INTRODUCTION

Micronutrient malnutrition has been identified as a public health problem for many countries in the UNICEF CEECIS region. Iron-deficiency anaemia, which impacts productivity, childhood physical and mental development and pregnancy outcomes, remains a significant health problem among pregnant women and children under 5 years of age. Folate deficiency, evidenced by national nutrition survey findings, is associated with debilitating birth defects, including neural tube defects like spina bifida. Estimates of neural tube defects are presumed to be high in the CEECIS region based on sub-national or hospital studies; however, established surveillance systems are lacking. Adequate intake of folate a month prior to and during pregnancy can decrease one’s risk for giving birth to a child with spina bifida by 30-70%.

The UNICEF country offices in the CEECIS region are actively assisting their respective countries to address problems of micronutrient malnutrition through a variety of proven interventions, among which are dietary diversification, supplementation and food fortification. With regard to food fortification, the Centers for Disease Control and Prevention singled out flour fortification as one of the top 10 public health achievements of the decade. It is an effective means by which to deliver essential vitamins and nutrients to the majority of a country’s population without requiring any behaviour change. To date, 68 countries around the world have mandatory flour fortification programs, which supply at a minimum iron and/or folic acid to their populations. The Flour Fortification Initiative supports national governments and flour millers as they develop and implement flour fortification programs by providing advocacy, technical assistance, and support with building monitoring systems.

OBJECTIVES

Workshop 1:
Addressing Micronutrient Deficiencies through Flour Fortification in the CEECIS Region
1. To discuss multiple options for addressing micronutrient malnutrition, making the case for flour fortification.
2. To provide evidence for the impact of flour fortification programs.
3. To explore the latest recommendations and research related to flour fortification.
4. To dispel concerns about the effect of fortified flour on individuals with thalassemia and other blood disorders.
5. To encourage consensus-building among participants and promote future engagement in national flour fortification efforts and research.

Workshop 2:
Addressing Challenges and Strengthening Local Capacity to Implement Flour Fortification Initiatives in the CEECIS Region

1. To share recent fortification activity updates and further develop existing national fortification plans as needed.
2. To provide participants with a thorough understanding of how to prepare a national standard and accompanying legislation for proper implementation and regulation of flour fortification efforts.
3. To conceptualize optimum QA/QC structure necessary to ensure consistent flour fortification processes.
4. To engage country representatives in dialogue about the creation and management of sustainable monitoring systems essential for successful flour fortification programs.
5. To discuss logistics related to premix sourcing, financial input, storage and use.
6. To address concerns related to trade relations and fiscal mechanisms to support flour fortification programs.

AGENDA
Please see Appendix 1 at the end of the document.

PARTICIPANTS
Please see Appendix 2 at the end of the document.

PRESENTATIONS
All presentations from Workshop 1 are posted on the Flour Fortification Initiative’s website: www.FFInetwork.org

SUMMARY OF PRESENTATIONS AND DISCUSSION

WORKSHOP 1
12 June 2012

Overview of Micronutrient Malnutrition and Effective Interventions: The Global Picture (Helena Pachón, FFI)

Micronutrient deficiencies are commonly referred to as hidden hunger because there are rarely visual signs pointing to such deficiencies until they reach the severe, clinical stage. In some cases, such as with severe Vitamin A deficiency, the symptoms can result in irreversible damage. The micronutrients that the international community is most concerned
about are folate, iodine, iron, vitamin A, vitamin B12 and zinc. Their physiological functions, consequence of deficiency and global prevalence of deficiency were described. Multiple and complementary public-health interventions that can be used to reduce micronutrient malnutrition were presented: supplementation, improved health care, nutrition education, dietary diversity, crop biofortification, and fortification.

One success story related to addressing micronutrient malnutrition is the enormous progress made in CEECIS region to eliminate iodine deficiencies through universal salt iodization. These notable efforts and their outcomes are documented in the Food and Nutrition Bulletin supplement of December 2011.1 In addition, the region is expanding its experience in food fortification through the initiation of flour fortification programs to address both iron and folic acid deficiencies. Flour is a well-chosen vehicle for fortification given high consumption rates of bread in CEECIS. Mandatory flour fortification, which is the preferred way to address micronutrient deficiencies on a population-wide scale, has been implemented by five countries in the region thus far.

**Fortification with zinc:** According to a 2010 article in the Food and Nutrition Bulletin, 22 countries fortify wheat flour with zinc; they include Azerbaijan, China, Jordan, Kazakhstan, Kyrgyzstan, Mongolia, Palestine, Tajikistan, and Uzbekistan.2 A study conducted in China with women of reproductive age showed that consumption of zinc through fortified food products significantly increased the women’s zinc levels.3

**Fortification with Vitamin B12:** Vitamin B12 is found mainly in animal products, such as beef, poultry, eggs and milk. Populations that consume a vegetable and grain-based diet may lack adequate B12 and therefore could benefit from fortified flour. Additionally, as people age, their ability to absorb B12 diminishes. Some countries using flour fortified with B12 include: Cameroon, Cote d’Ivoire, Ghana, Guinea-Bissau, Mali, Mauritania, Senegal, Tanzania, Togo, Jordan, Uruguay, and Uganda.4

**Overview of Flour Fortification (Robert Baldwin, FFI)**

**Enrichment vs. Fortification:**

Adding micronutrients to flour has been practiced for many years. During the milling process, the whole wheat berries are stripped of many micronutrients. Enrichment is the process of adding those micronutrients back during the milling process to reach levels that were originally present. Fortification goes one step further by adding additional micronutrients to flour in order to address a public health concern.

Though political will remains a notable challenge to implementing flour fortification programs, engaging all major stakeholders at the initial planning stages is one way to improve the likelihood of success.

**Mandatory vs. Universal Fortification: **Universal flour fortification implies that all flour in the country must be fortified. Instead, FFI and UNICEF advocate for mandatory flour fortification. This intervention targets the type/s of flour consumed by the majority of the

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2 http://www.foodandnutritionbulletin.org/downloads/FNB_v31n1_suppl_web.pdf
4 FFI Database 2012
population, focusing especially on the hard-to-reach and economically vulnerable layers of society. Legislation is essential to make flour fortification binding, and is the first step towards making a public health impact. While FFI and UNICEF actively advocate for mandatory flour fortification and provide technical assistance, the processes of drafting and passing legislation and standards, fortifying flour and monitoring the fortification program must be owned and directed by the stakeholders in each country.

Since 2004, the percent of fortified flour increased from 18% to 30% globally. The number of countries mandating national wheat flour fortification increased from 33 to 68. The combined population of these 68 countries is more than 2 billion worldwide, who now have access to additional vitamins and minerals in their diet because of fortified flour.

The cost of flour fortification ranges from US$1.50 to US$3 per metric ton of flour depending on the fortificants used. Quality control of fortified flour from small mills is more challenging than controlling the process of fortifying flour at industrial mills. For this reason, FFI and UNICEF focus their efforts on fortifying flour at those mills that have a capacity of at least 20 metric tons/day. Fortification programs in Pakistan and Nepal targeted mainly small mills, but it was very difficult to monitor and control the processes adequately. Additionally, these small mills only operated for a few months of the year.

Chile, the United States of America and South Africa have conducted cost-benefit analyses of flour fortification, showing that allotting $1 to flour fortification programs has saved each country International Dollars$12, US$48 and ZAR$30 respectively by preventing future cases of neural tube defects and the accompanying health-care costs of life-long treatment for affected children. Tremendous public health impact was evidenced after fortifying flour with folic acid in Oman. The cases of neural tube defects dropped from 3.0/1,000 births when the fortification program began in 1996 to 0.3/1,000 births ten years later.5

**Flour fortification in the EU Countries:** Different views about legislation in EU countries hinder the harmonized approach to mandatory flour fortification. For example, Scandinavian countries are very negative about flour fortification in general. They consider that all deficiencies should be treated by supplementation and not fortification. However, the European Commission is committed to developing legislation giving a choice of voluntary and mandatory fortification to each EU country. There are very few European countries that have mandatory flour fortification at this time. However, the UK and Ireland have liberal attitude towards voluntary fortification of numerous products.

Procurement of premix and related annual costs can be considerable for millers, many of whom already have minimal profit margins. In some countries, such as Canada, the costs associated with fortification are passed on to the consumer. Alternatively, the government can offset the costs associated with premix procurement by helping millers pay either for the premix itself or by reducing/eliminating import duties. Each country has to decide on the most acceptable method of covering premix and its associated costs (equipment, import duties and value-added tax) in order to make flour fortification viable.

Flour fortification programs that are implemented according to recommendations and controlled properly should have the intended public health impact. This was evident in both Oman and Kuwait where the prevalence of anaemia decreased gradually after fortification programming began. However, simply passing a law does not mean that flour will be

5 [http://applications.emro.who.int/emhj/V16/05/16_5_2010_0533_0538.pdf](http://applications.emro.who.int/emhj/V16/05/16_5_2010_0533_0538.pdf)
fortified. Sub-laws should be developed in order to initiate, regulate and control implementation.

**Regional Status of Flour Fortification in CEECIS (Vilma Tyler, UNICEF)**

The key factors that impact health and nutrition status of children include:
1. Access to and utilization of adequate amounts of high quality foods
2. Quality and effectiveness of health services
3. Quality and level of maternal and child care
4. Environmental conditions such as proper water, sanitation and hygiene

UNICEF is focused on supporting 3 strategic results in maternal, newborn and child health and nutrition:
1. Evidence-based analysis for policy and action
2. Development of enabling institutional frameworks
3. Large-scale acceleration of effective coverage interventions

Flour fortification can be a low-cost, effective public health intervention to address micronutrient malnutrition in the region. Bread is widely consumed in this region by individuals from all economic backgrounds. Therefore, fortification will improve their diet quality without requiring behavior change and help prevent new cases of micronutrient malnutrition.

CEECIS countries that have adopted mandatory flour fortification are: Kazakhstan, Kyrgyzstan, Moldova, Uzbekistan and Turkmenistan. Significant progress has been made by all other countries in attendance.

Regional challenges related to flour fortification include the following:
1. Political commitment
2. Organizing stakeholder efforts
3. Understanding stakeholder roles and responsibilities
4. Uncertainties about premix procurement, storage and use
5. Design and implementation of effective and sustainable monitoring and evaluation systems

Government stakeholders want to see evidence for the positive impact flour fortification programs have had on reducing anaemia, birth defects, chronic diseases etc. in other countries. This information can be provided through results from scientific studies and public health surveillance for example. Evidence of the impact flour fortification can have on reducing neural tube defects and improving iron status is available. Impact is only possible if fortification programs are properly implemented; monitoring plays a key role in ensuring this. UNICEF is currently in the process of identifying countries where consultants will document such evidence through case studies.

Supplementation is a viable intervention on an individual basis but typically fails to achieve the desired public health impact due in part to the required behavior change. Moldova shared its experience with an iron supplementation program targeted at pregnant women. Over four years, the program cost around US$ 1 million. The results were disappointing as the prevalence of anaemia in women and children (30%) remained unchanged.

WHO Recommendations on Wheat Flour Fortification (Quentin Johnson, FFI)

WHO recommendations on wheat and maize flour fortification were issued in 2009, based on deliberations held in 2008 and summarized in a Food and Nutrition Bulletin special issue. The negative interaction between zinc and iron vis-à-vis absorption is only observed with supplementation, not fortification. This is because the amount of iron and zinc provided in supplements is much higher than the amount provided in fortified food.

It is recommended that countries look at per capita fortifiable flour when creating the standards for a flour fortification program. In this context, fortifiable flour means flour that is commonly consumed by the target, vulnerable population in the country and that is produced in industrial mills with at least a 20 metric ton milling capacity daily.

Morocco considered peculiarities related to flour use and bread consumption in the country to inform its flour fortification program. For instance, in Morocco, many households mix artisanal flour with industrially-produced flour to make bread in the home. Additionally, only a small percentage of the population purchases bread from a market.

There are no data that indicate a link between vitamin B12 intake and cancer. The body has its own mechanism to limit absorption of vitamin B12 when the level goes beyond its needs.

Overview of Evidence for Impact of Flour Fortification with Iron (Althea Grant, CDC)

Iron deficiency (ID) is the leading cause of anaemia (affecting around 2 billion people worldwide). Most at risk are young children and pregnant women. The strategies to reduce ID are mainly to supplement with pharmacological doses and fortify industrially-milled flour with iron. Some other staple foods commonly fortified with iron are maize flour, rice, seasoning powder, salt and sugar. The form of iron with the greatest bioavailability is sodium iron EDTA. If the prevalence of iron-deficiency anaemia is more than 5%, a country should consider flour fortification.

Very often people expect a drastic reduction in iron deficiency in the country after fortification with iron. However, many variables play a role in the determining how quickly and how much the prevalence of iron deficiency in a country is reduced. These include: the baseline prevalence of iron deficiency, the type of fortificant used, the consumption of iron inhibitors and the reach of the flour fortification program. In the USA, iron deficiency remains high among certain populations despite the fact that flour has been fortified with iron since the 1940s. This is especially true for the Latino populations that consume mainly maize products instead of wheat products.

Evidence for the Safety of Fortifying Flour with Iron in the Presence of Thalassemia and Other Blood Disorders (Althea Grant, CDC)

Thalassemia is an inherited red blood cell disorder that causes the body to not make sufficient amounts of haemoglobin. There are two main types of thalassemia, alpha and beta. Alpha thalassemia is commonly found in individuals from Southeast Asia, the Middle East, and Africa while beta thalassemia is more characteristic of people with a Mediterranean (e.g. Greek, Italian, Cypriot), Middle Eastern, Asian or African backgrounds.

In the CEECIS region, published estimates suggest that thalassemia is most prevalent in Azerbaijan, Albania, Turkmenistan and Uzbekistan.

Thalassemia can cause iron overload if not treated properly, which can eventually lead to organ damage and premature death. However it is still highly recommended to fortify flour with iron in countries where iron deficiency is a significant public health problem despite the presence of thalassemia among the population for several reasons. Firstly, only the clinically significant forms of thalassemia (major and intermedia) are associated with iron overload and the overall prevalence of clinically significant forms of thalassemia is low in the region. Secondly, in transfused patients such as those with thalassemia major, the greatest contributor to iron overload is blood transfusions, not diet, because the amount of iron received through regular transfusions is dramatically greater than that consumed and absorbed from dietary sources. Thirdly, although in non-transfused persons with thalassemia (e.g. thalassemia intermedia) dietary iron can increase the rates of iron loading over time, this can occur even in the absence of iron fortification. Thus, individuals with these rare conditions in the population should be managed by screening, iron-load monitoring, and treatment of affected individuals with appropriate therapies such as iron-chelating therapies rather than by withholding iron fortification from the large population that would benefit.

Overview of Evidence for the Impact of Flour Fortified with Folic Acid (Helene McNulty, University of Ulster)

Folate plays a role in maternal health during pregnancy, foetal development, cognitive development, heart disease/stroke prevention, cancer prevention, bone health and cognitive function in ageing. Folate deficiency can seriously affect pregnancy and its outcomes, leading in some cases to neural tube defects (NTDs). When compared to folate, folic acid is more bioavailable to the body and more stable during cooking. Mandatory folic acid fortification has been in place for several years in a number of countries. This intervention has reduced the incidence of NTDs in the US and Canada by between 27% and 50%.

Spina Bifida: Causes, Consequences and Prevention (Murat Mutus, Istanbul Medeniyet University)

Neural tube defects can be prevented by folic acid intake prior to and during early pregnancy. In Turkey, spina bifida prevalence is about 2-3 per 1000 live births (very high); this is equivalent to 20-30 per 10,000 live births. In countries that fortify, the prevalence of neural tube defects is commonly below 10 per 10,000 live births. Annual health cost per patient in Turkey is about US$10,000, and lifetime health cost ranges from US$300,000-US$500,000. In Turkey, pregnancy termination due to the incidence of neural tube defects is not common. One of the recommended interventions to reduce the incidence of these birth defects is flour fortification with folic acid. The cost is relatively marginal while the public health impact is very high.

Question & Answer Session:

It is recommended that supplementation for targeted groups, such as women of reproductive age, continue in addition to mandatory flour fortification with folic acid.

A number of studies were conducted on the stability of B-group vitamins during baking. The loss is minimal, from 15 to 20%. Recommendations for the level of B vitamins to add to fortified flour take these losses into account.
Oman implemented a successful flour fortification program, which has reduced the incidence of neural tube defects in the country. To date, the incidence in Oman is almost 10 times less than in Turkey.

There is no clear evidence on prevention of congenital heart defects following fortification with folic acid. A study in the Netherlands did not provide specific evidence.

Fetal surgeries aimed at correcting neural tube defects during pregnancy have been tested in the USA experimentally. Such surgeries bear high risk and may result in death of both the mother and the baby. However, technological development in the future may make such surgeries safer, leading to routine use.

13 June 2012

Overview of Evidence of the Impact of Flour Fortification with Other Essential Nutrients (Quentin Johnson, FFI);

Based on November 2009 prices, premix (with vitamins B1, B2, B3, folic acid and iron) for the United States of America and Canada had a cost of US$10.80/kg and the cost of fortification was US$1.73/metric ton of wheat flour. The nutrient standard in the USA and Canada takes into account the naturally occurring nutrients in the wheat flour as well as the amount that will be added via fortification. An example of a regional standard for fortification is the Central Asian KAP complex. In terms of the evidence for the impact of flour fortification, other micronutrients discussed were B group vitamins, vitamin D, calcium and magnesium. For example, deaths from niacin deficiency in the USA declined to about 0 in a 14-year period, from 1938 to 1952. In a four-year period from 1944 to 1948, the prevalence of deficiencies of vitamins B1 and B2 declined to 0 in Canada. The United Kingdom has mandatory calcium fortification.

Vitamin D: Latest Recommendations and Experiences with Fortification (Kevin Cashman, University College Cork)

Sun exposure is the primary source of vitamin D, not the diet. The skin synthesizes vitamin D from ultra violet blue (UVB) exposure. Persons older than 60 years have less capacity to synthesize vitamin D from the sun than younger individuals. Darker skin, sunscreen application, clothing and cloud-coverage can also limit vitamin D synthesis in the skin. Persons living above 40° north and above 40° south experience seasonal change in capacity to produce vitamin D, with greater synthesis in the summer months than in the winter months. Dietary supply is relatively low because it is naturally present in few food sources. These two sources of vitamin D present challenges: sun exposure increases risk of skin cancer and the natural dietary source is scarce. Therefore, vitamin D fortification offers an alternative way to provide vitamin D to the population. In the USA, for example, 60% of the dietary intake of vitamin D comes from fortified foods. A recent meta-analysis showed that

11 http://www2.adb.org/Projects/sustainable-food-fortification/Wheat-Flour-Fortification.pdf
vitamin D-fortified food increased, to a greater extent, serum 25 hydroxy D (abbreviated as 25(OH)D) in volunteers compared with non-fortified food. It is recommended to fortify wheat flour with vitamin D3 as it is more effective at increasing serum 25(OH)D than vitamin D2. In studies specific to wheat, vitamin D3-fortified wheat flour used to make bread and bread fortified with vitamin D3 increased serum 25(OH)D in women and the elderly, respectively.

**Question & Answer Session:**

Suboptimal vitamin D status and vitamin D deficiency are common problems for a number of countries, including Turkey. However, congenital rickets cases were eliminated almost 10 years ago in the country. This progress is partially due to diversified eating habits (yogurt, vitamin D fortified margarine) and the climate.

Fortifying oil rather than wheat with vitamin D might not be a viable solution, as bread is normally consumed by more individuals than oil.

Supplementation works well at the individual level, but not at the population level.

The ability to synthesize vitamin D in the skin is reduced with obesity. Therefore, with the aging and overweight population, one would expect to see a greater prevalence of vitamin D deficiency.

**Statement of Understanding**

On the second day of the workshop, a Statement of Understanding, which lays out the key points discussed by speakers and participants throughout the duration of the event, was reviewed and revised as necessary. This document will be made available to participants in English, Russian and Turkish for advocacy purposes. An English version of the Statement of Understanding can be viewed in Appendix 3.

**WORKSHOP 2**

14 June 2012

**Flour Fortification Efforts and Impact: A Global Update (Becky Handforth, FFI)**

Flour fortification is an effective strategy for addressing micronutrient malnutrition. To date, 68 countries globally have legislation requiring wheat flour fortification of at least one type of commonly consumed flour. Flour fortification plays an important role in the reduction of neural tube defects and iron deficiency along with the prevention of iron-deficiency anemia. There are many examples and resources worldwide to support country efforts to create sustainable flour fortification programs.

Mandatory legislation does not automatically mean a country is fortifying. However, it is believed that all 68 countries indicated as mandatory on the FFI global map are fortifying at least a portion of their flour. Other countries have voluntary fortification, but these initiatives rarely reach the entire population, thus limiting public health impact. Countries with voluntary fortification rarely have over 50% of their flour fortified (and for some, much less).

15 [http://jn.nutrition.org/content/142/6/1102.abstract](http://jn.nutrition.org/content/142/6/1102.abstract)
16 [http://jn.nutrition.org/content/136/1/123.abstract](http://jn.nutrition.org/content/136/1/123.abstract)
17 [http://www.ajcn.org/content/89/4/1132.abstract](http://www.ajcn.org/content/89/4/1132.abstract)
The reasons why other European countries do not have a harmonized approach to flour fortification include:

1. Lack of political will
2. Lack of awareness that micronutrient malnutrition exists in their countries
3. Concerns about safety (that is why it is important to have a proper monitoring system in place)

In Sweden, fortification with iron was halted in 1994. One study measured the ferritin values in a random sample of 600 girls the year fortification stopped and then 6 years later took a second random sample of 600 girls from the same age as the first group. Results showed that the prevalence of iron deficiency had increased from 39.3% to 50.4%.18

**Flour Fortification Legislation and Standards (Quentin Johnson, FFI)**

Standards should be consistent with the Codex Alimentarius structure and clear about what is required. Not basing standards on the best science available could leave the way open to trading partners challenging the standard through the World Trade Organization (WTO). The legal minimum and maximum should be developed recognising what one wants to achieve but also realising milling technological limits and variations. Process control should focus on fortification at industrial mills and at the point of entry for imported flour.

Testing the presence of iron in fortified wheat flour is relatively simple and should be used as proxy for the presence of folic acid, which is much more costly and difficult to measure. The official methods to measure iron and folic iron in wheat flour are publicly available.

There is no evidence that consuming folate through natural food sources can cause negative health consequences. Studies consistently show that the levels of folic acid added to fortified flour are unlikely to have negative implications for a person’s well-being. However, consuming folic acid at the very high levels found in certain supplements may be linked with some harmful outcomes.

**Premix Panel Discussion (Francoise Chome-Fortitech, Vikram Kelkar-Hexagon, Lena Kampehl-Mühlenchemie, Cem Köylüoğlu-DSM)**

1. **What is the storage/shelf life of a premix?**
   **Mühlenchemie:** Minimum 12 months, depending on ingredients and storage conditions (preferably under 25°C and humidity under 75%).
   **Fortitech:** Storage can be extended beyond 12 months based on different methods used. For example, certain types of packaging can increase the shelf life of a premix.

2. **What technical support can be provided to countries as part of premix procurement?**
   **Hexagon:** A wide range of technical support is normally provided by present premix companies, including checking and ensuring the necessary quantity of a nutrient in the final product.

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Fortitech: As a norm, fortificant levels are always measured in the final premix product through special lab tests. This service can be extended beyond the first year and is based on customer’s request.

3. **How often can premix formulation be changed? What are the methods to establish revolving fund for millers?**

**Hexagon:** Revising the content of micronutrients found in premix is always customer-driven. However any changes should be approved by national regulations and then made available in public domain. Governments are normally sensitive with regard to this issue and request transparency and clarity in premix formulation. An example of establishing a revolving fund for millers in the region is Uzbekistan. Hexagon helped to estimate premix quantity for the population. Based on the estimates, World Bank and GAIN conducted bidding and procured premix. ADB was also supporting this initiative initially. Now Uzbekistan has a sufficient revolving fund. Another option is to establish a revolving fund for millers based on government contribution to promote long term sustainability.

**DSM:** There are two causes leading to a change in premix formulation: customer-driven and vitamin-driven. If there is a change in the product, the premix company is liable to inform the customer. In most cases the change in product is associated with an upgraded premix ingredient.

4. **Natural vs. synthetic ingredients in premixes**

**Mühlenchemie:** Natural and synthesized vitamins vary greatly in price. Natural premixes are undoubtedly more expensive. Most of the customers prefer synthetically produced premixes.

**Hexagon:** Most of the vitamins available in the market are of synthetic nature. Natural products are a luxury and are only used in certain high-brand cosmetic and food products.

**DSM:** Synthetic products are in a way identical to natural products (natural-identical).

5. **What is the price difference for a premix containing many micronutrients versus one that contains only a few micronutrients?**

**Fortitech:** The price of the premix does vary depending on the number of micronutrients added, but the ultimate decision for which premix to purchase should be driven by the potential health and economic benefits available to the country through fortification.

Purchasing premix in larger volumes normally decreases the overall price.

6. **There is a large number of small mills with small capacity in Moldova, hence implementation of mandatory flour fortification can be challenging. The problems lie in premix and pre-blend supply and their shelf life. Can each small mill prepare the pre-blend? Can the premix be collected in a central location and then distributed to individual mills?**

**Hexagon:** Hexagon uses small packages to increase the shelf life of a premix and has various solutions for different-scale fortification. In India, there are mainly small mills and the situation is similar to Moldova. One of the strategies is to establish a central procurement agency, estimate required premix quantity, collect orders from millers and then distribute the received product based on orders.
**Mühlenchemie:** We can also offer special smaller packaging aimed to extend the shelf life of a premix.

7. **Can premix manufacturers provide support in dosage and quality assurance?**

**Hexagon:** All present premix companies can provide this technical support and normally check the quality of samples received from millers. We partner with millers to provide the appropriate services and support needed in order to ensure that food is fortified with the right premix.

**Mühlenchemie:** Pre-test of premixes and checking feeders is an integral part of customer service.

8. **What are the additional services the premix manufacturers can offer? Can they offer free of charge custom clearance, shipment, provision of feeders and training of specialists?**

**Hexagon:** This depends on a mutually agreed proposal between a client and a premix manufacturer. Generally, the manufacturer’s responsibility ends at the country’s customs border. But in certain countries, where Hexagon has company representatives, they handle shipment, cover taxes, delivery charges and customs fees. For example, in Turkey, Hexagon can deliver premixes door-to-door and handle all charges. Price for delivery of feeders and training of specialists can be negotiated depending on the volume of the overall procurement. The decision has to be economically viable for both parties.

**DSM:** Additional free-of-charge services, including training, depend on the size of the business as well as criteria and conditions set in the initial proposal.

**Fortitech:** All present premix manufacturing companies provide matching services. Sales representatives of the present companies should be contacted to obtain more details and specifications.

**Addressing Trade Concerns, Import Duties and VAT (Quentin Johnson, FFI)**

Not basing standards on the best science available could leave the way open to trading partners challenging the standard through WTO. Adherence to the specifications in the WHO Recommendations on Wheat and Maize Flour will protect countries against potential complaints under WTO. Labels should meet existing country requirements and follow the Codex Alimentarius general guidelines. Regional flour fortification standards should be established, as was done by Central Asian countries in the form of the KAP Complex.

Countries are advised to use the most acceptable terminology during labeling of fortified food. The most commonly used terminology is ‘enriched’ or ‘fortified’.

When premixes are imported, in addition to issues arising with payment of duties and value-added tax (VAT), the received goods are sometimes kept at customs in some countries. The premixes need to be checked by special labs before release. This might affect the longevity of the product, and the customs storage conditions might not be in line with premix recommended storage conditions. Thus, the release of premixes has to be done quickly.

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20 [http://www2.adb.org/Projects/sustainable-food-fortification/Wheat-Flour-Fortification.pdf](http://www2.adb.org/Projects/sustainable-food-fortification/Wheat-Flour-Fortification.pdf)
Flour Fortification Program Monitoring and Surveillance (*Abe Parvanta, Independent Consultant*)

**Monitoring at industry level** means (i) tracking quantity of premix compared to total quantity of flour produced over time, (ii) tracking quantity of fortified flour that meets national standards over time (based on quality assurance by producers and quality control by regulatory agency), (iii) tracking quantity of imported fortified flour that meets national standards over time (certificate of conformity by importers and quality control monitoring by regulatory agency). **Monitoring at population level** implies tracking household/population coverage of fortified flour or fortified flour products over time. **Surveillance** is the on-going and systematic collection, analysis, and interpretation of data and dissemination of the trend information on micronutrient and health status of the target population in order to strengthen and sustain a flour fortification program. Once fortification is implemented and reaches ~80% of the population, surveillance should be conducted through population surveys targeting children and women of child bearing age. **Evaluation** is the systematic collection and analysis of detailed data and information about the activities, characteristics, and impact of the flour fortification program to assess and improve its effectiveness and make decisions about its continuation or expansion. Most public nutrition programs are evaluated at adequacy level – i.e. the preponderance of evidence indicates that the program has (or has not) helped improve nutritional status of the population.

**QA/QC Structure and Requirements (**Quentin Johnson, FFI**)

Food fortification needs process control to ensure consistent quality and safety of the output – flour adequately fortified with required essential minerals and vitamins. Effective process control systems use mechanisms to monitor activities and take timely corrective action. Well-implemented process control gives an early warning of problems, which in turn helps to avoid waste, reworking of product, customer complaints, food recalls and liability issues. Good process control systems include multiple measurable parameters, and they do not rely on just one parameter.

The session focused on the importance of continuous data collection, review, analysis and use of information on program inputs, implemented activities, outputs, and outcomes, to assess how the program is performing against predefined criteria, following the WHO/CDC logic model for micronutrient interventions. Key existing data monitoring sources are mill production records, ministry records and distribution reports, food control technical auditing and inspection reports, laboratory reports, and surveys.

In comparison to iodized salt, assessing the quality of fortified flour samples at the household level is technically difficult and expensive. Some proxy indicators exist for assessing the quality of fortified flour at the household level, but they assume that the flour is properly kept in bags with labels. There is a fortification questionnaire that can be used during data collection at household level.

If the population coverage of fortified flour is not sufficient (~80%), it is not reasonable to conduct household surveys.

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National Monitoring and Evaluation Systems: Experience from Iran (Hamed Pouraram, Ministry of Health and Medical Education)

Iran’s flour fortification program started in 2001 in Bushehr province as a pilot but was later expanded nationwide. The multi-stakeholder National Flour Fortification Committee has proven effective and includes members from both the public and private sectors. It helped build the capacity of the milling industry for the national programme and provided essential guidelines for carrying out flour fortification. Quality control of fortified flour is conducted with the help of government food laboratories and the methods used are semi-quantitative (spot test) and quantitative (spectrophotometric). Success of flour fortification implementation in Iran is mainly attributed to government commitment, active involvement of the private sector, familiarization of millers with benefits of flour fortification, and regular consultation and dialogue with all involved stakeholders.

There are 332 mills in Iran, and all of them fortify flour. Based on the results of several assessments, Iran decided it was cost effective to produce premix locally.

Since the onset of flour fortification in Iran, three assessments have been made: baseline data gathering in 2001, mid-term evaluation in 200423 and a final assessment in 2007.24 From the final assessment, the authors concluded “In areas where anaemia is not mainly due to iron deficiency, an iron fortification programme might decrease the prevalence of iron deficiency without affecting the prevalence of anaemia.”

Previous success with the salt iodization program in Iran made it easier for the country to implement flour fortification.

Four main strategies are used in Iran to address micronutrient malnutrition. They include: dietary diversification, supplementation, food fortification and treatment for intestinal worms. These interventions were implemented simultaneously.

Iran has two mandatory standards in place, one for fortified and another for unfortified flour.

Iran chose to fortify the flour used for making lavash because 85% of the population consumed this type of bread at the time. Nowadays, the population is diversifying its eating habits, so Iran is shifting to fortification of other flour types in order to sustain adequate coverage across the country.

A key stakeholder in flour fortification is the consumer. They can be the strongest advocates in the process. For instance, in Kyrgyzstan the salt iodization programme was not going well initially until the head of Salt Iodization Association, who himself had a goiter, realized the gravity of the problem and became the main advocate for iodization. Consumers create the demand.

15 June 2012

Discussions on Country Presentations

Turkey:

24 http://www.publichealthjrnl.com/article/S0033-3506(09)00281-9/abstract
• Iron standards need to be revised in the country.
• Collaboration between stakeholders at the national level is critical for pushing mandatory flour fortification.
• Instead of preparing a new plan of action on flour fortification, Turkey will add the actions from the workshop into their existing nutrition action plan.

Kyrgyzstan:
• A proposition should be made to government to create norms for imported flour. However, this should be addressed carefully as it involves neighboring countries and could touch on politically sensitive issues.

Albania:
• Roles between MoH and MoA need to be clearer, so they don’t overlap efforts.
• Gap in quality control to be strengthened and staff to be trained.

Kazakhstan:
• Kazakhstan exports a large amount of flour to Kyrgyzstan. Kazakhstan fortifies flour at 14 large mills in the country. A letter of conformity normally certifies that flour is adequately fortified when it is exported. Flour is assessed regularly and its quality is quite high. The problem is the difficulty in controlling/checking certain parameters of premixes.

Armenia and Georgia:
• UNICEF and FFI are committed to supporting flour fortification in these countries and many have benefitted from the expertise of FFI staff. However, national ownership of flour fortification efforts is critical for success.
• Staff training is required at different levels: lab, millers and government.

Azerbaijan:
• Flour fortification can be challenging as there are many small mills in Azerbaijan that cannot produce fortifiable flour and do not have internal labs for process control.

Moldova:
• Development of Moldova’s flour fortification program over the past year is notable. UNICEF and FFI are collecting experiences from multiple countries and will translate and share them with others.

Kosovo:
• Kosovo has a draft law for the fortification of flour with iron and folic acid. The country may discuss adding other micronutrients to the law prior to final approval. It was suggested that the specific micronutrients permitted for fortification purposes be
included in sub-laws or technical regulations rather than in the law itself. Laws are much more difficult to change.

**Macedonia:**

- EU Food Directive lists the different micronutrients that can be included in fortified flour but does not regulate the specific levels of micronutrients to be added to fortified flour. These are customized by each country in their technical regulations.

**Turkey Nutrition Studies (Nazan Yardim, Ministry of Health of Turkey)**

Traditionally, people in Turkey relied heavily on bread and other grains. However, food consumption patterns are changing, and people have increased their consumption of dairy products. The Obesity Prevention and Control Program in Turkey promotes healthy eating habits and breastfeeding, provides nutrition services in school canteens, ensures food labels include understandable and legible nutrition facts, and monitors media broadcasts to make certain that the messages about balanced nutrition are correctly stated.
AGENDA

Addressing Micronutrient Deficiencies through Flour Fortification in the CEECIS Region

A JOINT WORKSHOP HOSTED BY UNICEF AND THE FLOUR FORTIFICATION INITIATIVE (FFI)

12-13 June 2012
Ankara, Turkey

12 June 2012

Session Chairs: Vilma Tyler (morning) and Oliver Karanfilski (afternoon)

<table>
<thead>
<tr>
<th>SESSION TIME</th>
<th>SESSION NAME</th>
<th>SPEAKER</th>
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<tbody>
<tr>
<td>8:00-09:00</td>
<td>Registration</td>
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<tr>
<td>9:00-09:30</td>
<td>Welcome and Opening Address</td>
<td>Ministry of Health Turkey Representative, UNICEF Turkey Representative, Ayman Abu Laban, FFI, Robert Baldwin</td>
</tr>
<tr>
<td>9:30-09:45</td>
<td>Objectives of Workshop</td>
<td>Robert Baldwin, FFI</td>
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<tr>
<td>9:45-10:00</td>
<td>Introduction of Participants</td>
<td>Vilma Tyler, UNICEF</td>
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<tr>
<td>10:00-10:30</td>
<td>Overview of Micronutrient Malnutrition and Effective Interventions: The Global Picture</td>
<td>Helena Pachón, FFI</td>
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<tr>
<td>10:30-11:00</td>
<td>Coffee Break <strong>Sponsored by: Fortitech</strong></td>
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<tr>
<td>11:00-11:30</td>
<td>Overview of Flour Fortification</td>
<td>Robert Baldwin, FFI</td>
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<tr>
<td>11:30-12:00</td>
<td>Regional Status of Flour Fortification</td>
<td>Vilma Tyler, UNICEF</td>
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<tr>
<td>12:00-12:15</td>
<td>WHO Recommendations on Wheat Flour Fortification</td>
<td>Quentin Johnson, FFI</td>
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<tr>
<td>12:15-13:15</td>
<td>Lunch</td>
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<tr>
<td>13:15-14:45</td>
<td>Overview of Evidence for Impact of Flour Fortification with Iron</td>
<td>Althea Grant, Chief, Epidemiology and Surveillance Branch, Division of Blood Disorders, Centers for Disease Control and Prevention</td>
</tr>
<tr>
<td></td>
<td>Evidence for the Safety of Fortifying Flour with Iron in the Presence of Thalasemia and other Blood Disorders</td>
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<tr>
<td>14:45-15:30</td>
<td>Overview of Evidence for Impact of Flour Fortification with Folic Acid</td>
<td>Helene McNulty, Professor of Nutritional Science, Biomedical Sciences Research Institute, University of Ulster</td>
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<tr>
<td>15:30-16:00</td>
<td><strong>Coffee Break</strong></td>
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<td><strong>Sponsored by: Fortitech</strong></td>
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<tr>
<td>16:00-16:30</td>
<td>Spina Bifida: Causes, Consequences and Prevention</td>
<td>H. Murat Mutus, Pediatric Surgeon and Member of Turkish Spina Bifida Association</td>
</tr>
</tbody>
</table>
# AGENDA

**13 June 2012**

Session Chair: Helene McNulty

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<thead>
<tr>
<th>SESSION TIME</th>
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<th>SPEAKER</th>
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<tbody>
<tr>
<td>9:00-9:30</td>
<td>Overview of Evidence for Impact of Flour Fortification with Other Essential Nutrients</td>
<td>Quentin Johnson, FFI</td>
</tr>
<tr>
<td>9:30-10:00</td>
<td>Vitamin D: Latest Recommendations and Experiences with Fortification</td>
<td>Kevin Cashman, Professor of Food and Health, University College Cork</td>
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<tr>
<td><strong>10:00-10:30</strong></td>
<td><strong>Coffee Break</strong>                                                            <strong>Sponsored by: Fortitech</strong></td>
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<tr>
<td>10:30-11:15</td>
<td>Group Session: Discussion about Statement of Understanding</td>
<td>Helene McNulty, Professor of Nutritional Science, Biomedical Sciences Research Institute, University of Ulster</td>
</tr>
<tr>
<td>11:15-11:45</td>
<td>Plenary Session: Statement Feedback and Finalization</td>
<td>Helene McNulty, Professor of Nutritional Science, Biomedical Sciences Research Institute, University of Ulster</td>
</tr>
<tr>
<td>11:45-12:00</td>
<td>Concluding Remarks and Official Closure of Workshop</td>
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AGENDA
Multi-Stakeholder Meeting and Dinner
Participants of Workshop 14-15 June arrive at 12:30 for lunch

Ankara, Turkey
13 June 2012

Session Chair: Ibrahim Parvanta

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<tr>
<th>SESSION TIME</th>
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<tr>
<td>12:30-13:30</td>
<td>Lunch</td>
<td>UNICEF Turkey Representative, Ayman Abu Laban</td>
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<td>13:30-13:45</td>
<td>Welcome and Opening Address</td>
<td>UNICEF Turkey Representative, Ayman Abu Laban</td>
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<td>13:45-14:00</td>
<td>Scientific Workshop Statement of Understanding</td>
<td>Ibrahim Parvanta, Consultant</td>
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<tr>
<td>14:00-14:30</td>
<td>Plenary Discussion</td>
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<td>14:30-14:45</td>
<td>Current Support of Flour Fortification in the Region from Industry, Regulatory and Government Leaders</td>
<td>Vilma Tyler, UNICEF</td>
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<tr>
<td>14:45-15:15</td>
<td>Plenary Discussion</td>
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<tr>
<td>15:15-15:30</td>
<td>Concluding Remarks</td>
<td>Robert Baldwin, FFI</td>
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<tr>
<td>15:30-19:30</td>
<td>Free Time</td>
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<td>19:30-21:00</td>
<td>Evening Dinner</td>
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AGENDA

Addressing Challenges and Strengthening Local Capacity to Implement Flour Fortification Initiatives in the CEECIS Region
A JOINT WORKSHOP HOSTED BY UNICEF AND THE FLOUR FORTIFICATION INITIATIVE (FFI)
14-15 June 2012
Ankara, Turkey

14 June 2012

Session Chair: Quentin Johnson

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<td>8:30-09:00</td>
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<td>9:00-09:30</td>
<td>Welcome and Opening Address</td>
<td>Ministry of Agriculture Representative</td>
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<td>UNICEF Turkey, Representative</td>
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<td>FFI, Robert Baldwin</td>
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<tr>
<td>9:30-09:45</td>
<td>Objectives of Workshop</td>
<td>Quentin Johnson, FFI</td>
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<tr>
<td>9:45-10:00</td>
<td>Introduction of Participants</td>
<td>Vilma Tyler, UNICEF</td>
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<tr>
<td>10:00-10:10</td>
<td>Flour Fortification Efforts and Impact: A Global</td>
<td>Becky Handforth, FFI</td>
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<td>Update</td>
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<td>10:40-11:40</td>
<td>Flour Fortification Legislation and Standards</td>
<td>Quentin Johnson, FFI</td>
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<tr>
<td>11:40-12:20</td>
<td>Premix Panel Discussion</td>
<td>Moderator: Quentin Johnson, FFI</td>
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<td>Panel Speakers:</td>
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<td></td>
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<td>Francoise Chome, Fortitech</td>
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<td>Vikram Kelkar, Hexagon</td>
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<td>Lena Kampehl, Mühlenchemie</td>
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<td>Cem Köylioğlu, DSM</td>
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<tr>
<td>12:20-13:30</td>
<td>Lunch</td>
<td><strong>Sponsored by: Mühlenchemie</strong></td>
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<tr>
<td>13:30-14:00</td>
<td>Addressing Trade Concerns, Import Duties and VAT</td>
<td>Quentin Johnson, FFI</td>
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<tr>
<td>14:00-14:30</td>
<td>Flour Fortification Program Monitoring and Surveillance</td>
<td>Ibrahim Parvanta, Consultant</td>
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<tr>
<td>14:30-15:00</td>
<td>The Essential Components of a Flour Fortification Monitoring System for Production, Supply and Quality</td>
<td>Laird Ruth, FFI</td>
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<td>15:00-15:30</td>
<td>Coffee Break</td>
<td><strong>Sponsored by: Fortitech</strong></td>
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<tr>
<td>15:30-16:00</td>
<td>QA/QC Structure and Requirements</td>
<td>Quentin Johnson, FFI</td>
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<tr>
<td>16:00-16:30</td>
<td>National Monitoring and Evaluation Systems: Experiences from Iran</td>
<td>Hamed Pouraram, Senior Nutrition Officer &amp; National Food Fortification Manager, Nutrition Department, Ministry of Health &amp; Medical Education, Iran</td>
</tr>
<tr>
<td>SESSION TIME</td>
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| Sponsored by: Fortitech | Sponsored by: Fortitech | Facilitators: Quentin Johnson, FFI
Laird Ruth, FFI
Ibrahim Parvanta, Consultant |
| 11:00-12:30 | Working Group Session 3: External Monitoring of Flour Fortification | |
| 12:30-13:30 | Lunch | |
| Sponsored by: Doruk Group | Sponsored by: Doruk Group | Facilitators: Quentin Johnson, FFI
Laird Ruth, FFI
Ibrahim Parvanta, Consultant |
| 13:30-15:00 | Working Group Session 4: Sector Discussions on Improvements to Existing Internal and External Monitoring Systems | |
| 15:00-15:30 | Coffee Break | |
| Sponsored by: Fortitech | Sponsored by: Fortitech | Facilitators: Quentin Johnson, FFI
Laird Ruth, FFI
Ibrahim Parvanta, Consultant |
| 15:30-16:00 | Working Group Session 5: Create Country Power Point Presentations: Current Gaps and Next Steps for Building Sustainable and Effective Monitoring Systems | |
| 16:00-17:30 | Country Presentations | Robert Baldwin, FFI |
| 17:30-17:45 | Concluding Remarks and Official Closure of Workshop | |
### APPENDIX 2

## LIST OF PARTICIPANTS

<table>
<thead>
<tr>
<th>Country</th>
<th>Participants</th>
</tr>
</thead>
</table>
| **Albania:**     | Mr. Enver Roshi  
|                  | Ms. Mariana Bukli  
|                  | Mr. Albes Rama  
|                  | Ms. Jonida Mulaj  
|                  | Ms. Kristina Naumi  
| **Armenia:**     | Mr. Alexander Bazarchyan  
|                  | Mr. Ashot Petrosyan  
|                  | Mr. Mihran Hakobyan  
|                  | Mr. Smbat Daghbashyan  
|                  | Ms. Izabel Abgaryan  
|                  | Ms. Karine Saribekyan  
|                  | Ms. Liana Hovakimyan  
|                  | Ms. Margarita Babayan  
| **Azerbaijan:**  | Mr. Imran Abdullayev  
|                  | Mr. Hassan Taifour  
|                  | Mr. Ibrahim Ahmadov  
|                  | Mr. Sabir Valiyev  
|                  | Ms. Turkan Abbasova  
|                  | Mr. Afig Safarov  
|                  | Mr. Ibrahim Babayev  
|                  | Mr. Mustafa Hasanov  
|                  | Mr. Tarlan Gadirov  
| **Georgia:**     | Ms. Lela Sturua  
|                  | Ms. Nino Lortkipanidze  
| **Kazakhstan:**  | Mr. Nodar Karimov  
|                  | Ms. Zauré Akmëtovë  
|                  | Mr. Mëreke Ràkishev  
| **Kosovo:**      | Mr. Nâit Hasani  
|                  | Ms. Nysrëtà Dòdà-Gàshi  
|                  | Ms. Ilirjana Zymberaj  
|                  | Ms. Kate Wheeler  
|                  | Ms. Tàhirë Màlòkù-Gjërgjì  
| **Kyrgyzstan:**  | Mr. Kudaïaròv Dùïsha  
|                  | Mr. Ùzàkbaëv Kamchibeķ  
|                  | Ms. Damïrà Abàkïrova  
|                  | Ms. Òilekkeëva Ùlàngul  
|                  | Mr. Iseaï Ñisjärëbëk  
|                  | Ms. Òsàkôva Òreñà  
|                  | Mr. Æsùpëv Òmël  
|                  | Mr. Ëätigà Mràt  
|                  | Ms. Dàyddôva Ëyudmëlà  
| **Macedonia:**   | Mr. Êëgàr Veljëkovïk  
|                  | Mr. Òlivër Karanfiëlski  
|                  | Ms. Òlivëra Mariòtvëska  
|                  | Ms. Jàgòda Dimìtrjëvska  
|                  | Ms. Lënce Ìëtkôva  
| **Moldova:**     | Mr. Boris Gàïna  
|                  | Mr. Ùtrï Òçùinçëchì  
|                  | Ms. Òvëtëlana Òstëfànët  
|                  | Mr. Àndrä Òndòilo  
|                  | Mr. Ùtrï Òbalàn  
|                  | Mr. Òçùëtor Tòzłòvan  
|                  | Ms. Òlgà Ònicùlicà  
|                  | Ms. Ângëlë Ònòvàlëntëko  
|                  | Ms. Òràspàcovïa Òlàntënta  
| **Turkey:**      | Mr. Òbën Ùñë  
|                  | Ms. Ñàzàñ Òàrdë  
|                  | Ms. Cëyhàn Òàrðàr  
|                  | Ms. Òçëlm Ùlgë  
|                  | Ms. Ràbïève Òùñë  
|                  | Ms. Òmurù Òùlù  
|                  | Mr. Ë sûrû Òùltë  
|                  | Mr. ÒÌëkìt Òókùsal  
|                  | Mr. M. Hîkimòt Òòjàòglù  
|                  | Mr. Mûstëfà Òòçërlâk  
|                  | Mr. Ùñùr Òùlmë  
|                  | Mr. Òùràl Òùràl  
|                  | Mr. Òàvûl Kùral  
|                  | Mr. Òàvûzàìëmt Òëntàs  
|                  | Mr. Òrsàì Òëmìrcì  
|                  | Ms. Òànù Òéìr  
|                  | Ms. Ògùm Òòmtûs  
|                  | Ms. Òìfì Òçùkëtkëçàn  
|                  | Ms. Òmël Òìlà  
|                  | Ms. Óììd Òìkëc  
| **Turkey (cont.):** | Ms. Lìlàì Jëlàmschì  
|                  | Ms. Ñerëm Çëlivì  
|                  | Ms. Òbàhàt Tëççàn  
|                  | Ms. Òììëå Òöbas  
|                  | Ms. Òñïz Ilogen  
|                  | Ms. Òñïz Òïğë  
|                  | Ms. Basak Òçëzel  
|                  | Ms. Fòânòis Chòmë  
|                  | Mr. Òhàm Òànke  
|                  | Ms. ËÌnà Kàmpëhl  
|                  | Mr. Vîkram Kelkar  
|                  | Mr. Òàmded Pòrràram  
|                  | Mr. Òçhàd Òbùzáhëdhë  
|                  | Mr. Òbràhim (Abe) Pàrvàntà  
|                  | Mr. ÒÌllëp Òò-çëmòne  
|                  | Mr. Çëm Kòìlìòglù  
|                  | Ms. Sòpihe Mòrôskìñë  
|                  | Ms. Vìlìmà Òylër  
|                  | Mr. Ònàntìn Jòñson  
|                  | Mr. ÒÌàìd Òùð  
|                  | Mr. Ròbt (Bob) Bàldwaìn  
|                  | Ms. Òbetik Hàndforð  
|                  | Ms. Hëlëna Pàçòñ  
|                  | Ms. Hélène Mèçnùltì  
|                  | Mr. Mûràt Òìkës  
|                  | Ms. ÂÌtheà Gànt  

**Speakers, Organizers and Resource People:**

<table>
<thead>
<tr>
<th>Country</th>
<th>Participants</th>
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</thead>
</table>
|               | Ms. Francoise Chome  
|               | Mr. Thomas Hanke  
|               | Ms. Lena Kampehl  
|               | Mr. Vikram Kelkar  
|               | Mr. Hamed Pouraram  
|               | Mr. Jechad Abuzahedeh  
|               | Mr. Ibrahim (Abe) Parvanta  
|               | Mr. Philipp De-Simone  
|               | Mr. Cem Köyluoğlu  
|               | Ms. Sophie Moroshkina  
|               | Ms. Vilma Tyler  
|               | Mr. Quentin Johnson  
|               | Mr. Laird Ruth  
|               | Mr. Robert (Bob) Baldwin  
|               | Ms. Becky Handforth  
|               | Ms. Helena Pachón  
|               | Ms. Helene McNulty  
|               | Mr. Murat Mutus  
|               | Ms. Althea Grant  

24
APPENDIX 3

Statement of Understanding:

ADDRESSING MICRONUTRIENT DEFICIENCIES THROUGH FLOUR FORTIFICATION IN THE CEECIS REGION

Ankara, Turkey

12-13 June 2012

Mandatory wheat flour fortification has been legislated in 68 countries and is globally recognized as an effective public health intervention. Recognizing that optimal diet and nutrition status are essential throughout the life-cycle, a number of countries in the CEECIS region have either initiated the processes necessary for implementing flour fortification or have passed legislation and are actively fortifying flour per national standards. In support of such efforts, and after two days of discussion and deliberation, approximately 60 participants, representing national governments, health professionals, academia, and other entities focused on the scientific aspects of flour fortification, agree to the following set of principles and actions:

1. Based on the most recent data, we recognize that:

   - Flour fortification is supported by the World Health Organization as a safe and effective means for providing essential vitamins and minerals to populations around the world when implemented and monitored as recommended.
   - The current nutrition status of women and children and its considerable economic and social consequences is a significant public health burden for countries represented at this workshop.
   - Due to deficiencies of vitamins and minerals, such as folic acid and iron, a notable proportion of populations from the countries represented are hindered from achieving their physical and intellectual potential and cannot make their full and expected contributions as students, workers, parents and citizens generally.
   - Available evidence indicates that flour fortification with iron poses no excess risk to individuals who are carriers of hemoglobinopathies, such as thalassemia trait. The wellbeing of individuals with intermediate or severe forms of such conditions is dependent on appropriate clinical management, irrespective of whether or not flour fortification is implemented as a public health intervention.
   - Folic acid has been globally recognized as a preventative measure against the development of neural tube defects, and evidence from multiple countries has demonstrated that folic acid fortification reduces neural tube defects at the population level. There is also increasing evidence that folic acid fortification is associated with additional public health benefits such as improved cardio-vascular health, etc.
   - Flour fortification is expected to have a positive impact on national health and development indicators and is a critical intervention to help countries achieve specific Millennium Development Goals.

2. We believe that investing in flour fortification to improve the nutrition status of the populations, especially women and children, in the countries represented at this workshop should be accelerated. Understanding that flour fortification with at least iron and folic acid is a safe, low-cost and effective way to reduce iron deficiency and neural tube defects, we pledge to work together to accomplish the following tasks:

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26 Albania, Armenia, Azerbaijan, Georgia, Kosovo, Kyrgyzstan, Macedonia, Moldova, Turkey.
- Actively participate in a national fortification alliance with representation from various stakeholders to lead flour fortification efforts.
- Advocate within scientific, government and industry settings for mandatory flour fortification.
- Advise government leaders as they prepare national legislation and standards for flour fortification.
- Provide scientific guidance and support for research related to flour fortification.
APPENDIX 4.

Photos from the workshop.

Left to Right: Robert Baldwin (Flour Fortification Initiative) and Ayman Abu Laban (UNICEF Turkey)
Left to Right: Ibrahim Parvanta (Independent Consultant), Thomas Hanke (Muhlenchemie), Lena Kampehl (Muhlenchemie), Laird Ruth (CDC and FFI), and Althea Grant (CDC)
Left to Right: Ibrahim Parvanta (Independent Consultant), Hamed Pouraram (Ministry of Health, Iran), Helene McNulty (University of Ulster), Helena Pachón (FFI)
Left to Right: Becky Handforth (FFI), Sophie Moroshkina (UNICEF), Vilma Tyler (UNICEF)
Left to Right: Kate Wheeler (FFI), Tahire Maloku-Gjergji (National Institute of Public Health, Kosovo), Ilirjana Zymberaj (Food and Veterinary Agency, Kosovo)
Left to Right: Albes Rama (Albania), Robert Baldwin (FFI), Mariana Bukli (Albania).