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Speaker Summary Notes

Note to the Reader

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INAUGURAL SESSION

Speaker Summary Note

Session: Inaugural Session

Speaker: Shenggen Fan**, Director General, International Food Policy Research Institute**

Title: **Welcome Remarks**

Your Excellency, Dr. Manmohan Singh, Prime Minister of the Republic of India; Your Excellency, Mr. John Kufuor, Former President of the Republic of Ghana; honorable ministers; distinguished guests and colleagues:

We are standing face to face with some serious challenges: hunger, malnutrition, and poor health are denying billions of people the opportunity for a healthy, well-nourished, and productive life. Agriculture, which will need to feed additional billions of people in the coming decades, already faces more volatile growing conditions and scarcer resources.

These challenges are connected in a web of interactions. This means that when we pull a lever in the agriculture sector—when we, for example, promote a crop or establish a subsidy—we trigger changes not only in crop harvests, but also in the health and nutrition of farmers and consumers. All of our efforts—whether in agriculture, nutrition, or health—are inextricably linked. We are more likely to succeed in addressing the challenges if we understand these links and put them to work for people's benefit. New attention to agriculture on the global stage means that we now have a unique opportunity to look carefully at our agricultural system to and determine how to make it function more effectively for people's well-being. That is why we are here.

This conference is the centerpiece of a policy consultation process on "Leveraging Agriculture for Improving Nutrition and Health" facilitated by the International Food Policy Research Institute (IFPRI) and its 2020 Vision Initiative. As many of you know, IFPRI is one of the 15 centers of the Consultative Group on International Agricultural Research (CGIAR), a consortium committed to applying science to the task of achieving food security for all.

Our current understanding suggests that we will need to take action in a number of areas. We will need to fill gaps in our knowledge by learning how different patterns of agricultural growth affect nutrition and health, and by investing in research and education systems that can integrate knowledge from all three sectors. We will need to work to minimize the risks that agriculture poses to human health, and devise health and nutrition interventions that contribute to the productivity of agricultural labor. We are going to have to scale up innovative solutions; incorporate nutrition into the agricultural value chain; and design agriculture, health, and nutrition interventions with cross-sectoral benefits. Finally, we must create an environment in which cooperation can thrive, making use of partnerships, strong communication, and mutual accountability. Leveraging agriculture for health and nutrition will have implications not only for how we design policies and programs in all three areas, but also for our efforts to meet the Millennium Development Goals and to go beyond.

At this moment of challenges and opportunities, our deliberations here will point the way toward entry points for action to maximize the positive synergies and minimize the negative links among the three sectors. Beyond this conference, our hope is that concrete steps will be taken to leverage agriculture for health and nutrition and that the conversation between us will continue.

It is now my privilege to introduce Prime Minister Manmohan Singh, who has very kindly consented to give us his own perspective on the issues we will discuss here. Several years ago, Prime Minister Singh called upon IFPRI to provide research-supported evidence on efforts to tackle malnutrition around the world, demonstrating India's clear commitment to addressing this often-neglected issue. Today we are in New Delhi to bring to light new evidence and insights that will help not only India, but also other countries around the world, to conquer malnutrition and poor health. We welcome you, Prime Minister Singh

Text of Remarks

Session: **Inaugural Session**

Speaker: H.E. Manmohan Singh, **Prime Minister, Republic of India**

Title: **Inaugural Address**

I am very happy to participate in this very important International Policy Consultation organized by the International Food Policy Research Institute (IFPRI). IFPRI has established itself as a premier international organization engaged in research for sustainable solutions to end hunger and poverty. I would like to compliment IFPRI for organizing this conference to focus our attention on removal of both hunger and poverty.

These issues are particularly topical today as the world faces rising food prices in many countries and there is growing recognition that climate change may endanger food security in many developing countries.

Leveraging agriculture for improving nutrition and health, which is the central theme of this Conference, is particularly important in developing countries where agriculture is also the mainstay of a very large number of people. In India, about 52% of the labour force is dependent on agriculture for the bulk of their incomes. Studies in India show some correlation between agricultural performance of a State and the nutritional status of its people. States that have high agricultural productivity also have lower malnutrition rates for both adults and children. But malnutrition is a complex process in which habits regarding feeding the new born babies, maternal and child health, and also water quality are at least equally important. Let me offer some comments on how I see these issues in our own country.

Malnutrition remains a serious problem in India and many developing countries. Globally, nearly 1 billion people still go hungry. Nearly one in four children under age of five is underweight. The problem of hidden hunger—that is, deficiencies of essential vitamins and minerals, such as iron, Vitamin A and iodine—is also severe. Nutrition is therefore a serious challenge that has not received the attention it truly deserves.

Malnutrition is not only a consequence of poverty, it is also a cause of poverty. A malnourished child is more vulnerable to disease and less able to earn a leaving. The complexity of causes that underlie malnutrition calls for a multi-sectoral strategy to address the three key issues of availability, access and absorption.

In our country, rapid growth in agriculture with particular emphasis on the subsectors growing food and on the poorer regions will help to address issues of availability and access. But, experience has also shown that rapid growth in GDP in general and, even agriculture in particular, though necessary, is not sufficient to produce desirable nutritional and health outcomes among the socially and economically disadvantaged groups of the community. There are other causes that need to be addressed.

We need to address the issues of absorption of nutrition, health and hygiene, which in turn depend on many other factors such as the availability of clean drinking water, sanitation and also on the

education and status of women in society. Aware of this, our fight against malnutrition incorporates, as it must, all these areas. The Integrated Child Development Services is probably one of the oldest and largest programmes in the world to address the problem of child malnutrition. We have been looking at how to improve this programme and have recently added an element of direct cash transfers for pregnant and nursing mothers. We now have a Right to Education Act to back the Sarva Shiksha Abhiyan (SSA) which has already increased dramatically the proportion of our children who now go to school and reduced gender imbalances in this respect. This is supported by a countrywide Mid-Day Meal Scheme which not only addresses hunger but also promotes better learning. The National Rural Health Mission launched some five years ago has also had visible favourable effects, particularly increasing the number of births that are assisted with expert medical attention. Similarly, under Swajal Dhara, we have a time-bound programme to ensure clean drinking water to all habitations.

We, therefore, do not see Agricultural development as the only element in our strategy but it is nonetheless a key part of any viable strategy.

In India, our first priority has been to ensure food security which in turn requires a high order of self sufficiency. Cereals and pulses are the staple food of the people of India. We have naturally focussed attention on ensuring adequate production of these products to meet the needs of our population. The 'National Food Security Mission' launched a few years ago was designed to promote the spread of best practices that would increase productivity of food grains in areas and states where there was scope for such increase and there indeed is scope for such increase. We are also supporting additional location specific interventions like Eastern Region Development Programs to address underlying constraints to agricultural productivity and market opportunities. The constraints of infrastructure, various climatic stresses like moisture, salinity and floods are also being addressed.

We are also planning to focus on millets that have a high protein, fibre and mineral content and are extremely important food grains for their nutritive value and health benefits. Sustaining high levels of production of food grains is essential for meeting the calorific and nutritional requirement of our population.

Food grains however are only one part of the solution. With economic growth and changing dietary habits, demand for fruits and vegetables, milk and milk products, meat and fish, is steadily increasing. This is entirely natural. Good nutrition requires a balanced diet through multiple food sources.

To support the development of a diversified agriculture, we are promoting several schemes and programs such as the National Horticulture Mission and the National Dairy Development Programme to boost the production of fruits, vegetables and milk products. An integrated farming system promoting food grains, horticulture, and milch cattle, especially for the small and marginal farmers is the way to go forward in ensuring nutritional security. An important point in this context is that agriculture is getting more feminised, with clear evidence that female participation is particularly high in the growing areas of milk and vegetable production. Income from these diversified activities go more to women and therefore, have a gender impact which should add to reduction of malnutrition among other things.

Agricultural diversification in food requires back up support in terms of viable delivery and marketing chains because much of the agricultural produce is perishable. We have not done as much as we should have to promote modernisation of agricultural marketing. I have asked the Planning

Commission and the Ministry of Agriculture to focus particularly on this aspect in the our Twelfth Five Year Plan. Modernisation of marketing inevitably implies a greater interaction and involvement of the private sector. We will work with State Governments to ease whatever impediments may exist in this regard.

I understand that research efforts have made it possible to bio-fortify some crops for better nutrition outcomes. Golden rice containing beta carotene provides the calories as well as nutritional supplements that take care of several diseases associated with vitamin A deficiency. Multi grain flour that mixes soya, oats and millets with wheat flour in different product combinations is yet another approach to meeting the challenge of malnutrition. In all these initiatives, the imperatives of food safety and quality are paramount.

Looking ahead, we must all begin to take more concrete steps to meet people's aspirations to get access to healthier, more nutritious foods for their families. The Green Revolution in our own region of South Asia, to which Dr. Swaminathan made a magnificent contribution, shows just how much can be accomplished when technology advances are combined with sound policies. This was followed by the white revolution in milk, which has made India the largest producer of milk based entirely on small holder dairying. We now need a major revolution in agricultural marketing.

Rapid growth in agriculture, particularly that which diversifies the food basket while ensuring adequate availability of energy and other basic nutrients, combined with other activities and initiatives in health, hygiene and women's education will help overcome poor health, hunger and malnutrition. But, since malnutrition is particularly high amongst the poor and the vulnerable section, this needs to be supplemented by viable social safety nets. We are committed to soon bring before our Parliament a Right to Food Act which will seek to ensure this outcome.

This is, therefore, a particularly good time to meet together and exchange ideas on how best to achieve the goals we all share.

This conference serves to launch this conversation, which all of us must pledge to continue, until we meet our objective of a healthy, productive life for all. I wish you all very fruitful deliberations.

Speaker Summary Note	
Session:	**Inaugural Session**
Speaker:	Rajul Pandya-Lorch, **Head of the 2020 Vision Initiative and Chief of Staff, International Food Policy Research Institute**
Title:	**Vote of Thanks**

Your Excellency, Dr. Manmohan Singh, Prime Minister of the Republic of India; Your Excellency, Mr. John Kufuor, Former President of the Republic of Ghana; honorable ministers; distinguished guests and colleagues:

It is a great privilege for me to express warm and sincere thanks on behalf of the International Food Policy Research Institute (IFPRI) to His Excellency Prime Minister Manmohan Singh for his stimulating and timely remarks and for his gracious participation in this inaugural session. He has long demonstrated his interest in and commitment to improving human well-being, and his remarks show the scope of his thinking on these important issues that affect the lives of so many.

We are especially pleased to be able to hold this conference in India. As an emerging economy facing both exciting opportunities and difficult challenges, India is showing leadership in the search for solutions. In addition, India is home to a long history of learning and discourse on ideas. It is thus an appropriate venue for this "marketplace" of ideas in which we will be engaged for the next several days.

The success of this conference depends on the efforts of many people. We would like to thank our cosponsors whose enthusiasm and support has allowed so many of us to come together in this ground-breaking exchange of views and perspectives. We are grateful to the Conference Advisory Committee, whose members have shared valuable insights that have shaped the thinking behind this conference. We also express our warm appreciation to the many people behind the scenes who worked hard to make this conference happen.

This gathering brings together nearly 1,000 participants from 65 countries, representing all areas of agriculture, nutrition, and health. As we bring all of you together, we cannot even imagine the knowledge and ideas that will be generated and the relationships that will be formed. Our hope is that this conference will not only break new ground in terms of content, but also serve to "break the ice" between our various sectors.

This gathering marks the fifth in a series of conferences organized by IFPRI's 2020 Vision Initiative and designed to bring together a wide range of stakeholders to consider emerging issues affecting the global development community. We are extremely pleased that this conference has generated so much interest and attracted such a wide range of participants, and we hope that you will leave here with new ideas and renewed energy for achieving our common goals.

Please join me in expressing our appreciation to Prime Minister Manmohan Singh for taking the time to be with us today to consider these crucial issues. Thank you.

Text of Remarks

Session: **Inaugural Session**

Speaker: H.E. John Kufuor, **Former President, Republic of Ghana**

Title: **Keynote Address**

Dr Shenggen Fan, Director General of the International Food Policy Research Institute (IFPRI), Hon Ministers, Distinguished Guests, Ladies and Gentlemen, I am honoured to have been asked to co-chair this important conference on the role of agriculture in meeting health challenges. Can I start by congratulating the International Food Policy Research Institute for launching this global policy consultation? It is a sign of the prestige in which the Institute and its work are held that so many distinguished experts on food, farming and health have travelled to India to take part in these discussions. We have already heard some typically inspiring and challenging thoughts from Prime Minister Singh. Few leaders have such a high reputation at home and abroad. Both India and the international community are fortunate to have such courageous, wise and principled leadership. Dr Singh, of course, leads a country which stands as an example of development throughout the world. This is both the world's largest democracy and also one of its fastest growing economic powers.

In Africa, we look at the progress of India, a valued partner, not with envy but with hope. We also see, in its determination to overcome challenges and to harness the talents of its people, a model for us to follow. One of the biggest challenges, of course, is how India can securely and sustainably feed its fast growing population. This is a daunting challenge faced in many parts of the world as well.

Ladies and Gentlemen, over a billion people throughout the world, the highest number we are told for the past four decades, will go hungry today and every day. Food prices, which are rising sharply, are likely to increase these numbers. And there are many hundreds of millions more who, while not hungry, suffer the damaging impact of consistently poor diets. For these families, there may be food on the table. But they have little choice over what they eat. This failure to provide sufficient and nutritious food has a devastating impact on health and development. This starts in the very earliest days of life. The physical and mental development of unborn children is badly damaged, often irreversibly, if their mothers cannot eat properly. Malnutrition stunts our children's growth, increases their vulnerability to disease, and reduces their capacity to learn at school. And, of course, all this feeds through into the wider economy with poorer productivity and performance. So the challenges you are addressing today are not just about survival or fairness but are at the heart of hopes for long-term social and economic development. Without the solutions you provide and the commitment from political leaders to put them into action, our ambitions for a fairer and stable world will not account for much.

Ladies and Gentlemen, I have seen from Ghana and from the continent of Africa, the scale of the challenge we face—and also how, working together, with science and technology as the major tools, governments, research institutions, private sector and individual farmers can overcome it. For more than any continent, Africa stands in need of the solutions this august conference will proffer for tackling the myriad challenges in agriculture, nutrition and health. Africa alone, of all the world's continents, does not grow enough food to feed itself. This is not because of lack of will or shortage of land. In fact according to an authoritative recent report, around 60% of the world's uncultivated

arable land is in Africa. Rather the devastating food deficit on the continent is largely because of a lack of knowledge, resources and opportunity. The critical need is for the **Transformed Farmer.** Across Africa, farmers are still scratching a living from the land by hand like our ancestors used to do. Agriculture is back-breaking. There is no joy or reasonable reward in this type of farming to attract the educated youth of today. The revolution which has transformed agriculture around the world, including here in Asia, has largely passed Africa by. The average farmer in Africa has not largely shared in the advances in irrigation or improved crop varieties which have revolutionised yields elsewhere. Our agriculture is overwhelmingly still rain fed. If the rains fail, our crops fail. Even if the rains come at the time and intensity expected, our crops are at the mercy of pests and diseases. Post harvest losses remain heavy. There is little use of pesticides, machinery or fertilisers. Together with out-dated farming practices, this reduces the fertility of the land. It forces families to move on, slashing and burning, causing severe and lasting damage to our environment. The educated youth therefore escape and drift from rural areas into towns in search of non-existent jobs.

In Ghana, not long ago, virgin forests used to cover 40% of the country. Now it is as little as 7%. Sadly, our forests are still being felled indiscriminately to meet international demand for wood and timber. We are destroying our precious natural heritage. And yet again, we are exporting raw materials without adding any extra value for our citizens or country. And, of course, climate change is making these challenges even worse.

Africa is the continent which is going to be most affected by the impact of man's carbon emissions into the atmosphere. Already we are seeing the deserts in the north of Ghana creeping south. Extreme weather across Africa is becoming more regular. The rains are becoming more unpredictable. This failure of agriculture forces us to import food from outside our continent, stripping countries of the resources they need for development. But too often this food is itself of dubious nutritional quality. For example, chicken parts from Europe which can't be sold at home and poor quality rice from Asia are dumped in Africa, forcing down the prices for our home-grown crop. In sum, ladies and gentlemen, this is the unhappy story of agriculture in many parts of Africa today.

But distinguished ladies and gentlemen, the picture is not all gloomy. For the evidence shows that if our farmers are given the knowledge and resources which their counterparts in other parts of the world take for granted, they can quickly increase yields. I have seen this from my time in Government in Ghana on important cash crops like cocoa and in food production, generally. It also led to tremendous increase in the production of livestock and fisheries.

Ghana is one of the biggest exporters of cocoa in the world, in fact, the second biggest. But it was always clear that, with the right Government support and the spread of best practice, yields could be greatly increased. This is the path my Government followed. We adapted the latest knowledge from universities, agricultural institutions, experts and farmers across the world. The policy was underpinned with access to affordable credit to the farmer. Cocoa farms were sprayed with pesticides free of charge. The government provided fertilisers where they were needed. Importantly, government gave farmers a major incentive to expand production through enabling them to keep a much bigger share of the international export price from about 40% in 2002 to about 70% in 2004. The result was that, between 2002 and 2005, cocoa production doubled per hectare. From 350,000 tons in 2001, production jumped to 734,000 tons by 2005—an all time record in the over 100 years of cocoa farming in the country.

We successfully used many of the same techniques to improve production for food crops such as maize, yams and plantains as well. Government, for example, established the Grains and Legumes

Development Board (GLDB) to supply quality seeds and planting materials to farmers as a strategy to improve the quantity and quality of agricultural produce. The outcome is that, despite the problems the nation faces, food is plentiful in Ghana. We have made sure as well that our children gain from this progress and has also caused a monumental increase in enrolment. The government launched an ambitious programme to give all kindergarten and primary school pupils a daily hot and nutritious meal made from locally-produced food. This is keeping the children in school and has also caused a monumental jump in enrolment. Further, the farmer gets enriched while the child is properly nourished. The girl-child in particular is saved by this policy from such plights as teenage pregnancy. Into motherhood later and with education, she should be more responsible in raising her children with better feeding practices. Already, interesting results are showing as more girls than boys are being enrolled in schools and in many instances.

We invested, too, in wider rural development. It is little good increasing yields if crops cannot be stored safely or transported to market. So as well as supporting irrigation, improved seeds and crop diversification, government pursued an integrated Rural Development Policy in which it built feeder roads, silos and cold stores for horticultural crops and fisheries. Government also extended mechanization on soft loan terms to the farmers.

Reintroduction of strategically deployed Extension Services network was given oversight-ship in implementing the policy. Rural electrification, upgraded healthcare centres, potable water supply and quality schools are integral to the policy. By this policy, government extended support to six out of every ten of Ghana's population that still live in rural communities and helped to slow down the increasing drift of the youth into our towns and cities.

A further plank of this policy has been the introduction of the Youth in Agriculture Programme by which special measures are targeted at the educated youth to entice them to remain in farming. Happily, similar progress is being achieved in many parts of Africa. But there is so much more that could be achieved with the help of international institutions such as yours. Technical and financial assistance must be extended openly and generously to the countries which can most benefit. Thus, capacity development in beneficiary countries must be identified as priority. The objective must be for international bodies such as IFPRI to work together in partnership with research institutes and scientists of recipient states to focus on their peculiar agricultural problems. The role of IFPRI is absolutely critical here in helping agriculture in less developed countries—particularly in Africa—to become more productive to effect positively on the nutrition and health of these countries. This requires that IFPRI commits to sustained and purposeful advocacy to ensure that farmers and communities benefit from the breakthroughs made in research and development. In this era of the all-pervasive Information and Communication Technology, this should be achievable. To achieve all these goals, IFPRI and its partners have to help individual governments put their research outcomes at the heart of integrated national policy programmes. There must also be collaboration with important continental and regional groups such as the New Partnership for Africa's Development, the Southern African Development Community and the Economic Community of West African States.

Distinguished colleagues, there is no more basic need than the food we eat. It decides not just the health of individuals but also the health of communities. Yet it is because of shortages of nutritious food that millions of our fellow human beings are condemned to far shorter lives than those in more food secure countries. In the 21st century, this is a scandal which must shame us all. The forces of globalisation, if they are to be seen throughout the world as benign, must be harnessed to tackle this most basic of inequalities.

Ladies and Gentlemen, it becomes obvious that to leverage agriculture means above all, **transforming the farmer**, who must be educable and empowered by society to maximize quality food output using scientific and technological means. Properly rewarded by rational social market policies, farming should be the occupation of choice for the modern-day youth. A healthy and happy future for mankind needs such a farmer.

I am honoured to be with you. There is, I believe, no more important gathering in our world today than this conference. I wish you well in your discussions. Thank You.

Speaker Summary Note	
Session:	**Inaugural Session**
Speaker:	Mohammad Abdur Razzaque, **Minister, Ministry of Food and Disaster Management, Government of the People's Republic of Bangladesh**
Title:	**Keynote Address**

***H.E. Manmohan Singh Ji**, Prime Minister, Republic of India; **Madam Hillary Rodham Clinton**, Secretary of State, USA; **Professor M.S Swaminathan**, UNESCO Chair in Ecotechnology and Chairman M.S. Swaminathan Research Foundation, Republic of India; **Shri Sharad Pawar**, Union Agriculture Minister, Government of India; **Dr Shenggen Fan**, Director General, International Food Policy Research Institute, USA; Eminent experts; Distinguished guests, Fellow delegates from the world over, Development partners, Ladies and gentlemen:*

> *I feel honoured to be in the midst of such an illustrious group of policy makers and practitioners, working towards the common goal of eradicating hunger, achieving food security and nutrition by promoting agriculture, as the long term and sustainable means of improving health.*
>
> *I am also pleased to be in India—our close neighbor—with whom we share a close culture and friendship. On behalf our Honorable Prime Minister Her Excellency Sheikh Hasina, and the people, I extend greetings to all of you. I consider it a great conference for helping stakeholders to better design and implement strategies that tap into agricultural development for improved nutrition and health. I also wish to acknowledge my appreciation to IFPRI and USAID for having invited me to this Conference.*

1. South Asia accounts for 23 percent of the world population, but generates about 2 percent of global income. Housing about 40 percent of the world's poor (living on less than a dollar a day) and 35% of the world's under-nourished, the Region has the highest concentration of poverty and food insecurity in the world. It has the 2nd highest percentage of malnourished population after Sub-Saharan Africa, but in terms of number, it houses the highest magnitude. As a supplier of food, a source of income, and an engine of growth, South Asian agriculture has the potential to significantly improve poor people's nutrition and health. Therefore, *this conference, 'Leveraging Agriculture for Improving Nutrition," is a timely initiative of IFPRI given the challenges of food security and nutrition of the countries of the region.*
2. Let me share with you Bangladesh's increasing recognition and perspective of key issues on promoting agriculture, for improving nutrition and health. Since Independence in 1971, Bangladesh has made impressive progress in improving food security and nutrition. Food grain production has been tripled with rice production marginally surplus in normal years, however, production of wheat and other crops and non-crops are still below from that of nutritionally balanced diets for the population. Access to food has also been improved, however, the hardcore poverty incidence is still about 25 % leaving the fact that around one quarter of the population is facing hard times getting adequate nutritious food during normal times as well as in emergencies.

3. Between 1975 and 2010, prevalence of malnutrition in Bangladesh decreased markedly, but still higher than the WHO cut-off level. The stunting and underweight rates are still around 45% and 42% respectively. Maternal under-nutrition has also decreased to 32% in 2005. This is a good indication of nutritional improvement in view of the fact that malnutrition in a child's life begins with the mother. It is to note that Bangladesh and a few other countries in the region are progressing better in terms of school enrollment, sanitation and drinking water, immunization of children, vitamin A supplementation, infant and maternal mortality etc. Agricultural development along with interventions from different sectors have contributed to improved maternal and child health outcomes.

4. The challenges for improving food security and nutrition thus lie in a combination of factors including slow pace of diversification owing to scarcity of land, faulty food utilization, inadequate awareness and sanitation, low income resulting in low-grade food intake etc. Other emerging factors, such as rapid population growth, climate change and increasing disasters, lessening access to natural resources and vulnerability to price shocks, exacerbate the situation. Sustaining agricultural growth has a paramount role here because agriculture is the primary source of all nutrients for human being. The need is to understand the linkages between the agriculture and health sectors, how the linkages operate, where the portfolio of crops and opportunities for joint action lie, what the main obstacles to such actions are, and what the socially accepted solutions are.

5. Investing in nutrition has been a commitment in Bangladesh from the highest level of leadership. Comprehensive policies have been adopted and interventions have been put in place. The National Food Policy and its Plan of Action have specific objectives on availability, access, stability and nutrition. The recently prepared Country Investment Plan (CIP) articulates 12 prioritized programmes to help achieve the objectives in the medium term. Our government is implementing over 60 food and non-food based targeted safety net programmes focusing on poor and the disadvantaged including women and children. The international community have in recent months 'showcased' Bangladesh for its success stories in food security initiatives and country-led food security policies and plans. What is needed is extensive and complementary support from development partners to our prioritized programmes.

6. Especially the investments should be pursued in agricultural livelihoods that support small-holder farmers, promotion of horticulture production, homestead gardening and adopting GMP and GHP in the food chain. Support is also needed in agricultural research for developing climate stress tolerant food crops, promotion of food-to-food enrichment and conserving biodiversity. Building linkages between complementary feeding practices and agricultural production considering community perceptions.

7. Government of Bangladesh's Vision 2021 has set, among others, the target of achieving self sufficiency in food by 2012, ensure by 2021 a minimum of 2,122 k. cal/person/day of food to all and bring down poverty incidence to 15%. For these to happen, contribution of agriculture is going to play an important role. In the face of global market uncertainties, agricultural systems including livestock and fisheries need to be strengthened. I need to recall here that ODA to agriculture has been reduced to 4% in 2007 from 19% in the 1980s, which needs to revamp. I would appeal to the international community to revive the spree of supporting research and innovation in agriculture through CGIAR front line research, and research of regional and national institutions.

8. A good number of institutional frameworks have been devised and initiatives taken under the SAARC processes for improving food security in the region. SAARC should also work on regional

initiatives to leveraging agriculture for improving nutrition. I would hope that SAARC processes attain further momentum in complementing national as well as global initiatives for food security and nutrition.

9. I strongly believe that this important conference carries an opportunity to share and learn through cross country experiences and evolve mechanism for addressing policy and implementation challenges confronting agriculture, food security and nutrition and explore sustainable political, financial and technical support for the countries in need.

Thank you all.

Text of Remarks

Session:	**Inaugural Session**
Speaker:	M.S. Swaminathan, **UNESCO Chair in Ecotechnology and Chairman, M.S. Swaminathan Research Foundation, India**
Title:	**Keynote Address**

1. Food and drinking water are the first among the hierarchical needs of a human being. Growing population, expanding ecological footprint, diminishing per capita land and water availability, increasing biotic and abiotic stresses, and above all, the prospects for adverse changes in temperature, precipitation and sea level as a result of climate change, emphasize the need for keeping issues relating to agriculture high on the professional, political and public agenda. The multiple roles of agriculture in food production, improving nutrition and health, and climate change mitigation are now well recognized scientifically, but are yet be integrated into coherent national policies and strategies. Opportunities for generating synergy among agriculture, nutrition and health are great and this conference is therefore a timely one.

2. In India, the relationships between diet and health have been recognized since long in indigenous medical systems like *Ayurveda*. The National Institute of Nutrition of India is affiliated to the Indian Council of Medical Research (ICMR) to ensure synergy between nutrition and health care. Similarly, India was one of the early countries to develop an Integrated Child Development Service (ICDS) involving concurrent attention to nutrition, health and education. In spite of such early recognition of the need to “deliver as one” in relation to the nutritional and health requirements of the population, India has an unenviable record in overcoming child and adult malnutrition and in linking synergistically agriculture, nutrition and health.

3. Let me cite a few examples of the immense benefits that will accrue from leveraging agriculture for improving nutrition and health. When I was at the International Rice Research Institute, the Philippines, I organized in 1986 a consultation jointly with the World Health Organisation (WHO) on how to avoid the breeding of malarial mosquito in rice fields. We concluded that alternate wetting and drying of rice fields will disrupt the breeding cycle of the mosquito. Such a practice does not affect yield but confers the additional benefit of a substantial reduction in the demand for irrigation water. This approach to water management in rice fields is now incorporated in what is popularly known as the “System of Rice Intensification (SRI)”—an agronomic management method being popularized by Dr Norman Uphoff of the Cornell University, USA. As President of the Pugwash Conferences on Science and World Affairs, I had organized discussions on the role of nutrition in the treatment of HIV/ AIDS patients both in the “first wave” countries like South Africa, and “second wave” countries like India. The experience in both the first and second wave countries was the same—namely a food cum drug approach yields the best results. The same is true with reference to Tuberculosis and Leprosy where the need for prolonged treatment limits opportunities to poor patients for earning their daily bread.

4. Several steps are urgently needed for achieving the goal of linking agriculture with nutrition and health. First, nutritional considerations must be incorporated in Farming Systems Research. For example, pulses or grain legumes should find a place in the crop rotations. Crop-livestock integrated production system as well as coastal and inland capture and culture fisheries will help immensely in ensuring that the needed macro-and micro-nutrients are available in the diet. ICAR's All India Coordinated Project on Farming Systems Research should have a competent Nutritionist on its staff, so that appropriate agricultural remedies are introduced for the nutritional maladies of the area.

   The National Horticulture Mission affords uncommon opportunities for addressing the problem of micro-nutrient malnutrition i.e., the deficiency of iron, iodine, zinc, Vitamin A, Vitamin B12, etc in the diet. What is important is the addition of the nutritional dimension in the programmes designed to promote the cultivation of vegetables and fruits in different parts of the country. A Home Science graduate well versed in Nutrition can be added to the staff of the Mission in every district. They could also promote nutritional literacy in the area.

5. India proposes to make access to food a legal right soon, through a National Food Security Act. The National Advisory Council headed by Smt Sonia Gandhi has recommended that this Act should have both mandatory rights and enabling provisions. The mandatory rights will include the provisions of 35 Kgs of rice, wheat or millet (pearl millet, sorghum, maize, *ragi* and minor millets (preferred particularly in tribal areas) per month per family at a price of Rs.1, 2 and 3 per Kg in the case of millet, wheat and rice respectively. The inclusion of nutritious millets, inappropriately called "coarse cereals", will help to improve both nutrition and climate resilience, since these crops are more drought tolerant. The legal entitlements will be structured on a life cycle basis, with particular attention to the first 1000 days of a child's life (i.e., from conception up to the end of two years). The life cycle approach will ensure attention to all stages in one's life. ICDS will be restructured so that the nutritional needs of the infant during the first 1000 days are met.

   Among the enabling provisions, concurrent attention to clean drinking water, sanitation, environmental hygiene and primary health care, will be an important one. The additions of Nutrition in the National Rural Health Mission will help to foster symbiotic linkages among agriculture, nutrition and health. Synergy between nutrition and agriculture will include steps like the cultivation and consumption of *moringa* (drumstick) along with millet. *Moringa* is a nutritional marvel and the millet cum *moringa* combination in the diet will help to meet the needs of both macro-and micro-nutrients.

6. Globally and nationally, the prevailing rates of hunger and malnutrition are inexcusable. There are simple and cost effective approaches to making such a sad situation a problem of the past. This will however require coordinated planning and action among those involved in the agriculture, health and nutrition sectors.

Speaker Summary Note	
Session:	**Inaugural Session**
Keynote Speaker:	Sylvia Mathews Burwell, President, Global Development Program, Bill & Melinda Gates Foundation, USA
Title:	**Keynote Address**

Prime Minister Singh, President Kufuor, Ministers, Distinguished guests ...

I am truly honored to join all of you this evening to help kick off this important conference to discuss how we can tap the power of agriculture to help the world's poorest families lead healthier, more productive lives.

I am struck by what a wide range of dedicated professionals—from plant scientists to policymakers—we have assembled here.

Decisively combating undernutrition will require contributions from the fields of agriculture, health, water and sanitation, education, and social protection. It is my hope that this conference will foster greater collaboration between our areas of expertise and help us find solutions to the world's nutrition challenges.

While agriculture alone cannot defeat undernutrition, at the Bill & Melinda Gates Foundation we believe agriculture can play a bigger role than it has been in improving the diets of the world's poorest families.

Three-quarters of the world's poorest people get their food and income by farming small plots of land. If we can make smallholder farmers more productive and more profitable, we can have a massive impact on hunger, poverty, and nutrition.

Agriculture and nutrition are part of a virtuous cycle. Not only does increasing agricultural productivity improve the health of smallholder farmers through better nutrition, but healthier smallholder farmers are also more productive.

It's no surprise that a recent study shows that countries which pursue pro-agriculture policies have faster reductions in their stunting rates. Agricultural productivity has not only raised incomes, it has also reduced food prices, making it easier for the world's poorest people to feed their families.

And yet, while agriculture has done so much to combat malnutrition and undernutrition, we believe it can do much more.

It's not enough for us to just increase the *quantity* of food available to the world's most vulnerable communities, especially women and children. We must also improve the *quality* of their diets by ensuring they have access to diverse, nutritious foods.
Over 2 billion people in the world still suffer from poor nutrition.

Many countries with impressive gains in agricultural and economic growth have not experienced the full benefits of improved nutrition. India's tremendous economic achievements and dramatic increases in food production, for example, have not allowed it to break free from the challenges of chronic undernutrition and malnutrition among its poorest citizens.

I'd like to share three examples of how the Gates Foundation is working to realize agriculture's full potential to help overcome these nutrition challenges.

Through our work with HarvestPlus, we are supporting a game-changing effort to increase the levels of vitamin A, zinc, and iron in staple crops widely grown and consumed by the poor. By breeding higher levels of these vitamins and minerals into seven key crops—beans, cassava, maize, pearl millet, rice, sweet potato, and wheat—HarvestPlus aims to improve the nutrition of millions rural poor in Africa and Asia. The first high vitamin A sweet potato bred in Africa has been readily adopted by about 500,000 farming families over the last decade, helping to improve the health of their children. And over the next three years, HarvestPlus plans to release four more improved crops.

But we know that more nutritious crops are only beneficial if the world's poorest farming families have enough land and support to grow them. That's why we are working with RDI/Landesa, an organization securing land rights for the world's poorest families, to give women farmers access to land and training to help them grow nutritious foods to feed their families. By 2013, RDI/Landesa is on track to help 200,000 women farmers in West Bengal and Odisha become legal landowners, giving them the opportunity to grow homestead gardens that can help them build better, healthier lives for their families.

At the same time, we recognize there's a lot we still don't know about the links between agriculture and nutrition. To better understand why high levels of malnutrition in India persist despite sustained economic and agricultural growth, we have teamed up with the International Food Policy Research Institute to explore the links between agriculture and nutrition. This initiative is promoting platforms where agricultural experts, nutritionists, and other partners can address key knowledge gaps and drive changes that will accelerate the reduction of undernutrition in India.

Too often, even within our own foundation, we have not taken advantage of the linkages between our fields. Agricultural scientists and nutritionists have traditionally worked apart. But it's our belief that these sectors have a lot to learn from each other if we are to reach the common goal of improving nutrition.

Cooperation must start with conversation. I challenge all of you to use this conference to knock down the walls that separate your fields, share your knowledge and insights, and build new bridges that will lead us to better, healthier lives for the world's poor.

There's a saying we take to heart at the foundation, "If you want to go fast, go alone. If you want to go far, go together."

It's the goal of this gathering to go far, together.

So let the conversation begin. Thank you.

Speaker Summary Note

Session:	**Inaugural Session**
Speaker:	Ursula Schaefer-Preuss, **Vice President, Knowledge Management and Sustainable Development, Asian Development Bank (ADB), Philippines**
Title:	**Keynote Address**

Compelling need

This conference is timely as it will explore the pathways for agriculture of developing economies in improving nutrition and health. The present context and landscape by which we explore these pathways is extraordinarily complex. This means that there may be no-one-size-fits-all pathway.

Constructive and evidenced-based dialogues, such as this event, are essential especially for Asian and Pacific constituents. Asia and the Pacific are home to about two thirds of the world's hungry people. About 98 million are malnourished children under 5 years old.

Since the second half of 2010, prices of wheat, corn, sugar, and oil seeds are again on the rise. Prices of essential spices, like onions, garlic, and chilly, have also sharply increased. These prompted talks of another impending food crisis.

These trends are worrying, especially since many of the Asian and Pacific economies are still adjusting from the 2007–08 food and energy price hikes and the global financial crisis. Recent studies on the impact of transmission of high global food price in 2007-08 on low economies showed that the higher food prices most adversely affected the rural and urban poor who are generally net food buyers. Vulnerable households employed harmful coping strategies.

The agriculture renaissance phase

One good thing that came out of the 2007–08 food price surge experience was the reawakening among the international community, public and private sector and the NGOs, that agriculture is not a sunset industry but it needs huge investments. This period is like an "Agriculture Renaissance" phase and the conference is one of the renaissance activities for cross-learning.

Despite the complexity of the food and nutrition security challenges, Asia has much to offer in terms of emerging innovative solutions and countryside experimentation that have potentials for up scaling to sustainable pathways:

In the ADB-IFPRI study which overwhelmingly showed the transmission of the global food price increases on the poor, it noted that in Vietnam for example, the farmers gained from the food price increase, reduced their poverty and improved their malnutrition status. The reason was that Vietnamese farmers were mainly net sellers.

There are also ongoing experiments of regional measures to address food price volatility, instead of ad hoc national government responses of restricting exports. There are emerging public-private partnerships for production and marketing of fortified food, and country strategies that tackle food sector development, and improved health and nutrition holistically.

The conference is an opportunity to discuss and share freely and concertedly the pathways for

agriculture to improve health and nutrition of the almost billion poor. At the end of the conference, it is hoped that a few pragmatic steps will be identified for ensuring that this renaissance phase results to sustained solutions for reducing poverty and malnutrition worldwide.

TRANSFORMING AGRICULTURE, NUTRITION, AND HEALTH LINKAGES

Speaker Summary Note

Session:	**Transforming Agriculture, Nutrition, and Health Linkages**
Speaker:	William J. Garvelink, **Assistant Administrator, USAID Bureau for Food Security, and United States Government Deputy Coordinator for Development, Feed the Future, USA**

In 2009, President Obama launched the Feed the Future initiative and pledged at least $3.5 billion for agricultural development and food security between 2010 and 2012. This pledge helped leverage more than $18.5 billion from other donors and recognized that investment in global food security offers important and significant economic, security, political, and moral advantages.

Feed the Future, the U.S. government's global hunger and food security initiative, renews our commitment to invest in combating the root causes of chronic hunger and poverty.

What are some of our accomplishments so far?

USAID, who leads the whole of government initiative, created a Bureau for Food Security in November. The Bureau for Food Security will drive our food security efforts—our Agency's top strategic priority—and lead the implementation of Feed the Future. This is a historic milestone in the Agency's renewed commitment to agriculture-led development and demonstrates that we are committed to food security for the long term.

We have completed food security implementation plans for 18 of 20 potential Feed the Future focus country, which describe start-up activities for the first year. The approved plans are public at www.feedthefuture.gov and are already being implemented.

We have realigned our agricultural development activities to country-identified priorities where we can partner with others to drive impact at scale. For instance, in Senegal, our team was spreading its work across twenty value chains throughout the country. Now, we have agreed to focus on four value chains in two regions of Senegal.

There are now comprehensive indicators and a results framework for Feed the Future that will be used by all USG agencies who are supporting Feed the Future activities. These are posted for feedback on www.feedthefuture.gov. I encourage you all to look at our monitoring and evaluation tool and provide feedback.

The Agency has hired more than 50 additional USAID agriculture foreign-service officers.

We have conducted strategic reviews for 17 of the 20 potential Feed the Future focus countries, which details progress in the initiative to a high-level panel of interagency experts to strengthen our strategies.

The good news? The momentum to link agriculture, research and nutrition across programs is greater than ever before—and that is why you are all here.
We know the need is great. Nearly 200 million children under age five and 1 in 3 women are

undernourished. Poor communities in developing countries disproportionately bear the greatest burden of undernutrition.

We know that our work is crucial. Investments in nutrition are highly cost-effective, and are paramount to the success of virtually all of the Millennium Development Goals. The 2008 Copenhagen Consensus—reached by a group of leading scientists and economists, including several Nobel laureates—found that 5 of the top 10 highest return solutions to global challenges (based on benefit-cost analysis) closely relate to combating undernutrition.

Improved nutrition is a critical driver for economic growth and poverty reduction. Strong nutrition in early life contributes to human and economic capacity through improved learning and productivity, and contributes to a robust, capable workforce. It also promotes gender equality and opportunities for women and girls, lessens susceptibility to other deadly diseases, and is critical to national prosperity, stability, and security.

Tackling undernutrition requires global cooperation that focuses on high-impact interventions and innovative solutions in both the agriculture and health sectors.

At the G-8 Summit in 2009, the international community committed to increase focus on food security and reverse the decades-long decline in assistance for agricultural development. It also accelerated global momentum to link nutrition and agriculture like never before.

The United States is a proud partner in this effort and is committed to supporting country-owned processes that integrate agriculture and nutrition for sustainable food security outcomes. Nutrition is the defining link between the two game-changing U.S. Presidential Initiatives: Feed the Future and the Global Health Initiative.

The United States is proud to play a leading role in the 1,000 Days movement to focus attention, align and increase resources, and build partnerships to promote results-oriented and timely implementation of the Scaling Up Nutrition (SUN) Framework. The SUN Framework has been endorsed by over 100 public and private stakeholders who aim to improve nutrition through increased advocacy and programming.

Efforts to integrate agriculture and nutrition programs will contribute to healthier, more productive and resilient communities by ensuring better access to better quality food, thereby increasing the quality and diversity of diets. They will also improve accessibility to water and sanitation and health systems and will support better nutritional practices in the household.

Speaker Summary Note	
Session:	**Transforming Agriculture, Nutrition, and Health Linkages**
Speaker:	Namanga Ngongi, **President, Alliance for a Green Revolution in Africa (AGRA), Kenya**

- The linkage between Agriculture, Nutrition and Health is taken for granted and not much is done to ensure it is real.
- Productive activities in agriculture are critical to ensure availability of adequate food stocks, locally, nationally and globally.
- Shortfalls in production constitute the principal reason for inadequate food intake by the poor, especially for subsistence farm families who have to produce most if not all of the food they consume. Nowhere is this more critical than in Africa where some 70 percent of the population is directly dependent on agriculture for food and incomes.
- Low productivity in agriculture, particularly smallholder agriculture, is the main reason for record levels of food prices that are being reported globally. The world is bracing itself for a new food crisis that is likely to be catastrophic. Indeed the political turmoil experienced by several developing countries over the last month or two has been fueled partly by hardships imposed by the record food prices. Inflation is being fueled by high food prices and economic gains are being compromised.
- Farmers need to be supported to have access to the inputs they need to ensure high and sustainable production of quality food commodities. They need improved storage to reduce the unacceptably high levels of post-harvest losses and secure access to markets. Appropriate and affordable financial products need to be developed for farmers, especially smallholders and more so women farmers, for whom increased productivity is a sure route out of poverty. This support is needed even more in the face of climate change.
- Inadequate consumption and the consumption of inappropriate foods are responsible for the unacceptably high rates of malnutrition in the world. Although globally malnutrition has declined significantly over the last three decades, it is still very high in Sub-Saharan Africa with some 30% of the population and nearly 40% Africa's children malnourished.
- The high rate of malnutrition in rural Africa where 70% of the population is engaged in agriculture is clear evidence that productivity and production levels are low. This is compounded by the high levels of post-harvest losses.
- High rates of under nutrition sap the energies of farmers and expose them and the rest of the population to increased health risks that reduce their capacity to work their farms thus impacting negatively on production.
- Consumption of high volumes of nutritionally unbalanced foods has also resulted in high levels of malnutrition.
- In view of the fact that most rural populations especially smallholder farmers depend on own production for most of their food makes it necessary to breed for improved nutritional quality in the crops consumed by them and the urban poor, for example orange flesh sweet potato, high protein maize, and crop varieties with high levels of essential minerals and vitamins. Crops mostly grown by women farmers should be a priority.

- Intercropping of grain legumes and cereal crops and mixed farming of crops and livestock afford poor rural farmers opportunities for balanced diets.
- AGRA is working all along the agriculture value chain to improve productivity, production, market access and access to credit by smallholder farmers. Risk reduction in the face of climate change is a high priority.
- Unfortunately policy and programmatic actions at national, regional and global levels are segmented and uncoordinated. They do not build on the strong linkages that should exist between agriculture, nutrition and health.
- This problem has been recognized and several resolutions have been adopted at international conferences calling for the establishment of national commissions on nutrition that will bring about closer linkages between agriculture, nutrition and health but few countries have functional and effective nutrition commissions. Nutrition, the bridge between agriculture and health continues to be an orphan. It need not be so.
- Given the considerable benefits that would accrue from more coordinated actions in the fields of agriculture, nutrition and health, it is recommended that national nutrition commissions be established and that they are provided adequate support at national, regional and international levels.
- Among key objectives of national nutrition commissions should be nutrition education especially for women of child bearing age. This is critical to break the mother to child transmission of low birth weight that increases infant mortality rates in addition to higher maternal mortality rates.
- Ministries of Agriculture should be transformed to Ministries of Agriculture, Food and Nutrition Security that promote production of nutritious food commodities and their safe handling through the marketing system to the consumer. Ministries of Health should be explicitly charged with nutrition responsibilities, mostly clinical. Such explicit mandates will enhance the coordination/clearing house roles of national nutrition commissions.
- Advantage should be taken of the education system to introduce notions of the linkages between agriculture, nutrition and health to young children. A concerted educational effort will yield considerable benefits. Community change agents should be trained and deployed to increase awareness, demonstrate the use of available commodities for nutritious meals and change mid-sets.
- To be effective, national nutrition commissions should report to the office of the President or Prime Minister.
- Governments have a responsibility to ensure that their poor citizens have access to adequate nutritious food for healthy lives. Efforts should be made to set up nutrition support schemes and safety-nets that provide access to adequate food and in ways that improve capacity to be self-supporting.
- School feeding programs are but one example of such actions that promote food production, consumption and the establishment of stable markets. Other forms of institutional feeding and social transfer programs can contribute to strengthening the linkages between agriculture, nutrition and health.

AGRICULTURE, NUTRITION, & HEALTH – WHERE ARE WE NOW, WHERE ARE WE HEADED, AND WHERE DO WE WANT TO BE?

Speaker Summary Note

Session:	**Agriculture, Nutrition, & Health:** **Where are we now, where are we headed, and where do we want to be?**
Speaker:	Francesco Branca, **Director, Department of Nutrition for Health and Development, World Health Organization (WHO), Switzerland**

Introduction

At the beginning of this important conference aimed to explore the links between agriculture and nutrition, it is useful to examine the overall global nutrition trends.

Nutrition Challenges

1. When the MDG goals were formulated at the end of the 1990s number of people living below the World Bank's poverty line were 1.8 billion. This number went down to 1.4 billion in 2005, mainly because of China. In reality, without China, the number of people living in extreme poverty actually went up between 1990 and 2005 by about 36 million.

2. At the same time, despite earlier progress, the number of hungry has been rising since 1995 from 842 million in 1990–1992 to 873 million in 2004–2006 and to 1.02 billion people during 2009, the highest level ever.

3. In 2010, about 115 million children worldwide are underweight and 186 million children under five years of age are stunted[1] and every year an estimated 13 million children are born with restricted intrauterine growth or prematurely.[2]

4. Anaemia affects 47.4% of the preschool-age population[3] and 42% of pregnant women (468 million). 33.3% of the preschool-age population globally is vitamin A deficient. Overall, more than 2 billion people are deficient in micronutrients.

5. Undernutrition is recognized as the underlying cause of nearly one in three deaths from all diseases in children in pre-school years and together maternal and child undernutrition account for 11 percent of the global burden of disease.

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[1] Underweight and stunting, in: *World Health Statistics 2010.* Geneva, World Health Organization, 2010.

[2] de Onis M, Blössner M, Villar J. Levels and patterns of intrauterine growth retardation in developing countries. *European Journal of Clinical Nutrition* 1998, 52(Suppl.1):S5-15.

[3] de Benoist B, McLean E, Egli I, Cogswell M (Eds). *Worldwide prevalence of anaemia 1993–2005: WHO global database on anaemia*. Geneva, World Health Organization, 2008.

Trends and geographical priorities

6. The prevalence of stunting is higher in Africa than in Asia, but in absolute numbers most children affected by stunting live in Asia.

7. In Africa, rates of stunting have changed little between 1990 and 2010 while, in Asia and Latin America and the Caribbean, rates have almost halved.

8. The proportion of low birth-weight babies has fallen by over 10% in South Asia from 1980 to 2000, but still remains considerably higher there than in any other region.

9. Anaemia rates have not varied significantly in Africa since 1990 and have remained similar in South-Central Asia. Rates have declined in East Asia and Central America.

10. For most regions, apart from parts of Africa, rates of vitamin A deficiency have declined since 1990, although there is still regional variation.

11. WHO regional estimates indicate that the highest proportion of preschool-age children affected by night-blindness is in Africa, a value that is four times higher than estimated in Southeast Asia (0.5%). Africa has the greatest number of preschool-age children affected with night-blindness (2.55 million), and corresponds to almost half of the children affected globally.

12. Risk of iodine deficiency based on urinary iodine concentrations is higher in Europe than in many parts of the rest of the world.

13. In summary, improvement in stunting and vitamin A nutrition and a more modest improvement in anemia, but mainly in Asia, while little or no progress or even a deterioration has been observed in Africa.

Overweight and obesity

14. At the same time, the latest estimates suggest as many as 1.7 billion people are overweight, of whom 500 million are obese. Globally, the number of overweight and obese[4] preschool children in 2010 is estimated at 43 million. Worldwide, at least 2.6 million people die each year as a result of being overweight or obese.

15. Increasingly the impact is seen not only in affluent countries but even among poorer populations in countries undergoing nutrition transition. Infant and young child overweight trends between 1990 and 2015 illustrate the steeper rise in the lower-middle income group compared to all other groupings, reflecting rapid changes in those countries.

16. From 1990 to 2010 rates of childhood obesity in Africa doubled to 8.5, whereas in Latin America and the Caribbean rates stagnated; and in Asia rates increased from 3.2 to 4.9.

17. Within Africa, the rates in the Southern sub-region have been flat, whereas in Middle and Northern Africa the prevalence has increased four-fold. Within Asia, the Western sub-region

[4] +2 standard deviations or more above the median of the WHO standards.

prevalence increased five-fold from 3 to 15%, whereas in the Eastern region the prevalence hardly changed.

18. Approximately 500 million adults are obese. The prevalence of overweight and obesity are highest in the WHO Regions of the Americas (61.7% for overweight in both sexes, and 26.3% for obesity) and lowest in the WHO Region for South East Asia (13.5% overweight in both sexes and 2.7% for obesity). In the WHO region for Europe and the WHO region for the Eastern Mediterranean, and the WHO region for the Americas over 50% of women were overweight. For all three of these regions, roughly half of overweight women are obese (22.8% in Europe, 24.5% in the Eastern Mediterranean, 29.2% in the Americas).

Infant feeding

19. Only about one-third of children under 6 month of age are exclusively breastfed. During the period 2000–2008 in particular, the rates of exclusive breastfeeding seem to have declined in all regions, except in Africa. The Southeast Asia region has the highest rates of exclusive breastfeeding among all regions although even they do not reach 50% during the whole time period

20. More than 60% of countries stated a high percentage of children 6–8 or 6–9 months old receiving complementary foods.

Changes in the Quality of the Diet

1. Industrialization of the food chain has also changed the macronutrient composition of the diet, which is now much more energy dense.

2. The type of carbohydrate in the diet has changed with industrialization, with decreases in complex carbohydrates, such as starches, and an increase in refined sugar. The consumption of sugars has typically increased in fifty fold in industrialized countries, with upwards of 15% of energy intake now coming from refined sugar. The majority of these sugars is “hidden” in processed foods and drinks, rather than added to food by the consumer.

3. The fat content of the diet has also increased from 20% to 40% in many industrialized countries.

4. Food consumption patterns are becoming more similar throughout the world, with shifts towards higher-quality and more expensive foods, such as meat and dairy products, reflecting the progressive urbanization of the population.

5. In 1996, FAO was indicating that the share of dietary energy supplies coming from vegetable sources in 1990–92 was 71% in developed countries and 90% in developing countries. Cereals alone provided 60% of dietary energy in developing countries, as compared to just 30% in developed. Meat and fish provided 14% in developing against just 6% in developed countries.

6. FAO further reported in 2002 that meat consumption in developing countries had risen from only 10 kg per person annually in 1964–66 to 26 kg in 1997–99, and was projected to rise to

37 kg per person per year in 2030 (FAO 2002). Milk and dairy products have also seen rapid growth, from 28 kg per person per year in 1964–66, to 45 kg now, and could rise to 66 kg in 2030. Globally, some 660 million tons of cereals are used as livestock feed each year, representing just over a third of total world cereal use.

Effects of unhealthy diet

7. Overall, 2.8 million lives could potentially be saved each year worldwide if fruit and vegetable consumption were increased1 to 400 g/person/day.

8. Decreasing dietary salt intake from the current global levels of 9–12 grams per day to the recommended level of 5 grams per day would have a major impact on blood pressure and cardiovascular disease.

9. Increase in fat intake has been steady and particularly rapid since the 1980s in lower middle-income countries. This reflects the drastic changes in the food supply chain in those countries. According to existing data, there were large variations across regions of the world in the amount of total fats available for human consumption. The lowest quantities consumed were recorded in South East Asia, while the highest consumption was in Europe.

10. High consumption of saturated fats and trans fatty acids is a leading cause of heart disease; replacement with polyunsaturated vegetable oils lowers coronary heart disease risk.[5] For saturated fat, the lowest was in Africa, but the highest was in the European and American regions, with very high values observed in some of the Pacific Islands. Energy from saturated fatty acids usually account for one third of the energy from total fat, with the notable exception of Southeast Asia, where saturated fatty acids account for over 40% of total fat intake.

Policy Responses

1. Establishing health mindful supply goals

   Food Based Dietary Guidelines and dietary goals should be considered in policy decisions about the food supply. Goals could be established about
   - quantity and quality of fat
   - quality of carbohydrates
   - micronutrient content of food

2. Involvement of the whole value chain

   These supply goals need to be pursued throughout the food chain:
   - at the level of primary production: the selection of oil crops will affect the dietary content of n-3, n-6, SFA and monounsaturated fat; the investment in horticulture will affect the availability of vegetables, etc.; what is the supply goal for animal products (milk, meat);

[5] Hu FB et al. (1997). Dietary fat intake and the risk of coronary heart disease in women. *New England Journal of Medicine* 337(21):1491–1499.

- at the level of processing, product formulation and use of different ingredients will affect the nutrition profile of the foods marketed (TFA, salt, refined sugar, high fructose corn syrup, wholegrain cereals);
- at the level of marketing and distribution.

3. Multiple tools to guide the value chain

   Can we talk about health concerned food governance ? What tools there are to guide the supply of food?
   - Dynamics of incentives and taxation
   - Offer of food in public institutions
   - Information to the consumers : labels and nutrient profiles, marketing controls

   Can private sector investments be aligned to the supply goals, based on Corporate Social Responsibility?

4. Strengthening the evidence base.
   - For nutrition interventions, we have the Lancet series—programme guidance based on systematic reviews. For agricultural policy, evidence to be reviewed and experience analysed. This conference is important to scope the sector.
   - The scientific basis of the relationship between diet and health undergoes continuous revisions and this reflects on the establishment of dietary goals and the development of FBDG. In particular, there is debate about the quantity and quality of fat and the quality of carbohydrates.

5. WHO is developing a comprehensive implementation plan on infant and young child nutrition, addressed to the health sector that calls for the development of intersectoral nutrition plan, in line with the multisectoral framework that the Committee of Food Security has committed to develop.

Speaker Summary Note

Session:	**Agriculture, Nutrition, and Health—Where are we now, where are headed, and where do we want to be?**
Speaker:	David Nabarro, **Special Representative on Food Security and Nutrition, United Nations, Switzerland**

Key Messages

We need to :

- **fully understand the links between agriculture – food – health – diets – environment;**
- **develop policies to comprehensively, and jointly, address food and nutrition insecurity that deliver real outcomes for people;**
- **foster movements and common actions by the wide range of actors involved;**
- **encourage and support action at the national level especially and widely communicate the results achieved by communities and nations.**

My focus is on Where Are We Headed, and Where Do We Want to Be? with regard to the Health and Nutrition dimensions of these links. I write from the perspective of a medical person who for nearly 10 years worked on nutrition and development in Asian and African communities, and who now serves as an international bureaucrat focusing on the linkages with a particular responsibility for food and nutrition security.

Where are we Headed?

We are in a world that is severely affected by nutrition insecurity. This is not because of an absolute lack of food in our world. Those most likely to be nutritionally challenged usually are at the end of the line. They would benefit from fairer social policies and governance that takes account of the interests of the most vulnerable people. National decision makers struggle to prevent the numbers of hungry and malnourished from increasing as a result of volatile and rising food prices, and—till recently—declining investment in agriculture and social safety nets. They are anxious about the potential of hunger to fuel social unrest and political instability.

We are not headed to a good place. Our world is under threat with food systems that generally do not work in the interests of the food insecure; there are more than 22 countries affected by long term food insecurity; continuing high levels of under-nutrition; climate changing and an ever growing population—9 billion by 2050. And food prices are on the rise again as we speak. Within many communities the production of grains, meat and fish, especially by smallholders, is not keeping pace with demand. If not properly managed, increasing livestock production creates risk of major disease outbreaks at the animal-human-ecosystem interface. And trades in food are being financialized as those with funds to invest seek new ways to help their cash grow.
Action is being taken now to address these risks and make food systems work better. New Governance is provided by the revitalized Committee on World Food Security. The African Union

and other regional bodies are engaged. Links between work on food, nutrition, health, water, environment and climate are being actively addressed—through the coherent work of governments, civil society groups and farmers' organizations, global initiatives like the UN sustainability panel, the UN system High Level Task Force on Food Security and its Updated Comprehensive Framework for Action, and the work of the G20 and G8, and the World Economic Forum.

Where do we want to be?

We want to get the linkages right (based on people's realities and good science), to pursue comprehensive strategies in an integrated way, to focus—always—on equitable nutrition and health outcomes, and not just on average wealth, (a) in a manner that is responsible to the needs of people (and not the needs of specific authorities, agencies or professions), and (b) in a way that is continually accountable for what is being achieved.

How to get there? Eight lines of thought and action.

First, making sense of the links between agriculture, food systems, diets, climate, environment and sustainability. Applying an understanding of ways in which these links interact with people's lives. Fusing our sectoral perspectives so that they are fully integrated—and focusing on the ultimate results of (a) livelihood resilience and (b) people's empowerment. This is only possible if we put people's nourishment and autonomy at the centre of our work.

Second, incorporate joined-up thinking and action within our work as bureaucrats and decision makers. Focusing on good and poor nourishment: recognizing that poor nourishment in pregnancy, breastfeeding and early childhood increases the risk of chronic disease associated with excess consumption in later life. Recognizing the importance of an intake that contains the right mix of energy and nutrients (including micronutrients) for good health.

Third, devising and implementing the right policies. This means a focus on optimal policies and on the environments (e.g., regulatory) within which these policies are being implemented. Encourage a pattern of agricultural growth and food system development that not only influences the overall quantities of food produced but also:

- has positive implications for nutritional intake and health;
- minimizes the risk of zoonotic disease;
- avoids creating new burdens on women's time;
- avoids driving smallholders off their land;
- does not undermine the sustainable of the planet's resources.

Fourth, focus on ensuring that policies yield outcomes. Specific health outcomes should feature in agriculture policies, and thought should be given to pursuing these outcomes through transformations in agriculture and development. This means linking policies to

- improved nutritional status in pregnancy, breastfeeding and childhood (including reductions in deficiencies of micronutrients like Vitamin A, Iron or Zinc);
- reductions in chronic illnesses such as cardiovascular diseases,
- a lower incidence of injuries,
- a reduced risk of infectious diseases (including the zoonoses).

Fifth, engaging all stakeholders in our thinking about these issues, particularly those who are most at risk. People *tend to lead whole lives* and we need approaches that bring social and economic objectives together. The *agriculture-health* value chain is central and should be viewed as more than the absence of disease where value can be assessed using measures of diet and nutrition.

Sixth, involving a range of actors in implementing the policies. Civil society and private sector are key partners in supporting the implementation of pro-health nutritional policies and pro-health and pro-nutrition agricultural policies. There are common values and the potential for mutual trust among many public and private actors working for equity in health and nutritional outcomes.

The joint work to operationalize these concepts has to be advanced at national level. When the focus is on the poorest and most vulnerable, solutions need to be designed with care and this may call for the investment of public funds to help cover the costs (and time) needed for relationship-building among critical stakeholders. The continual focus must be on results—now and in the longer term. Selective investments will be needed to encourage disparate professional groups from agriculture, nutrition and health to work together at country and international levels. Training matters.

Seventh, foster movements that will bring a range of actors together on a platform that encourages common actions and results. There are 3 mains reasons for encouraging movements for food and nutrition security NOW: Firstly, the renewed international focus on human rights and equity as the basis for economic, social and human evolution, and the value given to rights-based "self" development that is country and community led. Secondly, the evidence on the impact of under nutrition on infant and young child mortality is extraordinary. And thirdly, there is a widespread recognition that we have a series of well tested and low cost interventions to address food and nutritional insecurity.

On Food Security we have a Global Partnership, backed by the Committee on World Food Security, and engagement of researchers, civil society, businesses and more. This concerted effort is evolving into a social network that is based on the Right to Food. On Nutrition there has been further progress through the Scale Up Nutrition movement.

Eighth, tell the story and make sure it is heard. There is really no excuse for our inability to share the good news. Most of us here know this but our message is just not getting across. We are not awaiting a new miracle cure for hunger. We are saying that tackling hunger and malnutrition can be done—it just requires the right policies and incentives in the right place at the right time.

Speaker Summary Note	
Session:	**Agriculture, Nutrition, and Health—Where are we now, where are headed, and where do we want to be?**
Speaker:	Per Pinstrup-Andersen, **H.E. Babcock Professor of Food & Nutrition and Public Policy, Cornell University, USA**
Title:	**Agriculture, Nutrition, and Health: Six key issues in agriculture**[6]

1. There are multiple pathways through which agriculture affects human health and nutrition. Understanding these pathways and how they operate is essential to design agricultural policies to achieve nutrition goals. I was invited to talk about the key issues in agriculture that may affect food security and nutrition.

2. As I see it, there are six such key issues:

   a. Large fluctuations in food production and dramatic food price volatility leading to increases in transitory food insecurity and malnutrition, particularly among the poorest rural and urban populations, many of whom are already suffering from chronic food insecurity and high rates of child morbidity and mortality. The production fluctuations are caused in large part by changing weather patterns, irregular rainfall patterns and extreme weather events leading to droughts, floods, wind damage and resulting crop and animal losses. The impact on food price volatility is amplified by irrational or poorly informed expectations by speculators, traders and farmers, volatility in oil prices and the close relationship between food and oil prices, and government interventions in international food trade to protect government legitimacy and keeping domestic food prices low benefitting domestic consumers and reducing producer incentives to expand production. This situation calls for improved risk management instruments such as more appropriate food trade rules, discontinuation of subsidies for biofuel production that competes with food production for resources, investments in productivity-increasing and risk-reducing research and technology, rural infrastructure and domestic markets, access to credit and social safety nets.

   b. Continued strong increase in the demand for food, particularly foods of animal origin and a diet transition that leads to increasing obesity and chronic diseases while at the same time increase diet diversity and reduce micronutrient deficiencies. Although lower rates of population growth reduce the rate of increase in food demand, rapid increases in the demand for foods of animal origin places upward pressures on the rate of growth in the demand for feed. Increasing investments in unit-cost reducing technology and efficient and competitive food marketing systems are needed along with policies that provide enhanced production incentives. Fiscal policies may be needed to adjust relative prices if the expected diet transition does not correspond to society's wishes.

[6] Prepared for Panel Discussion on "Agriculture, Nutrition, and Health: Where are we now, Where are we headed, and Where do we want to be?" at IFPRI Conference on "Leveraging Agriculture for Improving Nutrition and Health" New Delhi, February 10-12, 2011.

c. Failure to pursue sustainable management of natural resources and policies to mitigate and adapt to climate change. A full costing approach, in which the costs associated with unsustainable use of natural resources and negative contributions to climate change are fully added to production costs, is warranted. To be viable in a globalized trading environment, a full costing approach must be based on international agreements. Single country attempts would lead to distorted competition and incentives to pursue unsustainable production where full costing is not implemented.

d. Complacency in developing country governments with respect to the meeting of future food needs and associated failure to prioritize investments in sustainable productivity increasing research and technology, rural infrastructure and domestic rural markets. A strong decreasing trend in food prices during the period 1974–2000 led to complacency and low priority to investments in agriculture and rural areas. Large food price fluctuations during the last few years have caught the attention of policy-makers in both developing and developed countries. International commitments to increased investments in agricultural development and improved food security culminated with commitments by G8 and other countries at a meeting in L'Aquila, Italy in the amount of $ 20 billion. A relatively small share of the commitment has been released through The Global Agriculture and Food Security Program (GAFSP) and other vehicles. Initiatives by the Gates Foundation, USAID, DIFID, World Bank and several other organizations have made significant contributions. Some developing country governments, e.g. China and Ethiopia, have also expanded investments in agriculture, rural development and improved food security. However, many developing countries appear not to have made significant increases in such investments and only a few of the African countries have achieved the agricultural investment goals agreed to within the NEPAD/CAADP framework.

e. Prioritizing expanded global and national food production instead of improved food security and nutrition. According to the FAO, between 800 million and one billion people suffer from undernourishment, meaning insufficient access to the dietary energy needed for a healthy and productive life. The consequences of food price volatility are particularly severe for these people because they are close to or below long-term subsistence levels and they have little or no effective risk management tools. Making such tools available, including those mentioned above, are likely to more effective to achieve food security and nutrition goals than investments and policies aimed at the expansion of global food supplies. Merely expanding food supplies may be of very limited benefit to these population groups unless their access to food is enhanced. Pursuing the goal of expanded food production rather than food security goals may result in a worsening of food security and nutrition. Recent and on-going international land acquisition in low-income countries resulting in capital-intensive agricultural production and the removal of smallholder families from the land, they have cultivated but to which they do not have legal title, is an illustration of such a situation

f. Failure to explicitly incorporate gender-specific labor demand and power structures and the human health situation into the design and implementation of agricultural policies and projects. On the assumption that rural areas in most developing countries contain many unemployed or underemployed workers, policies and technologies should be labor using rather that labor saving. Increasing rural employment would be expected to reduce poverty and improve food security and nutrition. However, from a food security and nutrition perspective, it is critically important to understand how the policies and technologies would affect women's labor demand and how increasing demand for women's time will affect other activities traditionally performed by women such as child care, agricultural work,

cooking and the fetching of water and firewood. Furthermore, the impact on women's control of household incomes and gender-specific decision-making may be an important pathway between agricultural development and nutrition. The standard prescription of labor using technology may also need revision in cases where illnesses such as HIV/AIDS, Malaria and TB have reduced labor availability and labor productivity.

3. An integrated policy and investment approach for the food system, natural resource management, climate change and human health and nutrition is essential to achieve sustainable food security and good nutrition for all. Whether in policy-making, training or research, the continuation of past and current separation of activities within disciplinary or sectorial compartments is no longer viable and must be replaced by a holistic problem-solving approach.[7]

[7] Per Pinstrup-Andersen (ed) 2010. "The African Food System and its Interaction with Human Health and Nutrition," Cornell University Press, Ithaca, New York.

ENHANCING NUTRITION ALONG THE VALUE CHAIN

Speaker Summary Note	
Session:	**Enhancing Nutrition Along the Value Chain**
Speaker:	Barbara Underwood, **Retired, Adjunct Professor of Nutrition, Columbia University, USA**
Title:	**From Field to Fork: The whole value chain**

Agriculture and nutrition have traditionally operated in their individual area of expertise not considering the potential and limitations of the other in meeting "at risk" population needs for nutritious foods in sufficient quantity. International training programs in agriculture and nutrition have perpetuated this division. The goal of agriculture and of nutrition should be to achieve a healthy population. The malnutrition problems now affecting a vast number of people, mainly poor women and children, will not be solved if this isolationism is allowed to continue. Using a whole value chain approach—from field to fork—holds much promise for breaking down specialty barriers. In addition, the approach can identify other sectors that should be included to maximize economic, nutrition and health benefit for vulnerable producers and consumers.

What are some considerations for reaching nutrition and health goal using a value chain approach?

First: Programs within universities that are preparing the next generation of agriculturalists and nutritionists should include value chain concepts/approaches, along with other alternatives, for reaching nutrition and health goals. Students of international agricultural development and international nutrition programs need to sit and problem solve various agricultural/nutrition situations together. Only then will the needed respect for the contributions and constraints of the other's discipline be developed and lead to respectful and coordinated activities in future agriculture and nutrition development programs.

Second: Some agricultural development programs already use value chain approaches to identify problems and seek solutions to supply and demand from field to markets; it would take little more to expand the chain to include nutrition goals, i.e. from markets to forks. These extended links in the chain could then identify how value-adding actions within the consumer's home could increase and/or retain nutrients as the food is stored, prepared and consumed. Furthermore, the approach could identify meal patterns to maximize micro nutrient bioavailability from the whole family diet, e.g. the negative effects of phytate in cereal grains on iron and zinc absorption that can be counter balanced in part by including ascorbic acid containing foods at the same meal.

Third: The lack of clear nutrition goals and documentation of nutrition and health impact is a current weakness in most programs that have used a value chain approach. This deficiency should be corrected in the value chain analysis of future agricultural/nutrition programs to validate the benefits accrued using a value chain approach.

Fourth: A value chain approach lends itself to gender considerations, particularly because women make up the majority of small farm holders in developing economies and also are responsible for providing the family meals. Local and international NGOs are the usual program implementers at the community level. They could be trained in using value chain approaches, for example, while working

with local women's agricultural alliances to identify context specific hurtles to value additions—economic and nutritional—along the entire chain from field-to markets-to forks, including benefits to consumers for themselves, their children and other family members.

The above are only a few general considerations for using a whole value chain approach to meeting the nutritional and health concerns of malnourished populations.

Speaker Summary Note	
Session:	**1A. Enhancing Nutrition Along the Value Chain**
Speaker:	Ken Davies, **Coordinator, Purchase for Progress (P4P), United Nations World Food Programme (WFP), Italy**[8]
Title:	**Perspective from Development Agency**

WFP has changed greatly over the past few years.

Seeking to adjust the WFP food basket to include more nutritious foods.

WFP buys locally for cash about US$ 1 billion annually—mostly in developing countries.

This local purchase—and distribution of this food in WFP programmes reaching vulnerable people—provides a huge opportunity to leverage improved nutritional and health outcomes.

One opportunity for leveraging agriculture for health and nutrition is the PURCHASE FOR PROGRESS—or P4P—initiative.

P4P is a 5-year R&D experiment to learn lessons for sharing with all actors—that uses WFP's demand to improve market access for smallholder farmers in 21 pilot countries in Africa, Central America and Asia, and is linked to partners' supply-side expertise.

P4P is built on partnerships—the objective is to link 500,000 SH farmers to sustainable markets—not just to WFP but to wider market opportunities—through increasing quality, production and reducing post-harvest losses through capacity development, among other strategies.

My comments on enhancing ***nutrition*** along the value chain emanate from our practical field experience over the past two years working with smallholder farmers in the 21 countries.

Crop Choice

- Need to link more effectively to **Agricultural Research systems**—adoption of research findings is often excruciatingly slow.
- There is much greater potential **to link small producers to nutritionally improved varieties**, such as improved rice with enhanced iron, protein maize, and to link to other actors promoting nutrition in production, such as Harvest Plus.
- Farmers do not like risks when they are poor—consideration may be given to use of vouchers to improve access to improved varieties for small producers.

[8] Policy, Planning and Strategy Division, UN World Food Programme, Rome, Italy, Phone: (+39) 06 6513 2081, Fax: (+39) 06 6513 3455. Visit our new internal website: http://go.wfp.org/web/purchaseforprogress. External website: http://www.wfp.org/purchase-progress/blog

Gender Opportunities

- Effort within P4P to use the program to empower women economically as well as socially.
- One route is to focus on crops cultivated by women—such as PULSES.
- Another is to involve women in micro-processing to add value—for example, producing and marketing crops that would improve women's access to nutritious crops while saving time and firewood, such as partially cooked pulses to reduce cooking time, that could be packaged for sale at local shops.
- Using Farmer Organization meetings as opportunities for nutrition education for women and men.

Reducing Microtoxins in Staple Foods

- Aflatoxin has been linked to stunting in children—and may explain why stunting rates have remained high even where food availability has improved.
- Need a more concerted effort to improve testing facilities in country—are working on this through P4P in Mozambique, Afghanistan.
- Aflatoxin testing needs to be incorporated into all food production, and storage systems to ensure increased safety for consumers, who have remained innocent of the effects for generations in developing nations.

Value Addition

- Need to focus on enhancing nutrition in the value addition process
- Medium scale processing opportunities should be further pursued to link smallholder farmer s to commercial small/medium scale processing facilities. This link is presently being made in Guatemala, Mozambique and Uganda and even Afghanistan in the near future.
- Another value addition option may be the small-scale processing through the partial cooking, packaging and retail marketing of nutritious foods to make them easily accessible to mothers.
- Preservation.
- As the world's largest humanitarian agency that targets the world's most vulnerable mothers and young children in nearly 80 countries globally—and RUSF products are increasingly part of WFP's operations.
- In Pakistan as one option within the larger toolbox, we are helping meet our demand through local nutrition solutions. With guidance from food technologists—and in partnership with local industry—WFP locally produces a chick-pea based RUSF that was recently deployed in the flood emergency operation.
- Complementing the local production of RUSF, we must work to educate mothers on the right food choices for young children.
- And in time, as local RUSF products are available on the local retail market, they can be included as options within voucher programmes.

In addition to in-kind food, WFP now programs about $300 million of cash and voucher programmes.

Cash and vouchers provide another opportunity for improving health and nutrition—and for enhancing the inclusion of perishable crops such as vegetables in the food basket.

IN CONCLUSION, WFP is now increasingly focused on achieving nutritional outcomes, rather than just feeding people.

AND most importantly, in agricultural, nutrition and health efforts, we should ALL seek to act as advisers and partners with Governments as they take over implementation—including for example P4P or HGSF programmes.

The coordination function should rest with governments—we should work to the build government capacity to ensure synergies between agricultural, nutrition and health efforts at the national level,

Thank you.

Speaker Summary Note	
Session:	**1A. Enhancing Nutrition Along the Value Chain**
Speaker:	Marc Van Ameringen, **Executive Director, Global Alliance for Improved Nutrition (GAIN), Switzerland**
Title:	**Perspective from Regional Organization**

The choice of this topic itself reflects the radical rethink going on in the global community about how to meet the challenge of poor nutrition and its broad impact on development outcomes. The concept of the value chain is not new: it has been part of the language of business for decades, but its application to nutrition by the development community is novel and welcome.

It is worth recalling that the development debate has changed, not just because poor nutrition is now recognised as a critical impediment to the achievement of the Millennium Development Goals—as recognised by a growing list of authorities from health (Lancet) through to development agencies and governments (SUN Alliance). It has changed because improving nutrition is no longer seen as primarily the responsibility of public health agencies; it results from of a complex set of factors in which the food economy and markets are central. Put simply, most people buy most of the food they eat, and this is increasingly the case as more people move to cities. When this fact is overlaid with the multifaceted challenges to agriculture of climate change, environmental stresses such as water supply and solid degradation, unfair agricultural markets and protectionism, rising energy and other input costs, then the complexity and size of the challenge becomes clearer.

The resulting dislocations vary from the dramatic (sharp spikes of political interest, as we are witnesses in the Maghreb today, or the food riots of 2008) to deep and structural (the long term under/malnutrition affecting a billion poor people) challenges linked to poverty, or growing problems of obesity and overnutrition in all countries.

The solutions require long term, strategic reforms, new science and research which will take time to achieve, and form the wider context of this session. But the concept of planning more nutrition-sensitive value chains is a powerful and practical tool. It requires the problem statement to include not only what citizens needs/lack in terms of a nutritious diet, but how to engineer this. In Iowa and Malawi, Brazil and Indonesia the solution will be very different because the food economy is always local, even if it is part of a global system. The nutrition value chains encourage us to ask pertinent questions about who is in the market system and who falls outside it (and need to be reached via public programmes). It also enables us to think strategically about phasing results—about what is realisable in the short, medium and long term. Most importantly, it promotes a paradigm which engages the many players in the food chain, and is business like. It looks at the real economy, the delivery of changes which are doable and practical, and encourages a social entrepreneurial approach to change.

GAIN is preoccupied with practical and achievable solutions to malnutrition. We have already “intervened” in the nutrition value chain by improved nutrition for approximately 392m people (180m women and children) in 25 countries through food commodities as varied as fortified cooking oil and flour in Africa, soy sauce in China and biscuits in India. These are themselves

"nutrition chain" improvements, in essence targeting three sensitive points along the chain of staples: reforming public policy to regulate and enable food fortification (law and product standards), helping manufacturers to apply the required technology and keep costs down (technical advice, financing and bulk purchasing) and supporting demand creation/education among consumers (diet change). This relatively simple model has one clear benefit: a market supported and financed, permanent improvement in nutrition sensitive foods with proven effects on health outcomes.

Looking ahead, what are some key focal points for generating improved nutrition outcomes using this approach? At least four areas are priorities:

- **Finance**: access to finance, debt and equity can be critical to reshaping of food markets/chains. By analogy with all other development sectors involving enterprise, we know that synergizing concessional finance, using public funds to assume senior debt and risk can be critical in developing new products and markets. For example, GAIN's premix facility lower the costs of fortificants, and can help pump prime new production and support cross subsidization of products to the poorest. Sources need to be local as well as national.
- **Localised delivery**: Dietary quality is critical. In the long term more robust research into new crop varieties and other agricultural inputs will become available. But in the short to medium term, GAIN believes there is scope for scaling up home fortification through products such as MNPs, and LNS. This has great potential to deliver quick benefits in the 1,000 day window. This requires some product innovation and social marketing. It has the merit of being targeted to need, and involving communities and families in taking responsibility for better nutrition.
- **Considering the full chain**: sometimes the best results can be from tackling problems only indirectly linked to the end nutrition result. The example of the farmer education and quality control in the case of peanut production and the reduction of aflatoxin In Ethiopia show that poor storage and reduction of losses can be as critical as more nutritious food products, because they can improve access, generate higher farm incomes, and reduce costs to consumers. By investing far up the chain, not just at the delivery point, the returns may be better and more sustainable.
- **Targeting and Evaluation**: Cost benefit comparisons and evidence are vital to enable effective scale up to reach the most vulnerable billion. We know that there is a product gap especially in available an affordable complementary foods for weaning, and therefore innovation is required to incentivize and develop this market segment. The background paper makes it clear that the in the nutrition value chain, the starting point is defining what nutrition outcomes are sought. This needs to be accompanied by the identification of the right indicators along the value chain (e.g., we may choose stunting to track outputs beyond calories to include quality of diet). Evaluating the cost/benefit of various options in changing diet is not easy.

Methodologically, the nutrition chain approach requires a more dynamic and inclusive approach to development since it involves a very wide range of different stakeholders all of whom have interests and perspectives along the chain from field to kitchen. This means we have to be prepared to work differently and with different partners to achieve results.

Speaker Summary Note

Session: **Enhancing Nutrition Along the Value Chain**

Speaker: Stephen Hall, **Director General, The WorldFish Center, Malaysia**

Title: **Enhancing Nutrition Along the Value Chain: Research Perspectives**

We've heard a compelling case to broaden the focus of nutrition in agriculture from one that focusses exclusively on increasing production of nutritious foods to one that recognizes that there are many links beyond the farm gate that affect food quality, availability and acceptability for poor consumers.

Research is of fundamental importance in helping us achieve goals faster and better.

Three points about research on this issue:

1. Placing gender at the center of the research agenda is essential;
2. Post harvest processing and handling offers great opportunity, and;
3. Understanding and influencing consumers will pay enormous dividends.

I will use fish to illustrate these arguments

Place gender at the center of the research agenda

Over-arching theme is that issues of gender are rather under-emphasised.

In almost every link in fish value chains women play a central role. Our research agenda in support of development efforts for fish value chains needs to recognize this as a central organizing concept. I would be surprised if the same were not true for fruits and vegetables and other animal source foods.

- Role of women in fish value chains. Recent work on the nine major fish producing countries indicates that 46% of the people engaged in SSF are women. Probably the tip of an iceberg, if you include fish farming and gleaning.
- A huge research agenda here. Focussing our research effort on women, in particular, will be a key to filling the gaps in knowledge needed to inform sectoral policies.
- Explicitly thinking about women can suggest new approaches. Example from Bangladesh: working with women to culture larger fish (the carps) for sale, but simultaneously growing very nutrient dense smaller species for home consumption.

Post-Harvest processing and handling offers great opportunity

In general there is a positive correlation between a food's nutritional value and its perishability.

For fish this is a truly enormous problem. Spoilage estimates for Africa, for example, range from 20-25%, up to as much a 50%. Globally 10 to 12 million tonnes of fish per year.

Perhaps one of the quickest ways to increase access to animal source foods is to better understand what is going on and find ways to fix it. Needs technical work on cold chains, and on processing technologies, and on the economics and incentives for adopting improved methods.

Even where processing is currently in hand there is work to do.

- Example: fish pastes and sauces. The amounts of salt used in these products are very high, bringing with it increases blood pressure, and risks of stroke and heart attack. But as yet noone has investigated methods to minimise the amount of salt used or to properly quantify the benefits of reduced salt intake on women's health.
- Example: Dried fish. To keep away flies and insects, insecticides (DDT) are sprayed on the fish. Research is needed on innovative, simple, quick and safe methods for drying fish in order to reduce women's work load, and give a product of high nutritional and food safety qualities, as well as long shelf life.
- Example: Processing of fish is done in the seasons with plentiful fish supply. Research is needed in developing market mechanisms for staggering the sale of the products so that the market value is stable and gives the producers (mainly women) reasonable incomes.

Understanding and influencing consumers will pay enormous dividends

Understanding poor consumers demands and preferences and thier willingness to pay for nutritional quality will be absolutely key to unlocking the potential of a value chain approach.

Only when we have that understanding can we start to tailor products to thier needs and shift preferences through marketing and promotion of nutritious products and balanced diets.

This is a huge research agenda that needs to bring together researchers to identify practical options for making a balanced nutritious diet available and affordable and finding cost-effective methods to change behaviour where necessary. There is little doubt that a focus on women will be key to such behaviour change.

Concluding comment

A value chain approach can offer an important added dimension to efforts to improve nutrition, but it will only do so if we actively pursue VC work from a nutritional perspective and bring to light clearly any trade-offs between economic and nutritional goals.

I have illustrated the importance research using fish as an example, but the issues no doubt apply for many other foods, which also deserve the same kind of attention.

LEARNING FROM PROGRAM INTERVENTIONS

Speaker Summary Note	
Session:	**Learning from Program Interventions**
Speaker:	Victoria Quinn, **Senior Vice President, Programs, Helen Keller International (HKI), USA**
Title:	**Homestead Food Production and Nutrition Education**

History and Coverage of HKI's Homestead Food Production Model

HKI works within many different sectors to implement proven health and nutrition interventions to save the sight and lives of the most vulnerable members of society. Our nutrition work within the agricultural sector first started in Bangladesh over 20 years ago when HKI designed, tested and scaled up an innovative home gardening model which had the objective of increasing the production and consumption of micronutrient rich vegetables and fruits to address deficiencies in Vitamin A and iron especially in young children and women. This program model was subsequently improved by the incorporation of animal-source foods as an additional source of micronutrients, and became referred to as HKI's 'homestead food production' (HFP) model. Over time, the HFP model was adapted and expanded within Bangladesh as well as to Nepal, Cambodia, and the Philippines. Since HKI first launched HFP, over 5 million people (representing about 950,000 families) have been directly reached in these four countries via our partnerships with national governments and the more than 200 local non-government organizations (NGOs) through which the program is delivered. Many millions more have indirectly benefitted from spillover effects arising from the surplus of nutritious foods entering the local marketplace.

Description of Model

Based on a 3-year project cycle, HKI provides technical assistance to government field workers and staff of local NGOs to introduce poor rural and peri-urban gardeners (primarily women) to environmentally sound techniques to increase year-round production of foods rich in micronutrients. Our intent is to build local technical capacity within communities and of the service providers assisting them. A primary focus is to reach women small-holder gardeners to achieve not just nutritional improvements but also to strengthen their livelihood opportunities and capabilities through improved access to markets, agriculture services, and health and nutrition services. 'Village model farms' (VMF) are established, using existing structures and activities to the extent possible. Around each VMF, up to 2-3 groups are formed comprising about twenty farmers, mostly women. Through the VMF, members of these groups are provided with production inputs including seeds, seedlings, saplings, improved animal breeds, and feed and medicine for poultry and livestock, together with training in improved cultivation techniques. Nutrition education is integrated into the agricultural program activities to encourage women to adopt optimal dietary practices utilizing the foods they produce. Surplus production can be sold to increase income, particularly under the control of women, which can be used to purchase other nutritious foods or family necessities.

Measured Results

Evaluation results[9] have shown that HKI's HFP programs increase year-round production of

[9] Bushamaka, V.N., S. de Pee, A. Talukder, L. Kiess, D. Panagides, A. Taher, and M. Bloem. 2005. "Impact of a homestead gardening program on household food security and empowerment of women in Bangladesh."

nutritious crops and animal based foods, improve dietary diversity, and increase income (especially under control of women), as well as increase female empowerment in family decision-making. In some countries, anemia prevalence has been decreased in target children 6-59 months and non-pregnant women, and night blindness has been reduced in children 12-59 months. Evaluations of the Bangladesh program have shown that the effects of the program survive long after HKI's 3-year cycle of support has ended.[10] Although more work is needed to study costs, a 2005 analysis of the home gardening component of the Bangladesh program suggests total costs for each participating family to be about US$9 over the 3-year period. A cost-benefit analysis undertaken in 2007 showed the home gardening component to have an economic rate of return of 160%.[11] In 2009 HKI's HFP program in Bangladesh was selected as one of twenty-seven case studies[12] (out of 250 applications) to spot-light successful food security projects for *"Millions Fed: Proven Successes in Agricultural Development,"* an initiative of the International Food Policy Research Institute (IFPRI) funded by the Bill and Melinda Gates Foundation.

Future Directions

Through these past evaluations, HKI has been able to identify elements of the HFP program that could be strengthened, for example, expanding objectives to include child growth and re-tooling the design of the monitoring and evaluation system. This led to the basic HFP model being enhanced to include stronger links with local health services. A more complete set of Essential Nutrition Actions has been incorporated to address not only deficiencies in micronutrients, but also sub-optimal infant and young child feeding and women's nutrition practices. These Essential Nutrition Actions are similar to the proven interventions identified by the 2008 *Lancet Nutrition Series* and the 2010 *Scaling Up Nutrition: A Framework for Action*. State-of-the-art behavior change techniques have also been incorporated to strengthen the counseling skills of local health workers involved with the program to be better able to convince mothers to adopt optimal practices. Starting in 2007, HKI and the International Food Policy Research Institute joined forces to elaborate the theoretical basis of the enhanced HFP model (EHFP) and develop a rigorous methodology to track impact on child growth and other key outcomes. This collaboration has been critical in informing the evolution of HKI's new EHFP model, including the use of *program impact pathways* on which program design, operational research, and M/E is based. Under the EHFP, the four primary pathways to achieve

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Food and Nutrition Bulletin 26(1): 17-25. UNU; de Pee, S., A. Talukder, and M. Bloem. 2008. "Homestead Food Production for Improving Nutritional Status and Health." In *Nutrition and Health: Nutrition and Health in Developing Countries*, ed. R.D. Semba and M.W. Bloem. Totowa, NJ: Humana Press; Talukder A., L. Kiess, N. Huq, S. De Pee, I.D. Hill, M.W. Bloem. 2000. "Increasing the production and consumption of vitamin A-rich fruits and vegetables: Lessons learned in taking the Bangladesh homestead gardening programme to a national scale." *Food and Nutrition Bulletin* 21: 165-172; Bloem, M.W., N. Huq, J. Gorestein, S. Burger, T. Khan, N. Islam, E. Baker, and F. Davidson. 1996. "Production of fruits and vegetables at the homestead is an important source of vitamin A among women in rural Bangladesh." European Journal of Clinical Nutrition 50.

[10] Bushamaka, V.N., S. de Pee, A. Talukder, L. Kiess, D. Panagides, A. Taher, and M. Bloem. 2005. "Impact of a homestead gardening program on household food security and empowerment of women in Bangladesh." *Food and Nutrition Bulletin* 26(1): 17-25. UNU.

[11] Berning, C., B. Corrêa, K. Sirman, and F. Sosa. 2008. Homestead Food Production in Barisal, Bangladesh. Unpublished Capstone Research Study, The Elliott School of International Affairs, The George Washington University, Washington, DC, May.

[12] Iannotti, L., K. Cunningham, and M. Ruel. 2010. "Improving diet quality and micronutrient nutrition: Homestead food production in Bangladesh." In *Proven Successes in Agricultural Development: A Technical Compendium to Millions* Fed, Chapter 20. Washington, DC: IFPRI.

nutritional impact are: increased production, income, consumption and improved health. HKI is now testing the EHFP model in Asia as well as Africa where two new projects were recently launched in Burkina Faso and Tanzania.

Key Lessons Learned

1. Program Design
   - EHFP program is highly adaptability to many different settings
   - From "home gardens" to "homestead food production" which includes animal source foods
   - Improved nutrition requires three critical program elements: ***Food*** + ***Care*** + ***Health***: increasing household food production is not enough to improve nutrition
   - Strong links to local health services is key; also need to consider water and sanitation inputs
2. Monitoring and Evaluation
   - Huge challenges remain to secure adequate resources for well-designed M/E systems
   - Value of *program impact pathways* as basis of program design, operational research and M/E
   - Key priority is measuring the impact of the EHFP on child nutrition, particularly child growth
3. Adapting the EHFP Model to Africa
   - How do we adapt EHFP in areas facing water scarcity?
   - Challenges related to infrastructure and human resource constraints found in some African countries
   - Fewer local NGOs through which to work (as compared to Asia); what other delivery models could work?

Remaining Challenges

1. Perception issues and whether EHFP programs will be taken seriously by national agricultural planners
2. Pervasive myth that "increased production automatically leads to improved nutrition"
3. Apart from pro-nutrition agricultural policies, need to identify other leverage points in agriculture that could lead to improved nutrition since EHFP program are only one piece o**f** a larger solution needed to combat food insecurity and malnutrition. In other words, "**who else"** in the agriculture sector could do "**what**" for nutrition during "**which**" critical periods of the agricultural cycle (e.g., pre-production, production, harvest, marketing…)?

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For further information, please visit our website: www.hki.org

Speaker Summary Note

Session: **Learning from Program Interventions**

Speaker: Tom Arnold, **Chief Executive Officer, Concern Worldwide, Ireland**

Title: **Realigning Agriculture to Integrate Nutrition (RAIN) Project**

Rationale for the RAIN project

It is widely recognised that chronic malnutrition must be tackled through holistic and integrated programming including cross-sectoral actions in health, agriculture, education, and water and sanitation.

There is a need for innovative models and global evidence on effective, scalable and sustainable ways to prevent chronic malnutrition.

Description of the Project

Concern and the International Food Policy Research Institute (IFPRI) have recently embarked on a partnership to design, implement and rigorously evaluate a project aimed at preventing stunting in young children in Mumbwa District, Zambia.

The project will support interventions targeting mothers and children during the critical period from conception until 24 months of age, roughly equivalent to the first 1000 days of life. Like many traditional food security interventions, the RAIN project aims to do this by effectively improving food availability and access. The RAIN approach differs, however, in its focus on the realignment and integration of the agriculture and health sectors to achieve nutritional outcomes.

Agriculture, health, behavioural change and women's empowerment interventions have been selected based on their strong evidence base or, alternatively, where expert opinion endorses their use. Essential components include promotion of homestead production of nutritious crops or small livestock, intensive behaviour change communication for improved infant and young child feeding, gender- appropriate technology and support, and referrals for appropriate health care.

The project is designed to prevent undernutrition in children below two years of age and will primarily target 3,870 households. It will be implemented in four wards of Mumbwa District, Central Province, Zambia from January 2011 through December 2015.

Key Features and innovations of the RAIN Project

1. **Empowerment of women**. It is well recognised that women, as food producers and primary caretakers, play a key role in influencing the nutritional outcomes in their children. Empowerment of women will therefore be a cornerstone of the approach and a key outcome of the envisioned system change.
2. **Supporting small farmers to diversify cropping systems, particularly homestead production systems.** Agricultural activities will aim at improving availability of, and access to, micronutrient-rich plant and animal source foods at the household level and improving

food production techniques. This is important to meet nutritional goals and a focus on non-staple crops by agriculture extension will be an innovation of the project.

3. **Monitoring and Evaluation.** The rigorous evaluation component has been designed to detect the project's impact on child stunting. Operations research will be undertaken to understand the impact pathways that are most critical to achieving that impact. In this way, the project will contribute to the essential but scant evidence currently linking agricultural interventions to a reduction in stunting. The partnership between IFPRI and Concern Worldwide will combine the organizations' expertise in scientific rigour and on-the ground implementation to improve the learning opportunities.

4. **Coordination between different sectors**. The RAIN project will be implemented by Concern Worldwide, in partnership with local NGOs, the Ministry of Agriculture and Cooperatives and the Ministry of Health. The project will work in line with relevant national and district policies and facilitate a shift in how under-nutrition is conceptualised and addressed across the sectors. Building on this common understanding, we aim to foster coordinated planning, implementation and monitoring by key actors across the sectors at community, district and national level. This approach is innovative and key lessons will be disseminated on the process.

Conclusion

The project will offer evidence and guidance to practitioners on effective inter-sectoral approaches to improve nutrition. This will be used to improve policies and practice to leverage agriculture and health to improve nutritional outcomes on a wider scale.

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Speaker Summary Note	
Session:	**Learning from Program Interventions**
Speaker:	Grace Marquis, **Associate Professor, Department of Agricultural and Environmental Sciences, McGill University, Canada**
Title:	**Role of Animal Source Foods: ENAM experience in Ghana**

Rationale for the ENAM project

Multiple barriers limit the availability, accessibility, and use of animal sources foods (ASF) in the diets of young children in rural Ghana. Without micronutrient-rich foods in their diet, children will not meet their nutrient requirements and childhood malnutrition rates will remain high. To improve the quality of the diet and decrease the rates of anemia and stunting among young children, interventions simultaneously need to address income-generating and food purchasing power, nutrition knowledge, and women's empowerment to make feeding decisions.[13]

Description of the Project

The ENAM project was a quasi-experimental, community-based intervention to increase the use of ASF in young children's diets in rural Ghana. The planning and execution of the intervention was in collaboration with health and agriculture partners in universities (Iowa State University, University of Ghana, McGill University), governmental (Ministry of Food and Agriculture, Ghana Health Services) and non-governmental agencies (Heifer International-Ghana, Freedom from Hunger-Ghana), and the private sector (rural banks). It was carried out in six rural communities (181 caregivers of 2- to 5-year-old children) across three agro-ecological zones (Guinea Savannah, Forest-Transitional and Coastal Savannah) of Ghana. Six matched communities (with 287 women and children) were selected for the comparison group. The 16-month intervention consisted of four sequential 16-week microcredit loans (~ US$50 per caregiver, group guaranteed) to support individual income-generating activities, and weekly group meetings for entrepreneurship training, young child nutrition education, and collection of money for loan repayment and individual savings. Project data were collected quarterly for the intervention and comparison households on income-generating activities, food expenditures, food security, and children's dietary intakes and anthropometric measurements. Qualitative methods were used to understand the variation in success of the participants.

This integrated ENAM intervention demonstrated that poor households can improve the quality of their children's diets. By increasing the profitability of small businesses, rural women increased their purchasing power, and with more money and expanded nutrition knowledge, they decreased household food insecurity (endline OR =0.50; $p<0.001$) and improved the quality of their children's diets (increased protein, calcium, zinc; $p<0.05$) and their children's nutritional status (weight-for-age; +0.26 Z-score; $P<0.001$).

Key Features and innovations

1. **Research evidence guided the development of the ENAM intervention**. The ENAM project

[13] E. Colecraft, G.S. Marquis, R. Aryeetey, O. Sakyi-Dawson, A. Lartey, B. Ahunu, E. Canacoo, L.M. Butler, M.B. Reddy, H.H. Jensen, E. Huff-Lonergan (2006), "Constraints on the Use of Animal Source Foods for Young Children in Ghana: A Participatory Rapid Appraisal Approach. *Ecology of Food Nutrition* 45: 351–377.

built on scientific evidence, including that from previous Global Livestock–CRSP research: a randomized controlled experiment that added meat or milk to school-children's diets and demonstrated improved cognitive scores, improved growth, physical activity and behaviour, and decreased morbidity.[14] The ENAM project activities focused on increasing children's consumption of ASF products.

2. **Local best practices also guided the ENAM intervention.** The ENAM project developed its microcredit program based on the best practices of other local programs: individual loans for individual income-generation activities, group approval and group guarantee, and additional grants and/or training as required (e.g., chicks and feed). There was a 100% repayment of loans and substantial individual savings.

3. **Sustaining the ENAM program required early integration of local institutions.** Integration of the partners to develop the intervention activities helped create commitment, shown in part as seconded staff, office space, and sustainability of the project activities. Today, local rural banks provide resources to continue the nutrition and entrepreneurial education as an integral component of their on-going microcredit loan program to rural women's groups, rapidly expanding beyond the areas that were part of the ENAM project.

Conclusion

The ENAM project[15] provided evidence that an integrated package—that offers both knowledge and the means by which one can act on new knowledge—in rural Ghana can improve household food security and the diet and growth of young children. This integrated intervention is a viable approach that can be used in the private financial sector to reach isolated poor households and improve child nutrition throughout Ghana.

Funding

The ENAM Project was funded through the Global Livestock–CRSP, funded in part by USAID Grant No. PCE-G-00-98-00036-00 and Women in Development Office of USAID.

[14] L.H. Allen (2003), "Interventions for Micronutrient Deficiency Control in Developing Countries: Past, Present and Future." Journal of Nutrition 133: 3875S–3878S.

[15] R. Caputo, Hidden Hunger (documentary on ENAM) http://www.vimeo.com/14063199.

ADDRESSING AGRICULTURE-ASSOCIATED DISEASES

Speaker Summary Note	
Session:	**Addressing Agriculture-Associated Diseases**
Speaker:	Kabba Joiner, **Former Director, West African Health Organization (WAHO), Burkina Faso**
Title:	**The Dilemma of the Policy Makers in a Resource Challenged Environment**

In recent years, scientific and technological developments in the agricultural sector, have resulted in increase food and livestock production and at the same time to certain public health concerns—improper harvest technology resulting in agric commodities being contaminated; application of various agrochemicals (pesticides, fungicides, antibiotics); food pathogens entering the food chain(both traditional and organic agriculture); genetically modified foods and occupational hazards (workplace safety and health). These present challenges to policy makers, especially in a resource challenged environment. Use of various integrated food management systems are now being emphasized, to minimize the dangers posed to human health from improper agricultural practices.

Everyday, policy makers are faced with challenges that need to be addressed. Pressure on their time is intense, so they need to determine quickly which issues should get their attention. Policy makers (elected/appointed officials/staffs) rely on advisers (persons in and outside government, interest groups, experts, consultants, academics, civil society) to help them make and implement decisions. Policy makers tend to **rely on advisers with certain characteristics, to help them** sort through the myriad of information they receive. These characteristics include:

- Status of the individual: Influential interest groups; religious, political, business and labor leaders; researchers, academics
- Knowledgeable individuals on local political and logistics issues
- Persons knowledgeable about the current subject matter under consideration
- Dependable and trustworthy individuals
- Representatives of interest groups who straightforwardly tell the policy maker what they want and need.

Factors affecting positively the policy makers' key decision making process include:

- Policy briefs that are thought through, with appropriate rationale
- Issues that are framed, taking into consideration political, logistical, financial and sectional interests
- Interacting with the policy maker at the earliest possible stage in the decision making process.
- Presentation—policy alternatives, supporting data and materials presented short and simple, that can be easily translated into information the policy maker can use.
- Developing a long-term trust relationship with certain individuals that the policy maker can rely on for advice, counsel and support.

The policy maker determines what issues should get their attention by asking such questions as:

- Is the policy maker the sole sponsor of the policy and what should it include?
- Is the policy maker a co-sponsor of a policy developed by colleagues?
- Which conferences (national, regional, international); joint committees or working groups should the policy maker participate, in order to be knowledgeable on the relevant issues?
- What difference will the policy maker's decision make – hurt, help or have little effect?
- Can an inter-sectoral consensus be achieved on the issue?

With agricultural associated diseases**, policy makers in developing countries face challenges such as:**

- Lack of appropriate experts to advise them in the area of concern
- Implementation inadequacies: Budgetary and planning; local capacity to implement policies with resultant dependence on donor technical aid; weak health systems; low per capita expenditure on health;
- Donor fatigue and donor agenda setting
- Prescriptive directives from international bodies without reference to local conditions
- WTO, Intellectual Property Rights, Patent Regulations and other international conventions countries have signed on to.
- Political, sectional, religious and family pressures
- Gender inequality
- Inadequate leadership role of local officials
- Poverty and Corruption
- High illiteracy rates leading to "Elite Capture" and "Elite Control"
- Majority of farms are owned and managed by small farmers

The Health Impact Assessment (HIA) developed by WHO, can be a reliable tool in assisting decision makers. HIA can be used for development of policy at local, regional and international level. With the pressures posed on the health system by the agriculture associated diseases, policy makers need to adopt new approaches, most importantly more action and less rhetoric.

CUTTING HEALTH RISKS ALONG THE VALUE CHAIN

Speaker Summary Note

Session: **Cutting Health Risks Along the Value Chain**

Speaker: Bhushana Karandikar, **Agribusiness Strategist, Mahagrapes, India**

Title: **Certification Schemes**

A. Brief overview of certification schemes related to agricultural products

1. The oldest and more successful, stable certification schemes are mainly in basic processing, conversion based, low value added processes such as rice and lentils (for example, Agmark).
2. Certification for fresh produce is new entrant in the arena. It has two streams.
   (a) International certification for growers of produce for European and Japan market, like Global Gap
   (b) Domestic certification in fresh produce, used as inputs in growing food processing industry, like Jain Gap

B. Lessons learned or Insights so far

1. Even small and marginal farmers can comply with the complex certification schemes but the cost is most important issue (Mahagrapes).
2. Successful implementation is related to commercial benefit or promise of benefit due to certification as well as good legal enforcement.

C. Spill over effect of certification

Certification enhances better market access, thus promise of better income to the small farmer, creating better living conditions as well as nutrition for his family. (Story of *Baif wadi* organic certification)

D. Future trends

1. Domestic standards for fresh produce as IFPRI study show Indian consumer ready to pay more for certified fresh produce.
2. Stringent and complex international standards (and ineffective participation of small, marginal growers in determining the same).

D. Gaps

1. Inadequate infrastructure (testing labs),
2. Existence of weak consumer presence (unlike developed countries),
3. Lack of reliable structure, platform, pathway to disseminate information to thousands of small producers about changes, and
4. Legal treatments.

Speaker Summary Note	
Session:	**Cutting Health Risks Along the Value Chain**
Speaker:	Apollo O. Owuor, **Agronomy Manager, Kenya Horticultural Exporters Ltd., Kenya**
Title:	**Incentives to Develop Consumer Demand for Quality Food: Supply perspectives**

Introduction

Understanding food quality from a consumer's perspective is complex because consumer demands are influenced by personal preferences and tastes, cultural values, environment, socioeconomic issues, etc.

Food quality is function of a number of attributes such as appearance, taste, type, production, supply, and distribution process, etc.

There are two major players in the food production system and these are the producers (farmers/processors) and consumers yet the food supply chain is a complex networks of myriad other players that influence the availability and quality of food.

Producers derive high value and reliable output delivering jobs, income opportunities and skills for rural communities

Understanding the supply Chain: The Kenya Fresh Vegetable Model

- The EU is the largest importer of fruits and vegetable from Kenya
- UK supermarkets dominate the trade with spillovers in the wholesale and service industry
- Producers are a mixture of smallholder farmers, medium-scale and a few large scale operations

Major players in the chain are:

- Producers: Intermediaries
- Exporters
- Importers
- Retailers, Service Industry, Wholesalers
- Consumer

Challenges

- Sanitary and Phyto-Sanitary Requirements
- EU Food safety and Traceability Legislation

- PVS:
    - Emphasis on traceability and food safety (with regard to consumers and operators). Food safety in the view of chemical and microbial contamination and other physical hazards such as glass that pose health risks to the consumers
    - Worker health, welfare and safety
    - Environmental stewardship
    - Requires third-party verification
- All the above have been compressed into
- Food consumption trends are dynamic with major focus on food safety and traceability, food production process, sustainable production practices, worker and consumer health
- Branding

Incentives

- Building on gains made in:
    - Food Safety Management Systems: Comprehensively address consumer and operator; health risks associated with the farming, packing, processing, distribution operations
    - Integrated Farm Management: A holistic approach to sustainable farming practice
    - Climate and Environment
    - Socioeconomic Aspects: Rural development, increased incomes, skills

LEARNING FROM COUNTRY CASE STUDIES

Speaker Summary Note

Session:	**Learning from Country Case Studies**
Speaker:	Beatriz da Silveira Pinheiro**, Director General, Strategic Studies and Capacity Strengthening, Brazilian Agricultural Research Corporation (EMBRAPA), Brazil**
Title:	**Fighting hunger and poverty in Brazil – the role of agriculture**

Introduction

Brazil is a highly urbanized country of 190 million inhabitants and the fifth largest nation on earth. Through decisive government actions, aided by civil society engagement, the country has been rapidly advancing towards the achievement of the Millennium Development Goals (MDG).

Many of these actions are linked to the *Fome Zero* (Zero Hunger) strategy, which was designed to ensure the human right to adequate food by promoting food and nutrition security and eradicating extreme poverty with the aim of consolidating rights for the most vulnerable segments of the population.

The overall result of all these social and macroeconomic policies has been a steady reduction in hunger and poverty. The so-called "middle C class", measured according to levels of income, has increased and now represents more than half of the total population. Almost 30 million citizens were added to this group from 2003 to 2009 as result of economic growth and a myriad of social policies.

As documented by the 2010 National Monitoring Report of MDG, extreme poverty is less than one-fifth of that recorded in 1990 and inequality, as measured from Gini´s coefficient, was reduced from 0.612 to 0.544 in 2008. Child and infant mortality have fallen, respectively, from 53.7 and 47.1 deaths per thousand births in 1990 to 19.8 and 19.0 in 2008. Accordingly, maternal mortality ratio has been decrease from 140 per 100 thousand live births to 75 in the same period. Those are just a few of various indicators that are attesting the success of the strategies being carried out.

1. Government policies and the commercial sector-

A crucial historical moment in the country was observed in the mid-1990s, when a successful plan of macroeconomic adjustment eventually stabilized a chronic history of high inflation and created solid foundations for economic growth.

Among other relevant measures, two related key elements were of decisive importance for the future of agriculture in the country. Firstly, Brazil liberalized its markets and opened them for foreign competition. Secondly, several predicaments of agricultural policy were implemented, thus clearly establishing a market-based approach. Over the course of time, several positive results derived from these new policies, from the reduction of government intervention in several markets to the elimination of various forms of subsidies and price controls, apart from a strong incentive to agricultural research.

Taken the 2008 indicators, the country's agriculture and its agro-industrial chains account for 25.6% of the GDP (US$ 1.6 trillion) and responds for 37% of all jobs in the country and for 36.4% of total exports (an estimated US$ 198 billion). Agricultural productivity, in turn, is the main drive that stimulates production and accounted for 65% of the total agricultural growth in the period from 1970 to 2006. Its role has been crucial to guarantee low levels of food prices.

The overall performance of Brazilian agriculture transformed the country from an importer of some products in the past to one of the most relevant players in international markets of

agricultural commodities. Contini *et al* (2010) have demonstrated that these are trends resulting mainly from competent farmers, cheap and mechanized land available, agricultural policies, and tropical technology developed by Embrapa, state research agencies and universities under the National Agricultural Research System.

The Federal Government is currently promoting several programs and the "ABC Program" is trying to promote a "low carbon emission" agriculture. It stimulates the adoption of new technologies and systems of land management in order to reach clear goals of GGE reduction. In addition, simulation models have been successfully applied to establish new agricultural zoning, and the forest code is under review in an attempt to combine the preservation of natural resources with the production potentialities of Brazilian agriculture.

2. Government action and small producers

A turning point with regard to small farmers was the "National Program of the Strengthening of Family Farming" (Pronaf), which was established in 1995. It provides a wide array of credit channels for small producers ranked under different criteria and also offers financial support for those poor rural families settled under the National Program of Land Reform.

These credits are subsidized and cover costs of production, investments and commercialization. Gender has been addressed through "Pronaf Woman". This segment also receives specialized technical assistance and rural extension services to attend their particular needs regarding development of family agriculture.

In recent years, Pronaf has been strengthened and aided by other actions. One of them is the Citizenship Territories Program (PTC), which is focused on addressing poverty in rural areas through a sustainable territorial development strategy. Another one, the "More Food" Program was created in order to modernize the productive structure of family farms.

An important program over the years has been the Family Agriculture Food Procurement Program – PAA, which was structured under the well-known "Zero Hunger Program" launched in 2003. PAA promotes the direct purchase of food produced by small farmers in order to guarantee food supply to a chain of social assistance institutions throughout the country, including popular restaurants, "community kitchens" and food banks.

The stocks of food bought by the Government may also be used for special social targets formed of vulnerable families. One of these specific groups is that of school children – since 2009 approximately 30% of all government financial transfers to cover meals served in public schools came from the PAA program. Since 2003, over US$ 1.4 billion were spent and about 2 million tons of food were acquired by the Government.

Rural poor families have also benefited from other initiatives launched by the Zero Hunger Program. The main one is the "Bolsa Família" (PBF). It is a cash-conditioned transfer (CCT) type of social program whose financial transfers reach families living in poverty and under extreme poverty. Most of the beneficiaries live in the Northern and Northeastern states of Brazil. From 2004 to 2009, the PBF doubled the number of beneficiaries (from 6.6 million families to 12.4 million families). In December 2009, it was estimated that this program was benefitting approximately 49 million people.

Social security is another crucial public policy, especially retirement pensions for the rural population entitled to this support. This was a right ensured by the Constitution signed in 1988 but payments started only in the early 1990s and have been growing exponentially since then. In fact, the weight of social security benefits could reach up to one fifth of the total family income, meaning a decisive social achievement and a crucial policy to accelerate social inclusion for the rural poor.

3. Concluding remarks

A robust increase in agricultural productivity resulted in the reduction of food prices and the

sum of these trends meant that Brazilian agriculture has been successful in not only fighting hunger in rural and urban areas but also in providing social inclusion and greater prosperity. The recently launched final report of the UK-based foresight project on "The Food of Food and Farming" emphasized "there are causes for optimism that agriculture can become a more powerful force for the reduction of hunger and poverty in the decades ahead".

Brazil has been strongly exercising this strategy and promoting an array of different policies and incentives to support all types of producers, from small farmers to large-scale agriculture and the total financial support for agriculture jumped from US$ 14.8 billion in 2002 to US$ 69.6 billion in 2010.

The combination of entrepreneurship and nationally-developed technologies in tandem with various government policies, have turned Brazilian agriculture into a flourishing economic activity, thus contributing to feed not only its people but also offering an extraordinary contribution to reduce hunger in other countries. The persistent government support to small farmers is gradually encompassing the whole group of producers - including settlers established under the Land Reform Program - to provide them with technological expertise and ensuring their full integration into the economy.

Thus, Brazil is establishing a new model of fight against hunger and poverty in rural and urban areas, leveraging agriculture to conquer nutrition and health for its citizens.

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Speaker Summary Note	
Session:	**Learning from Country Case Studies**
Speaker:	Anna Lartey, **Associate Professor, Department of Nutrition and Food Science, University of Ghana, and President-Elect, International Union of Nutritional Sciences (2009-2013), Ghana**
Title:	**Achieving the Millennium Development Goal 1 (MDG1) in Ghana: The role of agriculture**

Ghana will be the first country in Sub-Saharan Africa to achieve the MDG1 (Reducing by halve the proportion of people who suffer from extreme poverty and hunger). There are several factors contributing to the progress made by Ghana. The key among these is good governance and political stability. This is the bedrock of Ghana's progress. Agriculture, no doubt played a role, however it is difficult to tease out the proportional contribution of each factor to the overall progress. The policies and programs directly enhanced agricultural productivity, especially among poor rural households thus reducing poverty and food insecurity. Ghana's Poverty Reduction Strategy (GPRS) gave priority to the modernization of agriculture with strong emphasis on rural agricultural development. There was significant growth in Agriculture from 4% in 2000 to 6% in 2005. Nutrition specific programs such as national food fortification, promoting infant and Young Child Feeding Strategy, community based Nutrition and Food security programs directly impacted on child nutritional status. There were programs that directly impacted on poverty reduction. Ghana status as a Highly Indebted Poor Country (HIPC) in 2002 brought substantial debt relief as funds from HIPC were channeled into improving social amenities for the poor, National Health Insurance Scheme removed financial barriers to health care access, the Livelihood Empowerment Against Poverty (LEAP-2007) provided direct cash transfer to poor households; Free maternal health services encouraged women to deliver in health care facilities and to receive the needed health care to ensure safe pregnancy and delivery; the Government capitation grant made available funds available to cover all basic public school pupils (kindergarten to JSS). This fund can be accessed to improved facilities in the school. Despite the success of these programs wide disparities in poverty and hunger exist. For example, the Upper West region of Ghana reports 34% food insecure households against 1% in the Greater Accra region (the capital). The policies and strategic plans of the Ministries of Agriculture and Health do not reflect this integration. Each group has secured its territory and prevents the "encroachment" of other sectors. The link of Agriculture with nutrition and health must be seen as a continuum to be promoted to complement efforts being made to achieve the health related MDGs. Sector Ministries must re-examine their policies to encourage this integration where needed.

Speaker Summary Note	
Session:	**Learning from Country Case Studies**
Speaker:	S. Mahendra Dev, **Director, Indira Gandhi Institute of Development Research (IGIDR), India**
Title:	**India: Learning from the Experiences of Linkages between Agriculture, Health, and Nutrition**

This brief examines the linkages between agriculture, health and nutrition in India. It also offers measures needed for strengthening of these linkages.

Indian economy has done well in terms of economic growth in the post-reform period which started in 1991. The average rate of growth in GDP in the last two decades has been more than 6 per cent per annum. GDP growth was around 8 to 9 per cent per annum in the period 2004–05 to 2007–08. India is now 1.3 trillion dollar economy. Even during the financial crisis, India's growth rate was between 6 to 7 per cent and it is expected to be 8.5 per cent in the year 2010–11. By all accounts, thus, India is considered as one of the fastest growing economies in the world. Income poverty also declined significantly in the post-reform period although progress should have been much better.

However, the reduction in malnutrition among children has been very slow as compared to the rapid economic growth in the post-reform period. For example, the percentage of underweight children declined only marginally from 52% in 1992–93 to 46% in 2005–06 in spite of 6% economic growth. International studies have shown that the rate of decline of child undernutrition tends to be around half the rate of growth of per capita GDP (Haddad et al 2003).

In India's case, the per capita GDP of about 4.2 per cent during 1990 and 2005 is expected to reduce malnutrition by about 2.1 per cent per annum or 27 per cent during this period. As compared to this, the decline in malnutrition among children is only 10% (Gillespie and Kadiyala, 2011). In fact, the rate of change in the percentage of underweight children has been negligible during 1998–99 to 2005–06. This percentage declined only marginally from 47% to 46% during this period. Due to this result, Indian Prime Minister called undernutrition 'a curse that we must remove' (see Haddad, 2009). It may be noted that **India is home to one-third of the world's undernourished children.** This puzzle of higher economic growth and lower decline in malnutrition shows that many other factors like inequalities across regions and social groups, access to adequate health services, clean drinking water, hygiene, women's empowerment, caring capacity and practice, intra-household food security, governance etc. determine the changes in nutritional status.

One part of the above puzzle relates to the role of agricultural sector (Gillespie and Kadiyala, 2011). Although the share of agriculture in GDP has declined significantly to around 15% in 2008, the share of employment is still high at 56% in 2004–05. In other words, food security and livelihoods of majority of households in India depends on the performance of agriculture sector.

Basic pathways from agriculture to nutrition are: income effect, price effect, diversification, micronutrients and fortification effect, women empowerment effect. Negative effects are: women spend less time on care of children, pesticide use, fertilizers have harmful health effects, some crops also have adverse impact on climate change etc. In India, the linkage between agriculture and

nutrition is less explored area as compared to other subjects. TANDI (Tackling Agriculture-Nutrition Disconnect in India) initiative of IFPRI with funding from the Bill Gates Foundation tries to fill this gap (more on this see Gillespie and Kadiyala, 2011).

Agriculture growth in India has been much less than those of industry and services. But, there is potential for higher agricultural growth and this can reduce malnutrition. As mentioned by TANDI project, "**agricultural initiatives alone cannot solve the nutrition crisis in India but they can play much bigger role toward that end than they have done thus far**".

One link between agriculture and malnutrition is that the malnutrition is more concentrated in rural areas. The proportion of underweight children was 36% higher in rural as compared to urban India in 2005-06. Similarly, the proportion of stunted children was 32% higher in rural compared to urban areas. The importance of agriculture in rural areas is obvious. If you want to reduce malnutrition in rural areas, agricultural growth and health facilities are important.

As mentioned above, overall GDP growth has been higher in India but agriculture growth is low. Thus, improving agricultural growth, *ceteris paribus*, can raise nutrition levels.

It is known that one has to go beyond income to explain variations in malnutrition. It does not mean that income growth cannot have impact on reducing malnutrition. National Family Health Survey NFHS -3 data shows that undernutrition for lowest and highest wealth categories respectively was 56.6% and 19.7% in 2005–06. It shows that with increase in wealth (proxy for income) undernutrition can be reduced. One can say that income growth is necessary but not sufficient as other factors are also important.

In a vast country like India, one has to look at disaggregate level. The evidence on the relationship between agricultural growth and malnutrition shows mixed picture across states. The nutrition is connected to agricultural development related variables for some groups of states and not connected to other groups of states. A look at the state-wise data for underweight children shows that highest malnutrition is in the Eastern and Central parts of India along with U.P. The numbers are: Madhya Pradesh (60.3%), Jharkhand (59.2), Bihar (59%), Chhattisgarh (52%), Uttar Pradesh (47.3), and West Bengal (43%). All these states are relatively agriculturally backward as compared to other regions. Therefore, here agricultural growth shifting to Eastern and Central regions may help in reducing poverty and malnutrition. In the case of other states, there are puzzles. Gujarat is having 44% in spite of higher growth. Kerala is still having 29% (slightly higher than that of Sub-Saharan Africa) in spite of education and low poverty. In other words, agricultural growth, income and poverty play important role in the states where malnutrition rates are high. Other factors like health and women empowerment can reduce malnutrition levels further.

For raising agricultural growth, price and non-price factors such as land and water management, credit, investment in infrastructure, technology and institutions are important.

Food intake in terms of sufficient calories, proteins and micro nutrients are important for nutrition. We have to focus on increasing the range of micronutrient-rich foods consumed. Similarly, public health services have to be improved in India. Health sector performance shows that there are basically six problems: (a) low levels of health indicators; (b) slow progress in these indicators; (c) significant regional, social and gender disparities; (d) poor quality delivery systems in health and ; (e) privatization of health services. Low standards of health, hygiene, sanitation and safe drinking water play important roles since sick children are not able to absorb essential nutrients**.**

The share of women in agricultural workforce in India has been increasing. It has implications for nutrition. Women's agency (health, education and empowerment) and intra-household issues are important determinants of undernutrition in South Asia in general and India in particular. Two of the three differences between South Asia including India and Sub-Saharan Africa relate to women: (a) low birth weight is the single largest predictor of undernutrition; (b) women in South Asia tend to have lower status and less decision-making power than women in Sub-Saharan Africa. This limits women's ability to access the resources needed for their own and their children's health and nutrition, associated with low birth weight, as well as poor child feeding behaviors in the first twelve months of life. The children's malnutrition is determined by caring capacity of mothers. Caring capacity and caring practices are overwhelmingly influenced by the status of women in the household and society. One important dimension of accessibility of food is intra-household disparity in consumption.

India has programs like Public Distribution System (PDS) and National Rural Employment Guarantee Act (NREGA) at household level and mid-day meal schemes and Integrated Child Development Scheme (ICDS) at individual level to improve food security. The functioning of ICDS which is supposed to be nutrition of women and children is far from satisfactory (see Saxena and Srivastava, 2009). It may be noted that political commitment and better governance play important roles in improving food security programmes in India and raising nutrition levels. For example, the performance of other programmes is mixed. NREGA in Rajasthan and Andhra Pradesh, PDS in Tamil Nadu, Andhra Pradesh, Chhattisgarh and mid-day meal scheme in Tamil Nadu have done well in terms of having impact on nutrition as compared to other states due to better governance, political commitment and institutions.

Finally, agriculture alone cannot sustain livelihoods of 56% of workers in India. There is a need to shift people to non-agriculture to raise labour productivity in agriculture. Development of rural non-farm sector is important here to absorb the workers in agriculture and improve incomes and nutrition of the population.

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LEARNING FROM EVALUATIONS

Speaker Summary Note	
Session:	**Learning from Evaluations**
Speaker:	Daniel Gilligan, **Senior Research Fellow, Poverty, Health, and Nutrition Division, International Food Policy Research Institute, USA**
Title:	**Learning from the Evaluation of the HarvestPlus Orange Flesh Sweet Potato Project**

Impact evaluations have emerged as a leading tool in development economics and international health for learning what types of interventions are most effective and why. When based on carefully designed field experiments, evaluations can be beneficial in studying agricultural interventions that have explicit nutrition and health objectives, where attribution of causal effects from agriculture to health can be murky in the absence of a structured evaluation. This presentation summarizes the findings of a four-year evaluation study of the impact and cost-effectiveness of a project that introduced provitamin-A-rich orange-fleshed sweet potatoes (OFSP) to more than 24,000 households in Mozambique and Uganda as a strategy to reduce vitamin A deficiency among children and women.

From 2007 to 2009, HarvestPlus collaborated with the International Potato Center (CIP); Natural Resources Institute (NRI) at University of Greenwich; World Vision and Helen Keller International (HKI) in Mozambique; and PRAPACE, VEDCO and FADEP in Uganda to disseminate conventionally bred OFSP vines to farmers and to encourage adoption, consumption and marketing of the crop. The project strategy involved a coordinated three-pronged approach to encourage adoption and consumption of OFSP including: (i) vine distribution and agricultural extension (seed systems), (ii) demand creation through nutrition trainings; and (iii) trainings in marketing and product development.

HarvestPlus collaborated with the International Food Policy Research Institute (IFPRI) and CIP to design and implement a randomized-controlled evaluation of the OFSP project in each country. Baseline surveys were conducted in Mozambique in 2006 and in Ugandan in 2007. The baseline included a detailed socioeconomic and agricultural survey as well as a nutrition and dietary intake survey. The dietary intake survey included 24-hour dietary recall interviews to measure intakes of vitamin A and other nutrients by young children and women. As a basis for identifying impact and learning about cost-effective dissemination strategies, sampled church groups (in Mozambique) and farmer groups (in Uganda) were randomly assigned into one of three intervention arms: an intensive 2–3 year intervention (Model 1), a less intensive intervention with reduced activity after the first year (Model 2) and a Control group. In 2009, endline surveys were conducted in both countries.

The results of the impact evaluation[16] showed that the project was very successful at fostering OFSP adoption and consumption of the crop by women and young children. The project caused a 68 percentage point increase in the probability of OFSP adoption in Mozambique and a 61 percentage

[16] Alan de Brauw, Patrick Eozenou, Daniel O. Gilligan, Christine Hotz, Neha Kumar, Cornelia Loechl, Scott McNiven, J.V. Meenakshi, and Mourad Moursi. 2010. "The Impact of the HarvestPlus Reaching End Users Orange-Fleshed Sweet Potato Project in Mozambique and Uganda." Washington, D.C.: International Food Policy Research Institute.

point increase in Uganda. The project led to substantial substitution of OFSP for traditional white-fleshed or yellow-fleshed sweet potato (WFSP/YFSP) varieties: the share of OFSP in total sweet potato area cultivated increased by 56 percentage points in Mozambique and by 44 percentage points in Uganda. OFSP also became an established part of the diet in project households. For example, the project increased average OFSP intakes of children age 6–35 months by 36–45 g/day in Mozambique and by 37–52 g/day in Uganda. As a result of this increased consumption of OFSP, the project caused significant increases in vitamin A intakes, equal to roughly 100 percent of age-specific daily requirements for young children (age 6–35 months), older children (age 3–5 years) and adult women. Notably, for children age 6–35 months, OFSP contributed 78 percent of their total vitamin A intake in Mozambique and 53 percent in Uganda by the end of the project.

For most of these outcomes, there was no significant difference in impact between the interventions in Model 1 and Model 2, although the less intensive Model 2 was nearly 30 percent less costly in each country. As a result, Model 2 was considerably more cost-effective as a strategy to disseminate OFSP. The average cost of Model 2 per targeted household was $65 in Mozambique and $48 in Uganda. However, factoring in additional cost savings and observed diffusion of the crop to neighboring households, the marginal cost of reaching new households in a scaled-up program are estimated to be $17 in Mozambique and $14 in Uganda. With greater encouragement of diffusion, these costs fall to $5 per household in Mozambique and $6 per household in Uganda. These results suggest that OFSP could be an important component of a national strategy to increase vitamin A intakes and reduce vitamin A deficiency in Mozambique and Uganda.

Speaker Summary Note	
Session:	**Learning from Evaluations**
Speaker:	Lora Iannotti, **Assistant Professor, Institute of Public Health, Washington University in St. Louise, USA**
Title:	**KickStart—Treadle Pumps in Africa**

1. Background—KickStart Program and Evaluation

KickStart International is a social enterprise,[17] a non-profit organization dedicated to advancing solutions to social problems by applying market-driven strategies to development. Their primary mandate is to alleviate poverty in Sub-Saharan Africa. In response to widespread dependence on rain-fed agriculture and the associated risks for small farmers, KickStart began selling low-cost irrigation pumps and other productive assets in 1991. Their approach was and continues to be application of a business model in which farmers, primarily women, purchase pumps from local retail shops. Non-governmental organizations also purchase and distribute pumps. The human-powered irrigation pumps range from small hip-pumps (US$35) to larger Super Money-Maker pumps (US$100) that can draw water from depths of up to 8 meters or approximately 25 feet. To date, KickStart has sold over 100,000 pumps in Tanzania, Kenya, Uganda, Ethiopia, Zambia, Mali and Burkina Faso.

Internal monitoring activities and years of observation have shown the potential for tremendous impact from the pumps extending beyond poverty reduction into the realms of education, health, and nutrition. KickStart recognized the importance of involving independent evaluators to examine more rigorously these effects. In 2009, KickStart partnered with the International Food Policy Research Institute (IFPRI) and Washington University in St. Louis, MO to undertake a large-scale impact evaluation in Kenya and Tanzania. Funding was received from the Bill and Melinda Gates Foundation, 3ie, and Voxtra to conduct this study.

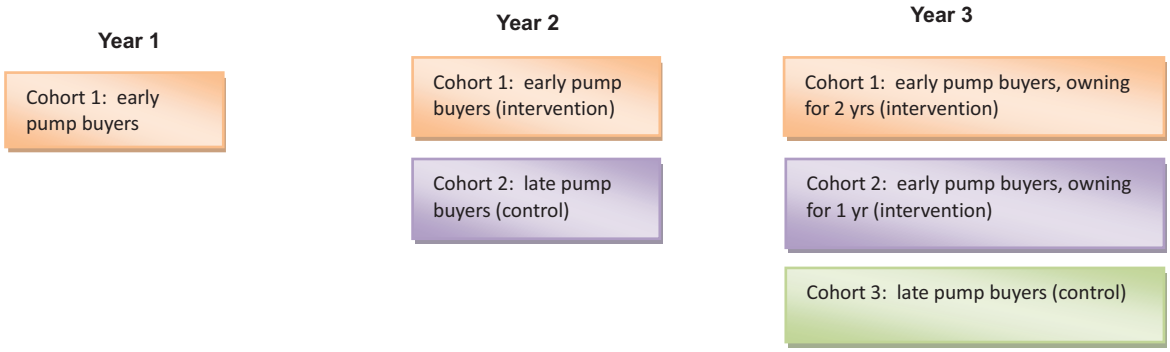
2. Evaluation Innovations: Design and Pathways

Design Innovations. While the primary intent of the KickStart impact evaluation is to evaluate poverty outcomes, the KickStart impact evaluation is uniquely designed to explore the effectiveness of an agricultural intervention on both health and nutrition outcomes. It is a 3-year, longitudinal study comparing the impacts of treadle pump ownership between control and intervention groups.

The first design innovation lies in the *construction of the comparison groups*. Similar to others in the social enterprise field, KickStart implicitly places value in the importance of particular characteristics of its targeted population of farmers. In particular, an entrepreneurial spirit and willingness to invest in agricultural inputs are two features associated with success. Thus, during the planning phase, much consideration was given to constructing a representative sample of typical pump buyers. The challenge was to find an appropriate control group, ultimately decided to be a group of farmers who recently purchased pumps but not yet realized any of the associated benefits. Simply defined, the control group includes 2 cohorts of “late pump buyers” and the intervention group including 2

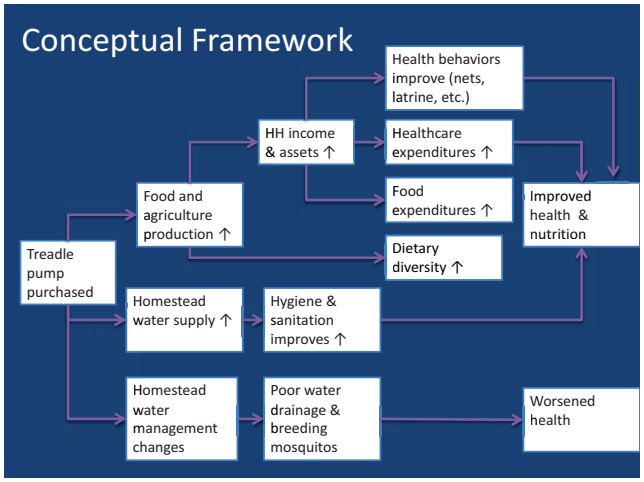
[17] Bornstein D. and Davis, S. *Social Entrepreneurship: What Everyone Needs to Know*. Oxford University Press, 2010.

cohorts of "early pump buyers" (one group owning for 1 yr, and one group for 2 years) in the following schematic. The full set of indicators is being collected annually, and the health and nutrition outcomes every 6 months owing to a faster rate of change and seasonality of determinants.



Another design feature is that enumerators are conducting surveys using *mobile phone technology and the EpiSurveyor software.*[18] This allows for more rapid feedback and error checks in the data. Additionally, GPS coordinates are being recorded in the phones for later use in analyses. With the innovations and design features described above, there will be an opportunity to apply an interesting combination of analytic methods to rigorously assess the effects of the treadle pump on health and nutrition.

Transdisciplinary pathways. The connections between irrigation pump ownership and health and nutrition impacts are not readily obvious. This evaluation explores pathways through which such an agricultural investment may influence household health behaviors, expenditures and consumption, but more importantly, the morbidity and nutrition outcomes among young children less than five years.



Two main pathways, each with multiple branches, are being explored for the hypothesized positive health and nutrition outcomes: (1) increased food and agricultural production leading to increased income and assets; and (2) increased water supply close to the homestead for uses extending beyond irrigation. Conversely, poor water management practices both at the homestead and on the land plots could lead to negative health outcomes, are also to be explored. A range of factors along these pathways are captured: agricultural production (irrigated and rain-fed); livestock; assets; markets; income; rural services; water use, sanitation, and hygiene; mental health and aspirations; household food consumption; and young child nutrition (diet and anthropometry) and morbidities related to nutrition, water and sanitation (diarrhea, respiratory conditions, fever and malaria, trachoma, and helminthe infections).

[18] http://www.episurveyor.org/user/index

3. Preliminary Findings & Early Lessons for Large Scale Evaluations

Baseline data collection is now complete for cohort 1. A total of 1264 households were surveyed, 614 from Kenya, 650 from Tanzania, and 458 children under five years from both countries (see map below with GPS coordinates of households visited). Some preliminary results from the full sample related to health and nutrition are presented, with the caveat that the data cleaning is not yet finished. Several of the nutrition and morbidity outcomes were aligned with findings from the Demographic and Health Surveys from these countries.

In the dry season, the common domestic water sources for households
were *covered wells located within the compound* (13%), a *natural spring or stream* (13%), or *a public well* (11%) suggesting the potential for KickStart pumps to improve water supply and access. Few households reported using the pumps yet for domestic purposes, but only about one half had begun to use them for irrigation. The average time to collect water during the dry season was 15 minutes with a high degree of variability and taking up to 3 hours from some families. *Adult women* have the primary responsibility for water collection (83%) in this region, offering the possibility of time and labor savings if the pump is used for domestic purposes. Almost one-half of the sample indicated they do not treat water before drinking (46.5%). Many families reported owning one or more bednets (88%), but very few use flush toilets (20%) and rely on latrines in various forms or nature. Increases in income and wealth from KS ownership may drive changes in some of these health behaviors.

Household food consumption reported from the previous week was greater for *cereals, vegetables,* and *legumes* when compared to *meats (beef, fish, poultry), dairy, and fats* groups. For the latter three groups where we hypothesize a change based on previous studies of food type demand elasticities, there was a consistent trend in frequency of consumption; approximately 80% of household did not report any consumption compared to 20% reporting some consumption. Patterns of consumption were similar among children less than five years. Prevalence of morbidities in previous two weeks in young children were: 13% diarrhea; 30% with fever; and 9% with acute respiratory illnesses. Very few reported trachoma or guinea worm infections. Anthropometric Z scores have not yet been calculated.

Early lessons are emerging for evaluating the impacts of an agricultural intervention on health and nutrition outcomes. (1) The <u>transdisciplinary nature of the study team</u> (nutrition, public health, agriculture economics, GIS/demographers) and involved partners seems to have fostered innovation through the convergence of ideas and methods. (2) All involved partners are working towards <u>building an evaluation legacy</u> within KickStart. Capacity strengthening of the impact evaluation and monitoring staff at KickStart is integral to the work of IFPRI and Washington University, and is being accomplished through training and involvement in the evaluation work. (3) <u>More pilot testing</u> of the survey instrument and use of the phone would have been helpful. (4) Collecting data from remote, hard-to-reach areas can be prohibitively expensive; and (5) Finally, the results from this study suggest there may be <u>new approaches in agricultural development</u> for improving nutrition and public health.

Speaker Summary Note	
Session:	**Learning from Evaluations: World Vision Programs**
Speaker:	Kioko Munyao**, Team Leader, Integrated Technical Services, World Vision Canada, Canada**
Title:	**Growing Healthy Children: Key lessons from evaluations of World Vision's integrated agriculture-nutrition-health programming**

Integrated Agriculture, Health and Nutrition programming in World Vision
World Vision (WV) is a Christian relief, development and advocacy organization dedicated to working with children, families and communities to overcome poverty and injustice. Established in 1950, the WV global federation has grown its operations to about 100 countries.

Agriculture/food security and health have always been a strong part of World Vision's humanitarian and development programming. The need for targeted attention to nutrition emerged when an extensive evaluation of World Vision's global programming clearly highlighted that conventional sector-based development programming in agriculture and health were not fully meeting the nutritional needs of young children, particularly those less than 2 years of age. During the same period, World Vision was implementing a number of integrated agriculture, nutrition and health programmes which provided a rich body of evidence for how to design and implement effective development programmes that met the needs of young children.

Taken together, the evaluation of WV's global programming as well as evaluations of discrete integrated nutrition programmes has led to a major transition in how WV addresses child nutrition. World Vision has prioritized nutrition globally and assimilated it into its operational structure (Box I). In practice, nutrition is increasingly integrated across sectors in our programming and integrated approaches to nutrition are now clearly articulated as a global priority.

Box I: World Vision's Child Well-Being Outcome Indicators: Globally, every World Vision country programme evaluates impact using six core outcome indicators. One of the six measures is stunting for the corresponding outcome of "Children are well nourished". The direct and indirect incorporation of nutrition-related indicators into the global impact evaluation system for World Vision demonstrates the high-level organizational support for nutrition.

Key Lessons Underlying Our Redesign of Our Agriculture Programmes to Better Meet the Nutritional Needs of Children

- ***Integrated approaches need strong coordination with shared funding and monitoring between sectors.*** This is one of the major challenges facing integration of nutrition and agriculture as most funding sources are sector-based. Engaging government stakeholders from agriculture, health, and other key sectors in nutrition programme design, training, implementation, and evaluation contributes to improved approaches, broad dissemination of learning, and enhanced impact.
  (Box II).[19]

> ***Box II: MICAH: Addressing stunting through improved child feeding.*** World Vision programmes that have resulted in significant decreases in rates of stunting do the following: (1) target and monitor reduction of stunting; (2) include multiple sectors (i.e., integrate nutrition with health, agriculture, and water/sanitation interventions); and (3) prioritize evidence-based interventions focused on mothers and children under five. In Tanzania, rates of stunted children decreased from 43% to 28%; underweight children from 42% to 21%. In Ghana, anemia among women of reproductive age decreased from 43% to 18%.

- ***Translating nutrition evaluation results for effective decision making*** is very important for institutional change and learning. National policy makers, senior organizational leadership, and field level staff (particularly non-nutrition specialists) require information in a form they can act on to make appropriate programming and policy changes.

- The ***'invisibility' of malnutrition, particularly the hidden hunger of micronutrient deficiencies***, is a major challenge for agriculture programmes that seek to contribute to improving child nutrition status. Increased investments in qualified technical personnel and innovative assessment methods appropriate to the rural context in which most of the undernourished children live are needed.

- ***Make improved nutritional status an outcome of agriculture/food security programmes.*** Recent reviews[20] (Berti et al. 2004; IFPRI 2007) present compelling evidence that unless improved nutritional status is an explicit objective of agricultural interventions, there is limited evidence improved nutrition will occur. Agriculture interventions that have successfully addressed child under-nutrition included nutritional objectives, implicitly recognizing that there is not a direct line between investments in agricultural production/growth and improved nutrition. There is an urgent need to develop a robust set of practical agriculture-nutrition indicators, particularly at the household level,[21] and guidelines that will support this important area of work.

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[19] World Vision Canada: MICAH final Programme Report 2006, *Improving nutrition of women and children*.

[20] Berti, P.R., J. Krasevec, and S. Fitzgerald, "A review of the effectiveness of agriculture interventions in improving nutrition outcomes," *Public Health Nutrition* 7 (2004): 599–609. **See also**, International Food Policy Research Institute and World Bank, *From agriculture to nutrition: pathways, synergies and outcomes*, World Bank (2007).

[21] Promising household level indicators are 'children receiving minimum dietary diversity' and 'minimum meal frequency'.

- ***Increase household production of nutrient dense foods.*** In addition to supporting increased production of staple crops, attention should be paid to increasing production and consumption of nutrient-dense foods. Selecting nutrient-rich foods for promotion, such as the orange-fleshed sweet potato in the Ovata Programme[22] (Box III) or animal-source foods, is an essential first step in achieving the goal of improved child nutrition.

- ***Poverty is a major driver of poor nutrition*** so addressing household livelihood concerns is critical. Promotion of nutritious and marketable foods helps to meet both economic as well as dietary needs of households.

- ***Sustainability of agricultural programme interventions and the nutrition benefits*** accruing from such interventions requires a sustained effort in ***nutrition education and behavior change*** and reinforce positive nutrition practices already existing in communities. These should be linked to existing community and government capacity building and advocacy mechanisms. (Box IV)[23]

From Lessons to Action—Scaling Up Nutrition in World Vision's Global Programming

Over the past 15 years, World Vision has undergone a major transition in its approach to addressing nutrition. As lessons from our global development programming and specific integrated nutrition programmes have emerged, our approach has evolved from implementing sector-based, discrete Agriculture and Health programmes to integrating nutrition-sensitive approaches across sectors in our long-term development programming. Integrated approaches to nutrition are now firmly embedded as a global outcome for the World Vision Federation.

World Vision's history and range of programming experience point to the importance of addressing key underlying determinants of poor child nutrition in its development programming. Support to nutrition-sensitive smallholder agriculture, particularly when targeted to women, can improve both availability and access to nutrient dense food at the household level. Combined with nutrition education activities to increase utilization of those foods and a set of cost effective, proven direct nutrition interventions, World Vision has developed a powerful set of tools to sustainably reduce child malnutrition in its programme areas.

Box III: The Ovata Programme in Mozambique (2002-2006)
Ovata was implemented by World Vision Mozambique, funded by USAID and reached 300,000 direct beneficiaries. With the overall goal of improving food security and decreasing vitamin A deficiency children, Ovata was successful in increasing vitamin A intake at the household level through promotion of the orange-fleshed sweet potato.

[22] World Vision, "Ovata nutrition and HIV/AIDS programme: DAP II, Final Evaluation." Mozambique: World Vision Mozambique (2006).

[23] World Vision, "Promising practices in food security programming," World Vision (2008).

Box IV: Using local foods and knowledge to build community-wide sustainable approaches to rehabilitate moderately malnourished children at home*: Positive Deviance (PD) Hearth.*
PD Hearth is a participatory, community-based programme designed to sustainably reduce child under-nutrition. The programme identifies health-promoting behaviours practiced by mothers or caretakers of well-nourished children from poor families and brings communities together to discuss these positive practices, with the objective of transferring such positive practices more widely in the community. The PD/Hearth approach particularly recognizes the expertise of women and strengthens their leadership role in addressing key development challenges in their communities. A 2009 evaluation WV's PD/Hearth programmes in 8 countries found that in:

- Nicaragua the percentage of malnourished children dropped from 43 percent to 31 percent.
- In Mali, the percentage of normal weight children increased to 84 per cent from 59 percent.

World Vision's Global Health and Nutrition Strategy outlines how achievement of our global organizational goal, "Children are Well-nourished," depends on multi-sectoral action on nutrition. Our Global Nutrition Framework, which is based on both the widely-accepted UNICEF framework, *Causes of Malnutrition*, from the UNICEF Nutrition Strategy,[24] and our field experience which shows that sustainably addressing child nutrition over the long term requires concerted effort in three interdependent pillars underpins this Strategy, and rests on three interdependent pillars:

- **Adequate household food security:** ensuring quality food for infants and young children (nutrient-dense food for families, animal-source foods, vitamin-rich vegetables); adequate quality and quantity of food for families in crisis;
- **Adequate maternal and child care practices:** child care (exclusive breastfeeding, treated bed nets, education); mother care (increased quantity of food, more time for rest, education); family response to child illness (appropriate home management, timely referral for treatment as warranted); and household and personal hygiene for everyone (hand-washing, use of latrines, proper food and water storage); and
- **Adequate health services and a healthy environment:** community-based maternal and child health (access to preventive and curative health services, education, coordination with government and/or community leaders); access to essential primary health care (immunization, access to essential services); and a healthy environment (access to clean water, latrines).

To operationalize our Nutrition Framework, World Vision is integrating a package of evidence-based, cost-effective interventions focused on improving the health, nutrition and food security of pregnant women and children less than 2 years of age in our global programming. With extensive reach around the globe and long-term commitments at the community level, World Vision is well placed to significantly contribute to the achievement of nutrition-related MDGs.

[24] UNICEF, "Strategy for Improved Nutrition of Children and Women in Developing Countries," UNICEF (1990).

Speaker Summary Note

Session:	**Learning from Evaluations**
Speaker:	Marie Gaarder, **Global Deputy Director, International Initiative for Impact Evaluation (3ie), India**
Title:	**Evidence on Links in the Causal Chain**

1. Some Findings from Systematic Reviews

1.1 SRs aim to provide unbiased assessment of what works and why through systematic identification of relevant studies and synthesis of quantitative and qualitative evidence:

1. Methodology set out ex ante in study protocol
2. Rigorous search to identify published and unpublished literature, in any language
3. Application of study inclusion criteria, determines what gets included
4. Critical appraisal of study quality, to assess how reliable is the included evidence
5. Synthesis of evidence, sensitivity and sub-group analysis
6. Review updated as new evidence emerges

1.2 Preliminary findings from Systematic Review (SR) of the Impact of Farmer Field Schools (Hugh Waddington, and Birte Snilstveit; 3ie):

- Knowledge generation among FFS-participants (two studies assessed this)
- Adoption of practices among participants across the majority of studies
- The impact on agricultural yield appears significantly positive on average across all studies for FFS-participants
- However, rates of adoption and impacts on agricultural outcomes among 'exposed' farmers are limited
- Eventual impacts on welfare, nutrition and health have not been examined

1.3 Preliminary findings from SR of the impact of interventions to increase agricultural production on children's nutritional status? (Edoardo Masset et al.; IDS):

- The agricultural interventions considered have a positive impact on households' incomes and on the consumption of specific foods promoted.
- Weak evidence of an impact on the absorption of micronutrients and on prevalence rates of stunting, wasting and underweight among children under five.
- Absence of nutritional impact could be the result of the poor methodological design of the studies reviewed rather than of the inefficacy of the interventions.
- Separate assessment of the existing evidence on the impact of biofortification studies found that consumers' acceptance of bioforitified staple food is good and that micronutrients in staple food are successfully absorbed by the body.
- However, no evidence was found on farmers' acceptance of biofortified crops, and little evidence of any impact of these interventions on nutritional status.

2. The Gap Map: mapping the theory of change to identify research priorities

2.1 A theory-based approach to impact evaluation, one that maps out the causal chain from inputs to outcomes and impact and tests the underlying assumptions, will shed light not only on what works or does not work, but also on the 'why' question.

2.2 Mapping out the causal chain as well as the existing evidence along the chain is also a useful way to identify the most significant evidence gaps and therefore a useful tool to help set priorities for a research agenda.

2.3 Figure 1 (below) maps out the possible linkages between agriculture and nutritional and health outcomes. On the left side of the figure are the typical inputs in terms of agriculture-related interventions, such as agriculture technology, agricultural extension, infrastructure investments, subsidies and tariffs, credits and grants, input supplies, land tenure systems, weather and crop insurance etc. These lead to outcomes, such as knowledge acquisitions, adoption of new technologies, and increased productivity, and then finally on the right hand side to intermediate and final impacts, such as increased income, increased food expenditure, improved health and improved nutrition. The picture is complicated because of two-way causalities (increased productivity may lead to higher income and thereby better health and nutrition, on the other hand it may come about through practices that have adverse health effects, e.g. pesticides, or through more labor and the related higher calorie-requirements), heterogeneous effects (certain new cultivation practices may lead to a shift in intra-household agricultural labor allocation), and different time-requirements for impacts to occur (increase in income would typically show up at an earlier stage than improved nutritional status).

2.4 In addition to gender, one of the main heterogeneities to consider is whether the targeted farmer household is a net buyer or seller of the crop in question, as this will have major implications for the way in which prices affect the welfare of the household. A related issue is how agricultural interventions affect non-agricultural households in the community. Further complicating the picture are issues of the macro-effects (national; regional, global) of changed agricultural patters (growth implications; price-effects; environmental effects etc) and how this in turn can affect nutrition and health outcomes (e.g. through such diverse ways as expenditure on health and education, and lifestyles related to urban versus rural living).

2.5 Figures 2 and 3 below map the studies, primary studies and systematic reviews respectively, that are being produced with support from 3ie or DFID, or currently being considered for support from AusAid/DFID/3ie. We also have a database of existing rigorous impact evaluation studies that include studies along the causal chain mapped out in figure 1. This can be found at: http://www.3ieimpact.org/database_of_impact_evaluations.html. While the database does not yet represent a complete picture of all the available evidence, it is clear from the studies that are included to date that they center around some of the issues covered by the ongoing SRs.

2.6 Conclusion: There are a number of relevant SRs that will be produced over the next couple of years. Whether they come up with useful evidence or as empty reviews, they will provide useful insights for future research. Similarly, a large and increasing number of primary studies (impact evaluations) are currently under way and will add important findings to the evidence-base, and little by little expand our knowledge of the causal chain. Some of the macro-linkages and market spillover effects will be crucial to further understand. General and partial equilibrium type of models will be required for these types of studies, however findings from rigorous impact evaluations with clear identification strategies can be used to improve and calibrate such macro-models.

Figure 1: Leveraging agriculture for improved nutrition and health

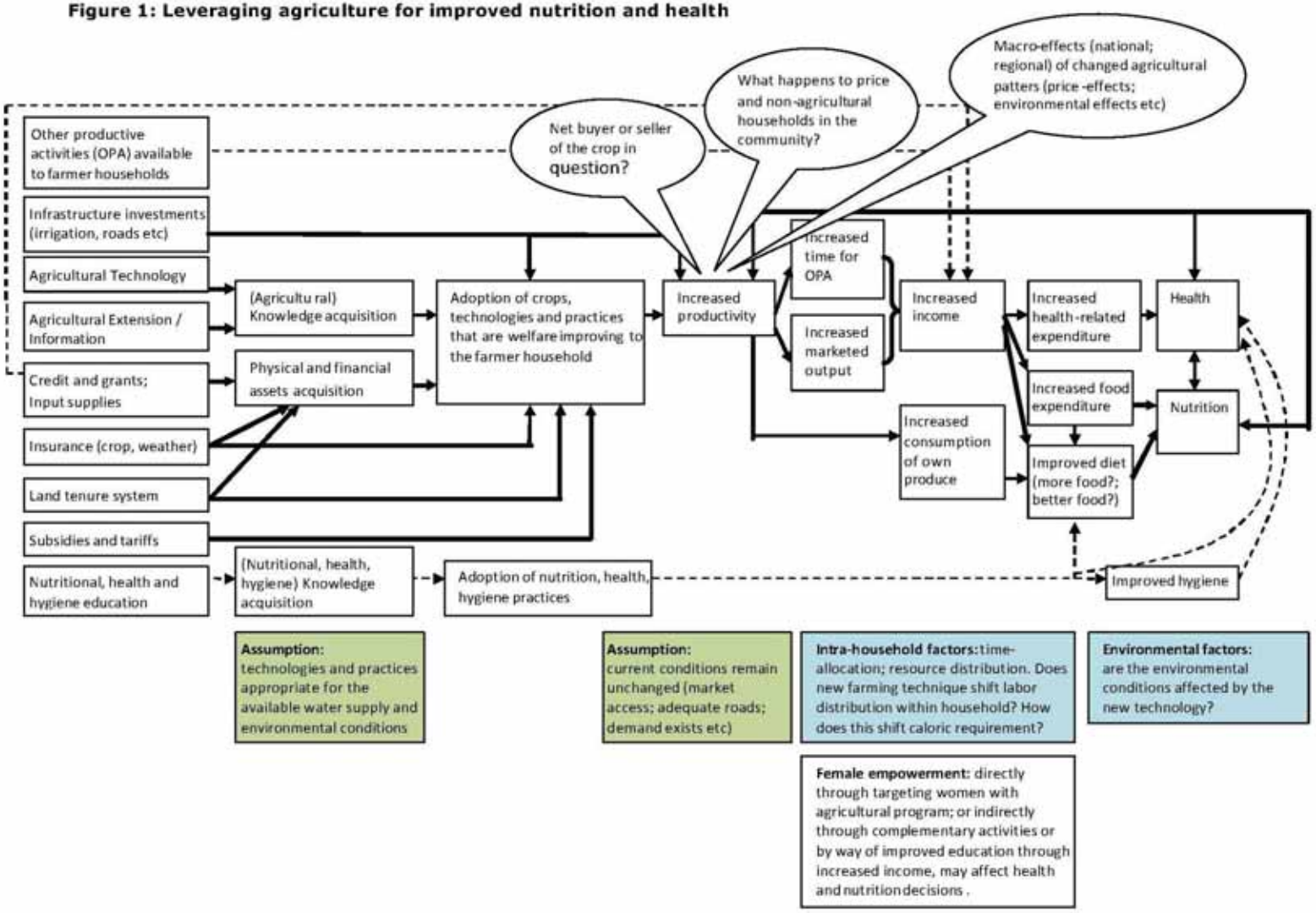


Figure 2: Impact evaluation grants funded by 3ie

	Knowledge acquisition	Assets acquisition	Adoption (technologies, and practices)	Productivity	Marketed output	Time for OPA	Cons. of own produce	Income	Health-related exp.	Food Exp.	Improved diet	Nutritional status	Health status
Agricultural technology		KickStart's Low Cost Farm Equipment (Kenya, Mali, Tanzania)	Agricultural Technology Adoption, Malawi Kickstart	KickStart				KickStart Supplying Double Fortified Salt Bihar, India		India	India		
Agricultural extension/ information	FFS against Excessive Fertilizer Use, China Demonstration plot experiment Mozambique		China Mozambique					China					
Credits and grants/ input supplies			Providing collateral and improving product market access for farmers, Sierra Leone	Tanzania's National Agricultural Input Voucher Scheme Sierra Leone	Tanzania Sierra Leone		Sierra Leone			Tanzania Sierra Leone			
Land tenure systems													
Subsidies and tariffs													
Insurance (crop; weather)			Index-Insurance in Gujarat, India Agricultural Insurance, China Weather Securities, India					China India		India China India	India		
Infrastructure investments (irrigation; roads)				Irrigation improvement in Agricultural Sector Program, Thailand				Thailand				Thailand	Thailand
Nutritional, health, and hygiene education	Biofortification Program (Vit. A Deficiency), Uganda		Uganda							Uganda		Uganda	Uganda

Figure 3: Systematic Reviews produced with support from 3ie or DFID, or currently being considered for support from AusAid/DFID/3ie

	Knowledge acquisition	Assets acquisition	Adoption (technologies, and practices)	Increased productivity	Incr. marketed output	Incr. time for OPA	Incr. cons. of own produce	Incr. income	Incr. health-related exp.	Incr. food exp.	Improved diet	Nutritional status	Health status
Agricultural technology			Under what circumstances or conditions do farmers adopt new technologies in Africa?	Under what circumstances does adoption of technology result in increased agricultural productivity?									
Agricultural extension/ information	The impacts of agricultural extension services		Ibid.	Ibid.									
Credits and grants/ input supplies			Is the provision of agricultural innovation grants to small holder agricultural producers effective in facilitating agricultural innovation?										
Land tenure interventions													
Subsidies and tariffs				What are the impacts of agricultural producer subsidies on productivity and farm incomes?				Ibid.					
Insurance (crop; weather)				How effective have financial mechanisms (such as micro-insurance) been in helping small-holders manage weather-related risks?									
Infrastructure investments (irrigation; roads)				What is the impact of infrastructural investments in roads, electricity and irrigation on agricultural productivity?									
Nutritional, health, and hygiene education										What is the impact of interventions to increase agricultural production on children's nutritional status?			

Speaker Summary Note	
Session:	**Learning from Evaluations**
Speaker:	Derek Byerlee, **Chair, Standing Panel on Impact Assessment, Independent Science and Partnership Council (ISPC), USA**
Title:	**Agricultural Research:** **Extending evaluations to include nutrition and health outcomes**

EVALUATION WITHIN THE AGRICULTURE, HEALTH AND NUTRITION NEXUS

I. **Evaluation for results and for learning is now at center stage in development programs**

- Pressure from donors and government auditors for accountability to show results against stated development goals—food security, poverty reduction, environmental sustainability etc
    - USAID's new Feed the Future will reserve 3 % of resources for evaluation
- Also emphasis on evaluation for learning and scaling up
- Finally, there has been a rigor revolution in evaluation, using randomized experiments and panel data

II. **Strong culture of evaluation of agricultural research in the CGIAR**

- Dozens of studies have demonstrated very high returns to investment in the CGIAR—a meta analysis shows that every dollar invested generates at least 9 dollars in benefits
    - However, narrow focus on economic returns until recently.
- **But few studies of evaluation of CGIAR research within the agriculture, health and nutrition nexus**
- Not easy
    - Impacts are very complex and in both directions. Many are unintended and indirect.
    - Impacts are often very long term (e.g., Finnish study on crop yields at birth and reproduction in the next generation).
    - Many impacts are hard to measure (e.g., micronutrient effects, pesticide poisoning)

III. Examples of CGIAR research

- **Nutrition:**
- Bio-fortification and nutrition (Harvest Plus)
    - Presentation during this session. Evaluation of outcomes at local scale using rigorous methods
- Global impacts crop genetic improvement on child malnutrition (Evenson and Rosegrant)
    - Macro-level modeling of nutritional impacts of CGIAR research—1965-2000 CGIAR research reduced child malnutrition by 15 million.

    - Included both direct effects on technology adopters as well as indirect effects especially through food prices.

- **Pesticides**: 350,000 lives lost per year due to poisoning.
    - IRRI research around 1990 showed that negative health effects of pesticides outweighed any positive yield effects
    - Follow up study of impact of IRRI research on pesticide policies and regulation in the Philippines (Templeton).
    - Excellent example of collaboration of an economist and medical doctor to assess effects of pesticides on human health and impacts of stronger regulation of pesticide use.
    - Data collection on medical costs and days lost to work.
    - Assessed two way impacts—agriculture on health and health on agriculture
    - Later study in 1990 showed that modest investment in policy research led to changes in policy reduced pesticide use by over 80%--B/C analysis of 200:1
    - Similar study by CIP on potatoes
- Note many impacts may be unintended and negative—very few studies look at these types of impacts
- SPIA call for proposals on agriculture and undernutrition just last week

Where to go from here

1. Evaluation must build on research to better understand the linkages
2. Data systems
    a. Household panel data sets with better measures of health and nutrition,
    b. Vast improvement needed in measures of undernutrition at country level.
3. Selective use of randomized control trials in some types of interventions especially for treatment effects on human health and nutrition
4. Models that better incorporate health and nutrition variables
5. Increase capacity in evaluation—dedicated units, specialized skills, sufficient resources.
    - Define reasonable expectations on what can be evaluated—comprehensive evaluation will not happen overnight but need to get started now.

PRIORITIZING AND SCALING UP INTERVENTIONS FOR THE MOST OPTIMAL AGRICULTURAL, NUTRITION, AND HEALTH OUTCOMES

Speaker Summary Note	
Session:	**Prioritizing and Scaling Up Interventions for the Most Optimal Agricultural, Nutrition, and Health Outcomes**
Speaker:	Kevin Farrell, **Special Envoy for Hunger, Ireland**

Ireland's very strong commitment in overseas aid programme (and indeed in whole foreign policy) to the global effort to prioritise the elimination of hunger. Some 20% of Ireland's total ODA now going towards food security, to hunger alleviation programmes, including agriculture and nutrition.

Particular priority has of late been a focus on encouraging the Scaling up Nutrition (SUN) initiative.

Launch in September 2010, together with the United States and in presence of UN and several governments and partners. Commitment to a programme of 1,000 days of action in support of Scaling-Up-Nutrition or SUN. This to emphasise the absolute necessity to address malnutrition among mothers and children up to the age of 2 years.

Follow up meeting 10 February with SUIN Partners – discussion

1. Leadership—Vital importance of ensuring that the SUM Movement for Scaling up Nutrition be **led** by the **participating countries**—that the **priorities and plans** be country-specific and managed by governments and leaders in participating countries.
2. The high **and growing** level of political commitment in many participating countries—often led by Head of State or of Government—which have resulted in Nutrition being placed more centrally in Government and which therefore is beginning to enable the kind of **interdepartmental coordination** which is so essential in the process. Now a very strong recognition of the importance of having a fully multi-sectoral approach to Nutrition.
3. Very importantly also Nutrition being reflected now much more strongly in **National Development Plans and in Poverty Reduction Strategies,** with an emphasis on ensuring that **all** development programmes have a strong nutrition focus.
4. But as well as being multi-sectoral—an increasing emphasis on the engagement of multi stakeholders. The importance of involving a very broad range of actors in the Nutrition effort.
5. **Cultural impediments** to extending/expanding nutrition programmes. Economic growth does not guarantee improvements in nutritional status. The task is to bring about behavioural changes which involve tackling existing impediments, e.g. a low level of education among women.
6. The role of the **private sector** noted—though still not as vibrant, or as adequately explored as it needs to be.

   Public Sector and Civil Society should be encouraged to create the ethical framework in which the private sector can operate (similar to the code of marketing breast milk substitutes) – to push ethical engagement (efficacious products, appropriate pricing and delivery and extensive distribution).

Also the potential to engage what we might call the more non-traditional elements such as **smallholder farmer organisations, trade unions, the media, consumer associations, professional bodies, and of course very importantly the whole civil society sector.**

7. The need for improved **coordination** both within governments and among all partners, to build **stronger capacity** at all levels, for help in **advocacy, and in developing Monitoring and Evaluation** frameworks.

8. Agreement at the meeting—which very welcome—was that participating countries will begin to develop **Reference Groups** who will bring forward the whole process in their respective countries.

9. Discussion on the need for **additional resources** and where such resources might come from. Some comments
   - **Is** already a strong commitment and support from several donor partner governments; also from multilateral agencies who are already engaged, and can be much more so, to help in the process.
   - Necessity for participating governments to continue to and indeed strengthen their own commitments to the process including in the allocation of resources.
   - The belief that as plans are developed, as structures within countries are put in place and strengthened, that resources will come available. Reaffirm Irelands commitment to and support for the process
   - With the overwhelming evidence, now widely recognised that investment in nutrition is the single most cost effective development investment, strongly encourage participating countries to have confidence to proceed with urgency to follow the paths which they are already embarked on
   - And appeal to all donors and development partners to continue to back up the commitments to prioritise nutrition in their ODA and to give the support that this whole effort so obviously and urgently warrants.

Speaker Summary Note	
Session:	**Prioritizing and Scaling Up Interventions for the Most Optimal Agricultural, Nutrition, and Health Outcomes**
Speaker:	Lawrence Haddad, **Director, Institute of Development Studies, University of Sussex, and Chair, Development Studies Association of the UK and Ireland (DSA), UK**
Title:	**Incentivising Agriculture for More Effective Undernutrition Reduction**

Agriculture cannot be the only or even the main solution to reducing undernutrition—the latter is too multi-determined. But agriculture can do a lot more to reduce undernutrition. Producing food is one thing. But the creation of jobs and income, the empowerment of women and an increased supply of micronutrients are also things that agriculture could do much more of. It would be in agriculture's interests to do so too. This note makes 4 points that might help incentivise agriculture to do more for nutrition while meeting its non-nutrition needs too.

1. More impact evaluations: we hardly have any to guide us

We need more impact evaluations of the small number of agriculture interventions that explicitly aim to improve nutrition. We can then learn from these. My IDS colleague Edoardo Masset has led the completion of a first draft of a systematic review of agriculture interventions which aim to improve nutrition status (1). The initial findings are sobering. 307 studies of agricultural intervention evaluations designed to improve nutrition were found which were published on or after 1990, in English, for developing countries, having data on outcomes (participation, income and expenditure, diet, micronutrients and nutritional status). Of these 307, only 30 reported an impact study on any of the indicators above. Of these, only 23 had credible impact evaluation models which allowed a counterfactual to be modelled. Of these 23 studies, 13 specifically looked at anthropometric indicators of children under the age of 5. Of these 13 studies, only one showed a positive impact on stunting, the rest showed no effect. Of the 13, 5 showed a positive impact on underweight, the rest showed no effect. The really troubling finding is that half of the "no impact" studies had impact designs with too low a statistical power to uncover impacts—even if they were present. Even for agricultural interventions that aim to improve nutrition status, the poor quality of nutrition impact assessment designs runs the risk of squandering public funding.

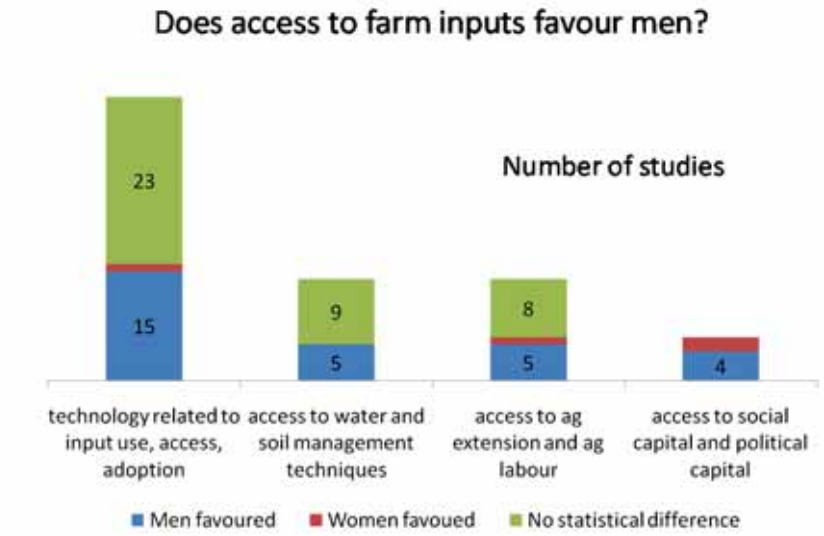
2. Use nutrition indicators to assess nutrition impact of agricultural programmes

If only 30 of 307 studies of agricultural interventions that aim to have an impact on nutrition (including fisheries, livestock, dairy, home gardens) actually contain an impact assessment on nutrition relevant indicators, then something is going badly wrong at a systems level. Either agricultural interventions fail to implement their nutrition components, or they are implemented but there is a failure to collect the indicators or there is a failure to undertake an impact assessment. Why were indicators not collected if the intervention was implemented? Perhaps it is a result of a perception that it is too difficult, perhaps a lack of resources to do it, or simply a feeling that it is not sufficiently important for the key stakeholders. Certainly it does require a different skill set to collect nutrition outcome data, but the methods are relatively straightforward and not costly relative to other outcome indicators. The same goes for impact assessment. The requirement to collect nutrition outcome indicators and conduct impact assessments would focus the theory of change of the intended outcome—improved nutrition status. Donors have a huge role to play here in insisting

that the purpose of the intervention and the indicators align and that creative impact assessments are completed. This is in agriculture's interests too. It is going to be increasingly difficult for donors to justify funding agricultural interventions –whether or not they explicitly aim to improve nutrition—that only aim to raise productivity and have no ambition to maximise the impact of that productivity on nutrition status. And even if donors can get away with it in the short to medium run, agriculture will lose out in the longer run as it becomes exposed to changing donor tastes with no insurance policy of a demonstrable set of impacts on human nutrition.

3. Increasing the women's control over agricultural decisions and resources

One way of incentivising the greater intertwining of nutrition and agriculture agendas is to create more opportunities for women to influence and shape agendas, decisions and resource flows in agriculture. That is because women are often responsible for both of these agendas. My former colleagues at IFPRI have done a nice recent review paper[25] on this, summarised by the figure below. For half of the comparisons of resource access, there is no gender difference. But for the other half, where there is a difference between male and female access, it is almost always in favour of men. I still find such data shocking and disturbing. At a practical level, it represents an overinvestment in male entrepreneurial energy and an underinvestment in female talent. At a more fundamental rights level, it surely does not reflect a free consensus on how best to grant access to agricultural resources. Citizens should demand more from their governments and the donors. There should be more experiments with quotas, all-women leadership programmes, and innovative approaches to creating the kinds of spaces for change that women can participate in and influence.



Source: Peterman, Behrman and Quisumbing, 2010. IFPRI Discussion Paper 975

[25] A review of empirical evidence on gender differences in nonland agricultural inputs, technology, and services in developing countries. 2010. Peterman, Amber; Behrman, Julia; Quisumbing, Agnes. IFPRI Discussion Paper 975. Washington, D.C. International Food Policy Research Institute (IFPRI)

4. Rethinking curricula in agriculture and in human nutrition

To intertwine nutrition and agriculture, it will help to have professionals who have an appreciation for both, even if they only have expertise in one or the other. There are very few analyses of university curricula for human nutrition or for agriculture. The most recent study I could find in nutrition was a survey in Norway of what prospective employers were looking for from Norwegian trained nutritionists[26]. When 91 potential employers were asked about the essential functions they are looking for from a nutritionist, the second ranked out of 31 attributes was an ability to provide nutrition information to those outside of the nutrition profession (the first was familiarity with laws and regulations pertaining to nutrition). The third ranked was an ability to transform science based knowledge into practical advice and the fourth was communication with the mass media. If we had nutrition curricula that delivered this, they would go a long way to facilitating cross-sector working. In agriculture, the most recent paper I could find was by Moore et al. 2009[27] which cites a study from 2003 which found that only 5% of agricultural undergraduate students in the US earned a passing score when quizzed about international agricultural issues. It would be interesting to do similar quizzes about nutrition. So on the employer side and the student side we have thin evidence bases, but what we have shows some demand for nutritionists (in Norway at least) who can think outside of the nutrition box and that agriculture students in the US will not learn about international agriculture unless it forms part of their core curriculum. I could not find any content analysis studies of nutrition or agricultural curricula. If you know of some, please contact me (l.haddad@ids.ac.uk).

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[26] Torheim, L. E. et. al. 2009. A survey among potential employers for developing a curriculum in public health nutrition. *Public Health Nutrition* 12(80): 1039-1045.

[27] Moore et. al. 2009. Developing and International Agricultural Leadership Program to meet the needs of a global community. *J of Leadership Education* 8(1): 118-128.

Speaker Summary Note

Session: **Prioritizing and Scaling Up Interventions for the Most Optimal Agricultural, Nutrition, and Health Outcomes**

Speaker: Venkatesh Mannar, **President, Micronutrient Initiatives, Canada**

1. The application of readily available low-cost solutions to address undernutrition has immediate and important consequences for improving the wellbeing of poor people around the world and needs to be the world's top priority. Achieving impact on maternal and child nutrition at a global level—both in the next five years to make progress toward achieving the MDGs, and in the long-term for true, systemic change—will require a broad, coordinated effort. The Scaling Up Nutrition (SUN) process offers a comprehensive framework for global action to address nutrition-related issues based on country-owned strategies and a multi-sectoral support for a specific range of evidence-based, cost-effective interventions.

2. The ultimate goal is for every individual to receive their nutrients in optimal quantities through the foods they consume on a self sustaining basis. Even if this ideal situation is achieved we need to recognize two groups that will need complementary interventions to improve nutrient intake:

   - Specific age groups in the human life cycle whose nutrient needs or need for nutrient dense foods are enhanced.
   - Population groups that become deficient because their access to nutrient-rich foods is limited by poverty, climatic conditions, or geographic isolation, because their dietary traditions limit or prohibit consumption of some micronutrient rich foods or because the absorption and utilization of the micronutrients is impaired once the foods are consumed.

3. Food and health-system based approaches and interventions must therefore be complementary to provide an optimal mix that ensures that immediate needs for nutrients are met for the entire population while simultaneously providing additional nutrients to those that need them at different stages in the life cycle. They must also address constraints that limit a household/population's ability to meet their nutrient needs. Determining the optimal mix and phasing is also governed by availability of proven interventions that are ready for implementation and scale up.

4. Where food and nutrient intake is compromised by poverty or geographic access, strategies are required that address this immediate need. Social protection programs such as conditional cash transfers have been shown to increase household spending on food, including nutrient rich foods such as fruits, vegetables and animal source foods in some Latin American countries. Where such programs do not exist or are insufficient to cover the gap in food availability such as emergency settings, distribution programs may also be required. In this case, intra-household sharing of foods should be taken into consideration in the provision of rations of culturally-acceptable nutrient rich foods to ensure that sufficient nutrients are available to the most vulnerable within the household.

5. Given that the diets of deficient populations are dominated by cereals with inadequate intake of other food groups (fruits and vegetables, animal and dairy products) the role of cereal fortification or biofortification is significant, at least to meet needs while constraints

to a more diverse diet exist (whether these be economic or food-related traditions). The nutrient content of cereals that are currently grown and consumed will not enable adequate nutrient intakes and are responsible for the huge gaps in several parts of the world unless complemented with nutrients from other sources.

The challenge with staple food fortification is to not only fortify industrially (centrally) processed cereals but also devise strategies for localized or small-scale fortification or distribution of multi-nutrient in sachets that can be added into food. Biofortification of cereals and other crops is showing promise. It is expected that within the next decade high nutrient content cereals will be available for large scale propagation. This is a vital strategy for investment that must occur concurrently with strategies to meet immediate needs.

6. All efforts to improve nutrition are guided by effective advocacy and communication at all levels. Of particular importance is high level political commitment. Countries where heads of State have prioritized nutrition have shown significant improvement and impact of intervention. Housing the nutrition program in the office of the President or Prime Minister sends a strong message to all line Ministries. A key need is better communications and cooperation among all sectors including agriculture and health. Additionally, within each of these sectors nutrition needs to receive a much higher priority.

7. We need to consider how we can channel the capacities of the private sector—and the huge potential for good—in a constructive and responsible manner. As a rule of thumb we could envision a division of labour through which Governments enable the private sector to serve the nutritional needs of the majority of the population who can afford to pay. The public sector plays a vital role to improve the capacity of those at lower end of the income spectrum to be able to purchase the foods they need; through social protection programs and/or income generation programs. However, even with improved purchasing power, the nutrient needs of the most vulnerable, specifically pregnant women and children in the first 2 years of life must be ensured through a combination of appropriate, nutritious foods and if necessary supplements.

8. Adequate regulations by both governments and international bodies—and public-private-civic partnerships—must be in place to prevent any actions that might in any way detract from the goal of reducing malnutrition. Along with such checks and balances, Government, industry and civic organizations all need to devote more energy and ingenuity to build such an alliance to ensure a significant joint contribution to improve the condition of undernourished people.

Speaker Summary Note	
Session:	**Prioritizing and Scaling Up Interventions for the Most Optimal Agricultural, Nutrition, and Health Outcomes**
Speaker:	Jay Naidoo, Chair, Board of Directors and Partnership Council, Global Alliance for Improved Nutrition (GAIN), and Founder, J&J Group Development Trust, South Africa

Nutrition, food security, and health have each moved up the global agenda over the past decade. Agriculture is the bedrock for each, and is in the spotlight today for two reasons. First, concern that food price rises cause instability. Second, anxiety that rising prices are symptoms of a worrying set of structural stresses linked to climate change, environmental degradation, exploding populations and global urbanization. While there is also new awareness that malnutrition is a dynamic cause of underdevelopment (as reflected in approach of the 2010 UN Special Session and major initiatives by the USA, Britain and other donors), the politics of food mean that the long term malnutrition does not capture headlines in the way immediate food prices rises and public demonstration do. We therefore need to be thoughtful about what and how we scale up interventions to ensure we deliver on our main concern: improving health through better nutrition.

Since World War Two, there have been two short spikes of investment in agriculture (immediately post-War, then the Green Revolution) followed by much longer periods of neglect and underinvestment. It is therefore important at a time when agriculture has the headlines, to think more broadly about how to turn the concerns about population growth, increasing prices, and severe environmental pressures into a long and sustained upward curve of investment in agriculture, and people-oriented nutritional and health outcomes. We need to seize the opportunity to turn these concerns into a global campaign which has deep roots and can set in motion changes which will both endure and target at the needs of the poor majority. The challenges are therefore part technical, part financial and part about leadership and mobilisation.

Delivery is at the heart of this challenge. We have known about the causes of malnutrition for a long time, the point is to find practical ways to address it. The idea that governments and donors can pay for and deliver solutions belongs to the past, it is a small, if vital part of the challenge relating to the most severely undernourished, the very poorest and those with chronic illnesses. In general, most people rely on the market to get their food, and governments, companies, producers and donors have to fund ways to make those markets work to tackle undernutrition, starting with food production (agriculture) and moving along the food chain to processing, manufacture, distribution (food security and nutrition) and consumption (health outcomes, public demand and awareness).

GAIN has had some success in doing this in relation to large scale food fortification of some staples and countries, a programme which we aim to scale up from 392m to 1 billion beneficiaries by 2015. This is one example of leveraging agriculture to reform markets in a pro-nutrition way, and there have also been some good successes in improving the nutritional quality of manufactured foods, for example, biscuits in India and yoghurt in Bangladesh.

The new paradigm has at its core understanding that it is the whole food economy environment which is critical: the consumer demand and awareness, the market conditions including regulation, blending concessional and private sector investment together. Therefore, we need to. Within this,

what are the priority areas for scale up and improving this enabling environment?

- **Public engagement and leadership**: strategic approaches to delivery: The first key area is not a product line or target market, it relates to creating models which can secure support for the new paradigm. This is about working differently, building pubic support and choosing areas where we can make a difference. The importance of this cannot be underestimated to avoid the errors of the past, and back sliding into divided efforts, competition and over reliance on a top down, donor driven approach. This means working with the food producers and distributors of all shapes and sizes. It means building a public base of support and understanding.
- **New Models—Targeting**: starting where we have cost-effectives solutions that we know work and can scaled up. GAIN believes that home fortification through MNPs can be a key tool ion targeting those with the greatest life cycle (1000days) and other needs (chronically ill, emergencies) to complements universal food fortification (which must be brought to full scale).
- **New Models for delivery**—moving from subsidization to capacitating: There is scope with the right public private partnerships to use cross subsidization and hybrid models (WFP/market-based solutions) to reach those in greatest need. Once we recognize that the food economy is critical to nutrition outcomes (most people buy most of their food most of the time) then—as with any business—to access finance and credit becomes a critical factor in the supply and value chain. (e.g., BRAC/Renata, Pre-mix Fund). The right interventions along the chain -the role of blended finance models to create facilitate innovation. Also technical and market support (Britannia)
- **Strengthening Policy**—GAIN's work with NEPAD to integrate SUN into CAADAP (policy can be a game changer along the value chain); creating and sustaining political will—GAIN's ability to create policy platforms that bring disparate groups together around a common framework.

Speaker Summary Note	
Session:	**Prioritizing and Scaling Up Interventions for the Most Optimal Agricultural, Nutrition, and Health Outcomes**
Speaker:	Meera Shekar, **Lead Health and Nutrition Specialist, Health, Nutrition, and Population, Human Development Network, The World Bank, USA**

The SUN not a project, it is not a program. It is a movement. Three key points:

1. **The SUN is rising at last, despite many odds, and it is rising especially quickly in the "early riser countries" who have volunteered themselves under the SUN.**
    a. The Bank is proud to have been an early initiator of the SUN.[28] We started with "Repositioning Nutrition"[29] some years ago, we estimated what it will cost to scale-up the most efficacious interventions,[30] and together with other partners we continue our support for the SUN, with a very strong focus on ownership at the country level.
    b. The initial focus is in the early-riser countries, but other high-burden countries (especially India) also need to be a part of it.
    c. The SUN prioritises those interventions that have been shown to be efficacious, and those that have delivery mechanisms for scale-up and hence can deliver on "outcomes." Many of these "nutrition specific interventions" are in the health sector. However, the SUN also places great emphasis on making our investments in other sectors more "nutrition sensitive."

2. **Multi-sectorality—A key SUN-rise issue: and as many have said, this is a golden-moment for working across sectors.**
    a. Even as the SUN rose, many valid criticisms emerged—One of these was that it was too "health-focused," that it did not address multi-sectoral issues. Not true.
    b. The challenge for the SUN was whether to focus on the evidence (what has been shown to produce results/impacts on underweight and stunting), or to accept the multi-sectoral rhetoric at face value. Everyone agrees that multi-sectoral issues are important in addressing nutrition, but few can show concrete examples of studies/projects in non-health sectors that have delivered results for nutrition. I sometimes refer to this as "faith-based" advocacy (vs. evidence-based prioritisation and scale-up). As we all know, faith is important, and any movement must be bolstered by faith—but in order to

[28] http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTHEALTHNUTRITIONANDPOPULATION/EXTNUTRITION/0,,menuPK:282580~pagePK:149018~piPK:149093~theSitePK:282575,00.html

[29] Repositioning Nutrition as Central to Development: A Strategy for Large Scale Investment, World Bank, 2006. http://siteresources.worldbank.org/NUTRITION/Resources/281846-1131636806329/NutritionStrategy.pdf

[30] Scaling-up Nutrition: What will it cost? Horton, Shekar et al, World Bank, 2009. http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/Peer-Reviewed-Publications/ScalingUpNutrition.pdf

deliver results, this faith must be grounded in the reality of evidence and results—what actions will make a difference? And what delivery mechanisms can we use to scale these up?

c. There is to-date, very little systematic knowledge about WHAT to prioritise in sectors outside health to have an impact on nutrition; even less is known about HOW to prioritise and scale these up. The recent DFiD-supported systematic review of the agriculture-nutrition links is a first step in that direction, but even that stops at saying "there is little evidence of impact" and does not go far enough to answer the question of "WHAT interventions in the agriculture sector are likely to produce an impact on nutrition outcomes" or "HOW can these actions/interventions be integrated in to other sectors?"

d. In FY10, the Bank's agriculture investments were about $4 billion; and its investments in social protection (a large part of being social safety nets) were over $9 billion. And, there is strong commitment in the Bank to make these more "nutrition sensitive." The opportunity to make a difference is huge—but the challenge to make it happen is not small. To address this challenge, the Bank is pulling together "guidance notes for practitioners." (These are not systematic reviews, but they build on the systematic reviews to address the "what and how questions"), in partnership with thought-leaders like Per Pinstrup-Anderson.

3. **Among the several multi-sectoral guidance notes, the first one under development is on "agriculture and nutrition"** (others to follow: social protection, poverty reduction …). Three key messages are emerging from the guidance notes:

   a. First, the evidence base on the impact of CURRENT agricultural investments on nutrition is sparse—and Lawrence spoke about this. One can go away from this with a pessimistic message. But, the work we are doing with Per Pinstrup-Anderson shows that when nutrition goals are explicitly incorporated into agricultural projects and policies, positive impacts on nutrition outcomes can be achieved. This is a key message emerging in the guidance notes.

   b. Second, the process (HOW) of introducing nutritional considerations in agricultural investments is not straight-forward

      i. There are often trade-offs between maximizing agricultural production and improving nutrition impacts. (For example, cash crops may improve production and incomes, but not necessarily nutrition. Women's participation in agriculture is to be encouraged for many reasons including women's access to incomes, but it takes away valuable time for child-care, increases women's workloads and may therefore negatively impact nutrition outcomes. Similarly, for nutritional purposes we wish to target the most vulnerable small-holder farmers; but productivity gains may be larger from focusing on larger farmholders.)

      ii. Some of these trade-offs can be managed carefully in designing programs to maximize both, others cannot. And we will need to accept those.

      iii. The solutions (and the binding constraints) are often context specific—so each country/project/programme needs to answer the trade-off questions in their own contexts and come up with the best options within their contexts. There is no one-size fits all answer. But the way forward is to encourage the right questions in each country/context—right at the beginning when these investments/projects

are being designed, so that decisions are made explicitly rather than by default, as is the case now.

c. Third, the "do no harm" principle needs to be front and center in all future agriculture investments. There are abundant examples of unintended negative consequences of well-intentioned agriculture and food security interventions—these need to be systematically avoided in the design of programs.

This will require extensive capacity-building and a paradigm shift at country level.

On the same note, working with the Ministry of Finance from Canada, the Bank is starting to explore some innovative Advance market commitment (AMC)-type of "pull mechanisms" for agriculture and nutrition. It is too early to say more, but if some of these ideas are launched successfully, these may be yet another mechanism to bring the agriculture and nutrition agendas closer together.

As we take this work forward, we aspire to live up to President Zoellick's New Year's message to staff—"*In 2011, I hope we can gain more momentum in the fusion of our work on nutrition with food security.*"

INNOVATIVE APPROACHES AND INITIATIVES FOR BETTER LINKING AGRICULTURE, NUTRITION, AND HEALTH

Speaker Summary Note	
Session:	**Innovative Approaches and Initiatives for Better Linking Agriculture, Nutrition, and Health**
Speaker:	Hans Jöhr, **Corporate Head of Agriculture, Nestlé, Switzerland**
Title:	**Health and Nutrition Impact Through Agricultural Development**

Creating Shared Value at Nestlé

Creating Shared Value is a fundamental part of Nestlé's way of doing business that focuses on specific areas of the Company's core business activities—namely water, nutrition, and rural development—where value can best be created both for society and shareholders. At Nestlé, CSV is embedded in our long-term thinking: Creating value in our daily business, shared with many groups in society—as a necessary long-term underpinning of value created for all stakeholders.

This value chain is not something that remains in academic abstraction. It is about everyday products, here, as example, improvement of grain quality in Western Africa, together with our partner IITA (International Institute of Tropical Agriculture). But it is also about factories, logistics and organisation. And it is about real people living in a wide range of different social and economic environments.

Central and West Africa (CWA) Grains Quality Improvement Project

Rationale

- There is an increased focus on mycotoxins in human nutrition and its negative impact on health
- Raw materials used for specific nutrition products are no longer considered as commodities
- The West African sub-region has high mycotoxins pressure due to the hot humid environment and inadequate farming and storage practices
- Specific procurement procedures needed to be established to ensure reliability of safe and quality compliant raw materials for consumer products

Objectives

- Eliminate all negative effects of mycotoxins and improve the quality of life of rural and urban households.

Shared Value Objectives Nestle

- Ensure supply to meet increasing demand for high quality cereals for Nestle cereal based products
- Reduce the dependence of Nestlé factories in CWA on imported cereals

Farmers:

- Increase the quality of grains consumed by households

- Increase overall health of farmers and decrease health related cost
- Increase access to markets for premium quality cereals to ensure household income

Nestle trains the following stakeholders in order to ensure change of practices and effective communication:

Interaction across the value chain

- Agricultural Extension Agents (Gov't Trainers of Trainers)
- Farm Village/Community Chiefs creating awareness of mycotoxins
- Farm Family Heads on grain nutritional quality
- Farmers on better agricultural practices and grain storage
- Transporters on safe and reliable transport and ensured timing of delivery

Achievements and benefits

- More than 10'000 farmers are trained to produce grains with mycotoxins levels within Nestlé norms (4ppb) in 2009/2010 through:
  - 90 Agricultural Extension Agents (train the trainers) to reach 9'800 farmers
  - 55 Farm Village Heads with coverage of 8 farmer households each
  - 80 Storage staff
  - 30 Transporters
- Farmers are now aware of the negative impact of mycotoxins on health and trade and enabled to use "Good Agricultural Practices & Good Storage Practices" to get market access and a price premium!
- Market access created for locally produced grains in West Africa with a farm base value of >20'000'000 US$ (enormous rural development impact!)
- Elimination of imported grains helped to create a leaner and cost competitive supply chain

Speaker Summary Note	
Session:	**Innovative Approaches and Initiatives for Better Linking Agriculture, Nutrition, and Health**
Speaker:	Ursula Schaefer-Preuss, **Vice President, Knowledge Management and Sustainable Development, Asian Development Bank (ADB), Philippines**

A. Introduction: Background about ADB, Strategy 2020, and Operational Plans for Food Security and Health

- Established in 1966 and headquartered in Manila, ADB is an international development finance institution whose mission is to help its developing member countries reduce poverty and improve the quality of life of their people.
- ADB's planning and financing operations are guided by its Strategy 2020. Its vision is a region free of poverty. The strategy has three complementary strategic agendas: (1) inclusive growth, (2) environmental sustainable growth, and (3) regional integration. It has five core areas of operations: (1) infrastructure, (2) environment, (3) regional cooperation and integration, (4) finance sector development, and (5) education. It has three other areas of operation: (1) health, (2) agriculture, and (3) disaster and emergency assistance.
- ABD's operations in agriculture and health are guided by the strategic three-year operational plans for sustainable food security and health, respectively. Common features of these plans are their multisector support approach and emphasis on partnerships and collaborations.

B. What does ADB do innovatively that will leverage agriculture in improving health and nutrition outcomes?

- Provides investments (lending and technical assistance) for infrastructure and services that will improve the availability of, and access to adequate, safe, and nutritious food for Asia and the Pacific's poor and vulnerable in a sustainable manner.
- Serves as game changer by investing on the pilot testing, trial setting, and up-scaling and out-scaling of agri-based technologies and management practices that ensure availability of nutritious and quality food.
- Serves as an honest broker by funding long-term and programmatic agriculture research for development work that in turn serve as basis for policy dialogues with high-level government officials, the private sector, and civil society organizations on food and nutrition security. Some examples that illustrate this catalytic role:
- Maximizes resources and outcomes by fostering partnerships and developing good governance practices to enhance synergy and harmonization in food and nutrition security work.

On initiatives of ADB, please visit the ADB booth at the Knowledge Fair.

Speaker Summary Note	
Session:	**Innovative Approaches and Initiatives for Better Linking Agriculture, Nutrition, and Health**
Speaker:	Jeff Waage, **Director, London International Development Centre, and Chair, Leverhulme Centre for Integrative Research on Agriculture and Health, UK**

The Leverhulme Centre for Integrative Research on Agriculture and Health (LCIRAH) is a new initiative led by a consortium of specialist Colleges of the University of London[31] aimed at building an inter-sectoral and inter-disciplinary platform for integrating research and training on agriculture and health. It engages anthropologists, economists, sociologists, agricultural scientists, public health professionals, and to work together to develop unifying research and training approaches and methodologies. Five-year funding from the Leverhulme Trust is directed at new academic posts and studentships which link agriculture and health units in the different institutions. LCIRAH was created in response to the visible lack of research integration in addressing problems associated with poverty reduction, sustainable development and globalization. Three examples of this:

1. Research investment in improving productivity and production of major crops especially cereals and vegetable oils, has contributed to reduced global prices which, while addressing food security in terms of calories, has imbalanced the composition and quality of foods accessed by poor communities, contributing to the rise in nutrition-related chronic diseases such as obesity and cardiovascular disease
2. Improving incomes has led to a “livestock revolution” with some potential for health benefits especially in low income countries, but also substantial potential risks to sustainability of agricultural production, chronic and acute zoonotic and cardio-vascular disease burden and climate change mitigation
3. Global estimates of hunger are historically based on extrapolations of agricultural production (calorie) estimates and are not gender-sensitive measures of household access to, and consumption of, food and its health effects, making the understanding of agriculturally-based interventions to improve nutrition and health extremely difficult.

The origins of this poor integration mostly lie in academia, where professionals are channelled in their education into separate health and agricultural sectors, with their own, distinct methodologies and disciplinary approaches. LCIRAH is therefore structured so that all activities are joint efforts between health and agricultural specialists, including PhD design and supervision, workshops, courses and publications. Through this process we are gathering valuable experience on how to collaborate and innovate across the health, nutrition and agricultural divides.
Some example areas of initial research focus include:

- Creating a dialogue between specialists on agricultural and health metrics to develop common and improved approaches to measuring the health and nutritional impacts of agricultural interventions, and vice versa. This initiative will begin with an international workshop organized with IFPRI in London in May 2011 that will bring together experts from the health and agricultural sectors.

[31] LCIRAH lead College include London School of Hygiene and Tropical Medicine, School of Oriental and African Studies, School of Pharmacy, the Royal Veterinary College and the Institute of Education.

- Examining how the increasing global sourcing of food is affecting diets and health in low and middle income countries, by changing agricultural systems, patterns of employment and income, local food production and the decoupling of food production, supply and consumption.
- Determining how the evolution of food systems and their rapid globalisation leads to greater levels of health hazard and increased complexity in the prevention and management of food borne and zoonotic disease risks.
- Exploring how longitudinal data sets on rural poverty and agriculture might be better integrated with similar datasets on rural population health, through statistical matching, to better understand the complex relationship between agricultural production, income, access to health care and diet.

By means of example, an early output of LCIRAH focuses on the health and broader economic consequences of meeting healthy eating guidelines (Lock et al. Lancet 2010). Using case studies from the UK and Brazil, we demonstrated that meeting international guidelines for saturated fat intake would be good for population health, particularly in the UK where both saturated fat intakes and death rates from coronary heart disease are high. However, using advanced economic models, we showed that as this shift in consumption of saturated fat would result in changes in the production of livestock (the primary source of saturated fat in the diet), meeting dietary guidelines would have significant impacts on economic productivity, especially in the agriculture sector, and with the largest impacts in Brazil where livestock production is a significant part of the economy. By quantitatively linking health policy with agricultural economic productivity we highlight the critical need for cross-disciplinary integrated thinking.[32]

LICRAH looks to strengthen and enhance food systems in order to provide safe, high quality, healthy and stable food supplies while at the same time minimising the negative impacts of agriculture and food production that impinge on our health and that of the environment. LCIRAH is a fast expanding initiative based in London and with a truly global outlook: we welcome your future collaboration.

[32] Lock et al. 2010. Health, agricultural, and economic effects of adoption of healthy diet recommendations. *Lancet* 376, 1699–1709.

ECONOMIC LEVERS

Speaker Summary Note	
Session:	**Economic Levers**
Speaker:	William A. Masters, **Professor of Food Policy, Friedman School of Nutrition Science and Policy, Tufts University, USA**
Title:	**(Some of the) Surprising Economics of Infant Foods**[33]

Improvements in child nutrition have been rapid in some regions but slow in others, and we are still discovering how best to improve health outcomes where stunting and underweight remain prevalent. Much of the success to date can be attributed to clinical and epidemiological discoveries about specific nutrients, foods, environmental and medical interventions that can be delivered directly to individuals, households and communities to help each child grow to their full potential. Nutritional improvements have typically occurred first in wealthier settings, and our challenge is to find interventions that can work on a large scale even in the poorest places, where under-nutrition remains widespread. We can accomplish this by making known interventions cheaper and easier to implement, and we may also be able to find new interventions that have not yet been tried in developing countries.

Tufts University is fortunate to be working with USAID and other partners to launch the Nutrition Collaborative Research Support Program in Africa and Asia, a five-year project whose goal is to discover what works best, where and how. The Nutrition CRSP is focused on population-scale outcomes, taking account of interactions among interventions and variation among people. We will begin this year in Uganda and Nepal, and hope to work elsewhere soon as well. The project brings together all kinds of researchers to study all kinds of interventions. A good illustration of the interdisciplinary linkages we might find involves the surprising economics of information about complementary feeding, which could lead to a game-changing intervention that helps low-income people access high-quality infant foods.

For infants to thrive, they need foods that mix a low-cost staple with more expensive ingredients and are carefully processed for digestibility. Production at home is labor-intensive, and the market for purchased foods is dominated by expensive branded products such as Nestlé's Cerelac. Many people cannot afford either enough time for home preparation or enough money for brand-name foods. Donors, NGOs, governments and private enterprises have long been investing in start-ups to produce cheaper infant foods, and these are effective under controlled conditions—but consumers rarely buy them, even those who cannot afford enough of the branded products to avoid under-nourishment.

Why might consumers choose a small quantity of an expensive brand instead of a larger quantity from a cheaper source? One answer is the economics of asymmetric information: if consumers cannot see how much of the expensive ingredients and processing methods were used, they may not believe that the off-brand product is worth anything at all. George Akerlof won the 2001 Nobel Prize in economics for this idea, which leads to the striking prediction that these unbranded products are simply impossible to sell commercially—unless they become a high-priced brand name

[33] The market experiment in Mali was funded by USAID, with publications and photos available at: http://sites.tufts.edu/willmasters/research/infant-foods. The scoping study in Ghana was funded by DFID, and is available at http://www.theigc.org/people/william-masters.

themselves, or a third party provides laboratory tests and inspections to certify that the off-brand products are actually worth their price.

To test Akerlof's hypothesis in the real world, we used a market experiment in Bamako, Mali that asked mostly illiterate mothers to make trade-offs between quantities of real infant foods, which they took home at the end of the experiment. In that setting, the value of a hypothetical quality-certification program for these very low-income mothers was US$1.75/kg. In other words, about one-third of what they were paying for brand names such as Nestlé's Cerelac was for quality assurance, which could be provided by a third party at much lower cost.

To design an actual intervention capable of delivering these benefits, we recently conducted a scoping study in Ghana, where there has been a particularly strong effort to develop and spread locally-made infant foods, often under the name Weanimix. Using a novel survey of availability by neighborhood and laboratory tests to measure actual nutrient density, we found the few products available were of very uneven quality. Products from the same manufacturer varied in nutrient density, sometimes far below benchmarks and labels. So consumers are right to mistrust local suppliers, and in response producers are justified in their reluctance to invest in quality control or wide distribution.

Introducing quality certification would allow new entrants and small producers to compete with Nestle's Cerelac and other heavily advertised global brands, and thereby help families meet more of their infants' nutritional needs at lower cost than is currently possible. For these impacts to be measured and the intervention improved over time, the rollout could be randomized.

The specific certification trial we propose, tentatively named the Infant Nutrition Quality Assurance Project (INQAP), would involve the following steps:

(a) An INQAP board of advisors would determine precise standards for locally-appropriate nutrient densities;

(b) Current and potential manufacturers of foods that could meet INQAP standards would be invited to enroll those products, based on inspections of their production plants;

(c) The INQAP staff would purchase random samples of enrolled products from targeted markets, and contract with laboratories for measurement of nutrient densities;

(d) Manufacturers of acceptable products would be given "INQAP OK" stickers to place on the acceptable products' packaging, with a clearly printed expiration date;

(e) The INQAP staff would conduct a randomized rollout of "INQAP OK" publicity services at selected marketplaces, with billboards and other signage, mobile demonstration teams and promotional discount vouchers; and

(f) Producers' and consumers' responses to the certification labels and publicity services would be monitored through market and household surveys at the target locations.

In summary, infant-food quality certification could significantly improve nutrition outcomes at population scale. Doing so in a randomized fashion would allow the impact of those services to be rigorously measured, to construct the most cost-effective package for sustainable replication elsewhere on a fee-for-service basis, either with or without donor support to accelerate its spread. This is the kind of discovery we hope to find through the Nutrition CRSP, and have an exceptionally valuable opportunity to discuss at this IFPRI 2020 conference.

Speaker Summary Note

Session: **Economic Levers**

Speaker: Richard Tiffin, **Director, Centre for Food Security, University of Reading, UK**

Title: **Using Fat Taxes and Thin Subsidies to Improve Diet and Health**[34]

1. Introduction

Public interest in the use of fiscal measures in the UK is typified by the proposal debated and rejected at the conference of the Scottish Local Medical Committee that a tax on chocolate might contribute to a reduction in obesity. A similar motion was debated in 2003 at the BMA annual representative meeting where a motion to impose a tax on saturated fat was defeated.[35] Interest extends to the US where a recent paper[36] has advocated the introduction of a tax on sugared drinks, an option which is amongst proposals that are currently under consideration by the United States Senate Committee on Finance as a means of raising revenue for health care reform. Evidence regarding the impacts of a fiscal policy on diet tends to focus on changes in the aggregate levels of food consumption of unhealthy products in the population as a whole. For example Marshall[37] [8] and Mytton et al.[38] extend VAT in the UK to products regarded as the main sources of saturated fats. Mytton et al. estimates that the ensuing variations in ischemic heart disease would lead to the avoidance of between 900 and 1,000 premature deaths every year. Whilst many studies[39] find that the impacts of a fiscal intervention on consumption are likely to be modest, these authors stress that a fat tax would be a useful tool to generate a revenue that could be allocated to prevention or information campaigns. In this vein and using Danish data, Jensen and Smed[40] investigate the effects of nutrient- and food-based taxes, coupled with subsidies in order to produce revenue-neutral scenarios. In line with other studies, they find that dietary effects would be minimal, but, as far as nutrient intake is concerned, better results are obtained by focusing the tax on nutrient content

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[34] This was paper was co-authored with Matthew Salois (Centre for Food Security, Department of Food Economics and Marketing, University of Reading, Earley Gate, P.O.Box 237, Reading RG6 6AR, UK) and Matthieu Arnoult (Land Economy and Environment Research Group, Scottish Agricultural College, Kings Buildings EH9 3JG, Edinburgh.

[35] Beecham, L. [2003]. Doctors vote against a tax on fatty food, *British Medical Journal* 327(7406): 72–81. URL: http://www.bmj.com.

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[38] Mytton, O., Gray, A., Rayner, M. and Rutter, H. [2007]. Could targeted food taxes improve health?, *Journal of Epidemiology and Community Health* 61(8): 689–694.

[39] Chouinard, H., Davis, D., LaFrance, J. and Perloff, J. [2005]. The effects of a fat tax on dairy products, CUDARE Working Paper 1007, Department of Agricultural and Resource Economics, University of California, Berkeley, USA. Kuchler, F., Tegene, A. and Harris, J. [2005]. Taxing snack foods: Manipulating diet quality or financing information programs?, *Review of Agricultural Economics* 27(1): 4–20.

[40] Jensen, J. and Smed, S. [2007]. Cost-effective design of economic instruments in nutrition policy, *International Journal of Behavioral Nutrition and Physical Activity* 4(10).

rather than on specific food items (e.g., saturated fats vs. red meat).

2. Public health impacts of a fat tax.

The use of a fat tax as a means of reducing the incidence of diet related disease is an example of the type of measure advocated in a substantial strand of the epidemiological literature, stemming from the work of Rose,[41] to tackle the incidence of population levels of disease. The basis for the advocacy of this approach to disease control is that the majority of deaths related to the condition occur amongst individuals who have only moderately bad diets. The corollary to this is that there will also be a very large number of individuals who would not die of diet related disease but who would also be affected by the policy.

We use a fully specified Almost Ideal Demand System to examine the impacts of fiscal regime in which a fat tax is combined with a subsidy on fruit and vegetables. The model was estimated using household data from the UK expenditure and food survey.[42] The tax is imposed as a 1 percentage point increase in the price of the good for every percentage point of saturated fat in the product. Thus full fat milk which contains 2.60% of saturated fats will see its price increasing by 2.60%.[43] We put a ceiling on the price increase of 15%. Our results show that average levels of saturated fat consumed fall from 14.13% of total energy intake to 13.84%. Fruit and vegetable consumption increases from 387 gramme ier day to 425 gramme per day. These changes are insufficient to bring saturated fat consumption to within the recommended 10% of total energy but do increase fruit and vegetable consumption above the recommended minimum of 400 gramme per day. The changes are the result of moving the mean level of consumption and mask a wide variation in diet. As a result a considerable number of people remain a substantial distance the recommended levels of intake.

Changes in the mean level of intake such as those described will result in a substantial number of lives saved because some individuals will benefit from marginal changes in their diet and there are a large number of people consuming close to the recommended levels. Arguably however the policy does little to address the diets of those who are of greatest concern: those that are some way away from the recommendations. We therefore construct a measure of the average risk of disease in the population that assumes that the risks of disease increase as a logistic function of the distance that an individual is above or below (as appropriate) a particular target. This measure is based on estimates of relative risk of disease taken from the literature and effectively computes a measure of the average risk in the population giving a higher weight to those individuals whose diets are particularly bad. Our results show that, relative to a situation in which everyone follows dietary guidelines the average risk of CHD in the population drops from a factor of 1.78 to 1.72.

In addition to the impacts of the tax on in the intakes of fats and other unhealthy components of the diet, it is also important to recognise that some healthy nutrients will also be adversely affected. In particular calcium and vitamin D intakes fall by 3% and 4.5% respectively as a result of the policy.

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[41] Rose, G. [1985]. Sick individuals and sick populations, *International Journal of Epidemiology* 14: 32–38.

[42] Tiffin, R. and Arnoult, M. [2011]. The public health impacts of a fat tax, *European Journal of Clinical Nutrition*. URL: http://dx.doi.org/10.1038/ejcn.2010.281.

[43] The saturated fat contents were obtained from data supplied in the Family Food module of the Expenditure and Food Survey. The majority of the data is from the Food Standards Agency's nutrient analysis programme, supplemented by values from manufacturers and retailers.

3. Fiscal impacts of a fat tax.

It is widely recognised that because of the declining importance of food in the budget of higher income households, a fat tax is regressive. In some investigations, the use of a subsidy on healthy foods is advocated as a means of negating some of this impact. There has however been little in the way of formal welfare analysis of these policies. We employ to framework originating with Feldstein[44] and Ahmad and Stern[45] [1] and compute the distributional characteristic for individual foods. The distributional characteristic is used to measure the extent to which consumption of a particular good is concentrated in those households which are deemed to be socially deserving. The higher the value of the characteristic, the more concentrated the consumption of the food group is in the more socially deserving households. Our results show that milk has the highest distributional characteristic whilst that of fruit and vegetables is much lower. Thus we find that goods which are likely to be taxed a most concentrated in the socially deserving and those which a likely to be subsidized tend to be consumed by the less deserving. The policy investigated here is therefore highly regressive and made more so by combining the fat tax with a thin subsidy.

4. Closing remarks

The literature supports the fact that substantial numbers of lives may be saved as a result of the introduction of fiscal measures designed to make the population's diet more healthy. The widespread use of such instruments would raise important distributional questions however. First, since unhealthy foods tend to be consumed by poorer households, such a policy is likely to be highly regressive. Second, the lives that are likely to be saved are likely to amongst those that have relatively healthy diets which are not the individuals that are of greatest social concern. Finally, with improved screening for diet related disease, it is possible that a more targeted approach to prevention may prove more cost effective.

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[44] Feldstein, M. [1972]. Distributional equity and the optimal structure of public prices, *American Economic Review* 62: 32–36.

[45] Ahmad, E. and Stern, N. [1984]. The theory and reform of Indian indirect taxes, *Journal of Public Economics* 25: 259–298.

SOCIAL LEVERS

Speaker Summary Note	
Session:	**Social Levers**
Speaker:	Lisa Dreier, **Director, Food Security and Development Initiatives, World Economic Forum, USA**
Title:	**Social Levers to Advance Agriculture, Nutrition, and Health Linkages: The role of the private sector**

Overview: The private sector can be highly instrumental in activating economic, social, inclusive growth and science and technology levers along the agriculture-nutrition-health value chain, and thus will be an important partner and driver of effective large-scale solutions. Improving the management of agriculture to strengthen nutrition and health outcomes will require a coordinated effort encompassing the whole value chain. To be effective, this must engage the full array of stakeholders that contribute to the chain, leveraging each actor's unique capacities and knowledge, while challenging them to apply those talents and engage with others in new ways. A number of new initiatives demonstrate the potential of the private sector as a partner in providing both specific solutions, and comprehensive approaches, to meet societal needs for agriculture, nutrition and health.

The role of the Private Sector in Empowering Communities and Improving Food Value Chains

Business can act as an important social lever when it empowers communities to improve their diets through improved access to information, increased incomes, or greater access to quality foods.

Companies are increasingly recognizing that the "base of the pyramid" market, earning USD 8 per day and less (PPP), represents a large scale business opportunity. This market encompasses nearly 4 billion people who spend over USD 1.3 trillion per year on food, and 70% of whom rely upon the food value chain for their livelihoods as either producers or entrepreneurs. It encompasses poor communities in rapidly-growing economies, many of whom will be tomorrow's middle-class consumers. The business incentive to engage these markets is now widely recognized; however the challenges are evident as well. Through experimentation and innovation, companies are developing new business models to engage poor communities as partners in their business activities along the food value chain.

Companies can engage with community members in three different business-oriented roles: as producers, consumers, and entrepreneurs. Engaging the community on these terms recognizes both the practical needs and the dignity of the poor as full business partners who are entitled to fair income opportunities and high-quality, affordable products. Effective business models include the following:

- **Producers**, particularly smallholder farmers, can be empowered to increase the quantity and quality of their production, improve their incomes in the process. This can be achieved by companies providing affordable access to agricultural inputs (finance, information, seeds, fertilizer, tools); strengthening farmer capacity through training and outreach; providing reliable access to markets at fair prices; and improving supply-chain efficiency to increase farmer incomes.

Examples from India: rural retail hubs by Godrej Agrovet/Tata Agrico; sourcing from small-scale producers by Nestle and Bharti Wal-Mart; improved horticulture value chains by Metro Cash & Carry.

- **Consumers** can be empowered to improve their nutrition and health through expanded access to quality products. This can be achieved through companies developing appropriate, high-quality and low-cost products for poor communities; expanding retail distribution networks to enable access to those products in poor and isolated regions; and by strengthening consumer knowledge and demand for nutritional products through educational campaigns and outreach.

  Examples from India: fortified biscuits by Brittania; wholesaling through micro-retailers by Subhiksha Trading; Hariali Kissan Bazaar rural retail hubs by DCM Shriram Consolidated.

- **Entrepreneurs** can be empowered to operate effectively as key links in the food value chain—whether they are farmers, food retailers, or service providers essential to the value chain (such as telecom operators, bankers, millers, transport providers or others). This can be achieved through innovative new business models and practices that provide entrepreneurs with market information, access to financial services, and new solutions to overcome infrastructure gaps.

  Examples from India: Crop insurance by ICICI and Swiss Re; Lifelines information service by BT and Cisco; Low-cost water treatment by Naandi Foundation and Tata Projects.

Relevant industries to implement these solutions include agribusiness, food and retail companies; finance and IT/Telecom; energy and infrastructure firms. Governments, NGOs and research institutes can help encourage the implementation and scaling-up of innovative BOP business models through organizing and capacity-building of poor producers, consumers and entrepreneurs; strengthening the business enabling environment through policy and infrastructure improvements; and sharing effective models through knowledge exchange, monitoring and evaluation.

These models and recommendations for scaling them are described in more detail in a World Economic Forum report titled *The Next Billions: Business Strategies to Enhance Food Value Chains and Empower the Poor*, available at http://www.weforum.org/agriculture.

The Role of the Private Sector in Wholistic Improvements to Agriculture Systems

Most of the BOP business models described above address a specific point in the agriculture and food value chain—one "piece of the puzzle" in a larger, more complex agriculture system. However achieving a step-change or major transformation in an agriculture system requires a wholistic approach, addressing the entire system. That type of step-change is urgently needed today, to address pressing needs for improvements to enable agriculture to deliver the nutrition and health outcomes, food security, environmental sustainability, and economic opportunity demanded by a growing global population.

Agriculture systems are comprised of not only each individual activity at each step of the chain, but an operating environment made up of policy, infrastructure, and market structure. Aligning these elements can enable a "virtuous cycle" of increasing skill-building and investment in a given agricultural system. The result can be a community that is supported and empowered by a thriving market-based system. However in many regions of the world, poor infrastructure, policy and market structures limit the benefits that productive farmers and effective business models can generate. Kick-starting a "virtuous cycle" dynamic requires coordinated efforts by government, business (both large and small-scale), civil society, farmers and other stakeholders.

A number of new models for this type of collaborative effort are being piloted. These include coordinated, multi-stakeholder efforts to improve either the value chain of a specific commodity; or multiple value chains within a given region—whether that be a high-potential "breadbasket" area; a key trade and production corridor; or an entire country.

In each of these cases, stakeholders are combining efforts according to their strongest capacities and specific roles. Governments set the direction—establishing public-interest goals; policy frameworks; and public infrastructure and services. The private sector innovates and invests within that framework—developing and scaling production, and meeting consumer demand. Civil society mobilizes the community, building skills and bargaining power among producers; providing education and information; and actively representing the voice of citizens in holistic transformation.

This wholistic, multi-stakeholder, and market-based approach is outlined in more detail in a newly-released report titled *Realizing a New Vision for Agriculture: A Roadmap for Stakeholders*, launched two weeks ago at the World Economic Forum in Davos, and available at http://www.weforum.org/agriculture.

Engaging the Private Sector as a Partner in Agriculture-Nutrition-Health Solutions

The private sector is a central driver of agricultural value chains, and of the food and agricultural markets that will ultimately deliver improved nutrition and health outcomes to populations on a large scale. As such, it is a key actor to engage early and integrally in efforts to improve nutrition and health outcomes. At the World Economic Forum, we work with business leaders in many industries to develop public-private partnerships and multi-stakeholder approaches to these issues. Many senior business leaders are already recognizing the inter-linkages among agriculture, nutrition, health and environmental issues, and are initiating efforts to explore and address them.

Addressing agriculture, nutrition and health linkages is a challenge that requires three responses among both leaders and community members: changing mindsets, commitment to action, and improved coordination.

- ***Changing mindsets***, for policymakers and business leaders alike, requires expanding the concept of the agricultural value chain to include the end result to the end user, in terms of nutrition and health status and outcomes. The nature of many companies' business already requires them to be customer-focused and results-oriented; this mindset can be usefully applied by all stakeholders to a jointly desired "result" at the end of the expanded value chain: namely, a healthy and well-nourished customer and community member.
- ***Commitment to action*** can be secured when both public and private-sector leaders feel a shared sense of responsibility and ownership for the end "product" or result they are seeking to deliver. This must be mirrored by a sense of empowerment and commitment among consumers or community members, to choose and enable that result.
- ***Improved coordination*** will be essential for effectively implementing change across long and complex value chains. This will require new approaches by institutions of all kinds who in the past have tended to focus their efforts in one sector, or among a limited set of stakeholders.

As leaders of all stakeholder groups start working to define this new approach and operate more effectively to achieve agriculture, nutrition and health goals in an integrated manner, several activities will help support this process. First, open dialogue and knowledge-sharing across sectors, such as that taking place at this conference, is an essential initial step. Continued dialogue can then

help facilitate deeper coordination and partnership across sectors and stakeholder groups. Aligning these efforts around shared goals, defined in the public interest, will provide guidance on what is sure to be a complex and challenging journey.

Speaker Summary Note	
Session:	**Social Levers**
Speaker:	Charlotte Dufour, **Food Security, Nutrition, and Livelihoods Officer, Nutrition and Consumer, Protection Division, Food and Agriculture Organization (FAO) of the United Nations, Italy**
Title:	**Working with Community Institutions in Afghanistan and Mauritania**

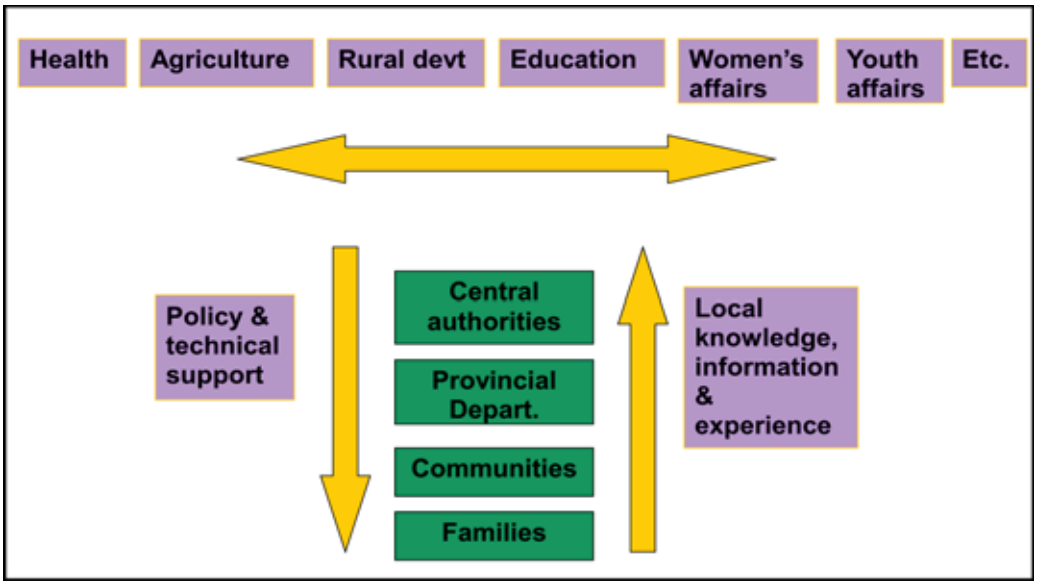
Through this presentation, I will share the experiences of working with different community institutions for strengthening agriculture-nutrition linkages, focusing on the examples of Afghanistan and Mauritania.

The **main messages** of this presentation are:

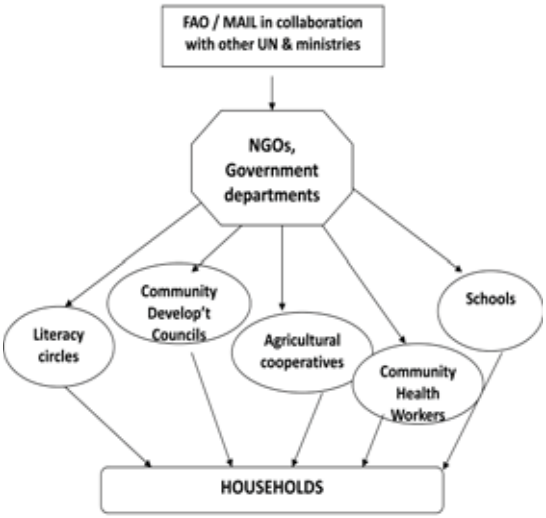
- to emphasize the opportunities we have for strengthening agriculture-nutrition by **working with various community institutions**. (By community institutions we refer to any existing group or structure used by members of a community to organise aspects of its social, economic and/or political life—it can be a school, a women's group, a literacy circle, a cooperative, etc.)
- When doing so, an essential success factor entails **developing synergies** between these institutions.
- This requires establishing a **common language, a common understanding of the nutrition situation, and mechanisms for bringing people together.**
- This approach has implications for the type of skills and capacities that need to be developed at various levels for promoting nutrition. In addition to a basic understanding of nutrition, skills are needed in **facilitation**, **joint planning**, and **coordination**.
- Community-level work, if associated with advocacy and capacity-development of government institutions can become a **political lever** for mainstreaming nutrition in agriculture and other sectors

"Supporting Food Security, Nutrition and Livelihoods in Afghanistan"

This German-funded FAO project was designed to mainstream nutrition in agriculture and food security policies and programmes and promotes food-based approaches to nutrition. This entailed working across all key sectors related to food and nutrition security. It did so by combining advocacy and policy support, sensitization and capacity development of government institutions at central and provincial levels, and providing technical assistance to field level workers (government or NGOs) (see graph below).



At provincial level, the project started by gathering staff from various government departments (health, agriculture, rural development, education) and NGOs and facilitating the preparation of malnutrition problem and solutions trees for vulnerable livelihoods groups. This ensured all partners had a common understanding and vision of the situation. Based on the joint analysis, the project team then worked with partners to integrate various nutrition interventions (nutrition education, improved complementary feeding recipes, home-based food processing, home gardens, school gardens) in ongoing development programmes, using different channels to do so (see graph below).



Synergies started to operate spontaneously between project components. (Example of synergy between nutrition education in women's literacy circles and school gardens: this combination motivated and enabled children and their mothers to grow more vegetables at home for own consumption). The project activities were also an opportunity to strengthen cooperation between different government departments.

The MDG-F UN Joint Programme on Children, Food Security and Nutrition in Mauritania

This UNJP is implemented by UNICEF, FAO, WFP and WHO in the context of the REACH partnership. It aims to achieve three outcomes: (1) to improve household food security, (2) to strengthen the management of acute malnutrition and improve feeding practices, and (3) strengthen coordination and institutional capacities for joint action on nutrition. The programme team is developing interesting modalities to strengthen coordination and synergies at decentralised levels. In addition to the establishment of regional steering committees composed of representatives from relevant government departments and NGO partners and UN technical staff, the programme team have established technical groups at district level (composed of the head doctor and technical staff from NGOs and government district offices) and "nutrition kernels" composed of field workers

implementing activities at village level (head of agriculture cooperative, heads of nutrition rehabilitation centres, managers of village food stocks…). The purpose is to facilitate joint targeting, ensure appropriate referral of families between the different services, and to create a team in which members can mutually support each other in addressing malnutrition at the local level.

Conclusion

Working through different community institutions simultaneously makes sense *technically* (households where malnutrition occurs need different types of support) and *socially:* it generates a supportive environment that can empower communities and households to better address malnutrition with the resources they have. The power of nutrition is that everybody can feel personally concerned because everybody eats, and everybody is concerned about their health. Nutrition interventions can be a lever for joint social action and for promoting resilient local food systems. When associated with advocacy and capacity development of government institutions, the social levers can become political levers for mainstreaming nutrition in national policies and programmes.

Speaker Summary Note	
Session:	**Social Levers**
Speaker:	Xing Li**, Economist, Swiss Reinsurance Company Ltd. Beijing Branch, China**
Title:	**Agricultural Growth, Nutrition, and Health of Rural Residence in China**[46]

Since reform and opening in 1978, the steady growth of agricultural production laid the foundation for sustainable rural economic and social development as well as the food security. Meanwhile, the rural medical and health system, rural living conditions and nutrition have been improved significantly. Along with the enhancement of food access availability, structure of food consumption becomes more diversified, with increasing proportion of energy and protein from animal products. In current rural China, life expectancy, infant mortality and maternal mortality rates have approached the average level of high-income countries.

First, why focus on the nutrition and health of rural residents?

The key factor affecting nutrition and health status is that of household revenue undoubtedly. In China, although rural income per capita made great enhancement, rapid economic growth has not reduced the income gap between urban and rural areas yet, on the contrary, urban-rural income ratio increased from 1.86:1 in 1985 to 2.79:1 in 2000, and up to 3.33:1 in 2009 (National Statistics Bureau, 2010). Meanwhile, despite the rural poverty has been declined enormously, it is very clear that poverty reduction as well as nutrition and health improvement in rural China is still the top priority for China's government.

Second, how is the nutrition and health of rural residents?

Nutrition

During the last decade, the nutrition of rural residents in China has been significantly improved as the following aspects.

1. *The ratio of expenditure on food is declining.* Income of rural residents has been greatly improved alongside the reform and opening, the proportion on the food consumption also showed a decreasing trend. Rural Engel coefficient decreased from 67.7% in 1978, to 60% or less in the early 1980s (59.1% in 1981), and then to below 50% in the new century (49.1% in 2000), to 41.0% in 2009.
2. *The structure of food consumption is optimizing.* When entering into the late 1990s, the structure of food consumption changed with stable food intake declining from 62% in 1990 to 56% in 2009, and meat intake increasing from 3% in 1990 to 6% in 2009.
3. *The structure of nutrient intake is improving.* There is evidence showing that since 1990 the per capita daily calorie intake of rural residents was decreasing (from 2841.6 kcal in 1990 to 2510.2 kcal in 2004), per capita daily protein intake is relatively stable (keeping 85-90

[46] The brief is supported by the National Sciences Foundation of China (approved No.: 70803052). The author also thanks to Dr. LU Kaiyu's valuable comments, who is an associate professor of Chinese Agricultural Academy of Sciences. The point of view in the brief is only on behalf of individual, not representing company's opinion.

grams), per capita daily fat intake showing a growth trend (41.9 grams in 1990 to in 50.6 g 2003) (Qin Fu, 2006). Based on FAO data, LU Kaiyu (2006) proved that the nutrition structure of Chinese residents since the reform has achieved huge changes. The first is protein and fat contributed by grain decreased rapidly, and second, protein and fat contributed by animal products including meat and fish tended to improve, third is the proportion of fat from vegetable inclined to drop.

Health

Health of rural residents in China continues to improve, embodied in a comprehensive reflection of three important health indicators: First, average life expectancy from 68.2-year-old in 1978 increased to 73-year-old in 2005; second, the infant mortality rate decreased from 34.7 ‰ in 1981 to 15.3‰ in 2007, down by 56%; and third, maternal mortality rate, from 88.9/0.1million in 1990 dropped to 36.6/0.1 million in 2007, a decrease of 60%. Although China is still a middle-income developing country, these health indicators has reached the forefront among developing countries and approached the average level of high-income countries.

While the data also showed that ratio of children under-weight below 5-year-old decreased from 19.1% in 1990 to 11.2% in 2000, and further to 6.9% in 2005. Percentage of population undernourished has declined from 15.0% in 1991 to 12.0% in 1996 and further to 10.0% in 2005 (United Nations, 2011).

Third, what factors affect the nutrition and health of rural residents?

- *China's grain production maintain at a high growth.* Improving grain productivity and guaranteeing the food security have always been a top priority for government attention. To this end, government developed and implemented the household contract responsibility system, market-oriented reform, agricultural tax policy, agricultural subsidies, agricultural R&D policies, to stimulate grain production, and therefore achieved expected results. China's grain production increased from 305 million tons in 1978, rapidly to 407 million tons in 1984, reaching a record of 512 million tons in 1998, and setting a new record of 546 million tons in 2010.
- *Farmers' income maintain at a certain growth.* Since the beginning of reform and opening up, with new institutional arrangements, farmers' enthusiasm to improve production was greatly stimulated. Farmers got the land use rights and controlled the surplus product, the level of agricultural output and the income of farmers increased significantly. Policies of reform and opening also encouraged the non-farm employment opportunities as well, which increased rural household income of farmers and lead poor out of poverty (Xinhua, 2004). During the period of 1978 and 2007, net income per capita of rural residents increased by 31 times, with the average annual real growth of 7.1% (Xinhua, 2008).
- *Food imports increased the possibility of allocating more sources to production of grain, which attribute to market opening and international trade.*
- *Targeting policies aimed at improving people's livelihood.* Before entering into the 20th century, the focus of agricultural policy was to stimulate food production, to improve the domestic food distribution, and after entering into the 20th century, government put more emphasis on dietary nutrition, food safety and living conditions. In order to ensure food safety, to protect public health and safety, the Chinese government implemented the "Food Safety Law" (People's Republic of Presidential Decree No. 9) in June 2009; and in July 2009, the State Council further to issue the "Regulations of Food Safety Law," to specify

regulations during process of food production and operations. In order to promote better nutrition and to improve the nutrition and health of Chinese residents, the Ministry of Health in September 2010 developed and implemented the "Management of Nutrition Improvement" (HDC, 2010).

Fourth, problems and challenges

- *Irrational dietary pattern*. In 2002, for urban residents, per capita daily oil consumption was 44 grams, increasing from 37 grams in 1992; energy from fat energy was over 35%, exceeding 30% the recommended by the WHO. Energy from cereals of urban residents is only 47%, significantly lower than the range of 55% to 65% (Ministry of Health, 2004).
- *Micronutrient deficiencies are a common issue.* Micronutrient deficiencies are a common problem in China. From the 2002 national nutrition survey data, ratio of children aged 3 to 12 with vitamin A deficiency was 9.3%, in which 3.0% in urban and 11.2% in rural areas, the ratio of marginal vitamin A deficiency was 45.1%, in which 29.0% in urban and 49.6% in rural areas. Calcium intake in both urban and rural areas was only 391 mg, equivalent to 41% of recommended intake. The micronutrient deficiencies become more and more serious in some remote poor mountain areas.
- *Coexistence of over-nutrition and malnutrition.* Various surveys showed that, malnutrition still exists, while over-nutrition appeared along with economic development. Over-nutrition occurs mainly in urban residents, especially in the developed cities such as Beijing and Shanghai. Affluenza incidence is also rising.
- *Food quality and safety issues highlight.* China's government has recognized that the adequacy of food output does not mean that nutrition and health in good mood. For example, in recent years, the development of food policy is more about food safety, production standards on pesticide use, standard dairy development, which showing that a reasonable diet and food safety are placed in a very important position for government's concern. Nutrition and health is not simply issues related to food, but also to income, education, health, social security network. Addressing nutrition and health problems, we must rely on collaboration and coordination between multi-sectors and multi-fields, in order to improve agricultural productivity as well as improvement of production structure.

GOVERNANCE AND INCLUSION LEVERS

Speaker Summary Note	
Session:	**Governance and Inclusion Levers**
Speaker:	Harriet Friedmann, **Professor of Sociology, Geography, and Planning, Munk School of Global Affairs, University of Toronto, Canada**
Title:	**Towards a Fifty-Year Plan for Healthy Food and Farming**

Magnitude of the Problem

Healthy food and farming depend on two conditions and policies designed to support them:

1. Grow what is good for the earth
2. Eat what is good to grow

The existing agrifood system does the opposite. The policy legacy of fifty years promotes maximum grain yields per person and low cost edible commodities. It did what was intended. It increased grain yields per person through specialization and trade, and for twenty-five of those years seemed set to end the vulnerabilities to climate and famine of peasant systems. However, for the past twenty-five years, food insecurity has increased as livestock operations and fuels offer better grain prices than poor humans, while byproducts, such as HFCS, drive manufacturing towards unhealthy edible commodities. Worse, industrial agriculture threatens the soils, water, and biological diversity—all the natural cycles that support human civilizations. In effect, the modern food system

1. Grows what is good to sell
2. Eats what is cheap to buy

Policy Legacies: Health and Agriculture

Agricultural and health policies for fifty years or more have grown up not speaking to each other.

1. *Agricultural policies support monocultures and trade*; for fifty years or more, they have had the desired result of increasing quantities of grains and livestock (that is, calories and proteins). Unintended consequences are
   a. diets high in fats and sweeteners—for those entering food markets
   b. inadequate quantities (food insecurity)—for those unable to purchase or grow their own food
   c. Now fresh fruits and vegetables (and aquaculture) are adopting the monocultural practices pioneered by grain and intensive livestock; California is the leader, followed by Chile, Kenya, and other export success stories
2. *Health policies treat sickness*; for fifty years or more, they have made great progress in infectious diseases. Nutrition was defined as sufficiency of calories and proteins, and targeted supplements of micronutrients.
   a. Only recently have health policies attended to more than quantitative dietary deficiencies; with the rise of chronic diseases related to excess fats and sugar and insufficient micronutrients, notably diabetes and heart disease, health policies and budgets face a huge challenge in refocusing on prevention and *quality* of diets.

b. In a pioneering policy initiative, building on decades of civil society experiments and advocacy, guided by a publicly funded volunteer Food Policy Council, the Toronto Department of Public Health is leading an effort to "embed food system thinking throughout government."

Health as a metric for integrated public policy

It is not easy to turn the massive ships of agricultural and health policies towards sustainability. I suggest two market-based policy tugboats that might, if pulling in the same direction, make immediate, significant progress towards a sustainable food system.

1. *Deepen **CCT** programs to include **productive investment** in sustainable livelihoods in regional food systems*. Instead of encouraging farmers to become growers of garlic or shrimp for export—and risking their livelihoods if the WalMart or Sainsbury checker rejects their products—make cash transfers conditional on improving integrity of ecosystems and health of crops.

   a. Direct productive CCT to small farmers to improve agro-ecosystem integrity through mixed cropping systems.
      i. Farmers' knowledge is crucial to diverse cropping systems embedded in natural cycles of soils, waters, forests, wetlands, and grasslands.
      ii. Fund scientific research to complement rather than displace farmers' knowledge
      iii. Design extension to collaborate with farmers and to integrate their needs into research agendas.

   b. Upgrade the incomes, skills, and social esteem of occupations in healthy food and farming.
      i. Pay farmers for managing natural ecosystems. The condition is to improve agro-ecosystem efficiency. This will increase diversity of crops and healthy diets.
      ii. Clean waters full of aquatic life, healthy soils, pollinating insects and other gifts of nature are public goods; squandering them will cost dearly.
      iii. Use public education of all kinds to train new farmers, and to promote respect for farmers and other food producers.
      iv. Pay farmers to train apprentices.

   c. Extend productive investment via CCT to infrastructure for regional agrifood networks.
      i. Farmers need more than cell phones to improve their ability to get crops to market.
      ii. Invest CCT to strengthen regional food networks, including artisanal processing and food preparation, cold chains for transport, and efficient distribution to small vendors and customers.
         (a) Minimize links between growers and eaters.
         (b) Link with social CCT via food literacy for families and in school curricula.
         (c) Promote collaboration with universities to create prototypes of frontier nutrient cycling technologies such as composting, methane capture, and carbon cycling.
      iii. Measure efficiency of networked agrifood systems. A model is the well documented efficiency of the dabbawallahs of Mumbai, who deliver 100,000 individually specified hot meals across fifteen miles of dense urban settlement in two hours every working day with an error rate the envy of modern industry.

   d. *Conclusion.* CCT for investment in healthy food and farming creates win-win-win: stabilize rural employment, take pressure off cities and public services to cope with unemployment; promote diverse agro-ecosystems, increase food security and food quality.

2. Public procurement is a policy tool available to all levels of government in all countries to lever healthy agrifood systems. K. Morgan and R. Sonnino, (*The School Food Revolution.* Earthscan, 2010) call this "The Power of the Public Plate."
   a. Schools, hospitals, government offices all combine possibilities for building regional markets for healthy, sustainable foods.
   b. Contracts for public catering can work incrementally to shift markets towards sustainable livelihoods and healthy foods.
   c. Food served in schools combines direct provision with education about healthy diets.
   d. Food served in hospitals is so obviously related to health care efficiency that it is astounding that pioneering initiatives in North America are needed to shift from unpalatable industrial meals lacking micro-nutrients to freshly prepared local foods.

Government as platform for social innovation. Both CCT as productive investment and strategic use of public sector food provisioning are market-based policies. Both exemplify a change from command-and-control to building platforms for the emerging social economy.

My experience in food system change in both civil society and municipal government in Toronto and Canada is that people respond enthusiastically and collaboratively to opportunities to grow food that is good for the earth, and to eat food that is good to grow.

Speaker Summary Note

Session: **Governance and Inclusion Levers**

Speaker: Manoj Kumar, **Chief Executive Officer, Naandi Foundation, India**

Title: **The Case for 3G:The green, the grain, and the gram**

Based on my years of field level work with rural households and small farmers, I want to share experiences and learnings that suggest for creation of frameworks that ensure suitable governance for convergence of agriculture and nutrition security thereby making it inclusive.

Isn't it an irony that despite having over 85% of India's agriculture represented by small and marginal farmers, they still have to depend on the PDS/fair price shops for their daily quota of food grains?

Most of these small and marginal farmers are dependent on rain-fed farming living in arid zones or in the hills. These populations have been the traditional torchbearers of the Indian agricultural system as they have been continuing the tradition of survival and livelihood based almost entirely on farming. Despite sweeping changes in the Indian economic landscape in the last few decades, the skill sets of these farmer families confined to agriculture, rendering them mono-skilled and non-adaptive to changing realities. Therefore these small and marginal farmers had to look for new ideas that the market had to offer. This meant abandoning their portfolio of nutrition and health—the green, the grain and the gram for culturally alien cash crops like cotton and soya bean. This changed the economics of small farmers' households. Input costs went up, outcomes became riskier and against predictions returns were often negative. All this meant the small farmer had to make one more adjustment—stand in long queues in front of PDS shops, which incidentally only dishes out nutrient deficient rice and wheat with no recourse to greens, coarse grains or grams/lentils. Given that rice became available at a ridiculously subsidized Rs.2/- per kg, farmers had no incentive to grow or consume the greens, grains and grams. They just adjusted to a nutrient deficient diet as part of the 'structural adjustments' they began to make in the modern economy. It is this paradigm shift from their traditional diversified cropping to mono cash cropping that has alienated small farmer from nutritional security.

Given this background, I will be sharing some experiences from Naandi Foundation's work which are valuable examples in governance and inclusion.

Naandi Foundation[47] works directly with communities in partnership with various state governments. We work with over 300 farmer co-operatives in the plains, mostly arid rain fed areas and with a very large tribal co-operative in the Eastern Ghats where we work with over 20,000 small farmers growing greens, grains, grams and coffee and black pepper. With these communities we also

[47] Naandi can be best described as a unique social enterprise that partners with various state governments to become their implementing arms for various social services across sectors and works directly with underserved communities with a large network of professionals and community development workers. Naandi also is the largest rural safe drinking water provider and the largest government partner in provision of mi-day meals for school going children. On last count, we provide over 1.3 million meals every day in AP, MP, Orissa, Rajasthan as of now and Bihar and Chattisgarh to be added shortly. Most of the hot cooked nutritious meals are also fortified with iron supplements. More on Naandi Foundation can be browsed from www.naandi.org.

work on their nutritional security, ensuring the community's mothers and children are able to access the government service providers (0–5 age group in particular) and ensure every child is in a school and learning. Naandi also runs creches or the anganwadi centers in hundreds of numbers and does a number of activities across clusters of villagers to create a framework for integrated convergence between health, women and child development, rural development and agriculture ministries. One such large cluster was part of a longitudinal action research project with the state government of MP, the World Bank and Naandi which proved how convergence helps improved indices that affect nutritional security of children.

Currently, we are harvesting learnings from across 100 challenging districts of six backward states as far as child development indices are considered. This is through a Survey we are conducting called the *HUNGaMA* (Hindi word for a 'stir'), an acronym for Hunger and Malnutrition. This will be the first ever Citizen led initiative to collect district level household data of children's nutritional status in the 0–6 years. As part of the survey we are interviewing over 60,000 women who are mothers of children, most of them nutrient deficient in one form or the other. The jury is still out as the data is being tabulated, but having been in some of the villages talking to the mothers personally, I can vouch for the fact that the 3G's are missing from their crop portfolio and thereby their daily plates. To bring it back we need inclusive levers, subsidies and incentives directed at this goal—nutritional security for every farmer along with food security. Only then should national food grain security be addressed. At the moment we are obsessed with food grains production and that is meant to guarantee food and nutritional security.

Speaker Summary Note	
Session:	**Governance and Inclusion Levers**
Speaker:	Robert Mwadime, **Senior Regional Nutrition Advisor, FANTA-2 Project, AED (Academy for Educational Development), Uganda**
Title:	**Governance and Inclusion Levers to Improve Nutrition Outcomes**

SLIDE 1:

Those who govern have a role in improving nutrition outcome by: developing food and nutrition policies, and setting standards; establishing (quality and functional) compliance and coordination mechanisms and; providing resources for interventions in food and nutrition social/"public goods". Three conditions should hold if governments are to perform on these roles: (a) improving nutrition outcomes must seen as urgent, (b) there must be political commitment to make a difference, and (c) enough resources to undertake the necessary programs must be provided.

SLIDE 2-4

We are facing challenges in moving nutrition agenda in eight countries where I work. It is obvious the governors in these countries need compelling in order to act on nutrition. Some of the innovative levers include:

1. *Advocacy* → The important role of (a) senior nutrition political champions; (b) exposure of senior leaders to real cases of malnutrition, and; (c) field visits to neighbouring "positive deviate" countries
2. *Pressure* → By (a) a well informed media (showing cases of malnutrition and presenting real stories of effects of malnutrition at community level), and (b) result oriented development partners putting pressure on governments.
3. *Monitoring government accountability* → (a) have Memorandum of Understanding (MoU) with measurable governance outcomes and milestones (I will share some indicators), and (b) have forums for joint review.

Sad though, development partners continue to "degrade" local capacity in nutrition by supporting efforts that are parallel to government systems.

SLIDE 5

NGOs and the private sectors find it very difficult to influence national policy making process at national levels: they are superficially involved in planning. However, they may have more influence at district level and especially if they are contributing to the district budget and/or in human resource capacity strengthening. They should concentrate on inclusion in district level planning by playing a major role of collecting and presenting quality data/information, sharing promising practices of plausible solutions to nutrition problems and Inclusion of communities in nutrition is difficult. Communities have many real and perceived needs, e.g. food, health, education, infrastructure, markets, and livelihood. The demand for nutrition is minimal. How do we involve them? Levers include:

- Making nutrition problems and solutions visible→Branding nutrition (slogans, logos, songs, visuals) to raise self-awareness and demand for nutrition and inclusion
- Informed media to educate and mobilize communities
- School children
- Local Government Assessment Indicators (in decentralized systems) that include nutrition

SLIDE 6

Sustainable improvement of nutrition outcomes calls for a critical mass of passionate leaders in nutrition at all levels.

SCIENCE AND TECHNOLOGY LEVERS

Speaker Summary Note	
Session:	**Science and Technology Levers**
Speaker:	Lindsay Allen, **Center Director, USDA, ARS Western Human Nutrition Research Center, and Research Professor, University of California Davis, USA**
Title:	**Priorities from a Nutrition Perspective**

Lack of systematic planning to optimize the nutrient intakes of populations

The following science and technology levers have been selected from the perspective of a nutrition scientist, with training in agriculture, who has planned, implemented and evaluated many types of nutrition interventions over several decades; single and multiple micronutrient supplements in tablet, liquid and lipid-based forms; food fortification; animal source foods including meat and milk; nutrient-rich plants; and home garden development in the context of a large agricultural development program. These types of nutrition activities are usually not well-coordinated with other nutrition or health interventions, let alone with agricultural programs which typically pay insufficient attention to meeting the true nutritional needs of their target populations. Addressing food security is not the same as addressing *nutrition security.*

The nutrition community has attempted to fill gaps in known or perceived nutrient needs with a patchwork of micronutrient interventions mostly focused on women, infants and children, but in reality failing to address the needs of the whole population for the considerable number of important micronutrients required. The agricultural community is attempts to fill nutrient gaps through biofortification and crop breeding, and home gardening programs, but these too struggle to fill all of the nutrient gaps. *Arguably, defining the nutrition gaps in a population should be a major priority and focal point for both nutritionists and agricultural planners*. Identifying these gaps, then joint planning based on how they can best be met, could provide an effective approach to linking agriculture with nutrition and health. In fact, without this joint goal it is hard to see how agriculture and nutrition can be linked effectively or efficiently.

Key developments than can coordinate linkage between the nutrition and agricultural communities to meet nutrient needs.

1. Facilitating collection and analysis of information on usual food consumption patterns and nutrient intakes

Too often, nutrition and agriculture program developers are extremely reluctant to collect any food intake data. Such data is perceived as overly-difficult and time-consuming to collect, unreliable and difficult to interpret. However we should start insisting on the importance of knowing what populations eat now, where they obtain that food, and the “gaps” in terms of their ability to meet nutrient requirements. In fact we can now appropriately interpret intake data collected on 1 day from only about 100 people in each population subgroup of interest, with 2 days on a subsample. Progress in analyzing these data should be accelerated by the following.

- The imminent release of the IMAPP (International Micronutrient Assessment and Planning Program) software by WHO. This user-friendly software takes nutrient intake data and estimates the prevalence of inadequate (and excessive) intakes of specific nutrients in

population groups, adjusting for day-to-day variability in intakes. It then allows simulation of the effect of increasing intake of specific foods, and of fortification at specified levels etc In other words, this is a tool that can be used for joint planning of agriculture and nutrition programs to meet nutrient gaps.

- IMAPP has developed generic estimates of nutrient requirements for all age groups including Estimated Average Requirements (EARs, missing from the nutrient requirement recommendations of WHO and many countries) which are needed to calculate adequacy of intakes. These are used in the IMAPP software.
- We need to link IMAPP to international food composition data bases such as INFOODS (FAO), or others such as EUROFIR and USDA. These tables should be adequate for most purposes with some rare exceptions.
- IMAPP is being linked to software that calculates the cost and limits of micronutrient additions to foods in fortification.

2. Improved efficiency of analyzing nutritional status biomarkers

Biomarkers of nutritional status are critical for enabling nutritional status evaluation, and planning and assessment both agriculture and nutrition programs. Common practice is to analyze none or few biomarkers due to cost and feasibility constraints. Hemoglobin (using a finger stick sample and field-friendly instruments) and perhaps an indicator of iron or vitamin A status. Even relatively sophisticated labs still analyze one biomarker at a time, using relatively expensive equipment and skilled technicians who can only 20 to 80 samples for a single nutrient in a day. PATH has supported development of a field-friendly RBP assay that has been used in the Ugandan national survey. Progress in developing multiplex assays in which multiple nutrients can be analyzed simultaneously, rapidly and cheaply, has been far too slow but assays available or under development include ferritin, transferrin receptors, RBP and CRP (iron and vitamin A status) by Erhardt et al.; PATH is working to develop a multiplex ELISA for simultaneous assessment of ferritin and transferrin receptors (iron status), retinol binding protein (vitamin A status) and CRP and AGP (inflammation) using a single dilution, which should be ready for testing mid-2011. A simple, rapid, anemia screening tool that measures presence of malaria-infected red blood cells, Hb, Hct, and red blood cell size, hemoglobin and number is well on its way to being available. A 5-nutrient assay is also under development but the results and feasibility for field application are not yet known.

At the same time there has been renewed attention to defining the types and cut-offs for biomarkers that should be used for specific purposes. WHO is revising recommendations for vitamin A and iron status biomarkers based on their evidence-based process. NIH is in its second year of its Biomarkers for Nutrition and Development (BOND) initiative in which cut-offs are being defined for a range of micronutrient status indicators based on their application to research, clinics, programs or policy.

Overall, these developments have the potential to enable agriculture and nutrition to become much more strongly linked. Agricultural planning should aim, as an early and extremely important priority, to fill the nutrient gaps that exist in the target population, and coordinate with nutrition programs.

Speaker Summary Note

Session: **Science and Technology Levers**

Speaker: Howarth Bouis, **Director, HarvestPlus Program, USA**

Title: **Food Prices and Their Effects on Dietary Quality**

Populations in developing countries roughly doubled between 1965 and 2000. Thanks to the technological advancements of the Green Revolution, cereal production more than doubled over this period. After adjusting for inflation, real cereal prices fell over time despite the increase developing country populations.

By contrast, production of non-staple plant and animal foods did not increase as rapidly as population. There was no commensurate technological change to the Green Revolution in the non-staple food sector. Consequently, inflation-adjusted prices of many non-staple foods increased over time.

Given these relative price changes over time, staple foods, which are the cheapest sources of energy (calories) became more affordable, but dietary quality (non-staple foods) became more expensive. This change in relative prices has made it more difficult for the poor to achieve mineral and vitamin adequacy in their diets. Certainly, for those poor whose incomes have remained constant, price incentives have shifted the diet more and more toward reliance on food staples. This has led to a worsening of mineral and vitamin intakes for many segments of developing country populations, poor health, and much misery.

The high growth rates in cereal yields seen during the Green Revolution have not been sustained, in part due to declining investments in agriculture. Population, of course, has continued to grow. As incomes increased in China, India, and other developing countries, greater demand for animal products has led to increased use of cereals for animal feed. These longer-run supply and demand factors put underlying pressures on food staple prices to begin to rise. Finally, short-term draw downs in global cereal food stocks and weather shocks caused by drought in major producing countries, led to very rapid and substantial increases in food staple prices in the first half of 2008. What have been the consequences for dietary quality of the poor? The poor must protect their consumption of food staples to keep from going hungry.

Economists predict changes in diet caused by rising food prices through price and income "elasticities." These provide estimates of percentage changes in quantities in foods consumed for given percentage changes in prices and incomes. Using these elasticities, changes in quantities of food consumed can be predicted for varying levels of price rises. These changes in quantities, in turn, can be converted into changes in nutrient intakes. With an increase in prices for staple foods price:

With an increase in prices for staple foods, price expenditures on food staples increase markedly due to inelastic demand, and expenditures for non-staple foods and non-foods decline.

For example, given a food price increase of 50% across the board (holding incomes constant), simulations suggest that for Filipino women, iron intakes would decline from 7 mg Fe/day to about 5 mg Fe/day. This would mean that the percentage of Filipino women meeting their daily iron

requirements would decline from 30% to 5% as a result of the price increase.

The long-run goal of public food policy is to stimulate growth in the non-staple food sector (sometimes referred to as "high-value" agriculture) through any number of instruments—agricultural research, education, building infrastructure, improving markets for agricultural inputs and outputs, to name a few. However, this process can take several decades. In the meantime, steps that can be taken to leverage agriculture to provide better nutrition in the shorter run.

One of the most promising strategies is biofortification. This is the process of improving the mineral and vitamin content of food staples eaten widely by the poor. This can be achieved either through conventional plant breeding or transgenic techniques**.** HarvestPlus[48]* leads a global effort to develop and distribute new varieties of high-yielding staple foods (rice, wheat, maize, cassava, pearl millet, beans, sweet potato) which are also high in iron, zinc, and provitamin A to combat micronutrient malnutrition (see table below).

Biofortification is targeted to rural areas, where most of the poor live. This complements fortification and supplementation programs, which work best in mostly urban areas that have the prerequisite infrastructure. After an initial investment in developing biofortified crops, they are then available to farming communities year after year. The crops can also be adapted to other regions at a low additional cost.

For biofortification to be successful, (a) high nutrient content must be combined with high yields, profitability, and other traits desired by farmers; (b) people's micronutrient status must be shown to improve from consuming the biofortified varieties; and (c) the biofortified crops must be adopted by farmers and consumed by those communities suffering from micronutrient malnutrition.

HarvestPlus Target Crops and Countries-Release Schedule

CROP	NUTRIENT	TARGET COUNTRY	TRAITS	RELEASE YEAR
Bean	Iron (Zinc)	DR Congo, Rwanda	virus resistance, heat, & drought tolerant	2012
Cassava	Vitamin A	DR Congo, Nigeria	virus resistant	2011
Maize	Vitamin A	Zambia	disease resistance, drought tolerant	2012
Pearl millet	Iron (Zinc)	India	mildew resistance, drought tolerant	2012
Rice	Zinc (Iron)	Bangladesh, India	disease & pest resistant	2013
Sweet potato	Vitamin A	Uganda, Mozambique	virus resistance, drought tolerant	2007
Wheat	Zinc (Iron)	India, Pakistan	disease resistant	2013

Note: HarvestPlus also supports biofortification of the following crops: Banana/Plantain (vitamin A), Lentil (iron,zinc) Potato (iron, zinc), Sorghum (zinc/iron).

[48] HarvestPlus is a Challenge Program of the CGIAR that works with experts in more than 40 countries. It is co-convened by the International Center for Tropical Agriculture (CIAT) and the International Food Policy Research Institute (IFPRI).

Speaker Summary Note	
Session:	**Science and Technology Levers**
Speaker:	Dyno Keatinge**, Director General, The World Vegerable Center (AVRDC), Taiwan**
Title:	**Achieving Nutritional Security Through Better Diet Diversity: Vegetables for enhanced vitality, variety, and value**[49]

The problems:

- Undernutrition in pregnant and nursing mothers and weaning children resulting in permanent health consequences and potentially infant mortality under 2 years old.
- The double burden of global ill health from under and imbalanced malnutrition leading to increased child mortality rates (under 5 years old), and chronic rates of obesity in children and adults and subsequent morbidity and mortality through diabetes, metabolic syndrome etc. The resultant economic costs to society of such preventable ill health.
- Tunnel-vision focus of donors and policy makers on a very few, staple crops. The risk then of being able to feed the world in 2050 but not being able to nourish it.
- Biofortification of staples alone is an impractical and insufficient way to move forwards to bring about nutritional security.
- Crop diversity, to ensure suitably balanced diets, is constrained by serious under-investment in research and development and a gross imbalance between the necessary food categories of cereals, root crops, protein-rich crops, fruit and vegetables
- A specific dearth in investment for research and development for small-scale producers; particularly, for the poor with limited access to land either in rural or urban environments.
- Even within the vegetables, lack of diversity exists today because of an over-reliance on a few exotic species and significant under-evaluation of nutritional quality considerations by present day breeders in the hybrid vegetable sector. Nutrient content of exotic varieties has been sidelined in favor of even ripening, long shelf-life and visual attractiveness suitable for sale as products in supermarkets.
- Lack of good agricultural production and storage practices to ensure that wholesome, nutrient-dense products can reach the market.
- The side-lining of disciplines such as home economics and domestic science in the secondary and tertiary education sectors today have undermined the understanding and knowledge needed by families on nutritional status, balanced diets and suitable food purchase and preparation.

The solutions:

- A balanced diet can be provided economically for all people through employing an adequate diversity of intake with suitable sources of protein, carbohydrates, fats, fiber, vitamins and micronutrients.
- Vegetables are one of the best sources of micronutrients, vitamins and proteins in the human diet.

[49] Paper co-authored with Jacqueline d'A. Hughes, AVRDC.

- An increasing diversity of vegetables—both exotic and indigenous—requires concentrated and consistent research and development attention and a factorial increase in investment.
- This should include support for “home garden” scale research support.
- Reduce risks and costs for vegetable producers and marketers by making them more climate, pest and disease resilient and having adequate post-harvest value addition.
- Ensure new vegetable varieties are sufficiently nutrient-dense and ensure that consumers know how to prepare them to retain the micronutrient bioavailability.

The changes needed to achieve success:

- Innovative science and technology approaches needed to address the constraints:
  - Improving smallholder farmer enterprise resilience to risk by growing a sufficient range of well-researched crops, including fruit and vegetables. There should be a focus on risk mitigation, ensuring an adequate yield of a range of crops even in the face of an uncertain or hostile climatic environment.
  - Breeding for crops therefore requires that they should be resilient in the face of climatic events and that are adaptable to changing environments which will include agronomic and pest and disease constraints. This requires long-term breeding and agronomic support to defend producers against major pests, weeds and diseases which continue to have a high mutation rate and seemingly have a preference within the plant-kingdom for nutrient-dense vegetables.
  - Breeding for higher nutrient density (global and indigenous vegetables)—as nutritional quality is critical.
  - Low cost protection measures against pests, viruses and diseases should remain as a high priority issue for investment as they can be a much more effective means of control than breeding or chemical protection.
  - Post-harvest value addition—is not only needed for the large supermarkets but for all producers large and small worldwide to ensure quality is maintained at minimal cost.
  - Marketing can be much improved with better knowledge available to producers and consumers and specifically with reference to improved nutrition.

- Donors, science and technology must
  - Diversify their interests and make consistent investment into high value crops (including vegetables) which will support the goal of nutritional security not just food security. This should include support for “home garden” scale agriculture.
  - Ensure nutritional quality is at the forefront of the breeders’ minds—in addition to the numerous other characteristics which have to be considered.
  - Look for innovative, affordable technologies to ensure fresh, perishable vegetables reach markets with maximum nutritional and economic value.

Speaker Summary Note

Session:	**Science and Technology Levers**
Speaker:	Lloyd Le Page, **Chief Executive Officer, Consultative Group on International Agricultural Research (CGIAR), Consortium Board, USA**
Title:	**Partnership Revolution for Innovation**

From what we have learnt already in this conference there is an urgent need to solve complex research challenges. Science and Technology is essential for solving complex challenges.

1. Complexity

(a) Increasing demand through population and economic growth, urbanisation, changing diets and landscapes.

(b) Increasing challenges of Climate Change, Energy and Food Crises, and political instability.

(c) Many being left behind, isolated, nutritionally.

(d) This is a global challenge – Not just about the developing world. Globally we must invest today in long term and sustained agricultural research to prevent food crises, and as a consequence political and economic instability, in 2020 and beyond.

(e) Cannot solve food, nutrition and health challenges without also managing fragile ecosystems, including forest areas, and more sustainable use of natural resources.

2. The challenge and complexity of sustainable nutrition security for health requires us to use all tools at our disposal

(a) **Need to increase volume through more rapid rate of productivity gains.** This is not only good for populations, but also good for the environment, providing more for every unit of resources consumed (including energy, land and water), and reducing pressure on more marginal areas.

(i) To do this we need all the tools of science innovation to double crop production on existing arable land, including in remote areas, using traditional knowledge and breeding, IPM, modern and organic farming methodologies, crop-rotations, molecular tools, biotechnology, agro-forestry, and many others.

(ii) Through productivity gains the CGIAR's new Research Program for Rice GRiSP, led by member center IRRI along with Africa Rice, and CIAT, aims to raise 150 million out of poverty by 2035

(b) **But solving health and nutrition issues is not just about volume and quantity of food. We must also improve quality.** New innovations allow reduction in fungal disease with less harmful mycotoxins; wise use of IPM allows reduced use of pesticides; new technologies allow improved nutritional quality, digestibility and bio-availability, and new crop research allows improved and increased crop and diet diversity.

(c) **Other tools** include Bio-fortification (Harvest Plus. ABS, Orange Fleshed Sweet potato, Cassava, Golden Rice) and a more diverse range of available vegetable crops for improved Vitamin A, Iron and Zinc availability, for example.

We can also provide more diverse protein sources such as livestock, fish and pulses, enhanced vitamin and essential element sources, improved value chains and availability amongst rural and urban poor.

(d) **Reduce losses**—prior to harvest, post-harvest, and even post consumption, through access to clean water, reducing diarrheal diseases.

3. To provide solutions to these complex problems, we must access the best research, knowledge and technologies available in public, private, academic and civil society

(a) Access to innovations that provide lasting and sustainable solutions requires a radical and urgent **partnership revolution** crossing sector boundaries, and at scale. It requires the private sector to embrace solving the challenges of the poor; it requires public institutions to embrace private enterprise. It requires a long term commitments to research that doesn't stay in the labs, but is rapidly disseminated and adapted with and by farmers, and their households.

(b) Partnerships critical to secure and deliver new innovation for public good particularly in crops, diseases, or areas under-served by Private Sector.

(c) Whether we are talking about more nutritious varieties of sweet potato or healthier grains, research should not be confined to the lab—includes research at the farmer level, with farmers, by farmers, for farmer households, most of them women. It also includes research on markets, trade barriers and value chains.

(d) In order for Science and technology innovation to improve livelihoods and health of the poor and most vulnerable clear recognition must be given that the rural household is the nexus of Agriculture, Health, Nutrition, Sanitation, and Education.

(e) Agricultural Research Investment pays off. Our CGIAR scientists work closely with hundreds of partners, including farmer groups, national extension and research, local and international private sector companies, civil society groups and academic research institutions to find the best solutions. We look for holistic and lasting solutions at the household and village level.

(f) When we look at the public investment in international agricultural research through the CGIAR world production would be 4–5% lower, developing countries would produce 7–8% less food, world food and feed grain prices would be 18–21% higher, and 13–15 million more children would be malnourished. For every $1 invested in CGIAR research, $9 worth of additional food is produced in developing countries, where it is needed most. The evidence is clear: agricultural growth alleviates poverty and hunger

4. What are some of the barriers to a "Partnership Revolution" for Agriculture, Health and Nutrition?

I don't have all the answers, but our scientists and centres are working hard to find them and I will leave the detailed studies to previous work done by our centers such as IFPRI on

the successes and failures to partnerships. However from personal experience, 'on the other side of the fence' a couple of areas I would like to highlight.

(a) **Apathy and lack of urgency**

(i) A sense that it is really someone else's problem, and that the "other" sector or institution or country will solve "that" problem. Poverty, and Malnutrition are no longer just "their" problem, they are "ours." Wheat harvests or deforestation in one region can and do have an impact that can be felt on the other side of the planet.

(ii) We must get past the sector divide, and mistrust. We must reach across the divide between Agriculture, Health and Nutrition. We must reach across the divide between Public and Private sectors, between institutions. We must get past the silo mentality.

(iii) A sense that the status quo is acceptable and that somehow the problem will go away. That grain yields in Africa one sixth of the rest of the world are acceptable. That 1BN people (and growing) are undernourished and go to bed hungry.

(b) **Analysis-Paralysis**

(i) Always looking for the 'perfect' solution, perhaps never finding it in this rapidly changing global environment. By the time we find a solution, the problem has changed.

(ii) A lack of willingness or funding to try, even if it fails. Our funding systems are bogged down in the search for the perfect. We must secure funding for adaptation and real world solutions that allow scientists and the farmer households they serve, to learn as they go. To be willing to fail, if by failing and less than perfect solutions, we learn.

(iii) Incentivising dreaming—funding for 'blue sky thinking'

(c) **Lack of long term commitments and accountability.**

(i) Lasting partnerships take time

(ii) Need to get beyond project mentality and election cycles

(iii) Research success demands long term commitment to achieve a full 'pipeline' with room and time to filter out imperfections.

(iv) Must get beyond funding for "pet projects" and knee jerk responses to crises.

(v) Competition for the same pool of funds

5. Potential Solutions

(a) Long Term Donor support and commitment

(b) Incentives essential—"Orphan Drugs" Legislation experience

(c) Policy incentives for long term Agricultural, Nutrition and Health research partnerships

(d) Combined extension models at a village level—Rural development nodes: para-health, para-agronomist, para-sanitation worker

Speaker Summary Note	
Session:	**Science and Technology Levers**
Speaker:	Siwa Msangi, Senior Research Fellow, Environment and Production Technology Division, **International Food Policy Research Institute (IFPRI), USA**
Title:	**Creating an Enabling Policy Environment for Science and Technology**

The urgent need to maintain the growth of agricultural productivity in order to meet the medium- and long-term growth in food demand has been voiced repeatedly by researchers and policy analysts in recent years, and has called attention to the gradual slow-down in productivity growth and the resources devoted to agricultural science and technology research and development. Given the considerable gestation period that is needed for original field research to translate into scalable and replicable technology interven-tions and for those technologies to be disseminated on a sufficient scale for achieving measurable impact it becomes clear why the pipeline of innovation, discovery and dissemination must be kept full. By some more recent estimates with US data, the 20–30 year lags between agricultural R&D investments and the measurable effect on productivity improvement might be even longer than that on the order of 40-50 years. This suggests that the past slowdown in R&D investments might have an even more far-reaching effects, and require even greater efforts on the part of current research efforts to act against the 'inertia' within the system, and begin to make a difference on the kind of outcomes we expect in 2050 and beyond.

Science and technology, when translated into concrete gains in on-farm productivity, and reduced losses of food through the post-harvest processing and marketing chain represents not only food that is saved, but also the savings of critical resources needed to produce it. The 'land-saving' effects of yield improvements has been clearly demonstrated by researchers looking at the longer-term need for food production growth and the lion's share that needs to come from productivity gains. If productivity growth were to fall or remain stagnant due to under-investment in agricultural technologies then the additional area that would need to be brought into cultivation would begin to seriously infringe upon the areas needed to maintain the health of natural ecosystems and habitat, and start to have strongly negative impacts on human health, as well. Technology improvements that reduce the per-hectare application of yield-enhancing inputs such as fertilizer or water, can also have powerful benefits for the health of the environ-ment as well as of human beings, directly. Increasing fertilizer use efficiency in more intensive systems, reduces the run-off that would otherwise cause nutritification of surface water bodies or leaching into groundwater bodies used for sourcing drinking supplies. Water-saving technologies, likewise, provide strong environmental benefits by reducing the need for diversions of surface waters away from sensitive ecosystems that are sustained by those flows, or from direct uses for humans. There are those technologies which enhance the retention of water for beneficial uses, such as the water-harvesting techniques which capture flows that would otherwise be lost to sinks, and have very useful applications in rainfed systems. But beyond these, there are technological innovations that allow water returning from human uses (such as wastewater) to be safely processed and recycled so that it can be used for food production also represent 2 powerful possibilities for expanding the availability of water resources through enhancing the ability for multiple re-use.

The role of policy in facilitating the development and application of those resource-saving technologies lies in providing strong institutions that can monitor and remediate dangers to environmental quality, and provide effective enforcement where needed. Where there are multiple

agents involved in drawing from a common-pool resource or who are engaged in the pollution of a commonly-shared environment policy-makers face a particular set of challenges in monitoring or enforcing action. Oftentimes, the observability of resource use or environmental damage is very limited, and prevents the precise targeting of policy interventions. Nonetheless, there is scope for providing extension services to speed up the adoption of better management practices, and widening the availability of improved production technologies that promote both environmental and human health. The 'roll-out' of better practices and technologies, and the ways in which policy can help requires more discussion, however.

Policy has a clear role in facilitating the dissemination of critical technologies, once they are available as well as creating direct incentives for the innovation that cutting-edge science can provide to researchers, as they develop them. Economics has long-recognized that the inability to fully appropriate the benefits of investments or efforts by private individuals or firms causes them to under-invest or to apply lower efforts than otherwise would be the case. This is an area where intellectual property rights can play an important role, in providing the assurance to innovative enterprises that they will be able to realize a long-term and sustainable return on their efforts or investments. If, however, left to their own devices purely privately-driven interests would not be able to produce the public goods that we, as policy researcher and analysts, know to be very important to addressing key social needs and problems such as that of hunger and poverty.

How then, can policy help to encourage the poverty-reducing and nutrition-enhancing science and technology innovations and interventions that we need to sustain future growth in the world's food system? We have seen good examples in the field of health, where some pharmaceutical companies (who undertake very costly and lengthy R&D efforts to develop new drugs) have been agreeable to allowing key anti-retroviral and other prophylactic medicines to be marketed in poorer countries in a way that doesn't detract from the sales in their more profitable markets. The role that policy had in making these licensing terms favorable enough to these firms is a compelling example of what might be done, in order to enhance the access of key agricultural technologies to those who can benefit most from it.

In summary, we argue that there are many compelling entry points for science-driven technology innovations to enhance agricultural productivity, environmental sustainability and human health and welfare. Good policies are needed, though, to facilitate this process, so that the benefits can reach the poor and that adequate incentives for innovation exist. Where private interests cannot provide needed public goods then policy must also act to fill the gaps. Indeed, we cannot expect science and technology to close the world's 'yield gaps' if a yawning gap in policy exists and remains unaddressed.

A F R I C A

Speaker Summary Note	
Session:	**Africa**
Chair:	Rhoda Peace Tumusiime, **Commissioner for Rural Economy and Agriculture, African Union Commission, Ethiopia**
Title:	**Rethinking How We Each Do Business: Regional and actor perspective**

The highlight of this section is on how agriculture links to improving food and nutrition security and addressing health challenges. This is a relevant and a long overdue issue that we in Africa consider as critical for advancing the welfare of our populations and the productivity of our work force.

As you all know very well, malnutrition is a major problem in Africa: One in four people suffer from malnutrition and 53 percent of pregnant women in Africa are said to be anemic. The dismal situation with general malnutrition point to worrisome prevalence of micronutrient deficiencies as well. Infectious diseases, which are common and persistent in much of rural Sub-Saharan Africa, contribute to a disproportionate burden of mortality among malnourished children. Malnutrition and high incidence and prevalence of diseases negatively impact cognitive development and overall health status of Africa's youth, which will perpetuate the intergenerational cycle of poverty. Although inadequate access to food is just one of several causal factors for malnutrition, addressing household food insecurity, in its diverse manifestations, goes a long way towards combating poverty.

For Africa, the agriculture linkage to food and nutrition security and health, as well as the roles of the actors, are clearly anchored in the Comprehensive Africa Agriculture Development Programme (CAADP). CAADP is an AU-led Framework aimed at transforming African agriculture through evidence-based and inclusive planning focusing on the full gamut of food and nutrition security, market development, natural resource management and agricultural research and extension that benefits the majority of the rural population. One of the priority thematic areas under CAADP and which is of utmost interest to the deliberations here are encapsulated in its Pillar Three, which aims to increase food supply, address nutrition security issues and improve responses to food emergencies employing a combination of tried-and-tested as well as innovative measures. CAADP Pillar Three's Framework for African Food Security (FAFS) presents the principles that need to be considered in developing a food and nutrition set of interventions and the menu of options that countries could choose from. FAFS provides thoughts on some of the linkages between agriculture, nutrition and health through the following policy actions:

- Cereal and oil fortification with vitamin A, iron, folic acid and multiple micronutrients.
- Production of complementary and therapeutic lipid-based foods.
- Community based production and blending of special blended and fortified foods.
- Accelerated expansion of highly nutritious staples including orange fleshed sweet potato, red palm oil and small grains.

I would in particular like to draw your attention to the inclusiveness aspect of CAADP. In order to achieve the ideals of CAADP we expect closer inter-ministerial collaboration in addressing critical issues of hunger, malnutrition, natural resource degradation and poor market access. CAADP also calls for the engagement of not just government technical and political leaders but also civil society organizations in charting the agriculture and food and security agenda. We at the AUC believe that

this is a new beginning and, indeed, a paradigm shift in the way agricultural and food security planning is formulated in Africa.

As noted earlier, CAADP provides the required tools and instruments to help countries in Africa reorient their respective agricultural and food security investment plans in ways that would benefit the majority of the population by at the same time accelerating growth as a precondition for further broad-based development. Importantly, as part of CAADP review of country agriculture and food security investment plans, advice and support is provided to countries to ensure that there are specific Food and Nutrition Strategies with responsibilities for their implementation shared between Ministries of Agriculture, Health and other important sectors such as Education. As in all other facets of life, the changes we are spearheading here do not always met with enthusiasm, for development planning in Africa has for decades been pursued along strictly sectoral lines, with little or no appreciation of the synergies that could be realised from employing an integrated planning approach. The good news is that CAADP has started catalysing changes in this sphere as well. For instance, all the 24 countries that have signed CAADP compacts—i.e., commitment documents with identified investment priority areas—have indicated achievement of food and nutrition security as a top priority. This poses both a challenge and opportunity to all of us here including political leaders, policy makers, the research community and civil society. **I would like this panel discussion to provide us with further thoughts on how best we could capitalise on the gains of this reorientation in agricultural programme planning so that the complementarities and synergies between agriculture, nutrition and health are realised at the implementation stage in ways that empower relevant line ministries and pertinent CSOs in delivering the desired results**.

As part of taking forward the CAADP strategic framework for increasing agriculture production, productivity, food and nutrition security together with health, the African union launched the Africa Day for Food and Nutrition Security, a day that will be celebrated annually on the 30th of October to raise awareness, and renew multi-stakeholder efforts towards improving food and nutrition security.

However, in order for our research and advocacy work to be of real value to our own populations in Africa, best practices obtained through implementing development projects as well as from time-tested indigenous practices of the diverse African cultures need to be synthesised and made available to programme planners. This will go a long way towards a better understanding of household behaviour in Africa in relation to the dynamics of food availability, nutrition deficiency and health improvement. Policy-makers need to work on providing countries with the knowledge of these practices and resources to upscale them. Commonly cited best practices include the promotion of exclusive breastfeeding for at least 6 months; targeted micronutrient interventions (vitamin A and iron) for pregnant women; micronutrient fortification and supplementation). **The question is how can policy-makers under different institutions work together to deliver these proven services at scale?**

CAADP provides the platform for strengthening the capacity of non-state actors (Farmers Organisations, Civil Society, Private Sector, Research Organisations as well as academia) so as to ensure that these key domestic constituencies understand the multi-faceted linkages between agriculture and nutrition and health outcomes. The platforms CAADP provide at country level are also believed to serve as advocacy fora for diversification of agricultural practices as well as education for ensuring adequate nutritional foods for better heath. **A key challenge for the deliberations in this panel is how to reorganise agricultural research and extension as well as the rural service delivery system at large so as to realise both increased food production and improved**

nutritional and health outcomes are realised.

With these remarks I now proceed to introduce the panelists for this session. I thank you!

Speaker Summary Note	
Session:	**Africa**
Speaker:	Rosanna Agble, **Former Chief Nutrition Officer, Ghana Health Service, Ministry of Health, Ghana**
Title:	**Rethinking on How We Do Business:** **Regional and actors perspectives—The Ghana experience**

Background

International, regional, national and sector policies and frameworks that have been developed in recent times seek to address the multi-dimensional nature of nutrition and stress the need for all stakeholders to collaborate and coordinate their efforts.
At the Africa regional level two frameworks on Food and Nutrition are recognised:

- The Africa Union Nutrition Strategy 2005-15 has two objectives that indicate clearly (1) the need to ensure regional, national and household food security within 10 years and (2) the need to define mechanisms for collaboration and coordination among the various actors concerned with food and nutrition problems at national, regional and international levels.
- The third principle of Pillar 3 of Framework for African Food Security (FAFS) states that it is necessary to ensure that all parties and players automatically seek to understand and address hunger and nutrition

In Ghana over the years, several national and sector policies and plans have addressed the need to link nutrition and agriculture. Apart from national development plans such as the Ghana Vision 2020—The First Step and Ghana Poverty Reduction Strategy 1&2, sector plans have objectives to address these relationships e.g.

- The Health Sector Medium-Term Development Plan 2010–2013 states that "In order to address the identified challenges the sector will collaborate with Ministry of Food and Agriculture in food security the fortification and targeting of food and supplements and create awareness on proper nutrition in targeted population"
- FASDEP-Agriculture Sector Plan 2009–2015 also states that "There is recognition that there is need to give support to improved Nutrition because there are several nutrient-rich foodstuffs whose production and consumption can be promoted alongside fortification technologies to get the best out of nutrients. The target is that stunting and underweight (in children) as well as Vitamin A, iron and iodine deficiencies (in children and women of reproductive age) would be reduced by 50% by 2015"

With all these policies what does it take to move into action? What institutional structures are needed to be effective at national and regional levels and what key actions need to be undertaken?

Challenges in Ensuring Institutional Collaboration

(1) ***National level structures***

Experience in Ghana and some African countries have indicated that there is really no need to create or develop new policies and that any suggested intervention should aim at strengthening existing

programmes and national structures. Lessons from managing nutrition and agriculture related interventions have revealed that there is need for a strong and effective coordination mechanism among the sectors. The question is: Who is best placed to do this? Agriculture and health sectors are huge and have huge challenges and usually nutrition issues fall between the cracks. The challenge is to identify a national agency which has the mandate of bringing the two principal sectors –health, nutrition and agriculture-together and is also capable of ensuring linkages in sector planning processes and making efforts to ensure integration.

Most countries have such national coordinating structures with the mandate to ensure synergy in the implementation of national programmes. In Ghana, the National Development Planning Commission, a Government organization with the mandate to coordinate the development agenda and has also a clear understanding of the government decentralization process was involved in a programme that linked health, nutrition and agriculture to reduce malnutrition in selected communities. The organization took the responsibility to ensure that (1) the health, nutrition and agricultural sectors especially at district levels worked together, and (2) the beneficiary communities were empowered with necessary health and agricultural facilities and materials to aid in the dissemination of both agricultural and health messages. The advantage of involving established government organization is that it ensures institutionalization of such programmes which will eventually leads to sustainability.

2. Sub-regional level structures

There are political structures in the various sub-regions in Africa such as ECOWAS in the West Africa sub-region. ECOWAS has the agriculture and health structures but they are scarcely seen actively working together, e.g. the ECOWAS nutrition forum is convened regularly under the West Africa Health Organisation (WAHO) but the agriculture sector of ECOWAS does not seem to play any role or participate in the nutrition forum. Again, meetings of the Ministers of Health and Agriculture are held separately with each one issuing its own communiqué. The technical meetings which precede the meetings of Ministers are usually attended by the technical officials from the Ministry concerned. The challenge is that if integration is not evident and practiced at the regional/sub-regional political levels it becomes difficult for individual countries to get the necessary political support to integrate programmes.

Need for Action

1. Advocacy

These challenges, lead to issues that ought to be addressed urgently. The misunderstanding of nutrition as a developmental issue is widespread across sector at both national and regional levels. The situation therefore calls for a strong and continuous advocacy drive using appropriate evidence-based outcomes which are specific to given situations at regional, sub-regional and national levels. This is necessary given the fact that the countries in the Africa region and are faced with both new and old natural and/or man-made challenges continuously and in the effort to address them, these linkages are usually lost. Having a statement inserted into sector policy document is only the first step but more effort has to go into advocacy within a lead country institution and among the agriculture and health sectors to translate such policies into action.

2. Nutrition lens approach

The situation also calls for the application of the “nutrition lens” which is a tool for analysis, planning and programme delivery across sectors. Use of the nutrition lens encourages awareness of the impacts of poor policy decisions; ensures that development investments “do no harm;” encourages coordinated management, information exchange and monitoring.

Speaker Summary Note

Session:	**Africa**
Speaker:	Tola Atinmo, **Professor, Department of Human Nutrition, University of Ibadan, and President of African Nutrition Societies, Nigeria**
Title:	**Agriculture and Nutrition Policies Coordination in Nigeria: Opportunities and challenges**

The FAO Status of Food Insecurity (SOFI) 2000 report (FAO, 2000) revealed a dramatic reduction in undernourishment levels in Nigeria, from 44% of the population in 1979–1981, to 16% in 1990–1992 and down to 8% in 1996–1998. Despite these reductions, Nigeria has been far less successful in combating its high level of malnutrition. IFPRI (2001) warns that "unless more aggressive measures are taken, progress against child malnutrition is likely to slow down." Malnutrition levels in Nigeria have not changed over the past decade.

The National Demographic and Health Survey (NDHS 2008) in Nigeria revealed poor nutritional indices, including high rates of stunting, wasting and under-weight, especially among the under-5 children despite annual increase in food production in the country. The gap between food production and nutritional status of the vulnerable groups (women, under-5 children, and the aged) has remained unabridged in the last decade. This is an indication that meeting adequate nutritional requirements of the populace is beyond food production ability.

The causes of malnutrition are many and complex and have been classified according to the UNICEF framework into three broad categories, which include basic causes (resources control, human, economic and organizational, political and ideological superstructures); underlying causes (insufficient household food security, inadequate maternal and childcare and insufficient health services and unhealthy environment) and immediate causes (inadequate dietary intake and diseases). This conceptual framework shows that the basic causes of malnutrition are crucial to the formulation, execution and proper coordination of nutrition- and health-related programmes for successful outcomes. They play a vital role in terms of policy development. Policies, as guided statements by stakeholders, are necessary for appropriate coordination of programmes.

In Nigeria, there have been several sectoral policies and programmes in Agriculture and Nutrition to address the problem of malnutrition. Implementation has however remained uncoordinated and limited in scope and thus has not achieved the much desired goal. Policies on Agriculture are devoid of information regarding nutrition and health and the Food and Nutrition policy, which was developed by nutrition professionals, contains few elements of Agriculture. The void created by the poor integration of Agriculture and Nutrition policies is now drawing attention from organized stakeholders in Nigeria. Along this line a conference on how to link Agriculture with Nutrition was held in December 2010, in Abuja, Nigeria by the Nigerian Academy of Science. The conference was the first time professionals in the two fields would come together to deliberate on how to improve the nutrition of women and children by closely working together.

The conference highlighted the need for collaboration between the two fields for improved outcome, especially in terms of nutritional status. The meeting ended with a communiqué calling for the establishment of a coordinating body for all nutrition programmes at the national level and the

involvement of all crucial stakeholders in nutrition.

It is becoming obvious now than ever before that Agriculture and Nutrition policies cannot work in isolation since neither can achieve its set goals successfully without consideration for some areas of overlap. Opportunities to integrate Agriculture and Nutrition policies exist. Creating a platform for those in charge of the two areas to work together will be an opportunity for synergy. It is equally possible to reconsider the curricula of higher institutions running Agriculture and Nutrition programmes with a view to updating such to ensure that both disciplines have some courses in common that will make the students understand the strong interconnectedness between the two fields.

The National Economic Empowerment Development Strategy (NEEDS), which is a government poverty reduction body has recognized nutrition as one of the bedrocks of national development and therefore will support any policy development on linking Agriculture and Nutrition. Another opportunity through which Agricultural and Nutrition could be linked is through macro-economic policies which can utilize nutritional status as one of the indices of national development. This will have a reverberating effect through the incorporation of food production technologies including biotechnology to improve nutrient quality of agricultural staple foods.

As much as there are opportunities, there are also challenges of working with the two separate policies to achieve one goal of promoting national development. One major challenge is how to make the professionals in the two fields work together to achieve this common goal without subjugating one another. Another challenge is the source of funding to organize professionals from the two fields to develop a joint-policy that will reflect the need for Agriculture and Nutrition experts to work together for the common good. Presently, the link between Agriculture and Nutrition is very weak and much effort will be required to bring the experts in the two fields together at the initial stage. Agriculture has been receiving more attention over the years through budgetary allocation but Nutrition has been mainly donor driven.

Development of a joint Agriculture and Nutrition policy document will provide the roadmap that will reveal how the two fields can work closely together to reduce the level of malnutrition in the country. It will also create institutional capacity strengthening for young professionals in the two fields. Success along this line will provide a more cost effective means of reducing the burden of malnutrition and improving health.

Speaker Summary Note	
Session:	**Africa**
Speaker:	Joyce Kinabo, **Associate Professor, Department of Food Science and Technology, Sokoine University of Agriculture, Tanzania**[50]
Title:	**Rethinking on How We Do Business: Regional and actors perspectives**

Background

All living organisms require nutrients to survive and this is the whole essence of nutrition. The human body requires about 42 different nutrients and most of them are essential. These must be obtained through agriculture production. Nutrition of people living in Africa depends largely on the nutrients derived from plants and to a limited extent from animal foods. All the foods we eat, either from plant or animal origin are produced using the elements present in the soil and through photosynthesis. Crops extract nutrients/elements from the soil to make the grains, tubers, roots, vegetables and fruits for food. Nutrients contained in the foods depend on the quantity and quality of the elements present in the soil and on the extent to which plants are able to extract or mine these nutrients from the top soil. Therefore, the health of the top soil determines the health of the people. "Quality of life is a health issue; but good health and nutrition is food depended and good quality food depends on soil health and agricultural practices"

Many of the activities performed in the rural and urban communities of developing countries involve human labour, which still provides much of the power needed for economic productivity. Thus, factors, which affect human labour, such as high incidence of Protein Energy Malnutrition (PEM) and micronutrient malnutrition as well as diseases affect productivity and influence economic development. Improved health and nutrition, as related to labour productivity can increase household income, contribute to economic growth, and result in improved livelihoods. Malnutrition is currently recognized as one of the major factors influencing health and labour productivity in many rural communities of developing countries. For many farmers, family labour still represents their main or only asset for agricultural production. This factor has often been neglected in the development planning process and nutrition interventions.

Regional Initiatives

There have been numerous initiatives in Africa including Comprehensive African Agriculture Development Programme (CAADP), Presidential Initiative to End Hidden Hunger in Africa (PIEHA) 2002, Competitive Commercial Agriculture in Africa, Rural Structural Programme, Regional Integration, African Capacity Development Operation, and Knowledge Partnership for Africa, Nile Basin Initiative, Africa Pollinator Initiative, Kilimo Kwanza (Agriculture First) and many more. The focus for most of these initiatives has been to increase agricultural productivity through provision of inputs (seeds, fertilizers, and pesticides), financing agriculture and development/improvement of markets. Very few of these initiatives have focused on or included aspects related to improving human labour productivity of which the most important components include health and nutritional status of producers.

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Initiatives to leverage agriculture for nutrition have included Biofortification through crop nutrient improvement for example promotion of High Quality Protein Maize (HQPM), Orange fleshed sweet potatoes, high protein rice, high iron and zinc beans and palm oil production, small ruminant and indigenous chicken improvement project. Nevertheless, the approaches used for the promotion of these crops again demonstrate the top down approach to solving food problems. Do we want consumers to depend on sweet potatoes or maize alone for protein and β-carotene? This type of approach defeats the entire purpose of dietary diversification and applying agricultural biodiversity to address malnutrition in Africa. Besides, the information packages for promotion of these crops contain information on different varieties, the recommended appropriate production practices, suitable agro-ecologies and post harvest handling practices but very little information is provided on nutrition or health benefits of the varieties or crops.

Priorities and Levers for Action

Sectoral approach

The sectoral approach to addressing agriculture, health and nutrition issues has led to divisions, fragmentation in service provision and implementation of activities and possession of knowledge. Each of these sectors often times has its own agenda and activities and sometimes the activities may be conflicting. There is a need to rethink on how the sectors can be better organized to better serve the human race at all levels; national, regional and international; and they should be integrated in such a way that we have a better service delivery system at country and community levels. We should always remember that at the community level there are no sectors; there are livelihoods and life. Holistic approach by looking at people's requirements should be the way to go. Nevertheless, the holistic approach to community problems should take into consideration of the potential of the people in communities to improve their own lives. These are important partners in this endeavor.

Agricultural planning "with a nutrition and health lens"

The goal of agriculture should be to grow food for health and nutrition. Planning for food production should be based on the nutrient requirements of the population (nutrient balance sheets). Currently, minimum nutrition consideration is included in planning for agriculture (crop/livestock) production. Efforts to improve agriculture have basically focused on yield or other characteristics such as efficiency of crop production, but very little on nutritional quality of crops. For example, how much of the vitamins are needed? What crops or animals would provide these vitamins, and how should they be produced? So far the practice has been to look at the energy levels only. We need to factor in other nutrients especially micronutrients levels in determining nutrient production levels in a given country (per capita levels of production of micronutrients). Recently specific crops have been bred for nutrition (maize, rice, sweet potatoes); yet, we do not know for example, by tipping the balance of nutrients in a crop, how does it influence nutrient utilisation in the body? Similarly, health planning should indicate the effective demand for nutrients for treatment and prevention of malnutrition.

Indicators for agriculture, nutrition, health

Indicators for measuring the agricultural sector performance should include assessment of health and nutrition attainment. In this regard, nutrition economics will be relevant here. The measure of yield per hectare should be translated in terms of nutrition and health. How much nutrition is or will be derived from a one hectare yield of a given crop? How much health will be or is attained from a one hectare yield of a given crop? I would like to borrow from Mark Fulford concept of nutritionally and healthy focused agricultural production; "producing for the purpose of health and nutrition," i.e.

"High nutrition agriculture" or "high health agriculture"

Training

Compartmentalization of knowledge acquisition: Training of agriculturalist, nutritionist and health personnel has been in compartments with very limited inter linkages. It is high time that training programmes should strive to link up the three sectors, considering that the goal of each of the sectors is to improve human well-being. Training institutions should develop inter/trans/cross/multi-disciplinary training programmes to produce graduates/professionals who can effectively translate the linkages between agriculture, health and nutrition in the field, in their capacity as extension workers or health care providers or nutrition counselors. For graduates/professionals who are already working in the field, they should be given an opportunity to build their capacity through short courses or seminars on agrinutrihealth (agriculture, nutrition and health) in order to provide better and comprehensive services.

Most of the health problems experienced by people in Africa are related to food-body interactions (inadequate food/nutrient intake).We need to get to a point whereby doctors would be able to prescribe food as part of a treatment regime. Currently, food bio-prescription (based on processed foods) is done for people living with HIV and AIDS but not for diseases such as malaria and other infections. When doing dietary surveys we often get answers from respondents that they would only eat fruits if the doctor prescribes. In this regards, health personnel would be very instrumental in linking agriculture to health and it will help to stimulate agriculture production and consequently improve nutritional status of the people. In the future we will need doctors who are equipped with knowledge and skills to provide food prescription. Therefore there is a need to rethink on how medical training is conducted and if necessary to review the training curriculum.

Research

In Africa nutrition, agriculture and health problems are huge and require multiple ways of solving them. Therefore we need holistic and integrated approach to research; interdisciplinary, trans-disciplinary and multidisciplinary research agenda or protocols.

Information and skills

Information on each of the three sectors agriculture, health and nutrition has often been presented separately without making reference to the other sectors. There is limited information linking the three areas. There is a need for more information (education/knowledge) about the linkage between agriculture, health and nutrition; also on improved skills towards sustainable agriculture for improved nutrition and health. What information should we send out to the general public and farmers in particular, on the linkage between the three sectors? How can we make farmers think about health and nutrition when engaging in agriculture production? We also need to provide appropriate and adequate information and communication along the whole spectrum of agricultural value chain for enhanced nutrition and health. Print materials are still very useful in rural areas but with advancement in information and communication technology, other innovative ways like mobile phones can be used to communicate messages to the general public about the role of agriculture in improving nutrition and of improved nutrition and health on agricultural productivity.

Strengthening agriculture, nutrition and health agenda

The three sectors are very important for economic development of Africa and tend to involve a wide spectrum of partners, Public, Private, and Commercial who should be linked and coordinated to enable them to move forward this agenda. Nevertheless, the most crucial partners are the

communities, where action ought to take place. Therefore, involvement of communities or villages to ensure greater participation and outcome is crucial. Nevertheless, it should be noted that nutrition, health and agriculture challenges are not the same in all communities. Differences exist both within a single community and from one population group to another. Thus, contextualization of nutrition, agricultural and health issues, as well as identification, prioritization of the issues to meet the specific needs of each location would be necessary and ultimately, mainstreaming of nutrition issues in community or village agriculture and health development plans.

Speaker Summary Note	
Session:	**Africa**
Speaker:	Ismael Thiam, **Program Officer, Non-Communicable Diseases and Nutrition and Food Security, West African Health Organization (WAHO) of The Economic Community of West African States (ECOWAS), Burkina Faso**
Title:	**Regional Initiative in West Africa: Optimizing the biodiversity to improve food and nutrition security**

INTRODUCTION

The 15 ECOWAS countries in West Africa as well as several others in the Sahel are facing the Double Burden of malnutrition. Undernutrition rates are some of the highest in the world with child stunting rates of one-third to one-half (except Ghana at 22%), yet overweight and obesity are emerging as well.

The 2009 Report of IDF estimates has shown that by 2030, without adequate interventions diabetes will increase up to 30% in Low and Middle Income countries, and incidence of other chronic diseases are still rising in the West Africa sub-region.

Food Insecurity is a chronic problem related to high poverty rates. We have a lot of food insecurity even before we experience food crises. Then we frequently have several kinds of acute food insecurity (on top of chronic) due to the 3-month hunger season that occurs every year before the harvests and due to “crises” of weather limiting crop yields or crises of political instability in the countries.

This year local crop yields were almost adequate except floods in Nigeria and Benin, but we are watching the global prices rise again, as they did in 2007–2008. This was highlighted at the 26th meeting of the Network for the Prevention and management of food crisis (Accra, December 2010). In West Africa one of our main staple foods is rice, and much of it is imported.

Food insecurity which typically affected just the Sahelian countries has become also a common problem in coastal countries.

From different meeting in the sub region we have recognized that:

- Any country provides 10% of the national budget to agriculture
- Agriculture and health/nutrition sectors are working separately (from policy formulation, program implementation, data collection, decision making…)
- Nutrition is not appropriately addressed in Regional Agriculture policies by most of the countries
- Agriculture sector is 70% of our workforce and 60 % of our GDP, the livestock sector can contribute up to 40% of our GDP.

Efforts a encouraged by NEPAD (2008, In the report), but it still a challenge to build strong collaborative pathways between agriculture and health nutrition sectors as discussed in 2008 at the ECOWAS Nutrition Forum (K. Kurz, I. Thiam, *SCN News*, 2010).

In 2005, Niger experienced a food crisis and the Assembly of Health Ministers asked to give more attention to nutrition within the food security issues. It is necessary to ensure food and nutrition security, to take into consideration: Food availability (supply side), Food accessibility (demand side, including prices incomes and purchasing power) and Utilization (food quality through dietary diversity to meet nutritional needs).

INITIATIVES

Multisectoral and multidisciplinary policies and programs are needed to change the current trends of the double burden of malnutrition (I. Thiam, K. Samba, D. Lwanga, *SCN News* 33, 2006).

In addition, to the implementing more fully the health and nutrition programs that already exist in the sub-region, WAHO and a variety of partners are addressing the huge gap around food consumption and dietary quality. Focusing on good dietary quality in addition to just the quantity of staple food available for consumption is the common denominator for reducing rates of under nutrition, overweight and obesity, and improving food security.

Dietary quality means that the full range of nutrients is being consumed, in addition to adequate amounts of energy from the food. Dietary quality is achieved through dietary diversity, for example, vegetables, fruits, secondary staples, and animal-source foods.

In some cases achieving greater dietary diversity will not be expensive for households, as in the promotion of local and traditional foods, like green leafy vegetables that are nutrient-dense but considered low status food. Local fruits and indigenous staple foods may also fall into this category. Animal source foods will be somewhat more expensive, but do not require promotion if household incomes rise due to consumption preference.

Since poverty is such a limiting factor in household's food consumption, our partnership brings together organization of smallholder farmers, as well as agriculture and health-nutrition policymakers and specialists. Smallholder farmers can produce and supply markets with the local foods that are being promoted for greater dietary diversity of consumers. At the same time, they will be promoting and preserving the biodiversity of local and traditional foods.

Coordination and Harmonization, Partnership and Advocacy

Following the food and nutrition crisis in Niger in 2005 and the mandate from the health ministers to improve the food situation in the sub-region, from 2006 to 2008, WAHO and CILSS in collaboration with a variety of international and regional partners, as well as the agricultural and nutrition officers in each of the countries, identified a set of nutrition indicators to be integrated into the Early Warning System of the Sahelian and ECOWAS countries.

Since 2007, our approach has broadened to promote dietary diversity. We focus on the promotion of the supply of a more diverse set of foods—agricultural production and marketing as a part of foods systems that supply a full set of nutrients—and of the demand for the diverse set of foods—improved policies, nutrition education, public awareness, and advocacy.

The partnership is among WAHO, Bioversity International, FAO, The Commission of Agriculture of the ECOWAS Parliament, and the Network of Food Producers of West Africa (more than 1,500 community-based associations of food producers affiliated to ROPPA, Civil Society).

A major technical constraint that we are addressing first is that we do not always know the food composition of the local and traditional foods, thus we don't know which is promote for agricultural production and food consumption. And so we are compiling existing country information into a West Africa food composition data base, and identifying the foods for which nutritient composition will need to be analyzed. Other important first steps are advocacy for policies conducive to diet diversity at the regional and national levels and raising public awareness about food and nutrition. Throughout is an emphasis on building the capacities we need to implement this throughout the sub-region (Abuja, Action Plan 2010)

In September 2011, The first Regional Local Food Composition table was finalized and disseminated at the 11th ENF, through a partnership WAHO, FAO, Bioversity International, INFOODS. This table is currently being updated with the data of Mali and The Gambia. WAHO has secured resources also to organize every year an experts meeting for the review of the table, and also to provide means for research institutions to improve the table as well.

Partnership was broadening progressively:
FAO, Bioversity, FAO were the basic leaders, others partners involved: CILSS, ADB, International NGOs and Associations (ENDA, AMLD, HKI…), Research (Universities, private sector), ROPPA, USAID/West Africa, Africa 2010/USAID, IFPRI (2007 meeting), ECOWAS Commission, ECOWAS Parliament, The IBD (starts). The Network for the Prevention of Food Crisis in Sahel and West Africa.

CONSTRAINTS

- Globalization in very negative for the regional market
- Demographic growth
- Poverty in urban and rural areas
- Climate changes issues: floods and drought
- These aspects have been discussed in 2008, at the 10th ECOWAS Forum (F. Egal, I. Thiam, M. Cohen. *SCN News* 38, 2010).
- Low resources for Agriculture and not articulated policies for the integration of food and Nutrition at Regional and at country level
- Coordination among partners (recommendation ENF, 2008)
- Governance (Hidden agenda)

CHALLENGES

- WAHO to secure resources to push the agenda (biodiversity, food and nutrition security)
- Strengthen and broaden partnership
- Mobilize additional resources for the implementation of the Abuja Action with the CBO of ROPPA, research institutions… (No partner is funding our initiative)
- Food and Nutrition security need a multisectoral collaboration especially
- Health and nutrition
- Agriculture
- Education
- Private sector (Food Industry)
- Research
- Civil Society

The need for collaborative partnership is increasingly being recognized in West Africa where, during the past four years, a strong regional collaborative, multi-disciplinary and cross-sectoral is being

strengthening. The overarching objective of this initiative is to ensure, through its activities, the effective promotion of use of local food resources from West Africa's traditional food systems in households, and in strategies and interventions against food insecurity, micronutrient deficiencies and diet related chronic diseases.

Speaker Summary Note

Session:	**Africa**
Speaker:	Milla McLachlan, **Professor, Division of Human Nutrition, Stellenbosch University, South Africa**
Title:	**Rethinking How We Each Do Business: Regional and actor perspectives—Africa**[51]

Introduction

Food and nutrition insecurity is a 'wicked problem'[52] (Rittel & Webber, 1973) which requires rethinking how we frame the problem and what we consider appropriate approaches to addressing it. While no one would minimize the seriousness of the situation and the human tragedies associated with it, we may also see in it the seeds of opportunity for innovation and redesign, not only of the food system itself, but also of knowledge production in support of that system. Inevitably, this challenges our existing sectoral and disciplinary demarcations, and will have implications for how the intersections of agriculture, nutrition and health are conceptualized and navigated. This rethinking is already happening in many places all over the world, involving a wide range of actors, including rural communities and city neighbourhoods, researchers from a wide range of disciplines, government officials and activist NGOs, start up entrepreneurs and established corporations. In this brief paper I introduce the Southern Africa FoodLab as an example of an initiative to bring new thinking and action to the challenges of food security, and highlight what we have learnt in the process of getting it established.

Background

Addressing the food crisis in South and Southern Africa requires appreciating the ecological underpinnings of livelihood systems and untangling the knot of 'multiple stressors' which lies at the root of regional food insecurity, compounded by the AIDS epidemic (Drimie & Casale, 2009), and increasingly by climate change (Ericksen, 2008; Ziervogel & Taylor, 2008). In South Africa, widespread food insecurity and hunger persist in both urban and rural areas (Frayne et al, 2009). While the country is food secure at a national level in terms of aggregate food availability, research suggests that one out of two households (52 %) are at risk of hunger; 16% consume less than adequate energy; about 22% of children under nine years of age are stunted; and almost 4% of children under nine years of age show signs of wasting (Rose & Charlton, 2002; Labadarios, 2008; Chopra *et al*., 2009). At the same time, over 50% of young women and 30% of young men are overweight or obese (Kruger, et al, 2007, Department of Health, 2007). In response, several agencies within the state, civil society and private sectors have embarked on efforts to document and find solutions to this multifaceted problem. Thus, food insecurity was high on the agenda in the discourse leading up to the national elections of 2008. This emphasis on food security in policy dialogue was supported by research initiatives at institutions such as the Development Bank of Southern Africa (DBSA) (see McLachlan and Thorne, 2009) and the Human Sciences Research Council (HSRC), which focused

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[51] Prepared in collaboration with Scott Drimie, IFPRI, Julia Harper and Candice Kelly, SU, Ralph Hamann, UCT and Vanessa Sayers, Reos Partners.

[52] Wicked problems are characterized by ambiguity in problem definition, multiple needs, preferences and values, different perspectives on what needs to be done and what role should be played by different parties, and inadequate understandings of the immediate and long term impact of actions taken by different groups (see also Carley & Christie 2001).

explicitly on the challenges of measuring and monitoring food security (see Altman et al, 2010). Several universities, including Cape Town, KwaZulu-Natal, Stellenbosch, and Pretoria have developed focused research programmes on food security. A wide array of civil society and private sector initiatives, ranging from food fortification and micronutrient supplementation programmes, school-based nutrition and health education and support programmes for emerging farmers, food gardening initiatives, and food distribution programmes, to efforts to introduce environmentally sustainable practices in food production, processing, logistics and waste management continue to be implemented (Faber & Laubscher, 2008; Food & Trees for Africa, 2010; Jacobs, 2010; Lekganyane, 2008).

While this renewed emphasis on food and nutrition security is laudable, progress is elusive. Given the rapidly changing context, which involves both 'long wave stresses' such as climate change, and short wave shocks like food price volatility, solutions that may have worked a decade ago are no longer adequate. Initiatives are often fragmented, piecemeal and difficult to bring to scale (Benson, 2008). Different stakeholders in the food system have widely different perspectives and interests and challenging structural issues such as power differentials among them remain largely unexamined (Vogel et al, 2007). Furthermore, the conceptual underpinning and empirical evidence base for perspectives and approaches vary widely, and are often more implicit than explicit. This makes rational discourse among stakeholders from different disciplines, sectors and levels difficult, and prevents them from working together effectively to find innovative ways to respond to food security challenges (Ramalingam et al 2008; Regeer & Bunders, 2009).

The Southern African FoodLab (SAFL) (www.SouthernAfricafoodlab) is a recent multi-stakeholder response to these systemic challenges. Having started with a focus on the South African food system, its aim is to bring together diverse role-players with passion and influence in the regional food system, to identify and pilot innovative means to achieve long-term, sustainable food security. Its origins lie in the DBSA Food Security research initiative mentioned above. Participants representing multiple sectors and disciplines who attended a report-back meeting in February 2009 agreed that better collaboration was essential within and between sectors on food security matters. The workshop led to a year-long 'Change Lab' process, modelled on similar international initiatives, notably the Sustainable Food Lab (www.sustainablefoodlab.org).

The three-phase Change Lab involved a range of different modes of learning, starting with problem framing based on a review of the scientific knowledge on the state of food security in South Africa and in-depth interviews with stakeholders representing different interests in the food system. Learning journeys to urban and rural settings provided a first-hand experience of aspects of the food system that seemed, from the prior analysis, to be particularly 'stuck'. These journeys also provided opportunity for participants to reflect on their own assumptions regarding the situation and what to do about it, and to begin to think together about possible leverage points to bring about change. The final phase of the change lab focused on identifying and implementing promising innovations in a collaborative manner. It included a two-day innovation workshop, which was designed to enable the SAFL to move from one mode of learning (through observation and reflection) to another mode (learning by doing), to harness the energy for change that had built up in the system, and to prototype innovations that could have a ripple effect throughout the food system. Teams have now started working on a number of initiatives to strengthen primary production through innovations in support mechanisms, and to strengthen existing initiatives to increase access to affordable, safe and nutritious food. There is also an initiative to start a national conversation on food security, and to improve the 'food security literacy' of journalist in the country. After the first year of operation, lab participants strongly supported continuation of the initiative, now known as the SAFL, as a platform

to convene and support innovation efforts for change in the food system, and to document and disseminate lessons from these experiences to a broader audience.

The SAFL is just beginning. But we are inspired by other change initiatives, such as the international Sustainable Food Lab that have grown rapidly over the last decade. A particular challenge for the SAFL is to develop tools and skills to draw on different knowledge systems, including academic research, indigenous knowledge and operational experience, to leverage shifts in the system. In addition, we have found it challenging to engage the leadership of activist NGOs and community groups and to have sustained participation from the public sector. We fully expect that issues of unequal power, constrained resources and different perspectives on the balance between talking, listening and acting will continue to surface as we learn our way forward. In this way, our initiative is indeed a laboratory taking part in the grand experiment of creating a food system that works for all.

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SOUTH ASIA

Speaker Summary Note

Session:	**South Asia**
Speaker:	A.M.M. Shawkat Ali, **Former Secretary of Agriculture, Bangladesh**
Title:	**Leveraging Agriculture Better for Improved Nutrition and Health in South Asia**

1. Introduction

In achieving the above objective, the priority actions for the key players like policy makers, farmers, private sector, civil society, academia and media may differ across the South Asian region. However, there is a commonality that arises from the overriding need to address the issues like food security, nutrition and health poverty through appropriate linkages to agriculture. This is because food, nutrition and health insecurity persist in varying degree in the countries of the region. The comments reflect Bangladesh situation.

2. Priorities for action by policy makers

Till date, agricultural policy makers emphasized more on higher productivity of staples food like rice and wheat and less on crop diversification and access of the poor to a more diversified food items. Much less attention is also paid to marketing of produce across different parts and assuring a reasonable price for consumers as well as producers.

For a country like Bangladesh to arrest shrinking lands for agriculture, can the agricultural land loss be regulated? If so by what means? As regards technology, more attention needs to be paid to affordable use especially in low and medium growth areas. The other areas include:

- Removing institutional barriers common in public delivery system involving such areas as improved coordination, effective and result oriented monitoring and taking timely and corrective actions;
- Educating farmers on the use of new technologies to achieve economy and efficiency in fertilizer and water;
- Attention to removing the gap in policy formulation and farmers' field experience;
- Use of improved information technology for dissemination of extension and market prices;
- Updating and disseminating soil health related messages; and
- More attention by policy makers to institutional strengthening of public food distribution system which is pro-poor and free from malpractices.
- Forging effective partnership with private sector.
- Public awareness campaign on diversified dietary intake, in particular, emphasizing sources of cheaper agricultural produce as a source of health nutrition security.

3. Priority actions for farmers

Effective farmers' organization is virtually nonexistent. Consequently, they have poor bargaining capacity being forced to sell produce immediately before or after harvest when there are falling prices. This calls for proactive support to farmers in building up farmer-led marketing as well as storage and preservation facilities. In this, the state has a responsibility. Farmers also need to have a farmer-led extension system which is inclusive. The existing system is top down and public delivery

system is divided across different entities.

4. Priority actions for private sector

In stabilizing agricultural input and output prices, the private millers and traders need to develop strategies to provide reasonable incentive to farmers. The elements of the strategy include:

- Timely procurement and supply;
- Farmers confidence-building measures by developing a mechanism of contract growing method;
- Grading and packaging of produce;
- Play a pro-active role in assuring sale of safe food items, and
- Implement corporate social responsibility for farmers' welfare.

5. Priority actions by civil society

The priotized areas for actions are listed below:

- Organizing information dissemination seminars/workshops for all the key actor involved in building up sustainable linkages of agriculture to nutrition and health;
- Closely monitor the situation to provide necessary feed back to policy makers, farmers, private sector, academia and media; and
- Assist the policymakers and implementing agencies in sustained actions to achieve the objective.

6. Priority actions for academia

- Take actions as appropriate to strengthen field research programme rather than pure academic research;
- Timely updating of research data; and
- Avoid repetitive research;

7. Priority actions for media

- Providing adequate space and time on agricultural production, sale price, availability and safety of products drawing on field data including international market situation;
- Assure reliability of the data used, the quality of analysis, conclusions drawn and remedial measures;
- Play a more proactive role enabling policy makers to make informed policy decision; and
- Act as an alternate monitoring outlet.

8. Actions not mentioned elsewhere

The mechanism of regional food security to be instrumented through SAARC Food Bank needs to be functionally effective. The options for international reserve of foodgrains may also be explored.

Speaker Summary Note

Session: **South Asia**

Speaker: G. Chandrashekhar, **Associate Editor, The Hindu Business Line, India**

Title: **Farm Resurgence Must for Improving Nutrition and Health**

The recently concluded international conference on 'Leveraging Agriculture for Improving Nutrition and Health' organised by the Washington DC headquartered International Food Policy Research Institute (IFPRI) in New Delhi during February 10–12 brought together over 1,000 participants from 65 countries around the globe to discuss strategies to combat poverty and malnutrition by strengthening agriculture.

This author was invited to speak on the Indian situation and how agriculture can be leveraged to improve nutrition and health of people. The presentation comprised specific solutions to the known issues that plague Indian agriculture and was divided into three parts, namely agriculture resurgence, nutrition challenge and legal angle.

Agriculture resurgence: Indian agriculture desperately needs resurgence. Farm growth over the last ten years has been tardy. During the period, the country has registered remarkable rates of economic growth year after year, driven primarily by the manufacturing sector and the services sector.

Agriculture, to be sure, continues to be a laggard. Rising incomes and demographic pressure generate expanding demand for food products; but domestic output growth lags demand growth, leading to tightening supplies, rising prices and increasing dependence on imports (pulses and edible oil regularly, while sugar and wheat occasionally).

India has all it takes to become a farm superpower—with about 270 days of sunshine, over 160 million hectares of arable land, 900 millimeters of annual rainfall, varied agro-climatic conditions and biodiversity, two cropping seasons, over 7,000 kms of coastline, and of course abundant supply of cheap labour.

The author professed a five point mantra for **Indian agricultural resurgence**. The action plan goes like this:

1. Strengthen the input delivery system: The input market needs to be monitored, and if need be regulated strongly, to ensure easy access to quality inputs (seeds, fertilizer, agro-chemicals) at affordable prices.
2. Rapidly expand irrigation facilities: Just about 40 percent of land under cultivation is irrigated and as much as 60 percent is rain-fed or dependent on vagaries of monsoon. Many irrigation projects have been languishing for long years, while enormous amounts spent on numerous schemes have not yielded desired results. Major field crops (rice, wheat, coarse cereals, pulses, oilseeds, cotton, and sugarcane) show no marked increase in acreage under irrigated land over last ten years. There have been inordinate cost and time overruns. Last-mile connectivity issues are not sorted out. Scientific management of water resources will

help raise crop yields substantially from the current low levels as well as help raise land use intensity, currently at a low 1.3.

3. Improve antiquated agronomic practices through revival of Extension services; and by involving the private sector through appropriate policy support: Encouragement for adoption of scientific pre- and post-harvest practices as well as infusion of technology inputs like genetically-modified seeds would help cut on-farm losses. (Bt cotton is a good example of success through tech infusion).
4. Invest in rural marketing infrastructure: Conditions in rural areas are pathetic. Huge budgetary outlays are necessary for building scientific warehouses, primary grading and sorting facilities, revamping the agricultural marketing yards and laying roads to connect them with villages. Quality-related pricing of farm produce will enhance growers' incomes.
5. Use information technology to deliver price and market information to growers: India's IT prowess is globally known; but is hardly utilized at home. Timely delivery of price and market information will convert humble growers into savvy traders. Capacity building to capture market opportunities is the key.
6. Step up public investment in agriculture. In the event, much-needed private investment will begin to flow into the farm sector.

India can learn from the OECD farm support program. While developing countries generally attack the humungous farm support program of OECD countries ($375 billion a year and counting), a look at the details of support would reveal that as much as $85–95 billion year are spent on what's described as 'general services' to agriculture which include expenditure on research, infrastructure, inspection and control as also marketing and promotion. These are absent in India.

To strengthen agriculture, in addition to specific crop production programs, India should invest large sums in general services as described above and build capacity among farmers to face market uncertainties. Higher farm output through higher yields or productivity gains is the way forward. Agricultural resurgence in India will improve rural incomes and allow easier access to nutritious food as well as other essential goods and services. It will set-off a virtuous cycle.

Nutrition challenge: India suffers from pervasive malnutrition and under-nutrition, especially among the poor in rural areas, and mainly among women and children. There is acute protein and calorie deficiency as the poor are unable to access nutritious food at affordable prices. This follows skew in income distribution resulting from skewed pattern of economic growth or 'growth without equity'.

There are easy policy options to deliver calories and protein to the poor at affordable prices. I make three notable salient recommendations:

1. The Public Distribution System (PDS) with 500,000 shops reaches a large number of the poor and delivers subsidized rice, wheat and sugar. It is critical that the Indian government includes edible oil and pulses also under PDS at subsidized rates. Admittedly, PDS as it works at present has certain limitations. Leakages exist. Yet, it is a time-tested and ongoing mechanism to deliver much-needed food and thereby nutrition for a large numbers of poor people. The government needs to strengthen the PDS and plug leakages through close monitoring and use of innovative means like 'smart cards'.

2. High food prices hurt the poor the hardest. Food inflation dilutes the consumption of nutritious foods among the poor. So, consumer subsidy is inescapable. Additionally, in agrarian economies such as India where hunger is turning chronic and food shortages endemic, government policies should check rampant marketisation of agriculture and rabid financialisation of agricultural markets. Curbs on speculative capital that chases essential foods in short supply and creates avoidable price volatility are necessary.
3. Rising incomes and spread of information and communication technology (ICT) are changing people's food habits. Consumers have to be educated about eating healthy foods. A campaign to 'make eating healthy food fashionable' is needed.

The Constitution angle: Under the Constitution of India, 'agriculture', 'health' and 'education' are State subjects. Importance given to agriculture, health and education varies across States. India needs a unified approach to agriculture which can help improve nutrition and health. It is suggested that 'agriculture' and 'health' may be shifted to the Concurrent list so that the Central government can come up with legislation that can be implemented uniformly across the country.

Finally, the government must demonstrate 'political will' to implement progressive and growth-oriented policies. Accountability for outcomes is necessary. Clearly, there is no one-step solution to leveraging agriculture for improving nutrition and health. India has to move in several different directions simultaneously but with one common national objective. Multitasking is the way forward.

Speaker Summary Note	
Session:	**South Asia**
Speaker:	Rohan Rajapakse, **Senior Professor, Agricultural Biology, University of Ruhuna, and Acting Vice Chairman and Member, University Grants Commission, Sri Lanka**
Title:	**Leveraging Agriculture, Nutrition, and Health: Some cases from Sri Lanka**

The relationship between agriculture and health may see intuitive and simple grow more crops and people will have more food and live healthier lives. But because agriculture and health policies are rarely coordinated, the reality is far more complex.

Most of the poor in Sri Lanka are farmers and farm workers, who depend on agriculture for their livelihoods, including the income needed to buy health services. Threats to agriculture become threats to health.

Health and Agriculture and Nutrition Together

The idea of linking food security and nutrition components into agriculture is not new. Effective approaches for incorporating nutrition goals into agriculture and rural development projects were recognized as necessary a decade ago, but effective approaches for doing so in an operationally acceptable way were not available.

Many developing countries are enthusiastic about the possibility of achieving nutrition goals through the agricultural sector. Research, on above, in Sri Lanka have identified certain types of agricultural programmes that were more successful than others in achieving food security and nutrition objectives. These include;

a. Expansion of cash crop production.
b. Introduction of hybrid varieties.
c. Creation of effective and appropriate extension services.
d. Making available agricultural credit to male and female producers.
e. Expansion of food crop production.

These programmes were able to reach the lowest income households, which were often the households most at risk nutritionally.

It is clear from available studies that as household income is increased, there is an improvement in both the quality and quantity of the household's diet. Increasing income at the household level, however, is not sufficient to alleviate malnutrition. Whether increased income translates into improved household and individual nutrition depends on a variety of factors including. How much of the increase is spent on nutritious food, how the increased quantity and quality of food is distributed among family members, and what the health and hygiene levels are of individual family members.

The key to tacking these problems lies in better integration of health and agricultural interventions and policy. For example, irrigation projects that increase yields may unintentionally encourage

diseases such as malaria or schistosomiasis. In Sri Lanka, intensification projects that have introduced both irrigation and pig production have created ideal conditions for Japanese encephalitis, whose mosquito vectors breed in ditches and use pigs as alternative hosts.

The purpose of agriculture is not just to grow crops and livestock, but to grow healthy, well-nourished people. Farmers produce a wide range of goods, including one of their ultimate tasks is to produce food of sufficient quantity to feed all. There is growing evidence of increasing malnutrition in Sri Lanka. The rising prices of food are likely to aggravate this situation, especially in households that do not produce food. Although the country does not have serious food shortages malnutrition affects nearly one-third of children and one quarter of women.

Agricultural growth could contribute to reduction of poverty, hunger and malnutrition. Poverty and food insecurity are largely problems in the rural and estate areas in Sri Lanka.

1. The development of Sri Lanka's agriculture requires many thrusts. There has to be much more investment in research and rural infrastructure development.
2. The agricultural extension services that are hardly serving its purpose should be reformed and reconstituted.
3. The problems of marketing of agricultural produce have to be resolved by developing storage and milling capacity, promoting competition and improving transport facilities.
4. There should be more constructive private sector-public sector collaboration. Land policies require to be reformed in the context of current situations to permit land use on the basis of economic returns.
5. Productivity increases in agriculture could play an important role in the reduction of poverty, hunger and malnutrition.

Targeted Consumer price subsidies

Targeted food price subsidies are a popular and common type of intervention aimed at increasing food consumption of poor households. The real incomes of the poor generally results in higher expenditures on food. Subsidy programmes are attractive policy instruments because they are highly visible and allow governments to reach a large number of poor people easily.

Prototype of Nutrition/Agriculture Programmes

- Provide credit to women in rural areas where agricultural activities are developed.
- Target agricultural extension activities to women.
- In Sri Lanka, women are actively involved in many aspects of food crop production (and increasingly in cash crop production). Extension activities geared to women, therefore, could result in increased food production that would benefit household food security, as well as provide an increase in the income of women.

There has been a lack of focus on agricultural biodiversity and on food systems as a whole. Our results suggest that farmer-focused initiatives that are food-systems based can sustainably improve dietary diversity and improve micronutrient levels in the diet of poor and vulnerable populations resulting improved nutrition.

Speaker Summary Note

Session:	**South Asia**
Speaker:	Vijay Shankar Vyas, **Member, Economic Advisory Council to the Prime Minister, India**
Title:	**Leveraging Agriculture for Improving Nutrition and Health in India**

For one of the fastest growing economies India's record in poverty alleviation and ensuring nutrition enhancement to its people is not at all encouraging. This despite the fact that country is signatory to several international agreements to end hunger and mal nutrition, and Food Security is repeatedly proclaimed as one of the principal goals of development. Very concept of Food Security implies "access to adequate food to all people at all times for *an active and healthy life.*" It suggests not only avoiding hunger and ensuring adequate calorie intake but also eradication of mal nutrition.

Current situation in the country is as follows:

- Hunger, in terms of starvation, has largely been eliminated, although there is a disturbingly large extent of seasonal hunger, especially in dry areas.
- There has been progress in reducing calorie deficiency. However, a very large proportion of rural households subsist on below 1800 calories per person per day, which the requirement for an active life, even in the so-called progressive states.
- There has been no progress in ensuring nutritional security, i.e. eradicating protein-energy malnutrition, barring in one or two states. The worst sufferers are young children, pregnant and lactating mothers and elderly persons without any family support.

In a country which has been aspiring for decades to achieve Food and Nutritional Security these are very disheartening facts. If the present rate of progress continues, India will not be able to reach the millennium goal of halving malnutrition.

One of the principal reasons for a disappointing performance in this area is the pattern of growth of the economy. The driving force for economic growth in India has been, mainly, the service sector and to an extent industry sector. Agriculture has not contributed to the growth to any significant extent although nearly 52 percent of the country workforce depends on agriculture. Experience all over the world suggests that growth in agriculture leads to much faster percolation of benefits and to a large number of people. Stagnation in agriculture growth meant that the large number of households dependent on agriculture were impoverished and could not improve their standard of living.

There are several reasons for widely prevalent mal nutrition in the rural areas. Firstly, there has been an excessive emphasis on wheat and rice for last several decades, right from the beginning of the Green Revolution in the early 1960s. This has resulted in the neglect of other cereals including coarse cereals which in many respects are more nutritious. Second, agrarian structure is progressively dominated by the small holdings. Agriculture on these holdings is not profitable and to that extent scope for purchasing more nutritious food from the market is not available to them. Third, in the financial allocation by the government, health and sanitation sectors are grossly neglected, more so when it comes to allocation in the rural area. This aggravates the situation of ill health and mal nutrition. Fourth, the role which civil society could have played in improving

awareness on health and sanitation related issues at the household level is totally missing.

While action in needed in all these areas to correct the situation, the most important agenda should be to emphasize agricultural growth, especially on the small farms. The fact that on a large number of small and marginal holdings agriculture is largely for self provisioning the nutritional aspects can be addressed right at the farm level.

The direction in which agriculture has to move to improve nutrition would include:

- Emphasis on the coarse cereals and other indigenous crops which are more nutritious.
- Strengthening the supplementary farm enterprises, e.g. dairy and fruits and vegetables, particularly on the small farms.
- Using breeding technology to develop nutritionally superior crop varieties (an example is the protein rich maize), or fortifying the processed food stuff, e.g. the flour of the cereals.

For undertaking these measures the public and private sector as well as the civil society have important roles. Public research has to give attention to the coarse cereals; public price policy has to discriminate in favour of these and other nutritionally rich crops. The private sector could contribute to the research on nutritionally fortified crops and food products. The civil society has the role in generating awareness about nutrition at the household level.

EAST ASIA

Speaker Summary Note

Session: **East Asia**

Chair: Vo-Tong Xuan, **Rector, Tan Tao University, Vietnam**

Title: **An Agriculture-Based Health and Nutrition Program**

The East Asians inhabit large tract of land masses that are blessed with tropical and sub-tropical weather and the gigantic Mekong River system and hundreds of smaller rivers, canals. These natural conditions enable the economically poor tropical agriculturists to flourish in producing tropical produces for the economically rich temperate world, such as tropical fruits, vegetables, spices and medicinal herbs. These produces are essential to daily requirements for human health and nutrition.

Unfortunately, people in tropical countries have yet to acquire the nutritionally conscious habit of those in the temperate countries. In the country, the farmers in the rural areas—where most foods and produces are grown—do not eat daily fruits and vegetables like people in the cities. Visual observations in most universities show that body size of students are generally small both in height and weight. Only in some particular cases one can find a tall and heavy student, who likely comes from a wealthy family in the city.

In a national conference in 2007, it was pointed out that there are about 21.2% rural children in Vietnam suffered malnutrition. But both UNICEF and UNDP[53] put the figure at 30%.

Aware of this common problem, governments of many countries have been collaborating with UNICEF or other international donors to carry out projects specially designed for improving the conditions. For examples, in Vietnam, the government, as early as January 2001 promulgated a Prime-ministerial decision no. 21 that charged the Ministry of Health to (1) readily improve the nutritional level of the common man by 2010; (2) in each family, mother and children must be reasonably cared of; (3) people's daily meals must be enriched; and (4) everybody must be improved of their knowledge and practice on nutrition. Of course it was not possible to implement such a decision due to lack of finance, human resources, and the political will. In 2006, another project supported by UNICEF[54] called "Nutrition Policy and Advocacy" was formulated to put more realistic activities to implement the earlier Prime-ministerial decision. This project is supposed to end at 2010, but many experts said, it's still not realistic and the results were far from accomplished.

The failure of most of nutrition and health improvement projects could be attributed to their lack of linkage to agriculture. If on the other hand some projects have interdisciplinary link with agricultural experts, the latter may not fully aware of the existing socio-economic aspects of the poor whom they try to help. They may prescribe solution beyond the financial capability of the poor farmers, and the project may not have all the funding for everyone. Therefore the poor families could not realize all the recommendations.
In Vietnam there are several health and nutrition models that based on agriculture as a primary objective. The most popular model in northern Vietnam is called VAC (horticultural garden + fish

[53] (http://www.un.org.vn/index.php?option=com_content&task=view&id=339&Itemid=1&lang=vi)

[54] (http://www.nutrition.org.vn/news/vi/28/39/0/a/chinh-sach-dinh-duong-va-van-dong-xa-hoi.aspx)

pond + domestic animal raising). In the Mekong Delta in the south, we have been promoting the ABCD approach which was advocated by Coady International.[55] This approach, asset-based community development, has been used all over the world including Africa with relative success. In Vietnam, the ABCD staff visit and discussed with poor families—especially with youth and women—of the vegetables and fruits, fishes and domestic animals suitable for raising in the area. They then explain clearly the nutrition values of each of the agricultural products that they have pointed out to the families. Then the agricultural extension workers take over to guide the families how to raise the crops first around their houses instead of leave the land idle. From there they may have some cash to invest in fish culture and animal husbandry.

As the poor families grow the crops, they learn to eat, particularly mothers teach daughters and the rest of the family eat the harvest. They improve their nutrition, hence, their health, and with surplus to sell in the market. The biggest drawback of this approach is that the landless or homeless farmers cannot participate successfully.

[55] (http://www.coady.stfx.ca/)

Speaker Summary Note	
Session:	**East Asia**
Speaker:	Esther Penunia, **Director General, Asian Farmers' Association for Sustainable Rural Development (AFA), Philippines**
Title:	**Rethinking How Each Should Do Business: Regional and actor perspectives**

Introduction. First of all thanks to IFPRI for giving us the opportunity to share our perspectives in this high level conference. I work as secretary general of Asian Farmers Association or AFA. We are an alliance of national farmers' organizations, currently having 10 members, with 10 million small scale women and men farmers, fishers and indigenous peoples as members, in eight East Asian countries—Philippines, Indonesia, Thailand, Cambodia, Vietnam, Taiwan, Japan and South Korea. Here, I would like to share xxx points.

Links between agriculture, nutrition, and health. For many of us, we are very sure that there is a link between agriculture, nutrition and health. Some farmers have gone sick because of mis-techniques in fertilizer application. Some farmers have experienced inability to catch protein rich mudfish from their paddy fields because they already died from water pollution. In the Philippines we have a folk song "Bahay Kubo" ("My Nipa Hut"), where it says even if the nipa hut is small, there are different kinds of vegetable around the house. When Per said yesterday that to see the link, you have to work with a woman who is a farmer and a mother, that I find is very true. My first involvement in rural development work was as a community organizer for eight years on nutrition and health. We formed mothers' groups at village levels, conducted nutrition and primary health care classes. The mothers established herbal and vegetable gardens in their homelots and the sides of the paddy fields, made ointments and syrups out of herbs and trees, and cooked vegetables and beans in different ways in efforts to make these more nutritious, palatable and exciting to their children.

Paradigm shift. The work of 400 scientists, called the International Assessment for Agricultural Knowledge, Science, and Technology for Development or IAASTD, commissioned by the World Bank and the FAO, called for the fundamental way we do farming. Business as usual is not an option, rather, investments on small-scale farmers and sustainable, integrated, diversified, agro-ecological and organic methods are the way forward and investments in this kind of family farming, will significantly respond to the interrelated issues of poverty, hunger, food insecurity, financial crisis and climate change. With this paradigm shift, we need a re-thinking on several areas.

Re-thinking on production. East Asia is a success in green revolution. But chemical-intensive farming has degraded the quality of our soils and our forests. At the same time, we need to adapt to the changing climate. We should also do our share in mitigating climate change because we are also citizens in this one planet. To address these concerns, we need to upscale our sustainable, agro-ecological approaches. As farmers' organizations, we help build capacities for this through farmer-to-farmer exchange, training of farmer extensionists, in situ demonstration farms, farmers field schools, learn and earning farms, on-site action research with local agriculture institutes, NGOs and involving farmers as researchers, even crop breeders , participatory plant breeding and community based genetic resource conservation. In Cambodia, our partner NGO CEDAC and our member

Farmer and Nature Net has successfully practiced the system of rice intensification, and now it is supported by the Ministry of Agriculture. In Bohol Island in the Philippines, an ordinance declaring the island as a sustainable agriculture province has been done, thanks to a lot of advocacy from the church, the NGOs and the farmers' groups. The transition from chemical to low-input, organic farming is difficult and we need studies and policies on how to support farmers who are in this phase. The re-discovery and further development of flood and drought resilient crops, as well as establishment of early warning systems and community based disaster preparedness and management and crop insurance are likewise necessary and is being advocated with governments.

Re-thinking on energy use. In the last BBC world challenge, one of the winners was a Philippine NGO promoting ram or impulse pump, a devise which uses the energy of falling water to lift a lesser amount of water to a higher elevation than the source. We had a meeting with the NGO who is promoting this two weeks ago and was excited to know that they have various simple, community-based technologies not only for irrigation but also for energy use—using wind and solar energy. I remember the villages in Attapeu province in Laos which we visited last year. They had a big river, and mountains, and unirrigated ricefields, and they can hardly grow vegetables. We have this belief that the ram pump can be an affordable answer to their need. Our member in Indonesia is also promoting charcoal briquettes from coconut; and, in Cambodia, fuel efficient stoves. It will be good if we further develop and promote small-scale renewable energy technologies.

Re thinking on marketing. We have long been organized as associations for political advocacy and claim making, but now we see the need to organize ourselves around commodity clusters, inspired by the highly successful village-level Production and Marketing Teams of Taiwan. We are starting with commodity clusters of organic rice, coconut, sugar, organic vegetables in Cambodia, Indonesia, Philippines, and Vietnam. Inspired by the marketing strategies in Japan and Korea, we call on investments in the development and improvement of traditional local markets, including wholesale markets owned and managed by local governments in partnership with organized farmers' groups. We are working for direct supply to traders. We are also starting to work on value addition. In the Philippines, we are organizing the clusters of producers of Philippine lemon, and they want to produce lemon "calamansi" concentrate, involving the women in these clusters. Inspired by Brazil, our Philippine member is negotiating with the Social Welfare Department that it use organic rice in its feeding program and that our members supply this organic rice. We will need support for soft loans for start-up capital for trading and marketing, capacity building for business management, and subsidies for basic pre- and post-harvest facilities. We will need support for consumers to patronize sustainable agriculture products and food sustainably processed by rural communities—make it more affordable and accessible to the poor—as they also have the right to safe and healthy food.

Re thinking on access to natural resources. Access and control of land, water, and common property resources by small-scale farmers, fishers and indigenous peoples are critical in sustainable agriculture. For fishers in the Philippines, the main policy needed is delineation of municipal waters to protect them from the intrusion of commercial fishers. With the emerging phenomenon of large-scale land investments by some developed countries some in East Asia, affecting developing countries some of which are in East Asia, we need policies to secure women and men farmers' land, water, and common property rights. And educate and organize farmers so that they have strong bargaining power when they negotiate for contract farming and joint ventures.

Re-thinking on gender. The work of empowering women always starts with helping women reflect on their situation, and then inspiring them by making them realize about their human dignity, their

rights, and what other women in similar conditions do. Organizing, capacity building and leadership formation and training will be key programs as well. Also, as farming in many developing countries is a family endeavor, the one important thing also that can greatly help women farmers is the support that they will get from their husbands and male leaders/members of their organizations. In households where both the man and the woman have been sensitized to the dynamics of gender and believe in equal rights and opportunities, the full potentials of a woman farmer are harnessed to the fullest.

The main role of Farmers' Organizations (FOs). Our mandate is to empower ourselves—politically, socially, economically—so that we can claim our rights as citizens of our countries, of our region, of our world; so that we can decide and do by ourselves what we think we should act or do to improve our conditions, and being able to get the necessary support from others. Politically, we increase the awareness of our members about our situation and our rights. We develop our capabilities to analyze these situations, to present confidently our policy and program proposals to our governments, decision makers, and other stakeholders. We organize ourselves to put pressure to our governments to listen, dialogue with us, and make laws and policies that will benefit us. Economically, we exchange experience and expertise on various sustainable agriculture technologies. We form commodity clusters, production and marketing cooperatives. We develop our capacities in making market researches, business plans, and feasibility studies. We facilitate links to markets, add value to our products, and develop direct farmer-consumer relationships. All of these to have better lives, stronger health.

A shift of development finance going directly to FOs will be a worthwhile investment. We believe that FOs are key pillars of social change and national development. If empowered and consolidated enough in terms of magnitude and competence, we have the potential to effect serious and substantive economic, political, and cultural changes in society. A financing approach called Farmers Fighting Poverty espoused by international agri-agencies is worth looking into.

In official development assistance, we call on policies that will strongly encourage governments to involve CSOs and FOs in the decision making processes in planning, implmentation and monitoring. The work of IFAD through the farmers; forum processes, the work of FAO through the civil society mechanism of the reformed CFS, and the work of GAFSP in involving CSO members in the Steering Committee—these are steps in the right direction. We hope that various ODAs in agriculture, nutrition and health will develop organized FOs as well. And that assistance be provided to strengthen their capacities for such meaningful involvement. Thank you for your attention.

Speaker Summary Note	
Session:	**East Asia**
Speaker:	Agusdin Pulungan, **President, Indonesian Farmers and Fishers Society Organization (WAMTI), Indonesia**
Title:	**The Farmers Dilemma:** **To secure the food nutrition while meet the market demand**

Food plays an important role in the Indonesian economy where the largest parts of the population are food producers. Food also has a very big share in the cost of living as well as small farmer's income. More than half the country's 245 million people living on agriculture are small family farmers.

When the food prices fluctuated, it affects at large the income of small family farmers. The differentiation between food prices in the market also affects the production as well as the consumption patterns. From the food groups, rice is the most important food consumption and production patterns of the Indonesian small farmers.

The perception of agriculture role is broadly understood as an important state contributor such as for: (1) provider of food for food security at the aggregate level, (2) provider of employment, (3) provider of raw materials for industry, and (4) source of income. *On the path of the economic liberalisation, most of the food polices has been brought to the benefits of trade and market opportunities.* Policies to access capital, market, and input materials were designed as priority mostly for the commercial or market driven and food security purposes. While food for the health and the nutrition especially for the needs of local poor family farmers is most likely behind the priority or still not considered as important.

In the sense of commercial agriculture, farmers in everyday lives are still facing problems in accessing high-quality seeds, fertilizers, water, rural infrastructure and machineries to process and road to transport the yields into the market place and the quality requirement from the trade to meet the demand. The national and local government are busy in developing policies and programs such as financial support for agriculture production and marketing with an extending various credit schemes or grants and programs related to industrial sector development such as the challenges to produce various refined agricultural products of higher quality and high value commodities. Incentive policies to develop the industrial sector have been designed as well as the policies to linkage and integration among small farmers (producers), traders, industries and exporters; and also the design of supported programs to speed up the improvement of agricultural productivity.

Frankly, the attention to understand or to relate between agriculture and production for the nutrition security for the poor family farmers is still missing. Moreover, lack of farmers awareness that agriculture could benefit to provide food for their nutrition and health needs and the less knowledge about the relation between growing food practices, the yields and its nutrition to health a is such an circumstances of the farmers life.

Conclusions

As the conclusion, the causal factors that bring to these conditions among others because of:

- Market and trade dictation
- Poor socioeconomic circumstances (= poverty)
- Ignorance, indifference
- Lack of health education
- The persistence of culture
- Soil condition and climate patterns
- Lack of knowledge of food and its cultivating practices

These problems should be seen at a locality approaches:

- how the actual ability of rural communities in meeting the needs of foods for their nutrition and health in accordance with the preferences and capabilities of the availability of the resources,
- how a flexible approaches to every specific regions implemented,
- how participatory effective food planning and implementation in local level integrate between farmers and government, and
- how in planning, *the market and trade not to be put always at the first place but the needs of nutrition and health for the family farmers.*

Recommendations

1. In fulfilling the needs, it must be considered that the quantity and quality of food which focuses on the potential of local resources to match the availability and habits (culture) of the local community and to nutritional standards. It is necessary to dig a new thinking policy of local food empowerment with a multidimensional approach.
2. To start improving the food conditions of rural communities is only fitting if done with participatory manner and well attention to socio-cultural issues of local communities.
3. The national food policy should be directed to appreciate and support the local food culture (local culture) and utilize the biodiversity resources as the fundament in building the strong access of small family farmers to food that benefit to their health.
4. Promote a campaign program in the rural level, to raise awareness and to improve the knowledge of farmers about the relation between growing food with nutrition and health.

Speaker Summary Note

Session:	**East Asia**
Speaker:	Men Sarom, **Vice Rector, Royal University of Agriculture, Ministry of Agriculture, Forestry, and Fisheries, Cambodia**
Title:	**From Food Shortage to Surplus: Experience from Cambodia**

In Cambodia, general concepts about agriculture, nutrition and health are:
Agriculture = Rice
Food = Rice
Rice = Nutrition and Health

The words food, agriculture and rice are synonymous in Cambodia. Cambodians eat rice in an average of 143 Kilogram per person per annum. Therefore, it is the third largest consumers of rice after Laos and Myanmar.

In Cambodia, rice is about everything: food, economic, social title, and power. About one-third of the country GDP comes from agriculture with the share of about 10–15 percent from rice. Rice is the main staple food of the people, the main source of daily diet, energy, protein and fat. In 2007, from the share of 75% carbohydrate, 10% protein and 14% fat in the daily diet of averaged Cambodians, rice provides up to 65 percent of calorie, up to 55 percent of protein and 13 percent fat.

Within the last ten years, rice consumption has slightly declined due to the invasion of fast foods, increases in the consumption of meats and vegetables. However, this decline is not expected to change the ranking of rice as the major and staple daily diet of the people in the short coming future.

After the fall of the Khmer Rough Government in 1979, Cambodia faced big deficit of food (rice). Donations in the forms of foods and other commodities from international communities were ones of the major issues for the country during that period. However, the situation has gradually changed and as a result of continuous growth in rice productivity, in 1995 the country was declared self sufficient in rice. The development was steady and encouraged. Rice production in the country has strongly grown above the national consumption requirement and consequently in 2009 more than 2 million tons of milled rice was reported as surplus.

This significant achievement has been contributed by many factors, including:

1. New technologies developed and released to farmers
    a. Variety: varieties of major crop plants with high yield and marketable qualities have been developed and released to farmers.
    b. Nutrient management: integrated soil-nutrient management systems, including fertilizer rates for different crop plants at different soil types have been developed and recommended to farmers.

   c. Pest management: some successes in this area through integrated pest management, chemical and botanical controls have contributed significantly to generate both quantity and quality (clean and safe to eat) agricultural produces.
   d. Post-harvest management: significant works have also been carried out in the area of post harvest (harvesting, storing, processing and transportation) for all agricultural commodities originated from crop plants, animals and fishes.
   e. New innovative production systems: some new production systems have been tested, and adapted by the rural communities.
2. Conversion of less productive to more productive production systems
   a. Floating rice to receding rice or irrigated (fully/supplementary) rice
   b. Slashed and burn to permanent crop production system
   c. Single crop production system to integrated farming systems
      - Rice fish farming system
      - Crop-Fish-Animal Farming System
3. Establishment of national agricultural research system, and strong linkage with regional and international networks.
4. Political settlement: the returned of peace to the country after more than 20 years unrests with wars, internal conflicts, and political divisions.

As conclusion, a great success in agricultural production, particularly in rice, has brought Cambodia from a food (rice) donated dependent into a potential rice exporter. However, regardless of this achievement about one third of Cambodians are still living under poverty line of one dollar per day and more than 22 percent of Cambodians are undernourished (higher than in Vietnam 11% and Thailand 16%). It is obvious therefore that the subjects on food security, nutrition and food health related issues are still very much debatable. To solve the situation and to keep people unite on this issue, a compromised strategy may be required.

Suggested actions to leverage agriculture for nutrition and health:

1. Develop crop varieties or animal/fish breeds with high nutritional values, free of toxins as in addition to yield *per se*. This may be the best and cheapest way to secure, both quantitatively and qualitatively, foods for all classes of people.
2. Encourage the development of production technologies/systems that produce less harmful produces for consumption. Active participation from policy makers, producers, researchers and extension people in this action is quite important.
3. Improve post-harvest (processing) management/technologies to prevent the qualitative losses that may happen after the time of harvest. Certain nutritious values in agricultural produces may losses and/or become harmful to the health of consumers.

Speaker Summary Note

Session: **East Asia**

Speaker: Tahlim Sudaryanto, **Assistant Minister for International Cooperation, Ministry of Agriculture, Indonesia**

Title: **Fine Tuning Policies to Better Link Agriculture, Nutrition, and Health**

1. **Accelerate food production and productivity growth, along with quality improvement.** To ensure availability of quality food, we need to increase food supply at national and global level in line with the increase on demand. Major policy agendas are: (a) investment on infrastructures, particularly irrigation, involving private and communities 'initiatives'; (b) investment on Research & Development, with priority areas on developing new crop varieties/animal breed with high yield potential and better nutritious values; (c) promote application of sustainable production system with environment friendly and less hazardous to human health, include food safety standard; (d) diversify food production based on the available local resources;

2. **Increase household access to adequate and better quality food.** The availability of food supply at national level does not guarantee household access (both physical and economic) to food. In term of physical access, the problem is more serious in non-continent countries such as Indonesia, which implies a complex logistic system and high transportation cost. To promote household access to sufficient and better quality food at all times, some policy interventions are needed, namely: (a) improve regional and local distribution system to reduce cost and timely delivery; (b) promote better post harvest handling system to maintain food quality; (c) promote development of regional and local food reserve system, to enable local authority take a quick response in case of emergency; (d) promote income generating activities such as production of high value commodities and non-farm employment; (e) connect smallholder farmers to new market opportunities.

3. **Facilitate the function of trade in improving national and global food security.** Poor household in some developing countries depend on imported food staples to meet their consumption need. Therefore, national governments and international organization should work together to facilitate the working of an efficient and well-functioning trading system. On the other hand, smallholder farmers in developing countries should be active participants and get maximum benefit from this global trade initiative. To better link small holder farmers to market, capacity building programs in the area of market access is necessary.

4. **Promote diversification of diets, particularly in countries with heavily dependent on a single staple food**. In some countries, consumption of staple food is heavily dependent on a single commodity (rice in the case of Indonesia and Cambodia). This consumption pattern creates pressures on the need to increase production in response to a growing demand. To reduce this burden, it is necessary to take initiative in promoting more diversified dietary pattern. Although diversification is positively related to income growth, focusing intervention on non-income factors (knowledge and awareness, availability of alternative

staples) will accelerate the process. This initiative will also creates higher demand for alternatives staples, include those locally grown.

5. **Focus to smallholder farmers.** Agriculture in many East Asian countries is characterized by smallholder farming. In Indonesia, smallholder farmers (operate land <0.5 hectare) have increased from 45.3% in 1993 to 56.4% in 2003. Because of limited access to productive assets and economic opportunity, they suffer from poverty and food insecurity. To alleviate them from poverty and secure sufficient food supply, productivity of their farm have to growth much higher than the average farms. In addition, smallholder farmers also need to diversify their income sources from various non-farm activities.

6. **Improve safety-net program.** To cushion the vulnerable groups from natural and economic shocks, a much better safety net program is necessary. The programs consist of: distribution of subsidized staple food, cash transfer, food or cash for work, etc. Some areas which require improvement are: (a) more accurate data base to have appropriate household targets; (b) improve design on distribution of benefit to avoid leakage to non-targeted household and moral hazard.

7. **Short and medium term initiatives: Appropriate responses to food price volatility.** Continuous price hikes of some food staples in the world market has raised concern to the access of poor household in developing countries to adequate food intake. National governments and related international organization need to work together to mitigate the issues and formulate appropriate policy responses. Some areas of works includes: (a) improvement on market information and transparency; (b) coordination among national governments for better policy responses; (c) develop risk management instruments to cope with price volatility for both farmers and consumers (crop insurance, future market, etc).

8. **Increase coordination across concerned agencies.** Conceptually, development of agriculture, nutrition and health need to be implemented in an integrated manner. However, in practice agriculture and nutrition & health development programs are coordinated by different ministries. Therefore, to come up with an integrated approach, it is necessary to have better coordination among Ministry of Agriculture, Ministry of Health, and Ministry of Development Planning in planning, implementation and evaluation of the policies and programs.

Speaker Summary Note

Session:	**East Asia**
Speaker:	Pattanee Winichagoon**, Resident Representative, Food and Agriculture Organization, Chile**
Title:	**Thailand's Community-Based Nutrition Improvement**

Thailand has implemented the first multi-sectoral nutrition policy and planning in 1977, under the national economic and social development plan (1977–1982). Building up a critical mass and availing information on magnitudes and severity of the problem was found to be essential in order to communicate the urgency of the problems, and convey messages on possible actions to policy makers and planners. One of the early key messages was that malnutrition must not be perceived as a health problem, but rather a result of compromising social, economic development which will impact human capital development. In addition, investing in nutrition program should be viewed as a national investment for intermediate and long-term growth, not simply short-term gains, or welfare expenses. These attitudes are very crucial at all levels, and "nutritional literacy" should be an integral part in planning and implementing nutrition programs.

Although having a multi-sectoral policy and plan is a major step in nutrition improvement efforts, it was found to be only the first step. The implementation in the first five years have encountered several challenges, especially on how to implement the program in an integrated manner. In planning for the fifth national development plan, Thailand's "Poverty Alleviation Plan (PAP)" was a spearhead of the rural development program which can be viewed as a quasi-decentralization effort with focus on poverty stricken areas. During this period, nutrition programs were employed as stopgap measures to relieve the most severe forms of malnutrition until systematic solutions could bring about long-term, sustainable improvement. The main thrust of the Fifth Plan's nutrition policy lie in its program of poverty alleviation for development of backward areas and the nationwide launching of primary health care (PHC). Specific nutrition indicators were set as common goals to be achieved by all relevant ministries.

The PAP was one of Thailand's first efforts to bring about effective and efficient infrastructural reforms conducive to rural development. Effective organizational structure and managerial mechanisms to coordinate and integrate multi-sectoral efforts at various administrative levels and within the communities was critical. Single coordinating organization with full authority and mandates at each level was felt to be better then several organizations with overlapping responsibilities. Four major ministries, i.e., Health, Agriculture, Education, and Interior (Community Development Unit), were involved and streamlined the integrated budgetary allocations to target poor villages through community's Village Committee. Each ministry also strengthened the intra-sectoral collaboration among its various departments or divisions.

PAP employed four key programs, namely, (1) ***Rural Job Creation*** to create jobs for rural people during dry season so that they remain in the communities and participate in community development; (2) ***Village Development Projects*** included village fish ponds, water sources, prevention of epidemic disease of poultry, cattle and buffalo bank, and other development projects focused for improving their economic status and household food security; (3) ***Provision of Basic Services***, i.e., health facilities and health services, clean water supplies, illiteracy education programs, were implemented in the target areas; and (4) ***Agricultural production Program*** included nutritious food production (e.g., crops for producing complementary foods), upland rice

improvement and soil improvement project. Income generation and household food security were the direct benefits. During the five years of PAP, 32 development projects were implemented in 12,562 poor villages in 38 provinces. Approximately 60,000 families utilized new agricultural technologies for agricultural production, and there were 2,655 new village fish ponds. The cattle and buffalo bank was able to lend animals to 20,000 families. Health services through the primary health care approach (see below) reached more than 80 percent of the targeted villages. Only about one percent of the annual government budget was actually allocated under the PAP programs.

The Ministry of Public Health had a prominent role via the primary Health Care (PHC) acts as a core of all nutrition related activities. By 1986, 550,000 village primary health care volunteers were trained, covering almost every rural village in the country. Nutrition activities were integrated within the PHC with other health services, such as, maternal and child health, family planning, immunization, clean drinking water supply. PHC movement was most successful in mobilizing the community to address malnutrition. It was also recognized that successful nutrition programs should not be centrally planned and made into ready-made packages. Rather, they should serve as broad guidelines. Key nutrition programs included nutrition surveillance and community-based growth monitoring, nutrition information, education and communication (emphasizing food security, nutrition knowledge focused on pregnancy and lactation, promotion of breastfeeding, complementary food, increased awareness of nutritious foods, food hygiene and correction of false food beliefs and taboos). Agriculture sector promoted the production of nutritious foods in the communities (e.g., home gardening, fruit trees, cultivation of legumes and sesames, fish ponds, and prevention of epidemic diseases in poultry). Specific focus of young child nutrition included complementary food production and feeding programs at village level, with participation of the women's groups and primary health care volunteers. Salt iodization and distribution targeted at endemic goiter areas were implemented. Extensive capacity building of health personnel, village-based primary health care volunteers and community leaders at grassroots level was to mobilize community participation. Nutrition training was also provided to personnel of various sectors, such as, agriculture and education.

Another major breakthrough was the adoption of the Basic Minimum Needs (BMN) approach in village-based social planning. This is a process for empowering people using BMN indicators in problem identification, prioritization and decision making which has unleashed village resources for community development. Community participation through the PHC and BMN approaches were translated into concrete actions in rural areas in Thailand. Nutrition interventions and indicators were made a part of the community development process, and in planning, monitoring and evaluating development programs. Therefore, the impressive reduction of malnutrition could not be totally explained by the implementation of direct nutrition intervention programs (notably growth monitoring, supplementary food and nutrition education).

In summary, achieving nutrition goals, not only food and nutrition policy are relevant, but also other policies (like primary health care and poverty eradication, as in Thailand), with concrete nutrition objectives. These objectives must be translated with a practical value in mind and explicitly targeted to those in greatest needs. Community-based nutrition intervention programs have a better chance of sustainability if they emphasize community organization for planning and management. Community manpower development based on appropriate technology and information, and a viable self-perpetuating community financing scheme are crucial element of successful nutrition improvement in Thailand. Special efforts should be made to empower people for self-reliance and self-determination so they become agents of change and not simply recipients of societal benefits. Evidence of the sustained impacts on nutrition was also evident from several subsequent national representative surveys of maternal and child nutrition.

LATIN AMERICA AND THE CARIBBEAN

Speaker Summary Note	
Session:	**Latin America and the Caribbean**
Speaker:	Graciela Noemi Albo, **Assistant Professor, Faculty of Agricultural and Forestry Sciences, La Plata National University, Argentina**
Title:	**How Argentina Has Advanced in Regard to the Goals Set by WHO in the Document on the Global Strategy on Diet, Physical Activity, and Health?**

The Program of Prevention of Infarction in Argentina (PROPIA) of the Universidad Nacional de La Plata is based on scientific endorsement of the benefits of replacing saturated and trans-fats by unsaturated fats in foods such as breads, eggs, beef bull frog and lizard using primarily seeds of flax, high oleic sunflower and phytosterols.

What are the strategies proposed by Argentina to the governments in order to reduce the risk of non-communicable diseases (NCD) through its Ministries of Health, Agriculture and Education? What strategies to the agriculture sector? What strategies to the industry?

There are indications that Argentina's business sector has realized that it must reduce saturated fats, sugar and salt concentrations in manufactured products anticipating the opportunity of a new changing market. For example, in 2010 it has increased the farming area of high oleic sunflower oil by 150% (from 200,000 crops to 500,000). However, the area used for farming of flax and canola has decreased in the last decade.

Why not to increase the area planted with these two seeds that are those with higher content of linolenic acid (ALA) and less saturated? Why not expanding the supply of oil rich in unsaturated fats to Spain and Latin America, encouraging the planting of other species such as chia?

The joint action of private sector and the state must establish financial mechanisms (tax relief, pricing, subsidies) and technology support. So far the industry has played its important role in reducing NCDs. However, there was a failure to develop a strong agribusiness sector during the change of Argentine's the role from "breadbasket of the world" to the "supermarket of the world." The industry should also incorporate other types of healthy foods, free of trans-fatty acids and to develop new technologies to recover residual oil that is lost during processing (extraction, shelling). Furthermore, social marketing and educational campaigns and other activities that contribute to the health of the population should be implemented.

The significant progress made by PROPIA following the Global Strategy of Diet, Physical Activity and Health has contributed to the risk reduction of cardiovascular disease in Argentina. Nevertheless, the activities in Argentina had its strongest impact on the middle and high income population that has purchasing power. The Food Security in Argentina recently named that population group the "Rich Skinny." In contrast, the low income population group was called "Poor Fat." In the first third Millennium crisis lead to a higher increase in obesity than malnutrition in Argentina, but in the future it has been predicted that malnutrition may become a more severe problem. It should not been forgotten that there are 45 million hungry people presently in Latin America and the Caribbean (LAC), despite a surplus of food production of 30% to food consumption.

In Argentina, 12.7 million are poor and 4.7 million are homeless. However, Marcelo is well off and has a nice home with Spanish ham that he will share with Noëlito.

On the other hand, the University of La Plata is involved in several projects (in collaboration with non-governmental organizations, foundations and the Bank of the Poor) targeting low income sectors. In particular, PROPIA is participating in projects organizing workshops in order to offer education to mothers of poor households and women in general.

What are the characteristics of healthy foods? How to optimize the few foods (in variety, quantity and quality) used in the “pot meal”?

These are just some of the challenges to the State, agricultural sector, industry and educational institutions. Finally, strategies and actions are needed to grant access to healthy food the most vulnerable and poor population groups.

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Speaker Summary Note

Session:	**Latin America and the Caribbean**
Speaker:	Jaime Miranda, **Associate Professor, Faculty of Medicine, and Director, CRONICAS Center of Excellence to Combat Chronic Diseases, Universidad Peruana Cayetano Heredia, Peru**
Title:	**Identifying Potential Levers for Agriculture From the Public Health Perspective**

We all in this session agree that agriculture, health and nutrition are interconnected. Without needing to look at the statistics, we also agree that the problem is of considerable magnitude and relevance across the world. This statement, quite possibly, will be accepted without further challenge. A major difficulty, however, remains to be addressed. That is, to identify what is the problem that we can address together and where we can jointly act upon? What is the single outcome we would all like to achieve?

It is fair to acknowledge that one of the greatest strengths of this gathering relies on the wide range of participants in itself. We all come from different backgrounds, constituencies, management styles and professional cultures. On a day-to-day basis, we are constantly exposed to a variety of multi-sectorial initiatives, programs, targets, and challenges. That is not new. Also it is not new that working inter-disciplinary and between sectors is not easy. And above all, governance and political commitment is an asset hard to secure.

Thus, given this diversity, is it perhaps not so farfetched to postulate that we will not agree on a joint identification of the problem we want to address. This is not to say that we will not be able to reach agreement on a joint framing or contextualization of the problem. But, singling out where we can concentrate our energies together will prove rather difficult, or at least not so simple. Then we should ask whether this is the right approach, to concentrate our efforts towards a single outcome, or perhaps it might be better to support each other in separate yet complimentary outcomes. Each strategy will require different approaches.

From a public health perspective, hereby I highlight some of its current challenges, which can well be opportunities to indentify additional levers for agriculture, not only for its practice itself but also looking at common avenues of future interconnected work. I have aggregated these in 3 points, which is not say that they are independent one from another.

1. **Population trends, demography, urbanization—Are we missing the human factor?**
   In year 2008 the world's urban population surpassed, for the first time in history, the rural population. An ongoing driver for this ongoing urbanization phenomenon is rural-to-urban migration. This is not new, and our and future generations will have to deal with increased urban poverty, limited public spaces and more overcrowding. On the other hand, when talking about agriculture, at least to me and perhaps to some policy-makers, the unnecessary dichotomization of two-poles comes to mind: small-scale subsistence rural farming and large-scale industrial-type exportation-oriented agriculture.

   In the context of more people living in urban areas with limited availability of healthy public spaces, the public health community is turning towards the built environment as a limiting

and/or enhancing factor of healthy lifestyle changes. Simple non-medical interventions more related to urban planning or to the urban environment can improve a range of health outcomes, e.g. bike lanes and open public spaces increase the uptake of physical activity, which in turns has benefits across age-groups.

And here is where we are missing one potential link: urban farming and/or urban agriculture has been largely overlooked. It is not a new concept, but one who deserves more attention. Firstly, in today's urban societies, the availability of healthy products in families assumes a passive "consumption" role of individuals. Secondly, in the context of rural-to-urban migration, we could expect that most of these migrants—at least in developing countries- are indeed more familiar with cultivating the land, which is not the case for urban-born people. It is a big assumption, but the return is potentially big. Support, subsidize and promote urban farming using shared public spaces to grow and feed locally urban societies using migrant groups as an entry (relatively) easy-to-train asset. The creation of shared public spaces does indeed contribute towards the feeling of "belonging" and improves the social capital, a measurement of integration of individuals with their wider surrounding community. This proposal thus provides an additional pathway for health benefits arising from agriculture-driven activities, including nutrition-related outcomes (better food leading to better nutrition, including the concepts of early-life determinants of adult diseases) and health-related outcomes (ranging from improvements in mental health to cardiovascular risk factors).

2. **Indicators for monitoring success**
   Another challenge in the process of (re)framing this debate across fields is closely related to monitoring. From the public health and development sector, policies and progresses on nutrition-related outcomes has been largely—and narrowly—concentrated on undernutrition. Overweight and obesity are indeed already affecting our populations, and our indicators, for all sectors, need to consider this. Svedberg has proposed an alternative approach to traditional indicators in children, and has even expanded it to include overweight.[56] This approach has been used in some developing countries highlighting the limitations of traditional indicators focusing on single indicators.[57]

3. **Major operational obstacles for countries at different stages of transition**
   The majority of public health professionals may be more familiar with the demographic and epidemiological transitions than the nutritional transition. Paarlberg[58] describes three different scenarios of diet transitions that require different approaches and strategies. The diversity of our region, in addition to rampant inequality, means that two or more of these stages do coexists within each individual country. This complex scenario imposes major operational obstacles or implementation challenges most likely to sore when addressing governance of future actions, plans and policies. Addressing these in advance means that attention needs to take place to properly establish intervention or research priorities, to plan develop capacity building efforts

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across sectors, to enhance collaboration between sectors, and last but not least, for these sectors to create a strong convincing argument to involved more powerful sectors (Ministry of Economy) as well as to engage other relevant ones (education, women, development, among others).

Speaker Summary Note	
Session:	**Latin America and the Caribbean**
Speaker:	Eduardo A.F. Nilson, **Substitute Coordinator of Food and Nutrition, Ministry of Health, Brazil**
Title:	**Perspectives from Brazil:** **Rethinking how we each do business**

In the last decade, Brazil has pioneered important efforts to redefine policies that relate agriculture, health and nutrition, rethinking the constraints that lead to hunger and malnutrition, while also facing the challenges represented by the demographic, epidemiologic and nutritional transitions and the local, national and global scenarios of the food chain and its economy.

Malnutrition, although not totally eliminated, because higher risks are still associated to socially vulnerable groups, as indigenous, afro-descendant and low income populations, has been drastically reduced. On the other hand, the Brazilian population is living longer and increasingly adopting unhealthy lifestyles, especially in relation to dietary habits, and, in consequence, overweight and obesity have become priority public health issues, as well as chronic non-communicable diseases are continuously rising and are placed among the main death and hospitalization causes in the country. Meanwhile, Brazilian economy grows stronger, population income has increased, bringing new consumers to the market (base of the pyramid) and, in the agriculture sector, homegrown agriculture, small farmers and large agribusiness enterprises coexist and often compete for land, labor force and other resources.

In Brazil, the major linkages between agriculture and health and nutrition have been through an intersectoral approach to social and economic policies, centered on food and nutrition security, on the Constitutional right to food and on the territorial organization of local actions, so food production, distribution, consumption and nutrient intake are all connected.

Since 2003, the Hunger Zero Program has symbolized this governmental priority on food and nutrition security, that, although, had already been stated years earlier, in the National Food and Nutrition Policy (1999), which reinforces these policies through its directives: guaranteeing access to food, promoting promote healthy diets and implementing food and nutrition surveillance from the local to the national level.

Some of the most important food and nutrition security policies include improving coverage and quality of primary health care (through Family Health Teams), redistributing income (especially through cash transfer programs, as the *Bolsa Familia* Program, which allies the access to food to basic social rights as health and education), stimulation of local agriculture (mostly through homegrown production) and the school meal program (which covers over 45 million students and much purchase at least 30% of its food products from local producers).

From the health sector perspective, reinforcement of primary health care and food and nutrition actions have also played important roles in redefining health policies, improving access to health and nutrition care and articulating social policies in the local level. The territorial approach by primary health care has also allowed articulations with the *Bolsa Familia* Program, schools and social

equipments, contributing to approximate the local food and nutrition security strategies to local food production.

Food and nutrition surveillance is also focused on this territorial and food and nutrition security approach, by providing information for policy and decision-makers through surveys, studies and health information systems, including the Food and Nutrition Surveillance System (Sisvan), fed directly at the local level, as an instrument for individual and collective surveillance for nutrition status and food consumption markers.

From the food and nutrition security intersectoral perspective, as was done within the National Food and Security Council (Consea), building monitoring and evaluation systems has also been a key element by gathering data sources from different sectors and organizations, helping to diagnose the situation of each of its dimensions (food production and availability, income and food expenditures, access to adequate food, health and education) and map links and perspectives for action.

National Expenditure Surveys have provided information for monitoring the fluctuations in food availability through time in Brazil, along with other relevant food consumption evaluations, which can guide agriculture and provision policies in order to promote healthier diets, by rethinking food supply, transportation and availability in order to facilitate healthy food choices for all the population, especially the most vulnerable groups.

In terms of key potentials and priorities for promoting health and nutrition through agriculture, the Brazilian experience has shown that production and demand must match at the local level, by respecting regional cultures, habits, climate and foods and the specific nutritional requirements of the populations and improving access to healthier foods (especially fruits and vegetables). Also, at the local, national and regional levels, agriculture, health and social policies must be articulated and strengthened in order to focus their efforts and multiply their outcomes, along with strong monitoring and evaluation systems which can subsidize all sectors and stakeholders in policy and decision-making.

Despite all achievements during the last decade, the main challenges in Brazil are still related to improving the articulation of food production, poverty, health and nutrition policies, for even more impacts on health and nutrition, especially in terms of infant mortality and malnutrition. The current governmental priority of eradicating poverty will certainly contribute to that, by setting a strong political environment for integrating local food production and poverty and infant mortality reduction policies and may as well help other countries in achieving their health and nutrition goals through articulated policies and improving the achievement of the Millennium Development Goals, especially in Latin America.

Speaker Summary Note	
Session:	**Latin America and the Caribbean**
Speaker:	Ana Victoria Roman, **General Coordinator, Nutrition and Food and Nutrition Security Division, Institute of Nutrition in Central America and Panama (INCAP), Guatemala**
Title:	**Building Capacity on Food and Nutrition Security: The Experiences of Central America and the Dominican Republic**

Malnutrition, including macro and micronutrient deficiencies, and the growing prevalence of non communicable chronic diseases remain as public health problems in Central America and the Dominican Republic, with resulting implications for individual well-being and the sustainable growth and development of the countries of the region.

Multi-sectoral policies at the regional and national level

At the regional level and in the framework of the Central American Integration System, SICA initiatives, strategies and policies have been adopted with the participation of different sectors, including health, agriculture, education, and environment. In 2008 at the Presidential Summit of Central America and the Dominican Republic, the Regional Health and Agro Environmental Strategy was approved as a result of a participatory process lead by the Council of Ministers of Health, Agriculture, and Environment of the eight participating countries. In this process and that of other regional initiatives the results of the evidence generated at INCAP in five decades of research on high impact nutritional interventions primarily targeting pregnant women and children under two years of age was used to develop regional, national, and local plans of action. This evidence was also used as a reference in the policy brief: “Scaling up Nutrition: a Framework for Action” prepared with the support of the Bill and Melinda Gates Foundation, the Government of Japan, UNICEF, and the World Bank.

At the country level, the coordination of activities related to food and nutrition security are under the responsibility of the National Authority of Food and Nutrition Security which has a mandate to coordinate the participation of various sectors, including health, agriculture, environment, economy, and planning.

The technical cooperation and assistance activities that INCAP undertakes in the eight member countries, (Guatemala, Belize, El Salvador, Costa Rica, Nicaragua, Honduras, Panama and the Dominican Republic) includes support for the formulation, implementation, and strengthening of national programs and multisectoral (health, agriculture, social protection, education and the private sector) and interdisciplinary National Commissions to reduce chronic malnutrition. Within this multisectoral approach specific pro-nutrition actions have been taken in the countries of the region accelerating actions on determinants of undernutrition like inadequate income and agricultural production. For example, in Guatemala a public private partnership led by the Association of Exporters in close coordination with the Ministries of Agriculture, Economy, Health and Social Assistance, Education, and the support of INCAP, provides technical assistance to organized groups of small holder agriculture in the rural areas of the country as a strategy for poverty reduction, focusing actions in those municipalities where the prevalence of chronic

malnutrition is over 45%. At present, more than one hundred groups of producers have strengthened their capacities for international certification in good agricultural practices with a real possibility of assuring markets and income for their families. DANIDA, FIDA, and USAID through the Fund for Competitiveness have sponsored this initiative. This program includes a component on health and nutrition for the reduction of chronic malnutrition in the families that integrate each of these collective producer associations. The direct nutritional interventions of this program include exclusive breastfeeding for the first six months of age; complementary feeding for infants after the age of six months; improved hygiene practices including hand washing; access for families to health services including maternal and child programs, micronutrient supplementation including vitamin A, therapeutic zinc supplements for diarrhea management, iron and folic acid supplements for pregnant women to prevent and treat anemia, use of multiple micronutrient powders, consumption of fortified products (iron and iodine), and assistance of girls to the formal education system.

Some of the accomplishments include: access to health services by women and children under two years of age; introduction of food and nutrition security in the school curricula of the participating departments; nutritional interventions incorporated into smallholder agriculture, including the production and consumption of fruits and vegetables; identification of indicators for undernutrition for monitoring progress and judging overall progress in the agricultural sector; and improving women´s access to income for enhancing household food supplies.

This initial effort can potentially highlight effective approaches and show what works and what does not. It is important to examine how successes can be adapted and scaled up, taking into consideration the lessons learned.

The main challenges:

- Governance and continued political commitment
- Impact assessment indicators for monitoring success
- Provision of substantially scaled up domestic and external assistance for the country owned nutrition programs and capacity
- Adaptation of this experience in other countries of the region

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HIGH-INCOME COUNTRIES

Speaker Summary Note

Session:	**High-Income Countries**
Speaker:	Linda Fulponi, **Senior Agricultural Policy Analyst, Directorate for Trade and Agriculture, Organisation for Economic Cooperation and Development (OECD), France**
Title:	**Reflections on Leveraging Agriculture to Promote Nutrition and Health**

Understanding linkages between agriculture-food-diet and health

- How do the links between agriculture and nutrition/health operate? To set attainable objectives and frame policies it is crucial to understand their functioning in some detail. What do we know? what do we need to know?
- Adequate or abundant food supplies are not synonymous to adequate nutrition and good health. Incentives to production are fairly well known but not those for food choices. The link between agriculture—food—diet means understanding consumers' consumption behaviours.
- Traditional agricultural policies in OECD countries have focussed on ensuring adequate incomes for farmers as well as food supplies within a context of technological change that has increased agricultural productivity and driven down real food prices. Direct and indirect support policies to agricultural producers of specific products such as dairy/meat/sugar/cereals/tobacco manifest little concern for their health or nutrition consequences of their consumption. In fact agricultural and health policies can be seen to often conflict.
- Food industry, transforming agricultural products into food, is an important part of the equation linking food/diet to nutrition/health, but nutrition and health have not always the priority.
- Globalization of the food system has opened up access to greater variety of food at low cost ? But have the choices improved nutrition and health better for nutrition?

Setting agriculture-health policy priorities: present and future

- Where poverty is the root of the malnutrition/hunger, then poverty which is itself a result of underdevelopment needs to be tackled. This requires multi-sector/multi task approach. Yet there are few solutions in sight, because we still know little on why some develop/grow and others not. More needs to be known on the cause of poverty/hunger/malnutrition of specific situations/regions so as to design better policies/approaches and target specific communities/regions/areas.
- Income growth should have a positive impact on malnutrition and hunger, if calories from nutrient rich foods, grains and vegetables are NOT replaced with foods high in fat and sugar.
- Food markets are now global and as incomes rise these countries draw investment by food industries supplying the 'western' diet the result of which is the generation of foods habits with unintentional consequences of overweight and obesity.

- Many countries face combating rising obesity in urban areas and hunger/malnutrition in rural areas. According to FAO, the nutrition transition is also happening in the rural areas as rural farmers give up mixed cropping for a single cash crops and the income used for food
- Policy coherence across health and agricultural sectors is required to avoid the more deleterious health/nutrition outcomes of OECD countries. Cross sector cooperation in policy formulation essential: at local/regional and national levels. Promotion of agricultural production needs to be done with a view to nutrition and health in short and long run:
- Policies need to be coherent across sectors, targeted and time-limited both on the production and consumption side. Monitoring outcomes and maintaining flexibility—to switch roads and objectives when needed is essential.

Double challenge for developing countries eliminating hunger and malnutrition and battling the trend in overweight and obesity

Speaker Summary Note

Session: **High-Income Countries**

Speaker: Brad Gilmour, **Chief, International Analysis, Agriculture and Agri-Food, Canada**

Title: **Reflections → Leveraging agriculture to improve nutrition and health outcomes**

It is a great privilege to be here. Thank you to the organizers and hosts for inviting me. I will touch on four theme areas: (1) getting diagnostics right; (2) establishing priorities and remedies based on the likelihood (or frequency) and severity of prospective system shocks; (3) anecdotes and musings on whether and how to reduce vulnerability and rebuild resilience in our agri-food eco-systems and value-chains; (4) avoiding capture and the creation of "gatekeepers" and bottlenecks wherever possible. This draws on my experience in East and South East Asia as well as in the OECD economies of Canada and Australia.

(1) Getting Diagnostics Right

Getting the diagnostics right is of fundamental importance to the design and delivery of "remedial measures." Ill-conceived "prescriptions" may do more harm than good.

I have long been impressed with the structured approach friends and colleagues in the veterinary, epidemiology and plant pathology fields use to deal with health and environmental risks. Their application of Hazard Analysis at Critical Control Points (HACCP) framework is something that—with some adaptation to encompass markets and infrastructure—can yield useful risk mitigation and management strategies and insights for the challenges confronting us in terms of improving nutritional and health outcomes for the poorest households on the planet.

In the current context, it is important to differentiate between: (a) causes and drivers; (b) symptoms; (c) consequences. Depending on their nature, frequency and amplitude of their impacts, risks are typically best dealt with by either directly addressing their root causes or the driving forces behind them *ex ante* and/or by dealing with their consequences *ex post*. Focussing on symptoms rather than causes can result in sub-optimal outcomes, wasted resources and, in some instances, actions which actually exacerbate matters in the longer run. There has been a lot of focus lately on the issue of volatility—which is indeed problematic—but which is more of a symptom of challenges elsewhere than a cause or a consequence; an over-preoccupation with volatility can actually be a distraction from constructive effort elsewhere.

(2) Establishing Priorities Based on Source, Likelihood and Severity of Prospective Shocks

Recent stresses within the world's agri-food complex have arisen as a result of the confluence of: (1) supply side shocks arising from a variety of sources; (2) rising affluence and standards of living in emerging economies; (3) prolonged under-funding of agricultural research; (4) patchy or inadequate infrastructure and/or value chains; (5) new technologies that increase the linkages between food, fibre and fuel markets and competition for natural resources and commodities; (6) income shortfalls; and (7) misguided policies.

In the context of stress placed upon the world's food systems and markets, it should also be noted that because food is a necessity—actual demand changes are moderate and gradual regardless of whether we are in a boom or in a bust cycle. Consumers may substitute cheaper food items for more expensive items and, in wealthier economies, eat out less. But consumers cannot delay food purchases indefinitely as they can with discretionary purchases. While demand-side events do impact upon price levels over time, they do not typically impact as directly or as much on volatility as supply-side phenomena or policy choices do.

Within risk assessment and risk management frameworks, some assessment of (i) the likelihood of a certain kind of event, and (ii) the severity or magnitude of impacts or consequences of such an event are the dimensions of concern that will inform priority setting with respect to whether or not action might be warranted. In the case of supply shortfalls, for example, do they arise from (examples only, not exhaustive):

- infectious diseases
- water scarcity
- infrastructural bottlenecks
- land/soil degradation or depletion
- invasive species
- flooding and other natural disasters
- weather / climate shocks
- misguided policies or incentive systems
- waste or misallocation in the value chain or distribution system?

To what extent can we establish likelihoods for the above events? What is the nature and severity of their consequences? Do they fall within the range of things we can influence or control or are they simply things we have to accept and react to? Are their impacts static and once-off (e.g., a poor crop year) or are they dynamic in nature (e.g., an infectious disease)?

(3) Reducing Vulnerability and Promoting Resilience in Agri-Food Systems

Given the relative importance of supply side phenomena and policy choices on volatility and system stresses, more precision is needed about the nature and origins of such phenomena if pre-emptive or remedial measures are to be contemplated and well-designed. Shocks to the system can come from a number of sources. For illustrative purposes, I will briefly discuss potential shocks relating to water resources and wheat production. I will also touch briefly upon the issue of conceivable disruptions and waste in the distribution system and in the value chain.

Water. Together with the land or soil, water is a key resource used in agri-food production worldwide. In many countries (if not most), however, water is undervalued as a resource. The incidence and amplitude of water-related stresses appears to be on the rise. Important agricultural regions in China, India, Mexico, Australia, Africa, the U.S., and elsewhere are already experiencing serious water scarcity. Global water requirements are expected to increase by 40 percent over the next 20 years. If trends continue, by 2025 competition between urban, industrial, and agricultural water uses will constrain both economic growth and agri-food production. Consequently, the importance of managing water resources well is also rising.

While undervaluation is problematic under the best of circumstances, it is particularly worrisome when water is scarce as it results in over use, depletion or degradation of the resource. Because of price distortions, extraction technologies are favoured over water conserving approaches. In extreme cases, this can result in over abstraction of aquifers in some localities and salinization and water-logging elsewhere. To avert serious shortfalls in crop production (not to mention ecological disasters) and some attention must be paid to improving crops' tolerance to drought and extreme

events and by improving water governance through appropriate pricing and aligning infrastructure, institutions, entitlements, obligations and incentives.

Staple Crops (Wheat). The production and yields of wheat, corn, rice, soybeans and most other agricultural crops are very dependent on weather related events (temperatures, precipitation). There is some evidence that the incidence, timing and amplitude of weather events is changing. To name just a few "events" that are increasing in frequency and amplitude:

- *Temperature above 30ºC for more than 8 hours* → can reverse vernalization
- *Water stress* → can impact upon flowering, pollination, and grain-filling
- *Excess soil moisture* → can cause water-logging, increase risk of fungal infestations

Obviously, one approach to such emerging challenges is to engage in crop-related research and extension activities geared directly to such extremes of temperature, drought and water-logging.

Another conceivable strategy is composite seeding. To deal with variation in weather and agro-ecological conditions which affect plant growth, some scientists have started experimenting with something which, loosely translated, might be called "composite seeding". In North-East China, for example, instead of planting just one wheat variety on a particular plot of land, they plant a collection of seeds from different varieties but with the same range of gluten and protein levels. Depending on the kind of year they have from an agronomic perspective, the varieties best suited to the rainfall and temperature conditions will predominate. While the results are still tentative, I understand that this cluster approach has reduced yield variability and concurrently raised yields by ~ 15 to 25 percent on average since they started experimenting with it. But, obviously, this would pose a challenge for systems with a strong attachment to strict interpretations of "product integrity" varieties/classifications.

This approach will obviously not be satisfactory for specialized seed producers. However, for food and feed production and consumption, it is an approach that we may want to consider in the event that the frequency and magnitude of weather events and agronomic conditions increase. But it may require a re-calibration of our thinking and approaches to crop production, grading, processing and other value added activities.

Disruptions to the Distribution System. The recent volcanic activity in Iceland—though far from the worst of its kind—disrupted trans-Atlantic movements of people, services and goods, causing some folk to reconsider certain features of the hub-and-spoke model of distribution.

Policy Design Considerations. In supporting agriculture and farming, perhaps we need to ask whether and which among our policies and programs promote practices that are resilient from an economic, agronomic and ecological perspective. When production losses are incurred and compensation is paid, do we inadvertently foster complacency in the face of shocks or environmental damage? Are there any policies and programs which encourage "stickiness" with respect to a tendency to keep farming the same crops when other crops might be more environmentally benign or less susceptible to environmental oscillations?

(4) Avoiding the Creation of Gatekeepers and Bottlenecks

Avoid Gatekeepers and Bottlenecks. While typically well-motivated, administrative approaches tend to be more lethargic, prone to preferential access and capture, preclude choice in the methods for achieving objectives, and susceptible to the creation of rents that run counter to society's interests.

They often result in rationing or queuing behaviour and inadvertently encourage wasteful lobbying, all of which affect poorer households disproportionately.

Speaker Summary Note	
Session:	**High-Income Countries**
Speaker:	D. Patrick Johnson, **Associate, Diplomacy and International Development, Booz Allen Hamilton, USA**
Title:	**The Role of Public Policy in Shaping Agricultural and, by Extension Health and Nutritional, Outcome**

Agricultural policy can be designed to have any number of desired outcomes

- Governments typically adopt policies that enable low food prices at home, maximize export value of crops and optimize resource and environmental constraints.
- Oftentimes, these objectives are competing and require a prioritization based on local needs and constraints.

In the United States during the Nixon Administration, a decision was made to pursue a "cheap food" policy

- Previously, the USDA helped maintain farm incomes by limiting production. In other words, some farmers were paid not to farm.
- However under Nixon's Ag Secretary, Earl Butz, this policy was reversed. Now, farmers would be given direct payments, subsides and price supports to encourage more production. The goal was to grow more food, and pay less for it in the supermarket.
- Earl Butz's "Get Big or Get Out" mandate in agriculture led to productivity gains from increased consolidation and specialization. With increased output, prices fell.

By pursuing "cheap food," U.S. farm policies achieved their desired outcome, but also introduced new and unexpected consequences

- Since the focus on "cheap food," the percentage of income spent on food in the US has fallen by nearly 50%.
- However while food prices were falling, the amount spent on health care has more than tripled (from 5% in 1960 to 16% today). Much of this increase is tied to dietary disease.
- Additional challenges have also resulted in food safety (traceability), as well as the environmental toll of agricultural production.

Applying this lesson to the developing world, care must be taken to ensure that agricultural policies align with national objectives

- There is no "one-size-fits-all" approach.
- Agricultural policies should be tied with national health, nutrition, environmental, economic, developmental and political goals.

As demonstrated in recent client engagements, many countries struggle with finding the right balance

- In many parts of the world, agricultural output remains a legacy of colonization.
- A huge opportunity exists in modernizing agricultural systems in these areas.

Speaker Summary Note

Session: **High-Income Countries**

Speaker: Eileen Kennedy, **Dean, Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy, Tufts University, USA**

- The entire concept of agriculture-nutrition linkages is not new. Indeed, research conducted in the early 1980s at IFPRI contributed significantly to our knowledge and debate surrounding the potential of the agriculture sector linked to the health sector as a way to improve nutritional status. The International Conference on Nutrition convened in 1992 by FAO and WHO also had a significant focus on agriculture nutrition links.
- Success stories on approaches linking agriculture/nutrition as a way to significantly enhance nutritional status are not as plentiful as many policy makers would hope.
- This conference provides us the opportunity to revisit leveraging agriculture and health as a way to achieve quantum leaps in improved nutritional status.
- The challenges are different than in the 1980s. The Global Face of Nutrition has changed; we now have the double burden of disease—problems of under nutrition existing side by side with problems of diet/chronic diseases. The ink was not even dry on the Millennium Development Goals, when it was clear that in some of the poorest countries of the world overweight and obesity and diet related chronic diseases are increasing at an exponential rate.
- The challenge is to articulate what combinations of policies and programs are needed to address the double burden of disease.
- Some significant efforts have already been launched with the political commitment to different paradigms for dealing with this Global Face of Nutrition. These include among other: Scaling Up Nutrition, Feed the Future as just two examples.
- While these efforts are focused on under nutrition in the pregnancy and preschool period, some elements of these initiatives are salient when we look at how to deal with the double burden of disease.
- A major obstacle to success in reducing diet related chronic diseases is the nearly complete lack of data on “delivery science”—that is the “how” to implement policies and programs, not simply the what. So for example, there are no examples of country-wide approaches to decreasing overweight and obesity that have been shown to be cost effective.
- Unlike some of the interventions with proven effectiveness—breastfeeding, micro-nutrients interventions—the preliminary evidence suggests that prevention of overweight and obesity will require much more multi-sectoral approaches.
- At agreed to at the 2000 National Nutrition Summit in the U.S. opened by then President Bill Clinton, food security is the foundation of good nutrition. Thus food security strategies that ensure access to nutritious foods is essential to addressing the global nutrition problems.
- Increasingly populations, including low income populations are getting their food from the commercial sector. Therefore there should be a serious conversation about models of effective public-private sector partnerships that can be used to improve overall diet. What

types of product formulation and reformulations are necessary in order to more effectively achieve improved diet quality?

- Capacity development at all levels is essential in order to identify newer paradigms for improving nutritional status. This capacity development needs to include human capacity, institutional capacity, political capacity and advocacy capacity. The public health community needs to identify innovative methods for quickly improving these capacities at all levels.
- It is unlikely that a “one size fits all” approach will be effective. Therefore there needs to be serious discussions about how to tailor policies and programs with demonstrated effectiveness to different geographical and economic environments.
- While a lot has been learned about essential actions for nutrition, there are many more gaps in our understanding of essential actions to link agriculture to nutrition to health. The OECD countries could make a major contribution by identifying strategies that can potentially be modified or adapted to other national environments.
- Some say the problems of food insecurity and diet/chronic diseases are daunting. There is now a window of opportunity to achieve success in improving nutritional status globally if we can engage in innovative research and newer partnerships involving the public/private sector.

REIMAGINING HOW AGRICULTURE, NUTRITION, AND HEALTH CAN LINK BETTER

Speaker Summary Note

Session:	**Reimagining How Agriculture, Nutrition, and Health Can Link Better**
Speaker:	Prabhu Pingali, **Deputy Director, Agricultural Development, Bill & Melinda Gates Foundation, USA**

At the start of this conference the Prime Minister of India Dr. Man Mohan Singh reminded us that agriculture is a necessary, although not a sufficient condition, for improved nutrition. That is certainly true! Agriculture productivity growth has a proven track record as an engine of economic growth and poverty reduction, especially when it is focused on smallholder systems. Agriculture growth has triggered positive nutrition benefits in the vast majority of cases.

Yes, there are several examples of disconnect between agriculture growth and nutrition important, this conference is being held in a country that is seen as a major outlier where malnutrition levels are still unacceptably high despite decades of Green Revolution lead productivity growth. That has been a major concern of this conference.

A closer examination of the data, disaggregated by districts, shows that malnutrition levels are disproportionately concentrated in areas of low agricultural productivity. For these areas, investing in small holder agriculture productivity growth is a necessary first step to better nutrition. Complimentary investments in water, sanitation, literacy and gender empowerment are needed to ensure sustainable improvements in nutrition and poverty reduction.

While I am a strong proponent of smallholder agriculture productivity growth, I also acknowledge that we can learn from the past and minimize some of the unintended consequences of past experiences. Historically agricultural intensification has been associated with particular crops, rice and wheat in Asia, maize in Latin America and Africa. Technology R&D, infrastructure and policy support have all been directed towards the rapid and sustained adoption of particular crops. Policies that promoted staple crop production tended to crowd out the production of non-staple crops, such as pulses & legumes, such as in the Indo-Gangetic plains of India. Relative prices of micro-nutrient dense foods rose relative to the staples. Can we design a policy that promotes agricultural intensification and productivity growth without being biased towards particular crops. A crop neutral intensification policy leaves crop choice to the farmer who bases it on market signals. In most areas the dominant crop would still be the staple cereal, given the high demand for staples, however we would also observer a higher level of diversification that we see today.

Despite the rapid rise in demand for non-staple food, especially for fruit, vegetables, milk and meat, the supply response has been extremely limited. It's puzzling that there has not been as much attention to this issue as one would have expected. Part of the reason for the slow supply responsiveness is the policy disincentives that I discussed earlier—the bias towards staple cereals. Part of the reason is also because of the structural impediments to enhancing non-staple food production. Market infrastructure, storage systems, and transactions costs associated with linking to organized retail chains have limited diversification. The lack of a vibrant private sector in the early stages of development adds to the problem of poor supply responsiveness. Targeted efforts towards market development and reducing smallholder transaction costs associated with market participation can enhance the supply of micro-nutrient rich food and reduce their relative prices.

Food Quality and safety are directly related to improved nutrition. Food borne pathogens, mycotoxins, etc., limit nutritional intake and increase the risk of chronic diseases. IFPRI's research shows that Aflotoxin contamination in maize and peanuts in Africa for instance, could have resulted in 36 million DALYs lost per year. R&D on varietal improvement, biocontrol and improved post harvest practices are urgently needed to combat the Aflotoxin problem.

Finally, I would like suggest that a major gap in our work is the lack of useful and credible data, especially at the household level that can allow us to understand the links between agriculture, health and nutrition. Without such data, it is hard for us to assess who the malnourished are, where they live and the progress or the lack thereof in their nutritional status. Lack of representative and credible panel data also prevents us from being able to assess the impacts of alternative pathways to nutrition improvement. Investing in better data will allow us to understand the multi-dimensional nature of poverty and malnutrition among rural households and a better understanding of the opportunities for improving their lives.

I would like to congratulate IFPRI for a great conference and I thank you for your attention.

WAY FORWARD

Speaker Summary Note

Session: **Way Forward**

Speaker: Shenggen Fan, **Director General, International Food Policy Research Institute, USA**

Title: **Way Forward and Closing Remarks**

There is a saying that goes: Be careful what you wish for. When we planned this conference, we hoped it would get people from various countries, sectors, and disciplines engaged and discussing. But I confess that we did not anticipate the strong momentum that developed. You became engaged and started discussing on Day 1, and you haven't stopped since. You've discussed ideas in the official sessions, the side sessions, the discussion sessions, and the knowledge fair. You have networked and exchanged cards and formed new friendships at every opportunity. The high level of engagement and excitement at this conference, and the quality of the discussions, have been tremendous.
Let me now add a few thoughts to this discussion.

Ladies and gentlemen, this is a timely moment for all of us to come together. A bigger role for agriculture on the international agenda, and the prospect of higher food prices, have turned the world's attention to food policy. Policymakers and the development community are looking for solutions. As Prime Minister Manmohan Singh rightly said, every person has the right to food. We need to do much more to meet the human right to healthy, nutritious, and sustainably produced food.

So, after three days of deliberations, what do we have to offer? Over the course of this conference, we have seen a great deal of enthusiasm, a lot of good ideas, and a new openness to dialogue across sectors. How do we channel that energy into new ways of thinking and acting? To help launch a conversation about the next steps, we at IFPRI have prepared a "Way Forward" Statement with input from the Conference Advisory Committee. This statement proposes some initial ideas about how we can get started and is based on four building blocks.

First, fill the knowledge gaps.
We need to invest much more in learning about the links and the best ways to exploit them.

Second, do no harm.

The links between agriculture and health and nutrition can be both beneficial and detrimental, so, let's minimize the cases in which the three sectors work at cross-purposes.

Third, seek out and scale up innovative solutions.

So far, examples of interventions that combine two or three of these sectors are rare, but they do exist, and we should build on them.

Finally, create an environment in which cooperation can thrive.
Partnerships, communication, and mutual accountability can create incentives for working together.

This Way Forward statement is a living document subject to further debate and change. We invite

you to go to the IFPRI website to contribute your own comments.

But beyond the Way Forward statement, as I've listened to the three days of presentations and discussion, I have noted some recurring themes.

First, I have heard that we need to do more to spread the word.

Those of us here at the conference are the converted, so we have to do more to communicate the importance of the links between agriculture, nutrition, and health to others. We all suffer from information overflow. To get our points heard, we need to combine hard evidence with good storytelling. By talking to both policymakers and various stakeholders about the potential for positive change, we will help build both the supply of and demand for sound policies in these areas.

Second, we need to improve the evidence base on these issues.

Our research agenda should tackle the most urgent questions. What kind of agricultural growth does most for people's nutrition and health? How can we measure nutritional impacts of agricultural interventions? How can we best organize policies and interventions that cross sectors? Stronger evidence will give policymakers and development agencies the confidence to act while agriculture remains high on the agenda, and a reason to act if the world begins to turn its attention away. This does not mean we need to wait until all the evidence is in before we take action—we already have some information about what works, and concrete actions can also serve as tools for learning.

Third, we need to improve the policymaking process.

Each of the three sectors perceives itself as neglected and underfunded, and no doubt they are. But we have generated a lot of information about the potential for synergies among the three sectors, and this potential becomes clear when we start talking to one another. Policymakers have the chance to capture an enormous opportunity to improve people's lives. Let us show them the way forward and support them in doing it.

Fourth, let's move this marketplace of ideas into education.

Let's make sure that students in agriculture, health, and nutrition don't graduate without knowing something of the other two sectors. Then, by the time they enter the professional world, these young people will have developed a habit of thinking multisectorally. This means changing how educational programs are organized. Those of you in the audience who are in education can lead, and we at IFPRI can provide materials that will support this effort.

These are key themes that have emerged at this conference, and we at IFPRI will follow up on them. We will do all we can to support better communication, improve the quality of the debate through research and information, and facilitate policy dialogue.

This morning I heard someone mention that this event is not only a learning forum, but also a leadership seminar and we are all agents for change. We have here 1,000 leaders here who can go out and promote these ideas in the rest of the world. Changing the status quo will not be easy. And we can't expect others to do all the changing. I'm reminded of a Chinese proverb: If you seek to change others, first change yourself.

As we wrap up this event, I'd like to thank the many people that made this conference possible. We are extremely grateful for the support and participation of our cosponsors. We greatly appreciate the work of the Conference Advisory Committee, which gave us invaluable guidance in the design of this conference. I want to thank the conference team, which organized this enormous undertaking, and especially Rajul Pandya-Lorch, as well as the many people working behind the scenes who have made the conference run smoothly. Finally I want to thank all of you for your lively and insightful presentations and discussions.

I'd like to leave you with a challenge. As we've heard, we speak different professional languages, and many of us fail to understand the imperatives and constraints under which people in other sectors operate. So let's replace our stereotypes and first impressions of each with personal contact and sharing of ideas and information. I have sensed tremendous energy for doing this, so let us not lose this momentum.

Many of you may already be thinking, "I hope I get another opportunity to talk to people in these three sectors." This is the wrong attitude. These opportunities will not arise spontaneously. It is up to us to make them. I challenge each of you to think of ways to reach out to your counterparts--instead of waiting for them to come to you. IFPRI will do everything possible to facilitate this important dialogue.

We have started to talk the talk—now let's walk the walk. The challenge for all of us is to translate this talk into action that helps poor people achieve prosperous, healthy, and well-nourished lives. It has been said that "There is nothing more powerful than an idea whose time has come." You've convinced us that this is an idea whose time has come.

KEYNOTE ADDRESSES

Speaker Summary Note

Session:	**Keynote**
Keynote Speaker:	C.H. Hanumantha Rao, **Honorary Professor, Centre for Economic and Social Studies, Hyderabad, and Former Member, Planning Commission, India**
Title:	**Patterns of Agricultural Growth and Links with Nutrition**

Agriculture-Nutrition Linkages

Agricultural growth rate well above population growth rate through the rise in productivity of inputs would result in a decline in the relative prices of food. This would ensure availability of adequate quantity of food at affordable prices. Second, pro-poor growth would generate adequate income and purchasing power for small and marginal farmers and wage labor among whom malnutrition is pervasive. Third, gender-sensitive growth with effective participation of women farmers in decision-making by exercising control over income and expenditure can ensure adequate nutrition for them and for their children. Reduced work burden at home and in the field by lowering demands on physical energy can improve their health status. Fourth, diversification of agriculture and rising share of high value food—rich in micro-nutrients—can improve access to such food for farm households because of their ready availability as well as securing higher income. Bio-fortification of food crops with micro-nutrients can further enhance their nutritional value; and finally, agricultural growth high enough to stimulate and sustain non-farm rural growth through its forward and backward linkages would result in higher wages for farm labor as well as greater off-farm employment for the poor with higher and more stable income.

Recent Experience

According to TANDI (Tackling the Agriculture-Nutrition Disconnect in India), the impact of accelerated per capita income growth on improvement in nutrition in India in the recent period is much weaker than that suggested by global experience. Slow growth of agriculture and consequent reversal of the decline in the relative prices of food grains could be a significant factor accounting for this disconnect. The weakening of public support systems for research, extension and institutional credit may have caused greater slow down in the income growth for small farmers and wage labor who predominate among the malnourished. Owing to population growth and sub-division of land holdings, land per head under cultivation has been declining. Pressure on agriculture has increased owing to slow growth of output and employment in the rural non-farm sector.

Agriculture has not fully benefited from the demographic dividend owing to the increasing out-migration of adult male labor. The consequent feminization of agricultural labor force in the absence of property rights on land for women, their low literacy levels and the absence of gender-sensitive public support systems for extension and credit may have resulted in low productivity and income while at the same time increasing the work burden on the already undernourished women farmers.

That agricultural growth has been skewed against the rural poor in India in the recent period is evident from the rise in the incidence of malnutrition among them. Estimates based on NFHS data show that between 1998–99 and 2005–06, the incidence of malnutrition (underweight) among below 3 year olds has increased by 1 to 3 percentage points for the bottom three deciles(with respect to the standard of living index) as against a decline by 3 to 7 percentage points for the top three deciles. These top deciles also show a significant decline in severe malnutrition to the extent of

4 to 7 percentage points whereas there is little change for the bottom three deciles. Among rural women, aged 15–49 years, the incidence of chronic energy deficiency (CED) increased by 1 to 3 percentage points for bottom three deciles over the same period while it declined by 9 to 16 percentage points among the top three deciles.

Prospects

The on-going phase of agricultural growth offers a great potential for attacking malnutrition through diversification of agriculture, strengthening the position of women farmers and accelerating rural non-farm growth.

(a) ***Diversification of Agriculture.*** Diversification of agriculture, underway, into micro-nutrient rich and high-value products like dairying, horticulture and fishery, etc., holds considerable prospects for ensuring nutritional security. Being land-saving and labor-using, these activities typically suit the small farmers. However, being input-intensive, perishable and risky they need strong support for extension of technology, credit, insurance and marketing services. Small farmers need to be brought together into cooperatives for reducing transaction costs by entering into contracts with the agro-processing firms which could also provide extension services and credit. A big push for public investment in irrigation, agricultural research and extension and rural roads needs to be supplemented by private investments in storage and other marketing infrastructure.

(b) ***Making Public Support Systems Gender-Sensitive.*** Diversification of agriculture suits women farmers, as they are traditionally engaged in these enterprises. Provision of institutional credit needs to be based on the viability of production plans and repayment performance, and de-linked with titles to land. The outstanding performance of Women's Self-Help Groups in India with respect to bank-linked credit and micro enterprises amply demonstrates its feasibility.

To meet the needs of feminizing agriculture, extension services need to become gender-sensitive and feminized by inducting women functionaries in large numbers at various levels in the services chain including agricultural research stations. There is an immediate need for the provision of technologies for women farmers to reduce drudgery from physical labor at home and in the field. Their literacy levels, knowledge and skills need to be improved to meet the needs of diversified agriculture.

(c) ***Accelerating Rural Non-Farm Sector Growth.*** Rural non-farm sector has a considerable potential for growth as it now accounts for only about half of output and less than one-third of employment in the rural sector. Diversification of agriculture and rise in farm incomes offer potential for the growth of agro-processing and other rural industries. Public investment needs to be stepped up in rural infrastructure like roads, power, education and skills, and institutional credit. Farmers with small holdings and landless laborers may increasingly shift to the emerging rural occupations both because of higher wages and more stable employment. These would have a favorable impact on their nutritional status.

Speaker Summary Note	
Session:	**Keynote: Social Inclusion in Agriculture, Nutrition, and Health**
Keynote Speaker:	Sukhadeo Thorat[59], **Chairman, University Grants Commission, India**
Title:	**Social Exclusion, Agriculture, and Nutrition Linkages: Consideration for inclusive policy**

Group inequalities in Malnutrition

Group inequalities in malnutrition is a feature which is often seen in many countries. At given (average) level of malnutrition, the magnitude is particularly high among certain social groups. In several countries malnutrition level is persistently high among the persons belonging to the groups distinguished by race, colour, social origin (like caste), ethnic and indigenous background, religion, gender and territorial location (Ellen Van and others 2008, Carlos Larrea and Wilma Freire 2002, Thorat and Nidhi Sadana 2009, Nidhi Sadana 2010, Kulkarni 2010).

Selective evidence also indicate that, while malnutrition is closely associated with the economic location of the poor, within the broad category of undernourished poor, the high degree of malnutrition is also caused by the social location (or social belonging) of the poor (Table 1) (Thorat 2009). Studies indicate that limited access to income earning assets (agricultural land and nonfarm business), regular employment, lack of access to education and public health services causes high level of under nutrition. While malnutrition level tend to be low among the poor persons yet "within," the "economic category of the poor," the poor belonging to certain social and minority groups suffered from much higher level of poverty and malnutrition as compared to their counterpart from "rest of the poor." This indicates that beside economic factors, the constraints associated with social/cultural/religious and other markers of group identity of poor belonging to these social grouping also matters. Factors that causes poverty are similar both for poor belonging to certain social groups and rest of the poor, but the "channels of causation" which aggravate high degree of malnutrition for the poor from "social groups," in some respect is different. It is now recognised that malnourished poor from certain social/cultural groups suffered from social exclusion—the processes through which they are excluded from having "equal" accesses to sources of income, employment, education and public health services. People who are excluded are not just like the "rest of the poor." They are also disadvantaged by who they are or where they live and as a result are locked out of the benefits of development. Social exclusion deprives people of choices and opportunities to escape from poverty and malnutrition (DFID 2005). "Nutrition outcomes are greatly affected by social norms, values and customary practices that, within the family, the community, or the market, lead to exclusion of women, ethnic, religious, indigenous and racial groups or the socially disadvantaged." It is this **unfair exclusion** from access to opportunities through markets and non-markets transaction and **unfair inclusion**," (access with discriminatory terms and conditions) which cause high malnutrition among the socially excluded groups and communities.

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[59] Note: Sukhadeo Thorat is a Professor of Economics in the Jawaharlal Nehru University. The author is thankful for Dr. Nidhi Sadana Sabharwal, Research Fellow, Indian Institute of Dalit Studies, Delhi, for research support and research input in the preparation of this paper.

How Does Social Exclusion Induce Poverty and Malnutrition?

Broadly speaking social exclusion is defined in the literature as "the process through which individuals or groups are wholly or partially excluded from full participation in the society within which they live. The exclusion could also manifest itself in diverse ways in terms of "causes and outcomes." Sen, therefore, refers to various meanings and manifestations of social exclusion, particularly, with respect to the causes of discrimination in a given society. Exclusion could occur through direct exclusion, violating fair norms of exclusion (that is unfavourable exclusion), or through inclusion, but under unfavourable conditions, again violating fair norms of inclusion (that is unfavourable inclusion), or through deliberate government policies (that is active exclusion), and through unintended attempts and circumstances (passive exclusion), which caused exclusion. The mainstream economic literature throws more light on discrimination that works through markets and developed the concept of market discrimination with some analytical clarity. In the market discrimination framework, exclusion may operate through restrictions on the entry in market, and/or through "selective inclusion," but with an unequal treatment in market and non-market transactions (this is close to the Sen's concept of unfavourable inclusion).

For the purpose of conceptual clarity it is necessary to recognise the group characteristic of exclusions. It is necessary to recognise, that economic exclusion or discrimination is independent of income, productivity or merit of individuals in a group. Often people do get excluded from access to markets due to lack of income or in employment due to low productivity/skill or in admission due to low merit. In these cases low income, productivity and merit is direct cause of exclusion. In the case of group based exclusion on the other hand, the basic of exclusion is group identity and not the economic characteristics of a group. The centre of exclusion is social group and not individual.

Consequences of Social Exclusion on Malnutrition and Poverty

The social exclusion aggravates poverty directly by denying the fair access to opportunities channelized through markets and non market transactions and indirectly by adversely affecting economic growth. The insight from theoretical literature indicates that markets discrimination does hampered economic growth, and bring unequal income distribution outcome. Insights from theory imply that the since employment discrimination involve hiring of labour based on ascribe characteristic and less on efficiency, it lead to inefficient allocation of labour. The market discrimination in other markets also brings imperfections in resource allocation. The less than optimal allocation and use of resources lead to less than optimum outcome.

In case of consequence on poverty and malnutrition, it is quite clear that in so far as exclusion and involve the denial of access to resources, employment, education and common facilities that other have, it can certainly impoverishes the lives that individual from excluded groups can enjoy. Thus, economic discrimination has potential to aggravate poverty indirectly by slowing down the economic growth and directly by reducing the access to various markets resulting lack of access to income earning assets, jobs, education.

India—A Case Study

In this background, we discuss the Indian experience with a purpose, first, to provide evidence of high malnutrition level among the social/ethnic/religious groups; second, to provide explanation for high level of malnutrition; and, thirdly, to indicate the inclusive policy, with experience from India. We first present the inter-social group inequalities in malnutrition level for children, women and men through relevant indicators in rural area of India using the National Family Planning Health Survey data (NFHS) for the recent year 2005/06 and then explain inter-social groups disparities in

term of variations in income, education, access to public health services, and the social belonging of the individuals.

For the inter-group analysis, the paper takes the groups by their wealth status (proxy for income), caste, ethnic, and religious belonging. For the caste groups, the NFHS provides data for schedule caste, other backward caste and higher caste and the schedule tribe and religious groups. Within the religious groups, it gives data by their caste and ethnic origin. Thus, the NFHS capture the inter-social group inequalities with respect to their wealth status, caste, ethnic and religious-back group and beside general factors (such as wealth status, education, access to health services, etc.), also enable us to estimate the impact of social belonging (in term of social exclusion from the access to opportunities) on the health our comes of various groups.

The indicators which capture the malnutrition include underweight children (weight for age) and body mass index (BMI) for women and men. The height and weight measurements in NFHS-3 are used to calculate the BMI. The BMI is defined as weight in kilograms divided by height in meters squared. BMI less than 18.5 is used to define thinness or acute under-nutrition.

Inter-Group Inequalities in Nutritional Status in Rural India

As expected in 2005, the degree of malnutrition measured in term of underweight children, anaemia, and infant mortality is high for schedule caste, schedule tribe, and other backward caste compared to “others.” In 2005, 56% of ST and 51% of SC children less than 5 years of age suffered from malnutrition (based on weight for age) followed by 45% of OBC children as compared to 36% for others. The incidence of anomie among the ST and SC children was also quite high, as nearly 78% of ST children and 74% of children from SC social group suffer from anaemia followed OBC (72%) and the other children (67%).

Analysing the level of malnutrition amongst women through BMI of less than 18.5 kg/m2 which indicate chronic energy deficiency we find (a) gender differentials and (b) social group differentials for both women and men. A social group pattern similar to children is also observed for women and men, indicating higher malnutrition among the ST and SC followed by OBC and the lowest for others.

As regard religious groups the situation of children from Hindu religious group followed by Muslim is the worst compared to religious groups of Christian, Sikh and others. Within the Hindu religious groups, the situation of children from Hindu ST is the worst (57%) followed by Hindu SCs and SC Muslim. In fact, the situation of children from Muslim SC social group is the worst amongst all socio-religious groups.

The pattern of the level of nutritional status for women and men across religious and socio-religious groups is similar to children’s status. Women and men belonging to Hindu and Muslim religious groups had lower nutritional level as compared to other religions in 2004-05. With respect to men, we find that Hindu men (38.7%) and Muslim men (38%) had a lower nutritional status as compared to men from Christian, Sikh and other religion. Among the socio-religious groups, it is the ST Hindu men (45.2%) who had the worst nutritional levels followed by SC Hindus and non-SC/ST/OBC Muslims.

Factors Associated with High Malnutrition—General and Group Specific

We find that the nutritional problem is particularly serious for children, women, and men from the excluded groups of scheduled tribes, scheduled caste and other backward classes. Both, general factors and the group specific factors seem to cause high malnutrition among these social groups.

General factors. In the general factors, we take income (consumption expenditure as proxy variables) poverty and wealth index (with five levels), education and access to health services. The factors associated with social belonging are capture by using the logistic regression.

The **data for 2005** shows a direct link between the per capita expenditure and nutritional levels as the groups which have a lower expenditure also have lower nutritional levels. Same is true for households dependent on farm income. Similarly, wealth index also reveals a close connection between nutritional status and standard of living. As expected, children from wealthier households are not as malnourished as those from the poor households. The gap between the poorest and the richest quintile is very wide, over 30 percentage points. The gap in nutritional status between the poorest and the richest quintiles is very wide for men and women as well and across social groups. The results show that even after controlling for the other factors, differentials by wealth index are large. As one moves along the wealth index ladder from the poorest to the richest, the proportion of under-nutrition children reduces indicating the wealth effect.

The 2005/06 NFHS data also revealed close inter-relation between level of education and malnourishment—the percentage of children who are underweight is higher for women with no literacy as compared to women who are literate and who have high level of literacy

The SC and ST mothers and their children also suffer from relatively poor use of public health services. As result the health services help only in limited way to overcome the constraints imposed by the poverty and low education level. The OBC mother's access is better-off than the SC and ST while it is lower as compared to non-SC/ST/OBC mothers.

To confirm the validity of the descriptive statistics observed in this paper, we conducted a logit analysis and the results support the relationship of poverty levels and education with the level of malnutrition among children. Ethnicity, wealth of household, mother's education, and body mass index of the mother are the significant (at 1% level) factors affecting differentials in child under-weight.

Importantly, the results of the exercise indicate that children who have better access to health services such as vaccination and ante natal care are the significant (at 1% level) factors affecting differentials in child under-weight. Similarly, ethnicity, religion, wealth of household, education and occupation of women are significant determinants for differentials in women and men BMI.

For women and men as well, wealth of the household and education are significant determinants for differentials in women and men BMI. Thus, wealth, educational level, access to health services and social belongings are important determinants impacting nutritional levels of children, women and men.

Thus, the analysis indicates that poor health status of all social groups is closely linked with poverty and education level. The per consumption capita expenditure (as proxy for income) and nutritional levels are also closely interlinked. The results show that even after controlling for the other factors, differentials by wealth index are large. As one moves along the wealth index ladder from the poorest to the richest, the proportion of under-nutrition children, women and men reduces indicating the wealth effect. The net effect of income within a similar category varies for children, men and women with children benefitting the least. The 2005/06 NFHS data also revealed close inter-relation between level of education and malnourishment. Percentage of children who are underweight is higher for women with no literacy as compared to women who are literate and who have high level

of literacy. Among the significant determinants of nutritional levels of children, women and men, ethnicity, religion, wealth of household, education and occupation of women are significant.

The results also showed that, even for individuals with similar standards of living and levels of education, the health status of the SC and ST is lower than that for their counterparts from the 'other' castes. The SC and ST mothers and children lag the other social groups in terms of access to various public health services. This indicates that, in addition to their poverty and education levels, SC and ST suffer from unequal access to public services. Although there are limited studies on this theme, some studies do provide evidence in this direction, highlighting unequal access by these groups to public health services as well as to schemes that guarantee food security to children in schools.

Group Specific Factors. The preceding analysis brings out two important features of health status and malnourishment of the social groups. It shows that, the malnutrition level of caste and ethnic group of SC and ST is higher compared to OBC and 'other' groups. The OBC groups lagged behind the "others" but are better than the SC and ST. Importantly, the results of the logistic exercise indicate that SC and ST children, women and men are more likely to be under-nourished compared to children, women and men from the "non-SC/ST" and OBC category.

Once controlled for other factors, there are differentials in nutritional levels by social groups as well for children, women and men as the results. The net effect of the social belonging on nutritional level is greater for children as compared to women and men. The difference between the SC and Other children is 7.4% points while the difference for SC adults is only 3% points. Additionally we also find that, within the SC, ST, OBC social groups, the risk faced by children seemed to be higher than the women and men in that group.

Among the socio-religious group, the probability of the risk being under-nourished for Hindu and Muslim children is relatively low and insignificant but for men and women the risk is greater and significant. Between men and women, it appears that after controlling for the other factors, differentials in the nutritional levels is wider between Hindu and Muslim women and men from same religious background.

Thus, we find that social belonging matters to greater degree for children as compared to women and men from the SC and ST social groups as there are wide differentials in the nutritional levels after controlling the effects of factors of wealth index, education of mother, father's occupation, religion, sex of child, antenatal care, BMI of mother, child receive vaccination and supplementary nutrition. While between men and women, it appears that after controlling for the other factors, differentials in the nutritional levels is wider between Hindu and Muslim women and men from same religious background.

Socially Inclusive Policies. This result have specific policy implications for the countries in which certain groups suffered from high malnutrition level both due to general factors and group specific factors. It demands that general health polices be accompanied with group-specific measures to address the specific problems arising out of social exclusion. The general polices include increased access of poor to income through assets and earning so that individual's capabilities to access food and related needs are ensured. Similarly there is need to improve the education level and the access to the public health services.

In the case social groups who face discrimination in accessing the sources of income ,education and public health service, beside these general measures they would also require additional policy measures to overcome the constrains imposed by processes of social exclusion in accessing sources of income ,education and public health services. This will require measures to provide safeguards against discrimination and measures to promote equal and non-discriminatory access to assets and employment, to education and to health care services to mothers and children from socially excluded groups and religious minorities.

Large number of countries in the world have recognised the excluded groups and developed special policies. Several countries in the world have one or more minority groups within their national territories; groups distinguished by their own ethnic, linguistic, or religious identity that differs from that of the majority population and suffered from some degree of social exclusion resulting in to denial of equal opportunities. The problems of minorities are different from country to country but suffer from social exclusion in various manners, resulting in lack of access to income earning assets, employment, education, and health services.

In Asia, minorities are identified mainly based on caste, ethnicity, indigenous origin and religion and these include India, Japan, Nepal, China, Malaysia, Sri Lanka, Pakistan, and Philippines. In Latin American and African countries, minorities are identified in the line of race, colour, ethnicity, gender and disabilities. In the United States, it is based on race, gender, and disability; and in Canada, it is based on ethnic minority. In Europe, the application of affirmative action in Northern Ireland is based on religion. But in United Kingdom, it is in the line of race and ethnicity. In France, affirmative action is based on territorial location. And, in general, various governments have anti-discrimination policy for disabilities and women. In Germany, the discriminated groups are the minorities (gypsies) and women. In New Zealand, the discriminated groups are identified based on ethnicity.

Indian Government Policy

Indian government has used both general policy and group specific policy. As regard health and nutrition the Indian government has developed program for children and women. Integrated Child Development Services (ICDS) is the major national programme that addresses the health and nutrition needs of children under the age of six. ICDS provides young children with an integrated package of services, including supplementary nutrition, health care and pre-school education. The programme also extends to adolescent girls, pregnant women and nursing mothers as it is recognized in the programme that the needs of a young child cannot be addressed in isolation from those of his or her mother. ICDS services are provided through a vast network of ICDS centers known as “Anganwadis.”

Mid-day meal is the other important program. India’s mid-day meal programme is the largest nutrition programme in India and is implemented through provision of free meals in government schools and the anganwadi centers.
The other important health programmes implemented by the government to improve nutritional status of newborns and infants are:

(a) Initiation of breastfeeding massages immediately after childbirth, preferably within one hour (Ministry of Women and Child Development, 2006). This message forms an important component of the National Rural Health Mission.
(b) Use of vitamin A supplements every six months until children reach three years of age, starting at age 9 months. This service is provided through Anganwadi centers.

(c) As Iodine is an important micronutrient, in 1983–84, the Government of India adopted a policy to achieve universal iodization of edible salt by 1992. All states and union territories were advised to issue notifications banning the sale of edible salt that is not iodized.

To improve the availability of and access to quality health care, especially for those residing in rural areas, the poor, women, and children, the government recently launched the National Rural Health Mission for the 2005–2012 periods. The provision of iron and folic acid (IFA) tablets to pregnant women to prevent nutritional anemia forms an integral part of the safe motherhood services offered as part of the Reproductive and Child Health Programme in India.

The other general schemes include employment guarantee schemes and the Public Distribution System (PDS) which plays an important role in ensuring minimum income and the provision of food security. Beside there are number of schemes in the form of affirmative action for SC, ST and OBC and Muslim ensuring access to income earning assets and business, employment, education, housing and other.

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Table 1—Social groups identified as most deprived: Selective example across the countries

Continent	Country	Social/Cultural/Religious Groups	Social Identifier
Asia	India	Low caste and tribal minorities Religious minorities: Muslim	Caste, Ethnicity, Religion
	Japan	Burakumin Okinawans, Ainu Japanese-born Koreans	Caste-**based** group; Indigenous groups; Minorities
	China	56 minorities	Ethnic Minorities
	Malaysia	Bumiputras	Ethnic Majorities
	Pakistan	Baluch, Pakhtun, Tribal	Regional Backwardness Ethnicity
	Sri Lanka	Sinhalese	Ethnic Majorities
	Nepal	Dalits Indigenous Groups	Caste, Ethnicity
Latin America	Brazil	Afro-Brazilian Handicap, Women	Race Disability, Gender
	Bolivia	Quechua, Aymara, Afro-Bolivian, Handicap, Women	Ethnicity Race Disability, Gender
	Peru	Quechua, Aymara Handicap, Women	Ethnicity Disability, Gender
	Mexico	80% of the indigenous women	Ethnicity gender
Africa	Nigeria	Ethnic Groups Women	Regional representation Gender
	South Africa	Blacks (African, Indians, colored), Women	Race Gender
	Namibia	Black Women	Race Gender
America	USA	Black American, Hispanics, Asian Women, handicap	Race Gender, disability
	Canada	Aborigine (American Indians, Metis, Inuit) Visible Minorities (Blacks, Muslims, Jewish, South Asians, Chinese, Canadians)	Ethnicity Minority
Europe	Northern Ireland	Catholics	Religion
	U.K.	Black (Caribbean), Ethnic minorities, Roma, gypsy, traveler	Race, ethnicity, minority
	France	Economically Backward Territory. Women. Handicap	Gender Disability
	Germany	Danish, Sorbs, Friesians, Sinti and Roma. (Immigrant) Women	Minorities Gender
NEW ZEALAND	New Zealand	Maori Tribe	Ethnicity

Note: List does not necessarily cover all the countries in the world. This is particularly the case with respect to Latin America and Africa.

Source: International Experience of Affirmative Action Policies, Indian Institute of Dalit Studies, 2005, Delhi, India.

Table 2—Nutritional status of children (0–5 yrs), women (15–49 years) and men (15–54 years) in rural area by social group

Social Group	Children (Weight for age) <Med -2SD (Under-weight)	Women BMI <18.5 kg/m2(Thin)	Men BMI <18.5 kg/m2 (Thin)
SC	50.6	44.7	42.3
ST	56.1	48.4	43.3
OBC	45.7	39.7	37.7
Others(Non SC/ST/OBC)	36.3	35.8	33.0
All	45.6	40.5	38.0

Source: National Family Health Survey-3 (2005–06).

Table 3—Health Status Indicator for children in India(2004–05)

Health Status Indicators	**SC**	**ST**	**OBC**	**Others**	**All**
Anaemia	74.0	77.9	71.7	66.9	71.6
Infant Mortality Rate (IMR)	66.4	62.1	56.6	48.9	57.0
Neo-Natal Mortality	46.3	39.9	38.3	34.5	39.0
Post Neonatal Mortality Rates	20.1	22.3	18.3	14.5	18.0
Child Mortality Rate	23.2	35.8	17.3	10.8	18.4
Under Five Mortality Rate	88.1	95.7	72.8	59.2	74.3

Source: NFHS-3, 2005–06.

Table 4—Nutritional status of children in different social group by religion

Social groups	Religion				
	Hindu	Muslim	Christian	Sikh	Others
SC	51.3	57.6	30.6	33.5	43.4
ST	56.9	36.5	44.1	NA	NA
OBC	45.6	46.7	27.3	19.6	NA
Others	33.7	43.5	27.7	18.8	NA
All	46.3	44.0	37.0	24.6	44.5

Source: National Family Health Survey-3 (2005–06)
NA- indicates frequency less than 50

Table 5—Nutritional status of women in different social group by religion

Social groups	Religion				
	Hindu	Muslim	Christian	Sikh	Others
SC	45.3	45.2	36.1	27.7	48.1
ST	51.1	31.0	24.5	NA	38.5
OBC	39.9	39.3	25.0	21.9	NA
Others	35.3	42.9	26.6	15.1	NA
All	41.3	40.6	27.4	19.4	44.2

Source: National Family Health Survey-3 (2005–06)
NA- indicates frequency less than 50

Table 6—Nutritional status of men in different social group by religion

Social groups	Religion				
	Hindu	Muslim	Christian	Sikh	Others
SC	42.9	33.0	24.6	23.4	49.1
ST	45.2	38.9	18.8	NA	41.6
OBC	37.9	36.6	26.9	33.7	NA
Others	32.6	40.2	31.8	14.7	NA
All	38.7	38.0	24.1	18.8	46.6

Source: National Family Health Survey-3 (2005–06)
NA- indicates frequency less than 50

Table 7—MPCE by Household Type and Social Groups in Rural Sector, 2004–05 (at 1999–2000 prices)

SRG	**Business**	**Farm Wage Labour**	**Other Labour**	**Farmers**	**OTHER**	**Total**	**2004**	**NL**		
							PR	C	W	M
2004-05										
ST	462. 7	331. 7	373. 6	414. 6	611. 6	396. 2	47.64	56.1	48.4	43.3
SC	456. 7	372. 3	442. 2	466. 7	639. 8	434. 5	36.8	50.6	44.7	42.3
OTHERS	582. 1	398. 8	507. 1	564. 0	779. 1	552. 5	22.7	36.3	35.8	33.3
Total	552. 4	380. 0	471. 5	536. 1	744. 5	511. 3	**28.29**	45.6	40.5	38.0

Source: Calculated by the authors using NSSO CES unit record for relevant rounds
PR=Poverty Rate, NL=Nutritional level, C=Child, W=Women, M=Men

Table 8—Nutritional status of children in different social group by wealth index

Social groups	Wealth Index				
	Poorest	Poorer	Middle	Richer	Richest
SC	57.4	51.5	45.0	36.2	22.7
ST	61.0	54.2	48.0	33.1	24.5
OBC	56.6	48.7	42.3	34.9	19.3
Others	48.7	46.2	34.0	29.6	17.2
All	56.3	49.2	40.8	32.9	18.6

Source: National Family Health Survey-3 (2005–06)

Table 9—Nutritional status of women in different social group by wealth index

Social groups	Wealth Index				
	Poorest	Poorer	Middle	Richer	Richest
SC	54.4	47.6	39.8	29.4	19.4
ST	53.4	49.1	42.7	27.5	27.1
OBC	47.8	45.5	39.1	30.3	19.9
Others	52.1	46.7	36.9	29.5	19.7
All	51.5	46.6	38.8	29.5	19.8

Source: National Family Health Survey-3 (2005–06)

Table 10—Nutritional status of men in different social group by wealth index

Social groups	Wealth Index				
	Poorest	Poorer	Middle	Richer	Richest
SC	50.2	44.1	37.2	33.4	22.6
ST	48.9	39.3	38.0	34.2	14.9
OBC	47.6	42.7	37.6	27.6	20.3
Others	48.7	41.1	35.3	28.0	18.3
All	48.8	42.5	37.1	28.4	19.0

Source: National Family Health Survey-3 (2005–06)

Table-12—Nutritional status of Children, women and men by social groups
(Children under 5 years, Women from 15 to 49 and Men from 15 to 54 of age, NFHS-3)

Social Group	Under-weight Children <Med -2 SD	Women BMI<18.5 (Thin)	Men BMI<18.5 (Thin)
All	45.6	40.5	38.0
SC	50.6	44.7	42.3
ST	56.1	48.4	43.3
OBC	45.7	39.7	37.7
Others	36.3	35.8	33.0
	Odds ratios@	Odds ratios*	Odds ratios*
SC	**1.350**	**1.126**	**1.134**
ST	**1.418**	**1.169**	1.084
OBC	**1.218**	0.977	1.032
Others	1.000	1.000	1.000
	Adjusted percent@	Adjusted percent*	Adjusted percent*
SC	**47.9**	**42.4**	**39.8**
ST	**49.1**	**43.3**	38.7
OBC	**45.4**	38.9	37.6
Others	**40.5**	**39.5**	**36.8**

Source: Computed from NFHS-3 individual data file.

Table 13—Nutritional status of Children, women and men by religious groups
(Children under 5 years, Women from 15 to 49 and Men from 15 to 54 of age, NFHS-3)

Religious group	Under-weight Children <Med -2 SD	Women BMI<18.5 (Thin)	Men BMI<18.5 (Thin)
All	45.6	40.5	38.0
Hindu	46.3	41.3	38.7
Muslim	44.0	40.6	38.0
Others	37.5	28.1	27.2
	Odds ratios@	Odds ratios*	Odds ratios*
Hindu	1.092	**1.574**	**1.466**
Muslim	1.065	**1.704**	**1.481**
Others	1.000	1.000	1.000
	Adjusted percent@	Adjusted percent*	Adjusted percent*
Hindu	46.0	**42.0**	**39.3**
Muslim	45.4	**43.9**	**39.6**
Others	43.8	**31.5**	**30.7**

Source: Computed from NFHS-3 individual data files.
Odds ratios shown in bold letters indicate significant difference (at the 1 % level) from the reference category 'Others'.