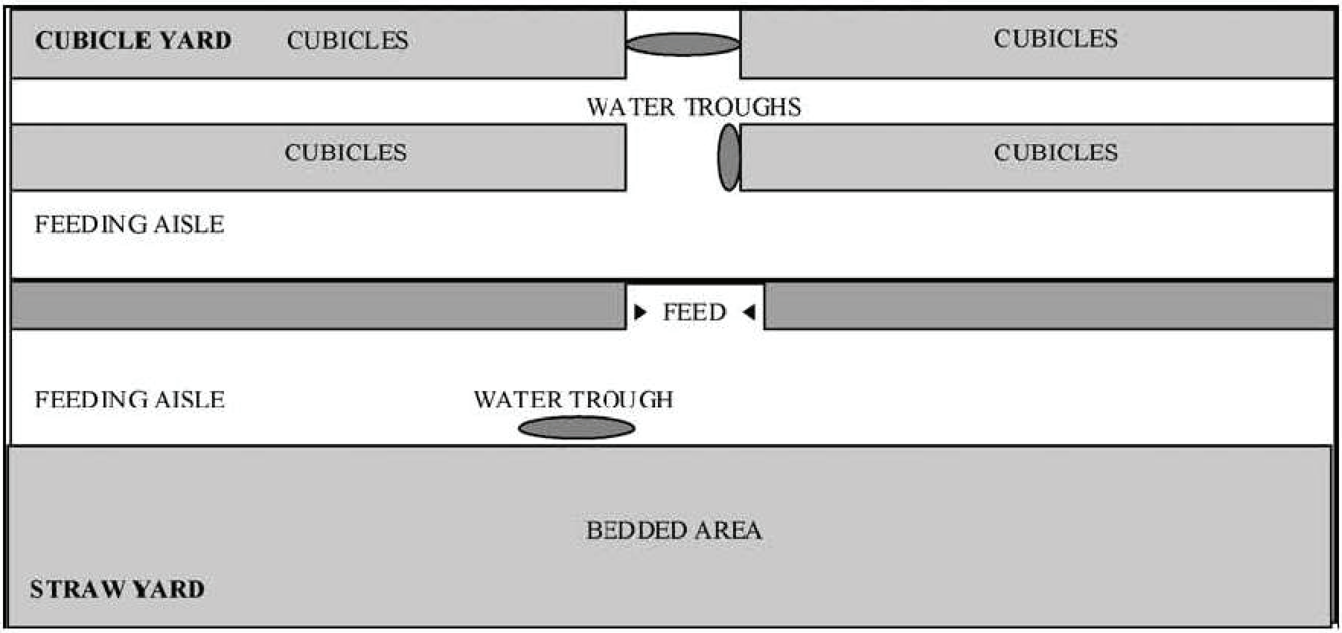
Detailed observations of eliminative behaviour are required in order to compile an ethogram and to determine whether there is any evidence of faeces and urine avoidance behaviour in outdoor cattle. Analysis of eliminative behaviour in the two most commonly used housing systems for dairy cattle in the UK, i.e., cubicle systems and straw yards, would help determine whether avoidance levels are affected and whether cattle adapt eliminative behaviour to indoor living conditions.

Study one: An investigation of potential differences in eliminative behaviour in high and low yielding dairy cows maintained in a straw yard or cubicle system

The aims of the first study were:-
to determine whether housed dairy cows show avoidance of freshly deposited faeces.
to assess whether housing type affects defaecation patterns, and
to measure the effects of yield level on defaecation behaviour within each housing system.

1.1 Method
The two main UK housing types were included in the study, namely a straw yard (S) and a cubicle system (C). High (H) and low (L) yielding cows were placed into four treatment groups, straw low, straw high, cubicle low and cubicle high, where the same housing unit was used for both yield groups (Fig. 1.1).

Fig. 1.1 A schematic diagram of the cubicle system and straw yard.



4 treatments: SL (n = 73); 13.8 $\pm$ 7.8 kg/d
SH (n = 72); 40.1 $\pm$ 13.5 kg/d
CL (n = 85); 17.8 $\pm$ 6.4 kg/d
CH (n = 93); 38.7 $\pm$ 7.5 kg/d

Yield difference was significant between high and low yield groups (ANOVA, $P<0.001$; Tukey's critical value = 3.63) but not within yield groups (Anderson-Darling Normality Test, $P<0.05$).

Each group was observed (round the clock) for six hours a day over four successive days, though not during the milking process. Each animal seen eliminating became the target animal for the duration of the behaviour (similar to the method of Weschler and Bachmann, 1998). Any cow that was observed to be about to defaecate had their behaviour classified as lying (L), standing (S) or walking (W) immediately before, during and after elimination. If the post-eliminative behaviour was only maintained for up to and including ten seconds the subsequent behaviour was also recorded.

Sequences of eliminative behaviour were then classified as showing (a) no avoidance of faeces, (b) incidental avoidance of faeces or (c) intentional avoidance of faeces. A standing cow avoids soiling her hindquarters by adopting the rounded back posture (Aland *et al.*, 2002) and a walking cow is removing herself from freshly deposited faeces, therefore, sequences were recorded as incidental avoidance when cows were walking or standing to eliminate and either moved away or remained standing after voiding but were also engaged in a second activity such as drinking or changing places at the feed bunk. Sequences were classified as intentional avoidance of faeces when cows stopped a specific behaviour to eliminate and moved away before resuming their pre-elimination behaviour and without engaging in a second activity. No avoidance of faeces was recorded where lying cows were lying down when voiding and remained lying after eliminating and where cows were standing to eliminate but did not move away before lying down.

All four treatment groups contained different numbers of cows and so prior to further statistical analysis, the total expression of each behaviour sequence was corrected by proportionately scaling down the totals of the larger groups so that they were equivalent to the totals of the group with the smallest number of animals within each test. Where housing effects were investigated, the data from high and low yielding cows were pooled. For goodness of fit, the G – test was used along with its associated Williams' correction factor.

1.2 Results

A total of 3438 expressions of defaecation behaviour were recorded for the 323 cows included in the study, averaging 10.64 instances recorded per cow. The location in each housing system of freshly-deposited dung was recorded (Fig. 1.2) and the total number of defaecations landing in the straw bed (851) was higher than those deposited directly in the cubicles (91; G_{adj} = 779.95; P < 0.001). Within the straw-housed groups, more faeces landed on the straw bed in total (851) than on concrete (760; G_{adj} = 5.14; P = 0.023). However, the concrete feeding passage, measured 208 m^2 compared to 572 m^2 for the bedded area, therefore, the rate of defaecation/m^2 was greater for the concrete passage at 3.65/m^2 than for the bedded area at 1.49/m^2 (G_{adj} = 4.0; P = 0.045). Cows housed in cubicles defaecated a total of 610 times in the concrete feed passageway (156 m^2) compared to a total of 1215 being deposited in the concrete cubicle aisle (114.4 m^2). The rate of defaecation/m^2 was therefore greater for the cubicle aisle (10.62/m^2) than for the feed passageway (3.91/m^2) (G_{adj} = 6.32; P = 0.012).

When sequences were classified as showing a) no avoidance of faeces, b) incidental avoidance of faeces or c) intentional avoidance of faeces (Table 1.1i), cows in both systems exhibited high levels of avoidance of faeces overall (G_{adj} = 3532.6; P = < 0.001). Between housing systems, however, (Table 1.1ii) cows in the straw yard groups showed both higher incidental and intentional avoidance of faeces b) and c) (P < 0.001), whilst cows housed in cubicles showed greater levels of no avoidance of faeces a) (P < 0.001). Within the straw yard, the high yield group (Table 1.1iii) displayed more incidental faeces-avoidance sequences (G_{adj} = 37.96; P = < 0.001) than did low yield cows. In the cubicle system (Table 1.1iv), both yield groups showed similar levels of no avoidance, incidental and intentional avoidance of faeces: (a) G_{adj} = 1.55; P = 0.210, (b) G_{adj} = 0.28; P = 0.594 and (c) G_{adj} = 0.36; P = < 0.550.

Table 1.1 Classification of the number of sequences of behaviour indicating intentional, incidental or no avoidance of faeces between cows in straw and cubicle systems and between high and low yield groups.

	No avoidance of faeces	Avoidance of faeces	G_{adj}	*P* value
(i) Housing type				
Straw yard (*n* = 145)	19	1591	-417.29	< 0.001
Cubicle yard (*n* = 178)	131	1697	-717.99	< 0.001
Straw yard and cubicle system	150	3288	3532.61	< 0.001
	Straw (*n* = 145)	Cubicles[a] (*n* = 178)	G_{adj}	*P* value
(ii) Behaviour category				
No avoidance	19	120	81.60	< 0.001
Incidental avoidance	1517	1308	15.45	< 0.001
Intentional avoidance	58	2	63.43	< 0.001
	High yield Straw (*n* = 72)	Low yield Straw (*n* = 73)	G_{adj}	*P* value
(iii) Behaviour category				
No avoidance	13	6	2.65	0.104
Incidental avoidance	882	642	37.96	< 0.001
Intentional avoidance	28	30	0.04	0.836
	High yield[a] Cubicles (*n* = 93)	Low yield Cubicles (*n* = 85)	G_{adj}	*P* value
(iv) Behaviour category				
No avoidance	69	55	1.55	0.213
Incidental avoidance	815	794	0.28	0.594
Intentional avoidance	1	2	0.36	0.550

(i and ii) indicate the interaction between housing type and behaviour category;
(iii and iv) indicate the interaction between yield and behaviour category.
[a] Values corrected for group size.

In all, thirty-three different sequences of behaviour were displayed at the time of defaecation and, for the purpose of this study, similar sequences were grouped and the data pooled (see Whistance *et al.*, 2007). The three most commonly expressed sequences for all cows were lSs, sSs and wSs which accounted for over half of all recorded events. Between cows in the two housing types, there was a highly significant difference in the expression of one behaviour in particular from each category of avoidance, namely lLl, wWw and lSwl (Table 1.2).

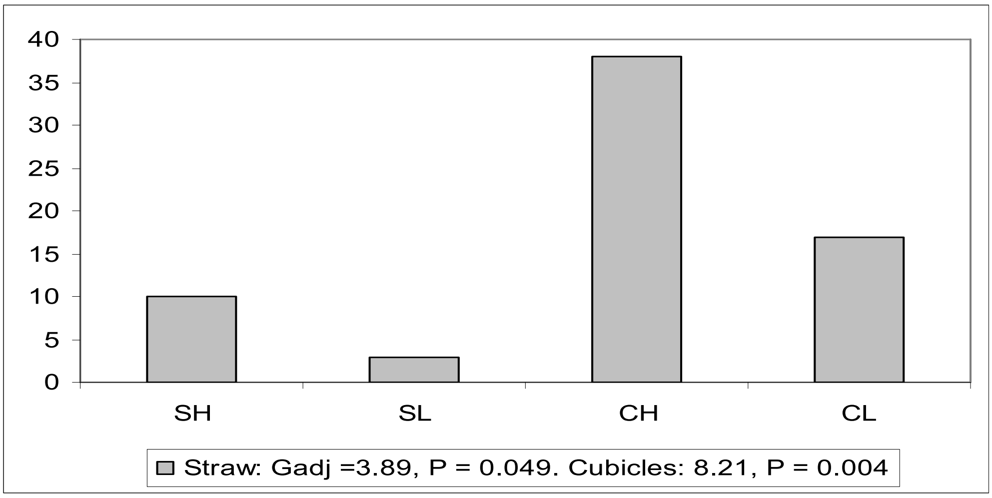
Table 1.2 Individual sequences of defaecation behaviour for cows housed in a straw yard or cubicle system, indicating intentional, incidental or no avoidance of faeces

Behaviour sequences[a]	Faecal avoidance[b]	Straw (*n* = 145)	Cubicles[c] (*n* = 178)	G_{adj}	*P* value
lLl	a	13	46	19.02	< 0.001
wWw	b	41	108	31.23	< 0.001
lSwl	c	58	2	63.43	< 0.001

[a] lowercase letters denote pre-and post defaecation behaviour and uppercase letters denote behaviour whilst defaecating.
[b] (a) sequence indicating no avoidance of faeces: (b) sequence indicating incidental avoidance of faeces; (c) sequence indicating an intentional avoidance of faeces.
[c] Values corrected for group size.

Comparing individual behaviour sequences of the high and low yielding cows in cubicles (Fig 1.2), the proportion in the high yielding group remaining lying throughout (lLl) was greater than in the low yielding group (G_{adj} = 8.21; P = 0.004). As with the cows housed in cubicles, cows in the high yielding group on straw showed a significant, but less marked, increase in the expression of lLl than the low yielding cows on straw (G_{adj} = 3.89; P = 0.049).

Fig 1.2. Expression of lLl over 24 h in high and low yielding cows in straw yards and cubicle systems



1.3 Discussion

The average rate of defaecation within each group recorded in this study, ranging from 9.4 - 12.8 defaecations/cow/day, corresponds with data from previous studies measuring total eliminations per day of 9 – 16 defaecations (Sahara *et al.*, 1990; Aland *et al.*, 2002). The rate of defaecation/m^2 for cows housed in cubicles was significantly greater for the cubicle aisle than for the feed passageway. This would suggest that cows were spending the majority of their time in the cubicle area of their housing. Konggaard (1983) found that dairy cows not engaged in eating or lying tended to congregate in the cubicle passageway. Within the groups housed in straw yards, more faeces landed on the straw bed in total than on concrete but the rate of defaecation/m^2 was more than two times greater for the concrete passage. These results are in accordance with the findings Seo *et al.* (2003) who noted that the frequency of defaecation was highest in the feeding area in straw yard systems. Rising more regularly to feed reduces the need to void immediately upon rising and, consequently, cows are more likely to move away from the bedded area before defaecating (Saitoh *et al.*, 2005).

Aland *et al.* (2002) stated that after cows have voided they take a few steps forward. Although the authors do not state under which conditions these observations were made, it is reasonable to assume that the behaviour was recorded from cows at pasture. In the present study, a significant number of cows in both housing systems remained static after voiding and, for groups SL, CH and CL, significantly more often than they moved forward, suggesting that both housing types strongly inhibited voluntary forward movement post elimination. However, cows in the SH group showed a greater level of forward movement post defaecation than the other three groups, suggesting a yield effect as well as a housing effect. The moving away from faeces when standing would suggest that high yield cows in the straw yard were more strongly motivated to avoid fresh faeces than low yield cows in the same environment. The reason for this is unclear, though may be linked to avoidance of disease.

The act of elimination is considered to be largely involuntary (Hafez and Schein, 1962; Albright and Arave, 1997, p.40) and a number of the sequences of behaviour recorded occurred whilst the cows were also engaged in other activities. For example, sSs was most often recorded whilst cows were eating at the feed trough and wWw mostly occurred when a cow moved from the feed passageway to the cubicle passageway. Cows move more quickly between resources when access to those resources is constrained (Munksgaard *et al.*, 2005). The behaviour sequences, classified as indicating incidental avoidance of faeces, do not indicate a clear intention to avoid faeces but may be indicative of a greater motivation to feed and drink or gain access to lying space (Metz, 1985; Phillips, 1998). However, a standing cow can avoid soiling her hindquarters by adopting the rounded back posture and a walking cow is also removing herself from freshly deposited faeces so that any further, and more obvious, avoidance may not be necessary.

Opportunities to move away from freshly deposited faeces differed with housing design. Those cows rising to defaecate before moving away in the straw yard all moved in a forward direction and consequently avoided contact with their faeces. Cows in cubicles, however, reversed out of the cubicles and subsequently stepped into the freshly deposited faeces, although a few cows were observed making an exaggerated first step with a hind leg, thereby avoiding contact. Cows housed in cubicles displayed sequences which exposed them to faecal contamination four times more often than groups in straw yards. Cows housed in the straw yard exhibited greater levels of sequences of 1) rising to defaecate and then moving forward and 2) defaecating then moving forward before lying down than did cows in the cubicle yard. The greater expression of these sequences may reflect both the higher level of comfort and greater ease of movement in straw yards where cows are more likely to intersperse lying time with feeding bouts and were consequently rising and lying more frequently each day (Hörning and Krämer, 2003). The cleanliness levels of the cows in straw yards were high during the study with none of the cows showing soiled body parts other than the lower leg. This would indicate that they were indeed capable of avoiding lying in the soiled areas of bedding.

The behaviour sequence lSwl suggests an intentional avoidance of contact with fresh faeces as lying behaviour was broken off for defaecation to occur and was then resumed shortly after the cow had moved away from the fresh faeces. Cows housed in the straw yard performed these sequences significantly more often, which again suggests that the straw yard system may have imposed fewer restrictions on faeces avoidance behaviour than did the cubicle system. The inability to move in a forward direction post defaecation, the reduced levels of comfort when rising and lying down (Hörning and Krämer, 2003) and a reluctance to vacate favoured lying spaces may all be contributory factors in discouraging the expression of faeces avoidance behaviour in cows housed in cubicles.

High yielding cows displayed a significant increase in the lLl sequence, irrespective of housing design. This would suggest that any motivation to avoid contamination with freshly deposited faeces by rising to defaecate was overridden by an increased need to lie and rest (Metz, 1985). However, the difference in the rate of expression of lLl between high and low yielding groups within housing systems was greater in cows in cubicles which implies that housing design further exacerbated the reluctance of high yielding cows to always rise before defaecating. The high yielding cows in the straw yard system were also more likely to void prior to lying down and showed significantly higher levels of avoidance on these occasions, compared to high yielding cows in the cubicle system, implying that the straw yard provided these cows with some behavioural flexibility when avoiding excreta which was not available to cows in the cubicle yard.

The results of this study suggest that the design of cubicles is successful in reducing the level of faeces and urine being deposited directly in bedded areas, although, once a cubicle is soiled a cow is not then able to avoid contact with faeces or urine without avoiding the cubicle altogether. This may be difficult if few, or no spare cubicles are available, in which case, the prompt cleaning of cubicles becomes essential if herd hygiene and cleanliness levels are to be maintained. The repertoire of behaviours is perhaps too complex to simply compare one sequence directly with another but, overall, cows housed in straw yards were more likely to show an avoidance of contact with faeces before lying down and were more likely to interrupt lying to void. Therefore, the successful design of cubicle systems in controlling where faeces lands also inhibits the dairy cow's ability to express inherent avoidance behaviours. This suggests that cubicle housing, designed primarily to ease management procedures, is not an optimum housing system for the cow herself. It is suggested that cows in cubicles are being forced into cleanliness rather than enabled to maintain personal behaviour patterns and that this forced cleanliness also affects other unrelated sequences of behaviours such as social patterns, lying time and behavioural synchrony (e.g., Galindo and Broom, 2000; Fregonesi and Leaver, 2001; 2002). This may then be in conflict with number four of the five freedoms namely, freedom to express normal behaviour (FAWC, 1997).

1.4 Conclusions

The high levels of avoidance faeces recorded in this study challenges the traditional assumption that cows do not avoid bodily contact with freshly deposited faeces and urine. The dairy cows observed in this study showed a large range of eliminative behaviour patterns. Some of these sequences showed a voluntary and intentional avoidance of bodily contact with fresh excreta whilst the majority indicated a more incidental avoidance. Cows in the straw yard showed much higher levels of intentional and incidental avoidance of excreta than did cubicle housed cows, whereas cows housed in cubicles remained lying to defaecate significantly more often, suggesting that housing design influences a cow's ability to avoid contact with fresh faeces. The greater incidence of high yield cows remaining lying whilst voiding, independent of housing system, may be an indication of their greater motivation to lie and rest.

Study two: An investigation of potential differences in eliminative behaviour and activity in high and low yielding dairy cows at pasture

The aim of this study was to investigate the eliminative behaviour of dairy cows at pasture, with the intention of improving knowledge of cow behaviour, when unrestricted by housing design.

2.1 Method

Sequences of walking (W), standing (S) and lying (L) were again recorded around each elimination event. Activities around an act of elimination were also noted for grazing cows to determine whether the behaviour that they were engaged in when eliminating had an effect upon their behavioural sequence. Static activities: lying (l), loafing (lo) and grazing (g); Active activities: moving to a different area of the field (mf), catching up with herd (cu) and walking to drinking trough (td). Twenty high yield cows (mean kg/d 38.0, range 30.6 - 51.2, SD 6.5) and twenty low yield cows (mean kg/d 17.0, range 9.4 - 21.6, SD 3.7) were selected as study animals (T-test: T-value 12.53, $P < 0.001$) and balanced for parity (total mean parity 3.4, SD 2.2; T-test: T-value -0.07, $P = 0.945$). The high and low yielding groups were each given access to approximately 10 hectares of rye-grass/clover pasture day and night and offered TMR after each milking period. For each group, six hours of behaviour were recorded each day (during daylight hours) over four consecutive days. The G-test, with its associated William's correction factor, was used for data analysis.

2.2 Results

The average number of defaecations recorded per cow were high yield group (GH) 10.4 and low yield group (GL) 11.5. None of the sequences recorded could be classified as 'no avoidance of faeces' using the stated criteria. The majority of elimination events for both yield groups indicated incidental avoidance of faeces with no difference between high and low yield groups (G_{adj} 0.53, $P = 0.466$). There was a trend, however, for the low yield group to show greater levels of intentional avoidance of faeces (G_{adj} 3.29, $P = 0.070$). The most frequently expressed sequences in both yield groups were sSws and wSws (GH = 0.26 and GL = 0.29) and lSw and lSws (GH = 0.23 and GL = 0.20).

When the data from the two groups were pooled, the cows (n = 40) performed sequences of standing to defaecate and then moving forward more often than sequences where they either stood to defaecate and remained standing (G_{adj} 166.27, $P < 0.001$) or walked whilst defaecating (G_{adj} 119.55, $P < 0.001$). Standing to defaecate and then moving at least a few paces forward, involved 18 of the 31 sequences which were expressed 170 times out of 208 for GH (G_{adj} 90.34, $P < 0.001$) and 196 of 230 for GL (G_{adj} 125.87, $P < 0.001$). Defaecating prior to lying down was expressed far less frequently in both groups than voiding after getting up sequences (G_{adj} 178.75, $P < 0.001$). Of the defaecation sequences recorded, eight included cows walking whilst defaecating. The levels of expression over the 24 hours studied were, standing whilst defaecating = 383 and walking whilst defaecating = 54 (G_{adj} 278.64, $P < 0.001$).

The activity of cows before, during and after elimination was categorised as (i) walking or (ii) standing to defaecate when cows were actively moving forward a) before, b) after, c) before and after defaecating and d) static before and after defaecation (Table 2.1). It should be noted that static activity refers to the activities in which cows were not actively moving forward; it does not indicate whether or not cows moved a few paces away from their freshly deposited faeces. The most predominant group of activity sequences for standing to defaecate was static activities before and after defaecation (n=317). For walking whilst defaecating, the predominant group of activity sequences was static activity before defaecating and actively moving forward after defaecating (n=24). When active before and after defaecating, cows were as likely to walk as stand to defaecate (G_{adj} 0.13, $P = 0.72$).

Table 2.1 Cows at pasture either standing or walking to defaecate within activity categories

Both groups (*n* = 40)	Walking	Standing	***G*adj**	***P* value**
Active before and static after defaecating	ai	aii		
	1	6	3.70	0.05
Static before and active after defaecating	bi	bii		
	24	43	5.42	0.02
Active before and after defaecating	ci	cii		
	14	16	0.13	0.72
Static before and after defaecating	di	dii		
	15	317	337.52	< 0.001

Overall, the predominant activity sequence expressed was grazing before and after defaecation (gSg), (Table 2.2). Low yield cows were more likely to rise to defaecate followed by grazing activity (G_{adj} 6.93, P = 0.01) than high yield cows, whereas the latter were more likely to rise to defaecate followed by loafing activity (G_{adj} 4.96, P = 0.03).

Table 2.2 Expression of individual sequences of activity most commonly expressed by high and low yield groups

Activities before, during and after defaecation.[1]	**High yield** (*n* = 20)	**Low yield** (*n* = 20)	G_{adj}	***P* value**
Standing to defaecate:				
dii) gSg	54	60	0.31	0.58
lSg	27	50	6.93	0.01
lSlo	34	18	4.96	0.03
loSlo	19	12	1.57	0.21
bii) lSmf	11	6	1.45	0.23
lScu	9	9	0	1
Walking whilst defaecating:				
bi) lWcu	6	6	0	1
lWmf	6	1	3.70	0.05
ci) mfWmf	2	5	1.24	0.27
tdWtd	2	5	1.24	0.27
di) gWg	4	3	0.13	0.72

[1]Uppercase letters denote walking (W) or standing (S) to defaecate. Lower case letters denote pre and post defaecation activities graze (g), lie (l), loaf (lo), move to different area of field (mf), catch up with herd (cu) and go to drink (td).

All activity sequences where cows expressed both walking and standing to defaecate were then compared. Where no differences were found between walking or standing to void, the most commonly expressed sequences of activities were lWcu (G_{adj} 1.19, P = 0.28) followed by mfWmf (G_{adj} 0, P = 1) and tdWtd (G_{adj} 0.07, P = 0.79).

2.3 Discussion

Cows at pasture exhibited 32 different sequences of defaecation behaviour. The most frequently expressed defaecation sequences were sSws, wSws, lSw and lSws which accounted for almost half of all recorded incidences for the 40 cows included in the study and yield status had no effect on their expression. These four predominant sequences, along with all other sequences in which cows stood to defaecate and then moved forward accounted for five out of every six incidences recorded. This general pattern of behaviour indicates that standing to defaecate and walking at least a few paces thereafter was the predominant behaviour pattern for cows at grass, as Aland *et al.* (2002) noted, and that pre-defaecation behaviours were consistently interrupted to maintain this pattern. For example, on all of a total of 204 occasions, lying behaviour was interrupted with cows standing up to defaecate. Indeed, eliminative behaviour upon rising was expressed significantly more often than voiding prior to lying down. In all management systems, cows tend to defaecate after a long period of lying (Aland *et al.*, 2002; Hörning and Krämer, 2003). This would suggest that there was little reluctance to intersperse or interrupt lying bouts to rise and eliminate. The significantly greater expression of rising to defaecate, as opposed to voiding before lying down, may also have an adaptive component in terms of faeces avoidance and, consequently avoidance of disease. Bacterial and viral diseases, as well as parasites, are associated with faeces on pasture (Michel, 1955; Hart, 1990; Henderson, 1990; Daniels *et al.*, 2001). Broom *et al.*, (1975) noted that animals lie in the area that they have just grazed and lying down without first voiding would ensure an unsoiled lying space. Eliminating upon rising, however, would then ensure that, as the cows moved to a new grazing area, they would not be confronted with grass contaminated with fresh faeces. The dairy cow's aversion to grazing near faeces has been well documented (e.g., Marten and Donker, 1964a; Pain *et al.*, 1974; Hutchings *et al.*, 2002). The grouping of faeces as a result of a concentration of cattle in space and time (Kilgour and Albright, 1971; White *et al.*, 2001) may not be a random consequence of camping behaviour but may, instead, be an alternative stable strategy to latrine behaviour as a way of avoiding parasites and disease.

Of the 205 recorded incidences of rising to void, cows resumed their lying behaviour on only 15 occasions, indicating that although the need to void was the initial trigger for standing up, cows utilised this standing up to perform other activities such as grazing, drinking, etc. Lying down and rising behaviours are the most expensive movements in terms of energy expended and risk of injury (Fuller, 1928; Haley *et al.*, 2001; Jensen *et al.*, 2005) and animals allocate their time between daily activities so that the resulting cost is minimised (Houston and McFarland, 1980). However, only a portion of the cows' day could be observed and different times of the day may have revealed other frequencies of sequence expression. For example, dairy cows perform several grazing bouts during daylight hours but spend most of the night resting and ruminating (Phillips and Denne, 1988), suggesting that resuming lying behaviour post elimination would be more frequent at night.

The recording of activities, as well as walking, standing and lying behaviour, around the time of elimination allowed an insight into why cows were deviating from standing to defaecate and were instead walking. Proportionally 0.47 of cows walked (instead of stood) to eliminate when c) active before and after voiding; 0.36 walked when b) static before and active after; 0.14 when a) active before and static after and 0.05 walked whilst defaecating when d) static both before and after voiding. Within category (c), two activity sequences were included, namely, mfWmf and tdWtd and the motivation to move into a different area of the available pasture or to drink occurred before the elimination event, but why cows then walked or stood to void within the sequence was presumably determined by the level of internal motivation of each cow to achieve their initial goal and subsequently overriding any motivation to stand still to void. Lactating dairy cows can drink in excess of 90 litres of water each day and a high motivation to drink, therefore, is a reasonable explanation for a high level of walking whilst defaecating. It was more surprising that cows appeared equally motivated to move to a different area of pasture when all fields contained the same clover/ryegrass mix, had a similar sward height and topography and when the most obvious effect of milking times on cow movement between fields was avoided. However, cattle tend to alternate among preferred grazing patches more frequently on managed grassland than when kept in more strongly heterogeneous environments (Bailey *et al.*, 1990; Bailey, 1995). Diet selection also changes throughout the day with clover being a preferred food in the morning and grass in the evening (Rutter *et al.*, 2004).

Although statistically more likely to stand to defaecate when b) static before but active after voiding, the largest expression of walking whilst defaecating was also expressed within this category. Two sequences in particular, namely lWcu and lWmf, were expressed on 8 out of 10 occasions. Why cows walked or stood to void after rising must, again, presumably be influenced by the level of motivation of the individual cow to engage in a second activity at the time of voiding. When unrestricted, an animal is likely to express a given behaviour if it is motivated to do so (Kirkden and Pajor, 2006; Lensink *et al.*, 2006). The high motivation to move to a different part of the field is feasibly motivated by hunger whereas the motivation for catch up sequences would be to rejoin the herd. Cows at pasture are highly synchronised in their activities (Castle *et al.*, 1950; Benham, 1982; Arnold, 1984; O'Connell *et al.*, 1989) with behaviours such as lying and grazing considered to be 'contagious' within the herd (Nicol, 1995). In the present study, some cows did continue with a lying bout after the main body of the herd had moved to graze a different part of pasture. Motivation to rejoin the main group may then have been greater for cows lying for longer, resulting in walking whilst defaecating. Lying was, in fact, the pre-defaecation activity in half of all the walking whilst defaecating sequences suggesting that recumbent cows showed some reluctance to rise and as the motivation to engage in a different activity increased, the likelihood of defaecation behaviour occurring whilst walking also increased. Nevertheless, overall, recumbent cows still stood to defaecate significantly more often indicating a preference for maintaining the open-legged, arched-back posture to defaecate (Aland *et al.*, 2002), thereby avoiding soiling their hindquarters and avoiding splashing before initiating a different activity.

Standing to void then walking forward was the predominant behaviour pattern for all cows at pasture, suggesting that cows were aware of their excreta and were averse to remaining in close proximity to it. This is, perhaps, unsurprising when their high sensitivity to faeces and its volatile components during grazing is considered (Dohi et al., 1991; 1999; Aoyama et al., 1994). Avoidance of faeces was maintained by all of the cows in all recorded instances providing evidence of an inherent avoidance of faeces at pasture. This then indicates that the expression of avoidance of excreta by cows at pasture was not inhibited by the environment itself, in contrast to cows housed indoors. It may, however, be influenced by lying eating and drinking patterns and general group activity in the outdoor environment. The majority of elimination events were rated as incidental avoidance because of a lack of a clear and measurable indication of intent, particularly when cows were engaged in different activities before and after voiding. Despite this, the total absence of any expression of 'no avoidance of faeces' and both the very high level of expression of standing to eliminate and moving forward as well as cows' rising in all but one instance to void all strongly indicate that they were aware of what behaviour was required in order to avoid bodily contamination with excreta and that this required behaviour was expressed at the appropriate time for avoidance to occur. This implies a degree of refinement in their response to an elimination event not previously recorded or attributed to cattle (Hafez and Schein, 1962; Brantas, 1968; Kilgour and Albright, 1971; Arave and Albright, 1997).

2.4 Conclusions

Cows at pasture exhibited a range of behaviour sequences around the time of elimination, all of which resulted in avoidance of bodily contamination with excreta. In the majority of incidences, cows stood to eliminate and walked at least a few paces thereafter, providing evidence of a consistent behaviour pattern indicating an inherent avoidance of excreta. Walking whilst defaecating appears to be related to a high motivation to complete an activity which was initiated prior to the defaecation event (e.g., going to drink) or a high motivation to initiate an activity after rising (e.g., catching up with the herd). Lying down upon freshly grazed pasture and eliminating upon rising may be evidence of an alternative stable strategy to latrine behaviour and its role in the control of disease transmission.

Comparisons between cow eliminative behaviour when grazing or housed.

The recording of standing, walking and lying behaviours at the time of voiding support the earlier finding that standing to void, followed by moving forward is the predominant pattern of behaviour in cattle (Aland *et al*., 2002). There were differences, however, between the most commonly observed sequences for cows at pasture (namely, lSws, sSws and wSws) and for cows housed in either the cubicle system or the straw yard (namely lSs, sSs and wSs), indicating that cows were actively moving away from excreta more often when at pasture than when confined indoors, suggesting that the housing of cows, regardless of housing type, has an effect upon faeces-avoidance behaviour patterns. Differences were also noted in the ratio of lying to standing pre-defaecation behaviour for cows at pasture (1:1) or confined cows (straw 1:4; cubicles 1:4). The greater levels of voiding indoors where the pre-defaecation behaviour was standing, indicate that other daily behavioural patterns including lying and standing were also disrupted compared to cows at pasture (O'Connell *et al*., 1989; Kondo and Hurnik, 1990).

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The ANIPLAN project: Reflections on the research approaches, methods and challenges *Stephen Roderick & Mette Vaarst*

Introduction

The objective of the ANIPLAN project is to 'investigate active and well planned animal health and welfare promotion and disease prevention as a means of minimising medicine use in organic dairy herds'. The basic idea lying behind this objective is that the active development of plans at the farm level to improve herd health and welfare will enable individual farmers to practically achieve the organic principles with regard to the health and well-being of organically-farmed animals.

To fulfil the objective, the project needs to be carried out in close collaboration with farmers and conducted in real farm situations. This means that the research is being carried out in an environment which is not under control the control of researchers. This, in turn means that there are inevitable methodological issues which will arise during the course of the study. This paper describes some of the issues arising during the first part of the study i.e the setting up of the project and the first year of data collection.

One major challenge for the research team involved in this project is to identify research methods which can describe and document the planning process as well as the disease, production and medicine use on study farms. This documentation will enable the researchers as well as the end-users of the research to evaluate the approach and the effect of animal health and welfare planning on herds. This includes the process of animal health and welfare planning, which can be regarded as an iterative social and individual human development process. The transformative learning process (Vaarst, ibid.) leading to a change of perceptions and priorities of those involved should be expected before actual changes are implemented in the herds. Again, there are methodological issues to consider in this respect.

With regard to the research methodology applied, the project moves beyond the traditional approach of measuring change in a set of biological parameters, to one which incorporates a number of research approaches that include social elements and qualitative as well as quantitative data. Thus there are inter- and trans-disciplinary research approaches which require consideration with regard to application and scientific quality.

The aim of this paper is to give a midterm view of the identified research challenges within the project, and to summarise reflections from discussions at the project workshop in Fokhol in Norway and a project meeting in Ghent in October 2008. The paper provides an ongoing discussion document on methodological issues.

Identifying the need for a qualitative research approach to document the process

At the first project workshop, it was agreed that the animal health and welfare planning process was essential and the 'animal health and welfare plan' would be the document resulting from the planning process. It was also agreed that this should be given value only as the written end result of a process, and formulated by the farmer instead of being a summary of 'good advice' given by advisors. The acknowledgement of the importance of the process emphasises a requirement for qualitative research approaches commonly used to document and analyse social processes. Although the project does not have a particular budget for such research activities, the need to include this activity within the current budgetary constraints have been discussed. In the following, a brief overview of some of the considerations is provided. Two major questions were raised in relation to this:

1) How to describe and document the planning process? Here, qualitative interviews and following the process by describing which initiatives are taken on the farms etc. are crucial,
2) How to measure improvements and the effect of the animal health and welfare planning? Here, a combination of epidemiological analyses and qualitative research methods must be used.

Describing the animal health and welfare planning process

The process involves a) the assessment of the herd situation, b) the dialogue with a person from outside the farm and c) an evaluation. In terms of research methodologies, the following considerations have been discussed and will be included in the final analyses.

a) The assessment of the herd situation

All participating countries have different approaches to data collection, ranging from central cattle data bases to farm records and data from individual dairy companies. In all countries, data from more than one source will be included. One major assessment of the herd situation in this project has been the recording procedure developed within the project 'Welfare Quality'. Issues of time taken to conduct the assessment and the immediate perceptions of relevance and usefulness seen from farmer and advisor point of view have to be included in an analysis of the success of the assessment methods.

A requirement of the assessment is that it must give a relevant and useful picture of the herd situation, and thereby also providing a basis for evaluating whether something has been improved on farm level. The research undertaken should aim at evaluating whether such tools have been proven efficient in achieving this goal.

An ambition of the project is to give advice on data and herd assessments (of routines and animal welfare) which can realistically be used as a basis for dialogue with advisors or fellow farmers in an animal health and welfare planning process. Different templates and formats of reporting have been developed for presentation of the data to the farmers, and the usefulness and success of these approaches to presenting data will be described. This will require country specific case studies and analysis. The feed back from the farmers and the involved advisors and facilitators will form the basis of the advice.

b) The dialogue as part of the animal health and welfare planning process

As illustrated in Vaarst & Roderick (ibid.), the dialogue within farmer groups needs to be adjusted to meet the particular cultural and production environments within each country. The extent to which participating farmers respond to the group discussion process is likely to vary between countries and situations, particularly with regard to the traditions with respect to group discussions and particpation. Again, the involvement of farmers in this is highly relevant. Interviews – individual as well as group focus interviews – need to be conducted appropriate to the needs and circumstances in each country and region.

The approach and perceptions of the facilitator of farmer groups is also critical. As an overall collection of different approaches to dialogue in farmer groups, it has been decided that an interview in English will take place with all involved facilitators, and in some cases with experienced facilitators within each of the participating countries.

Measuring improvements over time as a result of the process

The process of making changes within a herd, which may lead to improvement in the herd, is likely to be complex. At the Ghent ANIPLAN meeting in September 2008, an overview of how the process of change is likely to be brought about was developed and is described in Figure 1. The process is likely to be complex.

At the time farmers are interviewed, it is likely that the process of planning and change may only have reached the box 4 stage (farmer starts change), and probably not as far as the box 6 stage (measurable impact on animals). The approach to evaluating the process must take this into consideration i.e that the process is incomplete, and the methodology adopted (both qualitative and quantitative) must take this into consideration.

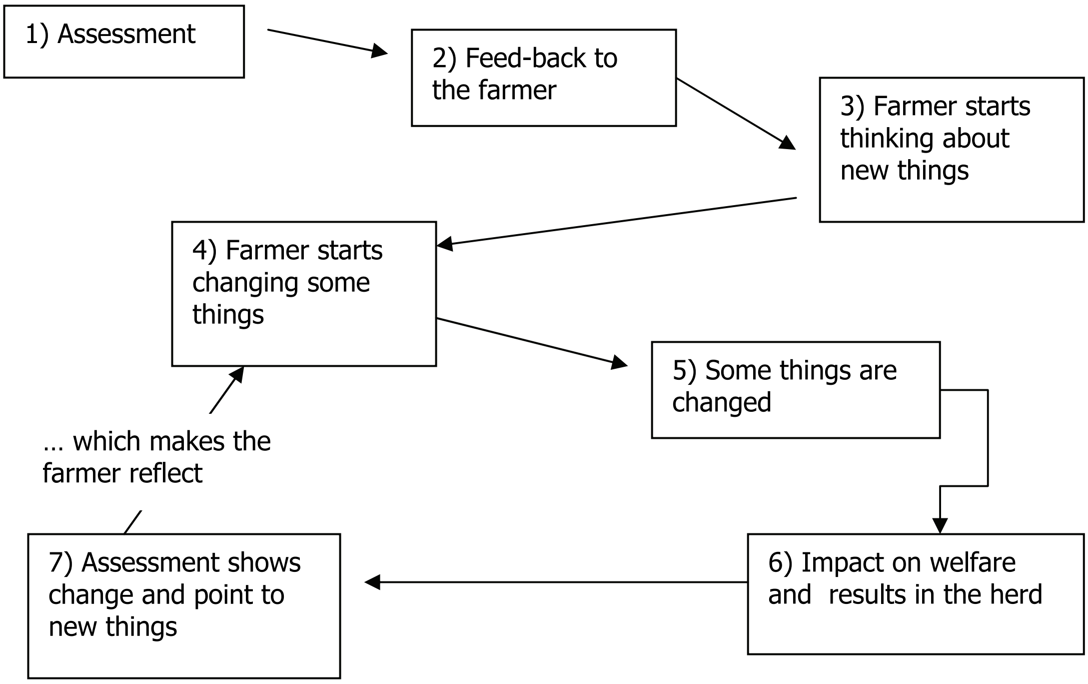

Figure 1. A draft of the process which maybe will be experienced by farmers and in the farms in relation to this project.

Measuring improvements related to the project objective and goal

The aim of the project is to minimise medicine use through improved animal health and welfare as a result of an animal health and welfare planning process. So, measures of the impact of change need to include answers to the following questions:

- Has medicine use been reduced?
- Has animal health and welfare been improved?
- Had the animal health and welfare plan contributed significantly to this?

This requires reliable and uniform data across countries, and the project group has spent much time and had many discussions in order to align the various country specific data and ways of measuring disease related parameters. Researchers from all countries carry out a certain amount of assessments of farm systems and animal based welfare parameters developed within the Welfare Quality project. This provides a source of consistent data for applying quantitative analysis methods and for communication between countries effects that may arise consequent of structural, climatic, geographical, cultural and other factors, as well as identifying common trends and developments.

In Figure 2 below, the various categories of parameters are listed and a simple overview over the research strategy in terms of measuring the situation in each herd at the beginning and end of the intervention (the animal health and welfare assessment) is shown. Application of qualitative research approaches then should enable the research teams to describe the 'things happening in between'. So, the first three categories are likely to be the subject of epidemiological and statistical analyses, whilst the latter two will require a more qualitative research approach.

	First assessment	Things happening in between (the process)	End point
Animal based (incl. milk records + production)	X		X
Medicine	X		X
Resources	X		X
Management	X		X(shortened)
Expectations	X		X(shortened)

Figure 2. The categories of quantitative and qualitative parameters and variables in the assessment of change.

In Figure 3 below, an example is shown of the strategy of measuring parameters related to a condition (e.g. mastitis) that may be influenced by the process in the year before the project (year 0) and comparing it to the herd situation after the intervention, when improvements may be expected. In this example, various mastitis related parameters are listed which could be included in an analyses of change in a herd.

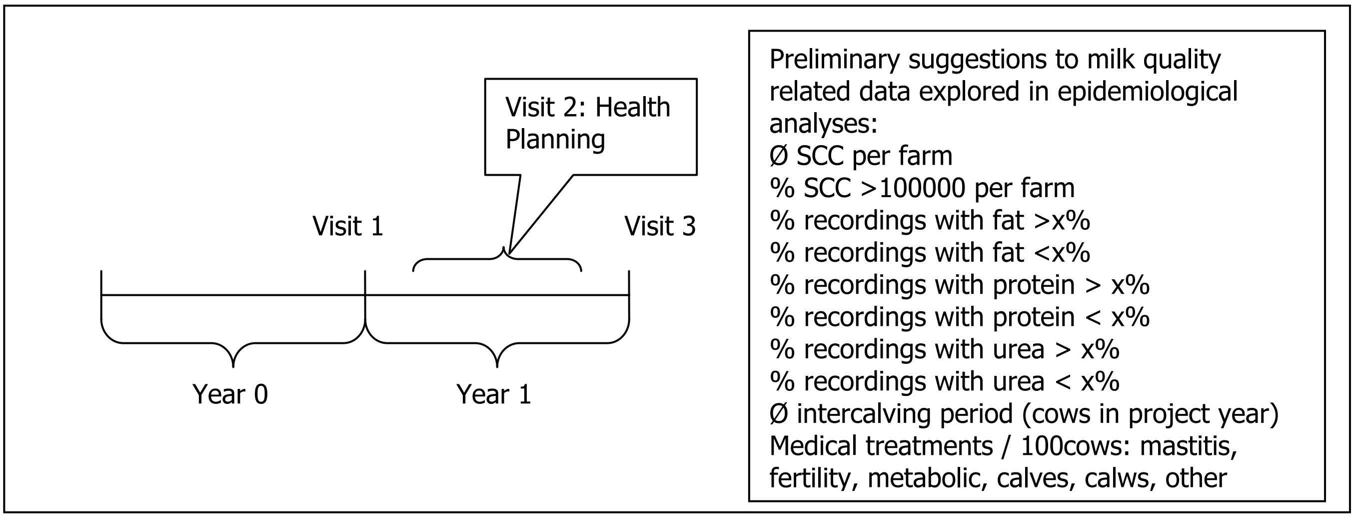

Figure 3. Using mastitis as an example of variables which can be looked at when evaluating change on a farm.

Figure 3 provides perhaps an ideal scenario for measuring change related to a specific parameter. However, limitations related to time need to be recognised. First, for some parameters a period of one year may be insufficient to conclude whether change has taken place. Secondly, there is variation between countries with regard to the start date. In some situations, the health planning process may have started less than one year before the evaluation. Also, in some countries, there is no data available or produced at all from 'Year 0'.

Including farmers' perception of improvement

An analysis of whether things have improved clearly has to include the farmer's own perception and be related to the farmer's own goals. Goals can change because the farmer becomes more and more well-informed or influenced. Such changes cannot easily and comprehensively be measured 'from outside' and effective evaluation will need to incorporate farmer reflections, including first hand experience.

The project 'goal' is minimised medicine use through better animal health and welfare. However, this may not be the primary goal of the participating farmer and hence it is appropriate for the project to consider the broader farm and personal goals of the farmer, and to attempt to evaluate the process and outcome of the project from this perspective. This makes it even more relevant to involve the farmer in the analysis of change, and to adopt the most appropriate research and analysis method to achieve this within the project budgetary and time constraints.

Conclusion

This project includes a broad range of conditions, a range of data resources and a multitude of possibilities with regard to measuring the process and impact of herd health planning. The need for both qualitative and quantitative approaches has been identified. Whilst many of the research and analytical methods that may be used are in common use, their joint application in relation to the project objectives is likely to be an onerous task. There are also methodological constraints to be considered with regard to the relatively short period of time required to evaluate a potentially lengthy process, the variation between countries with regard to the quality of data and the difference in time that project activities have been implemented in the various countries. Consistency of data is also a significant consideration.

Within the ANIPLAN researcher team, there has been agreement to conduct in-depth epidemiological and statistical analyses of health and welfare data, and to evaluate and discuss effects of an active process of improvement aiming at minimised medicine use through improved animal health and welfare. This will be combined with various qualitative research methods as described above, including interviews of farmers individually or in groups, as well as of advisors and farmer group facilitators. What is now required is further clear definition of the quantitative data analysis and a clear set of procedures for achieving this. With regard to the qualitative data, there is a need to establish what research and analysis methods are most appropriate for evaluating the human activity involved in health and welfare planning. A most significant task beyond that is to bring together the outputs achieved from the various approaches and countries so as to meet the overall project objectives. These methodological challenges will be the focus of the next ANIPLAN workshop in Austria during May, 2009.

Improving animal welfare by assessing college's farms *Gidi Smolders*

Health and welfare is a major topic in the Netherlands in both organic and non-organic dairy farming. This report highlights issues arising from welfare assessments conducted on Dutch farms producing milk for Ben and Jerry's (B&J) ice cream. The Netherlands is the base for the European market for B&J ice-cream. Four years ago 11 farms were asked to produce milk for B&J. High human and animal welfare was a pre-condition. In order to evaluate the animal welfare on those farms, cows were assessed at the end of the housing season and at the end of the grazing season. At a plenary meeting the farmers discussed the results and the possible improvements on their farms. Since the farmers had a desire to control things on their own farms, they wanted to assess their own farms and animals. In a number of sessions a checklist was developed by the group of farmers and tested. This so-called 'caring dairy' checklist is now used in all kinds of farmers groups, conventional and organic, with farmers assess each others cows and farms. A 5 hour workshop at a host farm at the beginning of the process includes a theoretical and practical part and at least a proposal from the host farmer with three points to improve. The following assessments of colleagues take 3 hours per farm, which also results in proposals to improve.

Starting workshop

The starting workshop with 8 – 12 farmers takes place at a host farm volunteering. The host farmer provides room for the workshop participants, a lunch and coffee or tea and data and records of his farm over the last year. The workshop is addressed by a specialist in assessing animal and farm based welfare and health. The workshop serves different goals: getting to know each other, learning to assess cows and farms, realizing the large differences between farms and providing theoretical knowledge of animal welfare. The day starts with a theoretical part where the host farmer presents his records and the other farmers are asked to comment. The theoretical discussion of animal welfare also takes place at this time, using examples from the participating farmers. This part lasts 1.5 – 2 hours during which time questions are also asked as to why farmers should aim for animal welfare and which factors are important (housing, feeding, care). Differences between farms become apparent. In this theoretical session it is also explained that improved welfare not only benefits the animal directly, but also results in improved animal health, decreases the need for treatment, is good for the image of organic dairy farming and last but not least, it is also better for human welfare too.

Needs of animals

In the theoretical part of the starting workshop it is explained that the 5 freedoms are the leading items in animal welfare. It is also explained that the demands of society might contradict with the demands of animals. In dairy farming the circumstances on most farms are not too bad (even if there is a large variety) and the image of the dairy sector in the Netherlands is quite good. The more direct the association between welfare and production, the greater chances are of meeting animal welfare requirements. Hunger and thirst are not desirable in lactating and growing animals because of their negative impact on production, but is sometimes practiced in dry cow management. Pain and suffering reduces production but is sometimes seen as normal during a curing process.

Fear and sorrow and natural behavior are sometimes issues even in organic farming. Dehorning is normal, space in stables is limited (also because of measure for nitrogen emission out of stables), nearly all stables have dead ends, etc. However, the Dutch minister of agriculture in January 2008 wrote: "Stables and farm management will in 15 years time be build around the animal, in a way society likes it and supports it. Animals will behave naturally, and will not be hurt in their integrity (get daylight, no castration and no dehorning)".

Aid in balancing animals and management

The performance and behavior of animals in a particular system are good indicators of whether they are able to cope with the circumstances on a farm. In other words, cows show if they fit with the farm or whether there is an imbalance between animal needs of the cow and the possibilities of the management. In the workshops it always became a point for heavy discussions whether farmers in their management were able to keep up with their cows. If cows are genetically able to produce 12000 kg of milk and the farmer only offers a management enough for 7000 kg of milk, then problems are likely to occur. The solution may be to improve management and/or keep animals with a lower genetic potential. If management can only provide enough feed, care, attention, housing etc. for 7000 kg of milk, the farmer should breed a cow adapted to that management. Traits other than milk yield can be in focus when breeding, such as longevity, mastitis index, or strong legs. The importance of finding a balance between the needs of the animals and the management is pointed out during the discussion, as well as the need to focus on animal welfare and how this can also reduce disease and veterinary treatments, which in turn can result in improving farmers' welfare and economic situation. The physical farm data of the farm is used during the workshop to compare actual achievement with the goals of the farm.

In order to avoid the bias introduced by organizational blindness and mirroring customs and habits, the animals and farm are assessed by colleagues, who also propose improvements after the scoring. In the practical part of the workshop farmers learn to score what they see, assessing without judgment, how the assessments works. They base all the recording on the checklist, which they use on their own and assess cows on body condition score (BCS), locomotion score and skin damage score. The host farmer only explains, but does not interfere with the assessment.

At the end of the workshop the farmers propose points to improve at the host farm. After this, the host farmer plays an active roll again by commenting on the suggestions: whether he agrees with the improvement points or not, whether they can be implemented and over what period of time. After a one day workshop, farmers form small groups of 3-4 persons for assessing each others farms.

Assessment by colleagues

The host farmer organizes the assessment on his farm: he invites his colleagues, provides them with his farm figures about production, disease incidences, health status, replacement and fertility (preferably by email a few days before the assessment) and serves coffee/tea.

The meeting starts with a 'kitchen table part' which takes about half an hour in which the host farmer explains the results of the farm and her/his goals to the invited 2-3 colleagues. In the checklist, questions about production, somatic cell counts, diseases (milk fever, mastitis, lameness, acetonaemia), still born calves and other dead animals in the last year, fertility parameters, longevity and live yield of the herd. It saves time if the figures can be looked at before the visit.

For the stable part (with clean clothing and boots) the checklist is worked through individually by each of the invited participating farmer. It covers design as well as animal based parameters, such as locomotion scores, laying down and standing up behavior, space, bedding floor quality, obstructions in passageways and dead ends in the housing system, light, fresh air, quantity and quality of feed and drinking water, farm yard and hygiene. Ten cows are assessed for locomotion score, body condition and skin damages. A critical view is needed because all blemishes, including those that are very small one, are recorded This is a very good demonstration to the farmers that if more cows have hairless patches at the same place of the body, it points to something in the housing system which is not well designed or used well enough. Special attention is paid to the dry cows, which sometimes tend to be a neglected group, even though they should receive more cared than the lactating cows. Dry cows account for 10% of total assessment score. At the end of the housing period, the risk of finding problems related to the housing system is greatest, and fortunately, it is not a busy time for farmers, so most assessments take place in this period.

Based on the kitchen table part and the stable part, a 3 point plan to improve animal health and welfare is discussed between the assessment team (the visiting farmers) and the host farmer. Obviously, some improvements are easier implemented than others. Some may need a complete renovation of the housing system while others only need a small investment or awareness every day. Examples of improvements suggested by the farmers in relation to these sessions are to make the cubicles longer, to roughen the walking floor, to change the breeding bulls, improve ventilation, break down some walls, add minerals and trace elements to the ration, or even to build a new barn.

Strict organization of the discussion and mutual trust

An assessment session takes 2.5 – 3 hours per farm if well organized and focusing on the task. The discussion should be related to the host farm records, assessment results, management routines and the visiting farmers' suggestions for improvements. This demands a fairly strict steering of the discussion.

This type of assessments alternates between farms, so that all farmers will have their turn as host as well as assessor. Trust forms the basis for this process of assessment. Sharing farm data with colleagues will only be possible if there is confidence that figures are confidential, which means that they are only used by the group to improve animal welfare. Assessing farms this way is a quick pathway to evaluate the management and animals of farms. Farmers learn from colleagues and a positive side effect of the process is that farmers see things at each others farms and through the discussions with colleagues that they can easily implement at their own farms to improve things.

Learning and empowerment in farmer groups as one way of creating a healthy process of animal health and welfare planning

Mette Vaarst

Introduction: farmer groups as a way to animal health and welfare planning in a dairy herd

An animal health and welfare plan is a useful document as a tool for improving the farm in ways which will lead to improvements in the herd. Atkinson & Neale (2008) distinguished between 'animal health plan' and 'animal health planning', where the first was the document, and the latter was the necessary process leading to formulating a plan. This means that the document becomes useful because it is a result of an active planning process, which involves a systematic analysis of the situation and a reflective process where the people, who are actually responsible for changes in the farm, are actively participating in the analysis of the situation and articulating their perceptions and planned actions. This process can be carried through in very many ways in practice, although based around some overall principles which ensure that there is room to carry through the process.

In the ANIPLAN project, we have developed a set of basic principles of Animal Health and Welfare Planning, developed through a group work process at the first project workshop, summarised as follows:

- It has to be a process involving assessment of the state of the art, dialogue leading to the formulation of a plan, and action followed by an evaluation, which then again can lead to a new dialogue and planning;
- Farmer ownership;
- Involvement of external knowledge;
- Have organic principles framework;
- Be written;
- Acknowledge good aspects;
- The plan must be farm specific; and
- External persons should be involved

In this paper, I explore definitions of learning and empowerment, and discuss how farmer groups can contribute to the learning process related to the animal health and welfare planning process, and how empowerment can be facilitated through common situated learning. The relevance of focusing on learning and empowerment as important for an animal health and welfare planning process is based around the substantiated belief that a process leads to action for better animal health and welfare when it involves active participation, ownership and meaningful learning among the persons who are responsible for the animals.

What is learning?

Conventionally, learning is often defined as internalization of knowledge from 'the outside world'. From this point of view, learning is absorption or assimilation between two worlds; the outside and the inside, and is perceived as a primarily intellectual phenomenon (Lave and Wenger, 1991). When viewing learning as a social phenomenon and process, it can be viewed as an interaction between the learner and the learning environment where the world is not an inside and outside world, but rather one with interrelations between the learner (and his or her background and competencies) and the surroundings, which also includes co-learners, cultural and social context, facilitator, teachers and specific situations. When working with farmer groups, this is a crucial point because in this context, learning is a social process which takes place in a group where knowledge is developed and related to practice.

The link between knowledge development and practice is another crucial point. Briefly, all people learn when the knowledge is relevant to them and to their daily practice. Therefore, when learning together – as happens in a group – the knowledge which is relevant to the participant will be developed, and the participants will support each other in the development of this knowledge. This is very different from the thinking of one advisor 'pouring knowledge' into the mind of a farmer, in some cases even knowledge which the farmer will not find relevant and therefore does not pick up. The concept of 'situated learning' refers to learning from and within a given specific context and situation. This also links the knowledge, the learned, to the experience of the learner, and of the participants in a learning process, as described by e.g. Kolb (1984): *'the process whereby knowledge is created through the transformation of experience'*. This means that when working in a farmer group, the participants expose their experience and share it with fellow farmers, and therefore common learning takes place. Sometimes, farmers' experiences are different, and therefore a negotiation process is necessary. This demands dialogue, and is very meaningful to the group members, because they negotiate their own experience and thereby put it into a context which – together with the experience of the fellow farmers – bring about common knowledge and constitutes a learning process.

The learning process is transformative for the learner, since it leads from one point and perception to another. This is a very complicated process, involving both first and second order experiences (Percy, 2005), and therefore also deep reflection, and periods with disorientation, surprise or 'optimal frustration' - all of these facilitating transformation and learning. This will not happen without dialogue and negotiation. New knowledge will be created as a product of the negotiations and processes in the group, where the group members work together to reach a common understanding of what is relevant and meaningful for them in their own situation.

Some learning happens through everyday activity, and does not need to be reflected. When entering a process of – like here – learning in order to improve a situation e.g. through active and continuous planning of steps in order to meet overall goals at a farm, we are moving from 'coincidential learning' to the view of situated learning as a conscious process.

The conscious and common farmer group process aims at finding negotiated meaning in the topics, issues and dilemmas shared by involved group members. The group members share all this on an equal level in the group (as described by e.g. Lave & Wenger (1991) when they use the term 'legitimate peripheral participation'), but the process needs to be facilitated by somebody who keeps the overview of the process and guides the dialogue in the group.

What is empowerment and how is it linked to learning?

Empowerment has been discussed and defined in numerous contexts in different parts of the world. In short, it can be defined as enabling humans, as individuals, in groups or in local communities, to develop a mastering of life situations and take control over and responsibility for their own life situation within a given framework and when necessary (Andersen et al., 2001). This also involves a critical sense taking action based on an evaluation of the situation and belief in ones own potential and influence, but it can be taken much further than that and also seen in relation to the building up of human and social capital. One can ask why and how it is relevant for farmers planning improvements in their own herds, because the term empowerment is built on a fundamental understanding of society as unequal and with underprivileged groups, and empowerment is linked to 'empowering the underprivileged group'. We use it in this context as an emphasis in relation to the basic principles of animal health and welfare planning described above, where the farmer ownership is a crucial characteristic. Here, we think primarily of the power to take action and responsibility, and set the agenda for ones own herd.

What brings about empowerment? Learning and becoming increasingly conscious about ones own situation, abilities and potential weaknesses are crucial elements of an empowerment process, because it strengthens the identity both as individual and as group. As explained above, a group of farmers challenge each other, negotiate and find common meaningfulness in their experiences linked to their own reality. This process is transformative in nature, and hence it leads to a process of empowerment, where individuals or groups of individuals are stimulated to take action in their own lives.

The relevance of learning together in farmer groups in an organic context

The basic principles of a good animal health and welfare planning process as described above can very well be fulfilled through a dialogue between one farmer (or the persons from one farm) and one advisor, as well as through a farmer group process. The particular focus for this paper has been the farmer group approach, as this seems to be an efficient and relevant way which, in practice, has proved to lead to action and actual improvements on farms (Vaarst et al., 2007). In the case of organic farming, it might be even more relevant, since it seems that being an organic farmer often calls for innovative approaches and local development of solutions to challenges. In a European network project (http://www.safonetwork.org) it was concluded that, in most European countries, there was a major need for educated competent advisors, especially veterinarians, to fulfil the needs of organic livestock farming in accordance with the organic principles and emphasising e.g. outdoor stay, integration of different enterprises into one diverse farming system and giving the animals opportunities to fulfil their natural needs and express their natural behaviour. Farmer to farmer advice, as well as common development of new knowledge based on the experience of the group members, creates knowledge which is relevant to their specific context.

The Danish Stable School concept

Farmer Field Schools (FFS) is a concept for farmers' learning, knowledge exchange and empowerment that has been widely used in various forms in developing countries. In Denmark, the concept was adopted and adjusted to Danish conditions in an action research and development project focusing on phasing out antibiotics from their herds through promotion of animal health and welfare. In this project, four Stable Schools were established and went through a one-year cycle with two visits at each of the five or six farms connected to each group. The facilitators, who were connected to the groups, were given the role of writing together with the host farmer, the meeting agenda, directing the meeting and writing the minutes to send to the group members after the meeting. The facilitator has a role of guiding the process and the meetings, and doing the practical work. The fact that facilitators were not given a role as the expert was crucial for the success to the process.

The Danish Stable Schools is one way of meeting farmer needs for development of their daily practice from inside, based on considerations and ownership of the farmers over the process.
Certain things distinguish the concept of Danish Stable Schools from the basic principles of animal health and welfare planning. The common goal of a Stable School is of crucial importance, and collects the group. No matter how different the farms, herds, and farmers are in one Stable School group, they still work towards the common goal and combine this common goal with the local goal of each farm. Another issue is the fact that the Danish Stable School builds on an idea of having an intense one-year cycle of group meetings, after which the group is dissolved and each farmer works 'on his/her own' until maybe linking up to a new group. The animal health and welfare planning is more a continuous process, and methods of forming groups where the level of intensity can go together with the wish to have a long-term continuous process must be identified.

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Implementation of farmer groups for animal health and welfare planning considering different contexts *Mette Vaarst & Stephen Roderick*

Introduction

This paper reflects some of the discussions that took place during the ANIPLAN workshop where participants discussed the special farming and farmer characteristics, needs and conditions in their own country in relation to farmer discussion groups, as well as more generic issues to consider when taking a farmer group approach to animal health and welfare planning.

Farmer discussion groups are not unique, and there are examples of different approaches to, and aims of, farmer groups worldwide. Perhaps an important starting point when analysing the successes and characteristics of these groups is to consider their original purpose. The starting point of the discussion in the ANIPLAN project has been the so-called Danish Stable Schools (Vaarst et al., 2007; Vaarst et al. 2008; mentioned in Vaarst ibid.), as well as existing approaches within the other participating countries, such as the Dutch Caring Dairy groups (Smolders, ibid.). A major feature of the Danish Stable Schools has been the time limited intensive working towards a common goal based around equal participation within the group. This is quite a different approach to other examples, such as the so-called 'erfa-groups' in Denmark ('erfa' as an abbreviation of 'erfaring', which in Danish means 'experience') that have worked for decades on dissemination of new knowledge and ideas to and among farmers, focusing on separate themes at each meeting, such as approaches to parasite control, winter feeding strategies, or the use of body condition scores. Similar focused dissemination programmes exist in many countries. What characterises the ANIPLAN project is that the focus is on a rather more systematic animal health and welfare planning process which is meant to be continuous at the farm level.

So, the goal of the farmer group is of crucial importance, but there also many other factors that will influence the operation, approach and success of farmer groups, including the approach to communication at meetings and the whole structure of setting up the farmer groups. These, in turn, may be influenced by various geographical, practical, cultural, technical and traditional issues in a given region or country. The acknowledgement of the need to adjust the approach of farmer groups to the life and farming conditions of the participants points to the necessity of making a context analysis when starting a farmer groups, and to ensure flexibility during the process based on feed back from the farmers in the group.

The background of the farmer

The educational background of farmers may be a relevant consideration. In many so-called developing countries farmer groups provide a means of educating farmers, some of whom may not received a basic school education. In northern Europe farmers tend to have received an education and have access to a considerable amount of educational material. Younger farmers tend to be generally more educated and there is some suggestion that education level amongst organic farmers is higher than in the conventional sector. In some countries a formal education is required in order to own a farm (e.g. Denmark), although elsewhere there tends to be a large number of family farms acquired through inheritance (Norway and UK). Although it is not clear what relevance this has with regard to willingness to participate in groups, it may be surmised that the latter may be run more 'traditionally' and with less openness to changes, which means that the learning process is aiming at making things work within a given framework rather than more fundamental changes such as the farm structure, herd composition or the basic management.

Who is in charge of and who take decisions about the herd?

The issue of 'family farms' raises other issues with regard to participation. Family farms often involve people from more than one generation and therefore present potential different interests in changing farm structures or management routines. The Austrian project team emphasised the importance of involving the whole family, especially the husband and the wife. In other countries quite dramatic changes over the last couple of decades has resulted in increasingly larger farms with more people involved (eg Germany, UK and Denmark). There was agreement in the discussion on the relevance and practical solution with regard to who is involved in the formation of farmer groups. For the purposes of learning on the farm, the person responsible for the herd should be able to participate at an equal level in a group, and for the mutual trust and stability to be maintained, the same people should participate in all the meetings. One other issue raised was regarding the participation of farms with many employed people where knowledge exchange within the work environment may be may considered sufficient, whereas farmers who work alone may be more receptive to professional discussions with fellow farmers, and maybe even welcome this as a social activity.

Different traditions with regard to open communication

There are different traditions and perceptions within the various farming communities and regions with regard to the openness in which farmers communicate with each other. The structure of the Danish Stable Schools, where one success case and two problem areas chosen by the host farmer are systematically included in the discussion, allows 'the exposed farmer' to direct the discussion so that it is not simply an attack on potential weaknesses. The workshop discussions suggested that there are likely to be regional variations in the degree of openness amongst farmers. Whereas in Denmark and Netherland experiences with very open-minded farmers did exist, there were more doubts from participants from some of the other countries whether farmers would be happy to expose their farm records and results to colleagues. In the UK for example, the quality and availability of farm records varies considerably, and thus a discussion group that partly relies on the use of farm records may alienate some from participation. There is also the issue of confidentiality and privacy to consider in situations where the common sharing of farm data is not commonplace. Culturally, communication between neighbouring farms is common at the personal level but not at the commercial or developmental level, although this situation is changing with increasing participation in discussion groups and benchmarking activities.

There is also a potential issue in situations where organic certification issues may be contravened.

In Denmark, research has shown that many farmers who really need improvement may be less open to actually expose their farm to colleagues because it is too painful, and because they may not have the sufficient overview to set the agenda themselves. Thus, farmer groups probably will be more relevant to farmers who are ready and willing to work towards a common goal within the framework of their individual farm goals, rather than farmers who need solutions to a crisis.

The influence of income and subsidies

In some countries, organic farmers have high subsidies and a good income as organic dairy producers, and in some regions, e.g. mountainous regions in Switzerland, there might be subsidies involved as a mean to keep farmers in business in rural areas. This was pointed out as a reason why farmers who are relatively financially more secure tend to be more open and interested in animal health and welfare improvements, whereas less affluent farmers in regions with less subsidies and under harder economical pressure may be seeking advice concerned with increased production and greater economic efficiency. Also, wealthier farmers may be in a situation where they can afford to spend time in farmer groups.

The role of the facilitator

In traditional farmer training situations groups may be formed so as to receive tuition from a professional advisor regarded as 'an expert in the field'. In the common participatory learning scenario, where the main focus is on exchange and mutual advice between farmers, the role of the professional advisor will be more of a facilitator rather than trainer or teacher. There are differences in the method of payment of advisors in different countries and in certain situations some farmers may be unwilling to pay an expensive advisor who facilitates rather than advises, as there is no perceived and tangible benefit obtained from the expert knowledge. There is no formal advisory service in the UK. Advisors are normally employed privately by farmers, either as general consultants or through marketing activities, such as nutrition advisors. Veterinarians increasingly act as herd health advisors, but this is not a general approach.

Experiences show that if the facilitator takes the role of being an expert, farmers will often be less open to give their own experience and knowledge as freely because they consider 'expert' to be the person with the right answers. Some participants expressed concern that farmers would not accept an advisor in this non-traditional role of facilitator rather than advisor. Others expressed concern that the farmers might say or suggest things which were simply wrong or could be harmful. The experience of participatory approaches in farmer groups in North Western Europe has shown farmers to be very knowledgeable and even through one farmer might express something that was not in accordance with the facilitators perception of what was the 'right thing to do', there would often be another farmer giving another view which often results in a more a balanced discussion. There are different perceptions across countries as to what 'a professional educated advisor' is supposed to contribute but a general consensus is that it requires a special effort by a facilitator to make a farmer group work with maximum participation and openness.

Length of time for meeting and transport

Farmer meetings need to fit into a farmer's busy schedule if good participation is to be achieved. Differences in opinion on the most appropriate time span of meetings were expressed. In particular, it was felt that in Switzerland farmers wanted to spend time talking and discussing when meeting, which may be related to the distances farmers need to travel to meetings and the dispersed of farms. This is particularly true when bio-dynamic farmers meet together as they often have to travel a long distance to meet other bio-dynamic farmers. Farmers in mountainous generally travel longer distances, and in some areas there is also long distances between organic dairy farms. In some areas of the UK, there are often clusters of organic farms which present a good opportunity for farmers in close proximity to work together. In the Netherlands, there is a preference for lunch time meetings to avoid morning and afternoon traffic congestion, whereas in Denmark farmers prefer meetings of 2½-3 hours that finish before lunch time. which exist, the communication between organic farmers perhaps tends to be more commercial or developmental rather than the more traditional personal communication, largely because organic farms tend to be dispersed.

How to compose a farmer group?

Ownership has been identified as critical to the development and implementation of animal health and welfare planning and therefore it is critical that if this is to be achieved through a group process, participants should be motivated to be involved rather than have a feeling of compulsion. In the Danish Stable Schools, the nature of the common goal (reduction in antibiotic use) made it possible to compose groups of farmers from very different farms (Vaarst et al., 2007). In other situations the common goal may be very specific to certain farm types or situations, which will dictate the composition of the group eg groups of bio-dynamic farmers or those with Jersey herds, or herds with milking robots or farmers from the same dairy company.

Lessons drawn from practical experiences

This paper has identified some key influential factors that are likely to influence the success, composition and nature of the farmer groups that will emerge during the ANIPLAN project across the various regions. During the course of the project, the practical experience from these farmer groups will be collected and analysed and used to develop recommendations for the future development of farmer participatory groups with common animal health and welfare goals.

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CORE Organic

Minimising medicine use in organic dairy herds through animal health and welfare planning

Abstract

'Minimising medicine use in organic dairy herds through animal health and welfare planning', ANIPLAN, is a CORE-Organic project which was initiated in June 2007. The main aim of the project is to investigate active and well planned animal health and welfare promotion and disease prevention as a means of minimising medicine use in organic dairy herds. This aim will be met through the development of animal health and welfare planning principles for organic dairy farms under diverse conditions based on an evaluation of current experiences. This also includes application of animal health and welfare assessment across Europe. In order to bring this into practice the project also aims at developing guidelines for communication about animal health and welfare promotion in different settings, for example, as part of existing animal health advisory services or farmer groups such as the Danish Stable School system and the Dutch network programme. The project is divided into the following five work packages, four of which comprise research activities with the other focused on coordination and knowledge transfer, through meetings, workshops and publications.

The content of this set of workshop proceedings reflects the fact that the workshop in Fokhol in Norway was held at a relatively early stage with regard to certain joint activities and methodological development. Training in animal welfare assessment had taken place for the first time in the project a couple of months previous to this workshop, and the results in terms of inter-observer reliability are presented by the organisers of this training workshop, Solveig March, Lisi Gratzer and Jan Brinkmann and their supervisor Christoph Winckler. This forms a good background for a reliable data collection in all countries. A presentation from a newly employed Ph.D. student linked to the ANIPLAN project, Lindsay Kay Whistance, gives insight into the study of defecation behaviour in dairy cattle. Although not directly part of the ANIPLAN studies, the presentation is particularly relevant to the considerations regarding animal welfare in housed and outdoor systems. Gidi Smolders from the Netherlands presented a paper about a Dutch farmer group initiative with a strong element of farmer ownership. Mette Vaarst contributes with a paper on farmer learning and empowerment in groups, with a background of Danish experiences with the so-called 'Stable Schools'. Two papers by Roderick and Vaarst reflect the workshop discussions about research methodologies and the various contexts and conditions for farmer group work. These two papers demonstrate the complexity of the research requirements when conducting a trans-national and cross-disciplinary research project with many stakeholders.

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ISBN: 978-87-991343-4-2