



FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative

Mainstreaming Nutrition into Agricultural Extension

Lessons Learned from Two Projects that Integrated
Agricultural Interventions and Nutrition in Bangladesh



USAID
FROM THE AMERICAN PEOPLE



Food and Agriculture
Organization of the
United Nations



INGENAES
Integrating Gender and Nutrition
within Agricultural Extension Services

Disclaimer: This study was made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents of this report are the responsibility of the authors and do not necessarily reflect the views of USAID or the United States Government.

The study was conducted in close collaboration with the Food and Agriculture Organization of the United Nations (FAO), specifically the Bangladesh office. The designations employed and the presentation of material in this report do not imply the expression of any opinion whatsoever on the part of the FAO concerning the legal or development status of any country, territory, city or area of its authorities, or concerning the delimitation of its frontiers or boundaries. The mention of specific companies or products of manufactures, whether or not these have been patented, does not imply that these have been endorsed or recommended by FAO in preference to others of a similar nature that are not mentioned. The views expressed in this study are those of the author(s) and do not necessarily reflect the views or policies of FAO.

© Integrating Gender and Nutrition within Agricultural Extension, INGENAES, and Food and Agriculture Organization of the United Nations, FAO



Designed to be shared. This work is licensed under a Creative Commons Attribution-Non-commercial License
creativecommons.org/licenses/by-nc/3.0/nz

INGENAES and FAO Bangladesh encourage the use, reproduction and dissemination of material in this study. Except where otherwise indicated, material may be copied, downloaded and printed for private study, research and teaching purposes, or for use in non-commercial projects or services, provided that appropriate acknowledgment of INGENAES as the source and copyright holder is given and that INGENAES or FAO's endorsement of user's views, products or services is not implied in any way.

This document is available for download at: www.ingenaes.illinois.edu/library

Citation: Saha, Manika; Mannan, Mohammad Abdul and Bhattacharjee, Lalita. 2016. Mainstreaming Nutrition into Agricultural Extension Services: Lessons Learned from the Integrated Agriculture and Poultry Nutrition Projects in Bangladesh. Published by the USAID funded Integrating Gender and Nutrition within Agricultural Extension project, INGENAES.

Language: The text was prepared with English spelling as is standard in the United Kingdom since the report was produced with clearance from FAO/Bangladesh.

Editing & Production: Andrea Bohn, Katy Mosiman, University of Illinois at Urbana

Cover Photo: © Rubina Akter, FAO Field Facilitator, 2016

Mainstreaming Nutrition into Agricultural Extension:

Lessons Learned from Two Projects that Integrated Agricultural Interventions and Nutrition in Bangladesh

*Manika Saha MSc (INGENAES),
Mohammad Abdul Mannan PhD (FAO)*

and

Lalita Bhattacharjee PhD (FAO)

in collaboration with

Agnieszka Balcerzak MSc (FAO)

and

Aklima Parvin MSc (FAO)

November 22, 2016

Abbreviations

AES	Agriculture Extension Services
AFO	Assistant Field Officer (AFO of DoF)
BD	Bangladesh
BIRTAN	Bangladesh Institute of Research and Training on Applied Nutrition
CHCP	Community Health Care Provider
DAE	Department of Agriculture Extension
DGHS	Directorate General of Health Services
DGFP	Directorate General of Family Planning
DLO	District Livestock Officer
DLS	Department of Livestock
DoF	Department of Fisheries
EAS	Extension and Advisory Services
FA	Field Assistant (FA of DoF)
FAO	Food and Agriculture Organization of the United Nations
FF	Field Facilitator (working for NGO/SMKK)
FFS	Farmer Field School
FGD	Focus Group Discussions
FSNSP	Food Security Nutrition Surveillance Programme
FWA	Family Welfare Assistant (of DGFP)
GoB	Government of Bangladesh
INGENAES	Integrating Gender and Nutrition within Agricultural Extension Services
IP	Implementing Partner
IFPRI	International Food Policy Research Institute
IPHN	Institute of Public Health Nutrition (under MoHFW)
IYCF	Infant and Young Child Feeding
MDGF	Millennium Development Goal Fund
MoA	Ministry of Agriculture
MoF	Ministry of Food
MoFDM	Ministry of Food and Disaster Management
MoFL	Ministry of Fisheries and Livestock
MoHFW	Ministry of Health and Family Welfare
MoLGRDC	Ministry of Local Government Rural Development and Cooperatives
MoPA	Ministry of Public Administration
NGO	Non-Governmental Organization
NNS	National Nutrition Services (under MoHFW)
SMKK	Sheba Manab Kallyan Kendra
SAAO	Sub-Assistant Agriculture Officer (SAAO of DAE)
ToT	Training of Trainers
ULA	Upazila Livestock Assistant (of DLS)
ULO	Upazila Livestock Officer (of DLS)
UC	Upazila Coordinator (working for NGO/SMKK)
UIUC	University of Illinois at Urbana-Champaign
USAID	United States Agency for International Development
VFA	Veterinary Field Assistant (of DLS)
WFFS (G)	Women Farmer Field School (Group)
WFG	Women Farmers Group

Contents

Mainstreaming Nutrition into Agricultural Extension.....	I
Abbreviations.....	i
Contents	ii
Acknowledgements	v
Foreword.....	vi
Introduction	I
Nutritional status and the role of agricultural extension in Bangladesh.....	I
Rationale and objectives for this study.....	2
Study methodology.....	4
Findings by component or topical area	4
Nutrition education in agriculture through Farmer Field Schools.....	7
Challenges and lessons learned from Farmer Field Schools	7
Recommendations.....	8
Skill development and capacity building through nutrition education training of government officials and NGO staff	9
Lessons learned for capacity development among government and NGO staff.....	9
Recommendations.....	10
Nutrition training materials and communication.....	10
Training manuals	10
Key messages.....	11
Communication materials.....	11
Mass media communications strategy and nutrition education campaigns.....	11
Lessons learned from training materials	12
Recommendations.....	13
Recipe development and cooking demonstrations.....	14
Micronutrient rich recipes published using available local foods	14
Development of integrated nutrition cooking training materials.....	15
Lessons learned in terms of recipe development and cooking demonstrations.....	15
Project provided guidance on selection of technologies on processing	16
Challenges to implement cooking demonstration in field level through AES.....	16
Recommendations.....	16
Livestock interventions.....	17
Lessons learned from livestock interventions	17
Recommendations.....	19
Nutrition integration through horticulture interventions.....	20
Lessons learned from nutrition integration through horticulture interventions	20
Recommendations.....	21

Aquaculture interventions	22
Lessons learned from aquaculture interventions.....	22
Recommendations.....	23
.....	23
Establishing community-based food processing and preservation facilities for improving diets and nutrition.....	23
Project provided support for the sustainability of the community based food processing activities.	23
Registration of women Farmer Field School Groups	24
Locally elected women members of the Union Parishad.....	24
Institutional arrangements.....	24
Challenges faced and lessons learned from the formal registration.....	24
Recommendations.....	25
Project implementation and monitoring through GoB services.....	25
Lessons learned from project implementation and monitoring by public sector entities	26
Recommendations.....	26
Better nutrition outcomes through investing in women’s empowerment	26
Lessons learned from nutrition education and women empowerment.....	27
Recommendations.....	27
The Government’s role in capacity building.....	28
Capacity development.....	28
Perception of the government officials regarding mainstreaming nutrition into AES.....	28
Recommendations.....	29
Challenges of AES.....	29
Women farmers’ status, perceptions, and behaviour change after the project completion.....	30
Hygiene practices at home.....	30
Women' expectations from the government and the implementing organizations.....	31
Income generating activities after the training.....	31
IYCF practices in daily life	31
Behaviour change activities from cooking demonstration session	32
Policy issues.....	32
Recommendations for the way forward	33
Scaling up and sustainability.....	33
Cooperation and coordination	34
Capacity building / development in nutrition education	34
Communication materials development	34
Opportunities	35
Conclusion.....	35
List of references and documents reviewed	36

Annex 1: Session plan and contents of each nutrition manual	38
Annex 2: Communication materials.....	39
Annex 3: Name of the recipe and the component of the integrated approach promoted.....	41
Annex 4: Lists of inputs provided by IAHBI, by category	42
Annex 5: Lists of training and BCC materials developed in IAHBI	43
Annex 6: IAHBI's exit strategy flow chart.....	46
Annex 7: Institutional structure of a WFFSG	47
Annex 8: List of the sixteen food groups	48

Acknowledgements

This study report was prepared by the nutrition team of the Food and Agriculture Organization of the United Nations (FAO) and Integrating Gender and Nutrition within Agricultural Extension Services (INGENAES) project, University of Illinois at Urbana-Champaign (UIUC) in collaboration with the Ministries of Fisheries and Livestock, Agriculture, Food, and Health and Family Welfare. Special thanks to Dr. Golam Rabbani, Upazilla Livestock Officer, Ministry of Fisheries and Livestock for reviewing the report.

Special thanks to Dr. Abul Kalam Azad, National One Health Advisor, Development Alternatives Incorporated (DAI) for his guidance and support. Thanks also to Mr. Md. Habibur Rahman, Taslima Akhter, and several other national consultants on the two projects for their kind responses to multiple queries. Much gratitude goes to Ms. Andrea Bohn, Associate Director, INGENAES, UIUC for an encouraging and positive criticism, guidance and valuable advice since the beginning of the study. She also contributed to editing of the manuscript of this report. Special thanks to Katy Mosiman of the UIUC for her contribution to editing the manuscript of this report.

Thanks to Bangladesh Institute of ICT in Development (BIID) for arranging the field visits. Finally, thanks to all those who participated in the interviews and gave their valuable time and shared their thoughts and experiences. Their views and experiences added valuable contributions to the study.

Foreword

Bangladesh is facing serious problems of malnutrition including undernutrition, micronutrient malnutrition, and overweight and obesity that impose unacceptably high economic and social costs at all economic levels. Multisectoral involvement is necessary for improving nutrition and reducing these costs through a food based approach.

Nutrition sensitive interventions have the potential to narrow the nutrition gap between what food is available and what food needs to be consumed for a healthy diet. Field level personnel in agriculture, fisheries and livestock, health and family welfare and many other nutrition relevant sectors who are engaged in programmes linking nutrition with food production activities need to have basic nutrition knowledge to become effective partners in the process of promoting better nutrition.

The important findings as documented in this report as lessons learned and recommendations from the study of the recently completed two projects: (i) Integrated Agriculture and Health Based Interventions (IAHBI) project and (ii) Improving Food Security of Women and Children by Enhancing Backyard and Small Scale Poultry Production in Southern Delta Region project are very useful. The Bangladesh government strongly emphasizes that food based approaches, including food production, dietary diversity, nutrition education and food fortification are sustainable measures to improve nutritional status of the population. The Agriculture Extension Services, Fisheries and Livestock Services and Health and Family Welfare Services in Bangladesh made significant progress in improving nutrition. While there are challenges, much has been achieved. Bangladesh Institute of Research and Training on Applied Nutrition (BIRTAN), for example, has received resources to play a bigger role in the field of nutrition among other positive developments in the government.

I trust this document is a useful resource for the policy makers, programme planners of the country and Government, non-governmental organizations and different development partners



Mike Robson

FAO Representative in Bangladesh
Food and Agriculture Organization of the United Nations
Bangladesh

Introduction

Food and nutrition security exists when all people are able to consume food in both sufficient quantity and quality to meet their dietary needs and food preferences, and they are supported by an environment with adequate sanitation, health services and care, allowing for a healthy and active life (FAO, 1996). Agriculture¹ is fundamental to this widely held definition of food and nutrition security. Approximately half of the people of Bangladesh depend on agriculture for their livelihoods as a source of income. Two-thirds of them are women farmers. Most agricultural producers also purchase foods to supplement their home production (GoB, 2011). Despite high level of economic growth in recent years, malnutrition persists in many countries of the South Asian Region. Bangladesh has achieved significant economic growth and poverty reduction, yet continues to battle some of the highest rates of malnutrition in the world (World Bank, 2011). To improve the nutritional status of affected persons in Bangladesh, nutrition specific interventions such as Vitamin A supplementation, food supplementation, and immunization programmes have been in place for many years. Unfortunately, little focus has been placed on the broader resolutions of nutrition through agriculture (including horticulture, fisheries and animal husbandry) that play an important role in reducing undernutrition through food-based approaches as nutrition-sensitive interventions.

Nutritional status and the role of agricultural extension in Bangladesh

The achievement of nutritional wellbeing requires an overall improvement across the lifespan, with a focus on the most vulnerable groups like mothers and young children, especially in the first 1000 days of life. Statistics on child underweight (low weight for age) and stunting (low height for age) are indicators that are used to measure the nutritional status of a country. Child nutritional status (0 to 59 months) is impacted by dietary diversity, micronutrient deficiency, poor sanitation and use of unsafe water. The Bangladesh Demographic and Health Survey (BDHS, 2014) reported that the rate of underweight was 34.6% in 2011 and declined to 32.6% in 2014, and the rate of stunting went from 41.3% in 2011 to 36.1% in 2014. BDHS also reported that the rate of wasting (weight for height of the under 5 children) also reduced from 15.6% in 2011 to 14.3% in 2014. The severe wasting (severe acute malnutrition) declined from 4.0% in 2011 to 3.1% in 2014. The Food Security Nutrition Surveillance Programme (FSNSP, 2014) reported that the chronic energy deficiency (BMI <18.5) among women declined from 23% in 2011 to 17% in 2014. Food Security Nutrition Surveillance Programme (FSNSP) also reported in 2011 that the number of overweight women surpassed the number of underweight women. The proportion of overweight women (BMI >23) showed an increasing trend from 30% in 2011 to 39% in 2014 (FSNSP, 2014). The prevalence of obesity is rising nationally, indicating that the problem is not confined within urban areas or well-off populations. The co-existence of under- and over-nutrition in Bangladesh indicates the risk factors for non-communicable diseases (NCDs).

Agriculture impacts human health and nutrition in many ways, both positively and potentially negatively. Agriculture creates the source of food which provides essential nutrients, dietary diversity as well as food security (FAOBD, internal document, 2015d). Nutrition-sensitive agriculture has emerged as a way to define agricultural investments with the purpose of improving nutrition by working with the global food system better equipped to produce good nutritional outcomes (FSN Forum, 2015).

A narrow definition of rural advisory services, or agricultural extension and services (AES), is that of informal education of farmers, with a focus on training them on new practices and technologies. The more modern, encompassing definition promoted by the Global Forum for Rural Advisory Services (GFRAS, 2013) defines AES as:

¹ The term agriculture is used to include crops, horticulture, aquaculture, fisheries and livestock.

“Consisting of all the different activities that provide the information and services needed and demanded by farmers and other actors in rural settings to assist them in developing their own technical, organisational, and management skills and practices so as to improve their livelihoods and well-being².”

This definition recognises the diversity of actors in extension and advisory provision (public, private, civil society); much broadened support to rural communities (beyond technology and information sharing) including advice related to the farm, organisational and business management; and facilitation and brokerage in rural development and value chains.

Mainstreaming nutrition in AES will help make sustainable improvements in nutrition within food systems. In addressing malnutrition, agriculture’s essential and singular role is to ensure that diverse, nutritious foods, adequate to meet the needs of people of all ages, are available and accessible at all times, either from the market or from farmers’ own production (IFAD, 2014). AES could be a significant contributor as they have access to rural households to improve their knowledge, provide information, and deliver improved practices. Here is the greater scope to reach the people by AES who could provide education to farmer families about dietary diversity, food-based nutrition, as well as nutrition education to improve their overall nutritional status for healthy and productive lives. To this end, AES are often thought of as a vehicle for the improved nutritional health of rural communities because they reach and interact closely with farmers in different settings, where AES can function as significant service providers on crop, livestock, and forestry aspects of food security, consumption, and production (Fanzo et al., 2015). Nutrition still needs to be mainstreamed into AES in Bangladesh where few projects and documents are available to integrate nutrition into agriculture. At the policy level, there are some activities going on to mainstream nutrition into agriculture extension services. But it is crucial for us to understand how nutrition could be integrated into the agriculture sector to improve nutrition and document the lessons learned for future scale up and intervention.

Rationale and objectives for this study

This objective of this study, conducted from February to May 2016, was to document lessons learned from two food security projects implemented in Bangladesh since 2013. The two projects are the “Integrated Agriculture and Health Based Interventions” (IAHBI³) project and the “Improving Food Security of Women and Children by Enhancing Backyard and Small Scale Poultry Production in Southern Delta Region” (referred to in this text as simply the “poultry project”). Both projects are particular examples where governmental, i.e., public instead of private or nongovernmental organization (NGO)-run, agriculture extension programs are purposefully integrating nutrition into their services⁴.

The study addressed questions such as how these two projects integrate nutrition into AES, what approach was used (e.g., Farmer Field School (FFS)), what were the main nutrition-sensitive interventions, what capacity building/development and training was carried out, and what the perceptions about the impact of the project are among staff and beneficiaries. Exploring these questions helped identify lessons

² This statement, in turn, is based on Christoplos, Ian. 2010. Mobilizing the potential of rural and agricultural extension. Rome: Food and Agriculture Organization of the United Nations and the Global Forum for Rural Advisory Services.

³ Note that this study does not include review any of the work conducted under the technical support from UNICEF and thus does not cover the health based (HB) interventions of the IAHBI project, albeit this project acronym is used throughout this report.

⁴ Other projects have or are specifically integrating nutrition into agricultural support programs or training communities in nutrition sensitive agriculture. Examples are DANIDA’s Farmer Field School programme, the EU funded Agricultural Nutrition Extension Project (ANEP), the Farmer Field Schools implemented by the USAID funded SPRING project, or the USAID funded Aquaculture for Income and Nutrition (AIN) project. IAHBI and the poultry project are unique in that they are led by the GoB, with only technical support from FAO and UNICEF.

learned from the projects, what constraints had to be overcome and what gaps may still exist, as well as recommendations for future implementation and scaling up of similar interventions.

Note that this study is neither an assessment nor an evaluation of either project. Formal end line surveys have been completed and the findings are expected to be published by August 2016 (FAO Bangladesh, 2016a and 2016b). This report is intended for a broad audience interested in practical tips on how to integrate nutrition into agricultural extension. It provides access to information from projects internal reports that are otherwise not available to the public at large.

The lessons learned and recommendations made are indicative and really intended to stimulate discussion among organizations tasked with pursuing similar aims as the projects presented here. The lessons learned and recommendations do not necessarily reflect the views of the Government of Bangladesh (GoB) or of the Food and Agriculture Organization of the United Nations (FAO) Bangladesh. Many statements reflect the comments made by key informants and by farmers themselves. The reader may or may not agree with them but the points made merit further discussion.

The objectives of this assignment were to -

1. Document the nutrition-sensitive interventions those were implemented
2. Explain how nutrition was integrated into the Agriculture Extension Services (AES)
3. Assess perceptions, challenges, identify opportunities for strengthening these services and obtain recommendations from relevant selected government officials, beneficiaries, and former project's implementers on how to integrate nutrition into (AES)
4. Develop lessons learned to inform future programme and policy development.

IAHBI was implemented by the GoB from February, 2012 to September, 2015 with technical support provided by FAO and United Nations Children's Fund (UNICEF) and funding from the United States Agency for International Development (USAID). The major objective was to improve food and nutrition security of 50,000 households in three selected districts of southern Bangladesh: Satkhira, Khulna and Barisal. The project used multi-sectoral, collaborative approaches aiming at strengthening government systems applying a community-led process; the project engaged multiple stakeholders like line ministries, NGOs/INGOs (international) and United Nations agencies. The project focused on integrating strategic nutrition interventions into food, agriculture, and health systems and services. Interventions focused on mobilizing women, scaling up community nutrition programmes, capacity building of rural female farmers, community support groups, strengthening behaviour change communication (BCC) and enhancing district and Upazila-level coordination in areas of food security, nutrition and health (FAOBD, internal, 2012).

The poultry project was implemented by the GoB from November 2012 to December 2015 with technical support from FAO. The goal was to reduce food and nutrition insecurity and enhance household income of targeted rural and peri-urban populations in the southern delta region of Bangladesh, with special attention to women and children. The targeted beneficiaries were 2900 backyard poultry farmers, 40 small-scale poultry farmers and 250 WFGs, each group comprising 20 women. The project was implemented in close partnership with the Department of Livestock Services (DLS) of the Ministry of Fisheries and Livestock (MoFL).

Both projects used innovative methods to integrate nutrition into AES. Both projects have contributed to increasing awareness among several units of the government about the need to better understand the links between agriculture and nutrition and to determine ways in which the agricultural sector can importantly contribute to improved nutritional status of the people of the country.

This study is intended to document the lessons learned from the two projects. It is also meant to improve the understanding among a broad range of stakeholders exemplifying how to set up nutrition-sensitive interventions and how such initiatives could become an integral part of public sector services offered by ministries of agriculture, fisheries, and livestock in Bangladesh and beyond.

Study methodology

The starting point for the study was to closely review planning documents, project reports (including monitoring reports and the terminal report for IAHBI), and other implementation intervention reports (specifically on FFS training material, etc.).

Key informant interviews with project team members and government officials who were responsible or otherwise involved in the implementation of these projects were conducted. Note that the interviews for this study were carried out several months after IAHBI project formally ended, thus providing a reflection of what worked and did not work well during the project implementation and what lasting effects are observable now. These semi-structured interviews focused on the following themes: status of the existence of good practices and approaches to integrating nutrition within AES; food-based nutrition training topics, training manuals, interventions, and key messages; cooking demonstrations and recipes, FFS, nutrition education, capacities required and challenges faced by AES staff; technical, institutional, and political support required to integrate nutrition within AES. Several non-implementing stakeholders and beneficiaries were also interviewed to capture their perspectives on what worked and did not work well, and other lessons learned.

Individual interviews and focus group discussions were audio-taped with written notes taken concurrently as a backup. The audiotapes were transcribed and translated from Bengali to English as appropriate.

Findings by component or topical area

This study investigated nutrition-sensitive interventions that were implemented and how these two projects integrated nutrition into the agriculture extension system. Findings are presented on the following key themes:

- Nutrition education in agriculture through Farmer Field Schools
- Skill development and capacity building through nutrition education training of government officials and NGOs
- Nutrition training materials and communication
- Recipe development and cooking demonstrations
- Livestock interventions
- Nutrition integration through horticulture interventions
- Aquaculture interventions
- Better nutrition outcomes through investing in women's empowerment
- Government role in capacity building
- Women farmers' status, perceptions, and behaviour change after the project completion
- Policy issues from the study
- Recommendations for the way forward and
- Conclusions

Box 1: Brief description of the “Integrated Agriculture Intervention for Improved Food and Nutrition Security project” (November 2012 to September 2015)

This project was implemented by the Government of Bangladesh with technical support provided by FAO (as project 049) and funding from USAID. The project is also known as IAHBI (“Integrated Agriculture and Health Interventions for Improved Food and Nutrition Security”) and this is the acronym used throughout this document. IAHBI includes work conducted with technical support from UNICEF but this report thus does not cover the health based interventions.

This project was implemented over the period of three years in three selected districts of southern Bangladesh. It focused on assigning higher priority to integrated nutrition training, devolving responsibility to the national, district, Upazila and community levels, and carrying out the process of social mobilization for empowering community members, government and private sector thus fostering greater multi-sectoral collaboration (FAOBD, internal document, 2012). To strengthen existing institutional arrangements at and between the community and Upazila levels for enhancing collaboration with government notably, Directorate General of Health Services (DGHS) and DAE, and civil society partners. The line ministries and relevant departments of the GoB directly or indirectly involved in the proposed programme were the Ministry of Agriculture (MoA) (in particular the Department of Agricultural Extension); Ministry of Food (in particular the Food Planning and Monitoring Unit and Directorate General of Food); Ministry of Health and Family Welfare (MoHFW) (in particular the Institute of Public Health Nutrition (IPHN) and National Nutrition Services (NNS)); MoFL (in particular the Department of Livestock Services and the Department of Fisheries); the Ministry of Public Administration or Cabinet (through the district and Upazila administrations) (FAOBD, internal, 2012). As per the IAHBI project goals 50,000 households were selected and women from these households were targeted as project beneficiaries. There were 60 FFSs established in project areas where each FFS consists of 30 women farmers. As all of them were women participants, these FFSs known as WFFSs. The overall objective of the Programme was to improve household food security and nutritional status and strengthening synergies with health-based actions, especially focusing on mothers and young children in selected Upazilas of Khulna and Barisal in the southern region of Bangladesh. The project was a joint initiative of several government units supported by two UN agencies: FAO and UNICEF, which aimed to improve nutrition situation in the project areas by nutrition-sensitive and specific interventions implemented jointly to bring synergies and escalate impacts between the sectors. FAO supported the nutrition-sensitive agriculture-based interventions (FAOBD, internal document, 2015b). The direct nutrition interventions under the second project outcome were supported by UNICEF and implemented through the health sector, notably National Nutrition Services (NNS). This report focuses on FAO supported nutrition-sensitive agriculture interventions and lessons learned.

The main and concrete outputs of the IAHBI project were FFS, integrated homestead gardens, training and training tools, manuals, nutrition education and messages, cooking demonstrations to promote improved family feeding practices and complementary feeding of young children, community-based food processing and preservation facilities for improving diets and nutrition, bio-secured poultry production, horticulture, livestock and aquaculture interventions, and a list of horticulture foods, fingerlings and small livestock and backyard poultry recommended for the upcoming seasons. Based on the recommendations and a follow up meeting with the stakeholders including Upazila Agriculture Officers from all project Upazilas, implementing agency Sheba Manab Kallyan Kendra (SMKK) and under the leadership of Deputy Director Khulna a final list of inputs (seasonal vegetables and fruits) were finalized along with input distribution plan. Inputs names of IAHBI project are given in the Annex 4. All project activities had entire participation by women.

Key findings from the Endline Survey Report on 'Integrated Agriculture and Health Based Interventions for Improved Food and Nutrition Security in Selected Districts of Southern Bangladesh. (FAOBD, 2016a):

- Stunting was reduced slightly to 33% in the end line (baseline survey: 34.3%)
- Prevalence of wasting was reduced to 9% in end line (baseline survey: 11%)
- Prevalence of underweight was reduced significantly to 24% in end line (baseline survey: 30%),
- Anaemia among children was reduced to 64.0% in end line (baseline survey: 67.7%)
- Prevalence of anaemia among both pregnant and lactating women was reduced from 62% to 57% and 66% to 54% respectively.

The end line report provides detailed tables and graphics to document the impact of the project and will be available to interested readers.

Box 2: Brief description of the “Improving Food Security of Women and Children by Enhancing Backyard and Small Scale Poultry Production in the Southern Delta Region” poultry project (October 2012 to December 2015)

The “poultry” project (FAO project 048) focused on livestock intervention and Women Farmer Groups (WFG) within the MoFL, particularly its Department of Livestock. It focused on providing bio-secured poultry farm and livestock interventions. The poultry sector was identified as a particularly important component for sustained agricultural growth and a critical subsector for health safety. Climate change and vulnerability of farmers in the southern delta region were also identified as important problems requiring attention. Emerging and re-emerging diseases particularly Highly Pathogenic Avian Influenza remained as a constant threat to the poultry industry and public health as well. The targeted beneficiaries were 2900 backyard poultry farmers, 40 small-scale poultry farmers and 250 WFGs, each group comprising 20 women.

This project was designed to demonstrate how improved bio-security can reduce the disease prevalence among poultry and improve poultry production and increase the availability of poultry-based animal protein and micronutrients for members of the community. Trainings on poultry rearing, bio-security, disease prevention, vaccination, etc., were given for better, healthier poultry management. The project promoted basic hygiene and sanitation, maternal and child healthcare, and the role of poultry in improving nutrition through training of poultry producers and WFGs. Well-ventilated poultry houses (10-chicken capacity) for 2900 backyard poultry farmers and commercial poultry houses (250-chicken capacity) for 40 small-scale poultry farmers were supported by this project. These poultry houses are known as “bio-secured poultry houses”. Training on bio-secured poultry houses and the preparation of recipes was conducted to improve the nutritional status of women and children. Thus, the project design was relevant to address the problems of disease control, lack of diversity of habitual Bangladeshi diets, and transmission of poultry diseases to humans. The objectives of the project included improving poultry production, reducing risk of diseases spread, promoting effective input supply, enhancing nutritional status, and providing a sustainable source of income.

Among the activities of the project better maternal diets and complementary feeding using poultry-based recipes were promoted. To this end, the consumption of poultry in the diets of mothers and children were included. As per the Endline Survey report, rural communities are interested in nutrition focused training and as a result there is ample scope for improving the traditional Bangladeshi diet. Nutrition training may be mainstreamed in DLS training programmes as the Government department workforce has shown keen interest in nutrition training. DLS and other partners can use the training module for women farmers groups that has been developed as a result of this project (FAOBD, 2016b)

Nutrition education in agriculture through Farmer Field Schools



@ Aklima Parvin, 2014. Nutrition training being conducted by C. Biswas, Family Welfare Assistant, Vurulia, Shyamnagar Upazila, Satkhira.



© Taslima Akhter, 2015. Nutrition training being conducted with a Women Farmer Group in Khulna.

The basis of FFS is a group of farmers with common interests who engage together in a season-long study programme with weekly meetings and practical demonstrations. The FFS in IAHBI not only taught farmers how to improve the productivity of their crops, livestock, and fishery operations but also how to specifically improve nutrition. It is an extension methodology that can be adapted to incorporate nutrition education and promote better nutrition practice among participants.

A multi-dimensional approach was pursued:

- Enhancing technical knowledge through hands-on-training along with other supportive inputs and approaches (including tools, supplies and built-in good practices through demonstrations);
- Networking and strengthening linkages through forming groups, meetings, workshops, and providing access to information for sustaining the program (FAOBD, internal document, 2014);
- Building the capacity of women participants through training.

Roll out was central to enhancing their knowledge and skills for increasing the production of homestead vegetables and fruits, livestock, and fisheries, and promote appropriate nutritional behaviour for a healthy diet (FAOBD, internal document, 2014).

Challenges and lessons learned from Farmer Field Schools

In both projects the first step was to select women beneficiaries and place them as members of the FFS and WFG. The women then received training on various fields of agriculture.

In future FFS establishment, it may be helpful to follow the suggestions below:

- Place farmers with similar agricultural interests in the same WFG. For example, those who have an interest in similar income generating activities should be placed in the same group.
- The WFGs should be registered with the cooperative department of the People's Republic of Bangladesh before providing them any support. Group registration is important for identifying participators, providing sustainability for the FFS, and making linkages with the government. For

the IAHBI project group, registration of the FFSs was done at the end of the project, which could not fulfil the actual aim of the FFS registration. Beginning the project with FFS registration may provide enough time to establish linkages between the government and farmers.

In the IAHBI project, first all 50,000 beneficiaries were selected and then from among these beneficiaries, WFGs were formed. From the WFGs, FFS were formed considering the presence of member from all the components (agriculture, livestock and fisheries) in the WFG. Women for the FFSs should be selected based on having similar interests and should share income generating activities. It was found in the IAHBI project that many women were included in the same FFS group, but they were not living in same village. The same FFS group members should be living in the same cluster. This allows for women in the same WFG to easily gather together and communication would be more convenient for them.

“The cluster approach would be a sustainable approach for the maintenance of regular communication and bonding among the group.” (Former programme officer of IAHBI project, FAO, Bangladesh)

Beneficiary selection is a critical part of any project. The selection of some of the beneficiaries may have been were politically influenced; this should be acknowledged and prevented in a sensitive way in future projects. A thorough participatory rural appraisal approach may be better suited for equitable beneficiary selection.

To create basic nutrition awareness, these projects took the initiative to teach the women through safe and healthy cooking methods to prevent the loss of micronutrients and maximize nutrient retention. This education should be scaled up in future agriculture projects.

Women farmers, who are the member of FFS, received training and later on conducted the training (roll out) among WFG. It was difficult to identify facilitators who had at least a minimal standard education. In some areas women farmer leaders had a standard educational background, and in other areas leaders had no standard educational background.

A FFS is like an open-learning “classroom”. A curriculum with topics of learning and discussion was developed by the project. The main practical learning areas were crop fields (i.e. rice and/or vegetable fields) and/or fish ponds and/or live animals (poultry, goats/sheep, cows/buffalos) and nutrition. In the future, training should be given more in accordance with the actual interests of the beneficiaries. Training also should not be given on too many topics. Rather, it should focus on specific topics where nutrition can be integrated. If it is necessary to train on different topics, the training should be arranged for multiple days and incorporate reviews of the material learned. This will insure topics are covered thoroughly and learner comprehension is achieved. During the implementation of IAHBI project, there were many sessions under each component, which created too many key messages. Training was only given once in the project period and there was little time for the farmers to review and remember what they learned.

Recommendations

- Currently, the FFS approach is used only by the MoA. The MoFL could consider adopting and adapting the approach so that farmers with similar interests could be grouped and receive regular training on nutrition-sensitive fisheries and livestock production and marketing.
- The project has developed a pool of WFG trainers who could be the ambassadors for integrated training in the community. It is recommended to share the list of the women farmer’s trainers to the relevant stakeholders who would like to implement relevant programme’s interventions in project sites in the future.
- There already are some FFSs in operation under the auspices of the DAE. However, the FFSs of IAHBI are integrated with nutrition, which is a unique feature of this intervention. FAO must familiarize stakeholders and ministries with these schools so they can continue them, but prioritize them based on their areas of highest need, effectiveness, and sustainability.

- The project document did not include a clear strategy for understanding and developing the capacities of government officials and beneficiaries', including the sustainability of capacity development activities. The government officials and the beneficiaries were not consulted about their capacity development needs during the development of the FFS training package. The FFS training package used in this project was developed centrally through a top-down process. Future projects should consider how to operate more on a needs-based, bottom up approach.

Skill development and capacity building through nutrition education training of government officials and NGO staff

To understand how the agricultural extension system incorporates project implementation, it is necessary to understand types of training and the training methodologies that are given to the extension officials. Training programs are aimed at preparing extension officials to mainstream nutrition into their platform.

The training component was crosscutting through the project. The Integrated Training Programme covered new technologies in agriculture production, particularly integrated homestead gardening (agriculture sector productivity or food security training), processing and preservation technologies, and nutrition training (dietary diversity, complementary feeding, child health and nutrition, cooking demonstrations) (FAO, internal document, 2015b). Government extension officers were trained as Training of Trainers (ToT) and integrated agricultural interventions were given to all beneficiaries. A total of 102 Government Officers and officials, including Sub-Assistant Agricultural Officer (SAAO) of Department of Agricultural Extension (DAE), Assistant Field Officer (AFO) & Field Assistant (FA) of Department of Fisheries (DoF), Veterinary Field Assistant (VFA) & Upazila Livestock Assistant (ULA) of Department of Livestock (DLS), Community Health Care Project (CHCP) of Directorate General of Health Services (DGHS), Family Welfare Assistant (FWA) of Directorate General of Family Planning (DGFP), and NGO staff (UC/FF of SMKK) from each Upazila and Unions of project areas participated in a six days training on nutrition, horticulture, fisheries and livestock under IAHBI (FAO, internal document, 2015b). They were also instructed on their main supervisory roles and the monitoring tasks expected to be fulfilled. These trainers then carried out the trainings of the FFSs and WFGs. Building the capacities of the FFSs were a priority as the training programme covered sessions and cooking demonstrations and they were to act as community mobilisers and centres for nutrition-oriented community based activities after the project withdrawal.

Lessons learned for capacity development among government and NGO staff

- The nutrition-sensitive interventions in the IAHBI project included four components: horticulture, livestock, aquaculture, and nutrition education. Within each component the project distributed different inputs and provided training on the input used. Nutrition education was covered by an extensive training with cooking demonstrations, food processing and appropriate technology transfer. Training along with the use of inputs such as seeds, fish fingerlings, poultry and ruminant distribution was the significant approach for the beneficiaries to practice the knowledge in their day-to-day life.
- The training followed three levels of participants. At the first level, specialists from each component (horticulture, aquaculture, livestock and nutrition specialists) provided ToT. This was done in order to improve and strengthen the capacity of professional and paraprofessional staffs of government and partnering NGOs. The participants of first level ToT conducted the second level of ToT of the FFS and the WFG leaders who acted as master trainers and conducted roll out sessions in their community as a third layer of training. The three layers of training were found to be very effective mechanism for knowledge dissemination from top-to-bottom among Government Extension Officers and the large community people.

Recommendations

- Most of the beneficiaries received training and, soon after, inputs were received. Other beneficiaries received inputs many days after the training due to logistical problems faced by the vendors. It is necessary to ensure that inputs can be received by the participants as soon as the training is completed. This will ensure that the participants are able to immediately put into practice what they learned during the training.
- Many, many trainings, including some on cooking and preservation of food were conducted at the field level. It was difficult to properly monitor the quality of all the trainings that were going on. It is necessary to make a realistic schedule with proper monitoring plans to ensure the quality of each training in the field.
- There was a large gap between the second and third levels of training of trainers (ToT). The second level of ToT was given to government and NGO staff, and the third level of ToT was given to selected leaders of the community who excelled in the second level of training. There was a notable quality issue between these two levels as a result of their educational background and experiences in training. When selecting leaders, it is necessary to keep in mind and ensure sufficient educational background (establish a minimum education degree requirement) and capacity to conduct training.
- Follow-up training and monitoring of the leaders is needed to ensure continued capacity development.
- All SAAO completed diploma courses in agriculture before joining in AES. Currently, nutrition education is not included in the curriculum. In the future, it would be ideal that nutrition education is included in the curriculum of SAAO's agriculture degrees.
- Nutrition education should be included in government training curriculum for agricultural extension staff. With nutrition included it will likely be recognized and accepted as a discipline. The nutrition education should include the food-based approach, key messages, and technical and practical demonstrations. From the policy level, it is necessary to emphasize nutrition to establish the changes in the government training curriculum for agricultural extension staff.

Nutrition training materials and communication

Training manuals

Under both the IAHBI and the poultry project, a series of training manuals and BCC materials were developed on horticulture, agriculture, aquaculture, livestock, and food-based nutrition, where nutrition was the main focus for each sector. For nutrition education, both projects developed “A Manual of Food Based Nutrition”. The manual contained several topic sections which covered the basics of food and nutrition, undernutrition, maternal, child and female adolescent nutrition and care, hygiene and sanitation, and cooking techniques. Training on nutrition was delivered as a part of the Integrated Training Programme. The manual was prepared based on existing materials and



© Manika Saha, 2015, Wazirpur, Barisal

adapted for the needs of the project. Available materials were adapted to develop training materials on food based nutrition for use at district/sub-district and community levels. During the preparation of the training materials such as manuals, recipe booklets, festoons, key messages, existing FAO food-based nutrition materials that were developed from previous FAO supported and FAO collaboration projects (Integrated Horticulture and Nutrition Development project, Millennium Development Goal Fund (MDGF) project, improved recipes for complementary feeding of children aged 6-23 months) were adapted and distributed to the Extension Officers of DAE, DLS, DoF, and departments of health and family planning to use at the integrated training programme (FAOBD, internal document, 2015b). The sessions with the contents of the nutrition manual are given in Annex 1.

Key messages

The project developed key message sheets as supporting training materials. These job aides covered the same topics or sessions as enclosed in the manuals, but organised according to the Integrated Training Programme. The key message sheets were distributed among FFS and WFG leaders to support them in the roll out of the sessions to the WFG. The same function had festoons which were prepared to ease the demonstration of different key messages to the FFS and WFG. Cooking demonstration guidelines were developed for each promoted recipe and served to support the trainers in performing group cooking sessions. All materials were printed and distributed to FFS and WFG members and to Extension Officers and officials who acted as trainers.

Communication materials

The project prepared two types of communication materials to target a wider audience: a leaflet to promote dietary diversity in complementary feeding and a billboard to promote dietary diversity in family nutrition. The leaflet contained key messages on child nutrition, hygiene of complementary food preparation and feeding, and three recipes: liver khichuri, egg suji and pusti gura. It was designed to be distributed to mothers through community clinics and health centres and was approved by the National Nutrition Services (NNS). The billboard promoted dietary diversity through three food groups: energy-giving foods, body-building foods and body-protecting foods. The billboards were displayed in prominent places of each project Union. The leaflet was not printed due to the budget shortages. One of the festoons which promoted dietary diversity and contained the same message as the billboard was printed and distributed to all community clinics, health centres and extension and local government offices in the project areas. The full list of training materials produced by the project can be seen in Annex 2.

Mass media communications strategy and nutrition education campaigns

To move households towards behaviour change, their specific situation was identified and addressed through appropriate communication tools and nutrition education campaigns. The project was involved in designing and drafting nutrition messages for a manual, key messages sheets, cooking demo guidelines, festoons, billboards, and a leaflet focusing on nutrition for the first 1000 days of life (FAOBD, internal document, 2015b). These materials also focused on how to improve food preparation skills in order to reduce nutrient loss during cooking and improve hygiene. These nutrition education tools were used during ToT, FFS training, and roll out training at the community level. During group-level cooking demonstrations, basic related nutrition messages were taught to encourage positive behaviour change at the community level.

The project also reviewed the messages on the food plate which was designed based on the Desirable Dietary Pattern developed by the Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine, and Metabolic Disorders with support from the Ministry of Food (MoF) and FAO. All the training aid materials were finalized by the FAO nutrition team.

To create awareness on dietary diversity, video footage on cooking demonstrations has been made and used in nutrition education campaigns.

The list of training tools used for nutrition education campaigns and mass communications is given in Annex 5.



Top: © Aklima Parvin, 2015, bill board on dietary diversity is displayed at Kakbasia Bangabandhu High school, Anulia village, Asasuni Upazila, Satkhira

Left: © Aklima Parvin, 2015, bill board is displayed at Rautara Pusti Farmer Field School, Anulia, Asasuni Upazila, Satkhira

Lessons learned from training materials

- The key message sheets were prepared based on the manual of Food Based Nutrition. Most of the materials were updated from existing FAO nutrition education material, food-based nutrition, and relevant publications from national sources: IPHN (NNS) and Bangladesh Institute of Research and Training on Applied Nutrition (BIRTAN) (FAOBD, internal document, 2014b). In particular, BIRTAN is an institute under the Ministry of Agriculture working to eliminate the nutritional problems and improve the public-health of the country through conducting research, providing training, organizing symposia and workshops, and promoting other related activities.
- Adaptation from available training materials on food-based nutrition, for use at the district/sub-district and community levels, gave the project more acceptance among the people. It is advised that future projects should follow the same methodology.
- Nutrition messages promoted the production and consumption of diversified diets (by women, children and adolescent school girls). A variety of micro-nutrient rich foods for household food security and nutrition improvement have been integrated into the standard package of agriculture training. Similar messages were also integrated into the training component of livestock and fisheries. These messages have been promoted via DAE, DLS, DFS and health and family planning staff at the Union and Upazila level for FFSs. So, with the lessons learned from these projects, agricultural extension officials could mainstream nutrition into their regular work.
- Key messages developed in different areas of agriculture were helpful materials for the WFG training. In the IAHLI project, there were many sessions and key messages under each component,

which made it difficult for the farmer to retain all the information. The poultry project only focused on poultry where nutrition was integrated into the livestock training. Beneficiaries were taught specific and a limited amount of messages, which was helpful for retaining the information. Projects like IAHBI, where they work with different components, should continue long-term with follow up training, so that farmers have opportunities to practice and revise what they learned.

- FFS, with its structured approach of training and development of training manuals and curriculum widely applied in project areas and with AES, offer a great opportunity to mainstream nutrition within AES activities. The publication of some manuals was delayed and became available only after some of the training sessions had already started. Future projects should be aware that the materials developed should be distributed during training sessions.
- These projects used festoons during training sessions. It was found that festoons were more effective than other materials. Future project should emphasize on festoons and posters rather than leaflets or flyers, which were found to be less effective. It was also found that leaflets and flyers were easily lost because these are smaller in size than posters and festoons, and their messages are also short-lived.

Recommendations

- Follow-up activities to FFS trainings were not incorporated in the field programmes. It is necessary to take initiatives as soon as possible from the government and as well as from the former implementation organization to confirm its continuity. On future projects, follow-up activities or refresher trainings should be incorporated to ensure its sustainability.
- Both agricultural extension agents and health and family planning staff were engaged in IAHBI. Health and family planning extension staff were also engaged as training facilitators. IAHBI was a remarkable example where food-based approaches were integrated into the health and family planning department along with agricultural departments. Generally, MoHFW services are focused on nutrition-specific interventions such as immunization, Vitamin A capsule, iron tablet and deworming tablet distribution, family planning, advice on pregnancy and childcare etc. But the food-based approaches, which are known as nutrition-sensitive interventions for improve nutritional status, were integrated through the food-based nutrition manual, key messages, and cooking demonstrations by IAHBI project. MoHFW needs to integrate both nutrition-sensitive and nutrition-specific interventions within their activities to ensure sustainable improvement of nutritional status for the country. They should better document how food-based nutrition was integrated with health and family planning through IAHBI to determine how to scale this up nationwide. The lesson learned is that indeed AES and health staff can collaborate and deliver coordinated messages.
- Develop or include curriculum on nutrition education in the main training manual for all government agriculture extension services along with related nutrition training materials such as festoons, posters etc.
- During the IAHBI project a set of training manuals and materials were developed for the agriculture components where nutrition was mainstreamed: horticulture, aquaculture and livestock. These materials could be used by Government Agriculture Extension Officers. The materials are very informative and should be printed to disseminate in field level.

Recipe development and cooking demonstrations

Cooking demonstrations on selected nutrient-dense recipes were performed during the Integrated Training Programme. Emphasis was put on complementary feeding, food combinations, dietary diversity, and on animal based foods.

The goal of cooking demonstrations in the two projects was to teach principles of food preparation; how to reduce nutrient loss; how to improve vegetable preparation, cooking, and blanching; and how to use different ingredients for enriching a given dish. Participants were also taught how to replace ingredients in the recipes depending on seasonal availability of different vegetables.



© Manika Saha, 2016, Khulna, Cooking demonstration session by WFGs

Micronutrient rich recipes using available local foods published

The project provided support to the group from the Bangladesh Breastfeeding Foundation (BBF) on a review of the complementary feeding and maternal nutrition recipes. All the recipes were based on the traditional local dishes prepared of locally available foods. They were improved by the BBF research team that was able to increase the foods' nutrient density. Trials were conducted in the communities. After the research was completed, two recipe booklets were created: "Recipes for Improving Nutrition of Women in Reproductive Age" (IAHBI, 2014a) and the "Recipe Booklet for Complementary Feeding of Children Aged 6-23 Months" (IAHBI, 2014b). Both booklets were published under the project output three in English to share with partners and in Bangla. A total of 300 copies were published both in English and Bengali (English copies were done for the donor, FAO HQ and Regional promotion, Bangladesh stakeholders for national promotion during different events, and also the District focal of DAE, DLS, DOF and MOHFW). Bengali copies were distributed to Upazila Livestock Officer (ULO), Upazila Fishery Officer (UFO), Upazila Agriculture Officer (UAO), and Deputy Director (DD) of DAE, District Livestock Officer (DLO), DoF, SMKK, other stakeholders. These materials were used during training and national events.

The recipe booklet for maternal nutrition contains 15 recipes and the booklet for complementary feeding contains 11 recipes. The recipes include main dishes, snacks and desserts. Each recipe provides the preparation process with simple steps and pictures. The nutrient content per serving (calculated values for key micronutrients) and the estimated cost per serving (IAHBI, 2014b; IAHBI, 2014a) were provided in each recipe. Nutrient-dense complementary foods and improved complementary feeding recipes were developed. Foods such as pusti gura, vegetables khichuri, drumstick egg omelette, and egg suji were promoted.

Development of integrated nutrition cooking training materials

A set of integrated core messages was developed for the horticulture, livestock and fisheries components and disseminated to women farmers through integrated training packages.

The project consultants engaged in the adaptation of a recipe booklet promoting diverse recipes using micronutrient rich indigenous horticulture, aquaculture, livestock and poultry foods, which was promoted at the community through cooking demonstrations with technical guidance by senior nutritionist. A list of recipes demonstrating combinations of horticulture, livestock/poultry, and fishery is provided in Annex 3:

Lessons learned in terms of recipe development and cooking demonstrations

- The two projects focused on enhancing nutrition awareness and promoting behavioural change with regards to food choices, food combinations, dietary diversity and appropriate complementary foods.
- Both projects worked with consistent and focused messaging through all community levels, groups, and workers (agriculture, livestock, fisheries extension and health sector). This was achieved through participatory cooking demonstrations, food processing and preservation techniques.
- Participatory cooking demonstrations were found to be the most preferred mechanism among the farmer field schools, women farmer groups, and among the agriculture, livestock and aquaculture extension services systems.
- Participatory demonstration strategies provided hands-on assistance to the mothers about the importance of nutrition, making dietary changes through demonstrating balanced recipes, strengthening traditional, simple and affordable methods and skills on food preservation and storage of indigenous foods. These lessons also affected greater intake of diverse and indigenous, vegetables, fruits, local fish species, meats, milk and milk products.
- The cooking demonstration guidelines that the project developed brought a participatory structure to the sessions. The project also promoted effective hygienic practices through demonstrations and verbal communication. The cooking demonstration guidelines and hygienic practices made the demonstration sessions more effective to the beneficiaries.
- The participants learned how to replace ingredients in the recipes depending on the seasonal availability of different vegetables. In some project areas it was found that beneficiaries were not aware of how to do this. In the future, projects should emphasize this topic.

Project provided guidance on selection of technologies on processing

- The IAHBI project promoted technologies in food processing, such as blanching, roasting, and drying technologies to help preserve micronutrients and extend a product's shelf life. During preparation of pustigura, the roasting method was used. Blanching and drying were used to prepare carrot powder. Beneficiaries were encouraged to use carrot powder to prepare complementary foods.
- Food processing and preservation technologies like drying, blanching, roasting, and pickling make food available beyond the period and location of production and improve food security at the household level. The low availability of some key micronutrients in vegetables such as iron can be significantly enhanced through food combinations, like using sour fruits and fruits and vegetables rich in Vitamin C with appropriate processing techniques were emphasized.
- Fish chutney, pickled mango, hogpum, jujube, tamarind, fish, and meat drying technologies were taught in FFS and WFG training. Drying vegetables was demonstrated by using carrots, olkopi, cabbage, radishes, and gourds. Beneficiaries were taught how to prepare vegetable cakes by mixing lentils and vegetables. These activities could be a source of small-scale business plans among the WFGs. These food drying technologies were well accepted by women farmers in the field level and should be adapted by future projects.



© Aklima Parvin, 2015. Demonstrations of processing and preservation techniques are being conducted with FFS by Mr. Nur Ali Biswas, SAAO, Jahajghata village, Vurulia Union, Shyamnagar Upazila.

Challenges to implement cooking demonstration in field level through AES

- Recipe demonstrations in the field are costly. However, since cooking demonstrations are an effective method to show farmers how to get the maximum nutrition from their food, the government should allocate funds to allow recipe demonstrations in field-level training.
- It was a challenge for male agriculture extension officers to implement cooking demonstrations. Frequently male facilitators declined conducting cooking demonstrations as they perceive cooking to be female work. More motivation is needed to change this perception.
- It was challenging to learn how to replace ingredients in recipes based on the seasonal availability of different vegetables.

Recommendations

- Cooking demonstrations were well-liked among the farmers and were most effective in learning the food-based approach. Food-based nutrition education, including cooking demonstrations, should be introduced as a regular agricultural extension system training component.

- Women learned about three basic food groups: energy-giving, body-building and body-protecting food in the nutrition training. Through cooking demonstrations and recipes, they learned how to combine these food groups to make balanced meals. Cooking demonstrations could continue if women take ownership of the task, as they could develop local recipes of their own by using the three food groups. This activity would motivate the rural women to use the three food groups in their family diet. It also brings synergy in nutrition education and change in the household diet by ensuring nutrient-rich food for the family

Livestock interventions

The poultry project designed and supplied portable well-ventilated and easy-to-clean improved poultry houses for the backyard poultry farmers. The project also provided basic supplies, including bags of feed (10 kg per bag), plastic drinkers for adult birds and young chicks, plastic feeders, and sachets of anthelmintic⁵ (de-worming powder) (10 g per sachet) to the 2900 backyard beneficiaries. In the poultry



© Taslima Akther, 2015, Khulna, Woman engaged in poultry rearing utilizing a backyard poultry shed provided by the project.

project, 40 commercial poultry sheds were constructed for small-scale poultry farmers. Each shed had a rain water storage system and a solar power generation system. Each small scale poultry farmer received 250 day-old chicks, 250 kg of feed, litter, hover, and a drinker feeder.

The purpose of the poultry project was to support backyard and small-scale poultry farmers to engage in more productive and hygienic poultry husbandry practices. This improves the nutritional status of the beneficiaries, particularly women and children. Small ruminant and poultry-rearing activities component of IAHBI also increased the source of animal

protein for family consumption. The livelihoods of both project beneficiaries results in vitalization of the rural economy of the area by reducing poverty and suffering, improving the nutritional status of poor families, and increasing opportunities for generating family income.

Lessons learned from livestock interventions

- The project worked in close partnership with Department of Livestock Services (DLS). Backyard and small-scale beneficiaries are also linked with DLS. However, the outreach of DLS is very limited that might constrain the service support to beneficiaries. Initiatives have been taken to formalize the WFG in the government's cooperative systems. The farmers have been informed about the available service support from both private and public sectors. Linking the beneficiaries with formal public sector

⁵ **Anthelmintic packet:** It is the de-worming medicine (against intestinal worms) for chickens. It prevents from malnutrition in chickens due to intestinal worms.

organizations and private sector entities will support sustainability of results achieved beyond the project period.

- The traditional concept and practices of poultry rearing among the project beneficiaries changed significantly. They started using a bio-secure poultry shed, preserving rainwater for poultry use, solar panels as a backup electricity supply, using floor mats, providing feed and water in separate pots, using a cafeteria, and using a tippy tap.
- The services (such as poultry vaccinations), technologies (tippy tap⁶, cafeteria system⁷, use of floor mats⁸, hazals⁹, etc.) are cheap technologies and affordable for farmers. Getting genetic material (hatching eggs) at a reasonable price from the neighbourhood will increase the productivity of hens than the previous days in their locality.
- When farmers are trained well and motivated, a genetically improved bird along with a good vaccination programme and a well-ventilated, clean house can contribute to an increase in egg and chick production in rural communities.
- Enhanced production of eggs contributes to the quality of family food and provides an additional source of income. Increased income can be used to pay for school fees, medical costs, or purchase additional food.
- Small-scale women farmers have already established themselves in the family as decision makers by contributing to the household income through selling eggs. Backyard beneficiaries are also getting eggs

⁶ **Tippy tap:** An empty mineral water bottle is used as a source of preserving water for immediate washing hands after using toilet and handling chickens. It is very useful in those areas where clean water is not available. There are three or more small holes pinched by hot red small screw in the bottom part of the empty bottle to run water down when needed. Then the bottle is fulfilled with water and the neck of the bottle is hanged with anything high tied by rope. Once the cap of the bottle is loosen, the outside air flows through the bottle and it's pressure results in running down of water by the holes. Once the cap is tight again, the water down stops. A soap is also hanged alongside the bottle for use. It prevents the chances of disease spread.

⁷ **Cafeteria system:** It is a system of providing kitchen wastages to chickens distributed in three separate compartments of two pieces of longitudinal section of a bamboo. People do provide different processed food items (Energy, body building elements, minerals etc) in different compartments and serve to chickens. Here food processing involved in washing, cutting of roots and peels of vegetable, fruits and scorching on fire only in case of egg shell and bones. It provides the option to chickens to select the food item as per their own need and taste. It is served two times daily (morning and before dark) in front of the chicken house. It also ensures the consumption of balanced and hygienic food by the chicken. As they are well-fed before going to scavenge (free movement here and there to find food), the chicken do take less dirty food which reduces the chances of food borne diseases in chicken.

⁸ **Floor mat:** It is a piece of polyethylene sheet placed on the floor of the chicken house daily just before dark. The faeces (stool) of chickens are accumulated on the mat overnight and you can take the floor mat daily in the morning, clean it with soap water and sundry it for tomorrow's use. It prevents the accumulation of germs (in the feces) on the floor of chicken house for a long period and reduces the disease burden of the chicken owner.

⁹ **Hazal:** It is the artificial portable nest box made by mud and sand for broody hen. It has two separate holes in front of broody hen's head position. A container filled with wheat or paddy is placed daily in one hole while another container filled with water is kept in the other hole. It facilitates the broody hen to keep her eggs warm most of the time (except only going out for defecation/toilet) and prevents her outside movement searching for food. We can also carry it from one place to another easily at any time in order to place the nest in the calm and quite corners of the house.

- and chicks and consume and sell them. With the money they earn, they pay for school fees, medical costs, and buy additional food for their family. This indicates that backyard beneficiaries are also
- becoming decision-makers in the family. Similarly, women community vaccinators are also becoming empowered in the family as well as in the community.
- Vaccination training was given to selected women farmers with vaccination kits. The women are now playing important roles as vaccinators in the community. They



© Md. Habibur Rahman, 2015, Khulna, Training on Community Vaccination Training for women vaccinators.

are now earning money and giving vaccines to their neighbours' poultry and have built good relationships with DLS through using their vaccines. This provided an opportunity to create linkages between women farmers and livestock extension staff.

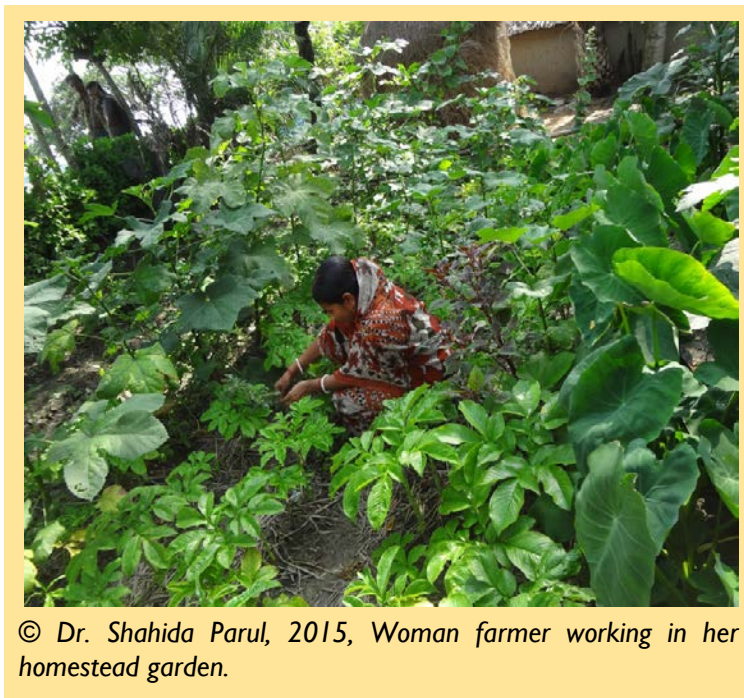
Recommendations

- The poultry policy has some actionable recommendations to improve the quality production of poultry, poultry products, and the development of entrepreneurs and extensionists. The project objectives were clearly aligned to the objectives of National Poultry Development Strategy, 2008. However, a review of poultry development policy is needed to understand the barriers to implementing the National Poultry Development Policy, 2008. The country has legislation in place for animal disease control and feed quality control. However, these legislations are rarely enforced and the barriers for law enforcement and legislation should be identified and removed.
- Well-ventilated and easy-to-clean poultry houses for poultry rearing should be scaled up with alternative technologies like the cafeteria system for poultry feeding, use of polythene sack floor mat, and the utilization of tippy taps for hand washing to ensure hygiene and sanitation to increase the productivity in rural areas and reduce poultry disease incidences.

Nutrition integration through horticulture interventions

In IAHBI, agricultural extension services implemented horticulture interventions through the distribution of high quality seeds and planting nutrient-rich fruit sapling trees. Home gardening is a highly valuable means to contribute to improvements in food consumption patterns which contribute to better nutrition and income generation at the household level. Food grown in the garden is usually used for family consumption, and the rest of the vegetables are sold to buy other food and non-food items.

Fertilizers and tools were also distributed as a part of the inputs package. The inputs were selected from a nutritional point of view with the seven to eight varieties of seeds per season providing foods that are rich in Vitamin A, Vitamin C, and Iron. The direct effects of the horticulture intervention are increased vegetable production, family consumption, and income. In addition, seed preservation, knowledge and skill development, neighbour motivation, and strong linkages with DAE and beneficiaries are indicators of future vegetable cultivation expansion in the homestead area.



© Dr. Shahida Parul, 2015, Woman farmer working in her homestead garden.

Lessons learned from nutrition integration through horticulture interventions

- Providing fruit trees and better quality seed distribution have given great potential to the farmers to plant these along their homestead garden. These trees and seeds will play important roles in improving household food and nutrition security.
- The IAHBI project collected saplings from vendors who brought the trees from faraway places. To boost up the locally adapted fruits varieties in the project area, it must deliver locally raised saplings to minimize tree transport injury, and it must develop knowledge on fruit tree sapling plantation and management to project beneficiaries before handing over the saplings.
- Meetings with district-level focal persons in fisheries, livestock and horticulture further helped to identify the most commonly grown and consumed foods in the respected Upazilas and Unions. Based on thorough discussion on the geographical area and the context of fruit tree development, Upazila Agriculture Officers unanimously selected the saplings for the next plantation year. This could be continued in the future.
- Training along with input distribution increased the farmers' capability to create tree plantation.
- Good quality trees and seeds must be guaranteed before distribution. Some fields had poor quality fruit saplings.
- Input distribution should be started as soon as the training session is complete. The time gap between training and when the beneficiaries received inputs sometimes was too long.

- Seed production and preservation is too highly technical for both the local and high-yielding varieties. The hybrid variety requires a high level of technical knowledge to produce and is beyond the farmers' capacity. The project distributed seven types of vegetable seeds; among those, bitter gourd seed was only hybrid one, but it was found that a remarkable number of beneficiaries preserved it as they would any other variety of seed.
- IAHBI project distributed plants according to different nutritional aspects of each household. In the future, for the marginal household that does not have space for planting or must plant in waterlogged places, year-round creeper vegetables should be planted.
- In some places in Khulna and Satkhira, where IAHBI project was implemented, pit system plantation is more sustainable than bed system plantation. This method is more appropriate for salty areas.
- Thirty-nine percent (39%) of beneficiaries have sold their surplus vegetables in the market, helping them earn money even though the primary aim of the homestead vegetable garden was to feed the family first. This earning will help to empower women in the family and encourage higher production (FAOBD, internal document, 2015c).
- Eighty percent (80%) of beneficiaries produced and preserved vegetable seeds for the first time, up from two percent before the project started, which indicates that beneficiaries are committed to continue the practice (FAOBD, internal document, 2015c).

Recommendations

- DAE conducts many training courses every year through their own revenue or project budget. While organizing training they can prioritize these non-trained horticulture beneficiaries in the training course. If beneficiaries receive the horticulture training, then they can continue the horticultural practices smoothly and efficiently. Their confidence levels will also increase and the linkages between women farmers and DAE will be established at the field level.
- During the FFS and rollout sessions, trainers should clearly mention during the vegetable seed production and preservation session that seeds should not be produced and preserved from plants that originated from hybrid types of seed, as the hybrid effect is lost in the next generation and there may be germination problems.
- Pesticides, especially chemical pesticides, are a health hazard to humans as well as insects and invasive plants and are not environmentally friendly. Beneficiaries must be informed through FFS and rollout sessions regarding the negative impact of synthetic pesticides. At the same time, trainers should encourage farmers to follow an integrated pest management system to control pests.
- A manual should be prepared on year-round creeper vegetables that could be used for training for landless and waterlogged areas.
- Due to the hard-to-reach and isolated location of the project area, IP staff and other service providers could not follow up with the program as required.
- Frequent changes of IP staff may affect the monitoring of cultural activities due to limited/lack of training and experiences.
- A short briefing on vegetable cultivation during distribution was not enough for technology transfer and motivating the mothers toward maximizing the production.
- Project beneficiaries got most of the inputs like fertilizer, vegetable seeds, fruit saplings, spade, hand hoe, and sickle timely at their door or a nearby house without any cost. Therefore, in some

cases they may be unaware of the availability or location of the inputs sources and unable to identify if the vendors are selling good quality items. If DAE officials informed people on the location or sources of the inputs and developed linkages with vendors, then beneficiaries would receive good quality inputs at a fair price. If linkages were developed by DAE officials, then vendors would also try to deliver quality inputs rather than cheat the beneficiaries.

- Mini vegetable nurseries in the area could be established or the project could motivate the beneficiaries to establish seasonal or year-round vegetable nurseries in their area (FAOBD, internal document, 2015e).

Aquaculture interventions

In IAHBI project, aquaculture components had a target of training of beneficiaries and distribution of limited amount of inputs among selected beneficiaries to demonstrate the improved aquaculture systems to enhance family nutrition through fish and shrimp production as a sources of good quality animal protein, improve nutritional status and livelihoods, and increase employment generation and family income.

“Without DAE, DLS, DoF and without food-based approach, malnutrition could not dispel from Bangladesh, whereas DoF is supplying the animal protein - fish, which is the source of protein and micronutrients.” (Former FAO aquaculture specialist)

Lessons learned from aquaculture interventions

- During IAHBI training, farmers learned about fish preservation. In the peak season when fish are available abundantly in the water body and price is comparatively cheaper than other times, fish could be preserved by sun drying. This project provided solar dryers to the FFSs. This practice is not common in DoF in Bangladesh. The extension service of fisheries should adopt fish preservation techniques and include it into their regular curriculum.
- Most of the beneficiaries practiced mono-sex tilapia culture by following the improved technology learned from the project. Beneficiaries produced a good quantity of tilapia from their ponds, earned money by selling it, and they consumed tilapia. Both the continuation of the culture and that beneficiaries were encouraging others to adopt the practice indicates the satisfaction of the beneficiaries with production, income and utilization of resources.
- Since the aquaculture session of FFS training were conducted by a DoF official, beneficiaries have now developed some linkages with field level officials of DoF.
- Most of the beneficiaries want to continue tilapia production through their own contributions aided by learned technologies, which indicates they are satisfied with the technology and adopt accordingly (preparation of ponds, use of lime and acclimatization of fries before stocking as well as regular feeding and fertilization of ponds for natural production).
- Most of the project locations were very remote. Therefore, it is difficult to deliver the inputs, especially live tilapia fries, as fries are very sensitive and carried from a specialized hatchery that required transport from a long distance.
- On the other hand, all beneficiaries were not present at times because they had to walk long distances (several kilometres), the return journey with the added load of inputs (especially for tilapia fries, which need to be released into ponds within a limited time frame). Travel in some of areas was very difficult, especially during the rainy season. The project must arrange distribution locally and from the nearest hatchery.

Recommendations

- In systematic formal training of the fisheries department, nutrition should integrate and extension staff could disseminate nutrition messages at the field level.
- Market linkages should be developed in the project area to get the optimum price for their product.
- Professional vendor(s) need to be selected for the specific inputs for smooth and timely delivery.
- The project should develop an official mechanism to expedite the testing of feed to minimize the time it takes to distribute fish/shrimp feed and to synchronize the inputs packages, both of which are critical to attain good results at the beneficiary level.



@ Aklima Parvin, 2015, Fish drying is being practiced as food preservation by a women farmer, Khulna.

Establishing community-based food processing and preservation facilities for improving diets and nutrition

Project provided support for the sustainability of the community based food processing activities

The project handed over cooking kits with tools to the registered groups, who kept them in their office space. It was expected that these tools would provide support to women farmers to develop a semi-commercial activity within the community. The kit includes a roasting pan, cooking pots, large bowls, lids, stone grinders, colanders, stainless steel knives, metallic chopper (boti), hygienic chopping boards, a manual rotatory blender cum mixer, flat cooking spoons, a pressure cooker for sterilizing foods and processing equipment, food covers, glass jars, bottles, packaging materials, hygienic airtight poly ethylene containers, candles, a portable cooking stove and dryer for large scale community-based processing (FAO, internal project document, 2015).

Community and home-based facilities/arrangements for utilization and preservation of surplus vegetable/fruit produce for sale during peak seasons and off-season for home consumption, the project had been providing training and field-based demonstrations for women's farmer groups on community and home-scale food preservation/processing techniques for household consumption and income generation (FAO, Internal Project Document 2015). To support this output and add value to the produce, establishing community-based facilities should be established for processing and preservation of local foods to enhance dietary diversity, quality and nutrition. Several traditional household food-processing and preparation methods were used to enhance the bioavailability of nutrients in plant-based diets.

Training in processing and preservation through IAHBI was provided to all FFSs and to 30,000 women farmers. Beneficiaries learned how to use appropriate technologies to prepare local value-added products and recipes such as pickles, dried vegetables, roasted grains, seeds and nuts. The project investigated possible entry points for implementation of community-based processing and preservation activities to improve the diets, nutrition and income of the participating project households/beneficiaries.

Registration of women Farmer Field School Groups

The registered Women Farmer Field School Groups (WFFSGs) were the IAHBI project entry points through which they promoted community-based food processing and preservation activities (FAO Internal Project Document, 2015). Through IAHBI, 60 WFFSGs were formally registered. These became the community-based groups within which all activities were implemented with support and leadership from the Upazila level officials (from MoFL, MoA, Department of Cooperatives, and community leaders). Formal registration of these groups was a component of the project's exit strategy to increase the likelihood that the group would continue to exist and function beyond the duration of the project.

Locally elected women members of the Union Parishad

Each Union Parishad has three women members who are elected by the community and are typically well-known and respected members of society. IAHBI staff made an effort to link WFFSG and their activities with these elected leaders. These linkages increased the group's significance, sensitizing the Union Parishad to their activities and helping to establish the group's activity within the community. IAHBI's exit strategy's plan flow chart is provided in Annex 6.

Institutional arrangements

Members of the WFFSGs elected a seven-member executive committee (one president, one vice president, one secretary, one treasurer, and three members). This executive committee represented the women's group for a specific time period. The president and the committee were responsible for the equipment and to set acceptable rules for how the group members could use the equipment. They met every month for a planning meeting chaired by the president during which group activities from the previous month were reviewed and the ones for the next month were discussed and agreed upon. The elected women members from local government were always invited to all meetings of the respective WFFSGs so they could report to the Parishad Chairman on their progress and decisions made. In most cases, one woman from the group attended. Her role was to activate the Union and Upazila level extension officers from MoFL and MoA to provide technical support for the group activities. She also acted as an advisor and added accountability to the group meetings.

The project provided cooking equipment to the WFFSG in order to promote food processing and preservation. The women produced preserves and dried vegetables and fruits for home consumption and small-scale commercial purposes. That income was paid into the group's bank account to be used for investments and loans to group members. Decisions on how to use these funds were made during the committee planning meetings. The institutional structure of a WFFSG is shown in Annex 7.

Challenges faced and lessons learned from the formal registration

The goal for each registered groups was to have a constitution, conduct regular meetings, set up their own savings scheme, and utilize an appropriate office or space in the community. The interviews conducted for this study showed that few government officials were aware of why the women's group registration would even matter. FAO assisted in connecting IAHBI FFSs and poultry project WFGs with the government through supporting the registration procedures for the 60 FFS through the Department of Cooperatives, MoA, and MoFL. However, this registration process took place only towards the end of the project. Formal registration should have been initiated much earlier, so that all stakeholders

understood the benefits of registration. Early, formal registration should facilitate linkages between FFSs and government extension services and Department of Cooperatives.

DAE has a longstanding familiarity with FFS and includes this approach in their practical organogram. DAE, rather than MoFL, handled the registration of these 60 new FFS.

Recommendations

- MoFL should consider whether FFSs are a viable option for DoF and DLS.
- Formal registration of farmer groups is through the “Department of Cooperatives” under the Ministry of Local Government, Rural Development and Cooperatives (MoLGRDC). However, at the outset of either project this ministry was not formally involved. In future projects, it is necessary to create linkages between the Department of Cooperatives and the farmer group from the beginning of the project implementation.
- In principle, public extension services should regularly follow up with the 60 FFS from IAHBI project and 30 WFG from Poultry project because of their formal status. These groups should have better access to various government services. It should be the routine work of the extension workers of DAE and DLS to sustain the activities.
- These FFSs and WFGs are the valuable outcome of all the hard work and investment of resources of project implementation partners. The social capital of the women farmers has been strengthened and their knowledge base increased. Without regular follow-up and monitoring, these groups will be lost one day.

Project implementation and monitoring through GoB services

The project implementation was monitored regularly by the designated GoB focal persons from the DAE, DLS, DoF and the Directorate General of Health Services, Institute of Public Health Nutrition (IPHN). The monitoring findings were regularly shared with the Project Monitoring Committee (PMC) headed by the Joint Chief, Ministry of Fisheries and Livestock (MoFL) and Project Director IA-INFS project, and the inter-ministerial Project Steering Committee (PSC) headed by the Secretary of MoFL (FAO, internal document, 2015b).

Since the project was implemented in cooperation with the Government Extension Services, the Extension officials were actively involved in the implementation process and were also trained as part of the programmes capacity building component and assisted with maintaining liaison with the vendors and input distributors. As a result, the involvement of the Extension Services strengthened linkages and built confidence of the project beneficiaries.

Six departments under the five Ministries provided strong support for smooth implementation of multi-disciplinary activities for improvement of the nutritional status of the poorest of the poor and the Extension Officers of the Government Extension services have been sensitized to the importance of integrated approach and its role in improving food security and nutrition in the communities (GoB 2016b). As part of the project’s exit strategy, responsibility of routine follow up with the 60 FFS from IAHBI project and 30 WFG from the Poultry project was taken up by the Extension Officers. It is understood that the quality of follow-up support provided to the groups is being ensured despite problems such as remote areas, poor road communication and natural calamities.

Lessons learned from project implementation and monitoring by public sector entities

- The project interventions were implemented through public extension services. Government officials were actively engaged in designing project interventions, selecting areas for implementing different components of the project and in the beneficiary selection. The project trained them as a part of its capacity building component and further implemented its training activities through the Extension Officers. The Extension Officers served as trainers in the communities, delivering sessions in their area of expertise (horticulture, livestock or aquaculture) and in nutrition. They also assisted in liaising with vendors and input distribution. This intensive engagement of the AES in the project activities resulted with strengthening their linkages with the communities and in building the confidence of the project beneficiaries in seeking advice from them. The Extension Officers and Officials were sensitized to the importance of nutrition and recognized their role in improving nutrition in the communities in which they work.

Recommendations

- Through the projects, the skills set and knowledge base especially on nutrition-sensitive agriculture and nutrition-sensitive interventions of the staff from DAE, DoF, and DLS were built up. A plan is lacking on how to mainstream such knowledge and skills throughout the departments, to plan for and fund regular follow up, and how to monitor the impact.
- These 60 FFS of IAHBI project and 30 WFGs of poultry project should be followed up by government in regular basis and they could be used as to integrate nutrition into AES.
- The approaches piloted through both projects and the lessons learned could serve as the basis for policy makers to establish a country wide policy on “Nutrition FFS”.
- Involvement of government officials and local government women representatives in the project encouraged the beneficiary women groups to mainstream nutrition through nutrition-sensitive agriculture including horticulture, fisheries, and livestock showed improvement in the end line survey. Close linkages established among the service providers of different sectors and beneficiaries for the improvement of nutrition. Thus, to mainstream nutrition, government need to make it mandatory to monitor nutrition activities into regular meeting of AES and also in the regular meeting conducted by local government in the community. In line with the Government's policies on food, nutrition and agriculture, nutrition-education is a common strategy that is being mainstreamed through health education and agriculture extension programmes.
- Targeting the community's self-supporting mechanisms through the implementation of FFS, WFGs and the community-based food processing facilities can have long-term implications for improving food availability, accessibility, and use at the household and community levels, which influences the agricultural and economical sustainability of the project. Moreover, the capacity building component of the project and nutrition education was a sustainable way to strengthen the impact of the agriculture on nutrition at household and community levels. Nutrition training and nutrition education should therefore be an ongoing and integral feature of agricultural extension programmes.

Better nutrition outcomes through investing in women's empowerment

The IAHBI and poultry project are good examples that show how women's empowerment through their involvement in project activities as direct beneficiaries can contribute towards better nutrition outcomes. By embracing the participatory approach of integrating different life skills on agriculture fields, including nutrition education among the women, the IAHBI project contributes to the improved overall development of the participants in their cultural context. During the interviews conducted as part of this

study, women farmers reported that they felt more accepted and respected in their communities than before and felt more comfortable talking with strangers. They reported being more confident preparing food, choosing nutrient-dense foods for their children and other family members, including themselves. This project increased their knowledge on nutrition through nutrition education training and cooking demonstrations, particularly on the importance of nutrient-rich foods and nutrient-dense foods for them and their children. Nutrition education with emphasis on diversifying consumption and using better food preparation techniques was integrated into agricultural topics such as appropriate technologies on food processing including blanching, pickling and preparations of chutneys, the preservation of micronutrient-rich foods, their safe storage, and food safety (FAOBD, internal document, 2015b). Compared from the baseline in 2013 when 45% of households consumed 6 food groups out of 16 (Annex 8), an increase to 8-12 food groups (44.5%) was noted in 2016 in IAHBI project (FAOBD, 2016a)

Lessons learned from nutrition education and women empowerment

- The two projects involved only women farmers in the training. However, as the projects have not involved other members of the household, particularly mothers-in-law and husbands, it failed to address the power relations within the household, which in some cases may be a limiting factor for greater outcomes and impacts of the project. In future, husbands and mothers-in-law should be involved in the training or project activities.
- Introduction of technologies like use of floor mats, tippy tap and the cafeteria system contributed to reducing their work load.
- Engaging women in the agricultural activities and giving them control over productive assets enabled them to earn some money, which in many cases was considered their own money. The project supported FFSs in initiating some community-based food processing activities with the intention that they contribute to improvement of diets and become an income-generating activity for women.
- The design of the both projects targeted women as mediators of change for involving more with agricultural activities along with improving production and nutritional outcomes within their households. A better understanding of gender dynamics and the particular needs of women would probably have improved project design and the nature of the interventions chosen.

Recommendations

- Gender education should be added in the nutrition-integrated agricultural project. Gender education will reach beyond the women to her husband, household members and the community, enabling more individuals to become aware about women's role in influencing the husband in food purchase, food choices and her contribution through wise food preparation. Additionally, it also includes information on rights and involving women in income-generating activities and decision-making, all of which ensure better nutrition for the household.
- A first step towards women's empowerment, which is known to be critical for better nutrition outcomes, is to offer services that are tailored to women's interests and their sphere of influence, that work within time and mobility constraints, and are compatible with their access and control over resources. Training that takes into account their literacy skills or, better yet, improves their literacy in the process, builds confidence and improves their agency. The ability to earn (more) income tends to greatly improve a woman's standing in the household and community. Gender-transformative approaches, which typically engage all household members, especially the husband and senior family members, are most likely to lead to more equitable outcomes for all.
- Both projects aimed to target women for the nutrition education along with agriculture training. In future projects, the nutrition education intervention should aim to include the father, as men

are involved in buying food for the household, and caregivers of children (like the grandmother) in the training. This practice will help to mainstream gender along with nutrition activities in the project.

- Future projects should also target the adolescent group in the community for several reasons: good nutrition early in life ensures better health and school-going adolescents can transfer their knowledge and behaviour related to nutrition to their family members as well as with others in the community, sparking better health for future generations.

The Government's role in capacity building

Capacity development

The GoB is committed to a multisectoral approach to improving national nutritional outcomes, as established through its Sixth Five Year Plan (2011 to 2015). This plan underlines the importance of food and nutrition security as developed in the National Food Policy (NFP, 2006), its Plan of Action (PoA, 2008 to 2015) and Country Investment Plan (CIP, 2010 to 2015) (GoB, 2008; GoB, 2011; MoFDM, 2006). Objective three of NFP includes “Adequate nutrition for all individuals, especially women and children”, while the key goal of CIP is to enhance nutrition and health of the Bangladeshi population through all its programmes (GoB, 2008). The PoA and National Nutrition Services (NNS) underline the implementation of an integrated and multi-sectoral set of broad and targeted interventions which require a strong coordination across sectors at central, district and community levels (FAO, internal document, 2015b).

As part of this multisectoral strategy, the GoB would need to strongly emphasize food-based approaches as practiced in IAHBI and the poultry project, namely to support the increase and diversification in food production, food fortification, and dietary (consumption) diversity. AES has a key role to play in supporting food-based approaches.

Perception of the government officials regarding mainstreaming nutrition into AES

As part of this study 10 government officials including seven extension officials were interviewed to find out what about their perception on nutrition and the integration of it into their work. Some key findings and recommendations are given below:

- Most of the officials were found to be very positive about nutrition and agree that they could mainstream nutrition into their activities. The most common response held that the government would do this effectively if the government wrote nutrition activities into their TOR as regular and mandatory activities.
- Nutrition is indirectly implied the regular activities of agriculture, livestock and fisheries extension services, but most extension officers are not specifically aware of nutrition nor truly concerned about it.
- In the interviews, some government officials stated that nutrition is not a work for the agriculture department. They think that nutrition implementation in field level should go under health ministry.
- In the interview, most of the extension officials mentioned that they need some specific support to integrate nutrition into their activities:
 - Firstly, they need clear instructions and recommendation from the government.
 - Secondly, they need capacity building on which messages they need to focus.

- Finally, they need financial support to carry on nutrition education at the field level. For example, they need money for organizing training activities and to cover transportation costs carry on their work in remote rural areas.

Recommendations

- It is necessary for agricultural extension staff to understand that they are directly taking part in improving nutritional status through their work. “Motivation” activities through nutrition education and awareness are necessary government initiatives in AES.
- Advocacy and skill development through training, operational funding supports to incorporate training in the field level, and agricultural input distributions were the key components through which both projects integrated nutrition into AES. These elements must be scaled up to mainstream nutrition into the agriculture extension system in Bangladesh.
- Food-based nutrition knowledge should be a mandatory component of extension staff training.
- The training should emphasize the importance and requirement of diversified food for different stages of life, especially that of infants, young children, and pregnant and lactating women.
- More specific plans need to be made on how nutrition could be integrated into extension staff’s regular activities rather than done as stand-alone activities.
- Knowledge about nutrition is not enough. The depth and breadth of knowledge on nutrition needs to be improved, but the beliefs and attitudes of many about nutrition need to change (e.g., the perception that women and girls do not have the same right to wholesome nutrition as men and boys), as well as the practices of both the extension field staff and their managers. Only if there is evidence of improved knowledge, attitudes, and practice among the population at large together with stable availability, access to, and utilization of nutritious foods will significant improvements in nutritional status in Bangladesh be seen.

Challenges of AES

- The project linked the beneficiary with DLS. However, weak outreach and financial capacity of DLS may impede the follow-up actions.
- Frequent transfer among agricultural extension staff may adversely affect the monitoring of activities due to limited/lack of training and experience of every new staff member.
- The 60 FFSs that were registered with the Department of Cooperatives and given cooking tools and training will be able to continue their activities if they receive technical support and coordination from the Extension Officers. This requires commitment at the central level as this kind of work is not a part of the regular duties of the Extension Officers.
- Lack of staff, high or unclear work load, lack of funding, transportation and communication support for remote places are the major obstacles noted by most of the government officials interviewed for integration of nutrition into their activities.
- There needs to be better coordination among horticulture, fisheries and livestock departments. Some officers stated that at times coordination among them is weak, which constraints the integration of nutrition.
- There are inadequate female field staffs in AES. To reach at the household level, women workers could make vital contribution to influence household women where male workers have less opportunity to reach. There should be sufficient women extension workers for integrating and improving nutrition through AES.

- Agriculture extension staff normally reaches to the rural people by working with groups, they have less opportunity to reach at the household. They can't do it because of their work load and their structure does not permit them to reach household. But, to improve nutritional status it is required to change the structure of AES to give them access to communicate with the people at household level. The health departments have this opportunity to communicate directly with the people at household level. Agriculture department should introduce this in their system.
- Food-based approach is not integrated with the nutritional services centres in Bangladesh. Food based approach and nutrition-sensitive activities should be introduced with nutrition service centres to mainstream nutrition-sensitive activities.

Women farmers' status, perceptions, and behaviour change after the project completion

The women farmers interviewed during the focus group discussions (FGDs) reported that through the training program their knowledge on different aspects of practical/daily life increased, which is a benefit in and of itself, but their confidence also soared. They acknowledged that the participatory cooking demonstrations were very important to strengthen what they learned from the sessions and felt that more of such practical elements are needed. In a survey majority of (about 80%) women farmers noted that they preferred and wanted to learn more on hygiene and sanitation, basic food and nutrition, maternal and child nutrition and cooking techniques (FAO, internal document, 2015e). The following describes some of the behaviour changes that came about as a result of nutrition integrated agriculture training:

Hygiene practices at home

Lessons on hygiene and sanitation practices were incorporated and well accepted by the beneficiaries. Hand washing and tippy tap demonstrations were important elements of the projects.

“We did not know about the six steps of hand washing, when we should wash our hands and the use of tippy-tap. Previously we rarely washed our hands before cooking and before child feeding; however, after learning from training we now wash our hands before cooking and child feeding. We also learned how often we should wash our hands.” (Women Farmers, FGD, Daccob, Khulna)

“Children learn from us the steps of hand-washing and making the tippy tap. Most of the tippy taps are made by our children and they like to make it and keep it always full with water. It is always difficult to teach our husband d what we learnt from the training such as hand washing with soap. They don't like to follow it as they think it is time consuming and wash hands with water is enough. We are trying to changing them; sometimes they follow and sometimes not. But we happy that our children are following and now-a-days they are suffering less from diseases than before which we think as a result of proper hand washing.” (Women Farmers, FGD, Daccob, Khulna)



© Manika Saha, 2016, Mother washing her child's hands following six steps of hand washing and using tippy tap and soap, Daccob, Khulna

Nevertheless, there were some reasons for which some women could not get opportunity to follow the learning.

“Sometimes that also true that we don’t wash our hands because of non-availability of water in front of our work place and when we are extremely busy but we now try our best to wash hands before cooking, child feeding, after using the toilet, or poultry rearing activities.” (Women Farmers, FGD, Daccob, Khulna)

Women' expectations from the government and the implementing organizations

Sadly, it seems that only few of FFS can still be found meeting after the end of the project. There seem to be no specific follow up activities by the government. But farmers now know where to go if they need help on horticulture, fish cultivation, poultry and ruminant rearing activities in their household. In the FGD, they were asked what they actually want in future. Most of the women answered that,

“We don’t want any inputs, money from the government and from the other organizations. We only want training like we got. These trainings really changed our life not only by increasing our knowledge in different areas of agriculture and nutrition but also gave us an identity in our family as well as in our society. Neighbours ask us now, what should they do and what should not specially for the pregnant women and children. We advise them and really feel very happy when we see we are helping our surrounding people by giving advice how to keep healthy. Moreover, society respects us now differently what we did not get before the project. We would be really happy if government or other organizations arrange training for us sometimes which will help us to learn more and serve to the other people in our community as well as in our family”. (Women Farmer Leaders, FGD)

Income generating activities after the training

There are more scopes to have an impact by fostering income generating activities by women farmers. Some WFFSGs were found to be very interested to way forward with the knowledge they received from the training. Some of the women farmers earning money by backyard and small scale poultry farming were supported by the poultry project by giving them inputs along with technical support as training. This study found that they need support which will guide and inspire them to move forward to do something new and make some contributions by earning money which will help them to become self-dependent women in the society.

“We learnt many recipes from the cooking demonstration such as different fruit pickles, fish pickles, fish ball, drumstick egg omelette, vegetable roll, pudding etc. and got many cooking materials from the project. Sometimes we arrange as small picnic in our group members and prepare some recipes what we learnt from the techniques and sometimes some group member come with new recipe or modified recipe that we learnt but we always keep in mind about the three food groups. In our FFS, we are thinking that there will be village fair some days later where we will make our own food stall to sell too many different food items that we learned from the training. We hope that this will make good profit as our small business.” (Women Farmers, FGD)

“I received 10 pullets from the poultry project, from those I have now 39 chickens. I sell eggs and chickens to my neighbours, my school going boy always eat egg before going to school, now I have always some money in my hands. I also got training on vaccination. I give vaccine to my chickens as well as in my community. I am earning as well as I am doing something good for my village.” (Women Farmer Leader, FGD)

IYCF practices in daily life

Women were found to note about the learning from IYCF session. After 6 months of exclusive breast feeding, how complementary food should be given in an appropriate way to the young children in a responsive manner were taught to the women farmer. This was ascertained in FGD, when women stated that how they changed their behaviour after the IYCF sessions:

“We were not serious about complementary feeding after six months of the children. Most of the time, we introduced family foods after 8-10 months. Now we know why proper complementary feeding is important after six months for the baby’s proper growth and development. Now we know how to prepare nutritious food for the children. We also know the frequency and consistency of foods need to give the children as complementary food. During food preparation for the children we always remember and try to give combination of three food groups.” (Dumuria, Khulna, Women Farmers, FGD)

“After training we try to make nutritious snacks for our children; we don’t want them to eat outside food. When we offer different recipe to our children, they like that. Earlier they don’t like to eat household snacks. But now we prepare what we learnt in the training such as drumstick egg omelette, pusti gura, vegetable roll, fish ball, egg suji which recipes are most popular among the children.” (Dumuria, Khulna, Women Farmers, FGD)

Behaviour change activities from cooking demonstration session

Cooking demonstration was one of the most popular sessions among the women farmers training. Women enjoyed it and recognized:

“There is now big difference in our cooking procedures than before training. The most useful learning on nutrition from the training is about the basic three food groups. We now know that which is energy giving, body building and disease protective foods and now we think during cooking that how can we make our today’s menu balanced with these three food groups. Previously, we never think about it. For this reason, most of the time we ate only energy giving food but now, this habit is replaced with diversified foods which are available in our hands from our agriculture production.” (Daccob, Khulna, Women Farmers, FGD)

“We also did not aware about that we should wash the vegetables before cutting, we should add salt at the end of the cooking, and we should be added sour food with leafy vegetables to get the maximum iron from the food. (Dumuria, Khulna, Women Farmers, FGD)

Policy issues

Nutritional improvement, in most of the cases, requires both nutrition-sensitive and nutrition specific interventions. Besides, strong coordination among the implementers of the interventions is important. The IAHBI and poultry projects have multisectoral collaboration at the central as well as at the grass-root levels. The AES, DoF, and DLS involved in nutrition-sensitive activities while NNS provided nutrition specific services to the beneficiaries in the project areas. The existing departmental services in the field were not well coordinated and collaborated before the implementation of the projects. However, the progress of implementation of the projects with their different components including cooking demonstrations, registrations with cooperative department, have influenced and made linkages among the multisectoral implementers to work together in a coordinated way, which is unique lesson learned from the project.

Recommendations

- The project was implemented by and through the Government structures at all levels, and by local NGOs thereby ensuring ownership and sustainability. The interventions and whole approach taken by the project was drawn from country policy frameworks notably the National Food Policy and its Plan of Action (NFP/POA) (2008 to 2015), Country Investment Plan (CIP) for Agriculture, Food Security and Nutrition (2011 to 2016), the Nutrition Policy 2015 and the National Plan of Action for Nutrition (NPAN) which provide a consistent and comprehensive reference for addressing food and nutrition security across different sectors. The inter-sectoral collaboration

(agriculture, food, health and education) fostered by the project at district and upazila levels can effectively serve to replicate it on a broader scale.

- The incoming new national food and nutrition security policy should emphasise on the importance of coordination of nutrition-sensitive and nutrition specific interventions considering the lessons learned from these two projects.
- Nutrition should be focussed in the nutrition-sensitive agriculture intervention, responsibilities of nutrition work should be included as the task of the extension workers and recognition of their contribution needs to be ensured.
- Agricultural inputs should be procured and supplied from the local vendors immediately after training and linkages developed among service providers, beneficiaries and suppliers.

Recommendations for the way forward

Scaling up and sustainability

- The IAHBI and poultry project are milestone achievements for the GoB by pioneering the mainstreaming of nutrition into agriculture, livestock and aquaculture extension services in Bangladesh. These projects only reached limited areas in Bangladesh and a comprehensive effort is necessary to scale up these types of nutrition-sensitive projects elsewhere in Bangladesh with the lessons learned from IAHBI and poultry project.
- The updated Country Investment Plan (CIP) of the government would need to allocate adequate funds for nutrition-sensitive agriculture to address dietary diversity, improve food systems and related nutrition issues so as to impact nutrition outcomes on a sustainable basis. The government should allocate at least 3% of its budget for nutrition interventions at the national level with effective monitoring and evaluation. The costing is being done by the Country Investment Plan at Food Policy Monitoring Unit of the Ministry of Food and the National Plan of Action for Nutrition of the MoHFW.
- The government already employs a large number of extension field workers (i.e., SAAOs). Thus, in principle the human infrastructure exists through which farmers (through groups or at household level) could be reached with food-based approaches to improve nutrition. While DLS and DoF have much less manpower than DAE, they too could integrate nutrition activities into their regular responsibilities.
- AES (crops and horticulture) have SAAOs at the field level who generally advise and discuss issues with farmers related to crop cultivation, growing nutritious crops and using updated technologies. If these SAAOs could be empowered and trained to provide nutrition education, they could disseminate nutrition messages along with agricultural extension services and monitor the uptake and utilization among the farmers by AES.
- Members of the Union Parishad are well accepted by the village people. Each Union Parishad consists of 11 elected members of which three women members are elected from three Wards. These three elected women members should receive more nutrition training to disseminate nutrition messages in the community. In each Union Parishad, the government regularly arranges different types of training, such as disaster management, handicrafts, and sewing, among others. Nutrition training could be integrated with those trainings or some key nutrition messages could be discussed regularly with the village people. The Union Parishad members could disseminate nutrition messages in the rural areas.

- According to FAO, internal report, 2015b, “The training component gave good results in terms of adoption of new technologies in agriculture (60-100%). It is important to notice that the IAHBI project promoted only environmentally friendly technologies, which improved the sustainability of the food production and promoted its adaptability to the changing conditions and challenges faced by agriculture production in the project areas” (FAO, internal report, 2015b). The project also encouraged using natural fertilizers based on compost and natural pest control methods including integrated pest management techniques. The benefits were taught both in terms of the environmental impacts as well as the effects on the human health.
- The project contributed greatly to knowledge improvement among its beneficiaries and the local Extension Officers through its capacity building component and the Integrated Training Programme. The Extension Officers improved their knowledge in the field of homestead food production, food-based nutrition, and they were sensitized about their role in improving the nutritional status of the population. The local population gained knowledge in food preservation methods.
- Both projects were involved in managing and distributing different agricultural inputs (seeds, fish fingerlings, livestock, etc.) among the beneficiaries. These activities faced logistic- and vendor-related challenges, which ultimately influenced the continuation of both projects. Future projects should emphasize technical support for effective integration and outcome.

Cooperation and coordination

- It is important to establish and sustain cross-sectional coordination between agriculture, livestock and aquaculture.
- There is need for better cooperation and collaboration between NGOs and government extension services (agriculture, livestock and aquaculture).

Capacity building / development in nutrition education

- It is necessary to strengthen the extension system, particularly by providing pre-service training in nutrition and facilitation skills for staff of extension services. Basic training on nutrition should be mandatory for all government levels (national, divisional, district, Upazila, Union, and village level) officials and workers. Top to bottom, every responsible person should have knowledge of nutrition.
- The government should review the agricultural extension training manual to include chapters on basic nutrition, food nutrients, health and sanitation. IAHBI’s nutrition manual could be a model nutrition manual and key messages to follow in nutrition sensitive interventions to establish food based approach in AES. Sessions are given in the annex I.
- The IAHBI project developed very detailed manuals for agriculture, livestock, fisheries and nutrition. These manuals could be used in large scale in other government’s extension services project and training.
- Ministry of Primary and Mass Education needs to incorporate nutrition education into the primary school curriculum and each class should have one chapter on nutrition.

Communication materials development

- Normally, communication materials are developed for the vulnerable and specifically targeted population. However, it is important to make nutrition communication materials available for the extension field staff to use with the farmers at large. Some communication materials such videos,

posters, and written drama need to be developed, especially to motivate the Extension Officers, helping them understand how to mainstream nutrition into their activities.

Opportunities

- There are 60 skilled WFFSs in IAHBI project and 30 WFGs who already went through the intensive nutrition-integrated training in agriculture, fisheries, and livestock. The GoB should take the necessary steps to use these groups effectively and arrange occasional trainings facilitated by agricultural extension staff.
- The government could use the leaders of the FFSs and WFGs as “master trainers or facilitators” for future local-level activities monitored by AES; they should be given some incentives for this.

Conclusion

The GoB strongly emphasizes food-based approaches, which include diversified food production, home gardening, dietary diversity, food fortification, and nutrition education as sustainable strategies for improving the micronutrient status of populations. The multi-sectoral approach of the project to improving nutrition was a policy outcome of the Sixth Five Year Plan (2011 to 2015), which underlines the importance of food and nutrition security as exposed in National Food Policy (NFP, 2006), its Plan of Action (PoA, 2008 to 2015) and Country Investment Plan (CIP, 2010 to 2015). Objective Three of NFP includes “adequate nutrition for all individuals, especially women and children”, while the key goal of CIP is to enhance nutrition and health of the Bangladeshi population through all its programmes.

The PoA and NNS underline the implementation of an integrated and multi-sectoral set of broad and targeted interventions, which require a strong coordination across sectors at central, district and community levels.

This study reviewed IAHBI and poultry project activities in order to document the initiatives that were undertaken, lessons learned from the projects, gaps, and recommendation for future initiatives to clarify how these projects mainstreamed nutrition through their agricultural interventions, as well as how to best deliver nutrition-sensitive agriculture. The acquired knowledge of mainstreaming nutrition into AES from these two projects can inform the current call for multi-sectoral approaches to improving food and nutrition security in regional and national initiatives, as well as within the global context.

List of references and documents reviewed

BIRTAN www.bd-directory.com/BIRTAN.html

FAO. 1996. Rome Declaration on World Food Security and World Food Summit Plan of Action. World Food Summit. Rome: Food and Agriculture Organization of the United Nations

FAO. 2011. Guidelines for Measuring Household and Individual Dietary Diversity. Rome: Food and Agriculture Organization of the United Nations

FAO. 2013. Policy on Gender Equality: Attaining Food Security Goals in Agriculture and Rural Development, FAO, Rome, 2013

FAOBD (internal document). 2012. Document on Integrated Agriculture and Health-based Interventions for Improved Food and Nutrition Security in Selected Districts of Southern Bangladesh. Dhaka: Food and Agriculture Organization, Bangladesh

FAOBD (internal document). 2014. Report on Training Implementation plan on Integrated Agriculture Intervention (Horticulture, Aquaculture, Small scale livestock and Nutrition) using FFS tool and Roll out modality, FAO (Internal project document), 2014

FAOBD (internal document). 2015a. Report on Establishing community based processing facilities for improving diets and nutrition, FAO (Internal Project Document), 2015

FAOBD (internal document). 2015b. Project Terminal Report

FAOBD (internal document). 2015c. IAHBI Report on Outcome Study of Summer Vegetables Cultivation in the project area.

FAOBD (internal document). 2015d. Action plan for exit strategy under IAHBI

FAOBD (internal document). 2015e. Report on Assessment of Nutrition Training Impact on Women Farmer Groups under Poultry Project.

FAOBD. 2016a, forthcoming. Endline Survey Report of IAHBI project (Draft)

FAOBD. 2016b, forthcoming. Endline Survey Report on “Improving Food Security of Women and Children by Enhancing Backyard and Small Scale Poultry Production in Southern Delta Region” Poultry project (Draft), 2016

FSN Forum. 2015. Integrating nutrition into the curricula of agriculture education institutions: Strengthening human capacity to promote nutrition-sensitive agriculture. Discussion No. 122. From 10 to 27 November, 2015. Global Forum on Food Security and Nutrition.

GFRAS. 2013. The “New Extensionist”: Roles, Strategies, and Capacities to Strengthen Extension and Advisory Services. Position Paper. Zurich: Global Forum for Rural Advisory Services.

GoB. 2008. National Food Policy Plan of Action (2008-1015), Food Planning and Monitoring Unit (FPMU), Bangladesh, 2008

GoB 2011. Report on Labour Force Survey 2010. Dhaka, Bangladesh: Ministry of Planning’s Bureau of Statistics.

GoB. 2011. SIXTH FIVE YEAR PLAN, FY2011-FY2015, Accelerating Growth and Reducing Poverty, Part-2 Sectoral Strategies, Programmes and Policies Ministry of Planning Government of the People’s Republic of Bangladesh 2011.

www.plancomm.gov.bd/wp-content/uploads/2013/09/SFYP_Part-2.pdf

GoB. 2016a. Bangladesh Country Investment Plan, A Road Map towards investment in agriculture, food security and nutrition, May, 2016

GoB. 2016b. Project Completion Report of Integrated Agricultural Interventions for Improved Food and Nutrition Security in Selected District of Southern Bangladesh, May, 2016 : Ministry of Fisheries and Livestock.

www.gafspfund.org/sites/gafspfund.org/files/Documents/BangladeshCIP_ARoadMap.pdf

IAHBI. 2014a. Recipes for Improving Nutrition of Women in Reproductive Age, IAHBI, FAO, Bangladesh, 2014

IAHBI. 2014b. Recipe Booklet for Complementary Feeding of Children Aged 6-23 Months, IAHBI, FAO, Bangladesh, 2014

IFAD. 2014. Improving Nutrition through Agriculture. www.ifad.org/pub/thematic/list

Jessica Fanzo, Quinn Marshall, Darja Doberman, Joyce Wong, Rafael I. Merchan, Mona I. Jaber, Alejandro Souza, Neelam Verjee, and Kristin Davis. 2015. Integration of Nutrition into Extension and Advisory Services: A Synthesis of Experiences, Lessons, and Recommendations. Food and Nutrition Bulletin 2015, Vol. 36(2) 120-137

MoFDM. 2006. National Food Policy 2006, Ministry of Food and Disaster Management, Bangladesh, August, 2006

World Bank. 2011. World Development Report 2011

Annex I: Session plan and contents of each nutrition manual

Session 2: Basics on Food and Nutrition

- Balanced diet
- Basic food groups
- Food combinations
- Understanding malnutrition

Session 3: Micronutrients and Health and Food Hygiene

- Foods rich in key micronutrients (vitamin A, Iron, Folic acid, Iodine, Zinc)
- Groups at- risk of micronutrient deficiencies
- Making a tippy-tap
- Health and hygiene
- Personal hygiene: Six steps of hand-washing and critical time for hand-washing
- Protective display of food and safe storage

Session 4: Infant and Young Children Feeding Practices and Maternal Nutrition and Care

- Early initiation of breast feeding and advantages of breastfeeding
- Position, attachment and signs of proper breastfeeding
- Nutritional needs and diet during adolescence
- Maternal nutrition and care during pregnancy
- Maternal nutrition and care during lactation

Session 5: Complementary Feeding

- Key recommendations for complementary feeding
- Types of complementary foods
- Increasing the energy and nutrient density of complementary foods
- Cooking demonstration of complementary foods

Session 6: Home Food Safety and Food Preparation Techniques

- Preventing nutrient losses during and after cooking
- Cooking demonstration on food combinations and improving dietary diversification
- Cooking demonstration on use of livestock products (a part of the livestock component of the training)

Annex 2: Communication materials

Name of the material	Audience	Channel of communication
ToT training manual on Food Based Nutrition		
1. Importance of integrated homestead farming systems	Extension officers, NGO partners, USAID partners	ToT and refresher training
2. Seasonal calendars		
3. Basics on food and nutrition		
a. Food, Nutrients and Nutrition		
b. Balanced Diet		
c. Food combinations and nutritious recipes		
d. Nutritive value of commonly consumed other vegetables, leafy vegetables and fruits of Bangladesh		
4. Understanding malnutrition		
5. Infant and Young Child Feeding		
6. Adolescent nutrition		
7. Maternal nutrition		
8. Home food safety and food preparation techniques		
9. Processing and preservation		
10. Health and hygiene		
11. Food adulteration		
Cooking demonstration guideline (detailing formation and groups and activity)		
Cooking demo guideline-coconut egg mixed vegetable curry		
Cooking demo guideline-coconut egg mixed vegetable curry		
Cooking demo guideline-Egg suzi		Workshop and meeting
Cooking demo guideline-Vegetables khichuri	Extension officers, Gob staff at central level, NGO partners,	
Cooking demo guideline-Pusti gura		
Cooking demo guideline-fish ball		
Cooking demo guideline-pickles		
Advocacy sheets		
1. Role of horticulture in nutrition	Extension officers, Gob staff at central level, NGO partners,	
2. Role of small livestock and backyard poultry in nutrition		

Name of the material	Audience	Channel of communication
ToT training manual on Food Based Nutrition		
3. Role of aquaculture in nutrition	USAID partners, other UN/non UN agencies in Bangladesh, donors	
Festoos		
1. Integrated homestead farming systems	Extension officers, NGO partners, USAID partners, women farmer leaders, women farmers at household level	ToT, WFG and FFS Upazila health complex, Community clinic
2. Three food groups		
3. IYCF		
4. Cooking techniques		
5. Blood building foods		
6. Processing carrot to prepare carrot powder		
7. Hygiene and Sanitation		
Key messages leaflets		
1. Integrated homestead farming systems	Extension workers, NGO partners, USAID partners, women farmer leaders, women farmers at household level	ToT, WFG and FFS
2. Basics of food and nutrition		
3. IYCF		
4. Maternal nutrition		
5. Malnutrition		
6. Hygiene		
7. Home food safety and cooking techniques		
8. Processing and preservation		
Food plates	Extension workers and farmers field schools	District, Upazila and union level Officials of DAE, DLS, DOF and health and family planning department, 1800 FFS members of 049 project
Billboard on food based nutrition	Community	Upazila Parishad/ Upazila Health complex, two school Premises of each Upazila (one primary and one High School), Union Parishad complex/ or in a very common place at union level
Training video footage on cooking demonstration	Trainees and women farmers	ToT
Food Plates	FFS	

Annex 3: Name of the recipe and the component of the integrated approach promoted

Name of the recipe	This recipe promotes the following components of the Integrated approach
Mixed Vegetable Soup	Horticulture, Livestock and Poultry
Coconut Egg Vegetable Curry	Horticulture and Poultry
Sweet Pumpkin Coconut Halwa	Horticulture
Mixed Vegetable Pitha	Horticulture
Sobuj Bhath	Horticulture and Poultry
Drumstick leaves bhorta	Horticulture
Drumstick leaves omelette	Horticulture and Poultry
Drumstick leaves pakura	Horticulture
Drumstick leaves kofta curry	Horticulture and Poultry
Drumstick leaves fish curry	Horticulture and Aquaculture
Dried fish bean curry	Horticulture and Aquaculture
Fish borboti bhorta	Horticulture and Aquaculture
Dried fish chutney	Horticulture and Aquaculture
Fish ball	Horticulture and Aquaculture
Vegetable role	Horticulture
Pudding	Livestock

Annex 4: Lists of inputs provided by IAHBI, by category

Horticulture: Each of the beneficiaries received either winter or summer vegetable seeds as well as fruit saplings, tools and fertilizers

Winter vegetables	Summer vegetables	Fruit saplings
Amaranth	Stem amaranth	Mango
Spinach	Bitter gourd	Zuzubee
Radish	Sweet gourd	Sapota
Carrot	Ladies finger/okra	Coconut Tree Seedling
Sweet gourd	Indian spinach	Lemon/Lime (Citrus Fruit)
Nol khol	Kangkong	Wood apple
Tomato	Long yard bean	
Tools	Fertilizer	
Watering can	Urea fertilizer	
Spade	DAP fertilizer (Phosphate)	
Weeding hook	MOP fertilizer (Potassium)	
Sickle	Mustard oil cake	

Livestock: Each of the beneficiaries received one type of animals, feed and shed materials

Animals	Feed	Shed materials
Sheep (x2)	Concentrated feed	Bamboo
Goat (x2)		
Duck (x8)		
Chicken (x8)		

Aquaculture: Each of the beneficiaries received one type of fish depending on season, feed and fertilizer

Post Larvae (March)	Fingerling (July)	Fry (May)
Bagda	Carp	Monosex tilapia
Feed	Feed	Feed
Nursery type	Grower type	Nursery type
Starter-3 type		Starter-3 type
Fertilizer	Fertilizer	Fertilizer
TSP, Lime, Urea	TSP, Lime, Urea	TSP, Lime, Urea

Annex 5: Lists of training and BCC materials developed in IAHHI

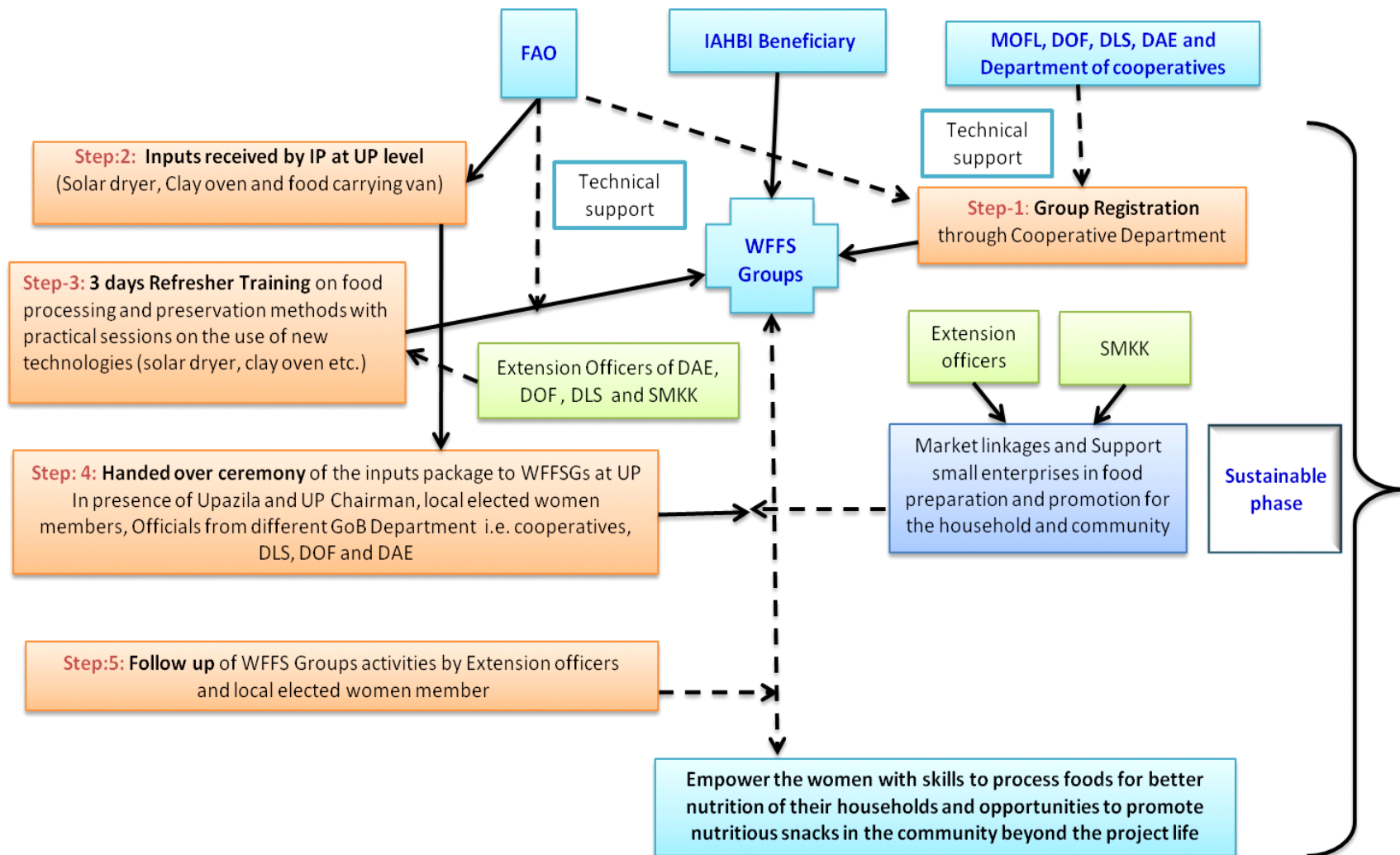
No.	Material	Main focus	Purpose	Language	No. of Pages
1.	A Manual on Food Based Nutrition	Nutrition: This document consists of 11 sessions: Home gardening, seasonality of foods, basic food and nutrition, malnutrition, IYCF, adolescent nutrition, maternal nutrition, food safety and preparation techniques, processing and preservation, health and hygiene, food adulteration.	Training of Trainers	English and Bangla	100
2.	Key Messages	Nutrition: This document consists of 6 modules: Basics of Food, Nutrition and Malnutrition; Breast Feeding, Complementary feeding and Maternal Nutrition; Cooking techniques; Processing and Preservation; Health and Hygiene. It contains only key messages selected from the Manual on Food Based Nutrition.	Farmer Field Schools	English and Bangla	19
3.	Cooking Demonstration Guideline	Cooking demonstrations: this is a step-by-step guideline on how to perform a cooking demonstration of 7 recipes promoted under the project for a group of 30 women.	Farmer Field Schools, Women Farmer Groups	English and Bangla	5 pages each
4.	Recipe Booklet for Improved Nutrition Among Women in Reproductive Age	Recipes: 15 recipes for highly nutritious foods.	Promotion through all the levels of training	English and Bangla	29
5.	Improved Recipes for Complementary Feeding of Children Aged 6-23 Months	Recipes: 11 recipes for highly nutritious foods.	Promotion through all the levels of training	English and Bangla	29
6.	Aquaculture Training Module	Aquaculture: This training module consists of 6 sessions covering: fish in nutrition, mono-sex tilapia culture, carp polyculture, baghda culture, prawn culture and mud crab culture.	Training of Trainers	Bangla	100

No.	Material	Main focus	Purpose	Language	No. of Pages
7.	Aquaculture Flipchart	Aquaculture: This document contains the key messages from the Aquaculture Training Module to disseminate at the field level. It is prepared in a way that the trainer can easily present it to the participants during the training session.	Farmer Field Schools, Women Farmer Groups	Bangla	34
8.	Horticulture Training Module	Horticulture: this training module consists of 12 sessions: horticulture and nutrition, homestead gardening, garden planning, methods of cultivation, cropping patterns, methods of vegetable cultivation, pest and diseases, seed production and preservation, organic and inorganic farming, fruit tree management.	Training of Trainers	Bangla	67
9.	Horticulture Flipchart	Horticulture: This document contains the key messages from the Horticulture Training Module to disseminate at the field level. It is prepared in a way that the trainer can easily present it to the participants during the training session.	Farmer Field Schools, Women Farmer Groups	Bangla	20
10.	Livestock Training Module	Livestock rearing: This module consists of 6 session: general session, goat rearing, sheep rearing, chicken rearing, duck rearing and biosecurity	Training of Trainers	Bangla	53
11.	Livestock Rearing Flipchart	Livestock rearing: This document contains key messages from the Livestock Training Module. Messages for small ruminants are delivered jointly in the goat and sheep session, and for poultry in the poultry session. It is prepared in a way that the trainer can easily present it to the participants during the training session.	Farmer Field Schools, Women Farmer Groups	Bangla	40
12.	Integrated Homestead Farm	Festoon	Farmer Field Schools, Women Farmer Groups	Bangla	1

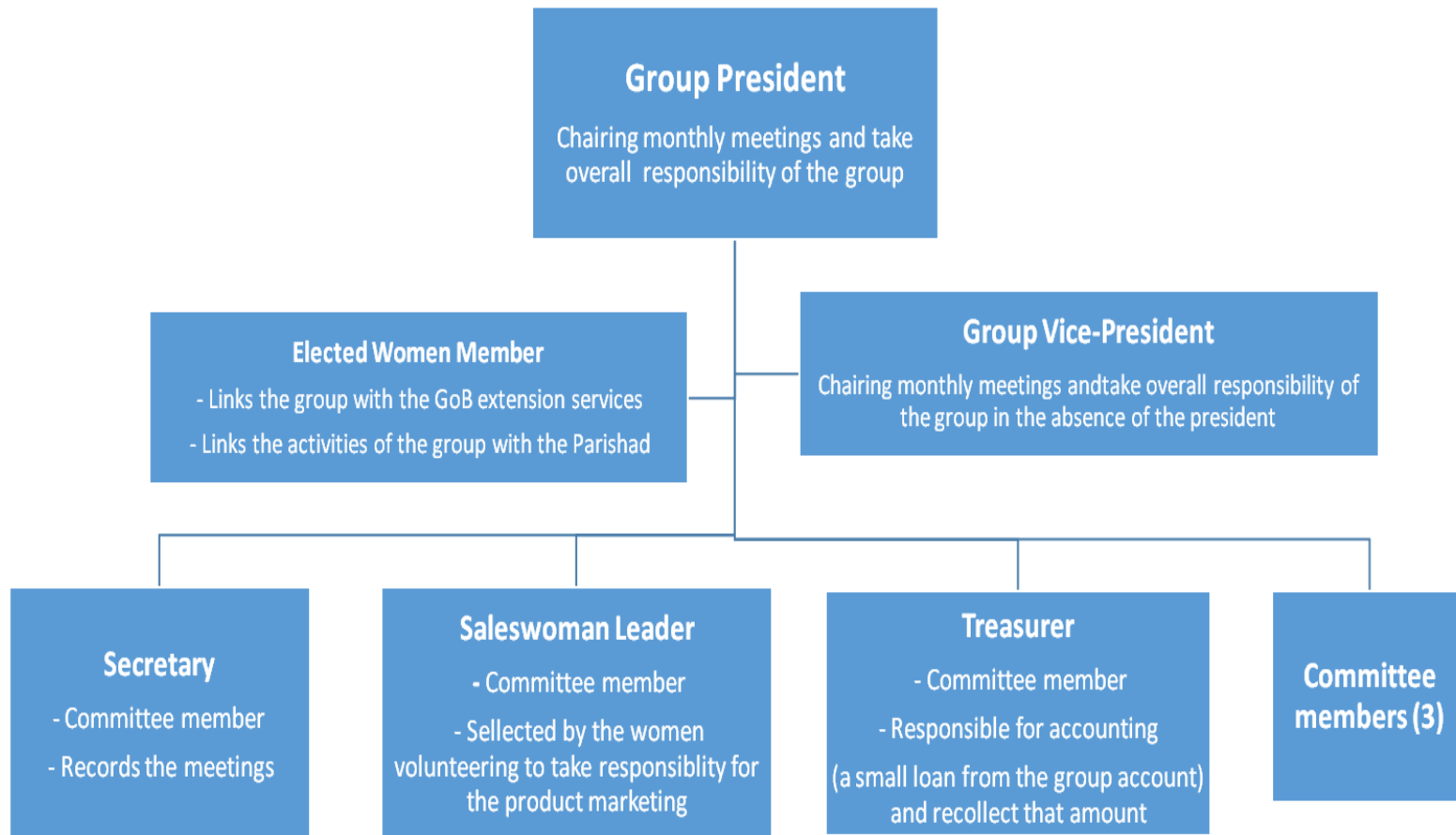
No.	Material	Main focus	Purpose	Language	No. of Pages
13.	Nutritious Foods	Festoon	Farmer Field Schools, Women Farmer Groups	Bangla	1
14.	Hand Washing and Hygiene	Festoon	Farmer Field Schools, Women Farmer Groups	Bangla	1
15.	Breastfeeding	Festoon	Farmer Field Schools, Women Farmer Groups	Bangla	1
16.	Right Cooking Practices	Festoon	Farmer Field Schools, Women Farmer Groups	Bangla	1
17.	Three Main Food Groups	Festoon	Farmer Field Schools, Women Farmer Groups	Bangla	1
18.	Pushti Ghura and carrot powder preparation method	Festoon	Farmer Field Schools, Women Farmer Groups	Bangla	1
19.	Billboard promoting dietary diversity	Billboard promoting dietary diversity in family nutrition through three food groups: energy giving foods, body building foods and body protecting foods.	Display in prominent places of communities	Bangla	1
20.	Leaflet promoting dietary diversity in complementary feeding	Leaflet – the leaflet promotes dietary diversity in complementary feeding. It contains key messages on complementary feeding and hygiene of complementary food preparation and feeding and three recipes: Liver kichuri, egg suji and pusti ghura.	Distribute through community health centres and clinics	English and Bangla	2
21.	Role of Horticulture in Nutrition	Fact sheet	General message dissemination	English	1
22.	Role of Small Livestock in Nutrition	Fact sheet	General message dissemination	English	1
23.	Role of Aquaculture in Nutrition	Fact sheet	General message dissemination	English	1

Annex 6: IAHI's exit strategy flow chart

IAHBI exit strategy implementation flow chart



Annex 7: Institutional structure of a WFFSG



Annex 8: List of the sixteen food groups

No.	Food Group
1.	Cereals
2.	White tubers and roots
3.	Vitamin A rich vegetables and tubers
4.	Dark green leafy vegetables
5.	Other vegetables
6.	Vitamin A rich fruits
7.	Other fruits
8.	Flesh meats
9.	Organ meat
10.	Fish and other sea food
11.	Egg
12.	Legumes
13.	Milk and milk products
14.	Oils and fats
15.	Sweets
16.	Spices, condiments and beverages

Source: FAO (2011) Guidelines for Measuring Household and Individual Dietary Diversity, page 8.