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Commentary

The rise and fall of paradigms in world food and nutrition policy

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Summary

This commentary describes and analyses how approaches to public health nutrition, and in particular child malnutrition in less-resourced countries, have changed since the creation of the United Nations after the 1939-1945 World War. A particular approach has dominated for some time, but then been replaced by a another new approach, which in turn has dominated for the next period of time, influencing or even 'controlling' research and practice, and so on. These different approaches have been manifestations of successive mind-sets, or 'paradigms'.

New paradigms in public health nutrition have repeatedly replaced one other in the second half of the 20th century. This convulsive process continues. These paradigm shifts are results of new scientific discoveries, changing interpretations of science, and competing ethical priorities and positions.

During each period a 'mainstream' paradigm has dominated research and practice, while at the same time being assailed by one or more 'counterpoint' paradigms. After some years one of these 'counterpoint' paradigms has replaced the old paradigm and has become the next 'mainstream' paradigm.

A sequence is evident. It goes like this. First came the protein deficiency paradigm, from 1950 to 1974. This was followed by the multi-sectoral nutrition planning and national nutrition policies paradigm, from 1973 to 1985. Then came the community-based nutrition and primary health care paradigm, from 1985 to 1995. This was replaced by the micronutrient paradigm, from 1995 to 2005, which is not yet replaced. The current competing two paradigms are on investment in nutrition, and the human rights approach, both with malnourished children as their focus.

Some of the paradigm shifts are primarily the result of new scientific discoveries. Others are more the result of changes in politics, ideology and ethical values, which lead to different interpretations of science. In general, nutrition paradigms have become increasingly normative, reflecting the general trend in development theory and practice. Theory and practice are dialectically related; one cannot be understood without the other. A significant gap between theory and practice has characterised almost all periods, causing a 'rhetoric-action gap' between what goes on paper and what happens in reality.

Introduction

There is no field of practical importance related to human well-being in which there is greater opportunity for dogmatism and quackery, pseudo-science and unwarranted presumptions and prescriptions, than in the domain of our daily diet.

The Lancet, 30 March 1940

Most observers would agree on the consecutive paradigm shifts in public health nutrition over the years. But there would be much less agreement on when exactly these shifts took place. The time periods suggested below are approximate and should be seen as indicative only.

- The period before 1950
- The protein deficiency paradigm (1950-1974)
- The multisectoral nutrition planning paradigm (1974-1980)
- The national nutrition policy paradigm (1980-1990)
- The community-based nutrition paradigm (1985-1995)
- The micronutrient malnutrition paradigm (1995-2005)
- A period of paradigm crisis (2005-present)

First, a discussion of the relationships between science and ethics, on one hand, and between theory and practice, on the other will be made. Then each of the six periods dominated by one mainstream paradigm will be discussed. The reasons for the rise, the main characteristics, and the reasons for the fall of each paradigm, will be presented. This will be followed by an analysis of the current paradigm crisis and its implications. Finally, the currently two competing paradigms are described and their different policy implications compared.

Science and ethics, theory and practice

Both science and ethics influence our construction of 'reality'. They are different but inter-related. Science deals with what can be done, while ethics deals with what should or ought to be done. Science is descriptive, while ethics is normative. Science is most often advanced

through observations and experimentation, while ethics is advanced through dialogue, reflection, enquiry and sometimes confrontation.

The relationship between 'can' and 'should' has been discussed by philosophers for a very long time. Immanuel Kant stated that: 'Should must be preceded by can – it is otherwise Utopia'. James Grant, while Executive Director of UNICEF, often said that 'morality must march with capacity' (1). He constantly reminded UNICEF staff to promote 'do-able actions', meaning those actions that both should be made and can be made.

Science and ethics are interrelated, sometimes almost dialectically. There are many examples of how ethics have influenced science, for example the ethical arguments in cloning research and the current debate on climate change. The way the increased awareness of the un-ethical promotion of breastmilk substitutes led to increased research in the importance of exclusive breastfeeding, is a good example in the field of child nutrition.

There are many more examples of how science has influenced ethics. One is the way increased research into the positive impact of breastfeeding changed the ethical position of many people in favour of controlling aggressive marketing of breastmilk substitutes.

Political philosophy deals with the ethics of public behaviour, and *politics* deals with the social relations involving authority and power. Politics always reflects a certain *ideology*, which in turn represents a mentally constructed 'reality' or 'world view', in which, typically, both science and ethics contribute. In this commentary the terms 'ethical', 'political' and 'ideological' are somewhat used interchangeably.

Scientific understanding of a problem involves understanding the *causes* of the problem. The different mainstream paradigms in public health nutrition over the years have shifted between *mono-causality* and *multi-causality*. In general, the recognition of social, economic, political and cultural causes has resulted in more multi-causal paradigms.

Theory and *practice* are dialectically inter-related. One lacks full meaning without the other one. Thomas Kuhn's famous statement 'you find what you look for' and Albert Einstein's statement 'It is the theory that determines what we can see… Nothing is more practical than a good theory' reflect the importance of theory when trying to understand reality.

The fact that practice influences theory is rather obvious from the practice of scientific work and experimentation. Any particular theory is changed or abandoned when it fails to 'explain' reality in a satisfactory manner. Then a paradigm shift takes place. A paradigm is based on a specific theory or set of theories. Paradigm shifts take place when new scientific discoveries are made and/or when the ethical and political positions of those in power to chose a new direction of research.

Paradigms and paradigm shifts

'Paradigm' in the sense used here, is a concept used by Thomas Kuhn in his famous book *The Structure of Scientific Revolutions* (2) By 'paradigm' Kuhn means a set of practices that define a scientific discipline during a particular period of time. A paradigm defines

- What is to be observed and scrutinised
- The kinds of questions to be asked
- How these questions are to be structured
- How the results of scientific investigations should be interpreted.

A paradigm is somewhat similar to 'group-think' or 'mindset'. Kuhn saw the concept of *normal science* as the most important aspect of a paradigm. During each period of a dominating paradigm, 'normal science' characterises what the majority of researchers do. He defines 'normal science' as '...research firmly based upon one or more past scientific achievements, achievements that some particular scientific community acknowledges for a time as supplying the foundation for further practice'. 'Normal science' can be seen as 'thinking inside the box'. Thinking outside the box means 'revolutionary science'.

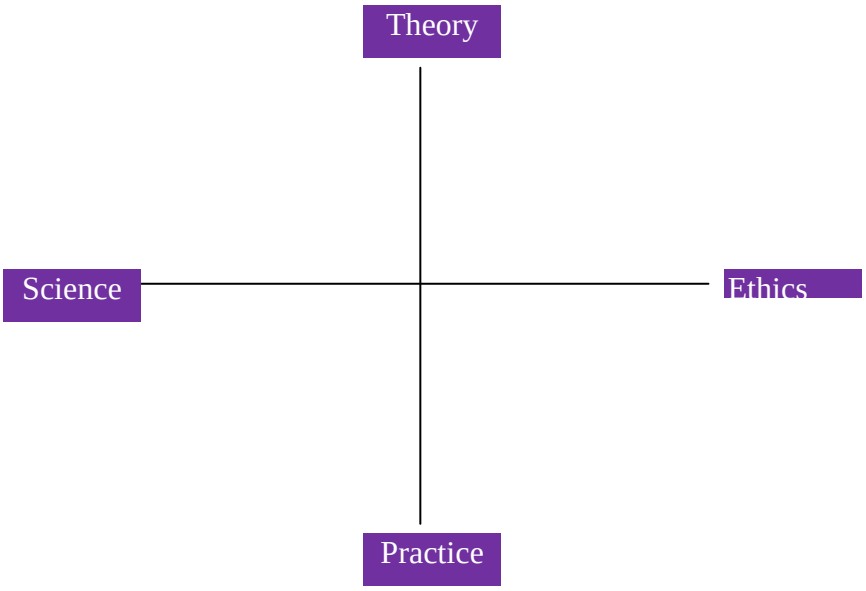
During the period of a particular paradigm there are often one or several competing parallel paradigm, most often, although not always, incommensurable with the dominating paradigm. The dominating paradigm is also called the mainstream paradigm, while the parallel competing ones are called counterpoint paradigms (3).

The work of reducing child malnutrition in the South (also known as 'developing countries') represents a very good example of the changes described above, or 'paradigm shifts' as Kuhn called them. A paradigm shift takes place when the mainstream paradigm is replaced by one of the counterpoint paradigms. Such a shift occurs when the old paradigm increasingly fails to explain phenomena or causes of a problem in that particular research field. A paradigm shift means 'to enlarge, renew, and give new meaning to what is already known' (4).

In a broader sense a paradigm can also be seen as a 'world view' or an explanatory conceptual framework. Development theory has gradually moved away from positivistic approaches, towards an increased understanding of the important role of normative thinking (5). The way human beings 'construct' reality is a complex result of scientific understanding and also of ethics.

Paradigm shifts are most often the result of either new scientific discovery and/or a changing 'ethical climate', influenced by changing political and ideological positions. Sometimes both take place .During the period of a particular paradigm there are often one or several competing parallel paradigms, most often, although not always, incommensurable with the dominant or 'mainstream' paradigm.

When some countries have managed to establish correct priorities, prepared national nutrition plans and secured basic financing, the implementation phase has been poor at best, non-existent at worst. This reflects a *rhetoric/action gap*; a gap between theoretical plans and practice. The process from theory to practice is driven or constrained by science and ethics, as understood by those who have the power to decide. The neglect of nutrition is not the simple 'lack of political will'. It is a result of deliberate political choices. The rhetoric/action gap exists because those who decide over the process do not take a decision, or take the wrong decision, because of their misunderstanding of science or their particular ethical or political positions (6).



The 'space for social action' can be defined by the science/ethics and theory/practice dimensions, as illustrated in the figure above. The same dimensions can be used to structure Knutsson's 'reality room' He repeatedly warned against any type of reductionism and emphasised that the meaning of what we observe is influenced both by scientific facts and values (ethics) and that theory and practice are not each other's enemies but must be understood together (7).

Before 1950
Vitamin deficiency paradigm

Throughout the centuries hunger has been seen as an inevitable part of many people's daily life. In some cultures hunger was even 'glorified'. Thomas Aquinas for example promoted the ethical (religious/political) position that people who were poor and hungry were lucky, because they would be the first to enter Heaven, well expressed in one of his statements.

'Naked follow naked Christ'. Similarly Mahatma Gandhi re-defined the lowest caste in India as *Harijan*, which means 'Children of God'.

Based on new scientific discoveries in chemistry, biochemistry and biology, Graham Lusk introduced *nutrition* as a new scientific discipline in 1909(8). It had though been known for centuries that some diseases were results of the absence of some specific foods in the daily diet. The Polish-American biochemist Casimir Funk proposed in 1912 that the lack of these specific, not yet identified, factors probably was the cause of beriberi, scurvy, pellagra and maybe rickets – 'and we will call these factors *vitamins'* (9). Indeed, 'you find what you look for'. Already by 1915 scientists had found and isolated several vitamins. The first 'paradigm' for modern nutrition had been created. This was: *Malnutrition in society is caused by lack of certain vitamins in the diet.* This was an evident scientific fact. The solution to the problem was straightforward; provide vitamins to people who are lacking them. This approach became the 'mainstream paradigm' for several decades.

The vitamin deficiency paradigm was a result of scientific discovery, and was clearly mono-focal as far as causality is concerned. And indeed many people were cured and prevented from experiencing diseases related to micronutrient deficiencies in their diets.

The decline of the mainstream vitamin deficiency paradigm was initially again a new scientific discovery. Already in 1932 a new disease in very young children was reported from the Gold Coast (now Ghana) (10). Later, similar cases were reported from Uganda. (11). The disease was called *Kwashiorkor* and could be cured by consumption of skimmed milk. In 1952 FAO and WHO agreed that kwashiorkor was caused by protein deficiency at the celular level; and renamed the disease *protein malnutrition*. As a result of new scientific discoveries, the new *protein deficiency paradigm* replaced the vitamin deficiency paradigm in around 1950.

1950-1974
Protein deficiency paradigm

Explanation for becoming mainstream

The vitamin deficiency paradigm could not explain kwashiorkor. The scientific discovery of the fact that human beings require a regular intake of protein, containing an adequate amount of essential amino acids, established the scientific basis for the new mainstream paradigm. Further scientific work discovered that the low protein intake was a result of low consumption of protein-rich foods. Finally, the discovery that the protein requirements for children seemed to be much higher than expected transformed the whole situation over

night into a 'global protein crisis'. The last step was as much ideologically driven as it was a result of scientific discovery.

Characteristics of the protein deficiency paradigm

From about 1955 the protein deficiency paradigm totally dominated nutrition research and practice. A ten year period followed that was characterised by 'puzzle-solving' as part of 'normal science', to lead the 'war against the world protein crisis'. Unconventional sources of proteins were explored from fish, soya and oilseeds to algae, leaves and micro-organisms(12). The excitement or 'hysteria' culminated in 1967, when through the lobbying of the United Nation's expert Protein Advisory Group, the UN issued its report *International Action to Avert the Impending Protein Crisis* (13).

The dominance of the protein deficiency paradigm as the 'mainstream' was almost total. Several of those scientists and practitioners who raised 'counterpoint' ideas were ruthlessly marginalised, by not being invited to important conferences, having their papers rejected by mainstream scientific journals, or by being side-stepped in their expected research careers. Kuhn's 'hidden faculty' was a reality.

Explanation of the decline of the protein deficiency paradigm

Ever since the early 1950s, individual scientists had criticised the protein deficiency paradigm for being too narrow and too simple (14). The criticism focused on four issues. First, it was discovered that most diets in poor communities in impoverished countries were actually low in both protein and energy (calories), with the energy deficit being worse (15). At such low energy intakes, valuable proteins would be used as an energy source, rather than as a source of essential amino acids for protein synthesis (16). Second, it is the 'protein quality' of the diet that counts, not that of individual food ingredients. If children had their energy needs met by consuming their 'normal' diet, the protein content and the 'protein quality' was most often adequate to meet the protein needs (17). Third, an increasing number of scientists found that the increased estimates for daily protein requirements were far too high (18). Fourth, increasingly nutrition scientists discovered that most malnourished children were also infected with diarrhoea and parasites, which significantly contributed to malnutrition.

In a *Lancet* paper in June 1973, Philip Payne and John Waterlow criticised the protein deficiency paradigm very strongly. They stated: 'The most likely effect of such statements is simply to distract attention from the need for a broad-based attack on the social and economic deprivation of which ill-health and malnutrition are but symptoms' (19). In August 1974 Donald McLaren initiated the 'final' debate with a *Lancet* letter entitled 'The great protein fiasco' (20). At the following year's World Food Conference there was not even one session on kwashiorkor or the protein crisis. In 1977 the Protein Advisory

Group was abolished. Economic, social and political causes of child malnutrition and world hunger were now emphasised.

In summary, discoveries in human nutrition had first created and then weakened the scientific basis of the protein deficiency paradigm. Many practitioners and researchers in the social sciences criticised this paradigm for reducing the problem of child malnutrition from a social and political problem to a technical, particularly a medical, problem (21) It was increasingly argued that it is unethical to continue to spend resources in producing protein-rich foods when most malnourished children were denied their 'normal' diet as a result of poverty and exploitation.

1974-1980
Multisectoral nutrition planning paradigm

Explanation for becoming mainstream

The most important reason for the next paradigm shift was the rapidly increasing awareness, understanding and recognition that delivery of protein-rich foods or limited medical interventions would not solve the problem of child malnutrition. This awareness came primarily from researchers with experience of practical work in low-income countries. They demanded a much broader multi-causal approach that would include social, economic, cultural and political aspects (22).

This also coincided with, or perhaps was a result of, the changes in development theory in general towards a stronger emphasis on political factors. The 'Science of Human Nutrition' was too narrow; a *Science of Nutrition Problems in Society* was needed. (23). The new position formed the intellectual base for the explosive development and acceptance of multisectoral nutrition planning (24), as the new 'mainstream' approach. The theory was a very ambitious attempt to address the structural causes of malnutrition. Multisectoral nutrition planning sought to go beyond technical fixes in favour of going to the heart of a country's development effort (25).

Characteristics of the multisectoral nutrition planning paradigm

This paradigm emphasised the need to recognise child malnutrition as a structural problem, embedded in poverty and underdevelopment. The structural causes of the problem were emphasised (multi-causality). Isolated technical 'fixes' should be avoided. Nutrition interventions should be multisectoral and integrated into overall national development policies.

The shift in mainstream paradigm in applied nutrition coincided with the increased interest to use systems theory for modelling development. Multisectoral nutrition planning immediately adopted systems theory as the planning framework. The efforts to develop evidence-based multisectoral conceptual frameworks of causality resulted in unbelievably complicated maps of the nutrition problem, where literally everything depended on everything else (26). Most models were variations of the 'food-chain' approach.

Explanation of the decline of the multisectoral nutrition planning paradigm

The multisectoral nutrition planning paradigm had been criticised during the period (27) although no single 'counterpoint' paradigm had emerged. The major reasons for the decline included (1) the approach required much more data than any low-income country could (or wanted) to provide; (2) the systems analysis became far too complicated ('A holistic daydream') (28) and (3) the assumption that nutrition would become a political priority was false – most governments were not interested and those few that were interested, could not convince their different ministries to be coordinated. Many were of the opinion that the approach had become too technical. As James Pines said, 'Multisectoral nutrition planning, oversold and under-politicised from the start, stands discredited for failure to bring about nutrition improvement' (29).

At the end of the 1970s most nutrition scholars had left multisectoral nutrition planning, but there was no return to the 'old thinking'. The nutrition problem continued to be seen as a 'problem in society', but now with a focus at the macro level, on national nutrition policies and their monitoring.

1980-1990
National nutrition policy paradigm

Explanation for becoming mainstream

Even if multisectoral nutrition planning had failed, some of its fundamental and often under-emphasised principles survived (30). All agreed that child malnutrition was a result of social, economic, political and cultural processes in society, and that efforts to solve the problem of malnutrition would have to address all levels of society, from national policy level to the community and household levels. Even if multisectoral nutrition planning had failed to mobilise political leaders, the problem of malnutrition was on the political agenda.

After the World Food Conference in Rome in 1974, the problem of malnutrition was no longer seen as a global protein problem, but as a global food supply problem. The FAO Fourth World Food Survey in 1977 (31) showed that the problem was not total food

supply but an unequal distribution of food, or lack of access to food by people who are poor. Poverty was singled out as the major cause of child malnutrition (32).

For some time the conclusion for many was that the only way or at least the best way, to prevent malnutrition was to reduce poverty. The 'counterpoint' position was based on new research showing that the link between poverty and *young* child malnutrition was not a simple cause-effect relationship (33). Instead they promoted the idea that malnutrition should be addressed by all relevant sectoral policies and strategies. Interventions in the different sectors should be *coordinated*, but not *integrated* as had been promoted during the time of multi-sectoral nutrition planning. This soon became the 'mainstream' approach as far as the macro-level was concerned (34).

Another explanation of the promotion of national nutrition policies and strategies was the much increased interest among donor countries to address the problem of malnutrition.

Characteristics of the national nutrition policy paradigm

Supported by multilateral and bilateral agencies, many countries prepared detailed 'national nutrition policies' or 'national nutrition strategies'. These were mostly prepared by expatriate staff from different agencies. Several governments prepared national nutrition policies and strategies to please specific donors, in order to secure additional assistance in the area of nutrition. The World Bank, for example, often demanded a new or up-dated national nutrition strategy before any loan to nutrition was approved (35). Similarly, donor agencies supported many low-income countries to establish 'national nutrition centres' or 'cells' to coordinate the implementation of their new national nutrition policies. The Tanzania Food and Nutrition Centre (TFNC) established already in 1973 with Swedish SIDA support, is a good example of this. I worked in TFNC from 1976-1980.

Together with the efforts to establish national nutrition policies, was the idea of *national nutrition surveillance*. Experts from the era of multisectoral nutrition planning used systems theory to develop sophisticated data collection and monitoring systems of nutritional status as well as of the key causes of malnutrition (36). Data from the surveillance system were analysed and translated into useful information for national level decision-makers. Many of these systems worked well, and continue to be useful in nutrition work, especially in countries that have managed to use information technology (37). Better data, however, did not result in more proactive nutrition policies.

Explanation of the decline of the national nutrition policy paradigm

A major reason for the decline of the national nutrition policy paradigm was the fact that with very few exceptions the governments of lower income countries were not genuinely committed to the implementation of their national nutrition policies or strategies. Most

national nutrition institutions, newly established with donor funds, continued to be strongly dependent on donor funding. Some slowly faded away.

Another weakness of national nutrition policies was the fact that most of them were very food-biased. Many governments correctly referred to them as 'food and nutrition policies'. Increasingly people working in the field of applied nutrition had realised that household food security was just one of the necessary conditions for good child nutrition.

Although many countries had established sophisticated national nutrition surveillance programmes, it became clear that more and better information did not *per se* solve the nutrition problem. In order to have an impact the new information would have to be used by key decision makers for improved nutrition.

From a broader perspective, it was obvious that the 'depoliticisation' of national nutrition policies could no longer be accepted. The nutrition problem could not be solved by 'neutral' technocrats.

1985-1995
Community-based nutrition paradigm

Explanation for becoming mainstream

While the national nutrition policy paradigm had focused at the macro level, another parallel or 'counterpoint' paradigm had emerged during the late 1970s, which focused at the micro level – the community. Two arguments were used in promoting a paradigm shift. First, too much emphasis had been given to rehabilitate already malnourished children. Instead emphasis should be given to *prevent* children from becoming malnourished. Second, individual children are affected by malnutrition and they all live in communities. The preventive actions should therefore be *community-based*.

The meaning of a community-based approach to applied nutrition was discussed at a consultation of nutrition experts in New York in September 1982 (38). There was a consensus that three major factors must be addressed simultaneously in solving the problem of child malnutrition, namely (1) proper infant and young child feeding, (2) control of major infections and infestations, and (3) adequate access to food. Community-based nutrition programmes within a primary health care approach took over the 'mainstream' position in the early 1980s.

In the *primary health care* approach, launched by the Alma Ata Declaration in 1978, priority was to be given to the community level – where people actually live. Primary health care is

defined in the Declaration as follows: 'Primary health care is essential health care made universally accessible to individuals and families in the community by means acceptable to them, through their full participation and at a cost that the community and country can afford. It forms an integral part of both the country's health system of which it is the nucleus, and of the overall social and economic development of the community' (39). The approach had three major priorities. First, it placed health at the center of development, and saw health as an outcome of development, second, it advocated low cost and practical knowledge, including the training of village health workers and low-cost services with high coverage, and third, it was based on community participation.

Many of the innovative characteristics of this holistic approach were however soon forgotten and not applied systematically in practice. Instead of being holistic and participatory, most work in the area of health and nutrition became selective and 'top-down'. In the early 1980s UNICEF launched the 'Child survival and development revolution' campaign, which is the best example of the adoption of selective primary health care (40).

Characteristics of the community-based nutrition paradigm

The breakthrough of the community-based nutrition paradigm did not take place until the mid-1980s, when some low-income countries, quite independently of each other, implemented genuine community-based nutrition programmes. Thailand and Tanzania are two good examples.

In Thailand, malnutrition had been addressed for quite some time by a service-driven approach through the national planning system. This approach was not only too expensive, but also proved to be not effective. A paradigm shift took place in the early 1980s in Thailand with the adoption of community-driven nutrition programmes. The new strategy emphasised social mobilisation and community participation. A new cadre of village-level volunteers was trained and deployed all over the country. These new volunteers played the role of community *mobilisers*. It was found that in order to be effective, the ratio of mobilisers and households must be in the range of 1:10 to 1:20. Local officers, extension workers, teachers and others all played the role of *facilitators*, who supported and worked with the mobilisers in situation analyses, programme planning and implementation, and monitoring and evaluation. In summary, the interaction between facilitators and mobilisers focused on training, supervision and quality assurance (41).

In Tanzania the concept of community-based nutrition programmes had been developed by the Tanzania Food and Nutrition Centre in the mid 1970s. The new concept was first used on a larger scale in the WHO/UNICEF joint nutrition support programme in Iringa region (42). The success of the project is well documented and became a model not just in the other regions in Tanzania, but in many countries in Africa and Asia. In five years, the

Iringa Nutrition Programme almost eliminated severe malnutrition, and reduced moderate malnutrition by half (43).

In the work with the Iringa Nutrition Programme (1982-1988) several discoveries and innovations were made that have influenced current thinking and work, both in the understanding of the nutrition problem, and in practice how to prevent it. The further development and refinement of a conceptual framework of causality as a tool to understand 'what to do' in order to reduce the nutrition problem (44) and the Triple A approach for 'how to do it', were the two major innovations (45).

The conceptual framework of causality was adopted in the UNICEF nutrition strategy of 1990 (46) and is now being accepted and used in various forms by most nutrition researchers, teachers and practitioners in the area of young child nutrition in developing countries.

During this period the interest in and commitment to solve the nutrition problem significantly increased among donor agencies and other actors of the international community, including an unusual consensus on the causes of young child malnutrition. In September 1990 the World Summit for Children was held in New York. The summit agreed on a Declaration that included seven major goals and 20 supportive goals for women and children (47). Eight of these goals were aimed at reducing child malnutrition by the year 2000. These are: Reducing severe and moderate malnutrition by half; reducing low birth weight to less than 10 percent; reducing iron deficiency anaemia in women to one third; virtual elimination of iodine deficiency disorders; virtual elimination of vitamin A deficiency; empowerment of all women to breastfeed exclusively to 4-6 months; growth promotion institutionalised; and dissemination of knowledge on household food security disorders.

During the same month the Convention on the Rights of the Child came into force (48) where the right of the child to good nutrition is codified. Both these events explain the great interest in child nutrition during the following years.

These basic priorities provided the policy context for a milestone meeting of the ACC/Sub-Committee on Nutrition (SCN) in London in November 1990 to discuss 'Some Options for Improving Nutrition in the 1990s' (49). The framework promoted in the UNICEF nutrition strategy guided the discussion. It was agreed that nutritional status is determined by the level of household food security, infectious disease and caring capacity. This approach was fully endorsed at the International Conference on Nutrition held in Rome in December 1992, whose final report stated: 'Although poverty is the root cause of malnutrition, nutritional status is affected by a wide range of factors which can be categorised into three main categories – food, health and care' (50).

The decline of the community-based nutrition paradigm

The community-based nutrition paradigm has survived until today, but was replaced in the mid-1990s as the mainstream paradigm of applied nutrition by the new micronutrient malnutrition paradigm. The major explanation for this paradigm shift consisted in a general decrease in the interest of donor and aided countries alike in the problem of protein-energy malnutrition. The increasingly stronger position and convincing evidence that this type of malnutrition in children in low-income countries are the result of historical, economic and social inequalities, maintained by the politics exercised by those in power, became unbearably embarrassing for both conservative governments and many donor agencies, including The World Bank.

In conclusion, the community-based nutrition paradigm declined as a result of the changing political and ethical climate, and as a result of the emergence of the new micronutrient malnutrition paradigm, which was and is based on much less politically threatening new scientific discoveries (51).

1995-2005
Micronutrient malnutrition paradigm

Explanation for becoming mainstream

In 1991 a first meeting to pursue the World Summit for Children (WSC) goals and recommendations was held in Montreal, Canada. The title of the meeting, 'Ending Hidden Hunger', referred to the invisible frequent forms of mild and moderate micronutrient malnutrition (52). The conference mobilised the international nutrition community to allocate more resources to this rapidly growing field of nutrition.

By the mid 1990s control of micronutrient malnutrition, particularly deficiencies in iodine, vitamin A and iron, became the 'mainstream' in nutrition research and development (53). At the same time the interest in protein-energy malnutrition dramatically decreased. In general, apart from the new interest in micronutrients, nutrition was given much less attention after around 1995. Already in 1992, UNICEF defined 'mid-decade goals' to be achieved by 1995 (54). It was decided that the goal of reducing protein energy malnutrition did not qualify as a mid-decade goal. This immediately resulted in reduced funding for this type of malnutrition, both by UNICEF and many other agencies and organisations. During the second half of the 1990s, some initiatives were made to revive the interest in the problem of malnutrition in low-income countries in general, and in protein-energy malnutrition in particular. In 1996 a small group of nutrition experts of which I was one, suggested the establishment of a new discipline to bring together the often uncoordinated

policies, programmes and projects in nutrition. The new discipline was called Public Nutrition (55), and in 1997 the first meeting on the new subject was held in Montreal (56).

In public nutrition, good nutrition is seen as a 'public good' and the state should take a significant responsibility to ensure that malnutrition is prevented. It further emphasises that the solutions are normally very contextual and that the key actors for prevention are the communities themselves. The discussion on 'public nutrition' died off after a few years, but had contributed to preventing nutrition being subsumed under 'health', and paved the way for an emerging 'counterpoint' paradigm – a human right-based approach to nutrition. It is encouraging that the concept of 'public nutrition' has been revived in the creation of the World Public Health Nutrition Association, publisher of this on-line journal *World Nutrition.*

The major reasons for the unprecedented rise of the micronutrient deficiency paradigm were scientific and ethical in nature. Results from research had conclusively demonstrated the health impact of deficiencies in iodine, vitamin A, and iron. Technologies for providing these micronutrients to individuals on a large scale had been developed at a low cost (for example, salt iodisation). The World Bank and others were convinced that control of micronutrient malnutrition was one of the most cost-effective interventions in the whole area of health and nutrition (57)

Also, in spite of the consensus regarding the problem of protein-energy malnutrition and many large-scale efforts to prevent it, the impact had been much less than expected. The fact that most of these failures actually were results of not applying the 'lessons learnt' was seldom appreciated. A political/ethical reason, and perhaps the most important one, was the fact that micronutrient control programmes could easily be implemented 'top-down' and would rarely require any change in social and political power structures. They were politically risk-free and therefore 'do-able'.

Characteristics of the micronutrient deficiency paradigm

Micronutrient malnutrition is a very common and important form of child malnutrition in many lower-income countries. Most forms are results of inadequate dietary intake of micronutrients, in particular iodine, vitamin A and iron. Dietary deficiencies in micronutrients can be solved by dietary change, food fortification or supplementation. The last two approaches are very mono-causal. They dominated the work to control micronutrient malnutrition during this period. The control of iodine deficiency disorders through universal salt iodisation was extremely successful, while the control of vitamin A deficiency by supplementation, and the control of iron deficiency anemia through fortification and supplementation were less successful.

It is very important to recognise the present success of this mono-causal paradigm. Criticism should not be targeted at this paradigm *per se*. Rather, when it became the mainstream paradigm it contributed to the neglect of the problem of protein energy malnutrition.

As the mainstream paradigms of applied nutrition, the micronutrient malnutrition paradigm and the protein deficiency paradigm have some important similarities. Both promoted mono-causality and therefore avoided any serious recognition of or discussion about economic, social and political causation. Both also reflect the attitude that '*they* lack something that *we* have – let us give it to them'. Of course micronutrients can be handled this way; power cannot. They were both promoted as 'magic bullet' solutions and therefore resulted in 'top-down' and 'outcome-focused' programmes.

As a result of the perceived mono-causality, it was easy to estimate the cost-effectiveness of micronutrient control programmes. The World Bank published a stream of reports showing that micronutrient control programmes were the most cost-effective health intervention, and rapidly became the largest funding agency for controlling micronutrient malnutrition.

Another effect of the mono-causality was the simplicity by which the problem could be described, analysed, communicated and understood. People without any prior knowledge became 'experts' on micronutrient malnutrition overnight. They were easily convinced about the advantages to focus on these 'do-able' programmes, at the expense of the more 'complicated' protein-energy malnutrition control programmes.

Last but not least, micronutrient malnutrition control programmes clearly benefited from the involvement of industry. Although such an involvement was technically sound and welcome, the new enthusiasm over the rapid growing number of 'private-public partnerships' had a not always transparent ideological and political motivation.

Control of micronutrient malnutrition continues to be a common strategy today, while prevention of protein energy malnutrition has become a rather silent 'counterpoint'. This situation, however, is likely to change again soon**.**

Explanation for the decline of the micronutrient deficiency paradigm

The decline of the micronutrient deficiency paradigm was caused by several factors. First, there was a general increased interest and commitment among donors and some developing country governments to reduce young child mortality rates, and there was agreement that protein energy malnutrition significantly increased the risk of dying of common childhood diseases like measles, diarrhoea and malaria.

Second, the actual results and effectiveness of many micronutrient control programmes had become increasingly questioned, in particular the extent to which vitamin A supplementation reduced young child mortality. This is the topic of a previous commentary in this journal (58). Third, as in earlier periods, the World Bank had decided to give a much higher priority to protein energy malnutrition than before, and this influenced many countries to change their priorities, at least on paper (59).

2005 – now
A period of paradigm crisis

Confusion and competing paradigms

There is now an emerging consensus that controlling micronutrient malnutrition will not solve the problem of child malnutrition in low-income countries. This was not the result of the emergence of any new mainstream paradigm. Instead a period of confusion and competing parallel paradigms began.

In early 2008 *The Lancet* launched a series of well prepared nutrition review papers covering all aspects of maternal and child undernutrition (60). The first four papers are thorough reviews of current knowledge, despite sometimes being author-biased. The fifth paper, however, has a very different purpose. Here the 'international nutrition system' is severely criticised for being 'fragmented and dysfunctional'. The authors recommend a better system for producing normative evidence-based guidance in applied nutrition. They conclude that 'The international community needs to identify and establish a new global governance structure that can provide greater accountability and participation for civil society and the private sector'.

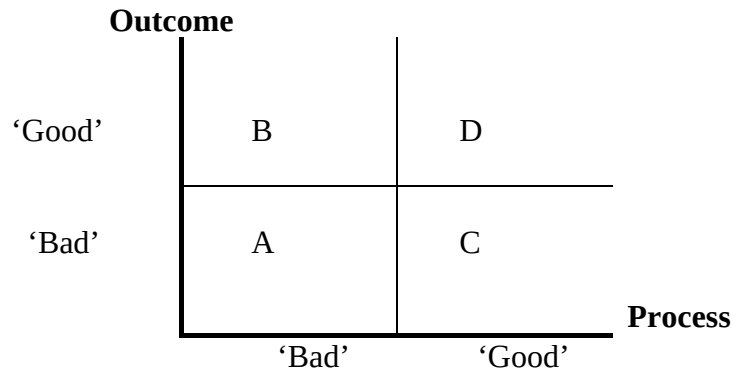
Instead of recognising, reviewing and analysing the obvious current paradigm crisis in applied nutrition, what is perhaps the most influential medical journal in the world chose to criticise the structure and function of organisations working in the field of nutrition. It is clear that the authors of this paper favoured a much stronger influence of the private sector in dealing with the survival and development of young children in poor households.

Although there are a number of ideas and pre-paradigms floating around at present, two of them have reached a level of counterpoint paradigms, and it is very likely that one of them in due course will be the next mainstream paradigm in applied nutrition. These two are the investment in nutrition paradigm, and the human rights approach to nutrition paradigm

Development as outcome and process

In order to compare the investment in nutrition paradigm and the human rights approach to nutrition paradigm, here is a construct of *development* (61). Development requires the satisfaction of at least two conditions. These are the achievement of a desirable *outcome* and the establishment of an adequate *process* to achieve and sustain that outcome.

Most of the health, education, and nutrition goals set at the World Summit for Children or reflected in the Millennium Development Goals, for example, represent specific, desirable outcomes. Effective (human) development demands a high-quality process to achieve such outcomes. In most development approaches, cost-effectiveness, participation, local ownership, empowerment, and sustainability have been seen as essential characteristics of a high-quality process in achieving (human) development goals. Level of outcome and quality of process define a two-dimensional space for development, as illustrated below.



Most development starts at A, and the ideal, final stage is D. But many development programmes move into one of the two areas represented by B or C. The former represents a good outcome at the expense of, for example, sustainability (an aspect of a good process), and is as ineffective as C - a good process without a significant outcome.

Outcome-focused approaches have been favoured by many economists and development agencies. A good example is the current almost universal focus on the achievement of the Millennium Development Goals without any serious discussion about the quality or legitimacy of the process.

Process-oriented approaches have been favoured by non-government organisations. Many small, local programmes have established high quality processes, but at a relatively high cost per person. Few have expanded to a markedly larger scale with significant outcomes.

The lack of more ethically and politically derived criteria in development planning and implementation was acknowledged by UNDP in their *Human Development Report 2000,* in which they admitted that 'Although human development thinking has always insisted on the importance of the process of development, many of the tools developed by the human development approach measure the outcome of social arrangements in such a way that it is not sensitive to how these outcomes were brought about' (62).

2005 – now

Investment in nutrition paradigm

There are now signs of a revival of the interest in nutrition in general, and in the prevention of protein-energy malnutrition in particular. The economic rationale for 'investing in nutrition in developing countries' has been supported by many scholars and practitioners over the years, in particular by the development banks (63). As part of the Millennium Project a number of task forces were established, including a Task Force on Reducing Hunger and Malnutrition. The final report strongly promotes an 'investment in nutrition' approach (64).

The impact of malnutrition of very young children on their later cognitive and productivity abilities has now been carefully investigated. The timing of the intervention is crucial. Control of malnutrition is most important before the age of 3 years. The 'window of opportunity' is the period from conception to the age of 3 years. After that age the damage of malnutrition at the earlier age is often irreversible (65). This fact has provided a powerful argument that investing in child nutrition at a very young age results in great later returns. Recently OECD promoted the same strategy for industrialised countries (66).

The World Bank is now arguing for 'investment in nutrition' (67). Several World Bank economists and nutritionists participated in the the so-called Copenhagen Consensus, where it was concluded that productivity losses from malnutrition were of three types: (1) direct losses in physical productivity, (2) indirect losses from a poor cognitive function losses and loss in schooling, and (3) losses in resources from increased health care costs.

The World Bank correctly identified several potentially direct losses in physical productivity from malnutrition, including increased risk and severity of diseases, increased child mortality rates (60 per cent of all child deaths would not take place if the children are well nourished), low birth-weights of babies increasing the risk of death, compromised immune system as a result of vitamin A deficient diets, increased maternal mortality due to iron deficiency anemia, and lower IQ of children due to iodine deficiency in pregnancy. All these contribute to reduced physical capacity and earning ability (68).

The World Bank uses three arguments for intervening to reduce malnutrition. These are (1) high economic returns and high impact on economic growth and poverty reduction; (2) the alarming shape and scale of the malnutrition problem; and (3) the fact that markets are failing to address the malnutrition problem in poor households.

Three common myths are criticised. The myths are, first, that malnutrition is primarily a matter of inadequate food supply. Second, that improved nutrition is a by-product of other measures of poverty reduction and economic advance. Third, that given scarce resources,

action on nutrition is hardly feasible on a mass scale, especially in poor countries. In fact the overall argument for preventing child malnutrition is that it is one of the best investments in human capital. This World Bank initiative was picked up very soon by global media and has already contributed to a renewed interest in nutrition.

The investment in nutrition paradigm is definitely 'outcome' focused, in the sense that priority is given to the achievement of the Millennium Development Goals. Process criteria are limited to sustainability, although less than before, cost-effectiveness and cost-efficiency.

The major reason why the investment in nutrition paradigm is likely to become the next mainstream paradigm in applied nutrition is primarily the fact that it was launched and will be promoted and supported by the World Bank. Also, this paradigm, by focusing on investment, avoids the sensitive social and political causes and consequences of malnutrition. This paradigm also reflects well the currently dominating 'free-market' economy ideology.

2005 – now
Human rights approach to nutrition paradigm

Freedom from hunger and malnutrition was recognised as a human right in the 1948 Universal Declaration on Human Rights. The Alma Ata Declaration recognises health as a human right. The rights of children to adequate food, health and care were recognised explicitly in the 1990 Convention on the Rights of the Child (69) As these constitute the three necessary and sufficient conditions for good nutrition, the *human right to nutrition* is a codified right for children (70). As the Convention is ratified by all countries in the world except Somalia and the USA, it is increasingly recognised as international customary law.

Children's right to nutrition was explicitly recognised in the UNICEF Nutrition Strategy of 1990 (70) where it is stated 'Human rights need not be defended from an economic perspective, although such an economic impact may be most welcome. Freedom from hunger and malnutrition is, therefore, a goal in nutrition strategies for states that have ratified the relevant international human rights conventions'.

Human rights

A human right is a *relationship* between one individual (or a group of individuals) who has (or have) a right and therefore a valid claim, and another individual (or group of individuals) with correlative duties or obligations. The first enters into the role of a *claim-holder* (or the subject of the right), and the second enters into the role of a *duty-bearer* (or the object of the right). Claim-holders and duty-bearers are *role*s, into which individuals (or groups of individuals) may enter. This means that the same individual may be both a claim-holder and a duty-bearer at the same time.

Children have a right to be well nourished and have therefore a valid claim (right) against their parents to be provided with adequate food, health and care – that is, to be well nourished. The parents are therefore the first line duty-bearers. Often, however, the parents cannot meet their duties because they do not have access to economic, human and organisational resources to provide food, health and care for their children. In other words they cannot meet their duty to their children because as claim-holders some of the rights they have against their governments have not been realised. This shows how the government (the State) becomes the *ultimate or final duty-bearer.* It is the State that has ratified UN covenants and conventions and therefore is legally bound to meet the obligations according to international law.

From this perspective, claim-duty relationships in society are linked and form a *pattern of human right*s. The identification and analysis of such patterns form the core of a human rights-based approach to programming. The identification of duty-bearers and a determination of the extent of their accountability are crucial.

In human rights treaties human rights *standard*s and human right *principle*s are explicitly codified. Human rights *standard*s define benchmarks for desirable outcomes, while human rights *principle*s represent conditions for the process.

Human rights standards include desirable outcomes such as access to food, basic health care and basic education; adequate nutrition and access to water etc. The first seven of the eight Millennium Development Goals represent important desirable outcomes, while the eighth represent the process. Human rights principles are normally seen as including equality and non-discrimination, participation and inclusion, and accountability and the rule of law. The most important characteristics of this paradigm are the following:

In a human rights-based approach to nutrition, children are recognized as subjects of rights to adequate nutrition and they are no longer seen as ‘beneficiaries’ or’ targets’ of interventions. Preventing young child malnutrition can no longer be a voluntary act of charity or benevolence, but must be an obligation.

A human rights-based approach aims at empowering claim-holders to claim their rights. Often people who are poor have valid claims as claim-holders on people who are less poor and much more powerful, who are the duty-bearers. This is why in a human rights-based approach, power can be challenged, impunity rejected, corruption exposed and access to justice ensured much more effectively than in any other development approaches.

A human rights-based approach gives more attention to exclusion, discrimination, disparities and injustice in society than most other approaches. Equality through the reduction of disparities allows for actions to redistribute resources from the richer to the poorer, something that most economics-based development approaches reject or avoid considering. The aim is to empower people as claim-holders individually and collectively. The strengthening of civil society is a prerequisite for democratisation.

Reasons for the human rights-based approach becoming the next mainstream paradigm in nutrition are as follows. First, clear accountabilities are explicitly identified and monitored. Over the last several decades, governments have regularly agreed and committed themselves to achieve nutrition goals and targets. These include the World Food Conference (1974), the World Summit for Children (1990), the FAO/WHO International Conference on Nutrition (1992) the World Food Summit (1994), the Millennium Summit (2000), and an endless number of regional declarations. These commitments have been nothing more than promises, with no accountability or penalty for non-performers. The voluntary ratification of a UN human rights covenant or convention has dramatically changed things, in the sense that countries in principle are legally bound to act.

A second reason for this paradigm to take over is the trend towards increasingly normative driven development thinking, which leads to the position that continued high prevalence of young child malnutrition is simply morally unacceptable in a rapidly richer world. Human rights provide both moral and legal arguments for such a position.

Different policy implications

A major difference between the investment in nutrition paradigm and the human rights approach to nutrition paradigm is their significantly different policy implications. These differences can be explained by the different ways each of the paradigms gives attention to 'outcome' and 'process'.

While the investment in nutrition paradigm is very outcome-focused, the human rights-based paradigm gives equal attention to both outcome and process. The differences in policy implications are summarised below.

The investment in nutrition paradigm	**The human rights paradigm**
Interventions most often in the form of 'packages' to be 'delivered' to 'beneficiaries'	Interventions mainly aim at building capacities for empowerment. Components of capacity includes acceptance of responsibility, authority and power, access to resources, capability to take rational and informed decisions, and capability to communicate.
Often very 'top-down'. Most multilateral and bilateral development agencies use very top-down planning and implementation practices. The planning of poverty reduction programmes, for example, very seldom include people who are poor	Promotes a combination of both 'bottom-up' and 'top-down'. It is the synergy between top-down advocacy and social mobilisation and the support of bottom-up initiatives that makes a difference
Planning 'for' rather than planning 'with'. Top-down planning implies planning 'for'	Planning 'with' rather than planning 'for'. Bottom-up planning implies planning 'with'
Power structures seldom addressed. Often actions that threatens existing exploitative power structures are deliberately avoided	Addresses power structures, exclusion and injustice, through more 'activist' type of strategies
Accepts many trade-offs, for example the acceptance of increased income disparities in the short time, in order to achieve high economic growth in the longer term	Accepts very few trade-offs, because in the human rights perspective it is not morally acceptable to sacrifice one child today in order to make two survive tomorrow.
Charity is a most welcome contribution. Most money does not 'smell'	'Charity is obscene in a human rights perspective' (Immanuel Kant)
Promotes the achievement of the Millennium Development Goals out of context of the Millennium Declaration – does not recognise that the MD stipulates that the MDGs should be achieved through a process characterised by democracy and human rights	Promotes the achievement of the Millennium Development Goals only within the context of the Millennium Declaration – recognises the condition of a democratic and human rights-based process
Promotes privatisation of health and education services, which always results in disparities between children in differences socio-economic groups	Promotes health and education services as a public good, which can ensure that all children receive the same level and quality of services
Supports poverty reduction, but not necessarily disparity reduction. Accepts the position that there is nothing wrong in some getting much better off as long as nobody gets worse off	Promotes poverty reduction through disparity reduction. Reflects the position that disparities *per se* are undesirable or even unacceptable. Resources should be transferred from people who are richer to people who are poorer

Conclusions

Since the middle of the last century, different paradigms to understand and to prevent malnutrition have replaced each other as mainstream paradigms. Most often the 'mainstream' paradigm has been replaced by a former counterpoint paradigm as a result of new and better scientific knowledge and/or changing political (ethical) climate. Proponents of the mainstream paradigm have always tried to oppose the change, both by providing scientific counter arguments and through political pressures and lobbying. Ethics, often translated into ideological and political arguments, has been used in both accelerating change, and in delaying or avoiding change (71).

Most of these paradigm shifts have taken place as a result of failures of the theory to guide the work in practice. Normally new scientific discoveries have been made in research institutions and have been translated into new theories for practical application. When these theories fail in practice, the demand for a shift grows increasingly stronger.

Over the years, approaches to understand and to prevent child malnutrition have also reflected changes in general development theories. The trend towards increasingly normative approaches to development has influenced approaches to malnutrition. 'Sustainable Human Development', for example, does incorporate good child nutrition as a necessary component of development.

The current paradigm crisis in applied nutrition manifests itself in many different ways. First, the absence of any mainstream nutrition paradigm reduces the natural emergence of internationally recognised and respected leaders in nutrition, despite of the several cries about the need for 'nutrition champions'.

Second, the mushrooming of new organisations, alliances and partnerships in nutrition, including GAIN, REACH, Alliances Against Hunger, Partnership for maternal, newborn and child health. This reflects that almost 'anything goes', which is very common during a period of paradi[i]gm crisis (73). The competition for scarce resources among these groups, once again reflects that 'it is the piper who calls the tune'. Third, the systematic attack on and weakening of the UN Standing Committee on Nutrition (SCN) has become apparent.

In a recent donors' meeting on nutrition, organised by the European Union, different options were discussed for a new *international leadership and coordination* for nutrition in developing countries. One of the four options agreed upon at the meeting recommended that the World Bank would be 'given an official mandate to lead the nutrition agenda through the Global Action Plan for Nutrition' (74).

It is likely that one of the two competing paradigms will soon take over to become the next mainstream paradigm in applied nutrition. Arguments for the investment in nutrition include its sound conceptual basis, recognising the importance of food, health and care; strongly targeting the very young children. It is championed by the World Bank with a likelihood of significant funding; and avoids sensitive issues, notably the political causes and consequences of malnutrition. So this approach has low political risk and is therefore 'do-able'.

Arguments for the human rights approach to nutrition paradigm to take the position of the next mainstream paradigm includes the general trend of development approaches of becoming increasingly 'normative'; the increased recognition of economic and social rights in general and of children's rights in particular; the fact that this approach explicitly promotes the rule of law, addresses impunity, corruption and social access to justice; and that it implies clear accountabilities, not just 'promises'.

The current competition between the investment in nutrition paradigm and the human rights approach to nutrition paradigm is unique in the history of nutrition, because the two paradigms have the same scientific basis. Their differences lie in different ethical and ideological principles. The investment in nutrition paradigm reflects an individualistic-oriented 'free market' ideology, while the human rights approach to nutrition paradigm reflects a collective, public health and democratic ideology. The investment paradigm is seen too technical by some. The human rights paradigm is seen too political by others. The factors that ultimately will determine which of the two will be the next 'mainstream' paradigm are based more on power politics and ideology than on new scientific discoveries.

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Key terms

Nutrition, Applied nutrition, Public health nutrition, History of nutrition, Theory of science, Theory of knowledge, Protein-energy malnutrition, Micronutrient malnutrition, Nutrition strategy, Nutrition policy, Community-based nutrition, Causality of malnutrition, Investment in nutrition approach, Human rights-based approach to nutrition.

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Request

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