

Assessment and evidence of the relationship between farmer well-being, and their animal welfare: a One Welfare *scoping review*

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Abstract : Background : The One Welfare approach is receiving growing interest from academic scientists. This approach acknowledges the interconnection between human well-being, animal welfare, and the integrity of the environment. In the farming sector, enhancing animal welfare has been an important concern from consumers, industry and politic institutions for about a century. Meanwhile, farmer well-being is preoccupying, and has not been often considered. Still, enhancing animal welfare could necessitate to enhance farmer well-being. The relationship between farmer well-being and the welfare of their animals has not yet been reviewed. Reviewing the methods used so far to assess it would be useful for researcher to design comparable protocols, and discuss their results. Identifying evidence of this relationship could also incite consumer, industry and politic institutions to not only enhance animal welfare, but also farmer well-being. **Objectives :** The main aim of this scoping review is to identify the methods used to assess the relationship between farmer well-being, and the welfare of their animals in primary research articles. The secondary aim is to collate potential evidence of a such relationship. **Methods :** The protocol of this scoping review was developed using the PRISMA extension for scoping reviews. Primary research articles of any study design are eligible for inclusion, as far as they include the relationship assessment between at least one farmer well-being indicator, and at least one indicator of their farm animals' welfare. Only livestock animals will be considered, but no restriction will be applied regarding livestock species. The literature search will be carried out on three databases: Web of Science Core Collection, MEDLINE, and CABI digital library. Extracted results from selected sources will be recorded in an Excel spreadsheet, then synthesized into four tables: methods used to assess 1) animal welfare, 2) farmer well-being, 3) the relationship between both, and 4) the results of the relationship assessment between the farmer well-being indicator(s), and animal welfare indicator(s).

Introduction

Rationale

There is currently a growing interest in the One Welfare approach among the academic scientific communities. One Welfare “serves as a call to recognize the many interconnections between human [well-being], animal welfare and the integrity of the environment” (Fraser, 2016). This approach is conceptually close to One Health, but completes it regarding welfare (OneWelfare, 2023). The emergence and growing interest in the One Welfare approach can be appreciated by the recent increase in the number of published scientific articles mentioning it (Figure 1).

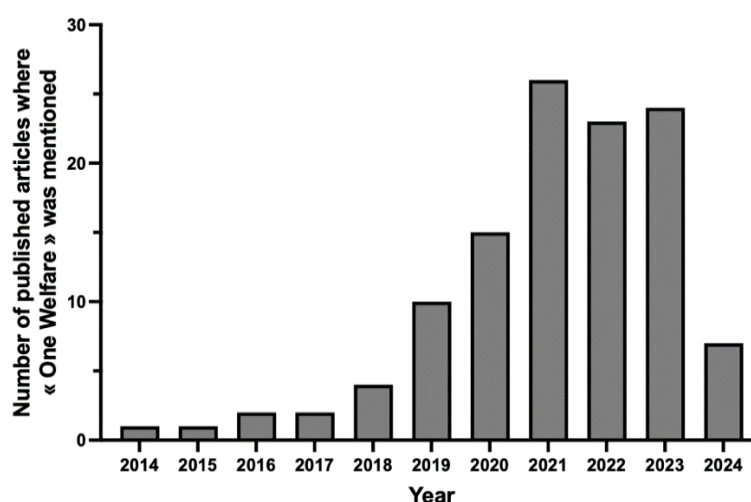


Figure 1 : Number of published scientific articles where the exact terms “One Welfare” were mentioned in the titles, abstract, keywords, or article according to a brief search on Web of Science (*results retrieved on June, 21st 2024, using “One Welfare” as the only keywords of the search ; first retrieved result was published in 2014 ; <https://www.webofscience.com/wos/woscc/summary/4d69a050-a8f5-4490-bf56-ccb4195fe0a7-f569963d/relevance/2>*)

The One Welfare approach initiates actions “to improve human [well-being] in order to improve animal welfare (and vice versa)” (Fraser, 2016). This kind of action suggests that a link between human well-being and the welfare of their animal exist. Empirical thoughts or statements can be found in this regard, but they are often not scientifically proven (Hoard’s Dairyman intel, 2024).

Demonstrating a relationship between the farmer well-being and the welfare of their animals is of high interest. Enhancing farm animal welfare has known a growing interest from consumers, industry and politic institutions in developed countries for about a century (Alonso et al., 2020). Meanwhile, farmers well-being has received little consideration. Still, farmers from developed countries report to experience high level of stress, anxiety, depression, burnout, or suicidal ideation (Jones-Bitton et al., 2020, 2019; Montgomery et al., 2024; O'Shaughnessy et al., 2022). Considering farmer well-being is important to maintain social sustainability in farming systems. Evidence of a positive relationship between farmer well-being and the welfare of their animals could incite consumers, industry and politic institution to consider farmer well-being. Indeed, such relationship would mean that higher animal welfare states are associated with higher farmer well-being states. So, enhancing animal welfare could necessitate a One Welfare approach, which also focuses on enhancing farmer well-being.

Reviewing the methods used so far to assess the relationship between farmer well-being and the welfare of their animal is important in the context of a growing interest in the One Welfare approach. Researchers motivated by exploring this relationship may design new protocols. However, it is important that protocols be comparable to discuss the reproducibility of the methods and its results. A review would provide a list of the methods used so far, and would thus be an interesting resource for researchers. Additionally, a review would map the aspects of the relationship between farmer well-being and the welfare of their animals that have already been explored, and the ones that have not yet been. Identifying such knowledge gaps would be valuable for designing future research about this relationship.

A scoping review is a type of evidence synthesis (Munn et al., 2022). Contrary to a systematic review followed by a meta-analysis, a scoping review doesn't aim to conclude on the effect of an intervention, nor to criticize appraisal of individual sources of evidence. Rather, it allows a qualitative examination of "how research is conducted on a certain topic or field", and to "identify the types of available evidence in a given field" (Munn et al., 2022). A scoping review seems thus to be of interest for mapping the methods used so far to assess the relationship between the farmer well-being and the welfare of their animal, as well as identifying potential evidence of a such relationship.

Objectives

The main aim of this scoping review is to identify the methods used to assess the relationship between farmer well-being, and the welfare of their animals in primary research

articles. More precisely, a focus will be set on the questionnaires used, parameters monitored, indicators measured, and data analyses carried out.

The secondary aim is to collate results of relationship assessments between the farmer well-being, and the welfare of their animals from the articles included in the scoping review. The perspective is to identify eventual scientific evidence of a such relationship.

Methods

Protocol

The protocol of this scoping review was developed using the PRISMA extension for scoping reviews (PRISMA-ScR ; Tricco et al., 2018), and following the guidance proposed by Peters et al. (2022). The protocol was developed before starting the study.

Eligibility criteria

Primary research articles of any study design are eligible for inclusion, as far as they include the relationship assessment between at least one farmer well-being indicator, and at least one indicator of their farm animals' welfare.

An individual well-being is defined according to the Oxford English Dictionary (2023) as “the state of being healthy, happy, or prosperous; physical, psychological, or moral welfare”. To be eligible, farmer well-being indicators have therefore to measure a state, related to farmer's physical health, mental health, happiness, life satisfaction, or standard of living satisfaction. Additionally, farmer well-being indicators have to be measured at farmer-level, since the review focuses on the relationship between the farmer well-being and their animal welfare. Measures of farmer well-being indicators at other scales, like a population scale, are excluded since they do not specifically inform about one farmer. Of note, a distinction has to be made between the assessment of a farmer well-being state, and the assessment of the farmer well-being importance. The latter is not eligible as a farmer well-being indicator in this review, since it doesn't inform about the state of one farmer.

Only livestock animals and poultry will be considered. No restriction is applied regarding species of livestock animals or poultry. Exploring a large scope of livestock animal and poultry species could indeed be of interest, if the reviewed methods to assess the

relationship between farmer well-being and their animal welfare can be transposed from a specie to another. To include a potential diversity of species, no geographical restrictions will be placed on the searches.

Animal welfare “is the positive mental and physical state linked to the satisfaction of its physiological and behavioral needs, as well as its expectations. This state varies according to the animal's perception of the situation” (Anses, 2018). To be eligible, animal welfare indicators should therefore measure a state, with an animal-based measure related to physiology, behavior, or physical health. Even if they do not inform about a welfare state, environmental-based measure related to housing, and management-based measure are also eligible. They indeed provide insights about the life conditions of animals. Animal welfare indicators can either be measured at animal-, herd-, or farm-level. Of note, production indicators, like average daily gain or milk production per year, will not be considered as welfare indicators, since they do not directly inform about a welfare state, neither the life conditions of animal. Likewise, the assessment of the animal welfare importance will not be considered as a welfare indicator in this review, since it doesn’t directly inform about a welfare state, neither the life conditions of animals.

Besides, there will be no date restrictions, and no language restriction. Articles written in another language than English will be translated on DeepL, using the file translator function (DeepL SE, Cologne, Germany ; <https://www.deepl.com/en/translator>).

Information sources

Three databases will be used for the literature search: Web of Science Core Collection (<https://www.webofscience.com>), MEDLINE (<https://pubmed.ncbi.nlm.nih.gov>), and CABI digital library (<https://www.cabidigitallibrary.org>). The maximal range of date available will be used on each database.

Literature search

The final search is detailed in Table 1 and will be formatted according to each database. The final search will be carried out on the Web of Science Core Collection considering all fields, MEDLINE considering only the “title/abstract” field, and CABI digital library considering only the “abstract” field. References from the three databases will be uploaded then

merged on one Excel file (Microsoft, Redmond, WA, US). References will then be deduplicated before title and abstract screening.

Of note, adding “*” to a keyword in strings 1 and 2 was pre-tested on the Web of Science Core Collection. The number of results in the final search was observed, adding “*” at the end of a keyword, one keyword at a time (from ‘farmer’ in string 1, to ‘flock’ in string 2 ; except for: ‘calves’, ‘veal’, ‘cattle’, ‘bovine’, ‘beef’, ‘swine’, ‘chicken’, ‘goose’, ‘geese’, ‘poultry’, ‘equine’). If adding “*” at the end of a keyword didn’t change the number of the results, “*” was removed.

Table 1: Search strings used to retrieve primary research articles where the relationship between farmer well-being, and the welfare of their animals was assessed.

String	Keywords
1	farmer* OR producer* OR rancher*
2	animal OR cow* OR calf OR calves OR veal OR cattle OR bovine OR beef OR steer* OR pig* OR sow OR boar* OR swine OR chicken OR turkey OR duck* OR goose OR geese OR poultry OR horse OR donkey OR equine OR sheep OR lamb* OR goat OR rabbit OR deer OR camel* OR buffalo* OR llama OR alpaca OR yak* OR mink* OR ruminant OR monogastric OR livestock OR herd* OR flock
3	wellbeing OR well-being OR welfare
4	associat* OR relat* OR correl* OR link*
Final search	1 AND 2 AND 3 AND 4

Selection of sources of evidence

Sources of evidence will be selected in two steps: 1) title and abstract screening, then 2) full-text screening. These two steps will be carried out by two independent reviewers (PL and MVB). Discussion between both reviewers about the selection of sources of evidence will only occur twice: at the end of each step.

Firstly, the two following questions will be used for screening title and abstracts:

1. Do the title or abstract suggest that the study is a primary research?
2. Do the title or abstract mention that the study includes the assessment of a relationship between at least one farmer well-being indicator, and at least one welfare indicator of their livestock animals or poultry?

Secondly, the five following questions (or set of questions) will be used for screening full-text articles:

1. Does the full text article describe a primary research study?
2. Does the full-text article include the assessment of a relationship between at least one farmer well-being indicator, and at least one welfare indicator of their farm animals?
3. Does the full-text article mention that livestock animals or poultry are the studied animal population?
4. Does the full-text article mention that the farmer well-being indicators used in the study are related to farmer's physical health, mental health, happiness, life satisfaction, or standard of living satisfaction? And that these indicators were computed for the analyses at the farmer-level?
5. Does the full-text article mention that the animal welfare indicators are related to animal-based measure (physiology, behavior, physical health), environmental-based measure (housing), or management-based measure? And are not production indicators?

At the end of both steps, eventual disagreement to include an article in the next step of the review process will be resolved by consensus, with the mediation of SB. Reasons of exclusions at the second step will be recorded.

Data charting process

The selection and inclusion process will be recorded following the flow of information proposed by Moher et al. (2009), for the Preferred Reporting Items for Systematic Review and Meta-analysis (PRISMA). One Excel spreadsheet, containing the retrieved items from the selected sources will be created.

Data items

Data extracted from the articles included in the scoping review will concern the nine following items (or set of items):

1. Study characteristics (first author name, publication title, publication year, year and country the study was carried out)
2. Objective and hypotheses of the study
3. Study design
4. Animal specy studied
5. Total number of participants to the study (farm, farmers, animals)
6. Method(s) used to assess animal welfare (questionnaire or tool used, parameters monitored, indicators measured or calculated from the data collection, time-window targeted by indicators [*e.g.* instant t or one day for clinical observations ; *a priori* weeks, months or years for housing type])
7. Method(s) used to assess farmer well-being (questionnaire or tool used, parameters monitored, indicators measured or calculated from the data collection, time-window targeted by indicators [*e.g.* instant t or one day for clinical observations ; *a priori* one month for some psychometric measures])
8. Method(s) used to assess the relationship between the farmer well-being indicator(s), and animal welfare indicator(s) (data transformation, statistical analysis)
9. Results of the assessment between the relationship between the farmer well-being indicator(s), and animal welfare indicator(s) (qualitative results: presence/absence of a relationship ; statistical indicator describing a relationship between the farmer well-being indicator, and animal welfare indicator ; quantitative results: value of the statistical indicator describing a such relationship)

One reviewer will independently extract data from selected sources regarding these nine items (or set of items) (PL). To ensure consistency, data extraction will be pre-tested by both reviewers from five references (PL and MVB). If eventually, ≤ 5 references are finally selected, the data extraction will be carried out by both reviewers. Eventual disagreement during data extraction will be resolved by consensus, with the mediation of SB.

Critical appraisal of individual sources of evidence

Since this is a scoping review, critical appraisal of the included studies will not be carried out.

Synthesis of the results

Extracted results in the Excel spreadsheet will be synthesized into four tables: methods used to assess 1) animal welfare, 2) farmer well-being, 3) the relationship between both, and 4) the results of the relationship assessment between the farmer well-being indicator(s), and animal welfare indicator(s). Numeric items, like the number of participants to the study, will be described with simple statistics (distribution, mean).

Risk of bias across studies

Not applicable for a scoping review (Tricco et al., 2018).

Additional analyses

Not applicable for a scoping review (Tricco et al., 2018).

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