DEBATES

Health and sustainability

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SUMMARY

In the present article, we explore how sustainable development strategies and health promotion strategies can be bridged. The concept of the ‘duality of structure’ is taken as our starting point for understanding the linkages between health promotion and sustainable development, and for uncovering the structural properties or conditions which either enable or constrain sustainable public health initiatives. We argue that strategies towards health promotion are not sufficiently integrated with strategies for sustainable development, and thus political strategies aimed at solving health problems or sustainability problems may cause new, undesired and unforeseen environmental or health problems. First, we explore how the relation between health and sustainability is articulated in international policy documents. Next, we develop a model for understanding the relation between health promotion and sustainability. Third, we use examples from agriculture and food production to illustrate that health and sustainability are mutually enabling and constraining. We conclude that while the renewed focus on food security and food inequalities has brought the health and sustainability dimensions of the food system onto the political agenda, the conceptualization of duality between health and sustainability could be a new platform for a critical and theoretical stance towards the market-oriented food system strategy. Thinking along the lines of duality means that the integration of health promotion strategies and sustainable development strategies cannot be based on an approach to integration in which either health or sustainability is given precedence over the other. From a duality perspective, integration means conceiving sustainability from a health perspective and health from a sustainability perspective.

Key words: health; sustainability; environmental health promotion; food

INTRODUCTION

It is an apparent paradox that the growth in the number of initiatives undertaken at both national and international levels to develop strategies for the promotion of health and sustainable development, respectively, are taking place while, at the same time, as we are experiencing an exponentially increase in chronic diseases, obesity, mental health problems as well as a worsening of many environmental problems. How can this paradox be understood?

From our perspective, the simultaneous deterioration of public health and the state of the environment is partly linked to the inadequate integration of health promotion and sustainability dimensions at local, regional and global levels. Many health and sustainability problems emerge as a consequence of society’s appropriation of natural resources and the overexploitation of environmental services such as carbon sequestration and biodiversity. In other words, many public health and environmental problems are caused by the increased intensification of agriculture and food production. However, shared root causes or drivers are no guarantee that health and sustainability dimensions will be integrated into local, regional or global policy documents or initiatives.

One example could be the clearing of tropical rain forests for production of palm oil for fuel and cooking oil in Malaysia, Indonesia,
Cameroon, Nigeria and Colombia (Brown and Jacobson, 2005). Here, the intent has often been to solve health problems (palm oil is free from trans fat) and provide affordable supplies of food oil, but the negative side effects result from palm oil being high in saturated fat, the exhaustion of soils, erosion of land and loss of biodiversity. We do not believe that the lack of integration of health and sustainability is the root cause of health problems nor environmental problems. Many health and environmental problems are rooted in the unintended and often negative side effects stemming from production and consumption processes driven by market forces and cost reductions. But we do believe that a greater emphasis on the interaction between health and sustainability will allow both for preventing unintended side effects and for identifying positive gains from new or ongoing initiatives. In addition, we believe that such an approach could enhance the understanding of the complexity surrounding solutions to health and environmental problems. Thus the aim of this article is to contribute to the discussion on how to integrate health promotion and sustainable development issues and at the same time take into consideration the possibilities for reducing unintended consequences. From a theoretical perspective, we find it crucial to discuss and re-assess the concepts of health and sustainability, and the positive synergy which could be achieved by thinking these concepts together. We understand both health promotion and sustainable development to be normative concepts. As such, both concepts draw on equity and democracy as the basis for societal development, for more healthy livelihoods and a better environment.

The concept of sustainable development is more than just sustainability. While sustainability is frequently understood as properties of, or indicators of, programme implementation, sustainable development is a process towards a new normative horizon and implies a paradigm shift from a development based on inequity and overexploitation of natural resources and environmental services, to one that requires new forms of responsibility, solidarity and accountability (WCDE, 1987; Olsén et al., 2003; Shiva, 2005).

The concept of health is understood in a wider context than health as the absence of disease. Health is part of the social dynamics of social organization, lifestyles and patterns of consumption and influenced by the bio-physical environment. Hence human health is determined by a complex context of the social and the economic system, the bio-physical environment and the person’s individual characteristics and behaviours. Health promotion implies a paradigm shift from an understanding of health as absence of disease (the bio-medical approach) to a socio-ecological understanding of health focusing on strength, resilience and assets to health (WHO, 1986, 1997a,b, 2010; Hancock, 1993, 1999; Kickbusch, 2010).

This contribution will start with a brief presentation of the concepts relating to health and sustainability formulated by international organizations to illustrate the lack of integration of health promotion and sustainable development visions and strategies. Then we will give an overview of different theoretical contributions to integrating health and sustainable development. Next we will introduce the duality model of health and sustainability and discuss how the conceptualization shapes the way we understand the relation between health and the environmental, social and economic dimensions of sustainable development. Further, we will illustrate the duality of health and sustainability by examples from food production. We have chosen these as food security and food sovereignty are important dimensions of a healthy life. While at the same time, food production in many cases has turned out to be an environmental ‘sinner’.

**HEALTH AND SUSTAINABILITY: STATE OF THE ART OF INTERNATIONAL POLICY DOCUMENTS**

From our perspective, international policy documents set a framework for, or a point of reference for, the formulation of regional and local strategies and initiatives. The state of the art will not assess the impact of the international policy documents on regional and local strategies or initiatives. Instead, we will focus on exploring how health and sustainability are conceptualized and how health and sustainability are interlinked and understood in the international policy documents.

Within the auspices of the WHO, and in wider scientific circles, the relation between health promotion and sustainability has been the object for discussion for several decades.
It has been argued that sustainability, understood as environmental sustainability, must be seen as a structural condition for promoting health. It has also been argued that health must be seen as a precondition for sustainable development (Hancock, 1993, 2009; Kickbusch, 2010).

In the conclusions from the first international conference on health promotion in Ottawa, it was stated:

Our societies are complex and interrelated. Health cannot be separated from other goals. The inextricable links between people and their environment constitutes the basis for a socio-ecological approach to health. The overall guiding principle for the world, nations, regions and communities alike, is the need to encourage reciprocal maintenance - to take care of each other, our communities and our natural environment. The conservation of natural resources throughout the world should be emphasized as a global responsibility. (WHO, 1986)

Along the same lines, the WHO in the 1980s defined the concept ‘environmental health’ as comprising those aspects of human health and disease determined by factors in the environment. Here environmental health problems are conceived as being related to the physical interaction of environmental and health factors. Later, in the 1990's, WHO’s approach to the concept of environmental health was widened to encompass social and psychosocial conditions which have an effect on health, arguing that even if it can be difficult to prove a direct correlation between some of these social factors and health, it should not make them any less important in the consideration of environmental health priorities. Consequently, the WHO defines environmental health as comprising of:

[T]hose aspects of human health, including quality of life, that are determined by physical, chemical, biological, social and psychosocial factors in the environment. It also refers to the theory and practice of assessing, correcting and preventing those factors in the environment that can potentially affect adversely the health of present and future generations. [(WHO, 1998) p. 9]

This approach implies that improvements or solutions to the problems should be found in the elimination of physical, chemical or biological risk in the environment and in the improvement of the social and psychological environment.

Under the auspices of the UN, the Brundtland Commission introduced the concept of sustainable development in 1987 and emphasized the relation between development, nature and the environment. The report underlines, development to be sustainable must include aspects of environmental, social and economic sustainability. Health is mentioned in the report as part of social sustainability. For development to be sustainable, it must meet essential human needs such as jobs, food, energy, water and sanitation. The basic human needs are named as: housing, water supply, sanitation and health care [(WCED, 1987) p. 55]. In our understanding, the two concepts have been seen as important in the defining of each other, although the one rather than the other is given precedence in different understandings and conceptualizations.

Since then, a number of international initiatives have been launched to integrate health issues and sustainable development. In the late 1990s, the WHO Healthy Cities Project pointed out that human health and sustainable development are inextricably linked. It explores health and sustainable development in relation to Europe’s cities and towns, and states that health both is an important objective for people and a main component of the process toward achieving sustainable development (WHO, 1997a,b). The Healthy Cities Project has therefore been one of the most significant contributions to initiating integrated frameworks, and building joint agendas between sustainability and health promotion, although cross-sector collaboration and citizens’ involvement often lagged in the local healthy cities projects (Hancock, 1996).

In 2000, the United Nations adopted eight Millennium Development Goals (UN, 2000)— to improve the lives of the world’s disadvantaged populations. The goals seek to reduce poverty, illiteracy, gender inequality, malnutrition, child deaths, maternal mortality and major infections as well the creation of environmental stability and a global partnership for development. Each of these goals deals with very important problems from a health and sustainability perspective. Most of these problems are approached in silos and dealt with separately hence do not sufficiently contribute to integrative thinking or solutions. This fragmented way of setting sector goals causes problems, as it
separates environmental considerations from health considerations. Therefore, the Millennium Development Goals do not contribute directly to linking or integrating health promotion and sustainable development.

The Adelaide Statement on Health in All Policies (WHO and the Government of South Australia, 2010) outlines the need for a new social contract between all sectors to advance human development, equity and sustainability, as well as to improve health outcomes. The argument is that health and wellbeing are subject to conditions beyond the health care sector, and are caused by societal and economic factors. It is pointed out that building a process for Health in All Policies requires context-specific key drivers, which in relation to the environmental issues can include encouraging experimentation and innovation to find new models that integrate social, economic and environmental goals.

The current climate change debate has brought renewed focus on the relationship between sustainability and health. The UCL Lancet Commission [(UCL Lancet Commission, 2009) p. 1659] in their final report concludes by saying that ‘Climate change could be the biggest global health threat of the 21st century’. The Commission outlines the major threats to global health from climate change through changing patterns of disease and mortality, water and food insecurity, vulnerable shelter and human settlements, extreme climate events, population growth and migration—impacts that may deepen inequalities in health. In particular, the Commission’s main contribution lies in taking wider health effects into consideration.

The above-mentioned documents and initiatives have made fruitful contributions to the ongoing debate on how to integrate health promotion and sustainable development. In particular, the international initiatives have contributed to the agenda of the political strategic level and helped to initiate practical projects across sectors. The experience from the healthy cities project indicates that it is more difficult than anticipated to implement projects across sectors and to involve citizens. From our point of view, a deeper and more profound conceptual understanding of the mutual linkages between health and sustainability could provide a better basis for bridging health promotion and sustainable development and hence guide practical strategic thinking. As a basis for further conceptual development, we will turn to the conceptual contributions on health promotion and sustainable development that have been underlying the international debate and the healthy cities project.

CONCEPTUAL KNOWLEDGE ON THE MUTUAL LINKAGES BETWEEN HEALTH PROMOTION AND SUSTAINABLE DEVELOPMENT

Hancock has been a seminal contributor in developing conceptual understandings of the relationship between health promotion and sustainable development (Hancock, 1993). His article ‘Health, human development and the community ecosystem: three ecological models’ (Hancock, 1993) has been the basis of many scientific discussions on health and sustainability during the last two decades, and the models have been adopted or used as the theoretical or conceptual point of departure for designing programmes, indicators and projects, e.g. within the fields of healthy cities and communities (WHO, 1997a,b; Hancock, 1999, 2009; Burris et al., 2008).

For the purpose of this article, we particularly find the ‘Health-environment-economy model’ of interest. He also names it ‘A model of human development’. Hancock states that the concepts of health and of sustainable development have important contributions to make to each other (Figure 1).

![Fig. 1: ‘The model of human development’ (Hancock 1993: figure 2). Reproduced with permission from Oxford University Press and Trevor Hancock.](https://academic.oup.com/heapro/article-abstract/29/3/558/754800)
Health contributes its emphasis upon equity, its concern with the broad social ecosystem and its concern for human health; sustainable development contributes its emphasis upon future generations, natural ecosystems and the health of other species ([Hancock, 1993] p. 43).

The model shows the (crucial) links between health or social wellbeing, environmental and economic wellbeing with a focus on equity and sustainability.

Hancock wants to change the focus of the debate on sustainable development from economic development to human development. Economic activity must preserve the environment in a sustainable way and social sustainability must also be taken into account. The Earth’s resources and the wealth generated by economic activity must be distributed in a way that the goal of ‘health for all’ is met thus equity becomes a key word. Concerning the linkages between health and the environment, Hancock ([Hancock, 1993] p. 44) makes it clear that ‘human health depends not only upon the generation and equitable distribution of wealth but upon a viable environment’. While Hancock (Hancock, 1999) advocates a shift in societal values to a focus on human development rather than economic development, Kickbusch ([Kickbusch, 2010] p. 12) has taken the model of ‘human development’ further by putting both health promotion and sustainable development at the core of the model. She argues that the overlap, i.e. the interdependence and the interaction, between the three pillars of sustainable development (economy, society and the environment) are the key determinants for creating healthy and sustainable communities. Kickbusch (Kickbusch, 2010) uses the Healthy Cities Project as an example of an integrative and joint agenda between health promotion and sustainable development. Referring to the concentric model of sustainable development with the economy in the core, the society in the inner concentric circle and the environment in the outer circle, Kickbusch (Kickbusch, 2010, 11) argues that the health promotion model is close to the concentric understanding of the three dimensions of sustainable development (Figure 2).

The concentric sustainable development model places the economy at the core, while the health promotion model places health at the core of the model. In this understanding, both health promotion and sustainable development are driven by the same forces and political factors. From Kickbusch’s perspective, there has been a gradual convergence and overlap in goals and agendas between health promotion and sustainable development. Kickbusch advocates health promotion strategies to seek

![Fig. 2: The model of the ‘Relationship – Public Health and Sustainable Development’ (Kickbusch 2010, figure 3). Reproduced with permission from Ilona Kickbusch.](https://academic.oup.com/heapro/article-abstract/29/3/558/754800)
approaches which create complementarity between health and the three dimensions of sustainable development. Using the food system as an example of the emerging convergence in concepts, in the normative base, and in joint policy agendas, Kickbusch [(Kickbusch, 2010) p. 28] identifies three fields where health promotion and sustainable development share common goals and joint strategies for action. The three food policy fields are food justice, food security and food sovereignty and the three health fields are health as a human right, health security and empowerment for health.

Kickbusch (Kickbusch, 2010) gives good examples of the convergence between food justice and health as a human right, between food security and health security, and between food sovereignty and empowerment for health, and how these convergences produce undesired or unintended outcomes. Focusing on convergent strategies will allow for the adoption of win-win strategies, and be a step towards creating more healthy and sustainable communities. This issue will be further developed later in the article. Despite Kickbusch’s focus on converging strategies in health promotion and sustainable development, from our point of view, she advocates for furthering a healthy, sustainable and equitable food system from a health promotion perspective rather than from an integrative perspective. This is because she gives the public health community a leading role in alliance building. However, convergence may produce enabling as well as constraining outcomes. Therefore, in our contribution, we want to promote a slightly different conceptualization of the relationship between health and sustainability.

THE DUALITY OF HEALTH AND SUSTAINABILITY AND THE CONSEQUENCES FOR HEALTH PROMOTION AND FOR SUSTAINABLE DEVELOPMENT

Inspired by Giddens (Giddens, 1984), we want to suggest that the duality of health and sustainability should be chosen as a starting point for understanding the two concepts, their mutual relationships and the ‘demands’ they put on each other to foster a healthy and sustainable future (Pedersen and Land, 2010). Several sociologists as well as other researchers have contributed to clarify the concept of duality of actors and structures. Authors include Berger and Luckmann (Berger and Luckmann, 1966), Giddens (Giddens, 1979), Bourdieu (Bourdieu, 1977) and Urry (Urry, 1982). In this article, we draw on Giddens’ contribution to the conceptualization of structure where duality means that structure is a medium and the outcome of social practices, latest stated in the Constitution of Society (Giddens, 1984). Giddens’ theory of structuration stresses that the constitution of agents and structures are not two independently given sets of phenomena—a dualism, but represent a duality where agents and structures are seen as mutually enabling and constraining [(Giddens, 1984) p. 25]. Likewise, we find it fruitful to conceive both health and sustainability as mutually enabling and constraining. The two concepts mutually produce, reproduce or constrain each other. As we later will illustrate with examples from food production, the separation of strategies for health promotion and for sustainable development may cause unintended social and environmental consequences or worse produce new health problems and/or new environmental problems. The concept of duality allows for an understanding of, and for developing a conceptual framework for, the integration of strategies for health promotion with strategies for sustainable development. The following figure illustrates that thinking along the lines of a duality between sustainability and health has consequences for the way we understand the interaction between environmental, social and economic development (see Figure 3).

By understanding health and sustainability as a duality, health both creates conditions and is conditioned by sustainability, understood as economic, social and environmental sustainability, while on the other hand sustainability creates and is conditioned by human health.
This conceptualization implies that the demands the Brundtland Report makes on development for it to be sustainable must be extended and stated more precisely. Health and sustainability must be conceived as a duality in which each creates and conditions the other. *Sustainability must be conceived in a health perspective and health must be conceived in a sustainability perspective.* Consequently, health promotion must take sustainable development into account. The failure to do so will be discussed later in this article.

**THE DUALITY OF SUSTAINABILITY AND HEALTH: EXAMPLES FROM FOOD PRODUCTION**

We will use examples from food production and consumption to illustrate the duality of sustainability and health. We will ask how thinking embedded in the concept of duality can contribute to an understanding of how the concept of sustainable food production and consumption must be conceived to meet the demands of promoting health, and how the concept of health must be conceived to meet the demand of sustainable food production, so that the unintended consequences and in particular negative effects might be avoided. The examples include brief descriptions of selected problems related to food security, healthy food, climate change and urban agriculture.

**FOOD SECURITY: UNINTENDED CONSEQUENCES FOR THE ENVIRONMENT AND RURAL LIVELIHOODS**

The Brundtland Commission (WCED, 1987) has called attention to three strategies for securing food production: increasing food production in regions with deficits, securing rural livelihoods and protecting natural resources and the services provided by nature. Today, we are witnessing new international strategies for sustainable intensification of crop and livestock production to enhance food security and meet the demand for a diet richer in animal products (COAG, 2010; Steinfeld et al., 2010; FAO, 2011).

The Green Revolution can be taken as an instance of agricultural intensification. This programme was initiated by the UN/FAO to increase food production in developing countries and hence ensure the supply of food. Politicians and scientists from developing countries, among others Vandana Shiva (2000, 2005), have, from a sustainability point of view, severely criticized the social and environmental consequences of this strategy. In India, modern agriculture employing pesticides, herbicides and other external inputs were introduced, and traditional varieties of rice and grain were substituted by high yielding but barren hybrid varieties. The reproductive ability of seed was blocked, and the new varieties were patented by international seed corporations. According to Shiva, the intellectual property rights regime of GATT (General Agreement on Tariffs and Trade), the biodiversity convention, the international trade platforms and the use of new biotechnologies simultaneously threaten the generative freedom of diverse species and the free and sustainable economy of small peasants and producers based on nature’s diversity [(Shiva, 2005) p. 91]. Moreover, health problems of the workers exposed to new chemicals such as pesticides can be seen as an unintended consequence of new intensified modes of food production. Hundreds of thousands of people are dying around the world each year from the effects of the use, or abuse, of pesticides (Konradsen et al., 2003).

In the case of the green revolution, both the duality of health and sustainability and the broad definition of health are overlooked. The strategy has mainly been driven by a rather narrow, nutritional definition of health as absence of disease and by commercial incentives.

The new eco-system approach to sustainable intensification of crop production launched by FAO (FAO, 2009; FAO, 2011) aims at enhancing food security by increasing productivity. Although the strategy developed aims at enhancing farmers’ livelihoods, the primary aim is to secure diversification of and integration of small-scale producers in the value chain, while it ignores health issues and the impact it might have on local self-sufficient food production, and thus the sustainability of local communities in economic, environmental and social terms.
HEALTHY FOOD: UNINTENDED CONSEQUENCES FOR THE ENVIRONMENT AND THE LOCAL CONDITIONS OF LIFE

In Denmark, the National Health Service is recommending citizens to eat fish several times a week. Fish is a good source of omega-3 fatty acids and protein, and supplies humans with vital vitamins and minerals including iodine, selenium and vitamin D (Astrup et al., 2005). The use of modern fisheries technology has made it easier and more efficient to catch fish but has also caused overfishing of many marine fish populations, leading to damage of marine habitats, and loss of biodiversity (Ayer et al., 2009). As fishery has become a global business, the world has witnessed a growing trend for western fishery industry to acquire fishing rights in marine waters belonging to developing countries (Wilkinson, 2006). West Africa is one of the severely hit areas as fish stocks have decreased radically since trawlers from the EU countries have acquired fishing rights to its waters (Kaczynski and Fluharty, 2002).

From our point of view, the propagation of fish as a vital component in a healthy diet has led to unforeseen consequences. Western consumers’ demand for healthy fish products needs to be balanced against local people’s food security and local fishermen’s livelihoods. Again we must call attention to the fact that the lack of thinking in terms of duality has led to an apparent successful health campaign with grave implications for sustainable development in the South.

Another example comes from aquaculture. In Vietnam, the culture of Pangasius fish has increased exponentially in recent years due to increased demand for healthy and cheap fish in Europe. It has created thousands of jobs in aquaculture and the associated industry, and has thus been a major factor in poverty reduction in one of Vietnam’s poorest rural areas. But the downside of the success is that the Vietnamese fish farms discharge polluted water from fish ponds directly into the Mekong River, where it may potentially negatively affect the livelihoods of local people. Moreover, the highly competitive culture of Pangasius undermines small fishing communities in the North Atlantic whose livelihoods are dependent on plaice (Madsen, 2011). This example illustrates how strategies for poverty reduction have unintended consequences for small fishing communities in the North Atlantic.

The demand for healthy food raises new issues as larger part of the world population gets better off. Applying the duality thinking could be a step in balancing positive and negative effects related to increased production of healthy food.

STABILIZING THE CLIMATE: UNINTENDED CONSEQUENCES FOR FOOD SECURITY, LOCAL COMMUNITIES AND THE ENVIRONMENT

There is a growing recognition that food security is critical for human wellbeing, places increasing demands on energy, water, land, biodiversity and climate (Godfray et al., 2011). The recent peak in food prices in January 2011, surpassing the peak in June 2008, has put the resilience of small-scale farmers and food security for vulnerable groups at the top of the political agenda (FAO, 2011). The increasing demand for biofuels in the EU and the US was the most important driver for global food prices in 2008 (Mitchell, 2008). In countries like China and India, growing crops for bio-fuels may cause water shortages as most of the water resources available for agriculture are already exploited (de Fraiture, 2008). For countries with abundant land and water resources, bio-fuels may offer new growth opportunities. However, from our point of view, increased demand for bio-fuels may offer enabling opportunities as well as constraining conditions to local and subsistence farmers, dependent on the scale and level of intensification as well as farmers’ access to fertile land, water for irrigation and a stable climate. As local and subsistence farmers often contribute significantly to local food security, bio-fuels may weaken small-scale farmers’ ability to compete for land and other local resources.

URBAN AGRICULTURE: A WIN-WIN SOLUTION INTEGRATING SUSTAINABILITY AND HEALTH

Urban agriculture may be an example of a win-win solution integrating sustainability and health dimensions. In a world where more people are living in urban settings than in rural areas (FAO, 2009), production, processing and
distribution of locally grown food may contribute to food security and overall public health. Urban agriculture includes a broad variety of food producing activity from community gardens, schoolyard gardens, over backyard gardens, window gardens and rooftop gardens to beehives, keeping of poultry and fish farms (Brown and Carter, 2003). Urban agriculture may increase food availability, food diversity and in some cases provide job opportunities or generate income (FAO, 2008). Urban agriculture may ease food insecurity as it allows for supplementing diets and hence increase access to fresh produce and food budget savings, especially for low-income families. Food insecurity has implications for the state of health as overweight and obesity lately has been linked to food insecurity [(Haering and Syed, 2009) p. 34–43]. In a recent review on the relation between food insecurity and overweight and obesity, it was concluded that food insecurity and obesity co-exists, and that the prevalence of those overweight remains relatively high among food-insecure children (Eisenmann et al., 2011). Urban agriculture may also be a vehicle for other positive effects such as enhancing the sense of community, making cities more climate friendly, increase self-possibilities in a meaningful way and strengthen local food markets. So far, there is little evidence of the potential of urban agriculture for securing food availability and access for the urban poor and disadvantaged. One example of the potential of urban agriculture comes from the city of Havana, where up to 70% or more of the fresh produce is grown within the city borders (Altieri and Funes-Monzote, 2012). It is not clear if this experience can be transferred to other larger urban areas, where the poorest live in densely populated aging apartment complexes that afford little opportunity for gardening. Other challenges related to urban agriculture are possible contamination of the food produce due to pollution of air, water and soil in larger urban areas. Yet, other challenges are getting access to land, knowledge and skills related to seasons, crop rotation and storage of fresh produce.

Urban agriculture may not be a panacea, but one important sub-strategy on the way to a healthier and more sustainable food system. Applying duality thinking to urban agriculture would involve focusing on structural factors and actors which can enable or constrain such a change in practice. One of the challenges lies in using the knowledge local actors have on the conditions for change of the social systems, and not least tap in on tacit knowledge.

**DISCUSSION AND CONCLUDING REMARKS**

Both health problems and sustainability issues have become more acute over the past decade and it seems prudent to believe that the pressures to find solutions that meet both health and sustainability claims will not decrease in the coming years—quite the contrary. Climate change may affect productivity and yield negatively, create food supply problems and increase food insecurity. Modern everyday life may lead to unhealthy shifts in dietary patterns and increase in lifestyle diseases. Increased use of artificial fertilizers, pesticides and GMOs may impair the environment and aggravate health problems. Further, the intensification of agricultural production may create new health and environmental problems, if the direction of intensification is not changed. Growing socio-economic inequality between the North and the South and within the highly industrialized countries are other problems pushing for integration of health and sustainability.

In this article, we have highlighted key international policy papers addressing sustainability and health respectively. Theoretically, the international actors have put forward important and constructive proposals on how the two concepts and related strategies can be interwoven or integrated. We have also shown that neither health nor sustainability should be given precedence over the other in strategy development and hence in the implementation of concrete initiatives. From a duality thinking, neither health nor sustainability issues should be given precedence in the strategies developed. To be truly integrative, a strategy should take into consideration sustainability in a health perspective and health in a sustainability perspective, and address both perspectives in the formulated policy strategies and the concrete development initiatives.

This article has focused on conceptual development, but we want to conclude by pointing out some of the barriers that we believe exist for duality thinking in policy and in planning towards sustainable health promotion.
First, we wish to point to the lack of adequate knowledge about how strategies related to health and to sustainability interact. The lack of knowledge may be instrumental in creating unintended and unwanted consequences such as we have described in the food examples. Both health and sustainability are fields each of which calls for transdisciplinary thinking. Integrating health and sustainability in policy formulation and in practice places even higher demands on transdisciplinary thinking and knowledge production. In such a setting, it becomes important to incorporate the social sciences more actively than they are today. Recently, Urry (Urry, 2011), Rayner and Lang (Rayner and Lang, 2012), and Lang et al. (Lang et al., 2009) have made important contributions to sustainable development and social issues from a trans-disciplinary perspective. These could inspire future thinking and work on integrating health and sustainability.

A new, dual conceptual understanding of health and sustainability will not be the adequate response to the problems and challenges ahead, unless the stakeholders across the affected fields of interests and power adopt duality thinking as the basis for strategic innovation. It will be a great challenge to develop a common understanding of health and sustainability as equal strategic objectives among the affected stakeholders across interests and knowledge. A truly integrative approach requires that the duality between health and sustainability is incorporated in the production of knowledge as well as into strategy development at all policy levels. A truly integrated approach may be possible if and only if, neither health nor sustainability become subordinate to each other. Approaching knowledge production and strategy development from a duality perspective calls for new and innovative ways to integrate health and sustainability. Such new and innovative ways could involve collaboration among a wide range of actors from the state levels, the sciences, business and the civil society. Collaboration among the actors could involve co-production of knowledge on how to integrate health and sustainability dimensions as equal critical components in strategy development, choice of means and in implementation in practice. Approaching health and sustainability from a duality perspective could alter the roles and responsibilities of actors. Involvement of lay people/citizens could change the nature of knowledge production, policy formulation and strategy development. New and innovative solutions may be enhanced by facilitating dialogue with citizens on values, objectives and means. Allowing citizens to engage in and play a role in how to integrate health and sustainability may be a new vehicle for addressing wicked and complex problems.

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