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# Training Workshop and Cooking Demonstrations Report

**FishFirst! Zambia: Research for Development and Scaling Staple-Fish Products for Enhanced Nutrition in the First 1,000 Days of Life.**

**Siavonga, Sinazongwe and Gwembe, Southern Province, Zambia**

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## List of acronyms

ASF	Animal source foods
ComFA+	Complementary Food for Africa + dried fish powder
MSU	Mississippi State University
WRA	Women of Reproductive Age
IYC	Infant and Young Child

## 1.0 EXECUTIVE SUMMARY

The FishFirst! Zambia Research for Development and Scaling Staple-Fish Products for Enhanced Nutrition in the First 1,000 Days of Life training workshop was conducted on the 21<sup>st</sup> of June 2022. The workshop was led by Mississippi State University (MSU) and WorldFish. The workshop was conducted in the Siavonga district of Southern Zambia. The training workshop activities included pre-posttest, presentations, open discussions and question and answer sessions, cooking demonstrations, and demonstrations on how to dry nutrient-dense food for ComFA+ and pack dried powders for nutrient-dense foods. The training was conducted in both Nyanja and Tonga. The presentations and discussions (theory) were conducted at Freshview Hotel, while the cooking demonstrations were conducted at the Pub and Grill.

Mothers acquired knowledge and skills on improving child nutrition, health, and household diet through learning about ComFA+Dried Fish Powder and other locally available foods. They also learnt how to make dried fish powder by properly drying Kapenta, roasting it to remove any 'fishy' taste, and grinding it into a fine powder. They learnt how to easily mix the dried fish powder with other locally sourced nutritious ingredients such as groundnut powder, orange-fleshed sweet potato, soybean powder and pumpkin leaves. Combining these ingredients with fish powder from small pelagic fish improves the nutritional benefits of complementary foods for children aged 6-23 months, staple foods for WRA, and staple foods for all household members. Mothers further learnt about other dried food powders such as dried soybean flour, mushroom powder, orange-fleshed sweet potato powder, and groundnut powder that can be produced locally by women/youth operating microenterprises. The mothers finally learnt how to make two ComFA+-fortified dishes that have the potential to be marketed locally by women/youth entrepreneurs. These dishes included: ComFA+ Cassava Balls and ComFA+ Nutri-Cookies.

Training workshops such as this one should be repeated regularly to refresh mothers' knowledge and encourage them to use ComFA+traditional foods to fight hidden hunger and improve birth outcomes among WRA and developmental outcomes among children aged 6-23 months. The training workshop should also be scaled up to others parts of Zambia where small fish is accessible and hidden hunger is prevalent.



## 2.0 INTRODUCTION

### 2.1 BACKGROUND

The FishFirst! Zambia project conducted a nutrition training for women of reproductive age in Southern Zambia to contribute to better nutritional outcomes during the first 1000 days of life. The workshop was led by Mississippi State University (MSU) and WorldFish Zambia. The women were accompanied by their children aged 6-23 months. The 1000 most critical days in life is the period between conception to the child's second birthday (WHO, 2022). During this period, good nutrition should be promoted to benefit women of reproductive age (WRA) and their children. Children aged 6-23 months are particularly vulnerable to stunting and chronic micronutrient deficiencies also known as hidden hunger. Consumption of fish especially small fish is known to reduce stunting (Marinda et al., 2018). Small fish dried whole, with heads, bones and organs, are a concentrated source of essential nutrients important in the first 1000 days of life (Longley et al., 2014). They contain animal protein, essential fats, essential micronutrients, minerals and vitamins (Thilsted, 2012).

The training workshop aimed to promote 1) increased fish consumption among IYC and all household members, 2) understanding the five forms of child malnutrition (wasting, stunting, underweight, micronutrient deficiencies, obesity), 3) understanding the importance of dietary diversity to combating stunting and hidden hunger among IYC, 4) learning about how small dried pelagic fish are nutrient-dense and can combat stunting and hidden hunger, 5) learning how small dried pelagic fish can be ground to a fine powder and added to meals for IYC and all household members, and 6) learning about the importance of WASH (water, sanitation, and hygiene) to help promote overall health for IYC and all household members.

### 2.2 OBJECTIVES OF THE TRAINING WORKSHOP

The objectives of the training workshop were to provide mothers with knowledge of how to improve child nutrition, health, and household diet through:

- 2.2.1 Learning about ComFA+, which stands for "Complementary Food for Africa+Dried Fish Powder," and how its key ingredient is locally sourced small pelagic fish such as Kapenta or Chisense that are dried, roasted to remove any 'fishy' taste, and ground into a fine powder.
- 2.2.2 Learning about how dried families can mix the dried fish powder with other locally sourced nutritious ingredients such as groundnut powder, orange-fleshed sweet potato, soybean powder and pumpkin leaves.

2.2.3 Learning that mixing dried fish powder and other locally sourced nutrient-dense foods improves the nutritional benefits of complementary foods for IYC, staple foods for WRA, and staple foods for all household members.

2.2.4 Learning about other dried food powders, such as dried soybean flour, mushroom powder, orange-fleshed sweet potato powder, and dried groundnut powder that can be produced locally by women/youth operating micro-business enterprises.

2.2.5 Learn how to make two ComFA+-fortified dishes that have the potential to be marketed locally by women/youth entrepreneurs. These dishes included: 1) ComFA+ Cassava Balls), and 2) ComFA+ Nutri-Cookies.



## 3.0 TRAINING WORKSHOP METHODOLOGY

The training workshop was conducted on the 21<sup>st</sup> of June 2022. The activities included pre and post-tests, presentations, videos, open question and answer sessions, discussions, cooking demonstrations, demonstrations on drying nutrient-dense food to be combined with ComFA+ and demonstrations on how to pack dried nutrient-dense food powders. The theory part of the training workshop was conducted at Freshview Hotel. In contrast, the cooking demonstrations were conducted at the Pub and Grill in the Siavonga district of Southern Province in Zambia.

### 3.1 PRE AND POST TEST

We adopted the Pre & Post-test method following the IYC facilitators' guide (WHO, 2006). The workshop started with a pre-test and ended with a post-test. During the pre and post-tests, the same set of quiz questions were asked to the mothers orally by one of the facilitators. Mothers were asked to close their eyes when answering each question. They were asked to raise their open palm to answer "YES" and to make a fist to answer "NO". The facilitators counted the number of those that answered the question correctly and recorded the numbers for both tests.

### 3.2 LECTURES AND OPEN DISCUSSIONS

The lectures and open discussion sessions were facilitated by two people. The first part of the lectures covered nutrition concepts in the 1000 most critical days in life under the slogan "FishFirst! Zambia, Nutrition for healthy women and healthy children in the first 1000 days of life". Topics included; malnutrition and what improves nutrition, emphasizing a diverse diet of nutrient-rich foods in all stages of life. Other topics were nutrition and serving sizes covering age-appropriate texture, meal frequency and amount of food per meal. The UNICEF video on Infant and Young Child Feeding summed all this up in Tonga. Tonga language was also the medium of communication for the lectures. Tonga is the predominant language in Southern Province as the Tonga people are the dominant ethnic group (Zulu et al., 2019). Mothers raised questions that the facilitators addressed during this part of the training (Table 2).

The Second part of the training workshop was on fish and nutrition. The first topic was on why women and children should eat Kapenta. Participants were led through a discussion that showed the positive health outcomes during the various stages in the life cycle, such as among pregnant and lactating mothers, infants and young children and adolescents and adults. Nutrients that Kapenta provides were the topic that followed. It contains essential minerals, essential fatty acids and essential vitamins. The benefits of dried Kapenta include

it being tasty, affordable, a powerhouse of concentrated nutrients and the fact that it combats stunting and hidden hunger. How to prepare Kapenta powder was equally covered. In addition, participants were informed that dried fish powder could be added to family meals and food for Infants and young children. Food such as porridge, soups, vegetables and many other dishes could benefit from adding fish powder, improving the food's taste and making it nutrient-dense (figure 1).



Figure 1. How to prepare a ComFA+Fortified dish

The Safe Water, Sanitation and Hygiene (WASH) topic was also covered. Facilitators emphasized that mothers and children should wash their hands with soap often. The key times to wash hands with soap included 1) before feeding a child, 2) before preparing food, 3) after using a latrine, and 4) after cleaning a baby's bottom. Mothers were reminded to dispose child's stool in a latrine or to bury it. The five key ways to prevent diarrhea were discussed. These included 1) handwashing with soap at key times, 2) giving a child (over six months) safe water which is boiled or treated to drink, 3) practicing good food hygiene, 4) community members using latrines or burying stool.

### 3.3 THE UNICEF VIDEO

The theory part of the training workshop was wrapped up with a UNICEF video on IYCF highlighting the importance of animal-source foods, including fish, in fighting hidden hunger among children aged 6-23 months. The video was in Tonga Language, a dominant language in the Southern Province of Zambia, including the three project districts<sup>7</sup>.

### 3.4 COOKING DEMONSTRATIONS

One of the objectives of the training workshop was to teach mothers how to make four ComFA+-fortified traditional dishes to increase their nutritional content for IYC, WRA, and all household members. These dishes include: 1) ComFA+Traditional maize porridge, 2) ComFA+Kapenta Chutney, 3) ComFA+Chibwabwa Fisashi (a dark green leafy vegetable (DGLV) dish made from dried pumpkin leaves, and 4) ComFA+Bean-Vegetable Soup (table 1). The participants were divided into four groups. Each group selected a fish recipe to

prepare. They prepared the brazier, cooking utensils and ingredients. Details of recipes are shown in appendix II.

Table 1 Recipes

Recipe	Ingredients
ComFA+Fish-bean-vegetable-soup	Dried kapenta powder, maize meal, soybean flour, bean flour, dried mushroom powder, onion powder, garlic powder, salt and vegetable oil.
ComFA+Fish-maize meal porridge	Dried kapenta powder, maize meal, groundnut powder, orange sweet potato powder and sugar
ComFA+Fish chutney	Dried kapenta powder, groundnut powder, onion, chilli powder, salt and vegetable oil.
ComFA+Chibwabwa fisashi	Dried kapenta powder, pumpkin leaves (can be fresh or dry) groundnut powder, and salt.
ComFA+Nutritious cookies and	Cake Flour, White sugar, Cooking oil, Dried small fish powder*, Baking powder, Orange Sweet Potato powder, Milk powder, Cassava flour, Salt, Whole egg and vanilla.
ComFA+Cassava balls	Cassava flour, Dried small fish powder*, Ginger powder, Onion powder, Garlic powder, Salt, Orange Sweet Potato powder, White sugar, Irish potato powder, curry leaves, Water.

Source: WorldFish. Fish-Based Recipes. (2017)

### 3.5 DRYING AND STORING FISH POWDER AND TRADITIONAL FOODS

A short demonstration on how to dry nutrient-dense foods using a 3-tray hanging drying net in was carried out (figure 4). This was to show mothers how they can successfully dry nutrient-dense foods for ComFA+ MNP while preserving their nutritional content as much as possible. There was also a display of fish powder and powders made from other nutrient-dense foods (figure 5).

## 4.0 WORKSHOP OUTPUTS

### 4.1 WORKSHOP ATTENDANCE

A total of 52 participants attended the training workshop. Most participants [80.8 % (42/52)] were mothers of children aged 6-23. Others were people from the government (11.5% [6]) and private sector (7.7 % [4]) (see Table 1).

Table 2 Training Workshop Participants

N=52	Total %(n)	Gwembe District % (n)	Siavonga District % (n)	Sinazongwe District % (n)
Mother/Child pairs	80.8(42)	33.3 (14)	33.3 (14)	33.3 (14)
People in government	11.5(6)	33.3(2)	33.3(2)	33.3(2)
Private Sector	7.7(4)	25.0(1)	50.0(2)	25.0(1)

### 4.2 PRE AND POST TEST

There was a general improvement among mothers in terms of knowledge. Figure 2 shows general increases in the number of mothers who gave correct answers during the post-test. This improvement in knowledge shows that learning took place following effective facilitation.

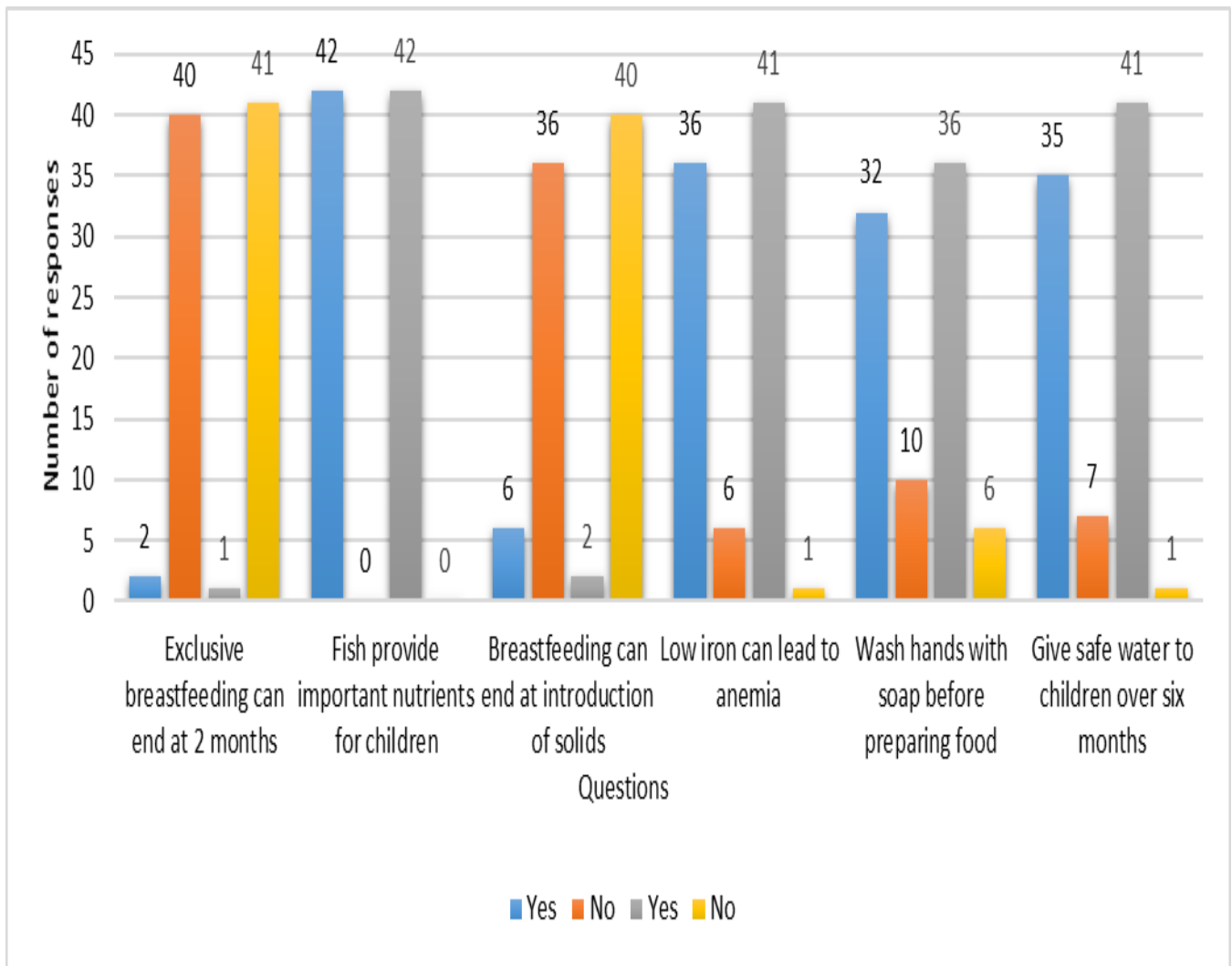


Figure 2 Pre-post test results

### 4.3. DISHES PREPARED DURING THE COOKING DEMONSTRATIONS

Four dishes namely; ComFA+Fish-bean-soup, ComFA+Maize-meal-porridge, ComFA+Kapenta chutney and ComFA+chibwabwa/fisashi were prepared together with the mothers in respective groups during cooking demonstrations. These were used for the Taste-Test study (figure 3).



Figure 3 COMFA+Dishes prepared

#### 4.4. DRYING COMFA+TRADITIONAL FOODS

Nutrient-dense foods for ComFA+ MNP dried in advance were displayed in the 3-tray hanging dry net (food dehydrator) under the shade. All locally available nutrient-dense foods can successfully be dried using the food dehydrator (figure 4).





Figure 4. Food dehydrator: 3-tray hanging drying net

#### 4.5. DISPLAY OF COMFA+NUTRIENT DENSE FOOD POWDERS

ComFA+Nutrient-dense food powders displayed include Kapenta powder, orange-fleshed sweet potato powder, dried mushroom powder and bean powder. Other powders are groundnut powder and green leafy vegetable powders (figure 5).



Figure 5 Displaying ComFA+Nutrient Dense Food Powders

## 4.6. QUESTIONS AND ANSWERS FROM THE TRAINING WORKSHOP

Participants asked several questions during the first part of the training workshop. Two separate questions were asked about linear growth. A participant wanted to know why some children are static, referring to those children who fail to achieve age-appropriate linear growth. Whether two short parents could produce a tall child was another related question. In addition, two separate mothers wanted to know why some children are overweight, born overweight or too big. Lastly, there was a report of some children refusing to eat, and a participant wanted to know the cause. Detailed appropriate responses are shown in table 3.

Table 3 question and answers from training

Question from participants	Response from trainer
Why are some children static	Several reasons can cause children to be static, but usually, it's due to poor nutrition, starting when the mother is pregnant with the child. If her nutrition is not adequate, it can manifest in their child being stunted. Other causes are suboptimal infant feeding practices, such as the early introduction of non-breast milk substances before six months, recurrent infections, and poor sanitation.
Why are some children overweight	Being overweight in children is mainly due to high caloric diets, usually given to children as sugar-sweetened beverages and highly processed and sometimes fried food such as potato chips. It could also be due to physical inactivity, and a few cases could be due to genetics.
Why are some children born overweight or too big?	Over-nutrition by the mother during pregnancy, but some extremely big babies could be a result of gestational diabetes on the part of the mother
Can parents who are both short have a tall child?	Yes, they can, especially if their shortness is due to poor nutrition. The parents can take steps to break the undernutrition cycle. Some actions include early antenatal care booking, supplementation (ferrous/folic), deworming, treatment/prevention of diseases such as malaria, and good nutrition to provide adequate nutrients during pregnancy.
Why do some children refuse to eat	Some children may refuse to eat due to factors such as poor appetite, lack of variety in the diet, non-responsive feeding, cooking methods (texture of the food not appealing to the child) and being force-fed.

## 4.7 ACTION PLANS FOR MOTHERS

Mothers were asked to develop an action plan for steps they would take after the training.

They mentioned the following:

1. Orientation of fellow mothers in their community on fish powders and appropriate feeding practices was a cross-cutting plan of action by mothers following the training workshop. Gwembe and Sinazongwe mothers clearly stated that they would teach fellow mothers how to dry ComFA+fish and other locally available foods and make powder for use in recipes such as ComFA+porridge.
2. Mothers in Gwembe and Siavonga planned to put into practice the drying and making of powders and porridge for babies out of ComFA+Fish and other locally available foods.
3. Siavonga and Sinazongwe mothers indicated plans to start small businesses of packaging and selling fish powders.
4. Lastly, Sinazongwe mothers planned to orient the headmen (community leaders) and work closely with the health facility staff in promoting ComFA+Traditional foods (table 4).

Table 4 Action Plans for Mothers

	Gwembe	Siavonga	Sinazongwe
5.0	Orientation of our fellow mothers in the community	1. Teach others in the community	1. Hold a meeting with headmen
6.0	We will teach the mothers about how to dry Kapenta, pumpkin leaves, sweet potato and pounding	2. Starting to practice food preservation	2. Work closely with the health facility staff
7.0	Teach mothers how to dry and cook fish porridge	3. Drying sweet potatoes, mushrooms, Kapenta, Chibwabwa, Irish potatoes, groundnuts, beans, soya beans, fish, cowpeas, rape, mupilu, Kalembula, Kachesha	3. Community sensitization
8.0	At the individual level prepare fish porridge for the babies	4. Grind the above items to make powders and store the powders in plastics or plastic containers	4. Teach them the theory
		5. Prepare nutritious food for babies.	5. Conduct cooking demonstrations in Zones using locally available foods such as dry fish, pumpkin leaves, groundnuts, soybeans etc.
		6. In the near future we will start the business of packaging and selling	6. Make more for sale

## 5.0 CONCLUSION AND RECOMMENDATIONS

Mothers acquired knowledge and skills on improving child nutrition, health, and household diet through learning about ComFA+Dried Fish Powder and other locally available foods. They also learnt how the key ingredient, the locally sourced dried pelagic fish (Kapenta), can be roasted to remove any 'fishy' taste and ground into a fine powder. They learnt how dried fish powder can be mixed with other nutritious ingredients that are also locally sourced – such as groundnut powder, orange-fleshed sweet potato, soybean powder, and pumpkin leaves. They learnt that mixing dried kapenta powder with other locally available nutrient-dense foods would improve the nutritional benefits of complementary foods for children aged 6-23 months, staple foods for WRA, and staple foods for all household members. Mothers further learnt about the many forms of dried food powders, including soybean flour, mushroom powder, orange-fleshed sweet potato powder, and groundnut powder, that women managing small micro-business enterprises could produce and sell. The mothers finally learnt how to make two ComFA+-fortified dishes that have the potential to be marketed locally by women/youth entrepreneurs. These dishes included: ComFA+ Cassava Balls) as well as ComFA+ Nutri-Cookies.

Training workshops such as this one should be repeated regularly to refresh mothers' knowledge and encourage them to use ComFA+traditional foods to fight hidden hunger and improve birth outcomes among WRA and developmental outcomes among children aged 6-23 months. The training workshop should also be scaled up to other parts of Zambia where small fish may be accessible and hidden hunger is high.

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## 7.0 ANNEXES

### ANNEX 7.1 PRE AND POST TEST QUIZ

#### Instructions

1. EXPLANATION: In order to understand everyone's current knowledge related to nutrition and health:
2. We are going to ask you some quiz questions
3. And we will ask you to close your eyes to give your answers to each question
4. If you think the answer is YES, raise your open palm
5. If you think the answer is NO, make a fist
6. Then we will go over each question and answer together

#### Questions

1. Exclusive breastfeeding can end when an infant is 2 months old: YES or NO?
2. Dried Kapenta and other fish provide important nutrients for infants and children: YES or NO?
3. When an infant starts eating solid foods, breastfeeding can end: YES or NO?
4. Low iron can lead to anemia: YES or NO?
5. One of the 4 key times to wash hands with soap is before preparing food: YES or NO?
6. One of the 5 key ways to prevent diarrhea is giving children (over 6 months) safe water that has been boiled or treated: YES or NO?

#### Answers

Exclusive breastfeeding can end when an infant is 2 months old:

ANSWER: NO – Exclusive breastfeeding can end when an infant starts eating solid foods at 6 months.

Dried Kapenta and other fish provide important nutrients for infants and children:

ANSWER: YES – Dried Kapenta and other fish are rich in nutrients like iron and vitamin A. Such nutrients help improve children's brain development, growth, and eyesight.

When an infant starts eating solid foods, breastfeeding can end:

ANSWER: NO – Breastfeeding should continue until the child is at least 2 years old.

Low iron can lead to anemia: YES or NO?

ANSWER: YES – Iron is essential for child survival and development. Lack of iron causes weakness, tiredness, and can lead to anemia.

One of the 4 key times to wash hands with soap is before preparing food: YES or NO?

ANSWER: YES – The 4 key times to wash hands with soap include:

- 1) Before feeding a child
- 2) Before preparing food
- 3) After using a latrine
- 4) After cleaning a baby's bottom

One of the 5 key ways to prevent diarrhea is giving children (over 6 months) safe water that has been boiled or treated:

ANSWER: YES – The 5 key ways to prevent diarrhea include:

- 1) Handwashing with soap at key times
- 2) Giving child (over 6 months) safe water – boiled or treated
- 3) Following food hygiene practices



- 4) All community members using a latrine and burying stool
- 5) Keeping child away from animal stool by keeping the compound clean

## ANNEX 7.2 RECIPES FOR NUTRITION TRAINING

### Recipe no.1: Nutritious Cookies

Item	Quantity (g) No. of products/pieces (240)
a. Cake Flour	900
b. White sugar	240
c. Cooking oil	400
d. Dried small fish powder*	160
e. Baking powder	2 tsp
f. Orange Sweet Potato powder	80
g. Milk powder	100
h. Cassava flour	100
i. Salt	1.3 tsp
j. Whole egg	4
k. vanilla	4 tsp

#### Procedure:

1. Mix all dry ingredients in a bowl, add 10ml of water.
2. Beat the egg in a small bowl then add the ghee.
3. Add the egg and ghee mixture to the dough.
4. Mix until smooth.
5. Let it rest for 10 minutes.
6. Cut in fancy shapes.
7. Place in oven at 176<sup>o</sup> C for one hour.

#### No. of cookies: 240 pcs.

	Energy	Carb	Pro	Fat
1 cookie	37 kcal	4 grams		0.7 grams 2 grams

Note: Estimate only, values are based on FCT from Thailand, Philippines & Bangladesh

### Recipe no.2: Cassava balls

Item	Quantity (g) No. of products/pieces (100)
a. Cassava flour	700

b. Dried small fish powder*	60
c. Ginger powder	5 teaspoon
d. Onion powder	60
e. Garlic powder	5 teaspoon
f. Salt	5 teaspoon
g. Orange Sweet Potato powder	2.5 tablespoon
h. White sugar	5 teaspoon
i. Irish potato powder	5 teaspoon
j. curry leaves	25 pcs.
k. Water	1000 ml

**Procedure:**

1. Mix all the dry ingredients.
2. Add the water and mix until smooth.
3. Add curry leaves.
4. Shape into balls.
5. Deep fry the balls until golden brown.

No. of chickpea balls: 100 pcs

	Energy	Carb	Pro	Fat
1 pc	73 kcal	4 gram	2 grams	5 grams

Note: Estimate only, values are based on FCT from Thailand, Philippines & Bangladesh

**Recipe no. 3: Fish-bean-vegetable-soup**

Item	Quantity (tbsp.) No. of servings (60)
a. Kapenta powder	30 tbsp.
b. Maize meal	20 tbsp.
c. Soybean flour	20 tbsp.
d. Bean flour	30 tbsp.
e. DGLV powder	30 tbsp.
f. Dried mushroom powder	30 tbsp.
g. Onion powder	20 tbsp.
h. Garlic powder	10 tbsp.
i. Salt	20 tbsp.

j. Vegetable oil 30 tbsp.

#### Recipe no.4: Fish-maize meal porridge

Item	Quantity (cups) No. of servings (60)
a. Kapenta powder	1
b. Maize meal	4
c. Groundnut powder	1
d. Orange sweet potato powder	2
e. Sugar to taste	

#### Recipe no.5: Fish chutney

Item	Quantity (tbsp.) No. of servings (60)
a. Dried kapenta	60 tbsp.
b. Groundnut powder	24 tbsp.
c. Onion	60 tbsp.
d. Chilli powder	6 tbsp.
e. Salt	12 tbsp.
f. Vegetable oil	24 tbsp.



#### About WorldFish

WorldFish is an international, not-for-profit research organization that works to reduce hunger and poverty by improving fisheries and aquaculture. It collaborates with numerous international, regional and national partners to deliver transformational impacts to millions of people who depend on fish for food, nutrition and income in the developing world. Headquartered in Penang, Malaysia and with regional offices across Africa, Asia and the Pacific, WorldFish is a member of CGIAR, the world's largest global partnership on agriculture research and innovation for a food secure future.