The meaning of 'health' in the organic principle of health

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Abstract

In the past, aspects of health in agricultural contexts have mainly been discussed in separate discourses within soil, plant, animal and human medical science, with little interaction or communication among these disciplines. The questions "What is health?" and "How can health be measured?" have not been discussed in a holistic and integrated way. However, a key statement of ecological agriculture and a foundation stone for the principles of the organic agriculture movement is the connectedness of soil, plant, animal, man and planet through health. If health is such an important goal in agriculture, it needs to be clear what it means and how it can be assessed. This project clarified and critically assessed health concepts in organic farming, reviewed and compared current approaches to define and measure health; and, by starting a dialogue between the presently disconnected debates, uncovered resilience as a universal criterion of health.

Introduction

In the early 1940's, Lady Eve Balfour concluded in her book 'The Living Soil' that: "The health of soil, plant, animal and man is one and indivisible" (Balfour 1943). With this key statement she set one of the foundation stones for the principles of the organic agriculture movement, later laid down by IFOAM (IFOAM 2005). It describes the connection of health between soils, plants, animals and humans, and implies that the promotion and maintenance of human health, as one of the highest goals of mankind, critically depends on the health of all other agricultural domains. This study explored the possibilities, limitations and consequences of bringing together perspectives on health from different domains, with the aim to gain a better understanding of health in agriculture. It reviewed current approaches to defining and measuring health in agricultural contexts, comparing commonly used concepts in the different domains, and attempted to bring together the presently disconnected debates.

Material and methods

One essential first step when attempting to link the various domains of health in agriculture is to assess which criteria and indicators these domains use to describe health. This study looked at the five agricultural domains of human, animal, plant, soil and ecosystem and investigated which criteria are used to describe health in these five domains, performing a qualitative content analysis. Using the text analysis software QSR NVivo10, health criteria were analysed in the current scientific literature. The analysis of 75 scientific articles was used to gain a first insight into the concepts and ideas which are most frequently used to describe and define health in the various domains. Sections within the papers were selected for analysis when they defined or described health in the specific domain. A coding system was developed using nearly 50 descriptors of health; examples are 'balance', 'coping', 'immunity', 'regeneration' or 'tolerance'; terms were coded (scored) on a five-point scale to rate how strongly the authors of the selected texts describe the term as a suitable criterion of health.

Additionally, in an interdisciplinary expert workshop, the text of the IFOAM principle of health was evaluated in light of the results of this study, and arguments explored for potential changes or amendments to the text of the principle. The expert group identified and initially discussed the impact pathways of the principle of health in three relevant areas: Practice, Research and Policy/Regulations; and explored how these areas would need to develop to do the principle justice.

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Results

How is health assessed and measured?

As the literature shows, the disciplines of soil science, plant pathology, veterinary science, human medicine and ecology have answered the questions of the definition of health and of suitable criteria of health in different ways. According to the text analysis of this study, the keywords used most frequently to describe health in the analysed papers are often shared among the different domains; but also considerable differences were found (Table 1). The terms 'function', 'maintenance' and 'resilience' were used in papers from all five domains. Other terms are more common in one domain ('resistance' in plant health; 'sustainability' in soil health), but less so or entirely missing in other domains. Some were found to be used very rarely as criteria of health ('normality', 'coping', 'wholeness') despite the relatively large amount of literature on the respective topics. This indicates that the number of papers analysed in this study is likely to be too small to cover the entire diversity of health definitions. However, this immense diversity of health definitions is also reflected in the analysis, as in total 42 different terms used as criteria of health were found. In each domain, 24 or more different criteria were identified that describe health; except in the papers on animal health, where only 12 different terms were found. The trends shown in the results suggest that some concepts are indeed comparable and that the different domains share criteria to describe health. The analysis revealed that 'resilience' is among the most frequently used criteria over all domains, and this could be one of the most promising shared concepts (Döring et al. 2013).

Linking health research across the domains

One of the most frequently chosen ways of linking health research in the domains of soil, plant, animal, human and ecosystem is by following one specific substance, e.g. nutrients or toxins, along the whole food/production chain, from one domain to another. Such studies investigate the paths of certain substances (e.g. nitrogen, heavy metals) and assess their health effects in the different domains; many toxins have negative health effects in all five domains. Examples of further types of links are microorganisms, as an important element impacting health (negatively or positively) in all domains. Also biodiversity in agricultural contexts provides a link of health across the domains: research in all five domains has shown that greater biological diversity tends to promote health. Linking research activities across the domains therefore offers opportunities to explain general mechanisms of how biodiversity affects various components of health. Bringing the domains of health together in interdisciplinary research projects can provide clarity and solutions to health related problems in agriculture and food systems. However, is it also useful to harmonise the assessment and functionality of health across the different domains? This seems to be difficult for various reasons: (a) identical terms may be used to describe health, but they might have different meanings in the other domains; (b) criteria need to reflect the specifics of different domains, describing their distinctive characteristics. For example, the concept of 'welfare' in animal health cannot be transferred to health assessments for soils or ecosystems. Criteria of health need therefore be chosen to comply with the specific demands of each domain.

Consequences regarding the IFOAM principle of health

In light of the discussions of this study, and after exploring the impact pathways of the organic principle of health, the expert workshop identified the following important next steps towards a better understanding, application and communication of the principle of health.
For Practice: The focus here should be on best practice in relation to health contexts, as it is crucial to assess which farmers are successful and why. The assessment should follow a bottom-up approach where researchers and farmers jointly investigate and define what 'best practise' with regards to health is.
For Policy and Regulations: First necessary steps are (a) a dialogue among disciplines and stakeholders (since health is not everyone's apparent highest priority); and (b) conducting a gap analysis, to evaluate which aspects are not yet covered sufficiently or with enough clarity by the rules. Creating a network of best practice, farmers and processors would demonstrate what is meant by the terms used in the IFOAM principle.
For Research: Initially, the focus should be laid on measuring and analysing components of health, rather than the one 'whole' concept of health. Health concepts need to be functional and need to address the difficulty of different interpretations and languages. A reference system is needed (a set of farms operating to best practice at that time etc.) and working definitions of health need to be formulated. Research outcomes should feed directly into policy and regulation statements, demonstration and the formulation of health principles.

Discussion

A stronger focus is needed on the implementation of the health principle in organic agriculture. This requires three steps: (1) clarification of the principle of health (explanatory text, working definition of health, clarifying organic views); (2) development of assessment tools for measuring health-related performance at farm, local and regional level; (3) integration of health assessments in best practice networks.
One important next step is the clear identification and demonstration of health concepts in organic agricultural practice. A network of best practice examples focussed on testing, monitoring and demonstrating health effects could contribute to a better understanding of health, its attributes, its connectedness in the various domains and its impact on the whole food system.
Many stakeholders, from farmer to policymaker would benefit and rules and regulations could be formulated in a more applied and clear form to enable the direct translation of principles into actions.

Table 1: Criteria of health according to a content analysis of 75 papers (15 in each domain: animal health, ecosystem health, human health, plant health and soil health). The table shows the number of papers in each domain using the term as a criterion of health; terms listed are mentioned at least in 3 papers.

Term	Total	Soil	Plant	Animal	Human	Ecosystem
function	25	8	3	3	4	7
maintenance	19	6	4	3	3	3
productivity	18	9	3	4	2	0
resistance	17	3	7	4	1	2
resilience	16	2	2	2	3	7
capacity	14	6	1	0	2	5
sustainability	12	9	0	0	3	0
diversity	9	4	4	0	1	0
adaptation	8	1	1	0	4	2
dynamic	8	4	0	0	1	3
wellbeing	8	0	0	1	4	3
complexity	7	2	3	0	1	1
tolerance	7	1	2	3	0	1
ability to recover	6	2	0	1	1	2
balance	6	1	3	0	1	1
performance	6	2	1	1	1	1
provision	6	2	2	0	1	1
survival	6	3	3	0	0	0
vitality	6	4	2	0	0	0
equilibrium	5	0	1	0	1	3
immunity	5	0	1	1	2	1
integrity	5	1	1	0	1	2
resources	5	1	1	0	1	2
natural	4	0	0	0	2	2
stability	4	3	0	0	0	1
fitness	3	2	1	0	0	0
homeostasis	3	0	0	1	1	1
restoration	3	0	2	0	1	0
welfare	3	0	1	2	0	0

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