

Austrian organic farmers' perceptions of the relevance of environmental influences for health promotion

Paxton, R.¹, Freyer, B.², Leisch, F.³ and Bingen, J.⁴

¹ *Department of Sustainable Agricultural Systems, Division of Organic Farming, University of Natural Resources and Life Sciences, Austria rebecca.paxton@boku.ac.at*

² *Department of Sustainable Agricultural Systems, Division of Organic Farming, University of Natural Resources and Life Sciences, Austria Bernhard.Freyer@boku.ac.at*

³ *Institute of Applied Statistics and Computing, University of Natural Resources and Life Sciences, Austria friedrich.leisch@boku.ac.at*

⁴ *Community, Agriculture, Recreation and Resource Studies, Michigan State University, East Lansing, Michigan, USA bingen@anr.msu.edu*

Abstract: Creating a sustainable health system requires a perception of health that includes the health impacts and health promotion potential of non-medical societal sectors. With its wide range of direct and indirect effects upon human health and environmental sustainability, agriculture could play a prominent role in sustainable health promotion. Organic agriculture has been progressive in arguing that agriculture should take responsibility for its human and environmental health effects, and has sought to adapt farming practices accordingly. However, treating agriculture as a responsible actor in health management involves linking human and environmental health, not only in policy, but also in the health perceptions of those involved in the sector.

In this article we discuss how Austrian organic farmers understand and practice the concept of health and examine the perceived power of the farmer to influence his or her own health through practices affecting the environment. This forms part of a larger study in which we combine Social Representation Theory with Critical Systems Heuristics to model organic farmers' representations of health. These representations consist of perceived sources of health motivation, power, knowledge, and legitimation. Thus defined, representations of health may have tremendous effects upon how farmers seek to maintain and improve health, or treat and prevent illness, e.g. through their farming practices.

The preliminary results presented in this paper indicate that environmental influences, and particularly those brought about by human impacts upon the environment, were considered relevant for organic farmers' health. However, the respondents perceived these influences as being beyond their control. They did not consider the environmental impacts of their own farming practices as having a relevant direct or indirect influence upon their health. Further research is required to determine the perceived relevance of their farming practices for the health of others and the environment, and whether this perception might motivate a sense of responsibility for health promotion.

Keywords: health perception, environment, organic farming, Critical Systems Heuristics

Introduction

Definitions of health change over time and across social groups, affecting how we seek to achieve good health by making some knowledge, practices, and actors more or less relevant to the endeavour (see naturalist vs. normativist debate, e.g. Boorse, 1977; Hamilton, 2010; Khushf, 2007; Nordenfelt, 2007). This can be seen in current Western health systems, which tend to restrict relevant knowledge to that of bio-psycho-social functioning, practices to those of biomedicine, and actors to qualified medical professionals (White, 2008). While this model of health is undoubtedly important for human health, the negative health effects of other societal and environmental sectors pose a negative burden on the medical health system (for an overview of the Austrian case see Gönenç et al., 2011; Ladurner et al., 2010).

The health promotion movement, underpinned by the 1986 Ottawa charter, has encouraged a greater integration of health with the sustainable use of the natural environment and social resources (Brown and Bell, 2007; Breton and De Leeuw, 2011; Simons-Morton, 2013). The key message of the movement is: "Health is created by caring for oneself and others, by being able to take decisions and have control over one's life circumstances, and by ensuring that the society one lives in creates conditions that allow the attainment of health by all its members. Caring, holism and ecology are essential issues in developing strategies for health promotion" (World Health Organization, 1986). The growing notion is that improving and maintaining health is not achievable through the medical system alone, since many of the causes of poor health arise in other societal sectors and environmental contexts (Smith et al., 1999; Corvalán et al., 1999; Lantz et al., 2007). Sharing the responsibility for health promotion across societal sectors by adopting environmentally sustainable practices backed by healthy public policies (Breton and De Leeuw, 2011) could provide a solution to this challenge. But this requires a shift in our perception of what health is, and how it is achieved (Antonovsky, 1996; Pelikan, 2007; Dooris, 2006).

The agricultural sector is the source of numerous environmental concerns (e.g. air and water pollution, soil depletion, biodiversity and habitat loss), which also directly and indirectly affect health (e.g. through exposure to toxins from agricultural inputs and outputs, loss of ecosystem services, and unhealthy diets through the overemphasis upon meat production) (Horrihan et al., 2002; Hawkes and Ruel, 2006; Lang and Rayner, 2007). Thinking more broadly about the concept of health, agriculture may affect health by promoting or preventing sustainable rural development and strong rural social networks (Marsden and Sonnino, 2008). The role of agriculture in producing or inhibiting health is therefore complex, and its potential untapped, since agriculture is largely viewed as an input-output system of raw material production (Waltner-Toews and Lang, 2000).

Organic agriculture has been progressive in accepting responsibility for the health effects of its agricultural practices and has – at least in theory - adapted its approaches to farming accordingly (Lund and Algers, 2003; Döring et al., 2012; Heaton, 2001; Conford and Dimbleby, 2001). The movement has a long history of questioning the boundaries of what health entails, and of extending the role of agriculture into the promotion of public health (von Borell and Sørensen, 2004) (Conford and Dimbleby, 2001). Lady Balfour, a pioneer of the organic movement in Britain, described the stance of many in the early organic movement as a "conviction that health of man, beast, plant and soil is one indivisible whole..." (Balfour, 1943: p.7). The International Federation of Organic Agriculture Movements (IFOAM) principles echo this sentiment in their guiding Principle of Health (IFOAM, 2005), which emphasises that health is "not simply the absence of illness, but the maintenance of physical, mental, social and ecological well-being". While the organic pioneers and IFOAM understand health in a complex and inclusive manner, setting lofty goals for organic agriculture's role in health promotion, it is unclear how today's organic farmers perceive health and their role in health promotion.

By targeting organic farmers, this research directly addresses the health perceptions of those tasked with implementing health and environmental initiatives within the agricultural sector. We chose to address this group as part of a larger study to understand the links between health perceptions, health practices, and distributions of responsibility for health. The results presented here address a key question of this study: How is health achieved? In the following we introduce the analytical framework for this study, which is derived from the process of boundary critique in Critical Systems Heuristics (see Ulrich 2005 and Midgley, 2006). This is followed by a short description of research methods and preliminary results of the empirical analysis. Finally, the perceived relevance of environmental factors in human health promotion is discussed; the role of organic agriculture in sustainable health promotion is not unproblematic given these preliminary insights into farmers' health perceptions.

Adapting Critical Systems Heuristics for examining farmers' health perceptions

Perceptions of health can be understood as systems of knowledge, goals, and practices that are considered relevant to health by a particular individual or social group²³³. Following Midgley (2006: p.2): As systems thinkers, we assume that everything is connected (directly or indirectly) to everything else, but that as human beings, we cannot gain a comprehensive overview of the resultant system as a whole. There are, undoubtedly, many effects upon health that must be ignored by any given health promoter, simply because it is impossible to consider everything. By setting boundaries we determine what actors, knowledge, goals, and practices we consider to be relevant to the situation, and take an important step for managing complexity in practice (Churchman, 1970). How these boundaries are set, and who sets them, has been the subject of critical systems research using Critical systems heuristics (CSH) as an analytical framework.

Critical Systems Heuristics was founded as a management approach for dealing with the decision of where to set a boundary for inclusion and exclusion, and was developed by Ulrich (Ulrich, 2005; Ulrich and Reynolds, 2010) and Midgley (2006), who built upon the work of Churchman (Churchman and West, 1968). Ulrich argues that boundaries - necessary as they are - should be justified, and that the justification is essentially a practical and value based exercise. He therefore proposes a list of 12 questions that can be used to understand how an individual or group currently set the boundaries of a system, and how they believe the boundaries ought to be set. The 12 questions are divided into four themes, which are: motivation, power, expertise, and legitimacy (see Ulrich, 2005 for the full list of questions). Together these four themes address which actors, knowledge, goals, and practices are considered relevant, and which ought to be considered relevant, in a given situation. The wider research project, of which this paper is part, focuses upon all of these questions. In this paper, however, only initial findings for parts of the second theme, i.e. "power" will be presented.

Table 1 shows how the original CSH questions by Ulrich (2005) are translated into questions of environmental influence upon human health. It should be noted that the respondents were only asked about practices affecting their own health, and not human health in general. The following section details how this framework was applied to data collection and analysis within the empirical study of Austrian organic farmers' health perceptions.

Methods: Surveying Austrian organic farmers' health perceptions

Data were collected through an online survey running from August 2013 to the end of January 2014. The survey was open to all organic farmers in Austria, regardless of type of farming or affiliation with particular organic associations. Respondents were asked to list practices that they currently engage in to maintain or improve their own health (QA), practices they would engage in to maintain or improve their own health, if resources were unlimited (QB), and influences upon

²³³ For further information on health perceptions and their effects upon health management, see Flick, 2003; Flick, 1998a; Flick, 1998b; Flick and Röhsch, 2007; Jodelet, 1992; Jodelet, 2008; Åsbring, 2012).

their health that they could not personally control (QC). The number of times, as well as the order in which items were listed, were assumed to indicate the relevance of the items (i.e. the more frequently and the earlier an item is listed, the greater its relevance) (Weller and Romney, 1988).

The responses were translated and coded to achieve the same level of abstraction.

Table 1: Adaptation of two CHS “power” questions to the topic of farmers’ health perceptions, and the connection between health and environment. The adapted survey questions are translated from the original survey questions, which were in German. The CSH questions have been abbreviated for the sake of clarity.

CSH theme	CSH question	Adapted survey question	Connection to environment
Power	What conditions of success can (should) those involved control?	What practices do farmers engage in to promote their own health? What practices would farmers engage in to promote their health, if resources were unlimited?	How relevant are practices targeting the environment for the promotion of farmers’ health?
Power	What conditions can (should) the decision-maker <i>not</i> control?	What influences upon good or ill health can the farmers not control?	How relevant is the environment as an uncontrollable influence upon farmers’ health?

Responses were then grouped into three overarching categories: “Environment” for all categories that referred only to environmental influences (e.g. weather, spending time of outdoors, working with animals), “Human” for human practices (e.g. nutritional choices, exercise, medical treatments, downtime), and “Socio-Environment” for human induced impacts upon the environmental leading to affects upon human health (e.g. pollution, exposure to radiation, organic farming). Only the coarser level categories are subjected to statistical analyses herein. Statistical analyses were performed in R version 3.0.2 (R Development Core Team, 2013).

Results: Perceptions of environmental influences upon human health

Responses to the survey were collected from 75 Austrian organic farmers. Free lists for each of the three questions analysed ranged from 1 to 10 items in length. The survey elicited an average of 4.11 ± 1.48 (median=4) responses for QA, 3.10 ± 2.35 (median=4) responses for QB, and 1.56 ± 1.00 (median=2) responses for QC.

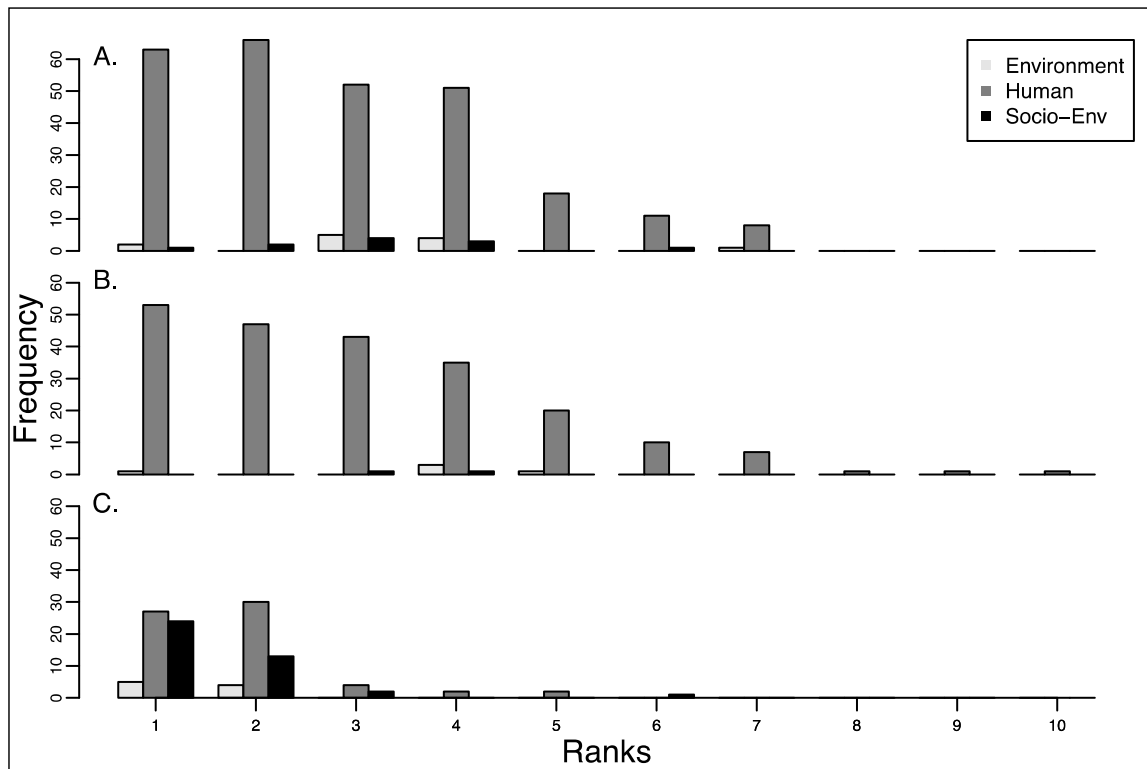
For QA (Current health practices) and QB (practices respondents would engage in given unlimited resources) human factors were dominant overall (92% and 97% of all responses respectively) and in all ranks (see figure 1). In QA, the most commonly listed health practices were “Nutrition” (24.7%) and “Exercise” (23.6%) both of which belong to the Human category. These practices were also most frequently ranked in the first four positions (data not shown). In QB “Exercise” (23.6%) was the most common response, and was most frequently ranked first, closely followed by “Holidays” (11.1%). Environmental and Socio-Environmental factors were negligible in all ranks for both questions (4% and 2% respectively).

QC (health influences beyond personal control), however, saw an upsurge in both Environmental (8%) and particularly Socio-Environmental (35%) influences relative to the lower overall number of responses. “Environmental impacts”, which belong to the Socio-Environmental category, were here the most frequently listed items (18.4%). This group was most frequently ranked in first position, together with the category “Inherited” (14.0%), which referred to genetically determined illnesses or disabilities, and was counted as a human influence. Overall, Environmental and So-

cio-Environmental influences were more frequently listed earlier in QC than in QA and QB, indicating a greater relevance among influences considered beyond personal control.

Overall, respondents were significantly more likely to list non-human categories for QC relative to QA and QB (Fisher’s exact test p -value 2.2×10^{-16} for both). However, the proportion of responses for each of the three categories did not differ for QA and QB (p -value 0.055).

Figure 1: Frequency and ranks of responses in each of the three categories Environment, Human, Socio-environment. Note the lower frequencies, reflecting an overall lower number of responses, for QB and QC.



Discussion

At first glance, the results shown here do not paint a promising picture for the endeavour to strengthen organic farmers’ role in health promotion. These initial results regarding organic farmers’ health practices imply that environmental influences are considered relevant factors that impact farmers’ own health, but not ones that they can control. Indeed, even given unlimited resources, environmental influences upon farmers’ health would not be tackled according to these findings.

It is worth noting that farmers rarely included farming practices among the practices they engage in or would engage in for their health. Instead, the respondents tended to list personal or “lifestyle” practices (i.e. proper nutrition, exercise, taking holidays, reducing stress). This indicates that farmers perceive their health concerns as individual, not environmental or socio-environmental. Practices (both farming and non-farming) that may indirectly affect farmer health by improving their environment are not mentioned, except by a small number of respondents who list “organic farming” and “nature conservation” as practices in which they engage for their health. However, farmers were not asked to list the practices in which they engage and that affect the health of others. Further research may indicate that farming practices are perceived as more relevant in this regard, given the great consumer emphasis upon health as a motive for supporting organic (Michaelidou and Hassan, 2008; Padel and Foster, 2008).

Perhaps it is not surprising that the Austrian organic farmers consider environmental factors as having an uncontrollable influence upon their own health. Interestingly, the broad category of “environmental influences”, which features heavily in QC, closely reflects the abstract terminology of the raw data, and its particular meanings are not known at this point. It may be that the respondents do not tend to disaggregate this group of influences, perceiving it rather as monolithic and unmanageable. This might explain why Environmental and Socio-Environmental factors are not given greater relevance in terms of practices the farmers do or would do given the resources - their impact upon the environment may simply be perceived as negligible compared with the environmental influences they are faced with. Another explanation may, however, be farmers’ awareness of the impact of farming upon environmental factors related to health. McCann (1997: p.748), citing Bruening and Rollins (1990), Napier et al. (1988), and Napier and Camboni (1988) states: “*Farmers consistently underestimate the severity of specific environmental problems on their own land*”. It is possible, therefore, that farmers do not perceive the environmental impacts of their own farming as hindering or promoting their health.

Social Representation Theory and Critical Systems Heuristics teach that it is often necessary to look beyond the broadest social groups to explain internal differences and similarities. Past research has tended to adopt socio-demographic or farm structure models to explain differences and similarities in farmers’ attitudes towards environmental and conservation initiatives (McCann et al., 1997). The perceived power of farmers to influence environmental factors may be differently distributed based upon such factors as age, sex, region, size of farm, and type of farm. Demographic and farm type data were collected during our survey, and will be analysed with respect to possible correlations with health perceptions in later steps of the research. Given the very low frequency of Environmental and Socio-Environmental factors in the responses to QA and QB, however, we are unlikely to find any significant demographic or farm type differences.

Conclusion

In order to reduce the burden upon the medical system and make it more sustainable, there is a pressing need to include more societal sectors in the promotion of health. Agriculture could play an important role in health promotion, if human and environmental health can be linked, not only in policy, but also in the health perceptions of those involved in the sector. Organic agriculture has, in the past, argued that agriculture should take responsibility for its human and environmental health effects, and has sought to adapt their farming practices accordingly. Little is known, however, about farmers’ own perceptions of health, and how these might help or hinder this endeavour.

This research combines Social Representation theory with Critical Systems Heuristics to map the health perceptions of Austrian organic farmers. These health perceptions include sources of motivation, power, knowledge, and legitimacy. In this paper we discuss the perceived power of farmers to influence their own health, and the role of environment in this process.

Results showed that the respondents perceived environmental and socio-environmental factors to be relevant for promoting their health, but perceived these factors to be beyond their personal control. We suggest that further research focusing upon disaggregating demographic and farm type characteristics of respondents, and the meanings of environmental and socio-environmental influences would be useful for understanding why farmers perceive themselves as powerless with respect to environmental influences.

Bibliography

Antonovsky A. (1996) The salutogenic model as a theory to guide health promotion. *Health Promotion International* 11: 11-18.

- Åsbring P. (2012) Words about body and soul: Social representations relating to health and illness. *Journal of Health psychology*.
- Balfour EB. (1943) *The Living Soil: evidence of the importance to human health of soil vitality, with special reference to national planning*, London: Faber and Faber LTD.
- Boorse C. (1977) Health as a theoretical concept. *Philosophy of science*: 542-573.
- Breton E and De Leeuw E. (2011) Theories of the policy process in health promotion research: a review. *Health Promotion International* 26: 82-90.
- Brown T and Bell M. (2007) Off the couch and on the move: Global public health and the medicalisation of nature. *Social science & medicine* 64: 1343-1354.
- Bruening, T. H. & Rollins, T. J. (1990). Perceptions of Pennsylvania farm operators regarding selected soil and water conservation practices. Department of Agricultural and Extension Education, The Pennsylvania State University, University Park, Pennsylvania.
- Churchman CW. (1970) Operations research as a profession. *Management Science* 17: B-37-B-53.
- Churchman CW and West C. (1968) *The systems approach*: Dell New York.
- Conford P and Dimpleby J. (2001) *The origins of the organic movement*: Floris Books Edinburgh.
- Corvalán CF, Kjellstrom T and Smith KR. (1999) Health, environment and sustainable development: identifying links and indicators to promote action. *Epidemiology-Baltimore* 10: 656.
- Dooris M. (2006) Healthy settings: challenges to generating evidence of effectiveness. *Health Promotion International* 21: 55-65.
- Döring TF, Pautasso M, Finckh MR, et al. (2012) Concepts of plant health – reviewing and challenging the foundations of plant protection. *Plant Pathology* 61: 1-15.
- Flick U. (1998a) *The psychology of the social*: Cambridge University Press.
- Flick U. (1998b) *Subjektive Vorstellungen von Gesundheit und Krankheit. Überblick und Einleitung. Wann fühlen wir uns gesund*: 7-30.
- Flick U. (2003) Editorial: Health concepts in different contexts.
- Flick U and Röhnsch G. (2007) Idealization and Neglect Health Concepts of Homeless Adolescents. *Journal of Health psychology* 12: 737-749.
- Gönenç, R., Hofmarcher, M. M. & Wörgötter, A. (2011). *Reforming Austria's Highly Regarded but Costly Health System*. OECD Publishing.
- Hamilton RP. (2010) The concept of health: beyond normativism and naturalism. *Journal of Evaluation in Clinical Practice* 16: 323-329.
- Hawkes C and Ruel M. (2006) The links between agriculture and health: an intersectoral opportunity to improve the health and livelihoods of the poor. *Bulletin of the World Health Organization* 84: 984-990.
- Heaton S. (2001) *Organic farming, food quality and human health: A review of the evidence*: Soil Association Bristol, UK.

- Horrigan L, Lawrence RS and Walker P. (2002) How sustainable agriculture can address the environmental and human health harms of industrial agriculture. *Environmental health perspectives* 110: 445.
- Ifoam. (2005) The Principles of Organic Agriculture. Available at: http://www.ifoam.org/about_ifoam/principles/index.html.
- Jodelet D. (1992) *Madness and social representations: Living with the mad in one French community*: University of California Press.
- Jodelet D. (2008) Social Representations: The Beautiful Invention. *Journal for the Theory of Social Behaviour* 38: 411-430.
- Khushf G. (2007) An agenda for future debate on concepts of health and disease. *Medicine, Health Care and Philosophy* 10: 19-27.
- Ladurner, J., Gerger, M., Holland, W., Mossialos, E., Merkur, S., Stewart, S., Irwin, R. & Soffried, J. (2010). *Public Health in Austria. An analysis of the status of public health. Observatory Studies Series* 24.
- Lang T and Rayner G. (2007) Overcoming policy cacophony on obesity: an ecological public health framework for policymakers. *Obesity Reviews* 8: 165-181.
- Lantz PM, Lichtenstein RL and Pollack HA. (2007) Health Policy Approaches To Population Health: The Limits Of Medicalization. *Health Affairs* 26: 1253-1257.
- Lund V and Algers B. (2003) Research on animal health and welfare in organic farming—a literature review. *Livestock Production Science* 80: 55-68.
- Marsden T and Sonnino R. (2008) Rural development and the regional state: Denying multifunctional agriculture in the UK. *Journal of Rural Studies* 24: 422-431.
- Mccann, E., Sullivan, S., Erickson, D. & De Young, R. (1997). Environmental awareness, economic orientation, and farming practices: a comparison of organic and conventional farmers. *Environmental Management* 21(5): 747-758.
- Michaelidou, N. & Hassan, L. M. (2008). The role of health consciousness, food safety concern and ethical identity on attitudes and intentions towards organic food. *International Journal of Consumer Studies* 32(2): 163-170.
- Midgley G. (2006) Systemic intervention for public health. *Journal Information* 96.
- Napier, T. L. & Camboni, S. M. (1988). Attitudes toward a proposed soil conservation program. *Journal of soil and water conservation* 43(2): 186-191.
- Napier, T. L., Thraen, C. S. & McClaskie, S. L. (1988). Adoption of soil conservation practices by farmers in erosion-prone areas of Ohio: The application of logit modeling. *Society & Natural Resources* 1(1): 109-129.
- Nordenfelt L. (2007) The concepts of health and illness revisited. *Medicine, Health Care and Philosophy* 10: 5-10.
- Padel, S. & Foster, C. (2005). Exploring the gap between attitudes and behaviour: Understanding why consumers buy or do not buy organic food. *British Food Journal* 107(8): 606-625.
- Pelikan JM. (2007) Understanding Differentiation of Health in Late Modernity—by use of sociological system theory. *Health and Modernity: The Role of Theory in Health Promotion*. 74-102.

- R Development Core Team (2013). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. ISBN 3-900051-07-0, URL <http://www.R-project.org>.
- Simons-Morton B. (2013) Health Behavior in Ecological Context. *Health education & behavior* 40: 6-10.
- Smith KR, Corvalán CF and Kjellstrom T. (1999) How much global ill health is attributable to environmental factors? *Epidemiology-Baltimore* 10: 573-584.
- Ulrich W. (2005) A brief introduction to critical systems heuristics (CSH). ECOSENSUS project site.
- Ulrich W and Reynolds M. (2010) Critical systems heuristics. *Systems approaches to managing change: A practical guide*. Springer, 243-292.
- von Borell E and Sørensen JT. (2004) Organic livestock production in Europe: aims, rules and trends with special emphasis on animal health and welfare. *Livestock Production Science* 90: 3-9.
- Waltner-Toews D and Lang T. (2000) A New Conceptual Base for Food and Agricultural Policy: The Emerging Model of Links between Agriculture, Food, Health, Environment and Society. *Global Change and Human Health* 1: 116-130.
- Weller SC and Romney AK. (1988) *Systematic data collection*, USA: Sage Publications.
- White K. (2008) *An Introduction to the Sociology of Health & Illness*: SAGE Publications Ltd.
- World Health Organization. (1986) *Ottawa charter for health promotion*. Geneva: WHO.