21. Implications for animal welfare of food system changes towards circular agriculture

F.L.B. Meijboom[1,2], J. Staman[1], R. Pothoven[1] and I.J.M. de Boer[1,3]*
[1]Council on Animal Affairs RDA, P.O. Box 20401, 2500 EK The Hague, the Netherlands; [2]Centre for Sustainable Animal Stewardship, Utrecht University and Wageningen University and Research, Yalelaan 2, 3584 CM Utrecht, the Netherlands; [3]Animal Production Systems group, Wageningen University & Research, P.O. Box 338, 6700 AH Wageningen, the Netherlands; info@rda.nl

Abstract

Dutch agriculture has become highly efficient and productive, but this has come at a cost. The quality of values, such as biodiversity, soil, air, water and nature has been compromised. Climate change and resource scarcity further complicate this situation and require farmers to reassess their production methods. A transition to circular agriculture seems a promising answer to these issues: closing cycles of nutrients and other resources in order to minimize losses and to end the impact on climate change. However, circular agriculture does not only answer questions, it raises also new ones. One set of questions focuses on animals and their health and welfare. On the one hand, current forms of livestock farming contribute to climate change and loss of biodiversity and, therefore, are part of the reason to find more sustainable forms of agriculture. On the other hand, animals can play an important role in circular agriculture by converting biomass that humans are unable or unwilling to eat and so helping to close circles. Although the role animals can play is not ignored, the animal welfare dimensions of circular agriculture seem to be a blind spot. In this paper we argue that this is a problem for both the success of circular agriculture and for the animals involved. To elaborate on this claim we analyse the background of the lack of attention. We claim that the lack of attention in the current discussion is embedded in the concept of animal welfare itself, in the current legal and economic possibilities and in the way circular agriculture is framed. Finally we present some steps that contribute to an animal welfare inclusive approach of circular agriculture.

Keywords: sustainability, food transition, livestock farming

Introduction

Dutch agriculture has become highly efficient and productive, but this has come at a cost. The quality of values, such as biodiversity, soil, air, water and nature has been compromised. Climate change and resource scarcity further complicate this situation and require farmers to reassess their production methods. A transition to circular agriculture seems a promising answer to these issues: closing cycles of nutrients and other resources in order to minimize losses and to end the impact on climate change. However, circular agriculture does not only answer questions, it raises also new ones. This includes the questions: at what scale should we close cycles? and; does this change have an impact on our consumption patterns? (De Boer *et al.,* 2019, Poore and Nemecek, 2018). Additionally, a transition has impact on animals and their health and welfare. On the one hand, current forms of livestock farming contribute to climate change and loss of biodiversity and, therefore, are part of the reason to find more sustainable forms of agriculture. On the other hand, animals can play an important role in circular agriculture by converting biomass that humans are unable or unwilling to eat and so helping to close circles (Van Zanten *et al.,* 2018, 2019). Although the role animals can play is not ignored, the animal welfare dimensions of circular agriculture seems to be a blind spot (e.g. Ministry of Agriculture, Nature and Food Quality, 2019). This is remarkable given the increasing attention paid to animal welfare in recent years and in

this paper, we argue that it also is a potential problem for both the success of circular agriculture and for the animals involved. Next we analyse the background of the lack of attention and present some steps to better embed the position of animal welfare in the transition towards a circular agriculture.

Animal welfare as a blind spot, is it a problem?

The relative silence about animal welfare in the discussions on circular agriculture is not a self-evident problem. This especially holds if one claims that in the end sustainable agriculture has to be animal free (Kortetmäki and Oksanen, 2020). Nonetheless, we have two arguments that can justify more prominent attention to animal welfare (including health) in the context of circular agriculture.

First, as mentioned above, in the circular agriculture animals can play an important role. They can convert low-value plant-based biomass into high-value food that is suitable for human consumption. In addition, the role of animals in circular agriculture could consist of other providing ecosystem services besides food provisioning, such as landscape conservation (e.g. cows and sheep grazing on pastures), nutrient recycling, and other provisioning of leather, wool, etc. A second argument starts in the assumption that at least in the coming decades we are in a food system that asks for animal products. Therefore, animals still play and will play an important role in the discussion on circular agriculture.

These two arguments may stress that animals can play an important role in a future circular agriculture and will be present as a result of a demand for animal product. However, it does not yet show why animal welfare is an essential element for circular agriculture. To make this step, we refer to the combination of moral arguments to take the interests of animals into account that is also reflected in national and European legislation and the increase of public attention for animal welfare (EC, 2016). This entails that the current lack of attention to the animal welfare implications of the innovations towards circular agriculture is problematic. It is even an urgent problem, because circular agriculture raises new animal welfare questions. For instance, we still have relative limited knowledge about potential welfare issues related to insects although they can play quite a prominent role in circular agriculture. Also, for more 'traditional' animals, such as cows, sheep, pigs and chickens, closing cycles may pose risks to animal welfare due to changes in animal feed and housing conditions. To get further grip on this problem and find possible ways to include animal welfare more explicitly in the transition to circular agriculture, it is important to explore the background of the current silence.

The background of animal welfare as a blind spot

The observation that animal welfare is not sufficiently on the radar in the discussions on circular agriculture is not easy to explain. In general attention to animals and their welfare is not as strongly embedded in politics and policy as the human equivalent. Nonetheless, in the European context animal welfare has been recognized as an important element in livestock farming (Schukken *et al.,* 2019). We think the lack of attention in the current discussion is embedded in the concept of animal welfare itself, in the current legal and economic possibilities and in the origin of the concept of circularity. These points we further elaborate on in this section.

First, animal welfare is a complicated concept that knows many definitions (RDA, 2018). However, they all share that welfare is linked to individual entities rather than to systems or collectives (Broom, 2010). This easily conflicts with developments towards sustainable farming that focuses on animal groups and collectives. Furthermore, it is not easy to quantify or calculate animal welfare by animal-based measures whereas more physical parameters, such as body weight and physical injuries, seem easier to translate in figures one can calculate. As a result, this easily leads to a situation in which animal welfare is largely left out as subjective and complicated and mainly some health related aspects of welfare are included

such as mortality rates or use of antibiotics. This does not deny the improvements in animal welfare that have been achieved during the last decades, for instance in housing systems and transportation. However, it is a problem that reoccurs in many animal related innovations and that, for instance, can also be recognized in debates on formulating animal welfare related breeding goals.

Second, within the current legal and economic frames the options to take animal welfare on board are limited. It is beyond the scope of this short paper to expand in a way that do justice to this point, but for instance in many national laws, animals can be commodities that are less well protected than humans. Consequently, when trade-offs are necessary between human and animal interests, for instance, when measures to fight climate change have negative impact on animal welfare, the human interests easily trump. This can also be recognized from a market perspective. Animals clearly represent an economic value in the context of farming, but it is not easy to show and calculate the economic added value of animal welfare measures. Nonetheless there are opportunities for animal welfare (RDA, 2017) that can be applied in the context of circular agriculture.

Finally, the circularity concept has its origins in both agro-ecology and industrial ecology and is aimed at preserving and managing natural resources for future generations. In practice this entails that the circularity concept focuses on the ecological dimension of sustainability (De Boer en Van Ittersum, 2018). Therefore, circular agriculture is a form of agriculture aimed at producing food while maintaining ecological values, such as fertile soil, clean air, pure water, a healthy climate, preserving the quality of the landscape, nature and biodiversity. Although this account is promising in addressing urgent problems in today's agriculture, it has its shortcomings. Next to the ecological dimension of sustainability, circular agriculture should also consider the economic and social dimensions of sustainability. In other words, it should be economically viable and socially responsible (RDA, 2020, Figure 1). This broader approach

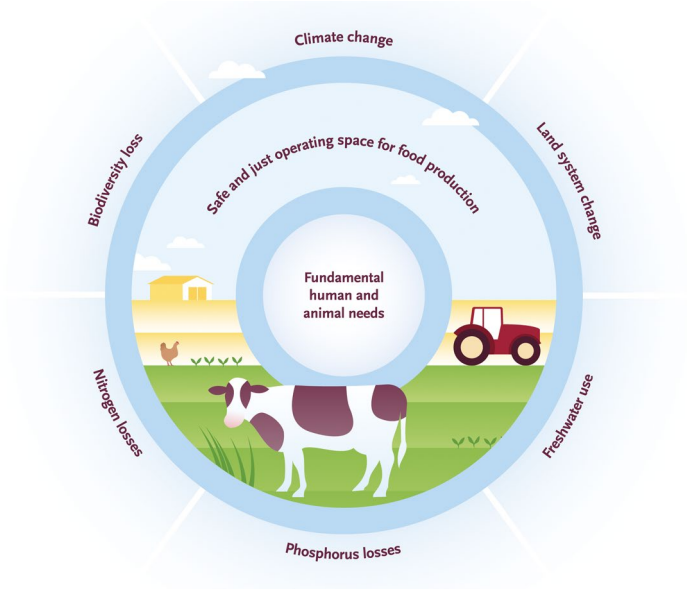

Figure 1. Determining safe and just operating space for sustainable food systems (De Boer et al.*, 2019). The operating space for agricultural entrepreneurs is determined by the ecological ceiling (such as nitrogen losses and loss of biodiversity), on the one hand, and by the social foundations, our social values (such as animal welfare and working conditions), on the other (RDA, 2020).*

of circular agriculture allows to include animal welfare as an element within the social dimension of sustainability rather than within the ecological dimension. This implies that animal welfare does not automatically form part of circular agriculture and that good animal welfare practices should be a separately formulated and monitored requirement for the development of circular agriculture.

Towards an animal welfare inclusive approach of circular agriculture

The short presentation of the background of the limited attention to animal welfare in the transition towards circular agriculture shows that the problem will not solve itself.

It first requires innovation at the level of the concept and assessment of animal welfare. Although welfare is primarily linked to individuals, it is important to further reflect on the relation between the individual animal and its position as member of a group (e.g. Ohl and Putman, 2014). Furthermore, the challenge is not only to include attention to animal welfare as such. It requires also that animal welfare is taken into account in a way that can deal with both current and foreseen problems that come with circular agriculture and with the problems it aims to address. For instance, due to the current effects of climate change, such as more extreme weather, be it warm, cold, dry or wet, the living conditions of animals are affected. At this point it is important to stress that circular agriculture may have positive as well as negative implications for animal welfare. However, little is known to date about these specific implications. This requires innovation in animal welfare science and the development of improved measures to address and monitor these welfare challenges. Finally, a welfare inclusive approach requires innovations that aim to do justice to the complexity of the concept of animal welfare and incorporate this dimension in assessment models that enable to bring welfare on par with other relevant dimensions (e.g. Tallentire *et al.,* 2019). Only if these three dimensions of animal welfare are taken seriously a welfare inclusive approach of circular agriculture is feasible. Here we see that science has to play an important role in the development next to NGOs, government and private parties for the implementation.

Second, we already argued that next to the ecological dimension of sustainability, circular agriculture should take into account the social dimensions of sustainability. This entails that animal welfare can be embedded in the concept of circular agriculture rather than an add-on.

However, even with animal welfare innovations that are responsive to circular agriculture and an account of circular agriculture that encompass attention to animal welfare, we have not addressed the more institutional problems that are rooted in current legal or economic frames. If these remain unaddressed animal welfare will not be taken on board. Therefore, the third field of solutions has to focus on this institutional dimension. This is complex and cannot be the task and responsibility of one party only. However, we see possibilities. Circular agriculture calls for a redesign of our food system, in which all dimensions of sustainability (people, planet and profit) are taken into account. This requires the input from many parties including government, the business sector and NGOs. This includes those who are able to shape and redesign political, legal and market conditions of food production. Furthermore, this transition requires time. This is not only a risk; it also is an opportunity. Institutional frames do not change overnight. Therefore, it is important to utilise that time to take the institutional dimensions into account and embed the attention to animal welfare. This can result in making good animal welfare practices a requirement rather than a dependence of the goodwill of individual farmers or NGOs. This can be part of governmental policy but can also be embedded in a private certification system. Furthermore, a level playing field is required within Europe. This asks for strengthening the network and coordination in Europe in order to develop circular agriculture in a European context as well. As a first step this can result in the investment of a research agenda and provide multi-year financing and to establish (national) Centres of Expertise for Animal Welfare that can function as a source of information and knowledge exchange for entrepreneurs who want to embark on the transition to circular agriculture.

These three steps will not solve all problems regarding animal welfare in the context of circular agriculture. There still will be tensions between economic considerations and animal welfare, public health risks of animal welfare improvements or conflicts between animal welfare and nature that ask for a careful assessment. However, by taking animal welfare as one of the key concepts from the start in the redesign of the food system, one can better anticipate on potential challenges and look for ways to mitigate problems that may occur when animal welfare conflicts with other public values. This requires time and energy and an attitude of openness and transparency of all involved to critically discuss the animal welfare concept in the light of circular agriculture as well as critically reflect on how circular agriculture can encompass animal welfare. However, this can speed up the process in the long run and enable to develop a food system that can deal with the impact of urgent challenges of climate change, population growth and biodiversity loss *and* includes animal welfare as a key concept of circular agriculture.

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