EVENT REPORT

WEST AFRICA PILOT TRAINING OF TRAINERS
Flour fortification planning, implementation, and monitoring

19-23 September 2016
Abuja, Nigeria

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Background and Rationale

Micronutrients are vitamins and minerals, such as folic acid, iron, and zinc, which are needed in small amounts for the human body to function optimally. Most micronutrients are not produced by the body and so must be consumed via food or as supplements. In Sub-Saharan Africa, micronutrient malnutrition is prevalent due to a variety of factors, such as poverty, droughts, and disease. Micronutrient deficiencies are not often apparent until the deficit of a particular vitamin or mineral is significant. For this reason, micronutrient malnutrition is sometimes called "hidden hunger".

The social and economic costs of micronutrient malnutrition can be extensive, including devastating birth outcomes for pregnant women and babies, impaired neurological development in young children, and reduced work capacity among adults. To decrease the risk of future cases of micronutrient malnutrition and to address existing deficiencies among populations, many countries have introduced flour fortification as part of a multi-faceted nutrition approach. Flour fortification is the addition of critical micronutrients to flour during the milling process. This initiative increases the nutrient density of flour and flour-based products for consumers.

Around the world, 85 countries have legislation requiring at least one type of wheat flour to be fortified. Virtually all West African countries mandate wheat flour fortification, making the region a leader in this public health initiative.

This pilot training of trainers (TOT) was designed as the initial step towards building a new generation of flour fortification specialists who will possess the knowledge and commitment to independently advise and train flour fortification stakeholders, both locally and beyond.

This event was considered a *pilot* for the following reasons:

1. A new training manual served as the foundation for instruction.
2. Unlike most fortification training activities, the event incorporated a variety of teaching techniques to facilitate knowledge retention and a better understanding of key concepts.
3. The participants were nominated, not necessarily because they already knew a substantial amount about flour fortification, but because they had expressed a clear interest in the topic and because they possess skills that can be leveraged by a fortification specialist (i.e.: teaching experience).

Twenty-one participants representing six countries attended in the TOT. Four participants were sponsored by the Global Alliance for Improved Nutrition (GAIN), one was sponsored by the

Standards Organization of Nigeria (SON), and the rest were funded under this project. A list of participants can be found in **Appendix 1**.

Goal and Intentions

The overarching goal of this event was to increase the capacity of flour fortification stakeholders in Africa to plan for, implement, and monitor well developed, feasible, and efficient flour fortification programs.

The pilot TOT helped to accomplish that goal by providing initial preparation to future trainers who aim to become fortification specialists.

To build this core group of trainers, we:

1. Offered an online course as pre-work for trainees; this ensured that all participants arrived to the TOT event with a basic understanding of fortification and monitoring.
2. Engaged participants using multiple teaching methods to make the TOT material accessible and retainable by people with various learning style preferences and backgrounds.
3. Trained participants on the following topics: fortification and monitoring basics, multi-sector alliances, legislation and standards, premix, monitoring plans, equipping a mill for fortification, internal monitoring, and external monitoring.
4. Encouraged communication and teamwork among participants through knowledge sharing, group work, and practical experiences; a strong rapport among group members was expected to facilitate future collaboration as well.
5. Provided each participant with a training manual and supporting documents to guide his or her training efforts.

Event Sessions

A summary of each session starts on the next page. A concise overview of the sessions and speakers is located in **Appendix 2**.

19 September

Opening Session:
Sarah Zimmerman, Afidra Ronald, Marjon Tuinsma, and Nancy Lowenthal

The TOT event began with an opening session that covered a summary of the agenda and administrative matters followed by introductions of each facilitator and participant. The participants' names and job descriptions were written on a large piece of paper, which stayed at the front of the room throughout the week to help with name recollection and to facilitate networking.

The official welcome was then given by Afidra Ronald of the Food Fortification Initiative (FFI), Marjon Tuinsma of Helen Keller International (HKI), and Nancy Lowenthal of the United States Agency for International Development (USAID). According to the World Health Organization (WHO), approximately 74 percent of children under five years old and 49 percent of women of childbearing age in the Economic Community of West African States (ECOWAS) region suffer from anemia. In the same area, more than 40 percent of children are at risk of vitamin A deficiency.[1] Flour fortification is a highly practical medium to long-term strategy for addressing vitamin and mineral deficiencies. Eleven years ago only two countries in Africa had legislation for flour fortification. Today that number is 25 (14 in West Africa). Given the strong uptake of flour fortification in the region, this public health initiative is Africa's to own. As such, the trainees were encouraged to share their knowledge with peers and potential flour fortification stakeholders upon returning home as a way to foster sustainable programs.

To promote interaction among participants, an icebreaker was conducted following the morning break. Three groups were created; the participants within each group had to come up with seven things that they all had in common, not including the obvious similarities such as body parts and clothing.

Why Fortify:
Sarah Zimmerman and Comrade Lawal-Aiyedun Olubunmi

Sarah started the session by reminding participants that most countries are familiar with the concept of food fortification due to existing salt iodization and milk fortification programs. Thus, the principles of fortification are not new even if flour fortification has yet to be implemented in a country. The key is to leverage those previous experiences when planning for, implementing, and monitoring flour fortification.

[1] Statistics presented as part of Nancy Lowenthal's speech.

In addition to convincing the trainees about the role of flour fortification in combating iron-deficiency and iron-deficiency anemia, Sarah, Communications Coordinator for FFI, also provided the trainees with strategies for effective communication. Sarah explained that anemia statistics are overwhelming and inconceivable to most people. As such, they need to be presented in a manner that is both comprehensible and memorable. For example, instead of just saying that 243,187,000[2] non-pregnant women of child-bearing age have anemia, tell stakeholders that the number of non-pregnant women of child-bearing age who have anemia stacked head to toe would reach the moon and circle it. That creates an image in the stakeholders' minds, which will help them to truly grasp the magnitude of the problem. Sarah also encouraged the trainees to ask their friends and family members if they have had anemia. If so, what were their symptoms and experiences? Using their examples is another way to help convince stakeholders to fortify. Lastly, Sarah stressed the importance of knowing one's audience. She advised the trainees to do research prior to meeting with potential stakeholders and donors in order to relate flour fortification to the entity's main concerns. For example, USAID is keen to prevent maternal mortality. Anemia increases the likelihood that a woman will die during childbirth. Fortification of flour with iron is one way to address anemia. Therefore, if meeting with USAID, the talking points should be related to the role of flour fortification in reducing of iron-deficiency and anemia. If meeting with the Ministry of Finance, on the other hand, the cost effectiveness of flour fortification is a viable talking point.

To close her presentation, Sarah shared examples of flour fortification's positive impact on anemia. She also mentioned that flour fortification is a recommended intervention for two of the WHO Global Nutrition Targets for 2025 (anemia and low birth weight).

The second part of the "Why Fortify" session was enthusiastically presented by Bunmi, a pediatric nurse and founder of the Spina Bifida and Hydrocephalus Care Foundation of Nigeria. Bunmi is clearly passionate about advocating for flour fortification as one option for decreasing a mother's risk of having a child with spina bifida. Her pictures were sometimes overwhelming; however, they provided evidence of the devastating realities facing children with spina bifida in Nigeria. For this reason, the participants found her presentation very impactful. Some points that Bunmi raised are as follows:

1. Very few women of childbearing age know what foods are fortified or when to eat them. We need to do a better job of educating the public.
2. Cheap foods commonly consumed by young women of childbearing age, such as rice and most brands of pasta, are not fortified.
3. As soon as a child with spina bifida is born, s/he will need ongoing and expensive medical care.

[2] The World Health Report 2002 – Reducing Risks, Promoting Healthy Life. World Health Organization.

4. In Nigeria it is difficult to find doctors who are knowledgeable about properly treating children with spina bifida.
5. Children with spina bifida are often abandoned because the parents are unable to take care of them or because the parents fear that they will be ostracized for having a child with a birth defect. In some cases the mothers will keep the child, but the husband will leave her.
6. Children with spina bifida are sometimes beaten as well. In parts of the country it is believed that those affected are cursed; beating rids the child of the evil inside.
7. In Nigeria, many women do not have antenatal care until four to six months after conception. Folic acid pills are given at that time, but it is too late to prevent spina bifida.
8. It is not right to assume the people in power have knowledge of spina bifida prevention. For example, many doctors do not even explain the purpose for folic acid when prescribing it. We need to remind them.
9. Policy makers and flour millers do not have adequate awareness about the positive impact of fortification on pregnancy outcomes and therefore might not prioritize this initiative.

Bunmi finished by saying let's move from where we are to where we want to be – and where we want to be is fortifying flour well.

Flour Fortification in the Region: Philomena Orji

Philomena, representing HKI, provided a status update on flour fortification in the region. She emphasized that we know flour fortification is feasible because it is being implemented across the continent. In fact, 70 percent of people in West Africa have access to fortified flour. However, even though fortified flour is available, the reality is that compliance with flour fortification standards has not been achieved by many flour milling companies. Philomena also explained that border agents who inspect imported fortified flour products need additional and better-quality trainings. To-date it seems that the training focus has been on the inspectors who conduct audits and inspections at flour mills instead.

To increase the penetration of vitamins and minerals among populations, many countries in the region have implemented fortification of multiple staple foods. Philomena stressed that this is a viable nutrition strategy but one that requires careful consideration about the levels of micronutrients to include in each product.

Lastly, Philomena shared that harmonized standards for the ECOWAS and UEMOA (West African Economic and Monetary Union) zones exist. However, these have not been implemented across the member countries.

Flour Fortification Monitoring (Distance-learning Course) Discussion: Becky Handforth

As pre-work for this TOT event, all participants were expected to complete *Flour Fortification Monitoring*, a distance-learning course created by FFI, GAIN, and the International Grains Program Institute of Kansas State University. *Flour Fortification Monitoring* was developed and beta tested in 2015. The course was then revised based on the feedback received. The TOT participants were the first individuals to gain access to the updated version of the course.

Becky, a consultant for McKing Consulting Corporation and former employee of FFI, led a discussion with the trainees to gain feedback on *Flour Fortification Monitoring*. Overall, the participants were pleased with their experience. They noted that the online platform was easy to navigate and that the information provided through the distance-learning course was relevant and useful. Some individuals had difficulty streaming the videos, which we expected to be a problem given poor Internet connection in some parts of Africa. However, those who encountered this issue were able to download the videos and watch them later. When asked if they noticed anything incorrect while taking the course, a few people commented on answers to the quiz questions. For instance, one question would not accept the British version of the word "metres" as part of the correct response. The participants were ambivalent about adding assignments and/or discussion board requirements to future sessions of the course. However, one individual noted that if such tasks were included, a timeline of deadlines would be helpful.

Our next steps will be to make a few simple changes to the course in addition to brainstorming ways to disseminate the course more broadly.

Introduction to Training Manual: Becky Handforth

The content of the TOT largely followed a training manual that was prepared as part of this project. This session introduced participants to that manual and covered the following:

1. Aim of the manual
2. Adaptability of the manual
3. Broad topics covered in the manual
4. Manual table of contents
5. Manual chapter format
6. Similarities between the manual and the training event
7. Why the event was designated a "pilot"

8. Teaching methods, in brief

Preparing for a Training Event: Becky Handforth

Becky explained that the training manual can be used in its entirety for an in-depth training on flour fortification, or it can be used piece-by-piece, for instance, to advise multi-sector alliance members about developing a monitoring plan. The purpose of this TOT session was to inform the participants about planning for an in-depth training. It included three primary parts:

1. Recommended planning timeline:
   Participants were advised to start planning for such an event 1-2 months in advance especially if it will be hosted at an unfamiliar location and if a flour mill visit will be included. Actions that should be carried out one to two months, two weeks, one week, and on the first day of the event were shared.
2. Training adults:
   Participants were first asked to brainstorm factors that influence their ability to learn. Items included: stress, interest in the topic, and previous education experience, to name a few. Six adult learning principles were then explained as a way to emphasize that adults and children learn differently. The two groups vary in terms of motivating factors, experiences, and abilities, for instance.
3. Teaching methods:
   Among a group of trainees, it is inevitable that the individuals' learning style preferences will vary; there will be auditory, visual, and kinesthetic learners included. As such, facilitators should utilize an assortment of teaching methods throughout a training to accommodate everyone involved. The teaching styles elucidated included: lecture, demonstration, practical activities, questioning, discussion, group work, case study, and role-play.

Fortification and Monitoring Basics: Becky Handforth and Afidra Ronald

To start out this session, participants were asked to define or describe the terms fortification and monitoring (*in relation to fortification)* and to provide reasons for instituting both.

Next, the participants engaged in a game to introduce the concept of an "elevator speech." Afterwards, some participants commented about situations in their own lives that benefited from being able to give an effective elevator speech. The activity for this session was to have the trainees prepare an elevator speech in groups. Each group was tasked with one of the following – 1) Create an elevator speech to convince someone to fortify flour 2) Create an elevator speech to convince

someone about the importance of monitoring a flour fortification program or 3) Explain either flour fortification or monitoring to someone who has little to no knowledge on the topics. Afterwards, a spokesperson from each group presented the elevator speech.

This activity was very well received; positive comments were made about it on the TOT evaluation at the end of the week (see **Appendix 3)**

20 September

Recap of Monday:
Sarah Zimmerman

Each morning - Tuesday through Friday - began with a recap of the previous day's sessions and follow-up information on the topics discussed. Both the facilitators and the participants contributed.

On this particular morning, Sarah presented the four key parts to every good story – 1) an enemy, 2) a hero, 3) an antagonist, and 4) a love story. Thinking about flour fortification, the enemy is not the government or millers but rather anemia and neural tube defects (such as spina bifida). The heroes are iron and folic acid respectively. The antagonist depends on the country. In some places it is a minister or a flour miller or even the general public. The love story is when everyone works together to properly fortify flour to increase nutrient intakes and decrease the risk of anemia and spina bifida. This analogy was very popular among participants and was referred to a few times throughout the remainder of the event.

Multi-sector alliance:
Sarah Zimmerman

To start this session, Sarah asked participants to draw three interlinking circles and label them as public, private, and civic [sector]. After defining those terms, the participants wrote specific examples of each sector from their respective countries. Sarah emphasized that it is better to include extra people in the multi-sector alliance as the alternative is overlooking someone important. If the multi-sector alliance becomes too large, task-oriented committees must be formed to ensure everyone's active participation. For instance, there can be a committee for communication, a committee for finance and so on.

Next, participants were split into three groups - one assigned to fortification *planning*, one to *implementation*, and the last to *monitoring*. The groups were asked to prepare a list of tasks that multi-sector alliance members should do in relation to each.

For instance:

1. *Planning* – Support the development of the fortification standard
2. I*mplementation* – Support ongoing training for industry representatives and regulatory authorities
3. *Monitoring* – Interpret monitoring data findings

The session ended with two role-plays. In both cases, a representative of a civic organization (Sarah) was trying to convince the Deputy Minister of Health (a trainee) to participate in the country's multi-sector alliance. The first role-play was an example of what not to do when trying to convince someone to support flour fortification (especially a high-level stakeholder); the second was an example of what should be done when trying to convince someone to support flour fortification.

Afterwards, a discussion ensued about whether or not a multi-sector alliance should continue after the flour fortification program is running smoothly. In Ghana the multi-sector alliance is not active; in Nigeria it remains active. Here are some of the comments that were made:

1. Where a country has statutory bodies, such as the food and drug administration, that are mandated to do certain activities related to flour fortification on a periodic basis, an ongoing multi-sector alliance might not be important.
2. Maintaining an active multi-sector alliance is important for ensuring that the standard is periodically reviewed and any issues indicated through the findings of flour fortification monitoring data analyses are addressed. Otherwise, there is no emphasis on program improvement.
3. Without an active multi-sector alliance, communication between sectors on the topic of flour fortification is rarely strong. This can keep the program from reaching its full potential.

Legislation, Technical Regulations, and Standards: Sarah Zimmerman

To start this session, Sarah presented the differences between mandatory, voluntary, and targeted fortification programs.

Secondly, the trainees participated in an exercise to review the terms fortification legislation, technical regulations, and standards. Index cards were passed out to participants, each containing a characteristic of fortification legislation, technical regulations, or standards. For example: *I am a lengthy document that is usually difficult to amend*. Participants were tasked with choosing the correct corresponding term, which in this case was *fortification legislation*.

Other points covered in the session as presented by Sarah or raised by the participants included:

1. Interpretation of the WHO Recommendations (including a worksheet)
2. The four iron compounds recommended for flour fortification – NaFeEDTA, ferrous sulfate, ferrous fumarate, and electrolytic iron
3. High versus low extraction flour
4. Standards, using a minimum versus a range of variation
5. Premix overage (~10%) to ensure that the fortification standard is met when analyzed quantitatively
    a. Participant comment: Is a minimum really sufficient? Millers want to adhere to the fortification standard but they don't have a clear idea about nutrient degradation 1) as premix sits in storage and 2) during flour storage and transportation. As such, millers might add too much premix to account for these unknowns.
6. Consequences for noncompliance
    a. Consequences should not foster negative relations between millers and regulatory agents. These two entities have a common goal – for fortification to be done properly; thus, they should work together. However, if a flour miller is purposefully underfortifying the flour or is not fortifying at all, then consequences are warranted. Each country's consequences vary. They should promote good practices rather than crush businesses. If a country's penalties are working, then maintain them. If they aren't taken seriously or aren't used, then look to other countries for best practices.

Formulator: Phillip Makhumula

The formulator was created as part of USAID's former A2Z project and has been used by countries to help devise or refine the specifications of fortification standards. It is based on multiple formula-based excel spreadsheets and is particularly useful for determining the amount of micronutrients to use if a country fortifies multiple staple foods. After inputting required data points, the formulator provides a summary page of recommendations for each staple food of interest that includes:

1. The expected additional daily intake of each micronutrient due to fortification
2. Production parameters – minimum, target average, and maximum level of each micronutrient in flour at the factory
3. Regulatory parameters - minimum, target average, and maximum level of each micronutrient at the market
4. Premix formulation
5. Estimated premix cost

Premix
Becky Handforth and Cheikh Ahmadou Lo

This session provided a general overview of premix followed by a presentation about the GAIN Premix Facility.

Becky explained that premix is comprised of vitamins and minerals, excipients, and anti-caking agents. Specifications of a fortification standard guide premix companies as to the fortificant compounds and levels that must be used. Periodically, the standard should be reviewed and revised as necessary by the multi-sector alliance and the national standards agency to ensure that the fortification program achieves a public health impact. Sometimes the premix formulation and premix addition rate are included in the fortification standard; however, these are not necessary. A few countries also provide a list of premix suppliers to be used by the flour millers. The process of procuring premix, premix inventory management, and the cost of premix were also presented. Additionally, participants were advised not to mix flour improvers and premix in the same feeder.

Cheikh, who represents the GAIN Premix Facility in West Africa, started his presentation by sharing lessons learned per his experiences in various countries. Topics encompassed:

1. The feeders installed at mills in a specific country were not able to achieve the premix addition rates required by the country's fortification standard
2. Premix homogeneity negatively affected by the chosen premix excipient
3. Organoleptic issues in bread due to the size of the iron particles in the premix

These issues point out the need for stakeholders (such as the government authorities and development partners) to involve flour industry representatives substantially during the fortification planning stage.

The history and processes of the GAIN Premix Facility were then shared. Importantly, all premix companies available through the GAIN Premix Facility are independently certified for quality. In some cases, flour millers can use a system of revolving credit to purchase premix from the GAIN Premix Facility.

21 September 2016

Equipping a Flour Mill:
Afidra Ronald

At the beginning of this session, Afidra noted that a micro-ingredient feeder is the primary piece of equipment necessary to fortify flour. Most flour millers will be familiar with feeders because they

are also used to add flour treatment agents to the flour stream. Similarly, every flour mill that fortifies must have the capacity to adequately integrate the premix into the flour, either with a mixing conveyor or a batch mixer. Industrial mills will already have one of these installed prior to the fortification program. Furthermore, Afidra emphasized that it is highly recommended for flour mills to invest in both an electronic interlock system and a premix low-level detector.

The second part of the session focused on the following:

1. Feeder options (screw, roller, or revolving disk)
2. Premix addition options (continuous addition or batch addition)
3. Mechanisms for measuring premix (by volume or weight)
4. Premix delivery (gravity-based delivery or pneumatic delivery of premix)

As it can be challenging to grasp how all of those terms fit together, some examples were provided. For instance, a mill might install a screw-type feeder, which sits on load cells directly above the flour stream. Premix is measured by weight (loss-in-weight) and is added in a continuous manner via gravity to the flour stream.

The third part of this session provided a step-by-step explanation of how to calibrate a feeder; this should be done when a feeder is first installed, after any mechanical failure, and generally on a periodic basis. The check weigh process, which is actually a component of the calibration process, was also described. The check weigh process is used to verify the premix feed rate and should be conducted multiple times per day.

Lastly, participants were asked about their expectations of feeder vendors. Additionally, Afidra provided guidelines for purchasing a feeder for flour fortification purposes (ex: The feeder should be outfitted with an agitator to prevent bridging and tunneling of premix).

Flour Fortification Monitoring Plan: Becky Handforth and Afidra Ronald

This session introduced key components of a flour fortification monitoring plan, including goals, objectives, activities, indicators, and strategies for disseminating monitoring results.

For practical application, participants were split into six groups. All groups were tasked with developing a simple flour fortification monitoring plan for the fictitious country of Fortifitopia[3]. After an hour, the groups paired up to share their plans with one another. At the request of the

[3] The fictitious country name of "Fortifitopia" was created by Anna Verster, Senior Advisor for the Food Fortification Initiative.

trainees, one group then shared its plan in front of everyone. The activity ended with some discussion questions. Participants found the activity very relevant, and they appreciated learning from one another.

To conclude the session, Afidra presented on the following aspects of Uganda's monitoring plan:

1. The monitoring plan's status
2. The entities that helped to develop the plan
3. Indicators that are collected
4. Challenges to implementation
5. Changes to the fortification program that resulted from monitoring efforts

Question & Answer Review Game
Becky Handforth and Sarah Zimmerman

The Question & Answer Review Game was developed as a fun way to challenge the participants' knowledge retention – both from the online course and from the first half of the training. It functioned similarly to the television show, "Jeopardy", which airs in the United States of America. For more details, please refer to the manual. It was very well received; participants were extremely enthusiastic.

Internal Monitoring (QA)
Afidra Ronald

At the start of this session, Afidra asked participants to describe or define internal monitoring. That was followed by a discussion about quality assurance versus quality control, which are the two primary components of internal monitoring. In the remainder of this session, the focus was on quality assurance activities. They included:

1. Using only premix that is provided by a certified supplier and accompanied by a Certificate of Analysis (COA)
2. Storing premix appropriately and using it by the expiration date
3. Checking premix feed rates
4. Packaging, labeling, and storing fortified flour appropriately
5. Verifying premix usage against production of flour that should have been fortified (premix reconciliation)

An enthusiastic discussion about the purpose of a COA was one highlight of the session. It resulted in a slight revision of the definition provided in the TOT manual. A second highlight was the premix reconciliation worksheet; participants found this exercise to be very practical.

Prior to closing this session with an activity, Afidra gave participants the following scenario – Imagine that a country's fortification program is scheduled to commence in two weeks. The primary mill in the country has premix on-hand and has a feeder installed. What steps need to be taken to prepare for a four-hour test run of the fortification process, and what actions need to happen during the test run? This exercise encouraged participants to think about how they would assist a flour mill if asked to provide technical support.

The final activity was based on case studies. Each case study presented a fortification-related problem that might occur at a flour mill. Three groups of trainees each received a single case study. They were then asked to answer the following questions:

1. What problem is presented in the case study?
2. What are some potential causes of the problem?
3. What steps would you take to identify the problem?
4. What do you think is the *actual* cause of the problem?
5. What steps would you take to resolve the problem?

The aim of this activity was to get the participants thinking outside the box. Troubleshooting is inevitable, especially at the start of a flour fortification program.

22 September 2016

Simulation – Feeder Calibration
Becky Handforth

As part of the previous day's recap, a feeder calibration simulation was conducted. Four funnels of various sizes represented a feeder at different settings – 25, 50, 75 and 100 percent. In place of premix, sugar was used.

The steps taken were as follows:

1. The smallest funnel was filled with sugar.
2. A timer was set for five seconds (instead of a minute, which would be the case if actually calibrating a feeder).
3. During those five seconds, sugar was collected in a bowl.
4. The sugar was then weighed.

5. Steps two through four were conducted a second time with the same funnel. An average of the two weights was calculated.
6. A point was plotted on a graph, which displayed "feeder" settings on the x-axis and grams of "premix" per five seconds on the y-axis.
7. Steps one through six were then repeated with the three other feeders.

A calibration curve was drawn between the four plotted points. The use of a calibration curve when setting a feeder for flour fortification was explained.

Internal Monitoring (QC):
Afidra Ronald

This first session of the day was a continuation of internal monitoring. This time Afidra focused on quality control activities. For the purpose of this TOT, they included:

1. Confirming that flour is fortified using a rapid qualitative test
2. Confirming with quantitative analyses that the amount of each micronutrient in the fortified flour complies with the specifications of the fortification standard

Participants raised the following points during this session:

1. Certain countries have inspectors conduct the iron spot test both with and without hydrogen peroxide to be sure that NaFeEDTA (as required in the fortification standard) is the only form of iron used.
2. Quantitative analyses should happen more frequently early in the program.
3. In Nigeria, it is not always necessary for flour millers to send out flour samples for quantitative analyses. Some have obtained iChecks while others even use High Performance Liquid Chromatography (HPLC).
4. Some flour millers complain that they do not have space to store all the composite samples required.

SON provided materials for an iron spot test demonstration followed by participant practice. The demonstration began with an explanation of the chemicals required, followed by proper dilution and mixing of the reagents. Next, the iron spot test was conducted on two flour samples – one fortified with NaFeEDTA and another that was unfortified.

After the demonstration, the participants broke out into two groups. Each group had three samples.

Sample A – fortified with NaFeEDTA

Sample B – either unfortified or fortified with electrolytic iron
Sample C – either unfortified or fortified with electrolytic iron

Knowing this information, the groups had to tell the SON representative how to conduct the iron spot test on all three samples.

The trainees seemed to really appreciate the activity. Many pictures were taken of the results and of the flour sacks representing each sample.

External Monitoring: Phillip Makhumula

Phillip, a flour fortification specialist and founder of Lifesciences Consulting, first introduced the term regulatory monitoring along with its three component parts: external monitoring (comprised of audits and inspections), import monitoring, and commercial (or market) monitoring. Phillip reminded participants that this TOT would not cover the latter two.

For the purpose of flour fortification, *audits* refer to the processes implemented by an external inspector to confirm that QA/QC procedures are both documented and followed by each mill in order to properly fortify flour. During an audit, the inspector will observe the fortification process and review QA/QC protocols and records at the flour mill.

Inspections refer to the process of verifying that the final flour product is fortified and actually complies with the specifications of the fortification standard. During an inspection, the inspector will collect samples for qualitative and quantitative analyses.

In most countries, food inspectors are already tasked with visiting flour mills periodically for food safety purposes. Phillip encouraged countries to merge the activities required for food safety and those required for auditing flour fortification into a single checklist, which promotes efficiency. An example flour fortification audit checklist was provided to participants.

Phillip also stressed the importance of being observant during an audit. For example, if an inspector walks into a premix storage area and notices 50 boxes of premix s/he should look at the expiration date. If the premix is set to expire in four months and two boxes are used each week, then there is a problem. The flour miller might continue to use the premix even after it is expired.

We had hoped to simulate a flour fortification inspection by having participants collect samples at a flour mill. However, given that a flour mill visit was not possible, Phillip described the process instead. Specifically, he advised participants about where to collect samples – from the end of the production line or in the packaging area, from the mill's warehouse, and from the inventory of

composite samples. He also talked about the importance of using composite samples for quantitative analyses as opposed to single samples in addition to the pros and cons of testing a sample for an indicator (marker) nutrient. In most cases the indicator nutrient is iron. The methods used to quantitatively assess iron content are simpler than for folic acid and vitamin A. Furthermore, the higher quantity of iron in flour makes it easier to analyze.

Two to four weeks following an audit and inspection visit, flour mills should receive a final written report that includes the completed audit (checklist), observations taken at the mill, results of the various analyses conducted, and notification of corrective actions required. An example report was shared with the participants.

To support this part of the session, Phillip had participants complete a handout that challenged them to determine whether flour samples had passed or failed the inspection per the countries' fortification standards and the quantitative analysis results.

Several discussion points followed, including:

1. Should the specifications of a standard use whole numbers or numbers with decimal points?
2. Should a quantitative result be rounded (up or down)?
3. What if a result is within the range of variation but not close to the target?
4. What if the result is significantly above the minimum provided in a country's standard?

A highlight of this session was the discussion about food labels. Phillip displayed various labels from fortified foods and asked participants to identify what was wrong or what aspects could be improved. Some examples are as follows:

1. Instead of including the name of each vitamin and mineral followed by the quantity per serving, only "nutrient" was written multiple times followed by the quantity per serving
2. Using the term "fortified" in the center of the label but "enriched" in the corner
3. Poor placement and size of the fortification logo

This exercise proved that even well respected companies aren't perfect. Thus, inspectors need to review flour packages while visiting each mill's packaging area or warehouse.

To close out the session, representatives of SON and the National Agency of Food and Drug Administration and Control of Nigeria (NAFDAC) conducted a demonstration of iCheck Iron and iCheck Chroma (for vitamin A) respectively. Half the participants watched each demonstration.

Reporting and Using Monitoring Data:
Sarah Zimmerman

The aim of this brief session was to get participants thinking about the entire process of monitoring. Sarah wanted the trainees to realize that fortification monitoring isn't just about collecting data and sending information to the designated receiving entity. For flour fortification to achieve the desired health impact, the process of monitoring needs to also include data analysis, interpretation of results, and dissemination of findings. From there, it is essential that the flour fortification stakeholders use the data to inform program improvements. Furthermore, this session got participants thinking about the manner in which monitoring findings should be shared and with whom. At the very least, an annual report of the flour fortification program should be prepared. While some fortification stakeholders will receive the entire report, perhaps the general public will see a few highlights on social media. For high-level stakeholders, a one-page brief might be sufficient given their busy schedules.

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The final day of the TOT was essentially a wrap-up of the week. Sarah revisited a statistic that was presented on Monday, which participants had questioned. She also noted a few changes in the manual and told participants about the files included on their TOT flash drives. Lastly, Sarah reminded the group that flour millers typically bear the costs of flour fortification while the healthcare system and the general population benefit. Therefore, it is important to treat industry leaders with respect and as equal partners.

Next, Phillip expanded upon some of the topics that were introduced during his previous sessions:

1. Comparison of quantitative analysis equipment options
2. Website for the Formulator tool (http://www.a2zproject.org/node/86)
3. Food fortification monitoring and evaluation flow chart
4. Use of a central collection center to collate monitoring data – Malawi example
5. Iron spot test - distribution of red spots can be indicative of a flour mill's mixing capabilities
6. Common issues with fortification standards
7. Regulation of flour at the factory level vs. market level in reference to fortification standards
8. Fortification monitoring reports – they should be easy for both fortification experts and lay people to interpret

Becky then revisited the expectations that participants shared on the first day of the TOT. Those that had not been covered during the event were discussed. For example, one expectation was to

understand how the materials provided at the TOT would be shared with other fortification stakeholders in West Africa. This naturally flowed into a discussion about the future implementation of the distance-learning course and additional trainings. Participants agreed that the distance-learning course should be made available to a broader audience and that TOT events should be held in other parts of Africa and worldwide. They inquired as to whether a training manual for import monitoring, commercial (market) monitoring, and impact evaluations would be developed as well.

Prior to the certificate ceremony, each trainee completed a short 10-question evaluation, which can be found in **Appendix 3.**

To bring an official close to the TOT, representatives of FFI, HKI and USAID each spoke briefly, congratulated the trainees, and handed out certificates.

Lessons learned:

1. Provide two to three weeks for participants to complete *Flour Fortification Monitoring* in advance of the TOT.
2. Be flexible; the timing of sessions will vary depending on the speakers and also the participants' personalities. This group liked to interact and engage in discussions.
3. It would be preferable to include a flour mill visit and conduct some practical activities on-site.
4. The "Formulator" was presented predominantly using Power Point accompanied by a lecture. For stakeholders highly interested in this tool, a one or two-day hands-on workshop would be beneficial.
5. iCheck Iron samples need to rest for a substantially longer time than iCheck Chroma samples. The time difference needs to be taken into consideration when planning iCheck demonstrations.
6. Prior to the event, ask participants how they would like their name printed on nametags and certificates.
7. Participants of future trainings provided by FFI, Smarter Futures, and other partners would benefit from the interactive methodology used at this TOT.

With Many Thanks

FFI would like to thank those agencies and organizations that supported this event, including USAID, HKI, GAIN, SON, and NAFDAC. The collaborative efforts of all entities were necessary to make this event successful. Additionally, our appreciation goes out to those who attended the

training. Their active participation made the training enjoyable for all, and their feedback will help to further refine the distance-learning course, the training manual, and future training events.

Appendix 1: List of Participants

Name	Position	Country
Gloria Osei	Senior Standards Officer, Ghana Standards Authority	Ghana
Richard Odum Nyumuah	Freelance Consultant	Ghana
Konah Okai-Reeves	Laboratory Analyst, Ministry of Commerce and Industry	Liberia
Sonnie Kesselly	University Instructor, Agriculture College at University of Liberia	Liberia
Phillip Makhumula	Founder, Lifesciences Consulting	Malawi
John Tehinse	Owner/Managing Consultant, Funta Services Nigeria Limited	Nigeria
Ufondu Amalachukwu Nwamaka	Regulatory Officer, NAFDAC	Nigeria
Ughanze N. Benedicta	Regulatory Officer, NAFDAC	Nigeria
Uduak Edem Igbeka	Business Coordinator for Scaling Up Nutrition (SUN)	Nigeria
Oyenike (Nike) Owoyele	Head of Dept./Ag. Director, Testing Lab. Services at SON	Nigeria
Olutayo (Tayo) Adeyemi	National Consultant, Nutrition Education and Capacity Strengthening at FAO	Nigeria
Benedicta Obaseki	Chief Regulatory Officer; Desk Officer Food Fortification, NAFDAC	Nigeria
Charles Okoro	ECOWAS Coordinator	Nigeria
Afolabi Fajemilo	Founder of Festus Fajemilo Foundation	Nigeria
Olugabenga Ben Ogunmoyela	Professor, Bells University of Technology Food Fortification Consultant	Nigeria
Amarachi Esther Elejere	Nutritionist	Nigeria
Talatu Ethan	Deputy Director, Laboratory Services at SON	Nigeria
Cheikh Ahmadou Lo	Africa Representative, GAIN Premix Facility	Senegal
Janette Saidu	Professor, Institute of Food Technology, Nutrition and Consumer Services at Njala University	Sierra Leone
Tamba S. Sonda	Professor, Institute of Food Technology, Nutrition and Consumer Services at Njala University	Sierra Leone
Ngenarr Njie	Testing and Inspection Officer, The Gambia Bureau of Standards	The Gambia
Hamadi Jagne	Shift Miller, The Gambia Milling Corporation	The Gambia
Afidra Ronald	Africa Network Coordinator, Food Fortification Initiative	Uganda
Becky Handforth	Consultant, McKing Consulting Corportation	USA
Sarah Zimmerman	Communications Coordinator, Food Fortification Initiative	USA

Appendix 2: TOT Sessions

19 September

Opening Welcome:
Afidra Ronald (FFI), Marjon Tuinsma (HKI), Nancy Lowenthal (USAID)

Agenda and Administrative Matters:
Sarah Zimmerman (FFI)

Introduction of Participants and Facilitators:
Facilitated by Afidra Ronald (FFI)

Event Expectations:
Facilitated by Afidra Ronald (FFI)

Icebreaker Game:
Facilitated by Sarah Zimmerman (FFI)

Why Fortify?
Sarah Zimmerman (FFI) and Comrade Lawal-Aiyedun Olubunmi (Spina Bifida and Hydrocephalus Care Foundation of Nigeria)

Regional Update of Food Fortification
Philomena Orji (HKI)

Flour Fortification Monitoring (Distance-learning Course) Discussion
Becky Handforth (McKing Consulting Corporation)

Introduction to Training Manual:
Becky Handforth (McKing Consulting Corporation)

Preparing for a Training Event:
Becky Handforth (McKing Consulting Corporation)

Fortification and Monitoring Basics
Becky Handforth (McKing Consulting Corporation) and Afidra Ronald (FFI)

20 September

Multi-Sector Alliance
Sarah Zimmerman (FFI)

Legislation and Standards
Sarah Zimmerman (FFI)

"Formulator"
Phillip Makhumula (Lifesciences Consulting)

Premix
Becky Handforth (McKing Consulting Corporation) and Cheikh Ahmadou Lo (GAIN Premix Facility)

21 September

Equipping a Flour Mill
Afidra Ronald (FFI)

Flour Fortification Monitoring Plan
Becky Handforth (McKing Consulting Corporation)

Question and Answer Review Game
Facilitated by Becky Handforth (McKing Consulting Corporation) and Sarah Zimmerman (FFI)

Internal Monitoring (Quality Assurance)
Afidra Ronald (FFI)

22 September

Internal Monitoring (Quality Control)
Afidra Ronald (FFI)

External Monitoring
Phillip Makhumula (Lifesciences Consulting)

Reporting and Using Monitoring Data
Sarah Zimmerman (FFI)

23 September

Final Comments *related to the training*
Sarah Zimmerman (FFI) and Phillip Makhumula (Lifesciences Consulting)

Review of TOT Expectations
Becky Handforth (McKing Consulting Corporation)

TOT Evaluations
Facilitated by Becky Handforth

Closing Certificate Ceremony
Afidra Ronald (FFI), Marjon Tuinsma (HKI) and Gertrude Odezugo (USAID)

Appendix 3: Evaluation Questions *(with select participant responses)*

1. **What was your level of knowledge about flour fortification prior to attending this event?** ***Answer 1-10 with 10 being a fortification specialist.*** _____

   Range from 2-8

   Some of the participants had significant fortification experience coming into the TOT.

2. **What do you feel your level of knowledge about flour fortification is today?** ***Answer 1-10 with 10 being a fortification specialist.*** _____

   Range from 6-9

3. **Do you think that taking the online course (*Flour Fortification Monitoring*) as pre-work for this event was helpful?**

   Taking the online course was supremely helpful. It would have been difficult for me to understand what was covered at the event without having read the background material provided by the course.

   Very helpful. It made me understand the training better, and I really appreciated it.

   The online course was very necessary because it enlightened my mind on things I did not know.

4. **Tell us at least one thing that you learned during this TOT?**

   Real life effect of micronutrient malnutrition, particularly in the African context.

   The need for strong collaborative national teamwork for fortification.

   More insights into activities involved in fortification, especially key elements in internal monitoring.

   Prepare an elevator speech as an opportunity to advocate for fortification can come at any time.

Fortification of flour helps in addressing NTDs and anemia and it should be taken seriously by all parties involved in the processes of the program.

5. **What did you appreciate most about this training of trainers?**

   I appreciated the presentation of the training – practical and educative – and the trainers were always willing to listen to the trainees and helping to address some of the countries' problems.

   The bringing of everyone together regionally. The hands-on activities that allowed the kind of comprehension not attained in the online course.

   Learning the new training techniques. Loved the aspect of the elevator speech.

   Simplicity of presentations; depth and coverage of the facts; opportunity to compare activities across countries.

6. **Do you feel that this event should be replicated in the future?**

   All positive responses.

7. **What would you change about this training of trainers event?**

   Maybe pay a visit to a mill factory.

   I think it would have been good if there was a session for the country teams to evaluate their country fortification programs in light of the course content and then make recommendations for what needs to be improved…by fortification stakeholders.

   Having more millers

   Rather than change, I will say what to add to keep improving and making it better – add areas on import and export [monitoring].

8. **Do you plan to use the information provided in this TOT to inform, advise or train others in your home country?**

   Yes, definitely. Too much focus on training inspectors and very little on internal monitoring for strengthening commitment to self-regulation by industry.

Yes, I can start with the iron spot test for my students this semester.

Yes, in my country when you attend a training away from home you present a written report to the human resource department and buttress it with a presentation and discussion [to other inspectors in my organization].

9. **If you answered yes to #8, who will be your audience?**
   If you answered no to #8, please explain what is keeping you from doing so?

   Variety of answers – typical flour fortification stakeholders in addition to the media, university students, and consumers.

10 **The length of time for this TOT was:**

   A. **Too long**
   B. **Just right**
   C. **Too short**

   Everyone indicated that the duration of the event was "just right" except for one person who thought that it should have been longer.

Please write any additional comments, critiques or suggestions below.

Generally, I think the TOT has been well planned and implemented. Kudos to the organizers.

FFI should continue to provide technical support to the trainees. Trainees should also maintain contacts for teamwork.

I think a better effort should have been made to get country experiences. The Nigerian experiences dominated the event, and I think this reduced the learning that could have been optimized... Overall though this was and is a great course. Big kudos to the facilitators! I wish I had taken this course prior to working on my current fortification activities but am really grateful for the opportunity and privilege to have taken it now. Thank you.

Let there be at least yearly meetings where we can come together again to review successes, challenges etc.

The training was informative, interactive, and educative. The training will enhance the review of standards.