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Nutrition-enhancing Food and Agricultural Systems¹

Session 3

What is meant by nutrition-enhancing agriculture and food systems and what is involved: the linkages between agriculture, food systems and nutrition

Nutrition-enhancing Food and Agricultural Systems

(English Only)

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I. Background

1. The large food price increases in the world market during 2007 and the beginning of 2008 were replaced by increasing price volatility during 2008-2012 and a significant price decrease during the first 9 months of 2013. A 30 percent decrease in world market cereal prices during the period September, 2012 – September 2013 would have been considerably larger, had it not been for rapid stock build-up of rice in Thailand to the current 18 million tons (equivalent to about half of a normal year's total world trade in rice), a stock build-up to 75-80 million tons of rice and wheat in India and increasing stocks of maize in some African countries, including Zambia and Malawi. Maize prices would have dropped more than they did, had it not been for blending mandate in the United States which removes about 40 Percent of the U. S. maize production. China is expected to have built up cereals stocks although the extent, to which its 400 million ton stock capacity is full, is not known.

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2. So it seems reasonable to argue that the world is awash in food. At the same time, FAO reports that more than 800 million people are undernourished – they do not have access to enough dietary energy to live a healthy life. Most if not all of them also suffer from nutritional deficiencies. Many more – possibly as many as an additional 1.2 billion – may meet their calorie needs but suffer from nutritional deficiencies. Around 1.5 billion people are reported to suffer from overweight or obesity. Many of them may also suffer from nutritional deficiencies. While the prevalence of deficiencies in dietary energy and nutrients is decreasing, although at a very slow pace, the prevalence of overweight and obesity is increasing.

3. The long-term trends in food supply look good. Both FAO and IFPRI projects that the supply has to increase 55 - 60 percent over the next 37 years to 2050. This corresponds to an annual compounded rate of increase of 1.3 Percent, which is likely to be achieved and possibly exceeded³. Thus, real food prices are unlikely to increase. However, extreme weather events resulting from climate change as well as speculation and faulty government policies are likely to continue and possibly amplify recent years' food price volatility. Failure to deal effectively with such price volatility will result in increasing transitory food insecurity and malnutrition.

4. World agriculture's great success in expanding food supplies is to be applauded. Governments and the private sector (including farmers and the pre- and post-farm supply chains) should pursue the policies and investments needed to continue such expansions. As mentioned above and further detailed in Pinstруп-Andersen (2013b and c), that is likely to happen. This gives the world breathing space to make changes in the food system that will strengthen its contribution to human nutrition. This paper attempts to contribute to the debate about how to do that, i.e. to develop "nutrition-enhancing food and agricultural systems". Much has been written about this matter recently. A list of additional papers with more details and a large number of references is provided at the end of the paper.

5. The rest of the paper is organized around the following six questions:

- a) What does "Nutrition-enhancing Food and Agricultural Systems" mean?
- b) How can human nutrition be enhanced through food and agricultural systems?
- c) Are there large potential nutrition gains from nutrition enhancement of these systems?
- d) Why are nutrition goals not explicitly considered in policy-making for food and agricultural systems?
- e) What national public and private sector action is needed to capture the nutrition benefits?
- f) How can international organizations help?

II. What does "Nutrition-enhancing Food and Agricultural Systems" mean?

6. The term⁴ describes food and agricultural systems that are designed, guided and implemented with explicit consideration given to nutrition goals, i.e. reduction of energy and nutrition deficits and excessive energy intake. It does not mean that improved nutrition is the

³ See Pinstруп-Andersen (2013b and c) for a discussion of the factors likely to assure such an increase.

⁴ Several other terms, such as "nutrition-sensitive" and "nutrition friendly" are found in the literature.

sole goal but merely that it is explicitly incorporated in decisions about action by the public and private sectors and NGOs. As discussed below, action to change food and agricultural systems to improve nutrition is mostly likely to succeed when combined with other goals to create win-wins.

III. How can human nutrition be enhanced through food and agricultural systems?

7. There are many pathways through which food and agricultural systems may influence nutrition. Understanding these pathways and the elements that make them up is essential to identify ways to improve nutrition within a framework of multiple goals pursued by the various decision-makers. The characteristics of the target group(s) and the nutrition problem(s) to be solved must be specified before specific pathways and opportunities for improving nutrition can be identified. The most important target group is low-income pregnant and lactating women and children up to 2 years of age, a target group often referred to as the first 1000 days after conception. However, other target groups are important. Malnutrition in low-income adolescence girls and women prior to and after pregnancy, influence women's health, productivity, income-earning ability and well-being. It also means a poor start of the 1000 days, a start that a sole focus on the 1000 days may not be able to rectify.

8. Nutritional deficiencies, overweight and obesity in children older than 2 years is widespread and need attention. Thus, malnutrition is a life-cycle phenomenon which mostly but not exclusively affects low-income people. The cycle may best be broken during the first 1000 days but until that happens, the other population groups, i.e. poor women in the reproductive age and children above 2 years of age should also be considered as target groups. A rapid increase in the prevalence of overweight and obesity in adult women and men as well as children calls for targeting that cuts across gender and age. The pathways also depend on whether the target groups are rural or urban and whether they produce food and, if so, the extent to which they are food self-sufficient (subsistence farm families).

9. The following five pathway components are particularly important: Food availability (both quantity and quality), incomes, prices, women's time allocation and intra-household decision-making processes. The importance of each of these pathway components will vary among target groups. The behavior of the agents within the food and agricultural systems, including farmers, consumers, traders and processors, is a very important determinant of how the systems affect nutrition. Therefore, government interventions in the system to improve nutrition should focus on changing behavior of these actors. This, of course, implies that government behavior can be a key factor in success or failure.

10. A generic household-level pathway to capture the target groups mentioned above as well as the triple burden of malnutrition is suggested in Figure 1. As further discussed below, all of the factors shown may be influenced by government policy and action by the private sector.

IV. Are there large potential nutrition gains from nutrition enhancement of these systems?

11. Common sense suggests that food and agricultural systems are essential for human nutrition. However, the extent to which government action directed at the systems would improve nutrition and whether direct nutrition interventions are more cost-effective have not been rigorously evaluated and compiled in the same manner as direct health and nutrition interventions. The problem is that evaluation methods based on randomized controlled trials (RCTs) – the gold standard and usually the only methods perceived to provide reliable results in the health sector – are generally impossible to apply to the food system except for small, usually insignificant projects, for two reasons. First, the pathways are long and influenced by a large number of variables including uncontrollable behavior by system agents and second, large policy interventions in food systems do not lend themselves to control groups and randomization. Yet, the big and promising opportunities for nutrition improvements are undoubtedly found in such policies and not in home gardens and other minor projects where RCTs can be used.

12. Recent assessments of available literature on the nutrition outcomes of policy interventions in food and agricultural systems found very little impact on child nutritional status and concluded that the evidence is inconclusive. Inappropriate evaluation methods have been identified as a possible explanation, rather than lack of impact. Rather than the fixation on RCTs as the only tool producing valid evidence, impact pathway analyses should be applied. If, as demonstrated in a multitude of cases, certain policy interventions in food and agricultural systems influence the elements of the pathways discussed above, e.g. incomes and relative prices, and changes in these elements influence nutrition (which has also been amply shown), it would be reasonable to conclude that these interventions impact nutrition.

13. Characterizing current evidence from path analyses as inconclusive invalidates existing evidence and sends a message to policy-makers not to pursue nutrition-sensitive policies for food system and agricultural systems. It also demotivates analysts from undertake more path analysis so urgently needed to guide action by governments and the private sector. Knowledge about how interventions in food and agricultural systems affect obesity is particularly weak.

V. Why are nutrition goals not explicitly considered in policy-making for the food and agricultural systems?

14. Good nutrition is very important for individuals and societies and health and nutrition goals would be expected to guide food systems. That is not usually the case. In a market economy, the nutrition goal is unlikely to be the primary goal for farmers and other agents in the food and agricultural systems. It is frequently overridden by economic goals among producers, traders, and processors. While it may be an important goal for consumers, tastes, preferences, poverty and lack of knowledge may reduce nutrition goals to a lower status. Consumer preferences frequently do not prioritize good nutrition over other goals; particularly if a less healthy diet is less expensive or better conform to the persons taste. Cultural issues

and lack of knowledge may also be important. Processed foods with high content of refined sugar and/or fat may taste better than dark green leafy vegetables. They may also be cheaper and require less preparation time.

15. Thus, efforts to change food and agricultural systems so they make a greater positive contribution to human nutrition may conflict with other goals and behavior by farmer, trader, processors and consumers. Yet, improved nutrition may have very large public health and economic impacts through higher labor productivity and lower health costs. But if these benefits are not captured by decision-makers in the food and agricultural systems or unable to compete with perceived benefits from alternative action, they will not play a role in how the system is designed and managed. Market-based economies operate on the basis of supply and demand and not on needs and compassion. Governments, for which improved human nutrition is an important goal, may need to take action to alter incentives, introduce regulations or generate and disseminate knowledge.

16. Although the stated goal of some governments is to improve food security or nutrition, few governments actually pursue policies to achieve such goals. Although poor nutrition is an important drag on economic growth in many countries, the impact is long-term and difficult to pin down. Population groups of greatest importance for governments to maintain their legitimacy – most governments' highest priority – usually do not suffer from energy and nutrient deficiencies and even overweight and obesity is rapidly becoming poor peoples' problem. Nutrition does not have its own ministry and health and agricultural ministries are busy lobbying for things other than improved nutrition.

17. Lack of “scientifically proven” nutrition impact of changes in the food and agricultural sector mentioned above is another reason why governments are not pursuing nutrition-enhancing food and agricultural policies. RCTs may be applied to small-scale projects such as kitchen gardens, but cannot be applied to the changes in the food and agricultural sector that really matter for nutrition such as priorities in agricultural research, improvements in output markets for smallholder farmers and major changes in the focus of food processing. Such changes cannot be randomized or controlled and the pathway between the changes and nutrition is long. Unfortunately, because of the above mentioned RDTs fixation, evidence of impact gained from path analysis is deemed to be inconclusive and communicated to governments as such.

18. So, efforts to improve nutrition through changes in the food and agricultural systems are faced with very serious barriers. There is much debate about who decides what is being consumed. Does the system take its cues from the consumer and passively produce what she/he wants, does the consumer passively acquire what the system makes available or does the system coerce the consumer to acquire what it wants to produce? The answer is case-specific. All three situations can be found. However, the answer is important in the context of this paper because it helps identify which decision-makers' behavior should be changed. Convincing farmers to produce broccoli instead of rice in a market where consumers want rice but not broccoli will fail. Similarly, efforts to convince food processing corporations to stop producing processed foods with high content of refined sugar or sweeteners, if that is what consumers want, will not succeed.

19. The challenge for policy interventions to enhance nutrition through changes in food and agricultural systems is to find ways to make the achievement of nutrition goals compatible with other, higher ranking goals or to alter these goals. Are there win-wins in which profit and nutrition goals are compatible or in which consumer preferences for cheap and “tasty” food are compatible with the achievement of nutrition goals? Can policy interventions create such win-wins by changing incentives, introducing regulations and/or creating and disseminating knowledge?

VI. What national public and private sector action is needed to capture the nutrition benefits?

20. The question addressed here is what public policy interventions might make nutrition goals compatible with existing food system goals mentioned above, i. e. what could governments do to make food systems more nutrition-enhancing?

21. As mentioned above, all of the variables shown in Figure 1 may be influenced by government policy. A menu of potential policy interventions from which context-specific interventions can be selected, are discussed below for each of the five main components of the generic pathway.

Increasing the availability of a nutrition-enhancing portfolio of food

22. Food availability is necessary but not sufficient to assure good nutrition. Availability depends on the behavior of the private sector, including farmers, traders and processors as well as government policies. Both domestic food production and foreign trade may be important. For example, trade liberalization may increase the availability of imported foods with undesirable characteristics such as processed foods with a high content of fats and sweeteners. Investments in research and processing by the private sector may develop new products beneficial or harmful to nutrition. Availability of meat, dairy products, fruits and vegetables may reduce micronutrient deficiencies while increased availability of foods rich in fats, oils, sugar, sweeteners and other energy-dense, nutrient-poor foods may contribute to overweight, obesity and chronic diseases as well as nutrient deficiencies.

23. Since a large share of the energy and nutrient deficient population is in rural areas and depend on agriculture for at least some of their incomes, policies to expand their food production may achieve both production and income goals through which their nutrition may improve. The most important government action to make this happen is investment in rural infrastructure, market information and other public goods such as contract enforcement institutions, standards and measures to facilitate market access by smallholders and private sector investments in domestic input and output markets. In order to reduce transitory food security and malnutrition, government action is needed to help farmers and traders increase resilience and manage risks and uncertainty, including that caused by fluctuations in food prices due to extreme weather events and market variability.

24. Support to village-level food fortification may be effective to reduce micronutrient deficiencies in some cases. Regulation of land tenure, including international and national

land acquisition, would be helpful to avoid increasing food insecurity and malnutrition caused by smallholder farm families being evicted from their land. Efforts by government and the private sector to influence the demands placed on women's time in both rural and urban areas is extremely important for improved nutrition and will be discussed in a separate sector below.

25. A high degree of diversity in the food supply, whether from own production or the market, is important to facilitate diet diversity. Diet diversity, in turn, is important to facilitate good nutrition. More diversity in the diet of subsistence and semi-subsistence farm families and other rural consumers depending on local production for their food may be promoted through the production, marketing and consumption of so-called "orphan crops", promotion of kitchen gardens and increasing consumption of animal products. In locations where water resources are available, aquaculture may improve diet diversity through fish consumption and income-generating sales. The nutrition value of foods may be improved by industrial fortification and biofortification.

26. Policies are needed to guide the on-going diet transition towards better nutrition. In particular, in view of the dramatic increase in the consumption of processed foods, there is a need to change the behavior of consumers and the food processing industry which currently contributes to rapid increases in overweight, obesity and related chronic diseases. Nutrition education, regulation of advertising and promotion of unhealthy foods, and taxes and subsidies specific to individual foods or food groups are examples of such policy interventions. Research is needed to better understand context-specific consumer behavior in order to design effective interventions. In a market economy, the processing industry will be expected to maximize profits by seeking to meet economic demand. If consumers demand – or can only afford - a portfolio of foods that result in malnutrition, that is the portfolio the processing companies will attempt to fill. They may also attempt to influence economic demand to enhance the market for its products. While social responsibility goals may seek to match the profit motive with improved nutrition of the customers, the former will override the latter where there is a conflict between the two. If this is unacceptable to society, policy interventions will be needed.

27. Agricultural research and technological change have played a critical role in expanding the food supply and calorie consumption. Modern scientific methods offer great opportunities for meeting future food demand at reasonable prices. However, to achieve nutrition goals, research should focus on productivity increase of a diverse portfolio of food commodities emphasizing 1) smallholders, 2) reduced unit-costs of production and marketing and 3) expanding the availability of nutrients. Research to improve the nutritional quality of food through biofortification, post-harvest fortification and improved processing, storage and transportation, should be expanded. A shift from processing aimed at foods with a high content of refined sugar, sweeteners, fats and oils to foods with a high content of micronutrients could be promoted through taxes on sugar, sweeteners, fats and oils; government financial support of nutrition-enhancing fortification; research and technology development for nutrient-dense foods such as fruits and vegetables; and educational and promotional programs to alter consumer demand. Results from research currently under way

on biofortification to enhance the content of vit-A, iron and zinc in several staple crops look very promising and should be expanded.

28. In addition to the above mentioned processing and fortification, the nutritional quality and safety of foods may be improved or deteriorated by action or lack of action in storage, transportation and other post-harvest activities. Waste and losses in the food supply chain including deterioration of the nutritional quality are estimated to account for about one-third of the food produced. The losses are even larger when pre-harvest production lost to plant and animal diseases and pest attacks in farmers' fields are added.

29. The demand for organically produced food is increasing rapidly. While organic production methods may have positive health effects due to reductions in the use of pesticides, antibiotic and other inorganic chemical agents, there is little solid evidence that organic foods are significantly more nutritious than conventional food. Yields are also lower than the best traditional production methods, resulting in higher unit-costs and prices or lower farmer incomes.

30. Food supply chains are becoming longer in most developing countries. This is driven in large measure by supermarkets and the increasing demand for processed foods, even among energy and nutrient deficient population groups. This places more responsibility on the traders and processors to provide a nutritionally sound food supply. Unfortunately, as discussed elsewhere in this paper, it also increases the risk of dietary changes towards less healthy food. Policies may be needed to regulate and incentivize the processing industry.

31. As developing countries liberalize their food and agricultural markets and open up for food import, processed energy-dense food products become more readily available. Energy intakes and resulting obesity are likely to increase. Diet diversity, which is critically important for good nutrition is also likely to increase but diet diversity resulting from a shift towards more processed energy-dense foods is not what is called for.

Increasing household incomes to improve nutrition

32. It should be obvious that poverty contributes to energy and nutrient deficiencies. It is less obvious but nevertheless true, that poverty also contributes to overweight and obesity. Changes in food and agricultural system may affect incomes of malnourished people in several ways. Firstly, research and technology may reduce unit-costs of production by improving productivity of land, water, capital or labor, not only in agriculture but in other parts of the food system. The result is higher incomes (in cash or kind) for farmers, traders and other food system agents, lower prices for consumers or a combination of the two as exemplified by the effects of the Green Revolution which lowered unit-costs of production of wheat and rice, increased farmers' incomes and lowered consumer prices. A second nutrition-enhancing pathway through incomes relates to policies to change labor demand, wages and access to productive resources, e.g., land and water, through labor-using technology, investments in rural infrastructure, changes in land tenure and water policies, and other fiscal and monetary policies. Thirdly, changes in the food system may change the gender-specific income control as well as the composition of household incomes (cash or own consumption), and the cash flow over time.

33. Those changes will influence household food acquisition behavior and the extent to which access is converted to acquisition (Fig. 1). It is also likely to influence the allocation of food among household members. Strengthening of the household budget control by women in most cases increase the portion of household incomes dedicated to food and nutrition, particularly as it relates to child feeding. As anti-poverty policies and campaigns are designed, it is important to remember that reducing poverty is important but insufficient to eliminate deficiencies and that it may contribute to obesity. This means that policies to fight the triple burden of malnutrition should be designed and implemented with a particular population group and nutrition problem in mind.

34. Although this paper is about how food and agricultural systems may enhance nutrition, the interventions specifically aimed at that goal should consider integration with other interventions such as social safety nets and subsidies for non-food essentials such as school and water fees, and personal transportation to strengthen the purchasing power of low-income people.

Seeking nutrition-enhancing food prices

35. Changes in food and non-food prices will influence a household's purchasing power and its access to food. Changes in relative producer prices among foods are likely to change the portfolio of food produced and changes in relative prices facing consumers will change consumption patterns. Unit-cost reducing technological change in food production, processing and marketing as well as commodity-specific taxes and subsidies and trade restrictions are examples of policy interventions that may change relative prices. Before such commodity-specific policies are designed, it is important to specify the nutrition problem to be solved: is it dietary energy deficiencies, micronutrient deficiencies or obesity-related chronic diseases? Can changing relative prices reduce the importance of one problem without contributing to another?

36. Most developing countries experience all three of these problems, i.e. the triple burden. This makes the choice of price-related policies difficult. For example, taxes on beef, vegetable oil, sugar and sweeteners may reduce the risks of chronic disease but increase deficiency of iron, essential fatty acids and dietary energy. If these foods are highly preferred by low-income households, such taxes may also reduce the consumption of other foods which are beneficial for nutrition such as fruits and vegetables. Price subsidies or lower prices resulting from unit-cost reducing research on fruits and vegetables to increase nutrient intake may release purchasing power that the consumer may spend on foods of lesser or negative nutrient value such as drinks high in sweeteners.

37. Food price fluctuations may contribute to transitory food insecurity and malnutrition. Policies to strengthen timely price information and projections might reduce such negative nutrition effects for both farmers and consumers. Incentives and regulations in the supply chain to facilitate sound competition and avoid hoarding in the food supply chain may be needed along with social safety nets to protect low-income people's nutritional status.

It is very likely that the high degree of food price volatility will continue and possibly increase in the future due to continued extreme weather events caused by climate change and

the reactions by governments and speculators to amplify price fluctuations as experienced during 2007-08, 2010-11 and the first half of 2012.

38. Refinement of WTO rules against unjustified and abrupt changes in food exports resulting in large changes in international food prices and consideration of new rules might reduce the temptation faced by exporting countries to alter trade policies at the expense of the rest of the world. A new set of rules of behavior for speculators in futures markets could also reduce the severity of future price volatility. Public and privately funded research to develop new food crop varieties tolerant to drought, floods, strong winds, and new biotic risks associated with climate change would be useful to reduce production fluctuations.

39. Economic growth, urbanization and globalization contribute to the diet transition, enlarges the supply chain and place new demands on the food system likely to result in changes in relative food prices. Fruits, vegetables and animal source foods are likely to be more expensive relative to staples such as maize and cassava although staple prices will be supported by the demand for animal feed and raw material for biofuel. If these relative price changes are driven by dietary changes among the non-poor, the poor and malnourished will respond by consuming more staples and less fruits, vegetables and foods of animal origin. The result may be further increases in micronutrient deficiencies, overweight and obesity, resulting from excessive energy intake and reductions in diet diversity.

Nutrition-enhancing policies to influence women's time demands and allocation

40. Opportunities in food and agricultural systems for improving - or harming - the nutritional status of pregnant and lactating women and children during the first two years of life (the first 1000 days following conception) are closely related to how the food system affects women's time demand and allocation. This is a point frequently ignored in often heard arguments that food and agricultural systems have little to offer to improve nutrition during the first 1000 days. In addition to the above mentioned changes in gender-specific household income and budget control, interventions to reduce the time pressures facing a large majority of low-income women may be very effective in achieving nutrition goals for women, fetuses and children below 2 years of age.

41. Policies often seek to empower women and improve their wellbeing as well as that of children by attempting to generate employment for them. However, some employment makes breastfeeding, which is critically important during the first six months of life and beyond, very difficult either because employment takes the lactating mother away from the baby for long periods or because the employment activities are otherwise incompatible with breastfeeding. Furthermore, employment creation by women may harm nutrition by reducing their time available for other important nutrition-related activities such as care, cooking, fetching water and firewood, and agricultural work. Thus, changes in food and agricultural systems should consider the net effect of changes in women's time demand before introducing new demands.

42. Introduction of labor-saving and productivity-enhancing technologies for the work traditionally done by women, such as herbicides to replace weeding, improved equipment for food processing, better access to water and fuel, and rural infrastructure to improve food marketing and the time needed to bring food to the market as well as child care facilities

appropriate for the particular situation, are examples of actions that could be considered and supported by governments.

Nutrition-enhancing behavioral changes

43. The policy interventions discussed above may be classified into those aiming to change behavior of agents in the system, e. g. consumers deciding to change their diet, and those aimed at the change of the socio-economic boundaries within which these agents operate, e.g. investment in rural infrastructure confronting smallholder farmers. A number of behavioral issues were discussed above. Others are relevant to the topic of this paper. One is the extent to which consumption decisions are made on the basis of rationality. Food availability, prices, incomes, time availability and knowledge may be perceived as providing the boundaries within which households make their nutrition-related decisions. In an ideal world, nutrition needs would be represented in household and individual wants which in turn would be represented in demand.

44. In the absence of the above constraints, the market would be expected to fulfill these demands. In the real world, the constraints exist and the demand is likely to be influenced by many factors other than nutrition. Assuming rationality, the consumer would seek to meet wants -but not necessarily needs - subject to the above constraints, other goals and the cost of achieving them as well as preferences and cultural issues. In addition to removing or reducing the impact of the constraints, government intervention might attempt to change consumer behavior to reduce the gap between perceived and real nutrition needs, e.g. nutrition education, as well as the gap between needs and wants, e.g. information about the consequences of malnutrition, and the gap between wants and demand, e.g. poverty alleviation or reduced food prices.

45. However, recent behavioral research suggests that much human behavior is not driven by expected consequences of the action taken, but by cues from the environment within which decisions are made. This corresponds to the argument that obesity is primarily a result of living in an environment of an abundance of food and food corporations promotion of processed foods with questionable nutrition value. However, overeating leading to obesity by consumers with a high internal discount rate for time and a low perceived risk of getting diabetes or other chronic diseases from obesity may be rational from the individual's perspective, particularly if society pays for health care. But if consumption decisions are made primarily by cues in the environment, the way out for policy-making may be to change consumer behavior by re-arranging the environment to produce the cues needed to achieve health and nutrition.

46. Improved knowledge regarding nutrition and its relations to the food system is needed for consumers, farmers, traders and policy-makers. Nutrition education and dissemination of information through labeling and social marketing for consumers has been commonly used to improve nutrition but with limited success. As might be expected, free-standing nutrition education programs will only be successful where lack of knowledge is the most limiting factor for good nutrition. Labeling, in turn, will only be useful to consumers if they have the necessary knowledge to interpret the label. Labeling can communicate misinformation by making unsubstantiated claims or claims that are clearly incorrect. There may, of course, be

reasons other than health risks, to label food. Labeling may be seen as a means to differentiate foods, a goal similar to private branding. However, it is important that neither private branding nor labeling make unsubstantiated health claims. Promotion of unhealthy processed foods leading to obesity, chronic diseases and micronutrient deficiencies is unfortunately common. While the suppliers of such food claim that they are merely meeting consumer demand, such demand may be created by the suppliers. In view of the severe public health and economic implications of the rapidly increasing prevalence of obesity, diabetes and other chronic diseases and the widespread micronutrient deficiencies, governments may wish to intervene through regulation, incentives and knowledge campaigns.

47. Educational efforts with all the right messages may be of no value if the new knowledge cannot be implemented because of time or income constraints. Similarly, increased incomes may be of little or no nutrition value in the absence of the relevant knowledge. Therefore, nutrition education should be combined with other efforts to remove constraints to good nutrition. Improved knowledge regarding food storage, processing and transportation may reduce losses, including deteriorations of the nutrition value. In some cases, the achievements of nutrition goals may imply trade-offs with other goals but multiple-wins are common and often overlooked. Examples include investments in rural infrastructure, agricultural research, food processing technology, nutrition education and market information, which may increase food production, reduce unit-costs of production and marketing, reduce consumer prices, increase farmer incomes and improve nutrition. Having nutritional improvements as one of the goals of interventions in the food system is preferable to the relegation of nutrition improvements to narrowly-focused food system interventions with the sole objective of nutrition improvement. Nutrition should be mainstreamed in food system interventions instead of relegated to a set of small projects.

VII. How can the international community help?

48. Members of G8 and G20 have committed large increases in their economic support for agricultural development and improved food security in low-income developing countries. New or expanded initiatives are also under way in several international organizations and bilateral donors. Some developing countries such as Ethiopia, Ghana, Nigeria and Mozambique are expanding their investments in agriculture. Most of these initiatives are focused on the expansion of the quantity of the current and past portfolio of crops and livestock. Efforts to change the commodity portfolio and the post-harvest activities to improve nutrition are few and far between although it is generally understood that merely producing more food will not assure good nutrition. It matters for nutrition how the increased food supply is brought about, of what it consists and what happens to it in the post-harvest food system. As long as the main global food problem is erroneously perceived as lack of food rather than lack of a nutrition-enhancing portfolio of food, emphasis will continue to be placed on quantity rather than quality.

49. The rhetoric to guide food and agricultural systems to strengthen the nutrition impact has gained prominence during the last few years but very little action has followed. A number of recent initiatives by FAO and WHO, including the ICN2, aim to generate debate and action around the topic. The International Obesity Task Force suggests a three-pronged strategy consisting of the inclusion of nutritional criteria in agricultural policies, undertaking health impact assessments of such policies and providing support for agricultural programs and

policies aimed at meeting WHO's dietary guidelines. The Scaling up Nutrition (SUN) Framework calls for action to address malnutrition through agriculture as do several recent documents by DFID, the EU, USAID's Feed the Future and World Vision and the UNSCN calls for the application of a nutrition lens to agriculture. A recent international conference organized by IFPRI was focused on the same topic.

50. If the rhetoric is to result in nutrition improvements, the international community needs to move to action in collaboration with public and private sectors and NGOs in developing countries. The point of departure for such action may be a clear specification of the nutrition problem to be solved, the target group to be addressed and the geographical area to be included. Existing literature, including the many flow diagrams and suggested generic pathways, may serve as the foundation for the development of context-specific pathways, behaviors to be changed and the identification of government interventions in food and agricultural systems likely to have the greatest impact.

VIII. So what is the bottom line?

51. While waiting for more research to strengthen the evidence base, a number of policy interventions including those mentioned in this paper, should be considered and tailored to the relevant contexts. A political economy approach, in which the policy process and the relevant stakeholder groups, their objectives and relative power are understood, is most likely to succeed. Merely assuming that improved nutrition overrides all other food and agricultural system goals, even if the head of state or some other high-level decision-maker declares that it is so, will lead to disappointing results. Instead, efforts should be made to identify multiple-win strategies in which nutrition goals can be achieved along with other goals of importance to the constellation of stakeholder groups.

52. The design and implementation of specific interventions should be tailored to the particular context but policies that: 1) expand incomes of households with malnourished members; 2) reduce unit cost in food production with emphasis on food crops and livestock that contribute to a more diverse diet with higher content of micronutrients; 3) include women explicitly in policy design and implementation; 4) does not add to women's time demand without simultaneously reducing their time demand in other activities; 5) provide incentives and introduce regulations in the value chain and households to reduce the consumption of energy-dense, nutrient-poor processed foods; and 6) incorporate improvements in sanitation and water quality, are likely to be relevant in most situations.

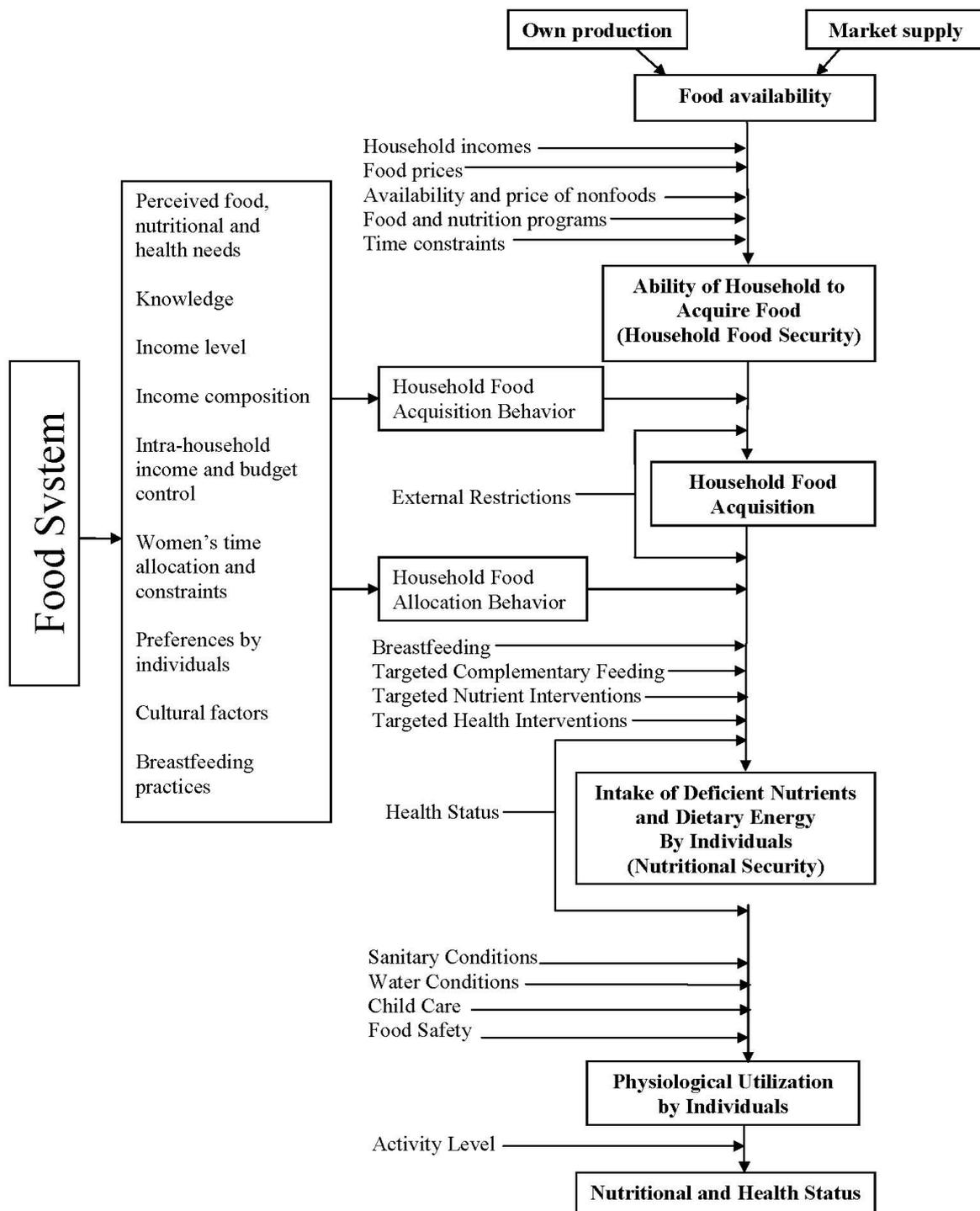
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Figure 1. A generic house-hold level pathway for nutrition-enhancing food and agricultural systems.



Source: Pinstrup-Andersen and Watson (2011)