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How to R.E.S.E.T. farmer mindset? Experiences from the Netherlands

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Introduction

From a historical perspective, agricultural extension specialists, researchers, and veterinarians assumed that agriculture was an activity executed by an individual farmer, based primarily on rational, technical, and economic considerations [1, 2]. Although such rational choices still play a role in farm management, we have learned that farmers' decision making about mastitis management based on these considerations is not always clear and understandable [3]. Why some farmers, even though it would benefit their results, do not implement effective mastitis management practices is not always known [4], but it is often assumed that, besides these deliberate rational considerations, other farmer mindset factors play a role [1, 3-14]. This paper described the R.E.S.E.T model that can be used as a framework for changing farmers mindset and improving udder health.

Farmer mindset

Farmer mindset comprises a variety of social psychology constructs such as the farmer's personality, attitudes, beliefs, values, intentions, skills, knowledge, perceived norms, and perceived self-efficacy. For example see the Theory of Planned Behavior [15-17] and the Health Belief Model [18-20], which are both frequently used to explain people's health behaviour [21-23]. All these factors, and probably more, comprise the 'human factor' which, for the sake of convenience, is summarized as 'mindset'.

Research of the Dutch Udder Health Centre (UGCN) in the Netherlands, has shown that indeed mastitis can be explained to a certain extent by farmer mindset and behaviour and that mindset explains a substantial part in these models[24, 25]. In this study from 2004, elements of farmer mindset explain 17% of the variance in clinical mastitis incidence and 47% of the variance in bulk milk somatic cell count (BMSCC), while farmers' self-reported behaviour explains, respectively, 12% and 14% of the variance of these parameters.

The results of several studies of the UGCN show that two factors of farmer mindset seem to be important behavioural determinants for mastitis prevention: the perceived threat (i.e. "Do I have a problem?") and the perceived efficacy of preventive measures (i.e. "Can I solve the problem easily?")[26, 27]. Interestingly, these factors are also known to be indispensable in motivating people to work on their own health and are included in the so-called Health Belief Model, that is presented in Figure 1. [18-20, 28, 29]. For veterinarians and other herd health advisors, it is important to acknowledge these mindset factors and to make sure they have a complete understanding about farmers perceptions on benefits and barriers of preventive measures when advising them.

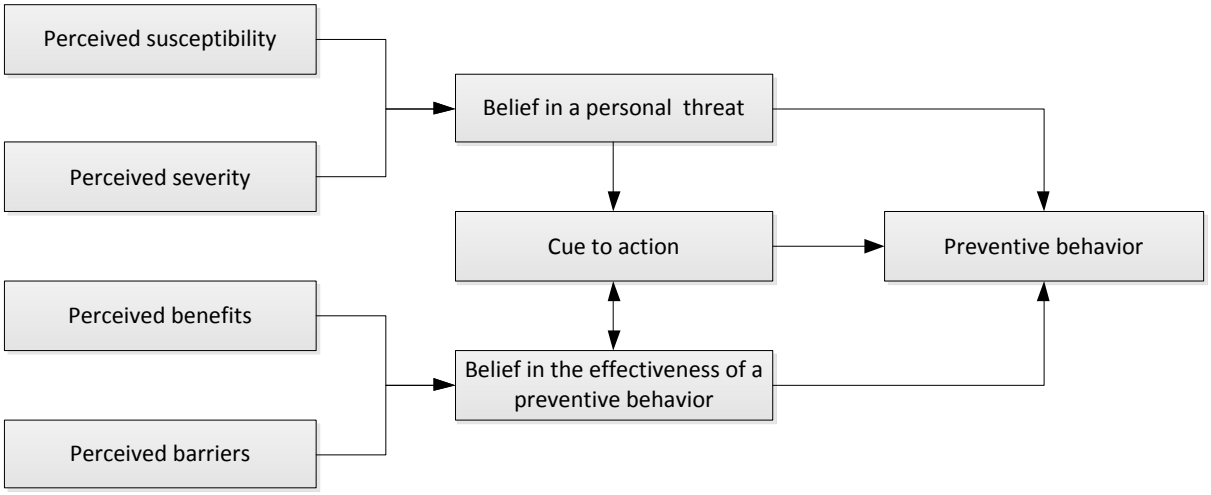

Figure 1. *The Health Belief Model [18], adapted by Koelen and Van den Ban[30].*

The R.E.S.E.T approach

The causes of variation in mastitis incidence on herd and cow level are not yet fully understood. However, this does not restrain the dairy sector from implementing policies to reduce mastitis. For a mastitis control program, it is important to influence elements of farmer mindset in order to change farmers' management practices to improve udder health. Farmers can be persuaded in many ways to change their behaviour regarding udder health [25-27, 31-33]. It is most important to note that farmers are different. They have various learning styles and prefer customized communication[32, 33]. A combination of actions and communication strategies are therefore needed to reach and change as many farmers as possible, because 'one size fits all' approach does not apply for effective communication.

To make life easier we can discuss some effective intervention strategies by following the R.E.S.E.T model, that was adapted from van Woerkum et al. [34], and Leeuwis [1] and was described in a different form earlier regarding mastitis by Lam et al[33]. The model shows five main instruments that need to be addressed when a change in behaviour of people is required: The R of Regulations, the E of Education, the S of Social pressure, the E of Economic incentives, and the T of Tools. As some people are more influenced by negative stimuli, and some more by positive stimuli or social pressure, it is the combination of all that makes a program or campaign effective[26]. Communication can be used as an instrument on its own via Education, but is actually the glue between all instruments together.

Simply said, behaviour can be changed either in a voluntary or a compulsory manner. Compulsory behavioural change is facilitated by coercion such as regulations and restrictive provisions[34, 35] (Van Woerkum et al., 1999). It is well known that compulsory behavioural change will probably only last as long as the coercion exists. Therefore, voluntary behavioural change is preferable. Voluntary behavioural change can be reached by internal or external motivation. Internal motivation is the most difficult one to influence via a disease control program, as it relates to age, generation, lifestyle, education and character. External motivation is therefore better suitable, but mostly underestimated.

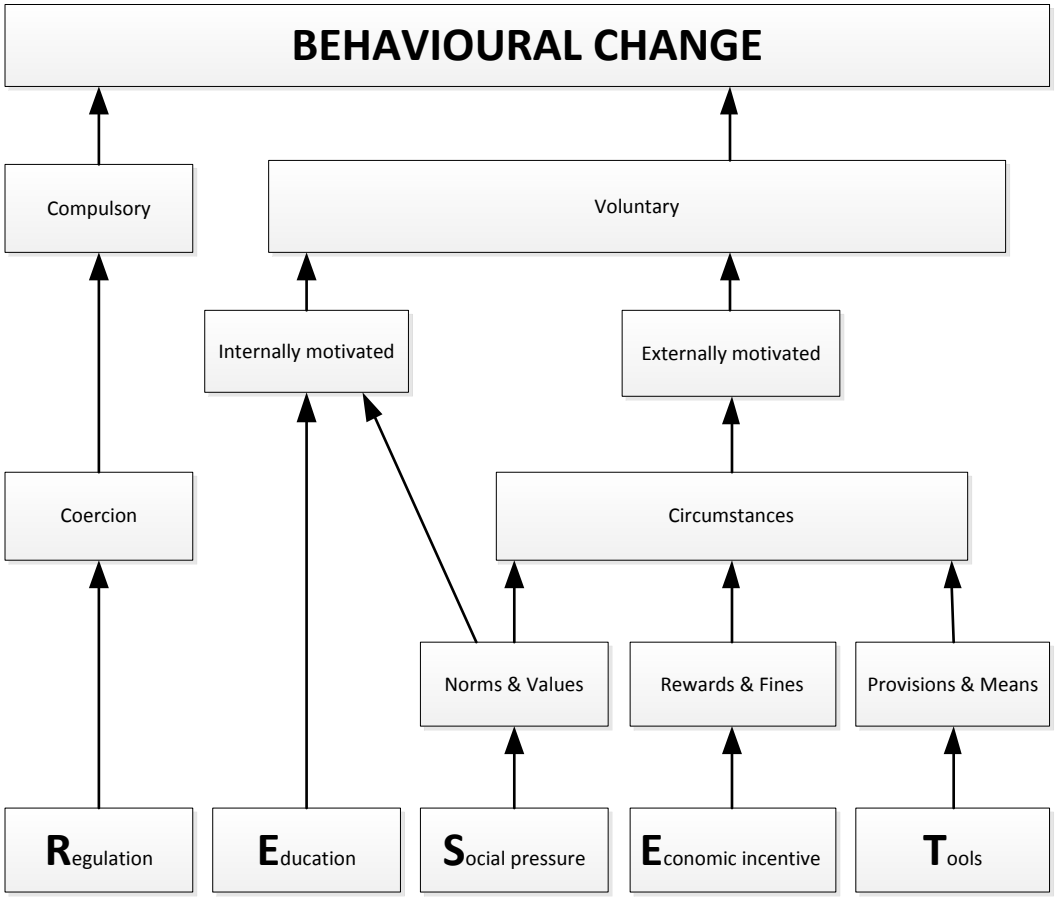

***Figure 2**. The R.E.S.E.T model: Behavioural change by a combination of strategies (adapted from Van Woerkum et al.[34], see also Leeuwis [1]).*

The R of Regulations

It is well known that regulations by law force people to behave in a preferred way. If you don't, you can end up with a fine, in jail, or even worse off in some countries. This mechanism works via coercion. It has nothing to do with voluntary behaviour. This may not apply to udder health directly, although legal limits for cell count, use of antibiotics and other drugs, and environmental regulations may influence farm management. These regulations need to be taken into account. It is known that a change in legislation has a direct effect when there is proper surveillance. However, this measure can only be implemented by authorities. It should be noted that these measures can work counterproductive. For example, when you want a farmer to renovate his barn, this is sometimes prohibited by local authorities or can take years to actually get all permissions. This can be one of the barriers within farmer mindset as presented in figure 1.

The E of Education

Education is one of the most used intervention instruments. The effect of it is important, but sometimes overestimated. Education does not mean that you can send farmers a book with information about udder health, and then hope they will learn from it[31]. Education should start early,

even within agricultural schools and vet schools. Education can be more effective if the information is offered and adapted to the different learning styles of farmers[33].

Using study groups as a method for education is quite effective for a specific group of farmers with a specific learning style. About 13% of farmers will participate in study groups when actively offered to them[31, 33, 36]. This means that a large part of the farming community are not reached. Different education and communication strategies therefore are needed as study groups focus more on rational behavioural change. Peripheral communication strategies may therefore educate people without them even being aware of it, as was shown by the milking gloves campaign of the UGCN. Milking glove use increased from 21% to 42% within one year of a short peripheral campaign focused on their use. Moreover, the opinion and knowledge of farmers about milking gloves changed in their favour, without actually addressing the benefits of gloves in the campaign itself[31].

The S of Social pressure

Social pressure influences farmers norms and values, and can therefore have a long term effect on internal motivation as well. However, mostly this will influence the circumstances on a farm and within a family, which makes a farmer change his behaviour. Humans need social cohesion to be successful. It is therefore one of the most powerful tools that can be used in intervention strategies. The success of study groups, where farmers influence each other is mostly based on this principle. Social pressure influences peoples frame of reference. What is normal for you on your farm? If an important and highly respected person within a farmers social network has a different frame of reference, a farmer may want to copy that in order to comply to the norms. Everybody wants to be unique, but nobody wants to be too different.

Veterinarians and other herd health advisers are important for increasing social pressure and setting a frame of reference about what is normal, and what is not. The more people within a farmers social network who put such a pressure on the farmer, the harder it is not to comply. That's why it is important that all farm advisors, and even all vets within the same practice, work together and send the same message. They also need to take into account others that may influence the farmer, such as family members, peers or staff. If the social pressure is high enough the other tools of the R.E.S.E.T model may have no or less effect.

The E of Economic incentives

External motivation can be accomplished by financial stimuli such as bonuses and penalties related to bulk milk somatic cell count (BMSCC)[37, 38]. Currently in the Netherlands a penalty is imposed for a geometric mean BMSCC above 400,000 cells/ml. This policy is effective in reducing the number of herds with a BMSCC above this threshold level. Penalties are always extensively discussed, as it is known that is has an effect as soon as these levels are adjusted. However, this does not solve all udder health problems, because serious clinical mastitis problems may occur in herds with a low BMSCC[39, 40]. In addition, milk of individual cows with clinical or subclinical mastitis can be withhold from the bulk and thus are not represented in the BMSCC.

People will change their behaviour by these penalties, not just through some sort of coercion, but mostly because they set a social norm. They tell you when you are not doing well. Unfortunately these norms sometimes have the opposite effect. As long as a farmer does not reach this norm, he

may think he is ok. Therefore it should be better if at the same time another statement is being made by rewarding farmers that do good. The premiums paid by many Australian milk processors for milk <250.0000 BMSCC is a good example of external motivation in a positive way. A good quality milk can be rewarded economically, but also by rewards that apply to the farmers sense of pride and status (social pressure), like best quality milk, best reduction in cell count, best udder health etc. Incentives can work counterproductive. For example, some practices and veterinary pharmaceutical companies in the Netherlands give a quantity discount on dry cow therapy with antibiotics: the more tubes you buy, the cheaper. But one should take in mind the symbolism of such a communication when you want farmers to reduce the amount of antibiotics they use, which is currently a hot issue in the Netherlands.

Finally, economic incentives can work for implementing control measures, by showing farmers the economic benefits of implementing measures, or by making certain measures much cheaper, such as bacteriology on milk samples. However, it should be taken into account that most farmers do not behave economically rational as was studied by Huijps et al [38, 41-43] and Asseldonk et al [44].

The T of Tools

Tools, such as technical provisions, means and methods can stimulate farmers to perform a certain behaviour. They can make the desired behaviour much easier to perform. E.g. the possibility for easy milk sampling, or the fact that the design of the milking parlour is optimal to treat mastitis cows as soon as you notice them. Tools can also be software to analyse the udder health problems. Tools only work if they are used properly and in combination with the other intervention instruments. Educating farmers that they need to take milk samples has no use if the nearest vet who can analyse such samples is difficult to reach or remote from the farm.

Tools can also help farmers to perform their behaviour unconsciously the right way. For example gloves can be attached to treatment tubes to make sure you are reminded to wear them when you apply dry cow therapy. Scientists are more and more aware of the effect of automatic unconscious behaviour in daily life. With our growing capacity to analyse peoples brains we get a better picture of what happens within the unconscious brain. The earlier mentioned peripheral campaigns can subconsciously influence people. Rational approaches via study groups may not be enough to make farmers use some tools[31].

Concluding remarks

Elements of farmer mindset are important determining factors in mastitis control, including the perceived threat (i.e. “Do I have a problem?”) and the perceived efficacy of preventive measures (i.e. “Can I solve the problem easily?”). These issues can be addressed in communication strategies using the R.E.S.E.T model as framework and can be used even as a guide to evaluate the communication strategies applied by veterinary practices and practitioners themselves. To be effective, a disease program should do more than distributing technical information about best management practices to dairy farmers. Prevention of complex diseases, such as mastitis, requires customized communication strategies as well as an integrated approach between various stakeholders and different scientific disciplines. Such programs need to be supported by a combination of several policy measures to change farm management on the long term, because farmers are part of, and are influenced by, a wide institutional context.

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