

Review

Why food in health security (FIHS)?

Mark L Wahlqvist MD (Adelaide and Uppsala) FRACP FAFPHM FAIFST FTSE

Division of Health Policy Research and Development, Institute of Population Health Sciences, National Health Research Institutes, Zhunan, and School of Public Health, National Defense Medical Center, Taiwan

Health is intrinsic to human security (HumS) although it is somewhat anthropocentric and about our own psychosocial and biomedical status more than various external threats. The 1994 United Nations Development Program definition of HumS includes economic, food, environmental, personal, community and political security with freedom from fear and want. Environmental factors are critical for health security (HealS), especially with widespread socio-economic difficulty, and health systems less affordable or accessible. The nexus between nutritionally-related disorders and infectious disease is the most pervasive world health problem. Most if not all of the Millennium Development Goals are food-linked. Maternal nutrition has life-long health effects on the yet-to-be born child. The mix of essential nutrient deprivation and energy imbalance is rife across many societies. Food systems require deeper understanding and governance to overcome these food-related health risks which are matters of food security (FoodS). Nutritionally-related Disability Adjusted Life Years (DALYS) are improving markedly in many parts of the world, along with poverty and hunger reduction and health system advances. But recent economic, energy, food, water, climate change and health crises along with conflict are limiting. It is time for international and regional understanding of how households and communities can collectively manage these threats in affordable and sustainable ways. There is untapped problem-solving capacity at the internationalisable local level if supported by combined food - health systems expertise, innovation, infrastructure and governance. Principles of equity and ethics must apply. The Food in Health Security (FIHS) roundtable aims to develop a Network to facilitate this process.

Key Words: human security, CCH-FBS, FBDGs, MDGs, Asia Pacific Region, epigenetics

INTRODUCTION

The linkage between food and health is most apparent when nutritional extremes are seen in settings of food shortage¹ and of abundance with unrestrained eating and food waste.² What is not so apparent is how changes in the range of eco-systems in which we live and work contribute to a wide range of health situations and problems^{3,4} and how important food systems are in this equation. This is partly because these systems are not well understood or articulated. As a consequence, the underlying causes have not been well-evaluated, the solutions not discovered nor implemented and the resources not available to deal with the problems.

The recent decision by an Australian community, Bundanoon, to ban water in plastic bottles, which has received world-wide attention, demonstrates that where people are informed and concerned about their eco-system, for example, in its plastic waste and water security and related health, issues like these can be addressed rapidly and effectively at the community level and action can be propagated to other likeminded communities.^{5,6}

Against this background, it is proposed to develop a 'Food in Health Security (FINS) Network' in the Asia Pacific region and, perhaps, beyond where several regions may be linked for more international outcomes.

The purposes are several:

1. To understand the current and future threats to food and health security in the Asia Pacific Region and to plan to alleviate these through regional collaboration

between the relevant cognate sciences and technologies.

2. To develop an integrated food and health systems network to enhance food and health security in the region.
3. To link with relevant international agencies expert in food and health security.
4. To raise global awareness of broad ranging issues relating to food security.

Working across the entire food and health systems and with other relevant inputs, it is planned to develop an informatics platform for the Asia Pacific Region at the National Health Research Institutes (NHRI) in Taiwan in conjunction with the World Vegetable Center based in Tainan. Facilitators of this initiative include the National Science Council, Academia Sinica, and Council of Agriculture in Taiwan and the Academies of Science (AAS) and Science, Technology and Engineering in (ATSE) in Australia. An NHRI Nutrition Consortium has been formed in Taiwan to bring together the collective scientific

Corresponding Author: Prof Mark L Wahlqvist, Division of Health Policy Research and Development, Institute of Population Health Sciences, National Health Research Institutes, No. 35, Keyan Road, Zhunan, Taiwan.

Tel: 886-37-246-166 ext. 36366; Fax: 866-37-586-261

Email: profmlw@nhri.org.tw

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and health policy-setting institutions in a way that food and health security matters can be addressed.

The process envisaged is that risk reduction and advances in food system (FSystem) performance will operate favourably on health systems (HSystem) and security as well as planetary health and that the process can become a more substantial part of the human security effort.

THE NATURE OF HEALTH SECURITY

Health security (HealS) is somewhat anthropocentric and generally about our own psychosocial and biomedical status. It came into vogue during the US Clinton administration in the 1990s when concerns about health equity encouraged the introduction of a Health Security Act, but which failed to pass into law. Until the recent financial crisis of 2008, unanticipated health expenditure accounted for most US bankruptcies; the Obama administration considers the lack of national health insurance an even greater threat to America's welfare today and in the future as health costs escalate. Many advanced economies have used the 'community-rating principle' to create national health insurance schemes which provide universal cover, with various mixes of governmental and private resources and integration of primary with secondary, tertiary and quaternary care (as in Taiwan's NHI; the UK's NHS; and Australian Medicare). They are often criticized for the risk of system abuse, but they have provided methods of cost containment and, through research, monitoring and surveillance pursued quality of care with costs less than 10% of GDP. Nevertheless, the ever-increasing costs of demographic change towards ageing populations, more patient-health care provider time, expensive medical technology and more management with high cost pharmaceuticals threaten even the most cost-effective current health care systems (HCS). Radical changes in the direction of prevention and non-pharmaceutical management are needed to enable HCSs to be affordable and sustainable. The theme for World Health Day 2007 was international health security. The aim was to urge governments, organizations and businesses to 'invest in health, build a safer future'.⁷

HealS is an essential part of human security (HumS). The latter was defined in 1994 by the United Nations Development Program and embraces economic, food, environmental, personal, community and political security with freedom from fear and want.⁸ Greater HealS should improve HumS and be a cost-effective contributor to it. The role of HealS in HumS is now being pursued more explicitly.

In reverse, the present pace of climate change and associated human, especially food, insecurity are major threats to health as well.^{6,9-11} (Figure 1)

THE ROLE OF FOOD IN HEALTH SECURITY

Food insecurity has been defined in various ways but that of Campbell in 1991 was 'limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways'.^{12,13} Indicators of food insecurity may include fear of running out of food, of money to buy food, of too little food because of economic problems, purchase of cheaper food than normal and being without food for at least a day for economic reasons.¹⁴ It is not only a question of food safety and availability (Figure 2), which is sometimes how language and culture perceive it. In the figure, the Chinese descriptors as well as their English counterparts are given; to a Chinese speaker, those for safety and sufficiency (as in the availability of a staple like rice) will be familiar, but not those to do with satisfactoriness and sustainability (these concepts are dealt with elsewhere in the Chinese approach to food which is, nevertheless, recognized as culturally intense and comprehensive).

The UN Secretary-General, Ban Ki Moon and WHO Chief, Dr Margaret Chan reported on behalf of the Economic and Social Council of the United Nations on July 6th 2009 that the current economic crisis was making it difficult for many nations to reach the MDGs and that food prices were adversely affecting food security and nutritional status because people were less able to buy healthy foods. This is one of several ways in which the food system can impact on health.^{3,4,15,16} One way in

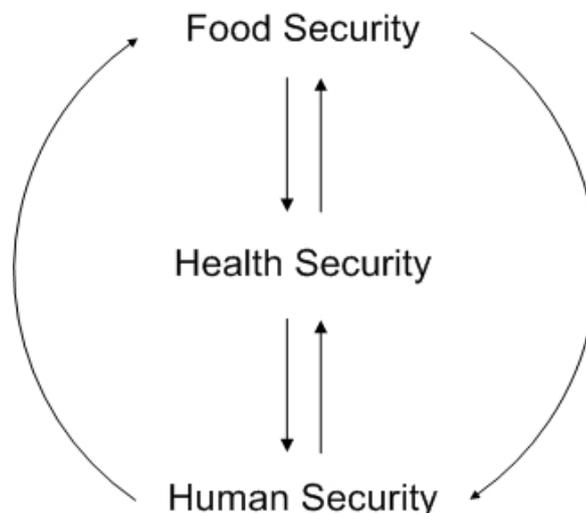


Figure 1. Food, Health and Human Securities are inter-dependent

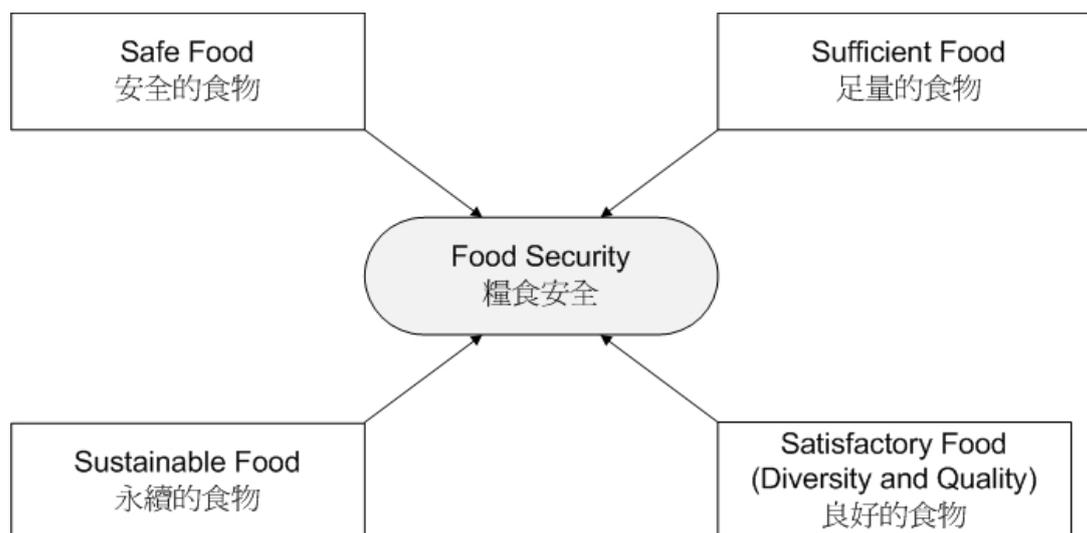


Figure 2. Food security is dependent on its safety, sufficiency, satisfactoriness (how nutritious and acceptable) and sustainability

which this is now being addressed is to improve the nutritional value of more affordable staple crops as in the HarvestPlus program.¹⁷

The FSystem operates from hunting, fishing or gathering to agricultural, pastoral, horticultural, aquacultural production, transport, processing, storage, packaging, brokerage, wholesaling and retailing, cooking, restauranting and apportionment of food in various settings like schools and work-place. This identifies several points at which food may affect health security.

There are several trends in the food supply chain which have the potential to threaten health security:

- Climate change with drought in temperate zones and less arable land; warming of land and sea with reduced (or at least changed) food production and with reduction in edible fish species and stocks; weather extremes with more flooding in some regions and changed typhoon, cyclone or hurricane frequency and severity (even affecting earthquake patterns as evident in Taiwan) with loss of crops and farm animals; rising sea levels with loss of rice and horticultural production in low-lying areas like the Mekong delta and Pacific Islands
- Limited water supplies for food production
- Increasing urbanisation and property development which encroaches on arable land
- Diversion of food crops to biofuels
- Increased demand for food with population growth in areas with constraints on food production; acquisition of arable land across national borders as both a benefit and source of conflict
- Rising affluence and a greater preference for animal-derived foods with greater environmental costs than plant-derived foods^{18,19}
- Price pressures which have decreased profit margins for players downstream from retailers in the food chain, notably small farmers and food manufacturers, and placed most control of food systems in the hands of fewer and fewer businesses at the retailing end. With economic crisis, and exposure to financial markets, the

viability of even these businesses is placed in jeopardy²⁰

- The lack of investment in primary food production and food technology at the community level
- The increasing dependence on food transported at high energy cost
- Wastage in food systems from harvest (especially with seafood) and production to transport, packaging, storage (although great gains have been made here as well) and 'at the table' (especially in affluent societies)

The spectrum of Nutritionally-related disorders and diseases (NRDs) is also much broader than currently thought.¹⁶ These include every human biological system and physiological function. They also represent new food-borne challenges to human biology like new sources of food (eg single cell for essential nutrients and active components), changing food patterns, changes in food composition and physico-chemical properties, changes in food ingredients and in recipes with functional properties, changes in food toxicology and changes in microbial and other transmissible agents (eg prions in BSE).^{20,21}

Moreover, with climate change, susceptibility to NRDs is changing.²² This is partly because of changes in human ecosystems, insect vectors, infectious agents and food system in particular, and to changes in susceptibility to disease, including nutritional status and immune function. The current education of health care practitioners and public health workers is not sufficiently geared to these situations.

INTEGRATED FOOD AND HEALTH SYSTEMS – FOOD IN HEALTH SECURITY (FIHS)

There are some settings in which there is cross-over between the food and health systems to considerable effect. These include cooperation between agricultural extension officers and primary health workers in rural settings where protein energy malnutrition (PEM) and micronutrient deficiencies are recognized; in the design and production of nutritious foods for nutritionally vulnerable groups of women and children; in school garden and feeding programs; in the training of some nutritionist and, rarely,

in the tertiary education sector for teachers, home economists, nutritionists or health workers. There is much more to be done of this kind and in more innovative ways.

What is attractive is for the food and health systems to co-operate in training, the development of livelihoods and programs for preventive health and health management. A good example is the Hewlett Packard sponsored program in Kuppam, India, where wireless facilities were provided for a radius of 30 km, mobile vans fitted with both a basic agricultural field and primary care facilities, small business opportunities provided for women (like digital photography) and local government improved with information services. In less than 3 years there was evidence of community transformation and sustainability of these technologically-relevant opportunities.²³

We require more integration between the food and health systems and training and practice to discover and manage an emerging new era of health problems.

THE PRINCIPLES OF EQUITY AND THE PLACE OF ETHICS IN FIHS

Disparities in access to food have been gross for much of human agrarian society, much of it worsened during the intensive and overwhelming period of European colonization of much of the world the 16th to 20th centuries.²⁴ Famine and pestilence in Europe was a significant factor in the import of new crops into Europe from colonies (eg maize and potatoes) and then emigration and colonization (eg after population explosion and failure of these crops as in the Irish potato famine, and in Swedish migration of a quarter of its population to North America in the 19th century).²⁵

This was also a period when the acquisition of commodities like sugar, tea and spices was sub-served by slavery, indentured labour and exploitation of colonized populations. Food (eg cod),²⁶ seasoning (eg salt)²⁷ and beverage (eg tea and rum) even served as currencies or exchangeable commodities.

The current disparities can not be solved by such means, yet they are now, by population size affected, much greater with some one billion of a world population of 6.7 billion suffering hunger and poverty and many more at the margin of this state.²⁸ Radical measures which educate, relieve debt, provide micro-credit,²⁹ empower women, build food and health systems and focus on households and communities are required to overcome the range of gross to lesser inequities.⁶

As food insecurity deepens, so the inequities in food distribution will widen.^{30,31} This constitutes a moral problem since human rights are taken to include the right to food.³² Even setting aside this UN Charter, more and more situations are emerging where one group has access to food and another is denied it. Fish is a poignant example since it is now known to confer particular health advantages in chronic disease prevention (cardiovascular disease, probably diabetes, certain cancer and cognitive impairment). Traditional fishing grounds of Pacific Island, Sumatran, West African, Mediterranean and other communities are being fished out with factory fishing fleets, making these foods less obtainable or affordable to the original users. Where next? Ultimately, there may be little fish left for human consumption and we may depend on

expensive and less satisfactory fish substitutes. The loss of productive fishing grounds or arable land, local food supplies and livelihoods to communities and households will be a growing problem.

The introduction of well-meaning solutions to food in health security for communities may not benefit all members in the same way, and may even out some at risk.^{33,34} An example is iron supplementation for anaemia in malarious areas, when increased adverse events may be seen as a result of overwhelming malaria.^{35,36}

How do informed consent and the ethical principle of autonomy apply in these complex food-health arenas? The role of ethics is, as yet, poorly developed where the food and health systems intersect.

A TIME OF CRISIS

The period beginning 2007 is a time of major global crises affecting financial, energy, water, climate, food and health. Some nations are coping better than others. Some imagine that it will pass and all will be well again. But the difference now is that the ecological and, probably human biological resilience is stretched to near the limits. That this is the case is borne out by the report of the International Climate Change Committee and, for food systems, by several reports from the International Food Policy Research Institute in Washington³⁷ and by the reports of the A time for innovation and risk management.

Just as this is a time of crisis for both food and health systems, it is a time of opportunity. Both systems have a track record of extraordinary innovation and interest younger people as careers and for their mutual relevance in economic, social and health advancement.³⁸

There are some critical points where the food system could make major gains for health. These include the application of sustainable energy sources to and greenhouse gas management of the system,³⁹ more nutritious and sustainable food production and food patterns conducive to optimal health.²¹

FROM HOUSEHOLDS, TO COMMUNITIES, TO REGIONS, TO THE PLANET

Food-based Dietary Guidelines (FBDGs), since their formulation in Cyprus in 1995 and promulgation by FAO and WHO have emphasized socio-cultural factors in food guidelines and nutrition policy to health advantage. However, their effect on households and communities remains limited and this focus, along with inter-community connectedness, is now required in addition to governmental adoption. This approach has been referred to as Connected Communities and Households – Food-bases Strategy (CCH-FBS).⁶ Such an approach also requires a heightened consciousness of the habitats in which we live and how healthy they might be for us as humans and for the planet.

CAN RESPECTABLE SCIENCE AND TECHNOLOGY BE A MOVEMENT FOR HUMAN AND PLANETARY HEALTH?

It is as important for food and nutrition policy to be underpinned by its science and supported by its technology as any other endeavour. To this end there has been increased attention to evidence-based nutrition (EBN), par-

ticularly through the International Union of Nutritional Sciences (IUNS) and in the Asia Pacific region.⁴⁰

There are indications that the current surge in food and nutrition science will provide innovative approaches to food and health security.²² These range from the growing awareness of the more integrative nutritional epigenetics to neuro-behavioural and societal nutrition⁴⁰ and a greater food and nutrition science effort for the most vulnerable communities.

AUTHOR DISCLOSURES

Author has no conflict of interest.

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Mark L Wahlqvist MD (Adelaide and Uppsala) FRACP FAFPHM FAIFST FTSE

Division of Health Policy Research and Development, Institute of Population Health Sciences, National Health Research Institutes, Zhunan, and School of Public Health, National Defense Medical Center, Taiwan

為什麼討論糧食、食品與健康安全?

健康是人類安全的本質，雖然它是比較自我的，且與個體自身在社會心理及生物醫學上的狀態攸關，甚於其他的各種外在威脅。1994年聯合國發展計畫署之《人類發展報告》，定義人類安全在免於恐懼及匱乏的自由，包括獲取經濟、糧食、環境、個人、社群及政治的安全。環境的因素對衛生安全具關鍵性，特別是對處於社經困境的廣大群眾，及負擔沈重或利用上困難的衛生體制。營養相關的疾病與傳染病之間的錯綜關連是最普遍的世界衛生問題。大多數的聯合國千禧年發展目標都跟糧食有關。母親的營養對還未出生的嬰孩的健康有著終身的影響。在很多社會中充斥著必需營養素的缺乏和熱量不平衡的混雜情況。需要更深入地了解及管理糧食體系，以克服那些與食物相關的健康風險。而這些都是糧食安全的議題。隨著貧窮、饑餓問題的減少和醫療體制的進步，「營養相關之失能調整生命年」在世界許多國家顯著的提升中。然而近年來的經濟、能源、糧食、水、氣候變遷跟衛生危機帶來的衝突卻讓這些進步受限。目前應是國際和區域的層級，了解如何讓家戶跟社區以負擔得起及永續的方法，來共同應付這些威脅的時候了，在已經能夠被國際化的區域那些尚未被利用的能力，可透過結合糧食與衛生體系的專業知識、創新力、基礎建設及管理的支持而被開發。同時必須遵循平等與倫理的原則。「亞太地區糧食、食品與健康安全國際研討會暨專家會議」就是以發展促進這樣進程的一個網絡為目標。

關鍵字：人類安全、結合家戶和社區以食物為基礎的策略、食物為基礎的飲食指南、千禧年發展目標、亞太地區、表觀遺傳學