

JIRCAS International Symposium 2017

Promoting an Active Role for Female Researchers in Agriculture, Food, and Nutrition Research

Proceedings

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JIRCAS International Symposium 2017
 United Nations University, Tokyo, Japan
 November 2, 2017

Opening Remarks

Masa Iwanaga

President, JIRCAS



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Distinguished guests, participants, ladies and gentlemen, good morning. It is my great honor and privilege to open the JIRCAS International Symposium 2017, titled “Promoting an Active Role for Female Researchers in Agriculture, Food and Nutrition Research.” This symposium is organized by Japan International Research Center for Agricultural Sciences (JIRCAS) and co-organized by the United Nations University Institute for the Advanced Study of Sustainability, with the generous support of the Research Council Secretariat of the Ministry of Agriculture, Forestry and Fisheries, the National Agriculture and the Food Organization, the Tokyo University of Agriculture and Technology, the Tokyo University of Foreign Studies, the Greater Tokyo Initiative, and the Japan Forum on International Agricultural Research for Sustainable Development.

This symposium is officially recognized as a side event for “Shine Weeks,” a period designated to promote movements for “A Society Where Women Shine,” in connection with the hosting of the “World Assembly for Women: WAW 2017” by the Government of Japan.

First of all, I would like to extend my cordial welcome to all guests and participants, particularly those who came from overseas. I would also like to express my sincere gratitude to our prominent keynote speakers, Dr. Ismahane Elouafi, Director General of the International Center for Biosaline Agriculture based in United Arab Emirates, Dr. Howarth Bouis, Founding Director of HarvestPlus, and Dr. Noriko Sudo, Associate Professor at Ochanomizu University, Japan. My appreciation is also extended to the other speakers, chairs and participants in the sessions that will follow today.

JIRCAS plays a central role in making Japan one of the leading countries that contribute internationally to scientific research in the field of agriculture, forestry and fisheries. Through joint research in developing regions, JIRCAS has provided valuable assistance in fostering human resource development and promoting gender equality. JIRCAS will collaborate with other institutions to further support the contribution of women to scientific advancement.

JIRCAS has recently adopted a new program titled “Initiative for Realizing Diversity in the Research Environment.” This program seeks to promote active roles for female researchers and is supported by funds from Japan’s Ministry of Education, Culture, Sports, Science and Technology. Under the program, we are currently implementing international collaborative research activities aimed at improving the nutritional conditions in developing areas. In addition, we will find ways to improve the nutritional value of crops and evaluate the nutritional content of foods as well as tackle gender issues in rural development.

Women play a pivotal role in food production and nutrition, and account for a large proportion of agricultural workforce in many developing countries, particularly in Africa and Asia. Despite this fact, they often face many challenges including limited access to critical resources and services.

In general, agricultural technologies are mapped by men with male farmers in mind. On the technology development front, I believe, however, that we should take a closer look at the gender aspect from a different perspective, identifying clearly our target beneficiaries and directing our efforts towards creating technologies that cater to their actual needs. In Africa, for example, women are usually in charge of food preparation for the whole household and thus, they would know the kind and the quality of food crops they need. These women are the real targets of development technologies as well as the key agents for the adoption and application of these technologies.

Today’s symposium has gathered together leading female researchers and scientists in the field of agriculture, food and nutrition research to share with us their research findings and their views on the need for active participation and involvement of women scientists in research aimed at securing a food-secure and healthy future. We hope to gain a deep understanding of the vital roles played by women in advancing agricultural development and food security through the insightful speeches by our keynote speakers and the presentations

Opening Remarks

of four invited female researchers who are currently working on these issues from various perspectives such as indigenous foods, gender role in food security, and the link between agriculture and nutrition.

In this symposium, we will discuss matters aimed at promoting active roles for female researchers in agriculture, food and nutrition research, and hopefully come up with a good support initiative for empowering female researchers and achieving gender equality in research.

Finally, I would like to express my sincere hope that with your precious contribution, this symposium will become fruitful and will achieve the objective for which it was organized. Thank you very much.

Welcome Address

Tomohiro Bessho

Director General

Agriculture, Forestry and Fisheries Research Council Secretariat,
Ministry of Agriculture, Forestry and Fisheries (MAFF)



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Distinguished speakers and chairmen, distinguished guests, ladies and gentlemen, good morning. I'm Tomohiro Bessho, Director General of Agriculture, Forestry and Fisheries Research Council Secretariat. On behalf of the Ministry of Agriculture, Forestry and Fisheries of Japan, I would like to extend a warm welcome to all of you who have come to participate in this JIRCAS International Symposium.

Ensuring food security is a priority for the entire world. The world population is expected to increase to 9.8 billion in the year 2050 from the current figure of 7.6 billion. With this population increase, food demand is also expected to become 1.6 times as large as the current level. This causes concerns over the possibility of tight supply and demand situation in the future. According to an announcement of the United Nations this September, the number of people suffering from hunger began to increase again in 2016 due to conflicts and climate change, and reached approximately 800 million. IPCC also reported that the temperature rise could negatively affect the production of staple crops. In order to tackle these challenges and achieve food security in the future, gender is one of the important elements that we should consider. In many developing countries, empowering women is shown to have a positive impact on children's nutrition and education. Also in some regions, such as Sub-Saharan Africa, women are the major producers of staple crops.

It is important to understand the different roles of men and women and the different challenges they face in society. This is why this symposium is very timely. By promoting an active role for female researchers, we could incorporate women's views and ideas on our research better and deepen our understanding of the opportunities and challenges in achieving food security and improving nutrition. Promoting an active role for women is also a priority for the Government of Japan. Prime Minister Shinzo Abe clearly stated his intention to bring about a society where women shine both within Japan and also in countries suffering from conflict and poverty.

I am pleased to note that the Government of Japan is now hosting the World Assembly for Women in Tokyo, which has been held annually since 2014 under the strong leadership of our Prime Minister, and that this symposium is regarded as one of its official side events.

In order to promote gender equality in Japan, the law to promote women's participation and advancement in the workplace was put in force in April last year. Under this rule, the government has been working to make information on active participation of women in private companies easily accessible, and carry out work reforms and promote changes in men's way of life.

The Ministry of Agriculture, Forestry and Fisheries also developed a plan to promote active female participation and work-life balance in 2014. Based on this plan, we have been accelerating recruitment and promotion of female staff and improving their work conditions. We have also been promoting active use of women's ability in agriculture. For example, by a project to link the wisdom of female farmers to technologies, knowledge and ideas of private companies and institutions.

I sincerely hope that today's symposium will help you to better understand the latest research on food and nutrition and the role of female researchers in this field. It is my great pleasure if today's discussion will promote women's active participation in research and society and shed new light on our work to achieve food security and better nutrition. Thank you for your kind attention. Thank you.

Welcome Address

Kazuhiko Takemoto

Director

Institute for the Advanced Study of Sustainability,
United Nations University (UNU-IAS)



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Excellencies, ladies and gentlemen, on behalf of the United Nations University, I am very pleased to welcome you to this important international conference here. This conference aims to promote an active role for female researchers in agriculture, food and nutrition research activities. I would like to take this opportunity to emphasize the importance of women’s full and effective participation and equal opportunities including contribution to scientific development. This morning, we are going to reaffirm the importance of promoting an active role for female researchers in agriculture, food and nutrition research.

In 2015, as all of you are aware, the United Nations General Assembly adopted the 2030 Agenda for Sustainable Development including Sustainable Developmental Goals, so called SDGs, as its core element. The international community has already started making effort to address these goals including those on gender equality and empowerment of all women and girls as well as food security, improved nutrition and sustainable agriculture.

Our institute, UNU-IAS, is a leading research and teaching institute and our mission is to advance effort toward more sustainable future through policy-oriented research and capacity development activities focused on sustainability. Our institute is in the position to develop research and capacity development activities toward achieving SDGs. In light of this, I am very much looking forward to dynamic and fruitful discussions today. We are very fortunate to have Dr. Ismahane Elouafi, Dr. Howarth Bouis and Dr. Noriko Sudo here as the keynote speakers for this conference. We expect professional and insightful input from these international experts.

Finally, ladies and gentlemen, I would like to conclude my remarks by wishing you a fruitful symposium as a good start to further contribute through involvement of female researchers in developing technologies for sustainable agriculture, forestry and fisheries with your active participation. Thank you very much and welcome. Thank you very much.

Keynote Speeches

Chair:

Kunihiro Doi, JIRCAS



WHY THE WORLD NEEDS MORE WOMEN SCIENTISTS FOR A FOOD-SECURE FUTURE

Ismahane Elouafi

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ISMAHANE ELOUAFI is Director General of the International Center for Biosaline Agriculture (ICBA), a not-for-profit research-for-development organization she has been leading since 2012. She is a visionary leader and strategic thinker. Before Joining ICBA, she was Director of Research Management and Partnerships Division at the Canadian Food Inspection Agency. She is a recipient of a number of awards and honors. Dr Elouafi holds a PhD degree in genetics from Cordoba University, Spain.



ABSTRACT

As climate change and population growth, among other things, put future global food security at risk, the world faces a daunting challenge of finding innovative and sustainable solutions to produce more food under increasingly unfavorable conditions. The Green Revolution offers some lessons on how humanity should overcome this predicament. One important lesson is that agricultural research and development are key to solving a potential global food crisis. The world needs a new Agriculture and Agri-business Revolution, but one that is more resource-efficient and gender-responsive as today challenges and realities are different. One way to bring about a new wave of much-needed research and innovation is to involve more women scientists in agricultural research as their potential has not been tapped fully yet.

Studies show that a larger number of women within teams is positively linked with higher levels of innovative thinking, creativity and productivity, ultimately increasing the likelihood of success. One large-scale, multi-country study found that gender-balanced teams are the most likely to experiment, be creative, share knowledge and fulfill tasks. According to this study, the most confident teams had a slight majority of women (60%). Research also shows that the more women there are in senior management, particularly within organizations that are focused on innovation, the better the organizations perform.

The agricultural sector is currently not enjoying the benefits that higher levels of female engagement in research would bring. While women make up more than 40% of the workforce in countries where agriculture is a key contributor to GDP, they do not enjoy the same level of access to training, agricultural inputs and land as men do.

There is also a disproportionately low number of women working in senior scientific and managerial positions. This gender gap is most visible in the staffing of agricultural research and extension organizations. As a result, policy and investment priorities may not be fully effective because they do not completely incorporate gender perspectives. Given women's role in agricultural production and consumption, potential benefits are being lost when they are needed most.

This is why it is important to invest more in building capacities of women scientists working in the agricultural research and development sector, especially in countries where food security is more vulnerable to climate change. Two programs to this effect that merit special mention are the African Women in Agricultural Research and Development (AWARD) and the Young Arab Women Scientists Leadership (*Tamkeen*) program in Sub-Saharan Africa and the Middle East and North Africa respectively. Both focus on empowering women in science through tailored fellowships and will be discussed in more detail in the presentation.

KEYWORDS

Women scientists; food security; climate change; agricultural research and development

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WHY THE WORLD NEEDS MORE WOMEN SCIENTISTS FOR A FOOD-SECURE FUTURE

JIRCAS International Symposium 2017
 "Promoting an active role for female researchers in agriculture, food, and nutrition research"
 2 November 2017



Dr. Ismahane Elouafi
 Director General
 International Center for Biosaline Agriculture (ICBA)



1

Global Food Security Challenge

2

World Population

1990		5.3 billion
2017		7.6 billion
2030		8.6 billion
2050		9.8 billion
2100		11.2 billion

The combined population of the 47 least developed countries will increase by 33% between 2017 and 2030
 Source: UN

3



Global
food production
 will need to increase
70%
 by 2050

POPULATION GROWTH
 CHANGING DIETS

Annual cereal production will have to grow by almost a billion tonnes (2.1 billion tonnes today)
 Source: FAO

4

Is Current Agriculture Enough?



Yields of major crops are projected to fall by 25% and more by 2050 due to, among other things, climate change
 Source: OECD

5

Climate Change is the Biggest Risk



Drought and extreme heat reduced crop yields by as much as 10% between 1964 and 2007
 Source: Nature

6



7

The Changing Nature of Poverty & Hunger

- Two billion people in the world suffer from various forms of malnutrition
- Malnutrition is an underlying cause of death of 2.6 million children each year
- 1 in 3 children in developing countries are stunted

Malnutrition comes in many different forms

Stunting
(people are too short for their age)

Wasting
(people are too thin for their height)

Obesity
(people are overweight)

Source: Global Nutrition Report, 2015

8

2 ZERO HUNGER

By 2030, end hunger and all forms of malnutrition, and double agricultural productivity of smallholder food producers
Source: UN

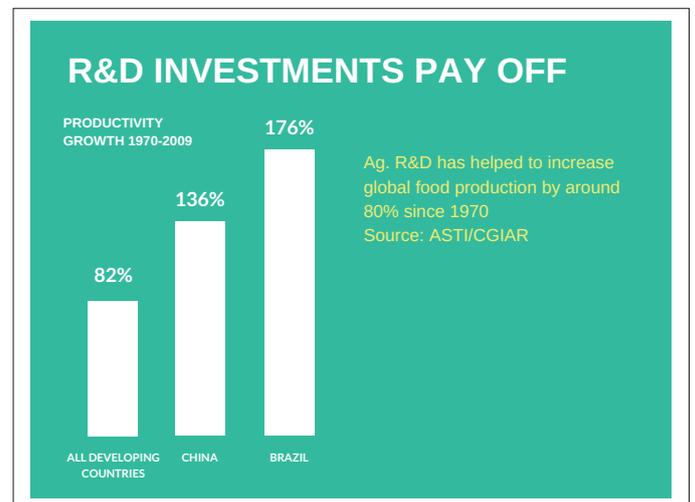
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R&D for Food Security

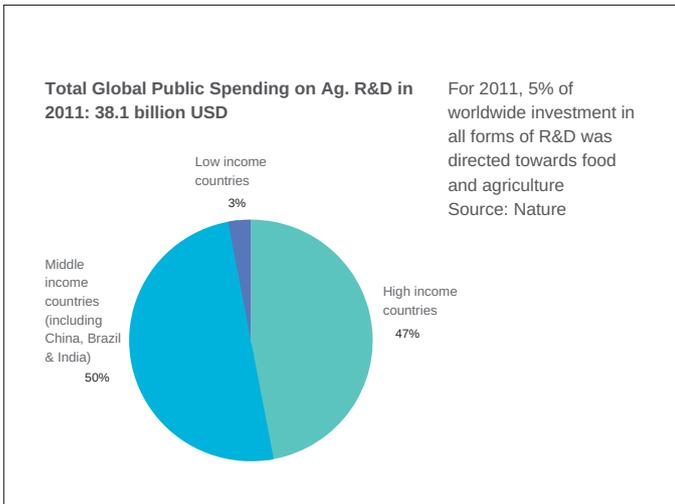
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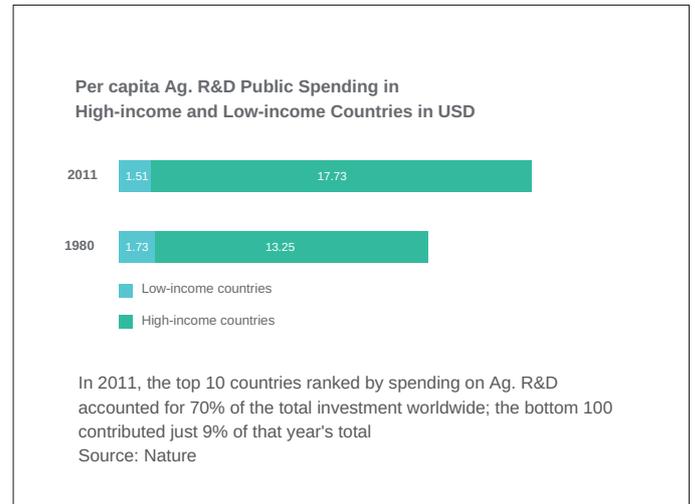
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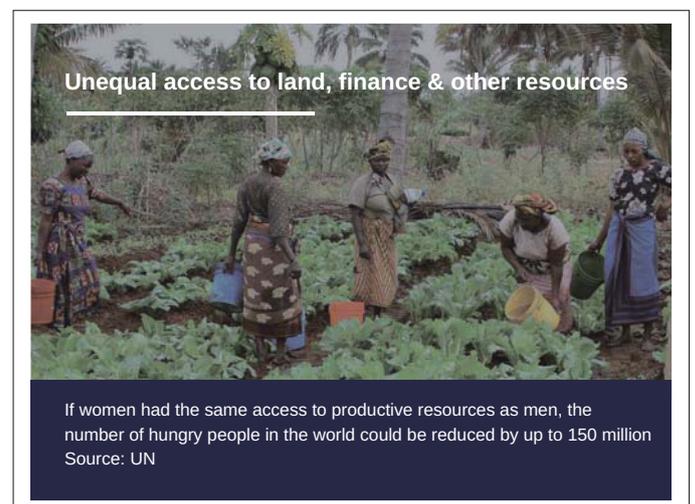
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Extension Services: Does Gender Matter?



Only 15% of the world's extension agents are women, and only 5% of women farmers benefit from extension services
Source: Farming First

19

Empowering Women in Agriculture and Science

20



Women as Drivers of Success and Innovation

Women are critical to innovation

21



AWARD Program in Africa

Since 2008 the AWARD program has empowered 1,158 African scientists and trained 1,466 researchers

22

ICBA's Programs to Empower Women in Science

23

Tamkeen Program in Middle East and North Africa



The average share of women scientists across the MENA region stands at 17%, which is the lowest in the world

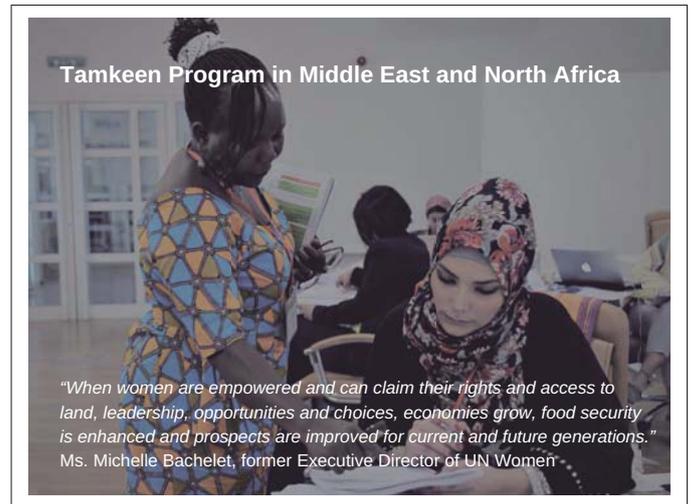
BILL & MELINDA GATES foundation



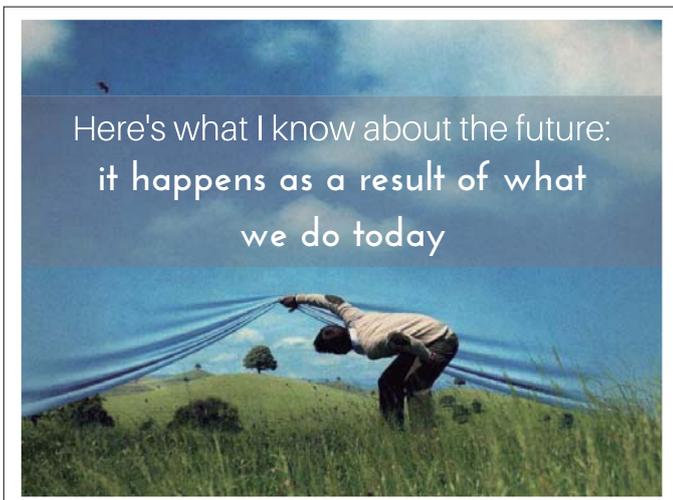
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28

BIOFORTIFICATION AND AGRICULTURE’S PRIMARY ROLE TO PROVIDE NUTRITIOUS DIETS FOR NATIONAL HEALTH

Howarth E. Bouis

Founding Director, HarvestPlus

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HOWARTH BOUIS received his B.A. in economics from Stanford University and his M.A. and Ph.D. from Stanford University’s Food Research Institute, a program in agricultural economics. As director of HarvestPlus during 2003-2016, he coordinated an interdisciplinary effort to breed and disseminate micronutrient-rich staple food crops to reduce mineral and vitamin deficiencies among malnourished populations. Since 1993, he has sought to promote biofortification globally.



ABSTRACT

Fundamentally, the prevalence of mineral and vitamin deficiencies is high in developing countries due to fact that agricultural systems do not produce sufficient foods rich in minerals and vitamins. During 1960-2000, the Green Revolution successfully increased cereal production faster than rapidly growing populations, where limited land was available to expand agricultural production. However, there were not the same investments in increasing agricultural productivity for non-staple food groups. Consequently, prices for these food groups – vegetables, fruits, pulses, animal products, which provide dietary quality -- rose rapidly. The prices that consumers pay for iron, zinc, and provitamin A have increased significantly. Looking to the future, many in agricultural community now recognize that agriculture has a fundamental responsibility to produce these minerals and vitamins to secure national health.

Biofortification involves breeding staple food crops to increase their micronutrient content, targeting staple foods widely consumed by low-income families globally. In so doing, biofortification contributes to solving the underlying problem of mineral and vitamin deficiencies by increasing the amount of iron, zinc and provitamin A produced by food systems. Biofortification:

- Taps into the effectiveness and cost-effectiveness of plant breeding as well as of seeds to replicate themselves, where the results of research undertaken in a central location can be replicated in other countries.
- Minimizes the need for behaviour change by: (i) piggybacking on an existing system of agricultural research institutes (international and national) that produces a stream of increasingly productive and climate-adapted crop varieties that are adopted by farmers and eventually account for a high percentage of total food supplies; and (ii) focusing on food staples that the poor already eat in large quantities.
- Provides extra iron, zinc and provitamin A to farmers and consumers at no extra cost by growing and eating biofortified varieties of everyday foods in a one-for-one substitution for non-biofortified varieties and initiates the delivery of these micronutrients in the relatively hard-to-reach rural areas where a majority of the poor reside.

When HarvestPlus first started in 2003, there was much doubt among a range of stakeholders, that biofortification would work. First, we had to prove to the plant science community that higher target levels iron, zinc, and provitamin A could be bred into high-yielding, profitable varieties. Presently, over 100 varieties of twelve biofortified crops have passed the agronomic tests of varietal release committees in 30 developing countries. In 3-5 years, biofortified varieties will be available to farmers and consumers in an additional 30 countries.

The nutrition community initially questioned the efficacy of biofortified crops – would the levels of retained nutrients and absorption be high enough? HarvestPlus has commissioned fifteen efficacy trials, all undertaken in developing countries. While five of these studies are still in process, there is already sufficient positive published evidence for iron and provitamin A, that the World Health Organization is now undertaking a systematic review of the evidence. This review will be completed and findings published by the WHO in 2017.

Can adoption of biofortified crops by farmers be scaled up, and a public health impact demonstrated? For example just four years after release of high-yielding, iron bean varieties in Rwanda, we now have rigorous evidence that 30% of farmers in Rwanda are growing biofortified beans on a regular basis. HarvestPlus estimates that 20 million farmers and consumers presently grow and consume biofortified crops in eight target countries.

The final and major challenge is to mainstream biofortification into the fabric of “business-as-usual” of a range of organizations – public and private agricultural research, institutions that focus on bringing improved agricultural technologies to farmers including multi-lateral lending institutions, private companies, non-governmental organizations, and the policies and programs of national governments, regional organizations, and UN agencies. The vision of HarvestPlus is that by 2030, one billion people will be reached by biofortified crops.



Biofortification and Agriculture's Primary Role to Provide Nutritious Diets for National Health

Howarth Bouis
 Founding Director, HarvestPlus
 November 2, 2017

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1



Dietary Diversity

Why are Mineral and Vitamin Deficiencies Such A Significant Public Health Problem?

2



Consequences Mineral & Vitamin Deficiencies

Vitamin A deficiency

- Supplements reduced child *mortality* by 23%
- 375,000 children go blind each year

Iron deficiency

- Impaired cognitive abilities* that cannot be reversed
- 82% of children < 2 years in India are anemic

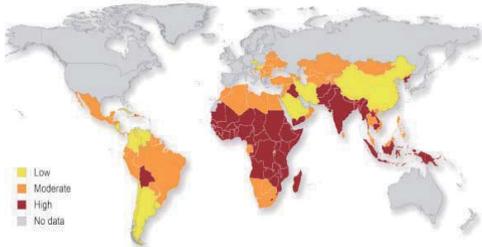
Zinc deficiency

- increased *incidence/severity diarrhea/pneumonia; stunting*
- 2 billion people at risk; 450,000 deaths per year

3

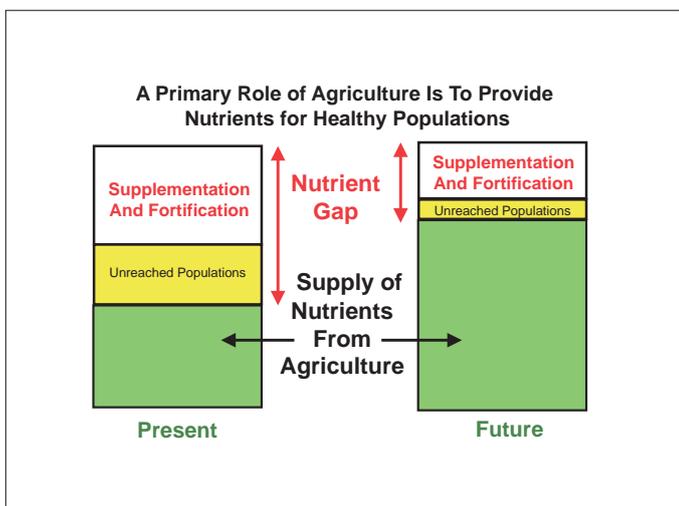


Severity of Micronutrient Deficiencies: Vitamin A, Iron, and Zinc

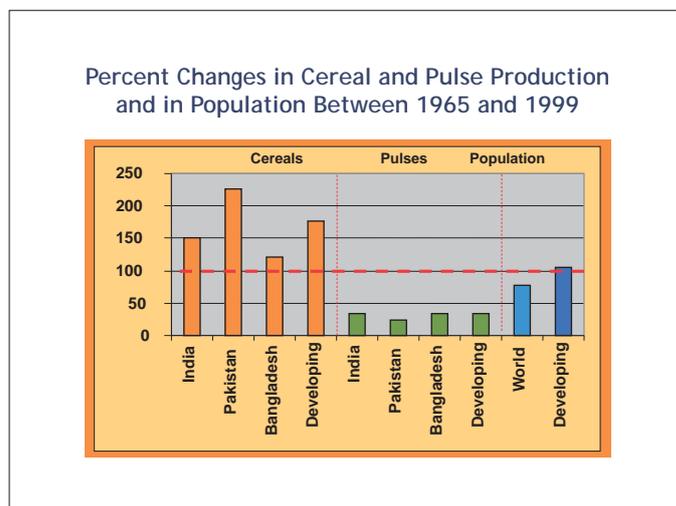


Source: World Health Organization (WHO) children under 5 prevalence data

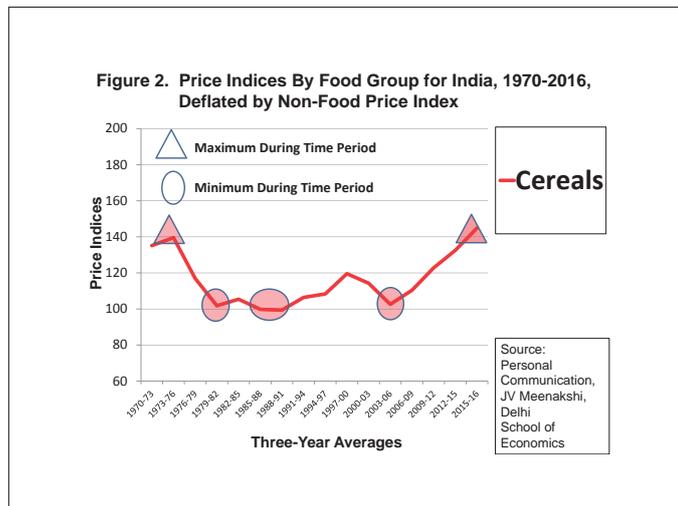
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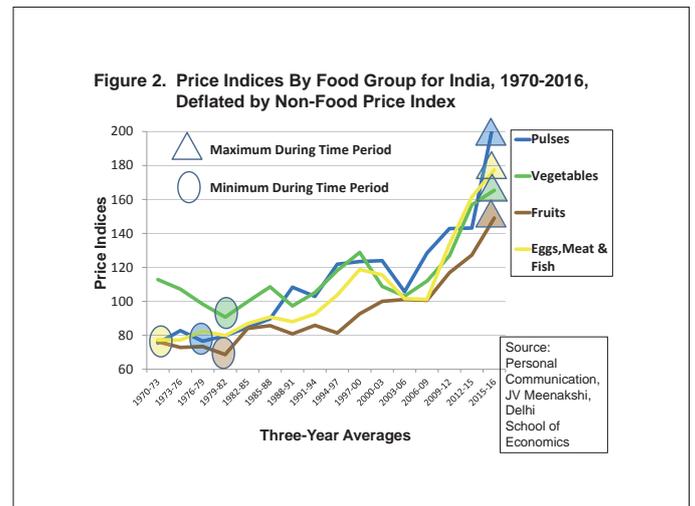
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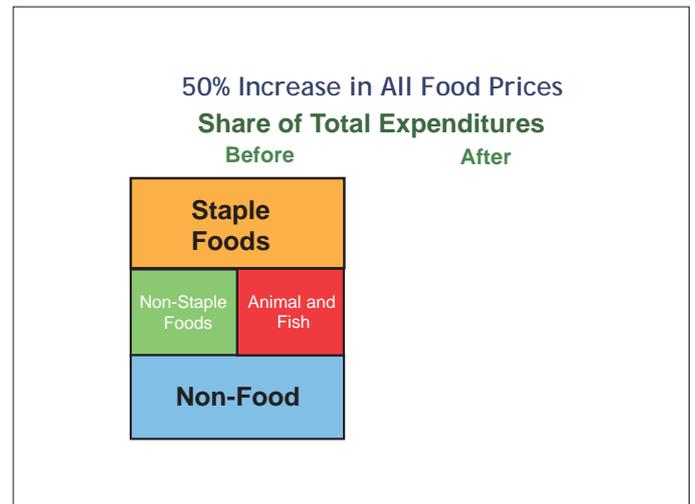


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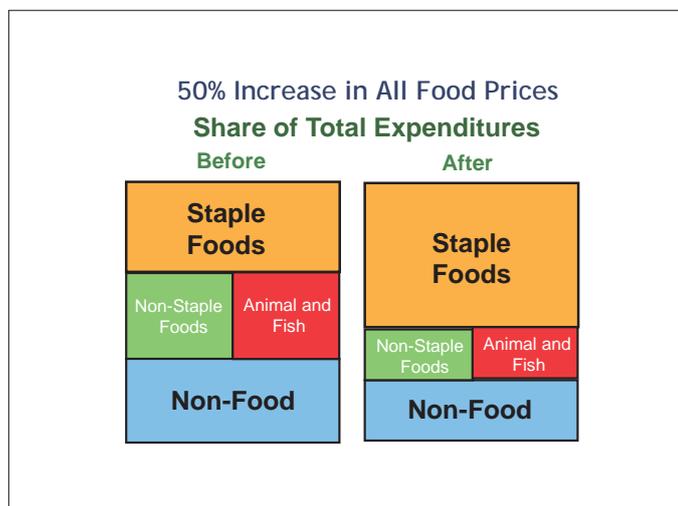
 **Rice Price Rise in the Philippines, 2006-2016**

- The **non-food** consumer price index rose by 31%
- The **food** consumer price index rose by 63%
- There were the following price rises of individual food groups:
 - **Rice** **74%**
 - Vegetables 82%
 - Fruits 82%
 - Fish 70%
 - Meat 40%
 - Milk, Eggs, Cheese 45%

9



10



11



12



Cost-effective: central one time investment

13

Excerpt From Recent UNICEF Brochure

8 BILLION
VITAMIN A CAPSULES

Government of Canada / Gouvernement du Canada

Thanks to a donation programme financed by the Government of Canada and implemented through the Micronutrient Initiative, UNICEF has received more than 8 billion capsules since 1996, which, when combined with programme financing, have been critical to maintaining strong Vitamin A supplementation programmes.

4 MILLION

The Micronutrient Initiative estimates that more than 4 million deaths have been averted during this time.

each silhouette represents 100 million capsules

Cost Per Vitamin A Capsule \$US 0.50-1.25 World Bank (2007)

14

Biofortified crops released in **30 countries**
In-testing in another **25 countries**

Rice Wheat Maize Pearl Millet Sorghum
Cassava Orange Sweetpotato Potato Banana Plantain
Lentil Beans Cowpea

15

> 150 Varieties Released Across 12 crops

NUTRITIOUS STAPLE FOOD CROPS: WHO IS GROWING WHAT?

Nutritious crops released in 30 countries; in testing in another 25

16

Human Nutrition Efficacy Trials

Fourteen Efficacy Trials either completed or in process

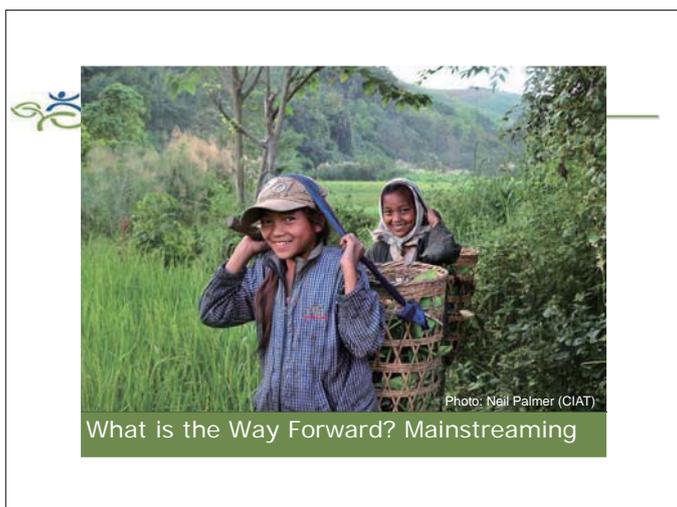
- High iron crops ✓+
- Meta-analysis completed for beans and pearl millet
- High pro-vitamin A crops ✓
- Multiple efficacy trials completed for sweetpotato, maize, and cassava
- High zinc crops
- Bioavailability studies positive, efficacy trials in the field

17

Functional Outcomes

- Efficacy trials with provitamin A, iron, and zinc biofortified crops have also shown improved functional outcomes:
 - Improved cognitive function (iron)
 - Better work performance (iron)
 - Better sight adaptation to darkness (provitamin A)
 - Reduced morbidity (zinc)

18



19

HarvestPlus Delivery Goals

Globally By 2030

- One billion people will be benefitting from biofortified nutritious foods.

Short-Term Goal By 2020

- 100 million people in farm households will be growing and consuming biofortified nutritious food crops

By the End of 2016

- 20 million people in farm households

20

Risk of Zinc Deficiency

Risk indicator: % with inadequate zinc intake

Region	% with inadequate zinc intake
Global	17.3
Africa	23.9
Americas and the Caribbean	9.6
Asia	19.4
Europe	7.6
Oceania	5.7

Zinc deficiency:

- Susceptibility to infections (diarrhea, malaria, pneumonia)
- 450,000 deaths among preschool children annually
- Stunting?

21

Per Capita Energy Intakes Per Day for Jessore By Income Group

	Lower Income	Middle Income	Higher Income
Food Staples	1816	1848	1876
Non-Staple Plant Food	339	427	474
Fish and Animal Foods	47	59	92
All Food Groups	2201	2334	2442

22

Per Capita Zinc Intakes (mg/day), Rural Bangladesh 2005, By Income Group

	Lower Income	Middle Income	Higher Income
Food Staples	5.9	6.4	6.9
Non-Staple Plant Food	1.8	2.1	2.4
Fish and Animal Foods	0.6	0.8	1.5
All Food Groups	8.3	9.3	10.8

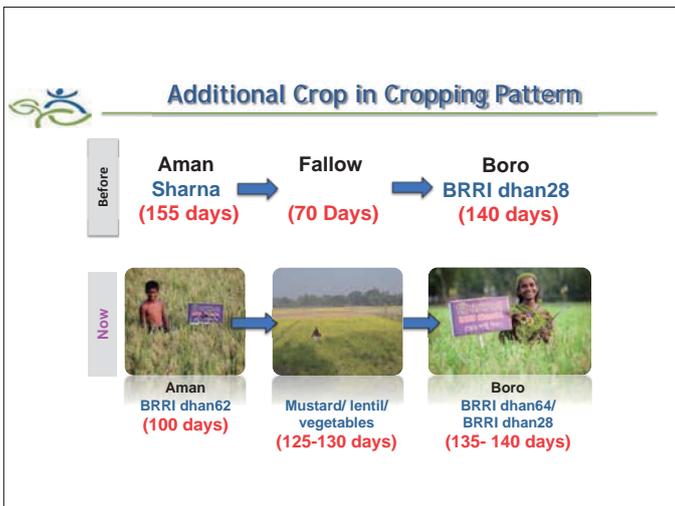
Estimated Average Requirement \approx 13 mg Zn/day
 15 mg/kg Zn milled rice x 400 gms rice intake/day = 6 mg Zn/day

23

Incremental Changes in the Prevalence of Inadequate Zinc Intake, Bangladesh

Scenario	Prevalence of Inadequate Intake (%)
Baseline	73%
Income and Diet	63%
+ High Zinc Rice	26%
+ Wheat Flour Fortification	25%

24

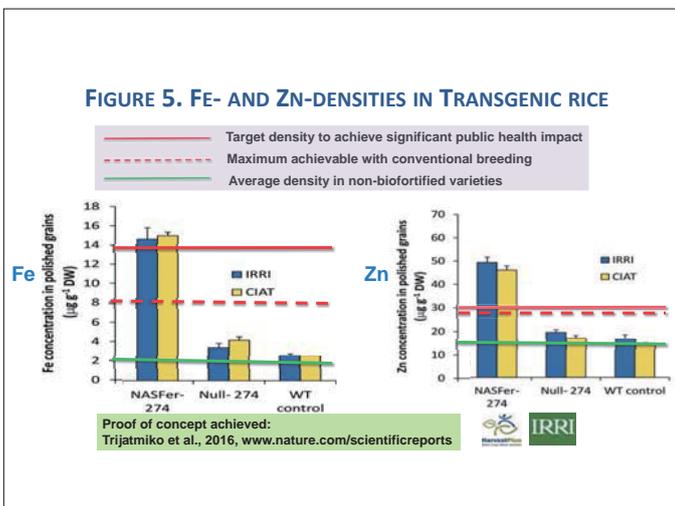


25

Effect of High Zinc Wheat Intervention on Morbidity Indicators

Indicator	High Zinc Wheat Subjects	Low Zinc Wheat Subjects	Days of Sickness Averted For ~ 1300 Subjects Over 180 Days	Difference Significant at 5% Level of Confidence?
Children 4-6 Years				
Days With Pneumonia	203	244	41	YES
Days With Vomiting	60	99	39	YES
Women 15-49 Years				
Days With Fever	999	1092	93	YES

26

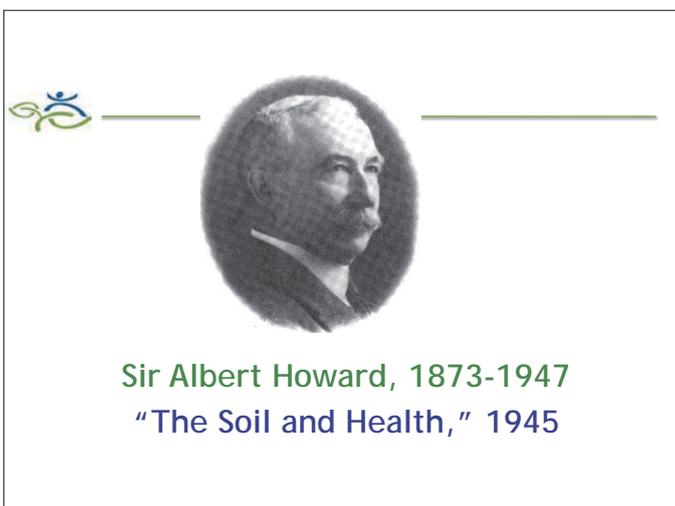


27

In Conclusion ...

“Such intimately related subjects as agriculture, food, nutrition and health have become split up into innumerable rigid and self-contained little units, each in the hands of some group of specialists. The experts, ...soon find themselves...learning more and more about less and less...The remedy is to look at the whole field covered by crop production, animal husbandry, food, nutrition, and health as one related subject and...to realize...that the birthright of every crop, every animal, and every human being is health.”

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THE IMPORTANCE OF WOMEN'S NUTRITION FOR THE NEXT GENERATION'S HEALTH AND COMMUNITY DEVELOPMENT

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ABSTRACT

Malnutrition in the womb and between birth and age 2 years has largely irreversible consequences. Maternal undernutrition is a common cause of poor fetal growth and a low birthweight (LBW). A LBW baby whose birth weight is below 2500 grams has not achieved her full growth in the womb and is undernourished from birth. If her malnutrition is not treated and she does not attain 'catch-up growth' during her childhood, she becomes an underweight woman who is at increased risk of having a LBW baby or losing the baby in the fetal or neonatal periods. Malnourished children may enroll late in school, and therefore get less education, and cannot do heavy physical work for long periods, and therefore get less income.

A child starts life as a single cell in the womb. The cell absorbs nutrients; it grows and divides into two cells. Each new cell absorbs nutrients to grow larger and divide again, until there are millions of cells which form different tissues such as neuron and brain. If enough nutrients are not available, these organs are not fully developed and mental function is damaged. Children who were malnourished in the first 1000 days cannot study well and so may get poor grades at school or drop out. It affects children's ability to make a living and realize their full potential for a full and healthy life.

If the fetus is undernourished, it adapts to this lack of nutrients by permanently modifying its structure and metabolism in order to survive. This is called 'nutritional programming.' The most obvious mechanism by which this adaptive programming could have an effect is through altering normal tissue and organ development. Exposure to low-protein diet during gestation leads to kidneys with fewer nephrons exhibiting symptoms of primary hypertension. Type 2 diabetes characterized by impaired insulin action and altered insulin secretion is a common postnatal phenotype seen as a result of nutritional programming.

Undernourished adults who have a lack of physical strength and stamina get low incomes. Physically and mentally disabled people due to micronutrient deficiencies will be a burden on their family. And today, most developing countries face a growing number of patients with non-communicable diseases (NCDs). NCDs are now a major development issue affecting health, well-being, income, and productivity. They cause premature death and disability-often of a main carer or wage earner at household level and loss of working population at community level. The coexistence of undernutrition or micronutrient deficiencies and signs of overnutrition is called 'the double burden of malnutrition.' Today, not only developing countries but also developed countries have to tackle both undernutrition and overnutrition at the same time.

KEYWORDS

the first 1000 days, nutritional programming, the double burden of malnutrition, intra-household food distribution, nutritional education

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The Importance of Women's Nutrition for the Next Generation's Health and Community Development

次世代の健康と地域の発展のための女性の栄養の重要性

Noriko Sudo, PhD, RDN
Ochanomizu University

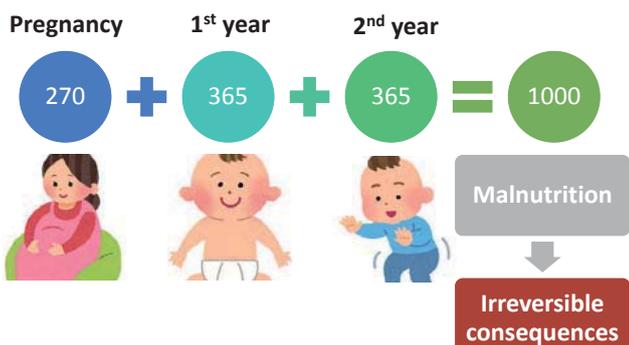
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Outline

1. 'The first 1000 days'
2. Nutritional programming
3. The double burden of malnutrition
4. The status of women in developing countries
5. Advantages of female researchers in field work

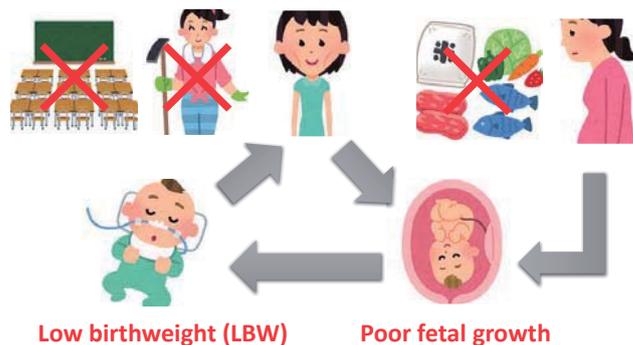
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1000 critical days (from conception to the 2nd birthday)



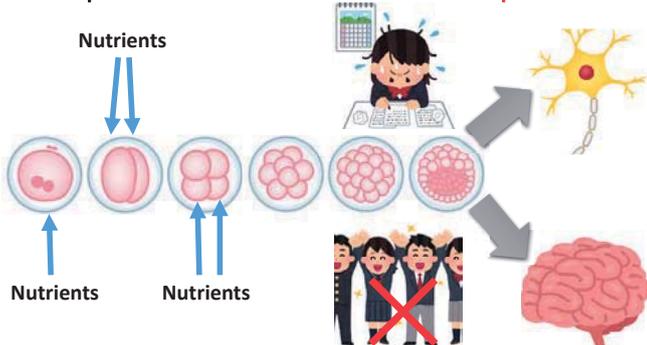
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1. Malnutrition in the 'first 1000 days' damages a child's physical growth.



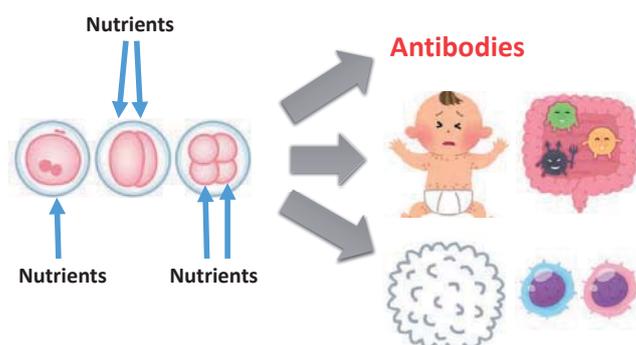
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2. Malnutrition in the 'first 1000 days' impairs a child's mental development.

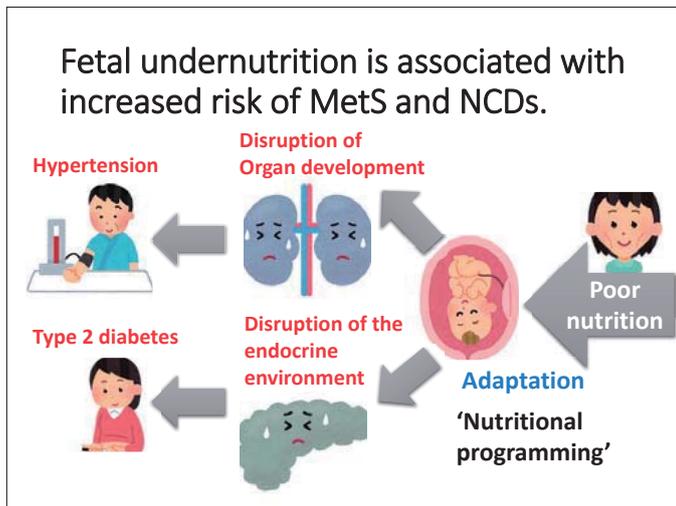


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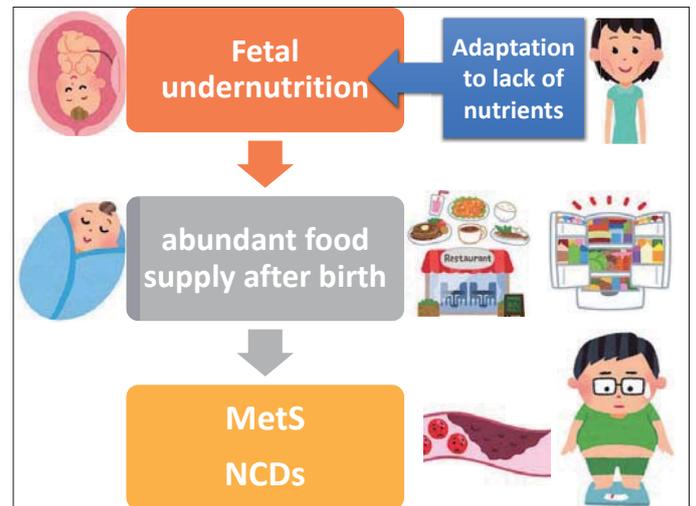
3. Malnutrition in the 'first 1000 days' weakens the immune system.



6



7



8

Nutrition and community development

- Undernutrition
- Micronutrient deficiencies
- Non-communicable diseases (NCDs)

Diabetes
Cardiovascular diseases
Some cancers

Double burden of malnutrition

9

National Health and Nutrition Survey in 2015 (Japan)

- Nearly 20% of adult males are considered as diabetes
- Nearly 10% of babies born in Japan have LBW

Overnutrition

Nearly 30% of adult **males** are **overweight/obese**

Undernutrition

22% of **females** in their 20's have **BMI <18.5 kg/m²**

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Conclusion-1

It is important, for a woman's and her baby's health, that she is well nourished **before** becoming pregnant.

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Conclusion-2

Husbands, partners, mother-in-law, and other relatives should understand that **improving health, nutrition, and education of women** who are responsible for feeding and caring for their household is beneficial for the entire family and the community.

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Session 1

Food and nutrition research
by female researchers

Chair:

Naoko Oka, JIRCAS



INDIGENOUS FOODS AND THEIR NUTRITIONAL VALUE: EVIDENCES FROM SOUTH ASIA

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**Presenting Author*

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ABSTRACT

The indigenous knowledge contains vital information that helps in answering various challenges facing today's world. However, the knowledge erodes rapidly. When the loss of this knowledge negatively affects the lives and health of traditionally living rural communities, a drive to conserve indigenous knowledge becomes essential. Existing indigenous knowledge about various foods and food habits may play a significant role in answering the emerging food security and malnutrition issues across the world. The present study attempts to investigate the various indigenous foods and traditional food habits that exist across South Asia, especially in countries like India, Bangladesh, Nepal, Bhutan etc. It also tries to assess the nutritional values of these foods and how it may help in attaining the SDG 2 in these countries. This study argues that the transfer of indigenous knowledge on traditional foods and food habits will ensure their availability and utilisation for resource-poor rural communities.

KEYWORDS

Indigenous Knowledge, Foods and food habits, South Asia, Sustainable Development Goal

INDIGENOUS FOODS AND THEIR NUTRITIONAL VALUE

Evidences from South Asia

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¹United Nations University Institute for the Advanced Study of Sustainability

Presented at

JIRCAS International Symposium 2017
 "Promoting an active role for female researchers in agriculture, food and nutrition research"

United Nations University, Tokyo, Japan

02/11/2017

1

Contents

- SDG 2: The global status and status of South Asia
- Major causes of food insecurity and dietary transition
- Indigenous food systems
- Indigenous food and South Asia: Examples
- Water Stress and Indigenous food
- Research Status on Indigenous food
- Conclusions and Way Forward

2

SDG 2 : The Global Status

Target 2.1 End Hunger, Achieve Food Security and Improved Nutrition and Promote Sustainable Agriculture

- The absolute number of people living in chronic food deprivation increased
- In 2016: ~ 520 million people in Asia > 243 million in Africa
- From 2014-2016, 1 in 9 people in the world suffered from severe food insecurity
- Prevalence of food insecurity slightly higher among women

Fig. 1: Regional distribution of undernourished people in the world from 2000-2016 *
 (*Source: The state of food security and nutrition in the world, FAO 2017)
 (*Source: The state of food security and nutrition in the world, FAO 2017)

3

SDG 2 : The Global Status

Target 2.2. by 2030 end all forms of malnutrition, including achieving by 2025 the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women, and older persons

- 155 million children <5 years of age are suffering from stunted growth ⇨ 130 million in 2025
- 45% of 6.9million child deaths annually linked to malnutrition
- >2 billion people suffer from hidden hunger*
- Africa and South Asia are the identified hotspots

Fig. 3: Distribution of Global hunger based on Global Hunger Index
 (Source: International Food Policy Research Institute, 2016)
 (*Source: The state of food security and nutrition in the world, FAO 2017)

4

SDG 2 : The Status of South Asia

- South Asia bears about 40 percent of the global burden of child stunting.
- The prevalence of stunting in the poorest households is 2.4 times higher than the prevalence in the richest.
- Hunger levels are "alarming" in Afghanistan, Pakistan and India
- Afghanistan and India are among the top ten countries with severe hidden hunger levels

Fig. 5: % distribution of underweight children in South Asia
 (Source: FAO 2017)

Fig. 6: % distribution of underweight children in South Asia
 (Source: FAO 2017)

5

Major causes of Food Insecurity and Dietary Transition

- **Income:** Reform in economic system brings about changes in food system
- **Urbanization:** A marked increase in the intake of energy-dense foods, a decrease in physical activity, and a heightened level of psychosocial stress
- **Globalization and trade liberalization:** a huge inflow of processed food products which has remarkably transformed the scenario of food market and people's food choices.
- **Climate Change:** Climate-related events reported to increase food insecurity, in terms of both availability and access.
- **Conflicts:** Food insecurity and malnutrition are found to be more prevalent in conflict affected areas

6

Indigenous Food Systems

- There is a shrinking diversity in major food crops in national diets.
- Macronutrients and micronutrient content in diets are ignored in most national food security programmes.
- Many of the plant varieties and animal have traits that allow them to adapt to local environments and climates, resist pests and diseases and satisfy local cultural preferences.

“Indigenous” food signifies food naturally existing or originating in a place or country rather than arriving from another place.

(Kuhnlein, 1996)

Indigenous Food Systems

Qualities of Indigenous food systems

- Dietary Diversity
- Sensory Qualities and Dietary Structures
- Nutritional Qualities



A traditional food processing tool to de-husk paddy, *Dheki*

Indigenous food systems are not only vital for human sustenance but also constitute a treasure of knowledge that contributes to well-being and health, environmental sustainability and cosmic balance of the ecosystem which could be harnessed for the benefit of all human kind (Kuhnlein, 2010)

Indigenous Food and South Asia: Examples (1)

- Widely grown in India and other South Asian countries
- Rich in micronutrients – β-carotene, folic acid, calcium, iron and vitamin C
- Largely grown in home gardens and also used for fencing



Moringa oleifera^a

- Ethnic fermented food of the Himalayas
- Rich in iron, calcium, sodium and potassium
- With limited or no access to leafy vegetables during off-season, mountainous people rely on the fermented leaf products



Gundruk^b

(^aSource: <http://www.puraphabiodiesel.org/moringa/about-plant.php>)
(^bSource: Senapathi et al, 2016)

Indigenous Food and South Asia: Examples (2)

- Ethnic fermented soybean food in eastern Himalayas
- Cheap source of protein, free amino acids, minerals, folic acid and vitamin B complex. Also, reported with antioxidant properties
- *Kinema* making is protected as hereditary right – mostly from mother to daughter



Kinema^a

- Large trees found in the dry deciduous forests of India
- Rich in sugar and protein, also contain – calcium, iron, phosphorus, potassium and vitamin B complex
- Largely used for making beverage



Madhaca longifolia^b

(^aSource: Tamang et al, 2009; Tamang, 2015)
(^bSource: Yadav et al, 2012)

Water Stress and Indigenous Food

- Purulia, a rural district in India, is mostly tribal dominated, largely illiterate, drought-prone, remote and inaccessible with depleting natural resources and low intensity of cultivation.
- Focus Group Discussion with village women, elders and farmers to identify the major coping and adaptation strategies to water stress, low productivity and drought situation.
- Prevalence of coping strategies
- Reliance of indigenous people on local natural resources remain unchanged



Digging puddles on river bed



Water Stress and Indigenous Food



Strategy	Women's Strategies (%)	Households' Strategies (%)	Farmers' Strategies (%)
Digging "dani" or puddles	~90	~85	~80
Using alternative source of water	~85	~80	~75
Limited use of water	~80	~75	~70
Walking farther to fetch water	~75	~70	~65
Using locally available food	~70	~65	~60
Migration to work	~65	~60	~55
Borrowing credit	~60	~55	~50
Alternative source of income	~55	~50	~45
Selling livestock	~50	~45	~40
Selling woods	~45	~40	~35
on-field water storage pit	~40	~35	~30
In-situ moisture conservation	~35	~30	~25
Change in crop variety	~30	~25	~20
Adjusting crop planting dates	~25	~20	~15



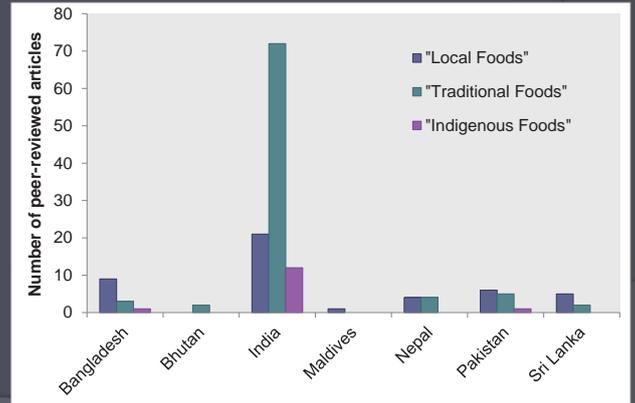
Research Status on Indigenous Food

Search Engine: SCOPUS
 Keywords: "Indigenous Foods" AND India, "Traditional Foods" AND India, "Local Foods" AND India
 Publications: Only peer-reviewed articles in English
 Time Period: 1987 – 2017

"Indigenous Foods": 160
 "Traditional Foods": 1896
 "Local Foods": 2387

13

Research Status on Indigenous Food



14

Conclusions and way forward

- Research status on indigenous food is far from satisfactory in South Asia that calls for further exploration and conservation.
- Documenting local food systems for scientific identifications and nutrient composition is essential.
- Research and development to enhance yield and quality parameters; domestication of indigenous plants and animals including reproduction/multiplication
- Support *in-situ* farm conservation as *ex-situ* collections cannot replicate the evolutionary processes and cultural practices.
- National food security strategies should demonstrate awareness and support for the role of traditional foods to address food security issues

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THANK YOU

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JIRCAS'S APPROACHES TO NUTRITION: THROUGH INTERNATIONAL AGRICULTURAL AND FOOD RESEARCH

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ABSTRACT

Nutritional issues are one of the highest-priority global challenges and have been rapidly drawing international concern in recent years. For example, Japan mentioned the importance of nutrition at the TICAD VI meeting in Nairobi last summer, and subsequently, an Initiative for Food and Nutrition Security in Africa (IFNA) and a Nutrition Japan Public-Private Platform (NJPPP) were launched.

JIRCAS is a national research and development agency which covers a broad range of issues regarding agriculture, forestry and fishery in developing regions. Until not long ago, the main approach of JIRCAS was on producers' perspectives such as productivity increase. However, in its current fourth medium- to long-term plan that started in 2016, JIRCAS has also focused on the various systems starting from the production side to consumption side, including human nutrition.

Malnutrition is complex as it includes not only energy deficiency but also micronutrition deficiency and obesity. Despite its complexity and multisectoral characteristics, we have to find an approach to fight against malnutrition. Agriculture plays a key role in nutritional supply as it produces food, which is the main source of nutrition. In reality food is not always available because of the changes in climate, weather, season, or lack of access. In addition, food availability does not automatically translate into adequate nutritional intakes for consumers due to lack of nutritional knowledge, intrahousehold allocation, etc. Agricultural and food research is expected to contribute to solving these problems.

Out of several nutrition-related projects ongoing in JIRCAS, three projects are introduced in this presentation. The first project is an evaluation of global food supply-demand and nutritional balance (J. Furuya). Using a global food supply-demand foresight model incorporating the effect of climate change, he makes a long-term outlook for changes in food supply-demand and corresponding nutritional balance. The second project is, in contrast, a regional-level research on local food utilization in Lao PDR (K. Hasada et al.). They carry out close monitoring to evaluate individual nutritional supply focusing on protein supply throughout the year. Combining food processing technology applicable to various local food resources such as fish and soybeans, they aim to propose a way for improving stable nutritional supply in the region. The third project is a mixture of macro- and micro- analysis in Madagascar (S. Shiratori). From national-level food supply data, she evaluates the excess or deficiency of nutrients and identifies each food category's contribution to the nutrient intake. She also collects information on food consumption and anthropometry by conducting household surveys, and seeks for a realistic solution to meet the nutritional requirements of consumers.

KEYWORDS

developing countries, food supply-demand model, JIRCAS, local food, nutritional balance

REFERENCES

This presentation refers to the JIRCAS projects below (researchers in charge of nutritional aspects are indicated in parenthesis).

- Evaluation of global food supply-demand and nutritional balance (J. Furuya and S. Shiratori)
- Multiple use and value addition of regional resources for improvement of sustainable productivity in semi-mountainous villages of Indochina (K. Hasada, K. Fujita, and J. Marui)
- Development of sustainable technologies to increase agricultural productivity and improve food security in Africa (S. Shiratori)

JIRCAS

JIRCAS's approaches to nutrition: through international agricultural and food research

JIRCAS International Symposium 2017
@United Nations University
November 2, 2017

Sakiko Shiratori, Ph.D.
Research Strategy Office, JIRCAS

Japan International Research Center for Agricultural Sciences

1

Introduction: Nutrition and Agriculture

Malnutrition

- Food is not always available
- Food availability does not automatically translate into nutritional adequacy

- Agriculture plays a key role in nutritional supply
 - “food”: main source of nutrition
- Agricultural and food research is expected to contribute to nutritional improvement of consumers

2

JIRCAS's Current Approaches to Nutrition

Based on 4th Medium- to Long-term Plan (2016-2020)

- Various systems including human nutrition

- Technology development and dissemination
 - For stable production of agricultural products
 - High-yielding crops adaptable to adverse conditions
 - For high value-added products
 - Nutritional value measurement, Product quality improvement
- Socioeconomic research
- Collaboration and alignment with various initiatives
 - Initiative for Food and Nutrition Security in Africa (IFNA), Nutrition Japan Public-Private Platform (NJPPP)

3

JIRCAS's Four Main Programs

- Program A: Environment and Natural Resource Management**
 - Climate Change Measures in Agricultural Systems
 - Watershed Management in Africa
 - Resource Management in Asia and Pacific Island
 - BNI Utilization
- Program B: Stable Agricultural Production**
 - Food Security in Africa
 - Environmental Stress-Tolerance Crops
 - High-Yielding Biomass Crops
 - Pest and Disease Control
- Program C: Value-adding Technologies**
 - Food Value Chain
 - Asia Biomass
 - Multiple Use of Regional Resources in Semi-mountainous Villages
 - Higher Value Forestry
 - Aquatic Production in Tropical Areas
- Program D: Information Analysis**
 - Food and Nutritional Balance

4

1 Global Nutritional Balance (Program D)

“Food and Nutritional Balance” (J. Furuya)

- Measure future impacts of climate change on nutrient supply
 - Global long-term food supply-demand foresight model
 - Effect of climate change
 - Food → converted into nutrient supply
- World Food Model
 - Simulation with several parameters
 - Continuously refined
 - 140 countries and regions
 - 4 crops and 5 animal products

Relationship between temperature and yield (Japonica rice in wetland)

N=165, HI=0.3, LAI=6.0, bo=231, bc=442, Rg=15MJm²

Furuya JARQ (2015)

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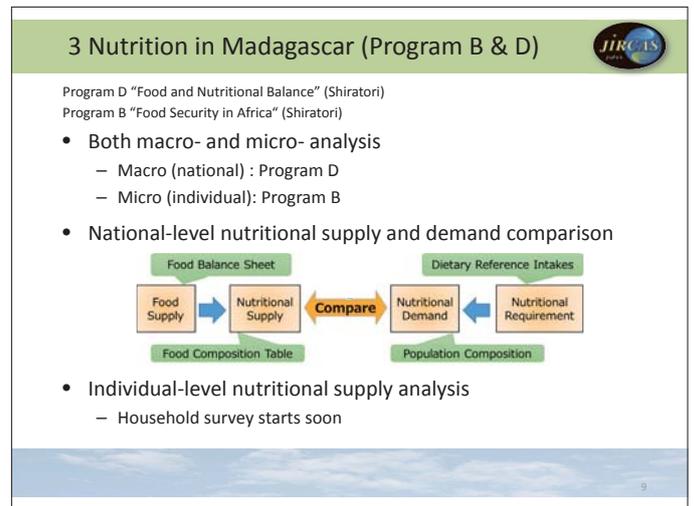
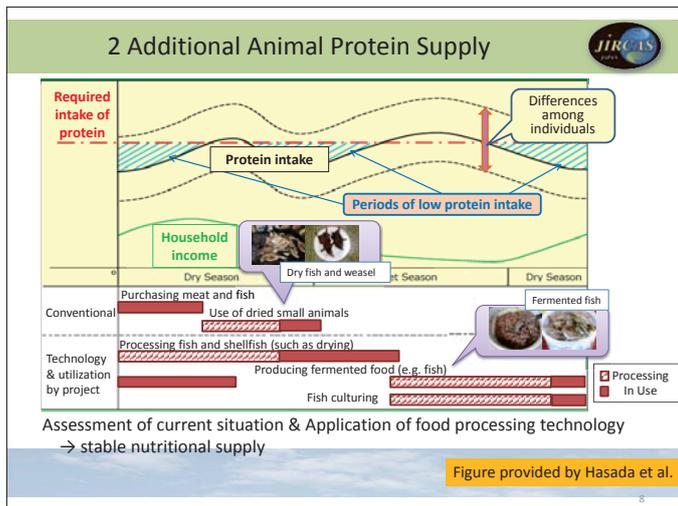
2 Local Food Utilization in Laos (Program C)

“Multiple Use of Regional Resources in Semi-mountainous Villages” (K. Hasada, K. Fujita, and J. Marui)

- Close monitoring to evaluate individual nutrient supply
 - Focus on animal protein
 - Seasonal change

Figure provided by Hasada et al.

6



Thank you!

Japan International Research Center for Agricultural Sciences

THE IMPORTANCE OF GENDER IN STRENGTHENING FOOD AND NUTRITIONAL RESILIENCE OF HOUSEHOLDS IN MADAGASCAR

Felamboahangy RASOARAHONA
– Jules RAFALIMANANTSOA

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FELAMBOAHANGY RASOARAHONA holds a PhD in Food and Agricultural Process Engineering (School of Agricultural Sciences, University of Antananarivo), and an Agronomist Engineer Grade (Spec. Food Science). Her main expertise areas are nutrition and plants (medicinal, cosmetic, aromatic and nutritious properties). She is now Vice-President of the Researchers' Platform fighting malnutrition from the Movement Scaling Up Nutrition in Madagascar.



ABSTRACT

There is enough food in the world to feed all human beings (BITTMAN, 2013), however, malnutrition and hunger are at an intolerably high level. Madagascar is one of the countries most affected by these scourges. Indeed, malnutrition remains a major public health and socio-economic problem in the country, affecting a large part of the population, especially infants and pregnant and lactating women (PNAN-III, 2017).

Madagascar is a country where the majority of the population lives mainly from agriculture (more than 70 % of actives, but only approx. 26% of the GDP). Today, it is unanimously recognized that women play a central role in the agricultural sector. In particular, they supply the bulk of the labour force: 60% of women of working age work in the agricultural sector. The woman also plays an important role in the food security of the communities (management of food stocks ...).

Facing this, in the country, gender inequality exists and persists in many regions, especially in rural zones. Despite the significant role that women play in agricultural activities, and in particular in the food security of the household, They are generally placed at disadvantage relative to men, mainly in regards of access to and control over resources and means of production (land , improved seed, fertilization, agricultural equipment, credit, information and technologies, etc.). In the household, they also have a low decision-making power.

Equity in gender relations and food and nutrition resilience within the household are closely linked. Promoting women's access to productive resources also seems to be a solution, but they must also contribute to social and economic change (BRIDGE, 2014). Women often play a greater role in ensuring food safety and quality, and are often responsible for processing and preparing food in their homes. Giving them importance, for example, nutrition education would help reduce micronutrient deficiencies within the household and improved her cooking capacities. An approach favoring men's positive commitment to children and women will also act as a multiplier effect of change at the individual and community level.

There is, however, another area of hope: increasing women's access to high levels of education, particularly in nutrition-related fields: for example, gender parity is almost attained in the training of agricultural engineers. This development can greatly help to promote gender equality.

KEYWORDS

Gender equity, households, rural, empowering woman, Madagascar.

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THE IMPORTANCE OF GENDER IN STRENGTHENING FOOD AND NUTRITIONAL RESILIENCE OF HOUSEHOLDS IN MADAGASCAR

Felamboahangy RASOARAHONA – Jules RAFALIMANANTSOA
MIKASA - Researchers Platform for the Fight against Malnutrition
ONN – Madagascar National Office of Nutrition



1

- Introduction:

- There is **enough food** in the world to feed all human beings (BITTMAN, 2013), however, **malnutrition** and **hunger** are at an **intolerably high level**
- Madagascar: one of the countries **most affected** by these scourges
- Malnutrition/hunger affecting a large part of the population, especially **infants** and **pregnant** and **lactating women** (PNAN III, 2017)
- Madagascar: 80% rural population, Malagasy women play a central **role** in the **agricultural sector**

➔ **How « promoting gender equity » can help in strengthening food and nutritional resilience of households in Madagascar?**

2

Presentation plan

- Few words about Madagascar
- Food and Nutrition situation in Madagascar
- Gender equity in Madagascar
- Promoting Women for Food security

3

Few words about Madagascar

80% Rural population → Only 26% of the Gross Domestic Product

Total fertility rate: 4.8 children per woman (2009)

Area: 587 401 Km²

Population: Between 19.6 million and 20.8 million

22 Régions, 119 Districts, 1.693 Communes, 18 251 Fokontany

21 inhabitants per km², 50.2% Woman, 80% Rural population, 49% Children under 15 y.o.a.

4

Food and nutrition situation in Madagascar

ALARMING SITUATION (1/2)

- **1/3** of households are in a situation of severe food insecurity (**33%** in rural zone and 18,7% in the capital and the large urban centers)
- Insufficient diet in terms of quality and quantity (not meeting daily energy requirements)
- ENSMOND 2012-2013 (National survey on the follow-up of the Millennium Goals) :
 - * diet is poor in quantity in **76%** of households;
 - * and in quality in **84%**.

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Food and nutrition situation in Madagascar

ALARMING SITUATION (2/2)

- Very **weak agricultural speculation** for all essential crops (rice, cassava, corn, sweet potato)
Because of several problems: Low utilization of inputs, lack of farmer training, outdated traditional agricultural practices, lack of hydro-agricultural infrastructure...
- **One child out of two suffers from chronic malnutrition:**  
- 8% of children under 5 suffer from acute malnutrition

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Food and nutrition situation in Madagascar

National Action Plan for Nutrition III (2017-2021)



"Reduce the rate of chronic malnutrition among children under 5 years from 47% to 38% nationally by 2021"

Nutrition, a guarantee of human capital for sustainable social and economic development

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Gender Equity in Madagascar

- Women supply the bulk of the production force: **60%** of them of working age work in the agricultural sector (INSTAT, 2015)
- Women also play an important role in the **food security** of communities (management of food stocks ...)

➔ Gender inequality exists and persists in many regions

- Women are generally placed at **disadvantage relative to men**, mainly in regards of **access to** and **control over resources** and **means of production** (land, improved seed, fertilization, agricultural equipment, credit, information and technologies ...)
- In the household, they also have a **low decision-making power**

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Gender Equity in Madagascar

Some examples ... (1/2)



- Access to factors of production is almost impossible for women either through **ignorance, tradition**, or the **distribution of roles** within society
- The man who **"nourishes the family"** is looking for work outside his home area. The money he sends to his wife is **derisory** and can not support the needs of his family, especially food. Sometimes he also has a **second wife**.

=> Food insecurity affects mainly women and children.

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Gender Equity in Madagascar

Some examples ... (1/2)



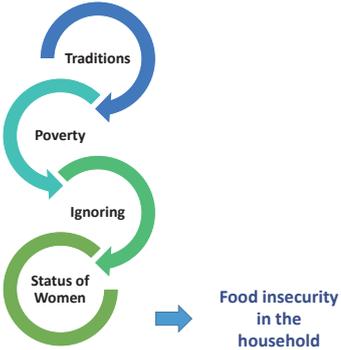
Socio-cultural practices negatively affect the nutritional status of pregnant, lactating women and young children:

- Men have the privilege of being served first, having the best shares and imposing their food preferences
- The practice of polygamy puts women in competition in order to have the consideration of the husband
- The woman has no special nutritional status during pregnancy. They continue to work on the fields

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Gender Equity in Madagascar

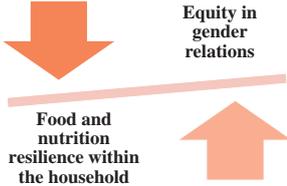


Food insecurity in the household

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Promoting Women for Food security



Promoting women's access to productive resources also seems to be a solution, but they must also contribute to social and economic change (BRIDGE, 2014).

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Promoting Women for Food security

Concrete case 1: Nutrition education to help reduce micronutrient deficiencies

Inadequate food practices are often the cause of malnutrition

It is necessary to educate women who are primarily concerned with feeding the household:

- Definition of a **balanced diet**
- **Dietary requirements** according to age, sex and activity (pregnant and lactating women)
- Association of food groups to prepare **balanced meals**
- **Role of food** and health problems related to dietary deficiencies
- Role of **breastfeeding**

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Promoting Women for Food security

Concrete case 1: Nutrition education to help reduce micronutrient deficiencies

Moringa oleifera : a miracle tree?



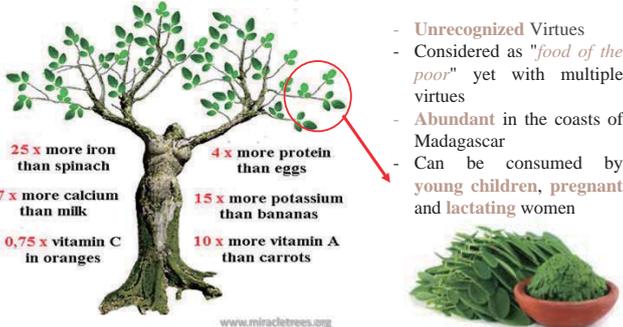
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Promoting Women for Food security

Concrete case 1: Nutrition education to help reduce micronutrient deficiencies

Moringa oleifera : a miracle tree?



- **Unrecognized Virtues**
- Considered as "*food of the poor*" yet with multiple virtues
- **Abundant** in the coasts of Madagascar
- Can be consumed by **young children, pregnant and lactating women**

25 x more iron than spinach
17 x more calcium than milk
0,75 x vitamin C in oranges

4 x more protein than eggs
15 x more potassium than bananas
10 x more vitamin A than carrots

www.miracletrees.org

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Promoting Women for Food security

Concrete case 1: Nutrition education to help reduce micronutrient deficiencies

Moringa oleifera : a miracle tree?

NUTRITION EDUCATION

- To make known the virtues of the plant
- **How to consume it while maintaining its nutritional value**
- **Provid nutrient recipes from the plant**
- **Produce the plant and transform it (powder)**

- Contributing to household food security (especially young children, pregnant and breastfeeding women)
- Create a **value chain**: one part will be destined for household consumption and the remainder may be destined for sale

Income generating activity = Promoting women

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Promoting Women for Food security

Concrete case 1: Nutrition education to help reduce micronutrient deficiencies

Moringa oleifera : a miracle tree?

Malagasy's women preparing Moringa leaf



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Promoting Women for Food security

Concrete case 1: Nutrition education to help reduce micronutrient deficiencies

« Eating Food with rainbow color »

- Madagascar has a very **wide diversity** in terms of **fruits** and **vegetables**
- Conveying this type of simple message can help to bridge **micronutrient deficiencies** through **food diversification**



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Promoting Women for Food security
 Concrete case 2: Nutrition education to improve cooking capacity

Cassava

- During the lean season, **cassava** is the **staple food** in rural areas in Madagascar
- However, consumed alone, this food is **not nutritionally balanced**

Transforming cassava in a simple way to make it more appetizing

Provide more nutritious recipes by combining cassava with other ingredients




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Promoting Women for Food security
 Concrete case 2: Nutrition education to improve cooking capacity

Cassava




↓

- Improving the **nutritional status** of the households
- Eventually, creating an **income source** for women

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Promoting Women for Food security
 Concrete case 3: Urban Agriculture



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Promoting Women for Food security



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UNIVERSITÉ D'ANTANANARIVO

Increasing women's access to high levels of education

Another area of hope to promote gender equity



For example, in the training of **Agricultural Engineers**: parity is almost obtained

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Conclusion

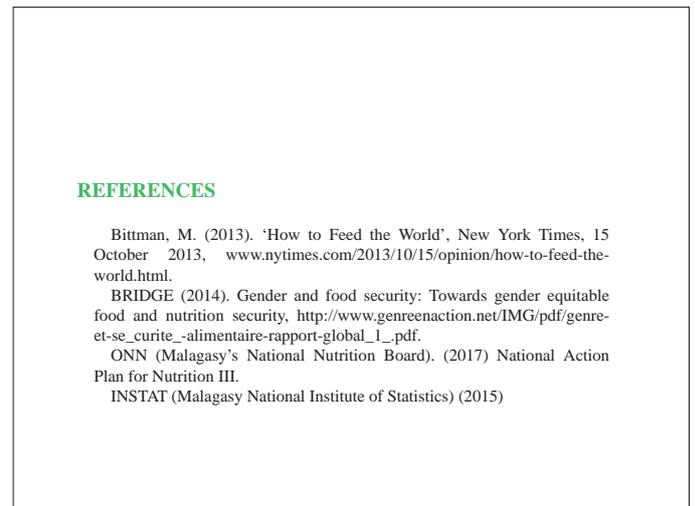
- Women play a **greater role** in ensuring food safety and quality
- **Gender inequality** still persists and this can have multiple **adverse consequences**
- An approach favoring **men's positive commitment to children and women** will also act as a multiplier effect of change at the individual and community level

➔ **Promoting women = one solution to the fight against malnutrition**

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LINKING AGRICULTURE TO NUTRITION IN AFRICA: THE ROLE OF BEANS

**Mercy Lung'aho^a, Rodah Zulu^β,
and Robin Buruchara^a**

International Center for Tropical Agriculture (CIAT): ^βMalawi, ^aNairobi.
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MERCY LUNG' AHO holds a Doctorate degree in Food Science and Human Nutrition from Cornell University (USA). She is a research scientist at the International Center for Tropical Agriculture (CIAT) based in Nairobi. Her expertise is in nutrition-sensitive agricultural programming. Her research includes a landmark study on iron biofortified beans. She advocates for more attention to nutrition in the field of agriculture. Mercy is a 2017 Aspen Institute New Voices Fellow.



ABSTRACT

Despite the clear potential for improvements in agriculture to enhance maternal and child nutrition outcomes the evidence for this is scarce. Recent reviews on agricultural interventions for improving nutrition reveal that more and better-designed research is needed to generate evidence of impact and information on what kinds of agricultural investments will have positive benefits for nutrition and health.

CIAT responds to this challenge by generating research that creates a shared understanding of the nexus between agriculture, food systems, nutrition, and resilience; generating evidence on what works, when, and how in linking agriculture interventions to nutrition outcomes and high quality diets; and catalyzing policy dialogue advocating for better diets.

CIAT has led biofortification efforts, through supporting breeding for enhanced iron and zinc in beans. There is documented evidence by HarvestPlus in Rwanda that eating beans biofortified with iron can reduce iron deficiency in women of reproductive age. CIAT continues to promote utilization of biofortified bean varieties while also promoting food diversification using the food basket approach. In Malawi for example, CIAT promotes nutrition education and behaviour change communication to influence caregivers' preferences towards more nutrient-rich foods, better intra-household allocation of food to benefit vulnerable groups, and other nutrition practices related to child feeding, caregiving, sanitation and hygiene.

Moreover, policymakers urgently need to recognize that poor diets are compromising economic productivity and well-being. Agricultural programs and investments are needed to support an enabling policy environment to contribute to improved nutrition. CIAT strives to lead the policy dialogue in its focal countries such as Madagascar towards national policies, action plans, and development activities that explicitly support nutrition through a multi-sectoral approach.

CIAT also focuses on promoting increased, responsible private sector engagement in targeted communities; encouraging processing and consumption of nutritious and safe foods; and harnessing the expertise of the private sector to shape healthy consumption patterns in its focal countries for example Kenya.

The results we seek in Africa are aimed at ensuring that consumers have better access to more nutritious food; that there are improved national systems to plan, manage, and evaluate nutrition-sensitive agricultural programs; and that we generate evidence of the links between agricultural interventions and improved nutrition.

KEYWORDS

Agriculture, nutrition, biofortification, policy, private-sector

REFERENCES

Laura E Murray-Kolb, Michael J Wenger, Samuel P Scott, Stephanie E Rhoten, Mercy G Lung'aho, and Jere D Haas. Consumption of Iron-Biofortified Beans Positively Affects Cognitive Performance in 18- to 27-Year-Old Rwandan Female College Students in an 18-Week Randomized Controlled Efficacy Trial. *J. Nutr.* jn255356; first published online September 27, 2017. doi:10.3945/jn.117.255356

Jere D Haas, Sarah V Luna, Mercy G Lung'aho, Michael J Wenger, Laura E Murray-Kolb, Stephen Beebe, Jean-Bosco Gahutu, and Ines M Egli. Consuming Iron Biofortified Beans Increases Iron Status in Rwandan Women after 128 Days in a Randomized Controlled Feeding Trial. *J. Nutr.* jn224741; first published online June 29, 2016. doi:10.3945/jn.115.224741

LINKING AGRICULTURE TO NUTRITION IN AFRICA: THE ROLE OF BEANS



JIRCAS International Symposium
Promoting an Active Role for Female Researchers in Agriculture, Food, and Nutrition Research
November 2, 2017
Tokyo, Japan

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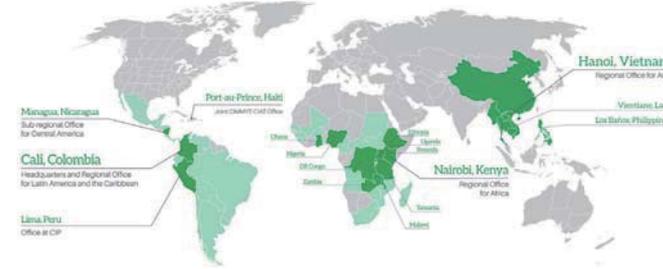
1

Who we are: About us

The International Center for Tropical Agriculture (CIAT)

CIAT AROUND THE WORLD

We work in 53 countries from 21 offices



Headquarters: Cali, Colombia
Regional Office for Africa: Nairobi, Kenya

Our vision, a sustainable food future

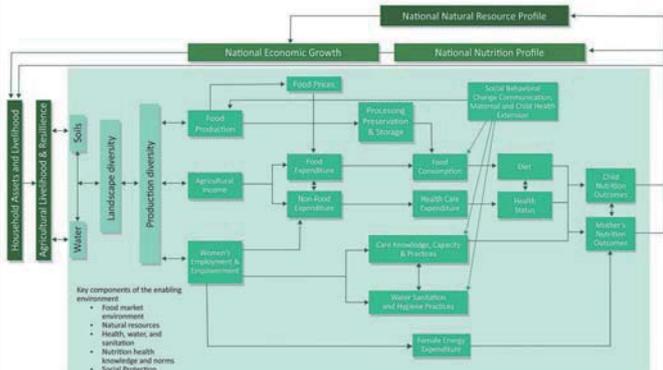


2

What we do in Africa

Linking Agriculture to Nutrition Outcomes

Food production, Agricultural incomes, and Women empowerment pathways



Key components of the enabling environment:

- Food market environment
- Natural resources
- Health, water, and sanitation
- Nutrition health knowledge and norms
- Social Protection

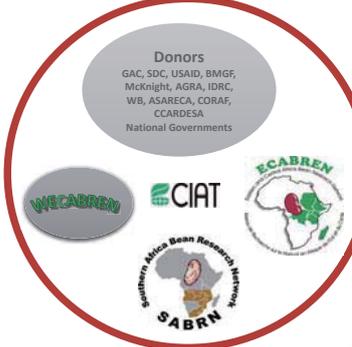
3

Where we work in Africa: PABRA Partnerships

Our Footprint and Organization in Africa



Donors:
GAC, SDC, USAID, BMGF, McKnight, AGRA, IDRC, WB, ASARECA, CORAF, CCADESA
National Governments



Our vision, a sustainable food future



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Partnerships for nutrition

Our model for impact

Regional Level	National Level	Community Level	Household Level
CIAT/PABRA Nutrition Team	NARS: Community nutritionists	Private sector, NGO, and Policy makers	Communities & vulnerable households
<ul style="list-style-type: none"> Joint context analysis and solution building Joint priority setting and intervention planning Strategic research Capacity building Monitoring & evaluation 	<ul style="list-style-type: none"> Development of community action plans Technology adaptation and policy support Catalyzing impact pathways for nutrition 	<ul style="list-style-type: none"> Catalyzing links and partnerships to reach users with knowledge, information, and products for improved nutrition outcomes 	

Our vision, a sustainable food future



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How CIAT impacts communities and households in Africa

Generating evidence of what works – Rwanda



Rwanda: Beans to the rescue
Climbing beans; Biofortified beans
Evidence

Summary
Problem: Anemia among women of reproductive age
Intervention: Biofortified beans – Efficacy study
Outcome: Improved iron status and improved brain function
Impact: Biofortification as a strategy incorporated into national agriculture/nutrition action plans

Partnerships:
NARS: Rwanda Agricultural Board
Private sector: Health Development Initiative
Research and Policy support: CIAT/ PABRA; HarvestPlus

Our vision, a sustainable food future



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How CIAT impacts communities and households in Africa
Generating evidence of what works – Rwanda

The Journal of Nutrition. First published ahead of print June 29, 2016 as doi: 10.3945/jn.115.224741.

The Journal of Nutrition
 Community and International Nutrition 

Consuming Iron Biofortified Beans Increases Iron Status in Rwandan Women after 128 Days in a Randomized Controlled Feeding Trial¹⁻³

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The Journal of Nutrition. First published ahead of print September 27, 2017 as doi: 10.3945/jn.117.255356.

The Journal of Nutrition
 Community and International Nutrition 

Consumption of Iron-Biofortified Beans Positively Affects Cognitive Performance in 18- to 27-Year-Old Rwandan Female College Students in an 18-Week Randomized Controlled Efficacy Trial

Laura E Murray-Kelb,¹ Michael J Winger,^{2,3} Samuel F Scott,⁴ Stephanie E Rhoads,⁵ Mercy G Lang'aho,⁶ and Jero D Haas⁷

¹Department of Nutritional Sciences, The Pennsylvania State University, University Park, PA, ²Department of Psychology and Culture and Behavioral Neuroscience, University of Oklahoma, Norman, OK, ³Division of Nutritional Sciences, Cornell University, Ithaca, NY, and ⁴ManoAfrica, CIAT, Kinshasa, Kinshasa, Rwanda

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How CIAT impacts communities and households in Africa
Influencing nutrition policy in Madagascar



Madagascar: Beans to the rescue School feeding program Policy

<http://scalingupnutrition.org/news/ministries-work-together-in-madagascar-to-revive-their-school-feeding-programme/>

Summary
Problem: Malnutrition due to monotonous diets based on rice
Intervention: Fortified composite bean-based porridge introduced in 2 school feeding programs in Antananarivo
Outcome: Increased school attendance and weight gain in vulnerable children
Impact: In 2015 Madagascar passed a policy to revive their national school feeding programme that had been abandoned since 2009
Partnerships:
 NARS: FOFIFA and ONN
 Private sector: PROFIT S.A.R.L
 Research and Policy support: CIAT/ PABRA

Our vision, a sustainable food future 

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How CIAT impacts communities and households in Africa
Nutrition advocacy among vulnerable communities in Malawi



Summary
Problem: Hunger and malnutrition among resource poor farming households
Intervention: Introduced biofortified bean varieties in 4 communities in Kasungu (North) and Mzimba (South)
Outcome: Food security, production of diverse foods, consumption of diverse foods and increased income from sale of surplus biofortified beans
Partnerships:
 NARS: DARS
 NGOs: Catholic Relief Services (CRS) and Mzuzu CADECOM
 Research and Policy support: CIAT/ PABRA

Malawi: NUA 45 beans to the rescue Community nutrition program Nutrition advocacy and education

Our vision, a sustainable food future 

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Celebrating five decades of innovation



Managua, Nicaragua
 Sub-regional Office for Central America
 28-29 September 2017

Cali, Colombia
 Headquarters and Regional Office for Latin America and the Caribbean
 9-10 November 2017

Nairobi, Kenya
 Regional Office for Africa
 29-30 May 2017

Hanoi, Vietnam
 Regional Office for Asia
 3-4 April 2017

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Session 2

General Discussion

Chair:

Fumika Sen, JIRCAS

Speakers:

Ismahane Elouafi, ICBA

Howarth Bouis, IFPRI

Noriko Sudo, Ochanomizu University



Chair: Fumika Sen



Speakers: Ismahane Elouafi and Howarth Bouis



Speaker: Noriko Sudo



Questioner

Fumika Sen

Ladies and gentlemen, I am so happy so many young ladies can join today's symposium. We have 30 minutes for the general discussion. I'm Sen from JIRCAS; I am in charge of this session.

Based on our schedule, I would like to ask some questions to the keynote speakers; and the time is very limited, so please take about 3 to 4 minutes for your corresponding comments, I think. After that, I would like to ask the audience to have any questions and comments.

My questions will focus on the theme of today's symposium. I want to start with Dr. Ismahane. As you have mentioned many things such as poverty reduction and nutrition improvement can be expected by raising the role of the women in agriculture. As a successful female researcher, I think also, especially a research manager, could you give us advice and the necessary requirements for career development or how to mentally prepare yourself in this field?

Ismahane Elouafi

Just from my own personal experience, what I could say is that everything starts with a passion. If you like something very much, you really give back. I'm trying to keep away from telling my daughter what to do. They are anyway too young so I hope I'll have still the spirit when they come to decide where to go because it doesn't matter to be in the most attractive area; if you don't like it, you wouldn't give back so it's very important that everything starts with a passion. Every person should find what makes them laugh, what makes their heart beat. It's like falling in love with something. It's like falling in love with a man or falling in love with your kid. You have to love your job because you spend so much time at it. Once you have passion second you should believe in yourself. If you don't believe in yourself, nobody is going to believe in you. That's the second major point – believe in yourself, believe in your capacity, understand yourself, understand your strengths and your weaknesses. It's very sad that many people think they know all and that's completely wrong. My daughter, she is 10 years and she thinks she knows it all because she can Google it; that's not enough. Reading on internet is not how you know things; it's in-depth knowledge that is required. As a person that loves languages, I would say what adds to my life more than science is languages. Once you know a language, you get to know the culture deeper. You get to conduct with people real discussions and that's where you learn a lot. I think it's passion, it's believe in yourself and it's persistent, persistent, persistent, persistent. With everything; practice with persistent, you get to what you want. Put a target and run for it. As your target move, you move on. I hope I gave some of my own experience and I hope it's going to convince the young women here to follow their dreams and to fight for it. Thank you.

Fumika Sen

Thank you so much for your very valuable advice, I think. Thank you for your comments. The next question I want to ask Dr. Bouis. I know much of your research has been on developing and scaling up the delivery of biofortified nutrition crops to solve hidden hunger and malnutrition issues. As a founder of the HarvestPlus, many scientists I think join your program like crop scientists and economists and the nutrition scientists, so could you tell us how female researchers' point of view can benefit in your projects? Also, are there any general comments about having more female researchers in these fields? Thank you so much.

Howarth Bouis

Thank you. I thought I had already been asked all the questions, but this is the first time I have been asked that question. In that biofortification has a nutrition focus, I think generally mothers, women are more focused on nutrition than men are. HarvestPlus is very interdisciplinary, so we work with plant breeders, of course we work with nutritionists, but we also work with implementing agencies to scale up. Perhaps plant breeders who are women would be more attracted to work on biofortification, than some of the men who are breeders. Of course, the nutrition community is already dominated by women. When we get into the implementing activities – for example, the seed multiplication, farm extension, and food marketing -- women are very involved in the marketing of foods. I haven't really studied whether the proportion of women working on biofortification within each one of these sectors is higher. Nevertheless, one of the aspects of biofortification in general that has driven me is that is the food distribution in the household. We have studied the food distribution in the households, and it's always the women who sacrifice the most. They make sure that their youngest children get the most nutritious, expensive foods first, and then the adolescents are next in priority, and the women are always last; they are last in the line for the best foods. The nutrient requirements of women are very high – but what do they eat? They eat mostly food staples. By biofortifying the food staples, I have always felt that we targeted women -- but that doesn't answer your question about the women scientists.

Fumika Sen

Yeah, thank you so much for your important comments. Lastly, I want to ask Dr. Sudo. We have learned a lot about the crucial role female researchers play in the nutrition field, especially in developing countries. Nutrition research has just started in JIRCAS, especially in the social science field, so I would like to know what new researchers in this field should be careful about when conducting fieldwork, and if there's any advice you can give them, also give us. Thank you.

Noriko Sudo

Okay, in my presentation, I talked about the home visit. We visit the actual families to make a detailed observation because the reality that cannot be found through the questionnaire is something that we can understand through the home visit. In many developing countries, for women to contact with unfamiliar men is not accepted. Therefore, the female researchers would be more accepted. Both the male and female members of the family feel more relaxed and comfortable coming in touch with female researchers; that's the advantage, however, we still need to be careful not to cause trouble for the families, because being observed or being examined as a subject may still cause some unease. For instance, in Japan for us to visit families and enter their kitchen to observe the cooking and dining of family members cannot be done. However, in the rural areas of developing countries we can do so. But basically, we should not forget what you cannot do in Japan, we should use caution when doing the same in developing countries. Regarding the local diet – we don't know what kind of food they eat, how they cook, or how they share it among the family. Since we don't know, it is necessary for us to ask them to show us, so we have to have a sense of respect and appreciation of our actions and behavior in fieldwork. Also, in developing countries, the status of women is usually quite low and the human rights of women are not necessarily respected. Therefore, there is a possibility of sexual violence issues, and in the villages, they are missing the policing functions, so compared to what we do in Japan, we have to be mindful of our own safety and our own security. It is not safe for women to travel into the village on their own. They should make sure to have a male with them. It could be just a driver, but it is important to have a male member along. I talked about the scary part but as long as you are careful about that then the villagers, being close with them is quite heartwarming; a completely different environment from your ordinary daily living where you get to know them and for the entire day, you stay with the mothers so you get to understand how the local mothers live. We can completely understand the lifestyles of these women, so it's a very valuable experience that could change your own values. And for the villagers, they are spending a very simple normal life with no changes but they are meeting Japanese for the first time. In this sense, it's advantageous for both sides, whenever we do nutritional research, there is usually a crowd of people observing what we are doing, so in that sense, it's also fun.

Fumika Sen

Thank you so much for your wonderful comments and points are useful for us in the fieldwork. We have many fieldworkers in the developing countries also in Asia and Africa so it's very useful for us. Thank you so much.

Now, I would like to turn to the audience to floor for additional questions and comments. Before the question, please give us your name and the affiliation. Thank you. Some question I mean one... Okay please.

Hiroshi Hiraoka

Thank you very much Madam Chair. My name is Hiroshi Hiraoka. I'm a Senior Advisor of the Japan International Corporation Agency. Let me first thank and congratulate the organizers of this meeting as well as the keynote speakers and presenters for the excellent series of presentations and keynote speeches; it was absolutely fantastic. I'm saying this because it was another strong reminder of the importance of multi-sectoral nature of the nutrition issues for which Dr. Bouis has pointed out that it's the matter dialogue between the agriculture and nutrition for the case of bio-fortified crops. Then the argument was strengthened by the presentation of Dr. Basu and Dr. Shiratori as Dr. Lung'aho about the importance of the information as well as the evidence in order to for the agriculture sector to be able to hear the questions raised by the 'nutrition' health sector. I have noticed from Dr. Bouis when he says 'nutrition', it is the health side nutrition and it is a little bit different from the nutrition which is imagined by the people in the agriculture sector like me. This is a very important and deep insight that has been given to me during this presentation. Then the next step probably would be in order for the agriculture sector to respond properly to the requirements coming from the health sector - the issue of nutrition needs to be structured in the agricultural strategy and policy, or in other words, the scope of the agriculture sector should be more oriented towards those specific nutrition elements, like iron and vitamins. That would really start accelerating the efforts of agricultural sector in order to address the nutrition issues defined by the health sector. The same thing is said

through the presentation of Dr. Sudo who really deepened the issue of the health, and focused the issues about the mother and children, and we recognize that this is another key issue we really have to think about for the nutrition advancement because the mother and child is key nexus of the intergenerated cycle of passing the nutrition status. Definitely, what is happening in most of the developing countries is this vicious cycle. We really cannot stop the malnutrition of mothers which is transmitted to the malnutrition of babies. We really have to cut it off.

Then she also opened up the issue of care, which is another question for the agricultural sector in terms of reduction of the burden of the female household members, especially through tools and mechanization. That will be another interesting point to think about. Also education, sanitation and water is also a prerequisite in order to complement our nutritional efforts.

Finally, ladies and gentlemen, the reason for more women – its already said by Dr. Sudo but let me add one more because women are mothers to create the next generation. Definitely that's what men can never do. From that point of view definitely women, there are some things only women can know, can feel, that's really transmitted into their ways and ideas about what a nutrition research agenda should look like, so definitely this is another message that I want to share with the floor today.

Very final words; the Japan International Corporation Agency last year launched the Pan-African initiative body, IFNA, Initiative for Food and Nutrition in Africa, which we believe to aim promote those multi-sectoral interactions so that all the communities in Africa really benefit from the multi-sectoral approaches for accelerating the nutritional advancement. Thank you very much indeed.

Fumika Sen

There is a comment, yeah. Thank you so much. Any question?

Dr. Sudo would like to make a comment after that. It was very well summarized, thank you very much for your summary.

Fumika Sen

Please.

Hirano (JIRCAS)

Hirano from JIRCAS. My question or comment is not like the well-organized institutional comment like the previous one. My questions to comments more like that to the general issues about like female scientists issues. Actually to this point, I was talking to Oka san previously during the break but I always felt some kind of a logical gap when they talk about – first of all, don't get me wrong. I'm all for the idea of increasing the number of female research scientists in the science community and I have nothing against that but what has always been kind of bothering is there seems to be a logical gap that when people often face particular in the agricultural sector, the majority of the farming people community is the female farmers, and of course, the percentage, I don't know what could be the exact percentage but as opposed to that when you are looking at the science community then some research institute would have say about 13% of female scientists, it's kind of inequality or imbalance but what kind of bothered me is like okay on the farmer's side, the majority of the people are female. The scientists' side who used to study those issues or plans or the communities, not too many like female scientists, so would that be a clear reason that should we simply just balance and then increase the number of female scientists? Would that solve the problem? That has always been kind of... it was not bothering but it was always kind of hanging around somewhere in my mind, but actually listening to Dr. Sudo Sensei's presentation about the clear advantage of being a female scientist, particularly if that's the situation of home visit and that was a really convincing thing and of course I have always known that but it was very clearly stated, really convincing; so that I'm quite convinced, so what about their lab situation, particularly in ICBA or any other research institutes or any other science organizations, would simply increasing the number of female scientists solve the problem, if there is a problem? I was curious to know that if I can hear some personal comments or opinions from some of the people on the floor or stage then it would be very interesting hearing that.

Ismahane Elouafi

First of all, there is a problem, let me tell you this upfront. Because if I see the study we did in the Arab world, we got at the university women up to 52-53% in scientific fields, so you go to university, you have the majority, it's women. I wouldn't be surprised that the rate is about the same in Japan, so in universities, you got women, you go to the workforce at large and then it starts dropping, whatever it is that workforce, be it in ministries, be it in research institutions. You go in the higher education, the numbers drop even further. You go in managerial, you get to about 2-3%, so there is a problem because in my mind, if girls are very good at school and they make it to university and they make it to post-graduate and they do their PhDs and what

have you, why don't they continue to use that knowledge in the workforce? That's is exactly what the TAMKEEN program was about. To look what's the problem. Why the women drop off later on? Why don't they stop before university? Why don't they stop at the university itself? We wanted to understand what are the roadblocks. For me, the numbers and the whole curve, there is something wrong about it. When we went and dig into it, what we found is one of several reasons that is weakening the woman is the leadership components. We were much more looking at why from women scientists, which is about 17% or workforce at large, you look in managerial positions and the percentage drops to 2-3%, so why you have that huge gap? Then what we found out, really is one of them is the stereotyping. If you ask many people do they want to have a male or female boss, most people will say they prefer a male Boss; including women unfortunately themselves; they are shooting themselves in the foot.

There is also the problem of not enough soft skill and competencies. Most of the curriculum does not have any soft-skills at the university. ONE of the most traditional sectors that didn't change across the board in south hemisphere as well as north hemisphere is education. We are still doing education in a very, very old way and if we continue this way, we are going to lose the next generation. We are still very much on hard science, very little soft. We are very much on basic disciplines and very little on soft skills. We give them disciplines but we don't show them what is it for. I remember very well myself the thing that I hated the most at university was statistics because I found it so hard but also I didn't understand what that is for. I remember when I was at the high school, I didn't enjoy history and geography, whereas it's extremely important because the way they teach it to you, it's not the right way. It's not about the discipline, it's about the methodology. I think there is a problem so we tried, we looked at those criteria and we tried to design a program to give them those opportunities. For me what is lacking behind are several roadblocks but also I want to sum it up as that women, she didn't have the same opportunities as men in general. In my perspective; It's not about equality because we are different and as geneticist and biologist, I do recognize that difference in hormones and what have you, but we should have the same opportunities. We could have the same opportunities for let's say a century and then we end up that we are still much lower than men; it's okay because that would be based on natural evolution. I could choose to stay home or I choose to become just a scientist and not become a leader; these are choices and personal choices but those choices have to be based on equal opportunities. I think that's why I keep repeating it is about having access to equal opportunities. We should give women equal opportunities with men and then let them choose what they want to do and we should recognize what are the roadblocks and try to minimize those roadblocks to give them the opportunity to go where they want; to go to the top of the ladder; if they choose to do it of course.

Noriko Sudo

I'm not sure about the researchers in the agricultural sector but in the nutritional sector that I'm in, in the past the nutritional researchers were the graduates of the Department Faculty of Agriculture but in the past two decades, there are more and more universities educating registered dietitian nutritionists, mostly women's universities, around Japan. Furthermore, nowadays, there are graduate schools above the undergrad programs where you can further study nutrition, so I think there would be more female academics in this field. We can look forward to seeing what kind of impact that would bring about in the society in the future.

Fumika Sen

Thank you so much. It's okay? We have 1 to 2 minutes left. I want the last question. Please?

Tsujimoto (JIRCAS)

I'm Tsujimoto, a researcher from JIRCAS. I'm also an old-fashioned researcher who still cares about tons per hectare and productivity but not much about the nutrition. But, in a series of discussions I luckily heard from yesterday, I'm learning the importance of the link between agriculture and nutrition, but one point I felt missing in the discussion is, I don't know, but the critical review about what occurred during the period of non-nutrition sensitive agricultural development. For instance, in the presentation of Dr. Howarth, you showed the price down of cereal crops but price up of vegetables and fruits even during the period of the green revolution. We need to do the critical review what occurred for nutritional side during the period of achievement of the green revolution if we call that as non-nutrient-sensitive agricultural achievement. The review is not to criticize the achievement of the green revolution but to make our current activities to link agriculture and nutrition more specific and more effective. This is rather a comment but if there are any answers and if anybody knows about those kinds of references who critically reviewed what occurred by doubling, tripling the yield of only cereal crops and what occurred in the nutrient status during that period.

Fumika Sen

Okay, short comment please.

Howarth Bouis

I agree with the comment. I didn't have a chance to show some of my slides on zinc density in rice, just as an example, but we have a hypothesis that when the rice yields went up and up, the zinc density in the milled rice went down and down, but nobody has really studied it. In fact, most of the zinc intakes in Bangladesh come from rice even at lower zinc density levels presently in high-yielding varieties. It may be that the high prevalence of zinc deficiency in humans resulted from the increase yields, and not paying attention, not even knowing, that zinc densities in milled rice were declining. Until relatively recently we did not even know zinc deficiency was a problem in humans in Bangladesh and we weren't paying attention to the nutrition content of milled rice, so we could learn from those mistakes. I want to use this tons per hectare and nutrition dichotomy, as a segway to talk about the traditional foods. A fundamental tenet of the biofortification strategy is that biofortified varieties are both high yielding and nutritious. I think that is what the discussion on indigenous foods lacks now -- the emphasis on high yields. To feed the world we have to have higher and higher yielding crops. Traditional varieties are often already highly nutritious, but how do we make them profitable for farmers to grow and how do we get the consumers to eat them? Nobody mentions prices. We need to make sure that the prices of the indigenous crops are low. Farmers don't like low prices that so indigenous crops need to have high yields to go along with the low prices. Traditional crops are very good on the nutrition aspect, but they also have to be also very good on the tons per hectare.

Fumika Sen

Okay, please be short.

Ismahane Elouafi

Just to add on what Howarth said. I think that's is where biodiversity has been left out but also public policy as you mentioned. If we look at subsidies, most subsidies are on the staple crops. Globalization moved everything to the staple crops but also did subsidies and policies. I think if we worked, if public invested as much in vegetables as they did in cereals, most probably the production would have gone up and the prices would have gone down. Right now the seeds of most of the vegetables are mostly in North Europe and they are extremely expensive as an import, so it drives the whole price. I think really it is about time to maybe revert back; biofortification its great but we need to also combine it with indigenous biodiversity and changes in the policy to also help have a normal pricing instead of competing with the super subsidized crops under the globalization agenda. Thank you.

Fumika Sen

Thank you so much. It's about time. I want to close the session and the time is already over. As you know in JIRCAS we only have 13% female researchers but we have increased the number in the last 2 to 3 years. We are expecting to see inspirational works in agriculture, food and nutrition fields. Finally, please give a warm applause to all the speakers and thank you so much for your attendance. Thank you.

Closing Remarks

Osamu Koyama

Vice-President, JIRCAS



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Good afternoon again. On behalf of the organizers, I would like to make a few concluding remarks at the end of this symposium, though I wonder if I am qualified for this role in this female-centered symposium. The main theme of today's symposium was to "promote an active role for female researchers in agriculture, food and nutrition research." By listening to the excellent presentations and discussions, I'm sure we have gained a deeper understanding on the vital and essential role of female researchers in agriculture and nutrition research. As Mr. Bessho, Director General of MAFF, mentioned in his welcome remark, the gender issue is an urgent and prioritized issue here in Japan, initiated by the Prime Minister. It must be treated in a broader context and not just limited to agriculture research.

However, I hope agriculture research or the society of agriculture research can be or can show a good and advanced model in Japan. We at JIRCAS will continue to make efforts to diversify our research environment to obtain better and meaningful research results, and eventually JIRCAS can be a real international research center of international standard in terms of female activity. This symposium, as you may have already noticed, has another objective, which is to reaffirm the importance of nutrition concepts in agricultural research. As many speakers stressed, we are expected to promote, or rather we must promote nutrition-sensitive agricultural research as all of you agreed that health issue or nutrition issue is more important than income issues, which we are now tackling.

I am sure that JIRCAS is in a good position to deal with this issue because this issue requires, again, a broader mind or broader academic experiences to solve, so we can make full use of the interdisciplinary nature of the capacity of JIRCAS to tackle this problem, and we will try to establish an even wider partnership domestically and internationally in this respect.

I would like to take this moment to thank all our speakers especially the three keynote speakers, Dr. Ismahane Elouafi, Dr. Howarth Bouis, and Professor Noriko Sudo, for your excellent speeches, and to the other speakers too, as well as our session chairs for moderating and summarizing the presentations and the discussion. I would like to offer a special word of gratitude to our co-organizer, the United Nations University Institute for the Advanced Study of Sustainability, and our cooperators, the Agriculture, Forestry and Fisheries Research Council Secretariat of the Ministry of Agriculture, Forestry and Fisheries, the National Agriculture and Food Research Organization, the Tokyo University for Agriculture and Technology, the Tokyo University of Foreign Study, the Greater Tokyo Initiative (TAMA Association), and J-FARD.

Finally, thank you to all symposium participants and to everyone involved in planning and holding this event. We are truly grateful for your valuable contribution and attendance. Thank you again. Thank you very much.





Program

9:30-10:00

Registration

Opening Session

10:00-10:05

Opening Remarks

Masa Iwanaga

President, JIRCAS

10:05-10:15

Welcome Address

Tomohiro Bessho

Director General, Agriculture, Forestry and Fisheries Research Council Secretariat, Ministry of Agriculture, Forestry and Fisheries (MAFF)

Kazuhiko Takemoto

Director, Institute for the Advanced Study of Sustainability, United Nations University (UNU-IAS)

Keynote Speeches

Chair: Kunihiro Doi

Director, Research Strategy Office, JIRCAS

10:20-10:50

Why the World Needs More Women Scientists for a Food-Secure Future

Ismahane Elouafi

Director General, International Center for Biosaline Agriculture (ICBA)

10:50-11:20

Biofortification and Agriculture's Primary Role to Provide Nutritious Diets for National Health

Howarth Bouis

Founding Director of HarvestPlus. International Food Policy Research Institute (IFPRI)

11:20-12:40

Group Photo & Break

12:40-13:00

The Importance of Women's Nutrition for the Next Generation's Health and Community Development

Noriko Sudo

Associate Professor, Ochanomizu University

Session 1: Food and nutrition research by female researchers

Chair: Naoko Oka

Senior Researcher, Rural Development Division, JIRCAS

13:05-13:20

Indigenous Foods and their Nutritional Value: Evidences from South Asia

Mrittika Basu

Postdoctoral Fellow, JSPS-UNU

13:20-13:35

JIRCAS's Approaches to Nutrition: through International Agricultural and Food Research

Sakiko Shiratori

Researcher, Research Strategy Office, JIRCAS

13:35-13:50

The Importance of Gender in Strengthening Food and Nutritional Resilience of Households in Madagascar

Felamboahangy

Henintsoa Rasoarahona

Vice-President, Researchers Platform for the Fight against Malnutrition, Madagascar

13:50-14:05

Linking Agriculture to Nutrition in Africa: The Role of Beans

Mercy Lung'aho

Research Scientist, International Center for Tropical Agriculture (CIAT)

Session 2: General Discussion

14:10-14:40

Chair: Fumika Sen

Sub Project Leader, Social Sciences Division, JIRCAS

- Comments from the speakers
- Discussion on the points presented by speakers

Closing Session

14:40-14:45

Closing Remarks

Osamu Koyama

Vice-President, JIRCAS

14:45-15:15

Tea/Coffee Break

Co-organized by

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Ministry of Agriculture, Forestry and Fisheries (MAFF)

National Agriculture and Food Research Organization (NARO)

Tokyo University of Agriculture and Technology

Tokyo University of Foreign Studies

Greater Tokyo Initiative (TAMA)

Japan Forum on International Agricultural Research for Sustainable Development (J-FARD)