Building Farm-level Sustainability Programmes in Agribusiness

A 5 step cycle based on lessons from working with the dairy industry

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Many food companies are eager to improve the sustainability performance of their products and present ambitious targets. As the major sustainability impacts of food production are at farm level, several food companies develop sustainability programmes aiming at improving the performance of supplying farms in order to achieve sustainability targets. These sustainability programmes for farmers by value chain partners are a relatively new phenomenon and require experimenting and learning by doing.

In recent years, Wageningen University & Research (WUR) has been assisting dairy processing companies to build this kind of programmes. In this paper we present a *5 step cycle towards effective sustainability programmes* that can help to design farm level sustainability programmes, based on reflections on our own experiences in two case studies in the dairy industry.
In this cycle most emphasis is put on two main issues: 1) creating clarity on best practices and 2) developing effective interventions. With the 5 step cycle these two steps are incorporated in a professional and business-like monitoring and evaluation approach (steps 1, 2 and 5) that allows for continuous improvement of the sustainability programme. The presented cycle aims to provide a structured but flexible framework to build effective farm-level sustainability programmes.

The paper ends with three main recommendations to improve impact of sustainability programmes:

1 integrate sustainability in the business cycle and be realistic about the required resources,
2 don't forget to address the business case for farmers and
3 invest in international harmonisation of approaches and exchange of knowledge.

The aim of this paper is to provide practical insights for representatives from both industry and research institutes and consultants working in the field of improving sustainability of agriculture. Dairy is used as an example case: concepts and lessons are written in such a way that they could also be valuable for other (agricultural) sectors as well.

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1

Quest for sustainable food production

Quest for sustainable agriculture

Sustainability has many definitions. United Nations uses the concept of sustainable development,[1] defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Food production plays a central but also ambiguous role in the quest for sustainable development globally. On the one hand, food is a primary necessity and availability of food is essential to eradicate hunger, poverty, obesity and malnutrition. On the other hand, current agricultural production is an important contributor to various environmental problems. It contributes to climate change, deforestation, eutrophication, soil deterioration, water depletion and other adverse biodiversity impacts.

A large share of the negative impacts of agriculture is attributed to livestock production (e.g. Leip et al., 2015).[2] An important reason for this is that simply a large share of current agricultural land is used for the production of animal feed instead of direct crop production for human consumption which is generally much more efficient in terms of land use. Furthermore, more and more stakeholders worldwide express their concern on the impact of current production systems on the welfare of farm animals. On top of that climate change increases the risk for incidents (think of floods and droughts) and current production systems are also economically vulnerable. The quest for sustainable development of agriculture can be viewed from many angles. In general it can be stated that it requires a holistic food systems approach, including all socio-economic aspects (Van Berkum et al., 2019).[3]

Role of food companies

Several international food brands feel the urgency to take action to improve the sustainability impact of their products. Many companies make bold statements and present ambitious targets. For example, Unilever has developed their sustainable living plan.[4] This plan includes three main goals: improving health and well-being for more than 1 billion people, reducing environmental impact by half and enhancing the livelihoods for millions. Each goal has sub-goals, e.g. for environmental impact the focus is on greenhouse gases, water, waste & packaging and sustainable sourcing. In addition, Danone[5] developed their One Planet One Health vision with a set of 9 goals for 2030. One of these goals is to preserve and renew the planet resources including protecting soil health through regenerative agricultural practices and the target to be carbon neutral by 2050.

Drivers for sustainability goals from food companies can be diverse: internal intrinsic motivation, market opportunities, external pressure from NGOs, external pressure from buyers and policy developments. Whatever the driver may be: as the major part of the sustainability impact occurs at farm level, improving sustainability of food production implies taking action at farm level.

In many cases, improving the sustainability performance of farms is easier said than done. Many companies in the food domain don’t have a direct relation with farmers but are sourcing from traders or processors. Moreover, transparency up to farm level is not automatically arranged. These companies can only influence their own supplier to take action at farm level. In some cases this can be several steps up in the supply chain.

1 sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf
2 Leip et al., 2015. Impacts of European livestock production: nitrogen, sulphur, phosphorus and greenhouse gas emissions, land-use, water eutrophication and biodiversity. Environmental Research Letters 10 – 115004.
3 library.wur.nl/WebQuery/wurpubs/fulltext/495586
4 www.unilever.com/sustainable-living/
5 www.danone.com/about-danone/sustainable-value-creation/our-company-goals.html

Processing companies that do have a direct relation with supplying farmers (such as dairy processing companies) have a better opportunity to work on improvement of sustainability performance together with farmers. Many dairy processing companies have taken this opportunity by building farm level sustainability programmes. Two examples of such initiatives are the Dutch Sustainable Dairy Chain (see page 10) and Cow Act from Danone (see page 11). From 2012 onwards Wageningen University & Research (WUR) executed research for Sustainable Dairy Chain and Danone and provided advice to assist the development of their sustainability programmes. A central question in both cases was how to effectively influence farmers to adapt their management in such a way that it contributes to achieving the sustainability targets defined at food company or sectoral level. During our work we have observed that also in this setting, improving sustainability performance of farms is rather complex for various reasons.

Content of this paper

Based on our experiences with building farm level sustainability programmes in the dairy industry, we developed a '*5 steps cycle towards effective sustainabililty programmes*' that is introduced in this paper.

This guidance is constructed for processing companies in the food domain that do have a direct relation with supplying farms. The paper describes the concepts that are applied, the practical execution of these concepts, the implications and the lessons learnt. Aim of this paper is to provide practical insights for representatives from both industry as well as research institutes and consultants that are working in the field of improving sustainability of agriculture. Dairy is used as an example case: concepts and lessons are written in such a way that they could also be valuable for other (agricultural) sectors as well.

In section 2 the *5 step cycle* is introduced, embedded in theoretical concepts. This cycle is constructed by reflecting in hindsight on our own experiences in two cases that are described in more detail on pages 10 and 11. Section 3 elaborates, for every step in the cycle, on the practical insights that we gained during our work. Section 4 ends with a number of overarching lessons and recommendations.

International context: Dairy Sustainability Framework (DSF)

In 2009 the FAO Livestock's Long Shadow report was published. This report triggered the global dairy industry towards a more pro-active approach on sustainability. One of the actions was to ask the consultancy company SustainAbility to execute a global materiality assessment of the dairy sector. Materiality assessment is the process of identifying, refining, and assessing the environmental, social and governance issues that are expected to most significantly affect a business or sector, and/or its stakeholders. This is usually done by a combination of interviewing or in another way consulting a large number of stakeholders and impact assessment (like LCA). In the end the gathered topics or issues are condensed into a short-list of topics as key issues. The mentioned study identified 11 so called sustainability criteria[6] and so-called strategic intents or targets.

1. **Greenhouse Gas Emissions:** GHG emissions across the full value chain are quantified and reduced through all economically viable mechanisms.
2. **Soil Nutrients**: Nutrient application is managed to minimise impacts on water and air, while maintaining and enhancing soil quality.
3. **Waste:** Waste generation is minimised and, where avoidable, waste is reused and recycled.
4. **Water:** Water availability, as well as water quality, is managed responsibly throughout the dairy value chain.
5. **Soil:** Soil quality and retention is proactively managed and enhanced to ensure optimum productivity.
6. **Biodiversity:** Direct and indirect biodiversity risks and opportunities are understood, and strategies to maintain or enhance it are established.
7. **Market development:** Participants along the dairy value chain are able to build economically viable businesses through the development of transparent and effective markets.
8. **Rural economics:** The dairy sector contributes to the resilience and economic viability of farmers and rural communities.
9. **Working conditions:** Across the dairy value chain, workers operate in a safe environment, and their rights are respected and promoted.
10. **Product safety and quality:** The integrity and transparency of the dairy supply chain is safeguarded, so as to ensure the optimal nutrition, quality and safety of products.
11. **Animal care:** Dairy animals re treated with care, and are free from hunger and thirst, discomfort, pain, injury and disease, fear and distress, and are able to engage in relatively normal patterns of animal behaviour.

Individual dairy processors and aggregators can sign up to DSF. One of the basic principles of the DSF framework is that a member works on the relevant regional topics (so not on all 11 criteria). The aim is to work according to the Plan-Do-Check-Adjust approach on continuous improvement.

The Sustainable Dairy Partnership (SDP)[7] is built on DSF and its eleven criteria. SDP has been developed by the dairy working group of the Sustainable Agriculture Initiative Platform (SAI). SAI is a platform of the global food and drink industry aiming to develop and to work on the adoption of sustainable agricultural practices. The SAI platform was founded by Danone, Nestlé and Unilever in 2002. Now SDP has over 20 members. Organisations like Arla, Barry Callebaut, Bord Bia, Dairy Australia, Dairy Farmers of America, Fonterra, FrieslandCampina and Mars are members.

SDP is a partnership between dairy producers (or aggregators) and dairy buyers. In addition to the eleven criteria the SDP includes minimum standards related to deforestation, animal welfare, human rights and compliance with local legislation. SDP defined 5 stages to help processors assess where they are on their sustainability journey. In a first step the processor has to identify the relevant topics to work on in his region, with a so-called materiality analysis. SDP does not prescribe a standard approach, the processor can work with his own sustainability programme. SDP is focussing on continuous improvement, the processor or aggregator has to have a programme in place to work on this. Depending on the matureness of the programme the processor will qualify for a certain stage, depending on the goals that have been set, the type of monitoring and the progress achieved. The overall assessment results in a simple one page report that can be used in the commercial relation between the dairy processor and the dairy buyer.

6 dairysustainabilityframework.org/dsf-membership/global-criteria/

7 saiplatform.org/our-work/news/the-sustainable-dairy-partnership-unites-industry-wide-push-towards-global-sustainability/

Textbox 1 explains the sustainability challenges of the dairy sector as described by the Dairy Sustainability Framework (DSF). The developments around this framework can be regarded as the international context of this work. The initiatives in both described cases are taking part in the DSF.

Two example cases in dairy

Dutch Sustainable Dairy Chain (SDC)

The Dutch initiative 'Duurzame Zuivelketen' (Sustainable Dairy Chain, SDC) was initiated in 2008 by the Dutch Dairy Association NZO (representing dairy processing companies that process 98% of Dutch milk) and the Dutch Federation of Agriculture and Horticulture LTO (representing 70% of Dutch dairy farmers). SDC was initiated to collectively and proactively respond to sustainability issues and demands from society and policy developments. SDC formulated sustainability targets for 2020 for the associated partners, subdivided into four topics: (1) climate neutral development, (2) improvement of animal health and welfare, (3) preservation of grazing, and (4) protecting biodiversity and the environment. All associated partners are free to develop their own sustainability programmes and activities to achieve the defined targets. To guide the realisation of these targets, SDC consists of a steering committee, a contact group, an advisory board, a management team, and programme teams (see Duurzame Zuivelketen, 2019[8] for more details). In 2019 SDC has defined new sustainability targets towards 2030,[9] also including new, more socio-economic topics like business cases for farmers, farmer safety and self-sufficiency in feed. All the described work was related to the 2020 targets.

Since 2012 several researchers of Wageningen University and Research are involved in SDC, among others in the development and annually update of the progress monitor (see Doornewaard et al. (2020)[10] for the latest version) and in an interactive and reflexive monitoring setting. In this latter role the research team executed various research (a.o. surveys among others farmers and advisors on their perception of the targets and activities of SDC, analysing relations between farm type and sustainability performance), advice (to management team and steering committee, both in formal and informal setting, mainly on constraints that hinder change) and facilitation activities (a.o. workshops with sustainability managers of all associated partners) for SDC. Next to this, numerous WUR experts were involved in various applied research projects and implementation initiatives to create progress towards individual sustainability topics.

8 www.duurzamezuivelketen.nl/en/about-us/

9 www.duurzamezuivelketen.nl/nieuwsberichten/2546/

10 Doornewaard G.J., M.W. Hoogeveen, J.H. Jager, J.W. Reijs en A.C.G. Beldman, 2020. Sectorrapportage Duurzame Zuivelketen; Prestaties 2019 in perspectief. Wageningen, Wageningen Economic Research, Rapport 2020-120. https://edepot.wur.nl/538950

Cow Act project (Danone)

Danone is a world leading food company currently organised in three main divisions: 1) essential dairy and plant-based products, 2) waters and 3) early-life nutrition & advanced medical nutrition. Danone sources fresh dairy from all over the world (EU, Russia, US, Asia and Africa) both from direct supplying farmers as well as from other processors and traders.

In 2016 WUR was invited to support Danone, on a project basis, with the development of effective sustainability programmes for its dairy supply, contributing to Danone's global targets but tailored to the specific regional situation. In 2016 Danone globally had defined 11 essential themes for sustainable dairy production under four main pillars: 1) healthy and safe milk; 2) economic sustainability; 3) resources preservation and 4) social value. The project that ran from 2016 up until 2020 under the name 'Cow Act' and focused on the direct supplying dairy farms in three different European countries (France, Spain and Poland). The Cow Act project consisted of two main elements: 1) development of 'activation plans' (how to stimulate and motivate farmers and other stakeholders to take action on sustainability) and 2) development of an effective monitoring system (where does Danone currently stand with respect to its targets and how to transparently monitor progress over the years). In the first 1.5 year of the project the research team 1) developed general indicators and approaches for individual sustainability issues, 2) analysed the regional situation (farm structure, data, hotspots, expertise and culture) and 3) developed regionally tailored 'activation plans'. The second part of the project was focused on development of practical generally applicable tools for the two themes that Danone had prioritised: climate mitigation and animal welfare.


2

5 step cycle for sustainability programmes

Basic approach

In both cases a central question was how to effectively influence farmers to adapt their management in such a way that it contributes to achieving the sustainability targets defined at food company or sectoral level. While working in both cases, the basic approach presented in Figure 1 was developed and refined.

This cycle was partially inspired on the PDCA management cycle. In this paper we will put most emphasise on steps 3-5 as we have worked most intensively on these steps.

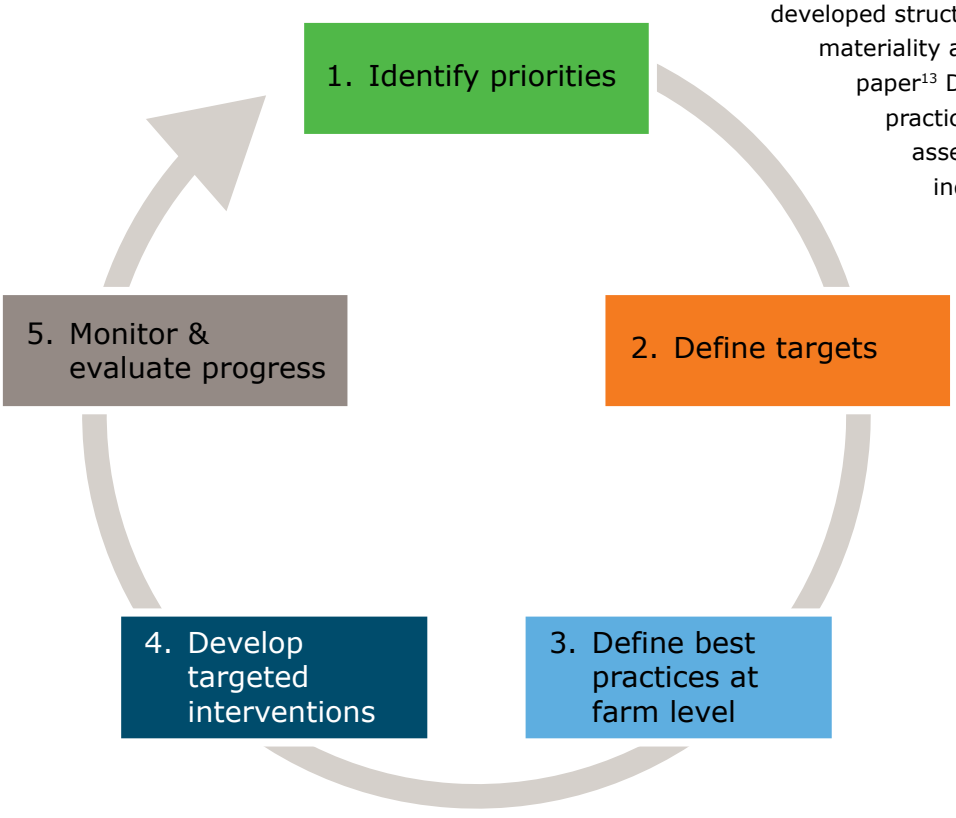

Figure 1: Central approach used in two cases of working with dairy industry to improve sustainability of supplying farms

Step 1

Identify priorities

Defining a sustainability programme, first of all requires a thorough materiality analysis. A materiality analysis refers to the process through which a company systematically identifies, selects, prioritises and reviews what is material to the company and its stakeholders, and thus merits inclusion in sustainability reports (e.g. Calabrese et al., 2019)[11]. Stakeholder consultation is thus an important aspect of this process. Materiality assessments can help to identify the priorities in a structured way. The Global Reporting Initiative (GRI)[12] has defined standards for sustainability reporting, including guidelines for materiality assessments. Several consultants have developed structured approaches for materiality assessments. In a briefing paper[13] DSF has summarised practical information on materiality assessments for the dairy industry.

11 https://www.researchgate.net publication/335575619_MATERIALITY_ANALYSIS_IN_SUSTAINABILITY_REPORTING_A_TOOL_FOR_DIRECTING_CORPORATE_SUSTAINABILITY_TOWARDS_EMERGING_ECONOMIC_ENVIRONMENTAL_AND_SOCIAL_OPPORTUNITIES

12 www.globalreporting.org/standards/gri-standards-download-center/consolidated-set-of-gri-standards/

13 dairysustainabilityframework.org/wp-content/uploads/2018/11/DSF1801-Materiality-Briefing-Paper-.pdf

Step 2

Define targets

After this process of selecting the most relevant issues, the next step is to define specific targets for every issue. Setting targets helps companies to make sustainability issues concrete and manageable. In a recent report,[14] SustainAbility has identified drivers for companies to set and communicate corporate sustainability targets. Sustainability targets help companies not only to improve performance on the issue and strengthen reputation and trust but also to break down big challenges into something manageable, to align sustainability with methods of tracking general business performance and to drive innovation.

Defining effective sustainability targets is a rather complex journey. Important criteria for sustainability targets are that they: 1) can be influenced by the company (within the span of control); 2) are realistically achievable within a reasonable timeframe; 3) are ambitious enough to meet the demands of stakeholders, and 4) are measurable. If these criteria are met, sustainability targets can really guide companies towards sustainable development in a transparent way. Different type of indicators can be used to define sustainability targets (see step 5 for more detailed information). The 'Contextual Goals Database'[15] can be used to explore examples of corporate sustainability targets.

Step 3

Define best practices at farm level

Sustainability targets are usually defined at the level of a food company, region, country or larger geographical areas. To develop sustainability programmes with farmers, targets at this higher aggregation level need to be translated to the specific required management practices at farm level that help to achieve the targets at the higher aggregation level. In our work we use the terminology of 'best practices'. Best practices can either be adjustments in the primary management (e.g. fertilisation, feed or herd management) or investments in new technology, buildings or equipment. Best practices should be defined in such a way that farmers can easily understand the action perspective. Furthermore it should be clear how the practice influences the sustainability performance of the farm: not only the performance on the targeted issue but also on other relevant aspects (other sustainability aspects but also productivity, benefits and costs). Negative trade-offs in other areas should at least be transparent but preferably avoided.

In some cases effective practices are already known and implement-ready for farmers. In other cases, such best practices are not available and innovations are needed to further develop them. This can either be innovation in technology development, but also exploring potential changes in daily management or development of new farming systems and/or business cases in specific circumstances.

14 www.sustainability.com/globalassets/sustainability.com/thinking/pdfs/sa-es-targeting-value.pdf
15 www.embeddingproject.org/goals-database

Step 4

Develop tailored interventions

To stimulate farmers to apply best practices, different incentives can be used. In our work we often use the RESET concept (e.g. Jansen et al., 2016[16] See next textbox) as a starting point. In the RESET model different social psychological models are translated into a practical concept of 5 different types of incentives. Based on personal values and preferences farmers will respond differently to these incentives. Responses to incentives also depend on the farm-specific situation with respect to the required practice. One farmer might for instance need additional investments to implement a certain practice, another might need mainly skills or knowledge and a third only motivation. With another subject the situation can be completely the opposite. To stimulate the complete group of farmers to apply best practices, it is recommended to introduce multiple types of interventions and to do this gradually over a chosen period of time.

The RESET model can be refined by different models to classify farmers in terms of mindset, values or preferences. With a spectrum of different incentive mechanisms (RESET) and a classification of farmers in terms of values or mindset (e.g. Rogers' theory)[17] in their toolbox, sustainability managers can start designing smart and tailored combinations to stimulate the desired best practices. In our work we use the terminology of 'interventions'. Interventions can be seen as the vehicles to organise change. To organise change profoundly, a food company also needs interventions that give some flexibility to change the business case of farmers (flexibility to think in terms of 'what is in it for the farmer' and to organise this; this can be economic premiums but also contract changes, opportunities to improve social status, to reduce business risks or just to make life easier). Such interventions always need to be company-specific as the current business relationship between the food company and the farmer always is the starting point and can be very different between companies, e.g. depending on the organisational structure (cooperative or private food company, local legislation, other cultural elements in the collaboration between farmer and processor).

Step 5

Monitoring and evaluation

Monitoring and evaluation is a crucial element of a learning organisation. A well-organised monitoring and evaluation system will allow to keep improving on the sustainability performance over time. In the case of sustainability programmes, monitoring and evaluation has 2 main objectives: A) transparently reporting on the progress that is made to the outside world and B) internally being able to evaluate effectiveness of interventions (step 4) and to adjust where needed.

For both objectives, the sustainability targets as defined in step 1 can be the guiding compass. The two objectives can, however, require quite a different type of information. Both objectives require indicators and/or information on the progress that is made in terms of the defined target. Objective B also requires indicators and/or information on the (success of) food company actions that were taken to achieve the target. Effectiveness of interventions can only be evaluated when there is a clear view on their (direct or indirect) contribution to the targets.

Social Impact Navigator gives an interesting overview of relevant issues when defining indicators.[18]

16 Jansen, J., Wessels, R.J., and T.J.G.M. Lam. (2016) Understanding the mastitis mindset: applying social psychology in practice. Proceedings of the 55th Annual meeting of the National Mastitis Council, Januari 31-February 2, 2016, Glendale, Arizona, USA, pp 5-15

17 Rogers EM. Diffusion of innovations. 5th ed. New York (NY): FreePress; 2003

18 www.social-impact-navigator.org/system/about-us/

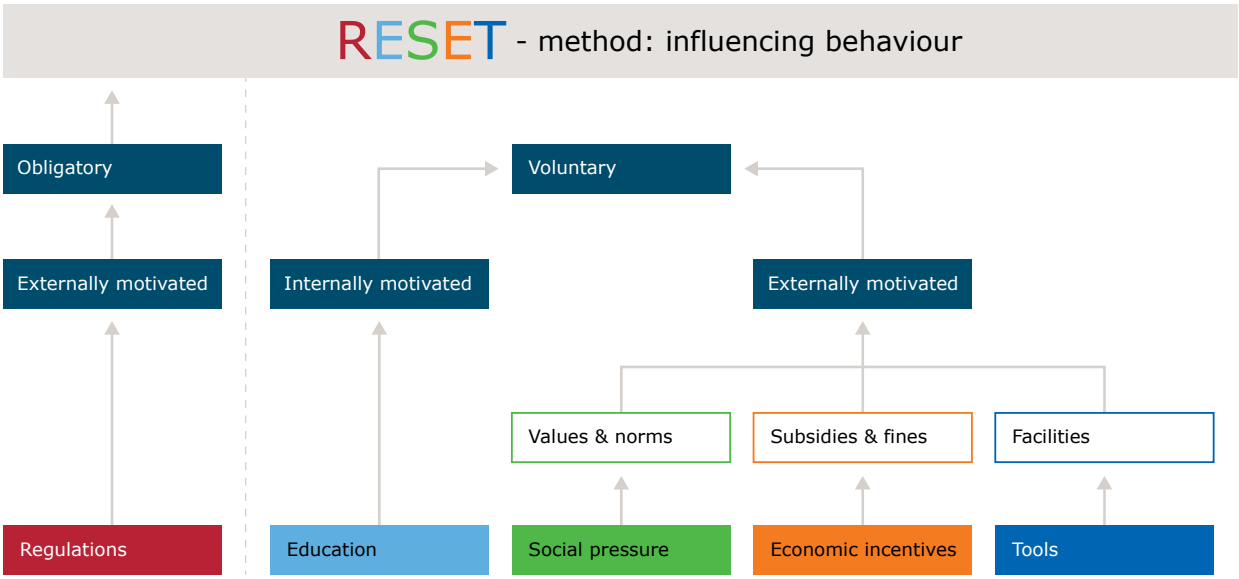

Figure 2: RESET model to influence farmers' behaviour (adapted from Jansen et al., 2016)[16]

The RESET concept departs from the perspective that farmers' behaviour (people's behaviour in general) is not only rationally determined but also by a more peripheral route. This route is based on routines and executed more or less automatically and impulsively without thoughtful considerations.

The RESET model only works in combination with a clear understanding of the desired farming practice. When it is unclear what behavioural change is desired, it is impossible and useless to define stimulating incentives. If it is not possible to define the practices that should be implemented to achieve the targets that have been set, innovation is needed to come up with new practices or new technologies.

In practice, Education (E) route is often used as the first step. This route is and remains important as it is the only route that contributes to internal motivation. This route can be supported by other incentives to voluntarily change behaviour. Social pressure (S) is about changing the social norm within the group and can for instance be organised by recognising farmers that already implemented certain practices e.g. by certain awards or by a broad introduction of benchmarks for new performance indicators. Premiums as higher milk prices can also help in stimulating adoption of certain best practices (E from Economic incentives). This was shown in the Netherlands with the introduction of a premium for grazing. It can also help to make the implementation of the best practice easy e.g. by offering support or turn key solutions (T from Tools). Finally rules or regulation can be put in place to create clarity and equal playing field between farmers. It can be used to force (the last) farmers to implement the best practice.

The RESET model is a powerful instrument to create a broad spectrum of incentives for farmers to change behaviour. This instrument can be refined by different models to classify farmers in terms of mindset, values or preferences. In our work we usually use the theory of diffusion of innovation or adoption curve (Rogers, 1995).[19] This theory describes (Figure 3) how innovations are adopted, first by the early adopters, followed by the early majority, next by the late majority and the laggards. Such classifications help to better understand the position of farmers and to create tailor-made incentives for individuals or target groups.

The assumption is that early adopters are more intrinsically motivated to try out new practices and can be inspired by the innovators. The late majority will probably only do so if the best practices have been proven to work for a wide group of peers.

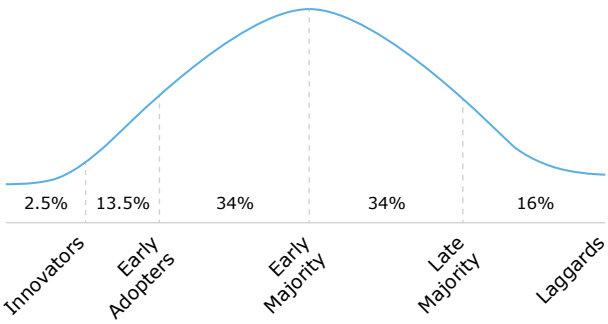

Figure 3: The adoption of innovations (Rogers, 1995)

19 Rogers EM. Diffusion of innovations. 5th ed. New York (NY): FreePress; 2003

Textbox 2: The RESET model and how it is applied in the two described cases in the dairy industry.


3

Examples of applying the approach and lessons learnt

Step 1

Identifying priorities

In general we observed a risk of too narrow or too limited consultation of stakeholders when identifying sustainability issues and making priorities for sustainability programmes. Stakeholder consultation should include both representatives from the business (including farmers and clients) as well as from organisations that represent public interests (such as NGOs and governmental bodies). A too narrow or too limited stakeholder consultation bears the risk that the programme lacks support from any of these groups. It needs to be noted that in both cases (SDC and Cow Act), the process of defining the relevant issues was already executed before we entered the scene as researchers.

Nice example of dairy sector materiality assessments are a study executed by the Innovation Center for U.S. Dairy[20] and an assessment executed by Danone.[21] Related to the Dairy Sustainability Framework a paper[22] has been published with an explanation of what a materiality assessments is and how it can be executed. The paper includes three examples of materiality assessments: Arla Foods,[23] FrieslandCampina and Dairy Australia.[24]

20 https://www.usdairy.com/getmedia/9ae815f1-c547-4e93-91de-de1fa35baac5/u-s-dairy-stewardship-commitment-materiality-assessment.pdf?ext=.pdf
21 https://www.danone.com/content/dam/danone-corp/danone-com/rai/2019/pdf/materiality-matrix-2019-danone.pdf
22 dairysustainabilityframework.org/wp-content/uploads/2018/11/DSF1801-Materiality-Briefing-Paper-.pdf
23 www.arlafoodsingredients.com/492fce/globalassets/afi/about-us/company/csr/2020/arlacsr2019_uk_0225a.pdf
24 https://dairysustainabilityframework.org/wp-content/uploads/2018/11/DSF1801-Materiality-Briefing-Paper-.pdf

Step 2

Define sustainability targets

In practice, step 2 (define targets) and step 5 (monitoring & evaluation) of the 5 step cycle are highly interconnected. Figure 4 illustrates the process a food company has to go through before it is able to define realistic, measurable and broadly supported sustainability targets.

In an iterative process the food company has to define the scope of the sustainability issue, the indicators that can be used to measure progress and the data that will be used. Often, it requires development of a data infrastructure (new or existing) to structurally report on the selected indicators. A baseline assessment is required to make an informed decision on the required efforts before defining a target.

In practice we observe that the time and effort needed for this process is often underestimated both by the food company itself as by external stakeholders. Quantitative targets are sometimes communicated (by higher management) without thoughtful consideration on the feasibility and consequences and appear to be unrealistic. This can have negative consequence for the feasibility and motivation for the sustainability programme and the reliability of the initiative / food company later on. Providing a baseline assessment before quantifying the target is an essential step to minimise this risk. And so is knowledge about the potential impact of applying the available best practices to achieve potential targets.

Taking time for a thorough assessment process automatically also includes risks at the other side of the coin: first of all the risk that all actions are delayed until the monitoring system is sufficiently developed. We also observe a risk that priorities have changed during the development process, especially in large dynamic companies. A strategy to minimise the latter risk is to follow an intensive sequential approach, starting with the high priority issues. This approach was taken in the Cow Act project resulting in implementing first on food company level the issues greenhouse gases and animal welfare.

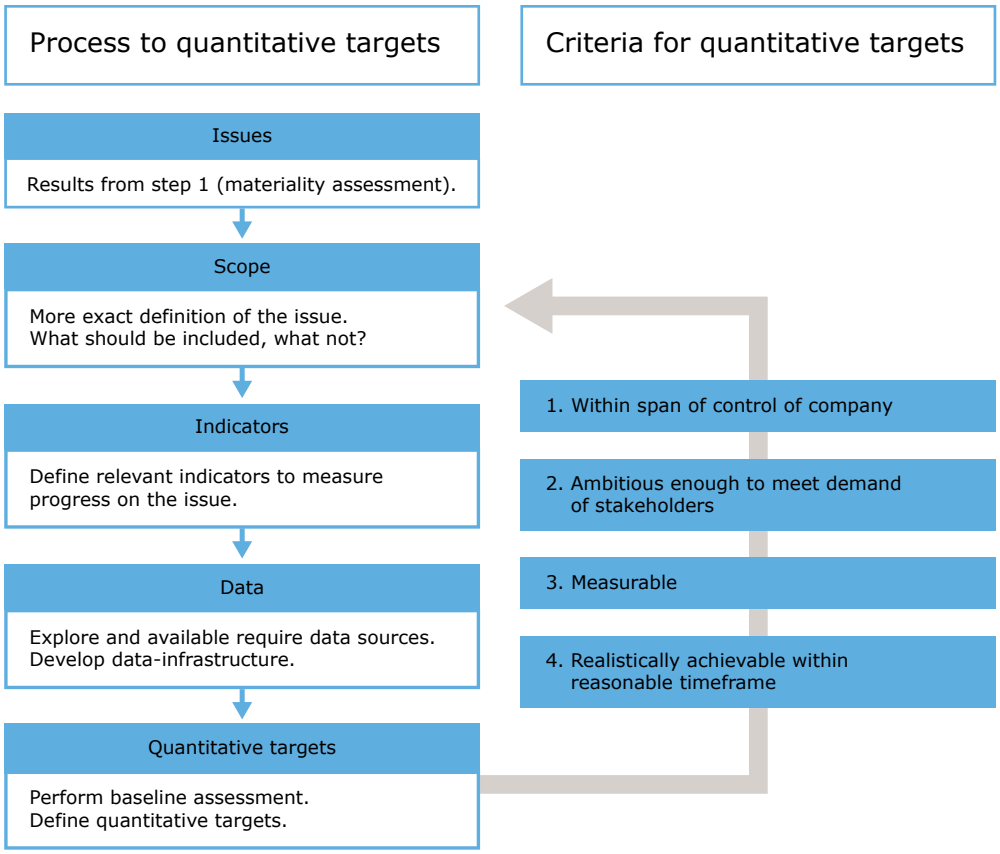

Figure 4: Process and criteria in defining sustainability targets and developing sustainability monitoring

Step 3

Define best practices at farm level

As indicated in the previous chapter, step 3 is crucial to translate targets at food company or sector level to the required behaviour and activities at farm level. Tables 1a and 1b give two examples of the translation of goals on a higher aggregation level to best practices at farm level. In some cases this can be done pretty straightforward. For example, when the target is to increase or maintain the percentage of farms that apply grazing (Table 1a) the desired behaviour of the farmers is to maintain or to start applying grazing. In other cases this can be more complicated. For example when the target is to reduce the emission of greenhouse gases (GHG, Table 1b), a long list of practices can be defined and expected effects of the practices depend on the farm-specific circumstances. If a farmer is considering best practices that might reduce GHG, he will also take into account the impact on other farm objectives that deal with e.g. economics, labour and other farm management aspects. Table 1b comes from the project Cow Act and was the result of a selection of best practices to reduce GHG emissions from dairy farms. The presented practices in this table were considered to be widely available and are expected to have a neutral to positive impact on the profitability on a wide range of dairy farms. Without using these additional criteria the group with available best practices would have been larger.

Though the step of translating targets at food company level to best practices at farm level seems quite obvious, we have observed that this step is sometimes neglected for different reasons. We have seen examples where sustainability managers had no clue at all on how farmers could improve on the prioritised subject. As a result it remains unclear how farmers can contribute to the targets and how the food company and other stakeholders can facilitate them. Just providing targets on sustainability topics won't stimulate a farmer to change his management and there is a large chance that nothing happens. Improving on sustainability topics usually is not the farmers first business priority.

One of the reasons for this neglection is that it requires detailed knowledge on farm management that is not always available at the food company. In addition to that it can be pretty time-consuming to specify all practices and their effects. What we also observe is a kind of reluctance to interfere with the farmers' management by prescribing management practices. The reasoning is that farmers are expected to be capable enough to decide for themselves how to organise change and realise impact reduction. Though we agree with the rationale of freedom to select the practices that fit with the specific situation of farm and farmer, farmers should at least be provided with a clear idea of the options to improve the performance on a sustainability topic. Moreover, when there is no clear view on the required best practices, there is also no insight in the potential costs and benefits for the farmers. To define clear incentives (step 4) you need to know what practice(s) you want to stimulate and what it implies for a farmer.

Formulating best practices: examples

Best practices as shown in table 1a and 1b are based on expert knowledge and have been defined in workshop settings. In some cases, best practices are in more detail scored on expected trade-offs, applicability in different farm conditions, expected effect on other sustainability topics, expected economic consequences and the determining factors for these effects. These kind of overviews give sustainability managers ammunition to clearer communicate the sustainability approach and the expected results to farmers as well as to communicate to consumers about the efforts farmers make. These approaches with experts assessing the impact of best practices offer opportunities to assess many practices in limited time.

A more thorough approach would be to perform more detailed model calculations to assess both trade-offs and economic impact for different farm types. Such ex-ante evaluations are, however, often considered as too expensive and time consuming. Moreover, with increasing innovativeness of desired practices, it requires very sophisticated models that are not always available.

Prioritising best practices

The best practices shown in Table 1b were selected on the basis of availability and readiness to apply on the farm in combination with a positive or at least neutral impact on the profitability on a wide range of dairy farms. Often such practices are referred to as 'low hanging fruit´ or 'most easy to apply'. If the application of such practices is not sufficient to achieve the defined targets, additional practices can be considered. Additional practices can for instance be grouped in categories based on their attractiveness for application in the short term (based on De Vries et al., 2018)[25]:

1 *Low cost mitigation options*: Best practices that have a relative small negative impact on the farm profitability
2 *High cost mitigation options*: Best practices that have a relative large negative impact on the farm profitability. New technology may cause high cost, that might decrease or disappear if technologies are applied on a larger scale.
3 *Mitigation options with negative trade-offs*: A trade-off is a situation where an improvement of one sustainability aspect is combined with an undesirable deterioration in another aspect. When improving sustainability, farmers and other stakeholders will try to identify major trade-offs and also try to avoid these trade-offs; either by finding ways to minimise these trade-offs or by not selecting this type of mitigation options. An example is the negative impact feed additives or barn floors – e.g. implemented to reduce emissions – can have on animal welfare.
4 *Mitigation options that are not yet implement ready*: Many new technologies will fall in this category. In present times this is true for e.g. cooling of manure to reduce emissions and collection of methane from cow barns.

If the sense of urgency to achieve a sustainability target becomes higher, best practices in the less attractive categories come to the fore. Most of this categories will benefit from research and development that might lead to new practices or techniques that avoid trade-offs, that are lower in costs or easier to implement in farms.

25 De Vries, M., I. Hoving, J. van Middelkoop, J. ten Napel, R. van der Weide, J. Verhagen and T. Vellinga, Climate smart dairy farming – A road map to implementation of mitigation and adaptation measures, Wageningen Livestock Research Report 1131 (in Dutch), November 2018, Wageningen Livestock Research, Wageningen

Textbox 3: More detailed information on the identification and selection of best practices

Table 1a: Example of translation of sectoral targets on grazing to best practices at farm level in SDC.

Case and issue	Target	Best Practices	Most relevant features to consider when taking decisions on farm level
SDC – Grazing	Maintain the percentage of farms that apply grazing to the level of 2012 (81.2% of the farms)	1 Apply grazing for dairy cows according to definition in 'Grazing Covenant'*	– Milking system (AMS yes/no) – Production level (milk/cow) – Farm size (number of cows)
		2 Apply other type of grazing**	– Sufficient grazing area

* *minimum of 120 days at least 6 hours grazing for milking cows with sufficient grass supply or equivalent (minimum of 120 days and 720 hours in total)*

** *minimum of 120 days with grazing for at least 25% of total herd (including dry cows and young stock) with sufficient grass supply*

Table 1b: Example of translation of food company targets on greenhouse gases (GHG) to best practices at farm level in the Cow Act project, including most important trade-offs to be aware of (Zijlstra et al., 2019)[26].

Case and issue	Target on food company or sector level	Best Practices on farm level	Most relevant side effects to consider when taking decisions on farm level
Cow Act – GHG	Annual reduction of 3-4% in carbon footprint (CO_2 equivalents per kg milk) of supplying dairy farms	1 Feeding a Optimise rations (match with require-ments) b Reduce feed conservation losses c Optimise feed quality and composition d Increase protein efficiency of feed e Direct feeding of compound ingredients f Offer unlimited access to drinking water	– Unidirectional focus at higher production levels per cow may create risks for decreased health and efficiency at the level of the total herd. – Other feed ingredients may have negative impact on health of cows and food safety.
		2 Fodder production on farm a Increase feed value of crops b Improve grazing management c Optimise fertilisation	– Impact on CO_2 emissions from land use or fossil fuels.
		3 Herd management a Reduce replacement rate by increased longevity b Reduce idle cows c Decrease age at first calving d Improve health management procedures e Optimise transition period f Apply disease eradication programmes g Optimise calf management	– Most of these practices require improved skills of the workers on the farm in the fields of feeding, health and animal care.
		4 Breeding a Improve genetics to increase feed efficiency b Improve genetics to increase cow lifetime production	– Impact on cow health and milk quality.
		5 Energy management a Production of green energy (wind, solar and manure digestion) b Apply energy saving technologies c Optimise use of energy d Optimise use of machinery e Select crops with low use of machinery f Apply more grazing and less silage making	– Some of these techniques are ready to implement, others need more research. – Some of these practices require investments and a farm-specific plan on costs and benefits, including impact on fodder production and milk production.
		6 Carbon sequestration in soil a Avoid soil compaction b Apply permanent soil cover by crops or mulching c Apply no-tillage on permanent grassland d Apply reduced tillage on crops e Reduce renewal rate of grassland	– Carbon sequestration is hard to measure. It will take at least 3 to 5 years before the impact of successful practices will be detected in soil samples. – Reduced tillage may lead to higher use of herbicides.

26 Zijlstra, J., A. Beldman and C.J. Hollander, 2019, Partnerships for sustainable dairy, Wageningen University & Research and Danone

Textbox 4: Examples of translating targets at sectoral of company level to best practices at farm level

Step 4

Develop targeted interventions

As indicated on page 3, this step can be regarded as central element in our approach. Without concrete, tangible and specific interventions, change at farm level can't be organised.

We observe that the RESET model as such is very helpful for sustainability managers to widen the scope on how to change behaviour of farmers. The concept can also be fully elaborated to define exact and specific combination of best practices and incentives. The RESET model as such, however, is just a building block for sustainability managers to define specific and tailored interventions. It needs to be loaded with best practices and worked up to clear actions towards farmers to really organise changes.

Figures 5 and 6 and Table 2 give examples of how dairy companies have used the presented concepts to formulate effective interventions to organise change at farm level, taking into account the variety of farmers and incentive mechanisms. The concepts help to broaden the scope and remain critical towards expected effects. It helps for example to avoid that efforts are only being made towards a specific group (e.g. frontrunners) or a specific type of intervention (e.g. education). It also helps to sustainability managers to live in the skin of farmers and think more in terms of their advantages and disadvantages.

Table 2: Overview of different types of interventions used or considered in dairy sustainability programmes

Type of intervention	Examples	Incentive type (RESET)	Target farmer group	Expected impact
Innovation	In laboratories / institutes		Frontrunners	Development and testing of new best practices
	At experimental farms		Frontrunners	
	At individual commercial farms		Frontrunners	
	With groups / networks of farmers		Frontrunners	
Learning trajectories	Individual improvement plan	E	Early adopters	Increased knowledge on how to improve farm performance, increased awareness and motivation
	Group learning with expert input	E S	Early adopters	
Dissemination	Open days, excursion, showcase farms	E S	Early and late adopters	Create awareness and set the standard
	Direct communication (newsletters, magazines etc.)	E S	Early and late adopters	
	Communication to network of advisors	E S	Late adopters	
Financial incentives	Financial reward for participation in activities, implementing practice or improved performance	E S	Early and late adopters	Increased implementation of best practices, better business case for applying best practices
	Subsidies	E	Early adopters	
Turnkey solutions	(free) Access to experts	T E	All	Increased implementation of best practices, better business case for applying best practices
	Organise data availability	T E S	All	
	Collective sourcing	T E	All	
Change by contract	Certification of farms	R E	Early adopters	Better business case for applying best practices
	Contract terms for farm development	R E	Early adopters	Increased implementation of best practices
	Minimum standards	R E	Laggards	Increased implementation of best practices, exit strategy for persistent non-compliers

The Figures below give examples of interventions developed together with dairy companies, based on the RESET model.

Figure 5 presents how the RESET concept was used in combination with Rogers' theory of innovation lifecycle in the Cow Act project. With this table, sustainability managers in different countries were facilitated to build their own sustainability programmes.

Figure 6 shows how the SDC programme team on Animal Health and Welfare elaborated a gross list of potential intervention activities and allocated them to the five different RESET intervention pillars. This type of lists can hold the actions planned to execute during a certain action period or can be used as start in a prioritisation process.

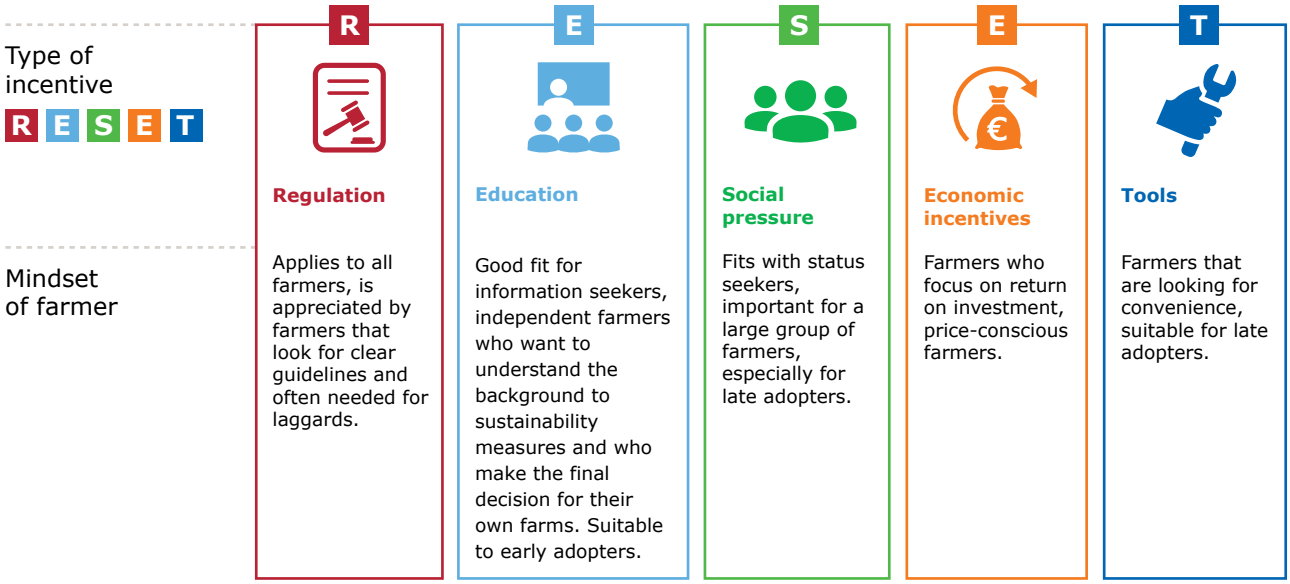

Figure 5: Example of how RESET model was used in combination with Rogers' theory in the Cow Act project.

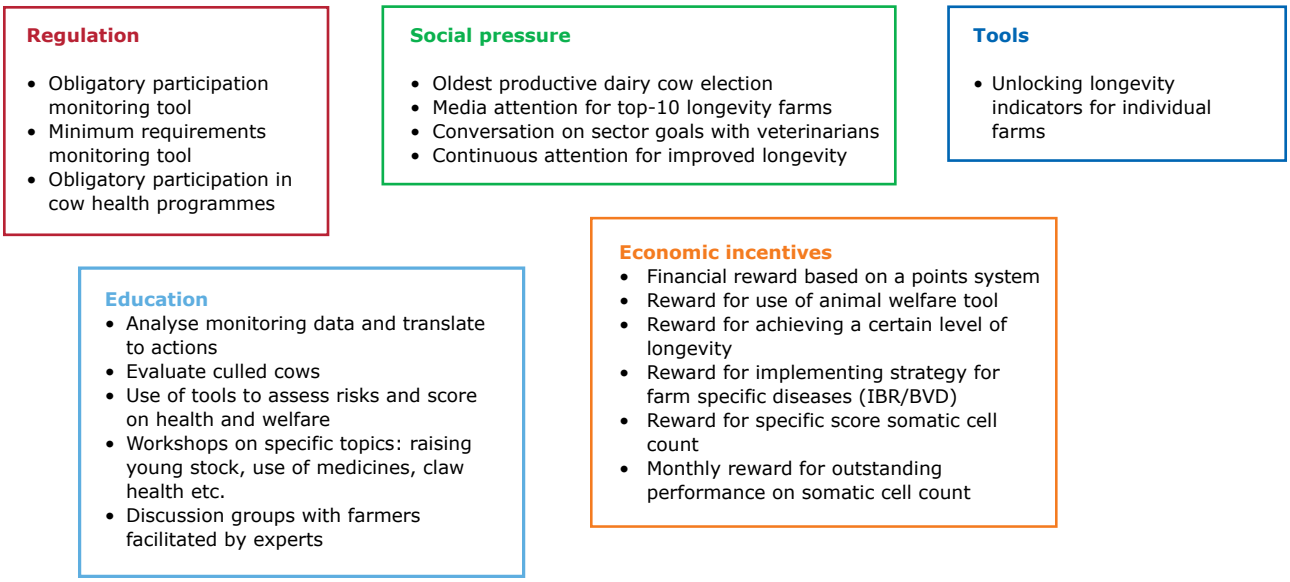

Figure 6: Mapping of existing actions of dairy processors to contribute to longevity, presented according to RESET categories they belong to. Helped sustainability managers to better understand the variety of incentives.

Lessons on interventions

Innovation

Should be considered when best practices are not available or not clear enough to be implemented by farmers. For dairy companies it is important to have a good overview of promising new technologies and practices. It is also important to involve farmers and other industry partners in an early stage in order to address potential obstacles and solutions in business cases or practical application.

Learning trajectories

Are most effective when the farmers are intrinsically motivated to improve performance on the subject. Individual trajectories have the advantage that it allows for in-depth and specific refinement of the practice and speed. Especially to be considered at large farms with autonomous entrepreneurs. Group trajectories have the advantage that exchange with peers is organised. An important advantage of group trajectories is that they also affect the social norm amongst peers. Group trajectories are also more cost-efficient.

Dissemination

Can be directed to the direct rational and the indirect peripheral route of decision making. To reach the farmers that are not intrinsically motivated, the peripheral route is important. This peripheral route also includes communication to the network of the farmers. Advisors (feed advisors, vets, accountants, technology suppliers) are an important target group within this network. An interesting route can also be to include the direct relatives in the communication, since in many regions dairy farms are family farms and especially for strategic decisions the family will be involved.

Financial incentives are relevant for all target groups

- Premiums for the implementation of certain practices or achieving a certain performance offer a direct relation between farmers behaviour and a reward. It is however not always perceived in a positive way, sometimes it is regarded as just a redistribution of profits or a penalty for not performing what is desired. To justify financial rewards it is important to know the economic effect of applying the best practice with and without a reward. Then the beneficial effects of the rewarded practice in terms of profit for the farmer, as well as profit for the food company, can be determined. This comparison often is omitted and the lack of knowledge about the possible outcome creates many debates and tensions amongst farmers as well as between farmers and processing companies about who will benefit most.
- Financial incentives can also be arranged by aligning required practices with governmental subsidies, think of subsidies for renewable energy, national investment programmes but also European subsidies (e.g. related to CAP). An important aspect can be to make farmers aware of potential subsidies and facilitate application.
- Economic incentives do not necessarily imply a direct financial reward. One can also think in terms of reduced interest rates, room to develop the farm etc.

Non-financial rewards are relevant for all target groups, but especially for the early majority

- Farmers want to be seen as good craftsmen or as good farmers. So if certain best practices are perceived as 'good farming practices' amongst farmers, this will help the adoption of those practices.
- Pride can also be an important driver. If farmers can show to the outside world that they perform better than their colleagues, e.g. by participating in certification schemes like "On the way to planet proof"[27] this will also motivate to adopt new best practices.

27 "On the way to planet proof" is an independent label developed in the Netherlands to offer consumers a proof that the product is produced in a sustainably way and therefore is better for nature, the environment, climate and animals.

Turnkey solutions are important for large-scale adoption

Solar panel programmes are a good example. Some organisations have set up a programme in which the farmer only has to sign the contract (and pay), all the rest is organised: selection of type of panels, choice of installation company, etcetera.

Change by contract is a sensitive but potentially powerful change mechanism

Obviously it is important to have all legal aspects covered. Our observation is that farmers are open for these kind of routes, mainly because they feel direct recognition from the processor for their efforts to improve sustainability on the farm. Agreement about farm gate milk prices that are higher for more sustainable milk is a very strong motivation for the farmer to implement new best practices.

Development of roadmaps to organise change over time

On specific sustainability topics the presented cycle (Figure 1) can be supplemented with a more tailor made concerted programme that covers all aspects to come to large scale implementation of best practices. These roadmaps can take into account:

12 growing awareness of the topic in the course of time among different farmer segments
13 time needed to prepare and rollout trainings, incentives, tools, model farms and other actions
14 overall organisation and logistics needed to introduce and continuously improve on the topic.

The ideal time to develop a roadmap is when priorities (step 1) and targets (step 2) are clear and when there is some knowledge available about the awareness of different farmer segments. A roadmap can help sustainability managers to plan in advance and work accordingly, especially the research and innovation part. A roadmap is not a blueprint of activities. Unforeseen circumstances can always alter priorities and required actions.
This textbox describes three examples of roadmaps developed in the Netherlands on request of SDC. These roadmaps were intended to be a recommended action programme for the Dutch dairy sector to achieve improvement. The roadmaps were made independent form each other for the topics longevity, biodiversity and greenhouse gases.

1 Longevity

This roadmap was developed by a stakeholder group of dairy farmers, veterinarians, consultants and researchers. They were involved in meetings where bottlenecks and solutions were explored. Researchers from WUR as well as a breeding organisation contributed with some research on present situation of longevity on farms and reasons for culling. Present activities and projects that were aiming at improving longevity were also explored to be aware of the opportunities to align future progress with already existing activities. Based on all these inputs a roadmap of possible future projects and activities was recommended to the steering committee of SDC. The key items in this roadmap to improve longevity are presented in figure 6 below. Each of these items can be seen as intervention that is expected to contribute to the goal of increased longevity. Next to interventions aiming at farmers, there are also interventions aimed at other stakeholders such as advisors, accountants, vets.

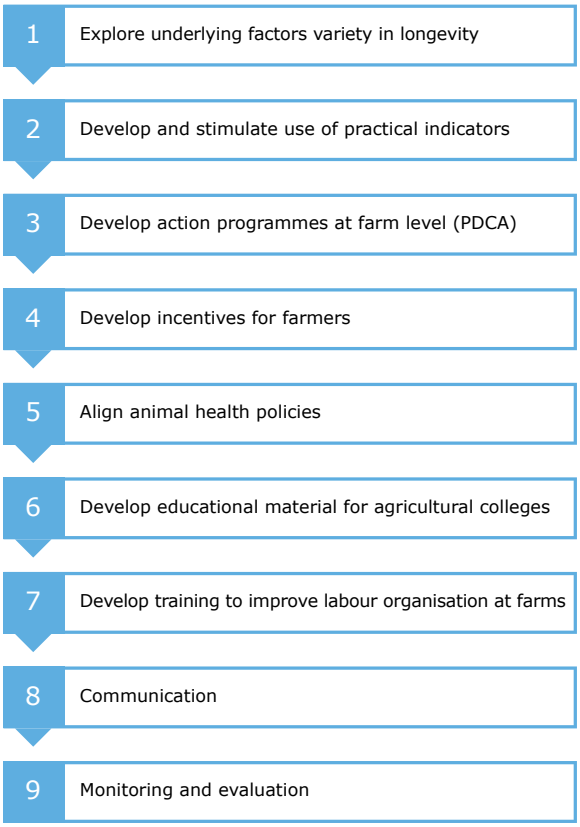

Figure 7: Roadmap to improve longevity (Zijlstra et al., 2013)[29]

2 Biodiversity

The roadmap for biodiversity (Zijlstra et al., 2014)[28] comprised five key activities to work on in the next three years:

1 Define biodiversity ambitions on dairy farm level.
2 Develop approach to improve biodiversity on farms.
3 Start on farm experiments to show how to improve and to create goodwill and support.
4 Develop and disseminate additional knowledge and tools about soil-plant-system approach.
5 Communication about goals, results and experience.

These themes are key interventions for those who are responsible for the further development of the programme to improve biodiversity in the Dutch dairy sector.

3 Greenhouse gases

De Vries et al. (2018)[25] developed a roadmap to implement greenhouse gas mitigation and climate change adaptation measures in the Dutch dairy sector, using two time horizons: 2030 and 2050. In the short term, measures are deployed that are ready for practice, that have no or low costs, such as reduction of methane and nitrous oxide via feed or manure management, or carbon capture in the soil. In the long term, measures are implemented that are not yet ready for practice or currently too expensive. One can think of new techniques to reduce methane and nitrous oxide emissions or breeding animals with less methane emissions.

28 Zijlstra, J., J. Poelarends, G. Migchels and F. van Alebeek, Road Map Biodiversity – Recommendations for a plan of action on biodiversity in the dairy chain, Wageningen UR Livestock Research Report 820 (in Dutch), December 2014, Wageningen UR Livestock Research, Wageningen
29 Zijlstra, J., M. Boer, J. Buiting, K. Colombijn-Van der Wende and E. A. Andringa, Road Map Longevity – final report from the project "Improving longevity of dairycattle", Wageningen UR Livestock Research Report 668 (in Dutch), June 2013, Wageningen UR Livestock Research, Lelystad

Textbox 4: More information on the use of roadmaps to organise change over time

Step 5

Monitoring and evaluation

Defining a monitoring and evaluation system for sustainability targets is a time consuming activity and the time required to develop monitoring and evaluation systems is often underestimated. Figure 4 gives helpful insight into the steps that should be undertaken. Furthermore, it is essential to start by making the distinction between A) transparent progress reporting to the outside world and B) internal evaluation of effectiveness of efforts, as indicated on page 15.

Internal evaluation requires information on the effectiveness of interventions. Often this type of monitoring and evaluation is neglected. As a result, there is no solid basis for adjustment of the programme.

Progress reporting requires information at farm level, either for the whole population or by means of a representative sample. An important aspect is that the monitoring system is based on data sources of which the existence is secured over a longer period. This can either be existing data such as national statistics, other research databases or food company-specific data (for instance collected as part of quality programmes) or newly developed data-structures. In the Netherlands for instance, a sophisticated central data-system was developed to make it easier for farmers to report their nutrient management performance with a tool that monitors the whole nutrient cycle on a dairy farm, including all emissions. Developing such systems requires that privacy, ownership, maintenance and user-friendliness aspects are thoroughly thought through. Also this aspect requires a substantial amount of time and resources.

Especially when a food company is working in multiple countries, consistent data collection for monitoring and evaluation purposes is challenging. Table 3 gives a summarising overview of the main output of the external monitoring system that is developed for, and in cooperation with SDC.

Internationally, several examples of sustainability progress reports exist for the dairy industry.[30]

Table 3: Themes and indicators of the Sustainable Dairy Chain and qualitative assessment of progress in recent years and progress in the achievement of targets in 2019. (see Doornewaard et al. (2020)[10]

Theme	Sub-theme	Indicator	Current target achievement status a)	Progress compared to 2017 b)
Climate-neutral development	Greenhouse gases - climate-neutral growth	Dairy Chain Emissions:(Mton CO2-eq.)	√	√
	Greenhouse gases 20% reduction compared with 1990	Dairy Chain Emissions:(Mton CO2-eq.)	!	√
	Energy efficiency	Dairy chain primary fuel consumption (m3 BOE per 1,000 kg milk)	√	√
	Sustainable production of energy	Sustainable energy production (% of consumption)	!	√
Continuous improvements to animal health and animal welfare	Antibiotics	Proportion of farms below the SDa action level	√	√
	Lifespan	Dairy cow age when culled	!	!
	Animal welfare	Development of monitoring system (by the end of 2017)	System ready, targets yet to be specified	
Preservation of grazing	Grazing	Proportion of farms with grazing (%)	√	√
Protection of biodiversity and the environment	Responsible soy	Proportion of responsible soy (%)	√	√
	Minerals	Phosphate excretion of dairy herd (million kg)	√	√
		Ammonia emissions from dairy herd (million kg)	!	√ c)
	Biodiversity	Development of monitoring system (by the end of 2017)	System ready at individual farm level, yet to be completed at sector level and targets yet to be specified	

a) √ indicates that the target has already been achieved, √ indicates that progress is being made in the achievement of the target but that further effort is necessary and ! indicates that substantial efforts are needed to achieve the target; b) √ indicates that the result in 2019 has improved from 2018 or that the result in 2019 is at the desired level, √ indicates that the result in 2019 is virtually unchanged from 2018, and ! indicates that the result in 2019 has deteriorated from in 2018; and c) based on tentative figures.

30 Arla (multiple countries), Cono (the Nederlands), Origin Green (Ireland), Dairy Australia (Australia): Report | Summary. Danone's most recent corporate sustainability report can be found here.


4

Taking a bird’s-eye view

Aim of this final chapter is to take a bird's-eye view on the presented framework. First, we position the work in its social context. Then we summarise the added value of the approach. Subsequently, we introduce a few critical success factors we have encountered as essential during our work in this field. These critical success factors have led us to three main recommendations that are formulated on page 33.

Positioning this work

The quest for more sustainable agricultural production is currently on top of agendas and likely to remain there for a while. Like many others, processing companies in the agro-food domain (such as dairy processors) are searching for the right role to play in this quest. Building and guiding sustainability programmes for farmers by such companies, is a relatively new phenomenon. Our observation is that companies are, in this respect, in a phase of experimenting and learning on how to come to effective and broadly supported approaches. Implementation in the normal routines and business processes is often very challenging and the efforts that are needed for this transition, should not be underestimated.

Added value of presented approach

With the approach presented in this paper we have put emphasis on two crucial points that we observed as essential while working on sustainability programmes in the dairy industry.

1 **Translate high level goals to concrete action at farm level (step 3):** when a food company or initiative starts with a sustainability programme, the issues and targets are often vaguely defined and not translated to desired practices and performance targets at farm level. The step towards action perspective for individual farms and concrete targets is, however, essential to make progress on sustainability topics. The essential question is: what can an individual farm do to contribute to achieving the target?

2 **Develop targeted and diverse incentives (step 4):** When the action perspective for individual farms is clear, effective incentives are needed to organise change towards the desired practices and performances. Incentives can be organised in various ways and should be adjusted to the specific situation of the farm. The essential question is: what can the processor (or other actors) do to stimulate farmers towards improved performance?

   For a structured approach of sustainability programmes, it is essential that these two elements are incorporated in a professional and business-like monitoring and evaluation approach (steps 1, 2 and 5) that allows for continuous improvement of the programme.

   The presented 5 step cycle aims to provide a structured but flexible framework to keep on working and improving on these aspects for anyone who is working on sustainability programmes in the agro-food domain.

Critical success factors

In retrospect we think that the following overarching elements are crucial for success of sustainability programmes in agribusiness:

Realistic estimation of required resources: As indicated throughout this paper, achieving effective and broadly supported sustainability programmes requires a programmatic approach and allocation of ample resources. Time, budgets and innovations need to be scheduled and allocated. Ownership needs to be organised. Required resources are often not specifically planned or underestimated. The consequence is that approaches lack profoundness to become effective and broadly supported. Internal monitoring and evaluation of activities is essential to learn and define next steps but is often not scheduled.

Integration in business routines: Building sustainability programmes requires combined knowledge from different actors and different (scientific) domains. It requires for instance

knowledge on farm management, business management, stakeholder management and environmental impacts assessment. Improving sustainability requires understanding of both practical details as well as theoretical and social concepts. It is quite a challenge to organise all these aspects simultaneously in a balanced way. Both, 'a good programmatic approach without the right content' as well as 'the right content without a programmatic approach' will not lead to success. Moreover, serious sustainability programmes require to be integrated in business decisions. When a food company is serious about improving sustainability, it has also implications for human resource management (e.g. recruitment and education of fieldworkers), quality systems (to enable progress monitoring) and marketing & communication (to create consistent products and messages).

Regional differentiation unavoidable: Both from the viewpoint of efficiency as well as level playing field, it would have been ideal if building sustainability programmes for farms could be addressed equally across the globe: e.g. same topics to prioritise, same indicators and methodology to measure progress, same farming practices to promote, same options for business case for farmers. In practice, it doesn't work that way. Materiality of sustainability issues varies between regions: not only because of the different geophysical circumstances but also because of different weighting and prioritisation of sustainability topics by local stakeholders. Over and above that the different productions systems and policy instruments across the world as well as cultural differences, demand region-specific analysis of best practices and possible business cases. Furthermore, data availability for monitoring and evaluation purposes, can vary substantially between regions, implying that also a central approach to monitoring is not an easy task. This implies that global systems always need opportunities for regional differentiation.

More attention for integrated approach of sustainability topics and business cases for farmers: At farm level all relevant sustainability topics come together. Applicability and effectiveness of sustainable practices depend highly on the circumstances of the farm and interactions with other measures. Measures to improve on a topic like greenhouse gas emissions can for instance have negative trade-offs in the field of animal welfare or biodiversity. These interactions are sometimes insufficiently addressed in sustainability programmes. This has several reasons. An important factor is that programmes are often organised along the lines of individual sustainability topics. Moreover, different sustainability topics can be in different stages of maturity. Biodiversity, for instance, is a pretty complex phenomenon and concrete tools to measure and improve on it, have been lacking for a long time. This can, whether or not intendedly, result in more attention to the topics that are better defined.
A specific example of neglected interactions is that there is often insufficient attention for the profitability impact of desired practices and performance. Though complicated, it is essential that potential trade-offs (including the business case for farmers) between sustainable farm practices are addressed. Counteracting interventions are both ineffective for the food company as well as harmful for the support amongst farmers.

Recommendations - What is essential for impact?

Based on all previous observations we think the following three recommendations are essential to improve on sustainable agricultural production by means of sustainability programmes of processing companies.

1 Invest in integrated and programmatic approach

It is essential that companies that want to act on sustainability invest in an integrated and programmatic approach from the beginning. Only an integrated approach allows for transparent prioritisation and full consideration of trade-offs. An essential step in a programmatic approach is representative stakeholder involvement. Another crucial element for companies is that sustainability is organised as an integral part of the business cycle. When sustainability is organised as a separate workstream alongside other business considerations, the risk that sustainability is deprioritised in relation to other relevant business targets is simply too high, despite all good intentions.

2 Address the business case for the farmer

Transparency on the expected business case for farmers is essential. Though it is complicated to address, as impact on farm profit is highly dependent on the farm-specific conditions, it may not be ignored. Assuming that improvement in sustainability automatically leads to a better economic performance, is too straightforward. Some measures cost money, some are neutral, others save money and these effects depend on the considered timeframe. There are also labour, capital, risks and complexity issues to consider. Sustainable farming can only be achieved when there is a valid and sustainable business case for the farms as well. In the end, a sustainable business case for farmers is also crucial for the business case of the processing company.

3 Keep on building an international community

Though regional differences do not allow for a central approach or blueprint, further harmonisation of sustainability approaches should be strived for both from the viewpoint of efficiency as well as level playing field. More cooperation between sustainability managers, consultants and researchers around the globe could speed up the process of harmonisation as it might help people from re-inventing wheels. In dairy production, the SDP of SAI (see textbox 1, page 9) already functions more or less in this way. This might be further expanded, for instance by creating platforms that help exchanging and sharing practices globally. Obviously this has a competitive dimension. Currently we observe that this kind of harmonisation is mainly financed and organised by companies itself. Also public organisations could play a role in this respect as harmonisation could speed up impact realisation and in this sense it is a public concern.

Improve the sustainability performance of your food products

Wageningen University & Research supports food companies worldwide in building and improving farm-level sustainability programmes. Our 5 step cycle helps you design and improve effective and flexible programmes that significantly contribute to achieving your sustainability goals. How? A systematic approach to priority setting, target definition, identification of best practices at farm level, development of targeted interventions and monitoring and evaluating of progress helps you to think through all essential elements. Contact researchers Alfons Beldman, Joan Reijs or Jelle Zijlstra for more information.

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