



# Managing the Supply Chain of Specialized Nutritious Foods

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# Managing the Supply Chain of Specialized Nutritious Foods



# About this Guideline

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## Purpose

Specialized nutritious foods (SNF) are increasingly recognized as a viable and efficient component of programmes to treat and prevent undernutrition.

This publication has been produced to provide comprehensive guidance on supply chain management of SNF. Its purpose is twofold:

- 1.** to improve planning, procurement, and delivery of nutritious foods to beneficiaries; and
- 2.** to maintain the nutritional quality of SNF by promoting optimal control during transport, storage, stock management and distribution.

This guideline merges existing information on nutrition intervention planning, procurement, quality management and logistics. It will serve as an operational tool in the field, supporting staff from WFP and the wider humanitarian and development community. Each chapter presents guidance, references for further information, and ‘golden rules’ for practice at each stage of the supply chain.

## Scope

This guideline addresses the use of SNF in nutrition interventions to:

- treat moderate acute malnutrition (wasting);
- prevent acute malnutrition (wasting);
- prevent chronic malnutrition (stunting); and
- address micronutrient deficiencies among vulnerable people.

SNF can also be used in other programming, for example general food distributions, school feeding, and food for assets. It is important to note that SNF are meant to be consumed in addition to the regular diet.

This guideline does not cover the use of SNF in the treatment of severe acute malnutrition (SAM). However, general principles relating to procurement, logistics, distribution and maintaining food quality are fully applicable in this context, too.

SNF differ from other commodities, such as staple foods, in several ways. Purchasing the right quality and maintaining it along the supply chain is challenging. For example:

- programme design can be complicated if the government hasn't incorporated SNF into their guidance and standards, or if programme designers are not familiar with using SNF;
- procurement planning needs to take into account the limited number of suppliers, limited stock availability, lead times and contingency planning;

- transport can be complex because the products need to be protected from high temperatures, and because cartons of different sizes complicate load plans for trucks;
- warehousing requirements may include temperature control, and monitoring will be necessary to maintain product quality;
- stock management must include detailed inventory data as Best Before Date (BBD) is one of the main considerations;
- traceability (tracking and tracing) must be in place in case of product recalls.

## Use

This guideline consolidates information currently available and builds on core materials used by different organizations. In some areas, little formal guidance exists at present; in these instances, issues are presented for consideration. The guideline will be updated on a regular basis to include the most recent developments.

This publication does not provide in-depth technical information; instead it provides references for resources from which additional information can be obtained.

Users seeking guidance on a particular topic should consult the table of contents and the index. The glossary in Chapter 9 explains the most common terms related to SNF.

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## Acknowledgements

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# Abbreviations

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<b>ART</b>	Antiretroviral Therapy
<b>BBD</b>	Best-before date
<b>BSFP</b>	Blanket supplementary feeding programme
<b>BMI</b>	Body Mass Index
<b>C&amp;F</b>	Carry and Forwarding
<b>CMAM</b>	Community Management of Acute Malnutrition
<b>CoA</b>	Certificate of Analysis
<b>CSB</b>	Corn Soy Blend
<b>DOTS</b>	Direct Observed Treatment Short-course
<b>EDP</b>	Extended delivery point
<b>ETA</b>	Expected time of arrival
<b>FBF</b>	Fortified blended foods
<b>FDP</b>	Final delivery point
<b>FEFO</b>	First Expired, First Out
<b>FIFO</b>	First In First Out
<b>FIM</b>	Food incident management
<b>GAM</b>	Global acute malnutrition
<b>GMO</b>	Genetically Modified Organism
<b>HIV</b>	Human Immunodeficiency Virus



<b>I.D.E.A.L.</b>	Initiate, Detect, Estimate, Act, Learn
<b>IU</b>	International Unit
<b>IYCF</b>	Infant and young child feeding
<b>LNS</b>	Lipid-based nutrient supplement
<b>MAM</b>	Moderate acute malnutrition
<b>M&amp;E</b>	Monitoring and evaluation
<b>MND</b>	Micronutrient deficiency
<b>MNP</b>	Micronutrient powders
<b>MUAC</b>	Mid-upper arm circumference
<b>PLW</b>	Pregnant and lactating women
<b>SAM</b>	Severe acute malnutrition
<b>SNF</b>	Standardized nutritious foods
<b>TB</b>	Tuberculosis
<b>TSFPs</b>	Targeted supplementary feeding programmes
<b>UL</b>	Tolerable Upper Intake Level
<b>UNHCR</b>	United Nations High Commissioner for Refugees
<b>UNICEF</b>	United Nations Children’s Fund
<b>WFP</b>	World Food Programme
<b>WHO</b>	World Health Organization

# Contents

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<b>About this Guideline</b>	<b>i</b>
<b>Purpose</b>	<b>i</b>
<b>Scope</b>	<b>ii</b>
<b>Use</b>	<b>iii</b>
<b>Acknowledgements</b>	<b>iv</b>
<b>Abbreviations</b>	<b>v</b>
<b>Figures and tables</b>	<b>xiii</b>
<b>Chapter 1. Specialized nutritious foods</b>	<b>1</b>
<b>In this chapter</b>	<b>1</b>
<b>1.1 Background</b>	<b>2</b>
1.1.2 Physical characteristics of SNF	6
<b>1.2 Elements to be considered in         SNF supply chain management</b>	<b>8</b>
1.2.1 Temperature	8
1.2.2 Shelf life	9
1.2.3 Availability	10
1.2.4 Lead time	10
1.2.5 Product traceability	12
<b>1.3 Why product quality management         is important for SNF</b>	<b>12</b>
<b>1.4 Golden rules</b>	<b>13</b>

<b>Chapter 2. Supply chain planning</b>	<b>15</b>
<b>In this chapter</b>	<b>15</b>
<b>2.1 The supply chain for SNF</b>	<b>16</b>
<b>2.2 Connecting key stakeholders</b>	<b>18</b>
2.2.1 Improving awareness along the SNF supply chain: internally and externally	18
2.2.2 Exchanging information for action	19
2.2.3 Addressing geographic constraints and climate variability	20
2.2.4 Uncertainty of demand and supply	21
2.2.5 Transport and storage conditions	22
2.2.6 Availability of resources	23
<b>2.3 Golden rules</b>	<b>24</b>
<b>Chapter 3. Managing the supply chain: determining the SNF demand</b>	<b>25</b>
<b>In this chapter</b>	<b>25</b>
<b>3.1 Determining the right product for the right response</b>	<b>28</b>
<b>3.2 Calculating estimated beneficiary numbers</b>	<b>42</b>
3.2.1 To treat moderate acute malnutrition in children aged 6-59 months and pregnant and lactating women	44
3.2.2 To treat moderate acute malnutrition in individuals on HIV or TB treatment	46
3.2.4 The use of SNF in non-nutrition programming	50
<b>3.3 Estimating overall SNF supply needs</b>	<b>51</b>
<b>3.4 Additional considerations for the order cycle</b>	<b>52</b>
3.4.1 Expected fluctuations	53
3.4.2 Unexpected fluctuations	54
<b>3.5 Golden rules</b>	<b>56</b>

<b>Chapter 4. Managing the supply chain: food quality</b>	<b>59</b>
<b>In this chapter</b>	<b>59</b>
<b>4.1 Specific issues that can be associated with SNF</b>	<b>61</b>
<b>4.2 Principles of quality management</b>	<b>66</b>
<b>4.3 Principles of product analysis throughout the supply chain</b>	<b>70</b>
4.3.1 How to manage the sampling process (WFP)	70
4.3.2 How to manage the analysis process	71
4.3.3 Use of Certificate of Analysis	72
<b>4.4 Visual inspection during handling</b>	<b>73</b>
<b>4.5 Traceability (tracing and tracking)</b>	<b>74</b>
<b>4.6 How to react in the event of food incidents</b>	<b>75</b>
4.6.1 What are food incidents?	76
4.6.2 How to systematically deal with SNF food incidents: the I.D.E.A.L. concept of incident management	77
4.6.3 How to respond to a food incident	82
<b>4.7 Golden rules</b>	<b>85</b>
<b>Chapter 5. Managing the supply chain: procurement of SNF</b>	<b>87</b>
<b>In this chapter</b>	<b>87</b>
<b>5.1 The procurement process</b>	<b>89</b>
5.1.1 Selection of the supplier	90
5.1.2 Ordering strategy	92
<b>5.2 Product analysis at supplier level (WFP)</b>	<b>93</b>
<b>5.3 Supplier performance monitoring (WFP)</b>	<b>95</b>
<b>5.4 Development of local suppliers</b>	<b>95</b>
5.4.1 Production cost	98
5.4.2 Market study	99
5.4.3 Corrective Action and Preventive Action (CAPA) plan	100
<b>5.5 Golden rules</b>	<b>101</b>

**Chapter 6. Managing the supply chain: logistics** **103**

**In this chapter** **103**

**6.1 Reception and handling** **105**

6.1.1 Reception and handling –  
general recommendations 105

6.1.2 A word about customs 110

**6.2 Transport** **112**

6.2.1 Air, sea or land – general considerations 112

6.2.2 By air 113

6.2.3 By sea 115

6.2.4 By land 117

**6.3 Warehouse management, and storing SNF** **117**

6.3.1 Warehouse considerations 118

6.3.2 Factors that affect temperature in storage facilities 119

6.3.3 Improvements and modification of storage facilities 127

**6.4 Stock management** **130**

6.4.1 Calculating stowage factor 130

6.4.2 Determining warehouse space requirements 134

6.4.3 Managing stocks 136

**6.5 Delivering and storing at partner level** **137**

**6.6 Golden rules** **140**

**Chapter 7. Managing the supply chain:  
distribution to beneficiaries** **143**

**In this chapter** **143**

**7.1 Food safety** **144**

**7.2 Stock replenishment** **148**

**7.3 Considerations for waste management** **149**

**7.4 Golden rules** **151**

<b>Chapter 8. Annexes</b>	<b>153</b>
<b>Annex 1. Causes of undernutrition</b>	<b>155</b>
<b>Annex 2. Indicators of acute malnutrition</b>	<b>156</b>
<b>Annex 3. Thresholds</b>	<b>159</b>
Assessing the prevalence of acute malnutrition	159
Assessing the prevalence of stunting	160
Assessing micronutrient status and food intake information	161
<b>Annex 4a. Summary of nutrition interventions at WFP</b>	<b>162</b>
Treatment of moderate acute malnutrition with targeted supplementary feeding programmes (TSFP)	162
Prevention of acute malnutrition with blanket supplementary feeding programmes (BSFP)	163
The food-based element of prevention of chronic malnutrition with complementary feeding	164
Addressing micronutrient deficiencies through home or point-of-use fortification	164
<b>Annex 4b. Non-nutrition interventions that may use SNF</b>	<b>166</b>
General food distribution	166
Emergency school feeding	168
<b>Annex 5. Incoterms</b>	<b>169</b>
<b>Annex 6. ISO 9001 in relation to SNF</b>	<b>172</b>
<b>Annex 7. Product disposal checklist</b>	<b>175</b>
Checklist for product disposal	175
<b>Annex 8. Overview of the FIM process</b>	<b>178</b>
<b>Annex 9. Quarantining SNF</b>	<b>180</b>
<b>Annex 10. Checklist for reception</b>	<b>182</b>
<b>Annex 11. Most commonly used helicopters</b>	<b>184</b>

<b>Chapter 9. Glossary</b>	<b>185</b>
<b>Chapter 10. Hand-outs</b>	<b>195</b>
<b>Hand-out 1.</b> Food incident management	196
<b>Hand-out 2.</b> Storage recommendations for small storage areas: key points for adequate storage of specialized nutritious foods	199
<b>Hand-out 3.</b> Specialized nutritious foods. Golden rules	202
<b>Hand-out 4.</b> Supply chain planning. Golden rules	203
<b>Hand-out 5.</b> Managing the supply chain: determining the SNF demand. Golden rules	204
<b>Hand-out 6.</b> Managing the supply chain: food quality. Golden rules	206
<b>Hand-out 7.</b> Managing the supply chain: procurement of SNF. Golden rules	207
<b>Hand-out 8.</b> Managing the supply chain: logistics. Golden rules	208
<b>Hand-out 9.</b> Managing the supply chain: distribution to beneficiaries. Golden rules	210
<b>Index</b>	<b>213</b>
<b>Image credits</b>	<b>218</b>

# Figures and tables

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## Figures

Figure 1.	The physical characteristics of SNF	6
Figure 2.	Supply chain management: an end-to-end process view	17
Figure 3.	Interdepartmental discussions in supply chain planning	19
Figure 4a.	WFP Specialized Nutritious Food Sheet 1	38
Figure 4b.	WFP Specialized Nutritious Food Sheet 2	40
Figure 5.	Variables in the calculation of estimated beneficiary numbers	42
Figure 6.	Estimating beneficiary numbers for MAM treatment programmes	45
Figure 7.	Estimating caseload in HIV programming	46
Figure 8.	Estimating caseload in TB programming	47
Figure 9.	Estimating beneficiary numbers for prevention programmes	49
Figure 10.	WFP's formula to estimate overall SNF needs for a nutrition intervention	51
Figure 11.	WFP's food safety and quality system	66
Figure 12.	Overview of the I.D.E.A.L. concept	77
Figure 13.	Example of a WFP FIM reporting structure	78
Figure 14.	Structuring for incident detection	79
Figure 15.	Some things to look for in incident reports	82



Figure 16.	The incident response decision tree	83
Figure 17.	Procurement process components	89
Figure 18.	COA evaluation decision tree	94
Figure 19.	Examples of different stack configurations	108
Figure 20.	Calculating the volume of a unit of SNF	132
Figure 21.	Converting weight from kilos to metric tons	132
Figure 22.	Calculating stowage factor for shipping	133
Figure 23.	Calculating stowage factor for warehousing	134
Figure 23:	Factors that contribute to undernutrition	155
Figure 24.	Incoterms 2010 rules	170
Figure 25.	The FIM process	178
Figure 26.	Marking quarantined goods	181

## Tables

Table 1a.	Food incident triggers: the main safety issues	62
Table 1b.	Food incident triggers: the main acceptability issues	64
Table 1c.	Food incident triggers: the main nutrition issues	65
Table 2.	Quality management in the SNF supply chain	68
Table 3.	Comparison of container loads of conventional commodities and SNF	115
Table 4.	Stowage factors and warehouse factors for the most frequently-used SNF products	135
Table 5.	Acute malnutrition indicators	156
Table 6.	ISO 9001 principles and definitions of quality management, <sup>51</sup> and applications to SNF	172
Table 7.	Mi-8T and Mi-8 MTV specifications	184



# Chapter 1.

## Specialized nutritious foods

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### In this chapter

- 1.1** gives a brief background on SNF, the different product categories and their physical characteristics.
- 1.2** describes elements to be considered in SNF supply chain management.
- 1.3** outlines the importance of quality management.
- 1.4** presents the golden rules.

For information concerning generic product specifications, see the following links:

- Specific requirements that vendors must follow to meet the World Food Programme’s contract for delivering our commodities. Online at:  
<http://foodqualityandsafety.wfp.org/specifications>
- UNICEF’s *Supply Catalogue*. Online at:  
<https://supply.unicef.org/>
- International Federation of Red Cross and Red Crescent Societies’ *Emergency Items Catalogue*. Online at:  
<http://procurement.ifrc.org/catalogue/>

## 1.1 Background

Undernutrition includes wasting, stunting, and micronutrient deficiencies, and is a leading cause of morbidity and mortality. Children who do not receive adequate nutrition during their first 1,000 days (between conception and 2 years) suffer irreversible, long-term consequences. Because undernutrition prevents children from growing up to live productive lives, it also undermines national development.

Undernutrition can occur for a number of reasons. These include: illness and inadequate nutrient intake, as well as food insecurity, poor health environment and deficient care practices (see the conceptual framework in Annex 1, Causes of undernutrition). Humanitarian emergencies often aggravate the causes of undernutrition.

Even in development contexts, individuals can have difficulties in accessing and utilizing the 40 nutrients required for growth and biological development. This is especially true of infants, young children, and pregnant and lactating (breastfeeding) women. Even if people appear to have enough to eat, they may still be lacking essential micronutrients. For these reasons, fortified foods are often used to supplement the current diet.

There are times when SNF are required as part of an overall response to treat or prevent undernutrition. In such cases, these foods are used to increase access to nutrient-dense foods, prevent irreversible, long-term developmental problems, and reduce mortality. Children with moderate acute malnutrition (MAM) are three times as likely to die than a well-nourished child.

### 1.1.1 Specialized nutritious foods

In recent years, a range of SNF has evolved to take into account nutritional programming requirements:

- SNF for the treatment of moderate acute malnutrition (MAM) are more easily absorbed than previous formulations. They contain animal proteins that contribute to improved recovery from acute malnutrition, and have a broader range of micronutrients.<sup>1</sup>
- SNF for the prevention of acute malnutrition are nutrient dense and contain fewer kilocalories than products for the treatment of MAM.
- SNF for the prevention of chronic malnutrition supplement the range of micronutrients and macro-minerals, essential amino acids, essential fatty acids and animal proteins (milk) required for linear growth.
- SNF used in prevention of micronutrient deficiencies, which were originally developed to provide iron and other nutrients required for addressing anaemia, are increasingly used in the prevention of a wider range of micronutrient deficiencies.

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**1** WHO has developed a technical note that serves as a reference for recommendations on the composition of supplementary foods used to treat children with MAM. Online at: [http://apps.who.int/iris/bitstream/10665/75836/1/9789241504423\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/75836/1/9789241504423_eng.pdf)

SNF covered in this guideline fall into three categories:

- **Fortified blended foods (FBFs)** are a mixture of cereals and other ingredients that have been milled, blended, pre-cooked and fortified with vitamins and minerals. In January 2010, WFP replaced its original FBFs with two improved products, Super Cereal and Super Cereal Plus. These are available as corn-, wheat-, or rice-soya blends, with or without sugar.<sup>2</sup>
  
- **Lipid-based nutrient supplements (LNS)** are ready-to-eat products, in the form of lipid-based pastes, that can provide energy and a range of nutrients and essential fatty acids. LNS are grouped into three categories, according to their energy and nutrient profile:
  - LNS Small quantity (Nutributter®);
  
  - LNS Medium quantity (Plumpy'doz®, Wawa Mum, eeZeeCup™); and
  
  - LNS Large quantity (Plumpy'sup®, eeZeeRUSF™, Acha Mum).

LNS are also sometimes referred to as ready-to-use food (RUF), a generic term for foods that do not need to be prepared, cooked, or mixed with water.

- 
- 2**
- **CSB+** = Super Cereal — Corn Soya Blend;
  - **CSB++** = Super Cereal Plus — Corn Soya Blend;
  - **WSB+** = Super Cereal — Wheat Soya Blend;
  - **WSB++** = Super Cereal Plus — Wheat Soya Blend;
  - **RSB+** = Super Cereal — Rice Soya Blend; and
  - **RSB++** = Super Cereal Plus — Rice Soya Blend.

- **Micronutrient powders (MNPs)** are mixes of vitamins and minerals packed in small, single-dose sachets. They are added, at household level, to solid or semi-solid foods after preparation (to avoid heat degradation) and prior to consumption. They are different from the premixes used to fortify industrially-produced foods such as flour, sugar or oil. There are various country-specific names for MNPs. They may also be referred to as ‘Vitamin and Mineral Powder’.

WFP’s SNF Sheets in Section 3.1, Figures 4a and 4b, summarize which SNF should be used for each of the four interventions covered in this guideline. They specify targets and ration size, as well as the products’ characteristics and shelf life. WFP’s SNF Sheets build on the product sheets in the Global Nutrition Cluster’s *Decision Tool for Emergencies*,<sup>3</sup> and are modified to address specific logistical and programme planning requirements.

It is important to be clear about the distinction between SNF and fortified food aid commodities:

- Staple food commodities, such as vitamin A-enriched vegetable oil, are used to address household food insecurity in general, not individual nutrition status.
- SNF, on the other hand, have all been formulated to achieve specific nutritional objectives for individuals. They can be used in the treatment of MAM, the prevention of acute malnutrition, the prevention of stunting, or in addressing micronutrient deficiencies.

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**3** Global Nutrition Cluster (2012) *Moderate Acute Malnutrition: A Decision Tool for Emergencies*. Online at: [http://www.unicef.org/nutritioncluster/files/MAM\\_DecisionTool\\_July\\_2012\\_with\\_Cover.pdf](http://www.unicef.org/nutritioncluster/files/MAM_DecisionTool_July_2012_with_Cover.pdf)



### 1.1.2 Physical characteristics of SNF

**Figure 1. The physical characteristics of SNF**



**Raw Materials.** SNF are mainly composed of ingredients such as cereals, pulses, oil, milk and sugar, and additives such as emulsifier, antioxidant, minerals and vitamin premix. All ingredients and additives must be of good quality and should comply with prevailing Codex Alimentarius safety standards. Some countries may have additional regulations concerning genetically modified organisms (GMOs). Be aware that SNF products are available with and without GMOs.

**Formula.** Emulsifier and antioxidants are used to ensure product homogeneity and stability during assigned shelf life. Mineral and vitamin premixes are used to increase nutrient

density. Each manufacturer must determine the right quantities of these ingredients so that the finished product complies fully with the specifications.

**Processing.** If cereals and pulses are used, they are pre-cooked to improve their taste, digestibility and stability, and to reduce their microbiological load. Recipes must be followed precisely, with all ingredients being mixed according to pre-defined ratios. Processing SNF requires strict adherence to food hygiene principles throughout the manufacturing process.

**Packaging.** The packs in which these products are shipped are designed to efficiently protect SNF against contamination, infestation, moisture and oxygen from the air. Provided they remain intact, they will protect the finished product along the supply chain.

**Labelling.** Primary and secondary packaging is labelled with essential information for logistics operations and beneficiaries. This information must comply with Codex general standard for the labelling of pre-packaged foods.<sup>4</sup> Labelling enables traceability, which facilitates segregation in the event of a food incident (see Section 4.5). From a beneficiary's perspective, labelling provides information about how to use the products correctly and safely. For all SNF, it is critical that instructions for use are provided in beneficiaries' local language and, where possible, communicated in pictures on the package. In the case of MNPs, small sachets with a generic design are packaged in boxes, the labelling of which is part of programme design.

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<sup>4</sup> CODEX STAN 1-1985

## 1.2 Elements to be considered in SNF supply chain management

SNF products are sensitive to high temperatures and humidity. Implications for supply chain management are summarized below. Operational modifications for Food Quality, Procurement and Logistics are discussed in the respective chapters.

### 1.2.1 Temperature

Oxidation and vitamin degradation (particularly of vitamin A) are proportional to temperature exposure. Rancidity, loss of nutritional value, and quality incidents may arise when SNF are not stored properly.

<b>PRODUCT TRANSPORT/ STORAGE TEMPERATURE<sup>5</sup></b>	<b>&lt;30°C<sup>6</sup></b>	<b>More than 180 days (6 months) above 30°C<sup>7</sup></b>	<b>More than 90 days (3 months) above 40°C<sup>8</sup></b>
<b>RISK</b>	Nutritional content and taste remain satisfactory.	Nutritional content and taste may no longer be satisfactory. You should contact your quality focal point.	

**5** Any temperature measurement inside the cartons, the transport vessel or vehicle, or the warehouse.

**6** Unless stated differently on the packaging.

**7** This refers to the total number of days during which the temperature was consistently above 30°C.

**8** This refers to the total number of days during which the temperature was consistently above 40°C.

If SNF have been stored for more than 6 months above 30°C, or for more than 3 months above 40°C,<sup>9</sup> the product quality may have degraded, and the focal point for food quality must be asked to check them before they are distributed (see Chapter 4). Storage instructions are included on SNF product labels. Current recommendations for MNPs state that they should be stored at less than 25°C or as indicated on the packaging.

### 1.2.2 Shelf life

Compared to staple foods, SNF have a short shelf life. Also, their nutritional value can be reduced by prolonged exposure to high temperatures. As a result:

- Specific transport and storage conditions are required.
- Procurement should ensure that suppliers deliver products with the longest possible BBD. Orders should include a contract clause stating a minimum acceptable shelf life.
- The frequency of orders should be appropriate to the context. This will avoid using up shelf life time in storage prior to use.
- Warehouse management must apply the First Expired First Out (FEFO) Rule.

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**9** This applies if the SNF have been stored in conditions in which the temperature is consistently above 30°C for 120 days or consistently above 40°C for 60 days.

### 1.2.3 Availability

SNF were originally manufactured in Europe and the USA. Some of the countries and regions that implement nutrition interventions have now developed local manufacturing facilities for FBF and LNS.

During peak demand, global production capacity may be limited, and procuring stocks internationally might not be feasible. Sourcing SNF locally may relieve global capacity constraints faced by producers. However, developing local production requires investment in suppliers. It also requires the buying organization to decentralize their food quality management and monitor quality locally. During emergencies, even local producers may be overwhelmed if large quantities are needed urgently.

### 1.2.4 Lead time

There are two types of lead time to consider.

- **Procurement and production lead time.** SNF are produced only on request and, due to other outstanding orders, production can sometimes take several months. Lead time depends on:
  - the capacity of selected suppliers to fulfil existing orders as well as new ones;
  - the amount of time the buyer needs to place the order and complete internal processing;

- how long it takes for the manufacturer to receive materials, such as premix and packaging, from their suppliers, and produce the SNF;
  - the time needed for end product analysis and confirmation of quality before the product can be released; and
  - how quickly the product can be palletized and shipping marks can be affixed.
- **Transport lead time.** Transporting SNF from international production facilities to the partner's warehouse in-country can take up to three months, and depends on:
    - contractual Incoterms;<sup>10</sup>
    - shipping and port handling capacities;
    - cargo clearance times;
    - customs clearance times;
    - inland transport infrastructure (e.g. transport market availability, road network, etc.); and
    - the inland transport environment, which may be affected by rainy seasons, security constraints, and border procedures, etc.

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**10** The Incoterms (see Annex 5, Incoterms) define where the ownership and risk transfers from the supplier to the buyer.

### 1.2.5 Product traceability

SNF are processed foods and are manufactured in production batches.<sup>11</sup> Batch numbering facilitates product recalls in the event of food incidents (see Section 4.5 for further information). This level of traceability is especially important when large quantities are bought, shipped to the port of entry, then split into different consignments that are forwarded to different countries or destinations.

### 1.3 Why product quality management is important for SNF

- SNF are expensive and any losses will have higher cost implications than losses of standard food commodities.
- Beneficiaries are particularly sensitive to safety hazards as they are already physiologically vulnerable. If they are malnourished their immune system will be weak. If they are young children, or pregnant or lactating women, then they will be in critical periods of growth.

To achieve the nutritional objective, the SNF with the right nutrients needs to be consumed regularly in the right quantity. If nutritional quality has degraded, or if nutrient intake fluctuates, it may not be possible to reach the nutritional objectives, improve beneficiaries' health status, or reduce mortality. For details on specific hazards and defects see Section 4.1.

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**11** For WFP, the WFP batch number includes, on average, four supplier production days.

## 1.4 Golden rules

- ✓ Specialized nutritious foods (SNF) covered in this guideline are: lipid-based nutrient supplements (LNS), fortified blended foods (FBF) and micronutrient powders (MNPs).
- ✓ SNF are developed to more effectively meet the specific nutritional objectives of programmes, such as: treatment of MAM, prevention of acute malnutrition, stunting, and micronutrient deficiencies.
- ✓ Each SNF is defined by its product specification.
- ✓ SNF are particularly sensitive to high temperatures, which can affect their nutritional value.
- ✓ Shelf life, supplier's stock availability and lead time are the main constraints for managing SNF.





# Chapter 2.

## Supply chain planning

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### In this chapter

- 2.1** introduces the components of the SNF supply chain covered in this guideline.
- 2.2** looks at overlaps for information sharing between different actors in the supply chain, and focuses on the main considerations regarding SNF.
- 2.3** presents the golden rules.

## 2.1 The supply chain for SNF

*Supply chain management of SNF encompasses the planning and management of all activities involved in sourcing, procurement, conversion, storage, transport and delivery. It may also involve enabling beneficiaries to access SNF in the marketplace through cash or voucher schemes. Importantly, it also includes coordination and collaboration with channel partners.*

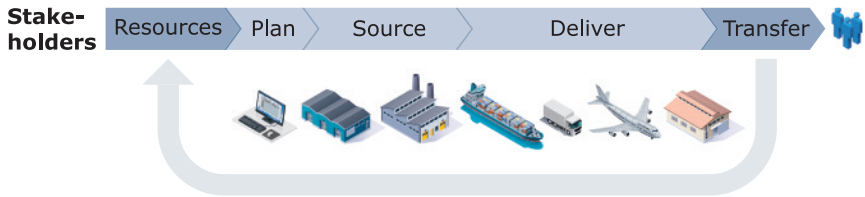
An efficient supply chain for SNF is one that ensures that time and resources are not wasted. An effective supply chain is one that achieves the nutrition programme's intended outcomes.

For a supply chain to be both efficient and effective, it must deliver the correct amount of the necessary SNF to the right place at the right time, and quality must be assured. All of this must be achieved in a way that reduces risk of food-borne illness and promotes the health and development of individuals.

As shown in Figure 2, supply chain planning consists of several steps. Often, responsibility for these steps will be assigned to different departments or individuals within an organization. Planning and decision making takes place at country level, often with inputs and support from regional and headquarter levels.

Smooth and continuous information flow back and forth between departments and across geographic levels is a critical enabling factor for a functional SNF supply chain. Planning often needs to be refined. Factors such as funding shortfalls, contextual changes that impact upon transport and warehousing, and rapidly deteriorating nutrition situations will all necessitate supply chain review.

## Figure 2. Supply chain management: an end-to-end process view



12, 13, 14

Once Programme has identified that a nutrition intervention is needed, and has estimated the total number of beneficiaries and appropriate SNF to be used, these planning figures are translated into tonnages of SNF required for the duration of the nutrition intervention.

It is beyond the scope of this guideline to address resource mobilization; however, Programme, Procurement and Logistics are covered in detail in later chapters.

**12** Figure 2 was adapted from WFP Supply Chain Management Seminar, Module 9.0 SCM Introduction Dec11, Slide 8.

**13** Depending on whether the SNF are purchased locally or internationally, steps within this chain are skipped.

**14** This supply chain management model was adapted from the Supply Chain Council's SCOR model. Online at: <http://supply-chain.org/scor>

## 2.2 Connecting key stakeholders

Several factors can jeopardize the timely distribution of any product, in both emergency contexts and development projects. For SNF there are additional risks because these are specialist products made by only a few manufacturers, and they have special transport, storage and stock management needs. Thus, the planning and programme delivery process for SNF relies particularly heavily on information exchange.

The following points should be addressed more closely when planning an operation.

### 2.2.1 Improving awareness along the SNF supply chain: internally and externally

Various people, departments and organizations will be involved in the SNF supply chain. It is critical that they all understand the role and contribution of each of the internal and external actors in the supply chain process. For example:

- ✓ Individual processes may be handled on a global, regional and local level. Complications may arise unless staff are fully briefed on where and how their tasks link into the overall chain. Each person must understand their role, their responsibilities, the timescale for their task, and when and with whom they need to exchange information.
- ✓ It is helpful if all staff are aware of why and how SNF are used, the products' specificities, and the implications for the supply chain. This makes communication easier between departments — for instance, when ideal programme planning has to be translated into what is actually feasible.

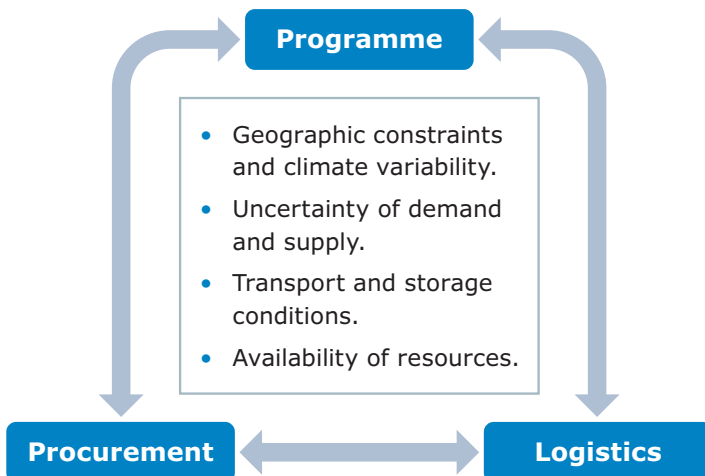
Those individuals whose work involves communicating with government and other partners must have a basic understanding of SNF. They will need to promote appropriate use, and ensure that awareness-raising activities are undertaken to teach government, stakeholders and communities about the products.

- ✓ Staff must understand the management steps required to ensure food quality and to prevent and mitigate food-borne illness.

### 2.2.2 Exchanging information for action

Once SNF needs and the type of intervention have been decided, various departments will need to work together to plan the supply chain. Figure 3 shows examples of some of the topics that are likely to arise.

**Figure 3. Interdepartmental discussions in supply chain planning**



External stakeholders, such as donors, must also be considered. Their influence on the supply chain is considerable — particularly where funding is concerned because it affects operational budgets and procurement schedules. A well-managed supply chain is transparent, and feeds back up-to-date information that can be shared swiftly with donors.

### **2.2.3 Addressing geographic constraints and climate variability**

Both natural disasters that trigger an emergency and normal seasonal changes can make the transport of SNF challenging. They can also influence the overall type and scale of nutritional support required. The following points need to be considered:

- ✓ Before pre-positioning, take into account shelf life and all lead times to ensure that the product will still be in date by the time it reaches beneficiaries.
- ✓ Select SNF with a long shelf life if the food is likely to be pre-positioned for several months.
- ✓ Be aware of possible variations in the number of beneficiaries requiring the nutrition intervention. This is especially pertinent in displacement situations, and in regions where acute malnutrition levels rise during the lean season.
- ✓ When selecting warehouse locations, avoid areas prone to extreme weather, including flooding.

### 2.2.4 Uncertainty of demand and supply

As well as meeting current needs, supply chain management also focuses on forecasting and planning for future demand. In order to give accurate information for SNF, consider the following points:

- ✓ Due to limited production capacity and long lead times, demand forecasting should begin as soon as possible.
- ✓ Overall supply needs should be shared and refined through the relevant nutrition cluster or sector coordination mechanism so that preparedness is improved and actors can respond to changes in supply and demand.
- ✓ Keep in mind that in emergency situations, particularly acute onset emergencies, calculating beneficiary needs can be challenging. It may be hard to access accurate information about the affected population and their nutritional status, and this will make programme design difficult.
- ✓ Take into account international/regional/local market availability. If a product is not available then discuss options.
- ✓ Government-approved SNF may not be the most suitable products for the planned nutrition intervention or for the geographical or climatic constraints. This may limit supply options.
- ✓ Make sure that up-to-date information about the potential for local procurement is available.



- ✓ Develop a procurement plan as soon as possible.
- ✓ Maintain a three-month distribution plan outlining tonnage, location and timeline.
- ✓ Calculate a warning level for stock-outs for every SNF product used in the country. Take safety stock and the lead time into account (see Section 5.1.2).

### **2.2.5 Transport and storage conditions**

During transport, temperatures are difficult to monitor and manage. Longer transit increases exposure to poor conditions. In order to mitigate the impact of temperature on SNF, the following points should be taken into account:

- ✓ In hot climates or transport conditions, short transport times are essential.
- ✓ If a delivery truck breaks down, consider unloading and storing the items safely until a replacement vehicle arrives or the truck is fixed.
- ✓ Assure dedicated space for SNF in warehouses that have appropriate interior climate conditions, and monitor and record temperature during storage.
- ✓ Prepare and issue guidance for staff on what can be done to reduce temperatures in storage spaces (see Section 6.3.1. Selection and alteration of storage facilities).
- ✓ If applicable, take partners' storage capacity into account when planning the frequency and location of deliveries.

- ✓ Give special attention to the ‘last mile’, meaning from the partners’ warehouse to the beneficiaries. SNF have much stricter storage requirements than commodities such as rice or wheat. It will be necessary to identify temperature-controlled spaces with adequate climate conditions.

### 2.2.6 Availability of resources

Section 1.2.3 discussed issues around product availability. Two other types of resource are needed to implement a response that requires SNF.

- ✓ **Funding.** A change in the funding situation should be followed immediately by a meeting between representatives from Programme, Nutrition and Procurement. Changing rations and SNF products is a complicated process, and a pipeline break can put people receiving nutrition intervention at serious risk.
- ✓ **Human resources.** SNF require special considerations, and staff along the supply chain must be trained accordingly. This could be done through information sessions for warehouse personnel, hand-outs for transporters, and training sessions for staff on food incident management (see Section 4.5) throughout the supply chain and prior to distribution to beneficiaries.

## 2.3 Golden rules

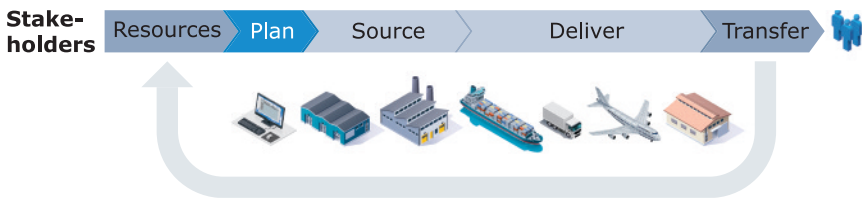
- ✓ All supply chain actors have a role in maintaining the quality of SNF until it reaches beneficiaries.
- ✓ Ensure that staff involved in Programme, Procurement, Logistics and Food Safety, as well as cooperating partners, are all engaged in the planning process and are assigned clear roles and responsibilities.
- ✓ Ensure relevant information exchange — including programme updates — between all players in the supply chain if the nutrition situation changes or if there is a risk of pipeline break.
- ✓ Anticipate the impact of the external environment (climate, security, infrastructure, etc.) on the operation.
- ✓ Make sure the SNF can be imported and/or are allowed for use in the country, and identify all relevant documents and processes required for their import and distribution.
- ✓ Ensure proper stock management to meet anticipated needs, and avoid lengthy storage.
- ✓ Make sure that storage facilities meet the necessary conditions for preserving the characteristics and nutritional value of SNF. Take into account that regulating interior climate conditions is a complex process and may require specialist input (see Section 6.3.1. Selection and alteration of storage facilities to store SNF).

# Chapter 3.

## Managing the supply chain: determining the SNF demand

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### In this chapter



This chapter focuses on the first step of the supply chain: determining the overall SNF demand. This involves selecting the right SNF for the nutrition intervention and estimating how much will be required for the duration of the programme. There are three components to consider:

- 3.1** determines whether a nutrition response is needed and, if so, which intervention and products are appropriate to the context.
- 3.2** discusses how to estimate the number of beneficiaries and how to calculate the quantity of SNF required.
- 3.3** looks at how to develop a procurement schedule that is appropriate to the context.

For further information on nutrition situation analysis, please see the following sources:

- Golden M., *et al.* (2006) *Measuring Mortality, Nutritional Status and Food Security in Crisis Situations: SMART Methodology*. Online at: [http://www.smartindicators.org/SMART\\_Methodology\\_08-07-2006.pdf](http://www.smartindicators.org/SMART_Methodology_08-07-2006.pdf)
- Prudhon, C. (2011) Module 7. Measuring Malnutrition: Population Assessment, in *IASC Global Nutrition Cluster's Harmonized Training Package (HTP)*. Online at: [http://www.unscn.org/en/gnc\\_http/](http://www.unscn.org/en/gnc_http/)
- WFP and UNHCR (2011) *Guidelines for Selective Feeding: The Management of Malnutrition in Emergencies*. Online at: <http://www.unhcr.org/4b7421fd20.pdf>
- WFP Food Security Analysis. Online at: <http://www.wfp.org/food-security>

Information on WFP's nutrition programme guidance can be found in *Nutrition at the World Food Programme: Programming for Nutrition-Specific Interventions* (2012). Online at <http://home.wfp.org/stellent/groups/public/documents/newsroom/wfp256973.pdf>

A summary of WFP nutrition interventions that use SNF, and selected non-nutrition interventions that may also use SNF, can be found in Annexes 4a and 4b.

For additional information on the use of SNF in refugee populations, please see UNHCR (2011) *UNHCR Operational Guidance on the Use of Special Nutritional Products to Reduce Micronutrient Deficiencies and Malnutrition in Refugee Populations*. Online at: <http://www.unhcr.org/4f1fc3de9.html>

Recent decision making guidance for MAM in emergencies can be found in Global Nutrition Cluster (2012) *Moderate Acute Malnutrition: A Decision Tool for Emergencies* .  
Online at: [http://www.unicef.org/nutritioncluster/files/MAM\\_DecisionTool\\_July\\_2012\\_with\\_Cover.pdf](http://www.unicef.org/nutritioncluster/files/MAM_DecisionTool_July_2012_with_Cover.pdf)

Even though there are no international standards for beneficiary calculations, several tools have been produced to assist planning:

- Save the Children-UK's Community-based Management of Acute Malnutrition (CMAM) Toolkit includes tools with which to estimate caseload and supply needs. Online at: <http://www.fsnnetwork.org/resource-library/nutrition/community-based-management-acute-malnutrition-cmam-toolkit>

For WFP staff, a tool that includes SNF supply calculation will be available on the nutrition topic page at [wfp.go](http://wfp.go) and will be available on request.

Please contact: [nutrition@wfp.org](mailto:nutrition@wfp.org)

### 3.1 Determining the right product for the right response

Undernutrition is the result of a wide range of factors — most directly, an imbalance between an individual’s nutritional requirements and the mix of nutrients the individual actually receives and absorbs from what they eat.<sup>15</sup> Energy intake (kilocalories) is often the focus of food security programmes, but for many beneficiaries this is not sufficient to ensure healthy development or, indeed, survival. As well as meeting energy intake requirements, nutrition interventions pay particular attention to ensuring that all of the nutrients needed for individuals’ recovery, growth and development are available.

For an effective response to nutrition problems, programmes are needed that address the root causes of undernutrition. Because so many factors — and combinations of factors — can contribute to undernutrition, situation analysis and programme decision making should be undertaken in coordination with relevant actors from other specialist organizations. This can be complex, and the level of participation in the analytical process will depend both on the context and on the degree of collaboration between stakeholders.

In emergencies, there may be little time for consultation; information may not be easily accessible; assessments may not be possible. Nevertheless, certain key questions do need to be answered.

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**15** For an overview of the causes for undernutrition see Annex 1, Causes of undernutrition.

These include:

- **What** nutrition problems are present or are likely to develop?
- **Who** are the people affected by undernutrition?<sup>16</sup>
- **When** does undernutrition occur? Is there a seasonal trend?
- **How** many people are undernourished?
- **Where** do the undernourished people live?
- **Why** are they undernourished?

Once it has been determined that a nutrition problem exists, and the driving factors (direct, underlying and basic causes) are understood and potential responses are clear, further information is needed to refine programme options.

- The institutional environment needs to be understood because the programme must align with the national government's institutional framework of policies and priorities. Key areas to consider are the government's:
  - development policy;
  - emergency response framework;

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**16** Data are reviewed to determine whether undernutrition affects particular groups — delineated, for example, by age, gender, livelihood or culture.



- sectoral plans for health and nutrition; and
- technical protocols and quality standards for specialized nutritious foods.

An important aspect of emergency preparedness is ensuring that the national government's food quality standards allow the use of SNF. If they don't then it will be necessary to advocate for appropriate technical inputs. Joint sensitization of government and partner staff may also be needed.

- **Stakeholder analysis, and partnership and capacity assessment** should be undertaken to identify who should participate in programme development and implementation, and how they can be engaged. Consider the following questions.
  - What other programmes are being implemented?
  - Can an existing programme be scaled up?
  - Are new programmes needed?
  - Are there gaps in coordination that can be addressed across sectors to ensure a holistic response?
  - Do partners have the technical capacity to deliver all the nutrition intervention's components (appropriate use of SNF, record keeping, behaviour change communication)?
  - Do partners have the logistical capacity to transport,

warehouse and distribute SNF without breaks in the pipeline?

- What does each organization feel they can contribute to the response?
  
- **Monitoring and evaluation (M&E) and lessons learned** analyses should be reviewed to gain an understanding of what works best in this context. Of particular use in the programme design process is information on: targeting, coverage, SNF acceptability, programme acceptability and accessibility, population-level impact, effective engagement with the community, and effective inter-sectoral linkages. Useful resources include:
  - M&E data from operational programmes;
  - impact evaluations; and
  - lessons learned documentation developed by partners.

This guideline covers the use of SNFs in four nutrition interventions:

- 1. Treatment of moderate acute malnutrition (MAM) with targeted supplementary feeding programmes (TSFP) for:**
  - children aged 6-59 months with MAM;
  - women with MAM who are pregnant or lactating (PLW), up to six months after giving birth;

- children (aged 5-19 years) and adults with MAM who are on antiretroviral therapy (ART) and/or a Direct Observed Treatment Short-course (DOTS) for TB.
2. **Prevention of acute malnutrition** with blanket supplementary feeding programmes (BSFP) for PLW, and children aged 6-23 months or, under certain conditions, aged 6-36 months or 6-59 months.
  3. **Prevention of chronic malnutrition** with complementary feeding for children aged 6-23 months and, increasingly, PLW and adolescent girls.
  4. **Addressing micronutrient deficiencies** through home-based fortification or point-of-use fortification for children aged 6-23 months and, increasingly, school-age children.

WFP's SNF Sheets (reproduced at the end of this section) show which SNF should be used in each type of nutrition intervention.<sup>17</sup> There are four classes of SNF products: ready-to-use foods (RUF), fortified blended foods (FBF), lipid-based nutrient supplements (LNS), and micronutrient powders (MNPs). These are described in more depth in the Glossary in Chapter 9. SNFs should not be used for programmes for which they are not recommended. The choice of SNF depends on several factors:

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**17** Currently, SNF are recommended for use in WFP nutrition interventions; however, the potential for using cash and vouchers to prevent undernutrition (instead of SNF) is being explored.

- **Household's ability to cook.** FBF can only be used in households that are able to cook. In emergencies, households often have no utensils or fuel. In these circumstances, LNS are recommended for treatment of MAM because they are ready-to-eat.

Once the situation has settled, and households can cook again, other SNF can be considered. However, switching beneficiaries from one product to another can be challenging, and requires additional logistical planning and communication with local authorities and the community.

In the case of refugees and internally displaced persons in camps, it will be essential to advocate for the reestablishment of cooking facilities with UNHCR, the government and NGO partners.

- **Cultural practices and food preferences.** Improved FBF based on corn (maize), wheat and rice are available. LNS are usually peanut-based, but locally-produced chickpea-based LNS are available in some areas. Local consumption preferences should be taken into account, but this consideration should be balanced with the need to get SNF to beneficiaries as quickly as possible. Formative research should be undertaken as part of programme design to confirm acceptability and improve adherence.

There is no global consensus on methodology. However, UNHCR's *Operational Guidance* includes an example that uses quantitative and qualitative methods to determine nutrition related behaviours and beliefs. It also covers key factors for encouraging acceptance and correct usage. WFP and partners have broad experience and guidelines for

assessing cultural practices and acceptability for MNPs, and experience is being gathered for guidelines about small-quantity LNS.

- **Conformity with national standards.** Many host governments are currently unaware of the use and benefits of SNF. Consequently, they have no SNF-specific legislation on import requirements or food quality standards. SNF are rarely included in essential drug lists or in Ministry of Health procurement procedures. Thus, logistical capacity for handling nutrition programme inputs (SNF, anthropometric equipment, behaviour change communication materials, routine medications) is often variable. Capacity to correctly conduct food safety tests at national level may also be limited.

Prior to programme planning, and as part of emergency preparedness, national standards for SNF must be determined. Where these standards are at odds with programme needs, partners should engage in advocacy with the government.

National protocols may recommend specific products, or local formulations may be available. Where standards exist but are not implemented, technical support may be needed. Capacity development and training for technical, food quality and logistics staff may be a critical enabling factor for nutrition intervention quality.

- **Operational considerations.** Often, nutrition interventions are delivered in tandem with other programmes. In many cases, food security programming, such as a general food distribution (GFD), is already in place

and can be the delivery mechanism for nutrition interventions, such as blanket supplementary feeding to prevent acute malnutrition.

Using the same SNF in both the GFD and nutrition intervention simplifies the logistics. However, it will be necessary to communicate to GFD recipients that the SNF needs to be given to the intended individual, not to the whole family. It is not a supplement to the household ration.

Broader aspects of programme design include systematic risk assessment of nutrition programming, and forward planning to promote quality programming. The following should be considered:

- ✓ **Adequate human resources** must be available to deliver quality programming to beneficiaries. There must be enough people with enough training, experience and supervisory support to administer the programme safely and effectively.
- ✓ **Consumption of any nutrient in excessive quantities** carries a risk of adverse effects. The *Tolerable Upper Intake Level (UL)* is the highest level of a nutrient that is likely to pose no risk of adverse health effects to 98% of a population, and refers to the total, combined intake of a nutrient from food, fortified food, and supplements.

If SNF are consumed at the recommended dose they pose no risk of overdose. However, if the recommended dose is exceeded, or if SNF are consumed in combination with other fortified foods and supplements, then there is a risk — particularly a cumulative one. This risk must be assessed, and if excessive intake is considered likely, either the SNF

should not be used or its micronutrient formulation should be adjusted.<sup>18</sup>

- ✓ Proper use of SNF **should not undermine optimal infant and young child feeding (IYCF) practices**, such as breastfeeding and complementary feeding of children. SNF are meant to be consumed in addition to the regular diet. A potential risk exists for SNF to lead to displacement of breast milk consumption in children under two; but, so far, little evidence has been gathered. Behaviour change communication should include messages on the proper use of the SNF and should promote IYCF.
- ✓ Most LNS are peanut-based. **In people with peanut allergy, LNS may cause an anaphylactic reaction.** Such reactions can happen very rapidly (often, within minutes of contact or ingestion) and are life-threatening. It is critical that nutrition programme staff are aware of this issue, and that they know where to locate appropriate care.<sup>19</sup>
- ✓ **SNF might not be consumed by the intended beneficiary**, due to errors in targeting, household-level sharing, or resale of the products in the market. Appropriate post-distribution monitoring is important, though guidance varies from organization to organization and is outside the scope of this guideline.

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**18** UNHCR (2011) *UNHCR Operational Guidance on the Use of Special Nutritional Products to Reduce Micronutrient Deficiencies and Malnutrition in Refugee Populations*. Online at: <http://www.unhcr.org/4f1fc3de9.pdf>



**19** UNHCR (2011) *UNHCR Operational Guidance on the Use of Special Nutritional Products to Reduce Micronutrient Deficiencies and Malnutrition in Refugee Populations*. Online at: <http://www.unhcr.org/4f1fc3de9.pdf>

- ✓ Distribution or use of SNF may contribute to food-borne illness. It is important to provide safe water and hygiene facilities during distribution days, and to educate recipients on how to prepare, use and store the SNF in order to **reduce the risk of food-borne diseases**.

Figures 4a and 4b, on the following pages, are reproduced from WFP's SNF Sheets and explain which SNF products might be used for particular types of food intervention. WFP is not specifically endorsing the brands mentioned. However, the SNF listed in the examples do meet WFP's quality management specifications for use, and they will be familiar to those currently in field operations.



## Figure 4a. WFP Specialized Nutritious Food Sheet 1

<b>Programme</b>	<b>Treating Moderate Acute Malnutrition (MAM)</b>	
<b>Generic product term</b>	<b>Lipid-based Nutrient Supplement (LNS) Large Quantity (92-100 g)<sup>1</sup></b>	
<b>Current WFP nutrition products</b>	<b>Plumpy'sup®</b> (Peanut-based) <sup>2</sup>	<b>eeZeeRUSF™</b> (Peanut-based)
		
<b>Target group</b>	Children 6-59 months	Children 6-59 months
<b>Key ingredients</b>	Peanuts, sugar, whey, vegetable oil, milk, soy protein, cocoa, V&M	Peanut, sugar, milk solids, vegetable oil, V&M
<b>Daily ration</b>	92g sachet	92g sachet
<b>Nutrient profile</b>	500 kcal, 13g protein (10%), 31g fat (55%). Contains EFA, meets RNI and PDCAAS	500 kcal, 13g protein (11%), 31g fat (56%). Contains EFA, meets RNI and PDCAAS
<b>Avg. duration of intervention<sup>4</sup></b>	60-90 days	60-90 days
<b>Shelf life<sup>6</sup></b>	24 months	24 months
<b>Packaging details</b>	Carton: 14.7kg (gross) and 13.8kg (net) has 150 sachets	Carton: 14.9kg (gross) and 13.8kg (net) has 150 sachets

<sup>1</sup>Also referred to as RUSF. <sup>2</sup>Plumpy'sup is formerly known as Supplementary Plumpy (same product). Note: Plumpy/nut is a different product used for the treatment of severe acute malnutrition (SAM).

<sup>3</sup>Super Cereal is usually mixed with 20g oil and 15g sugar before distribution (total est. 989-1176 kcal, 31-38g protein (12-13%), 16-20g fat (31-32%)). <sup>4</sup>Can vary in different situations and contexts.

<sup>5</sup>For PLW, duration lasts from identification to recovery, or until 6 months post-partum, per national protocol. For malnourished individuals on ART/DOts the avg duration of treatment is 180 days.

<sup>6</sup>Shelf life indicated is valid for storage at temperatures less than 30 degrees C.

**Fortified Blended Food (FBF)  
(200-250g)**
**Acha Mum**  
(Chickpea-based)

**Super Cereal Plus**

**Super Cereal<sup>3</sup>**


Children 6-59 months

Children 6-59 months

Pregnant and Lactating Women (PLW).  
Malnourished individuals on ART/ DOTS

Chickpeas, vegetable oil, milk powder, sugar, V&amp;M, soya lecithin

Corn/wheat/rice, soya, milk powder, sugar, oil, V&amp;M

Corn/wheat/rice, soya, V&amp;M

100g sachet

200g  
(includes provision for sharing)200-250g  
(includes provision for sharing)520 kcal, 13g protein (10%), 29g fat (50%).  
Contains EFA, meets RNI and PDCAAS787 kcal, 33g protein (17%), 20g fat (23%).  
Contains EFA, meets RNI and PDCAAS

752-939 kcal, 31-38g protein (16%), 16-20g fat (19%). Meets RNI and PDCAAS

60-90 days

60-90 days

Variable — based on target group<sup>5</sup>

6 months

12 months

12 months




Carton: 10.5kg (net) has 105 sachets

Primary: 1.5kg (net) bag;  
Secondary: 15kg (net) carton has 10 bags;  
or 18kg sack has 12 bags





25kg (net) bags

**Abbreviations:** LNS = Lipid-based Nutrient Supplement, RUSF = Ready-to-Use Supplementary Food, FBF = Fortified Blended Food, EFA = Essential Fatty Acids, ART = Anti-Retroviral Therapy (treatment for HIV), DOTS = Directly Observed Treatment (treatment for TB), RNI = Recommended Nutrient Intakes (FAO/WHO), PDCAAS = Protein Digestibility-Corrected Amino Acid Score (min. 70%), V&M = Vitamins and Minerals, mt = Metric Ton.

## Figure 4b. WFP Specialized Nutritious Food Sheet 2

Programme	Preventing Stunting		
	Preventing Acute Malnutrition		
Generic product term	Lipid-based Nutrient Supplement (LNS) Medium Quantity (20-50g)		
Current WFP nutrition products	<b>Plumpy'doz®</b> (Peanut-based) 	<b>eeZeeCup™</b> (Peanut-based) 	<b>Wawa Mum</b> (Chickpea-based) 
Target group	Children 6-23 months	Children 6-23 months	Children 6-23 months
Key ingredients	Vegetable fat, peanut, sugar, milk powder, whey, V&M, cocoa	Vegetable fat, peanut, sugar, skimmed milk powder, V&M	Chickpeas, vegetable oil, milk powder, sugar, V&M
Daily ration	46g portion (1/7 portion of a pot)	46g portion (1/7 portion of a pot)	50g sachet
Nutrient profile	247 kcal, 5.9g protein (10%), 16g fat (58%). Contains EFA, meets RNI and PDCAAS	253 kcal, 6.0g protein (10%), 15g fat (56%). Contains EFA, meets RNI and PDCAAS	260 kcal, 6.5g protein (10%), 14.5g fat (50%). Contains EFA, meets RNI and PDCAAS
Duration of intervention	Duration may vary and must be aligned with national guidelines. Please refer to programme design guidance for more information.		
Shelf life <sup>3</sup>	24 months	Minimum 12 months from manufacturing date when stored at warehouse conditions	6 months
Packaging details	Primary packaging: 325g pots. Carton: 12.7kg (gross) and 11.7kg (net) has 36 pots	Primary packaging: 325g pots. Carton: 12.7kg (gross) and 11.7kg (net) has 36 pots	Carton: 10.5kg (net) has 210 sachets

<sup>1</sup>All nutrition products listed help address micronutrient needs, but small quantity LNS and MNP do not prevent acute malnutrition. <sup>2</sup>Super Cereal is usually mixed with 20g oil and 15g sugar before distribution (total est. 613-989 kcal, 15-31g protein [10-12%], 8-16g fat [33-41%]). <sup>3</sup>Shelf life indicated is valid for storage at temperatures less than 30 degrees C.

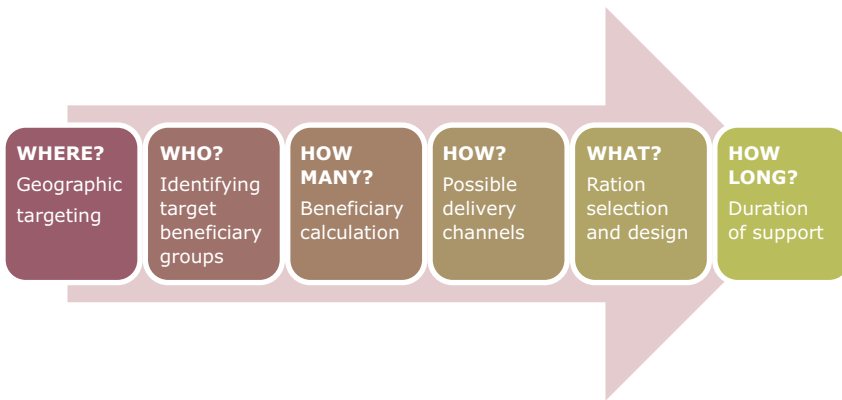
		Addressing Micronutrient Deficiencies <sup>1</sup>	
Fortified Blended Food (FBF) (100-200g)		LNS Small Quantity (≤20g)	Micronutrient Powders (1g)
Super Cereal Plus	Super Cereal <sup>2</sup>	Nutributter® (Peanut-based)	Micronutrient Powders (MNP)
			
Children 6-23 months	Pregnant and Lactating Women	Children 6-23 months	Children 6-59 months. School-age children
Corn/wheat/rice, soya, milk powder, sugar, oil, V&M	Corn/wheat/rice, soya, V&M	Peanuts, vegetable fat, sugar, skim milk powder, whey, V&M	Vitamins and minerals (V&M)
100-200g (200g includes provision for sharing)	100-200g (200g includes provision for sharing)	20g sachet	1g sachet every second day
394-787 kcal, 16-33g protein (17%), 10-20g fat (23%). Contains EFA, meets RNI and PDCAAS	376-752 kcal, 15-31g protein (16%), 8-16g fat (19%). Meets RNI and PDCAAS	108 kcal, 2.6g protein (10%), 7g fat (59%). Contains EFA, meets RNI and PDCAAS	Meets RNI  (No energy, fat or protein content)
Duration may vary and must be aligned with national guidelines. Please refer to programme design guidance for more information.			
12 months	12 months	24 months	24 months
Primary: 1.5kg (net) bag; Secondary: 15kg (net) carton has 10 bags; or 18kg sack has 12 bags	25kg (net) bags	Carton: 11.95kg (gross) and 10.92kg (net) has 546 sachets	Carton: 14kg gross) has 240 boxes; 30 sachets in each box. *Packaging varies with supplier

**Abbreviations:** LNS = Lipid-based Nutrient Supplements, RUSF = Ready-to-Use Supplementary Food, FBF = Fortified Blended Food, MNP = Micronutrient Powders, EFA = Essential Fatty Acids, RNI = Recommended Nutrient Intakes, PDCAAS = Protein Digestibility-Corrected Amino Acid Score (min 70%), V&M = Vitamins and Minerals, mt = Metric Ton.

### 3.2 Calculating estimated beneficiary numbers

Estimated supply needs have to be calculated for each nutrition intervention. Calculations are based on the variables shown in Figure 5.

**Figure 5. Variables in the calculation of estimated beneficiary numbers**



First, geographic areas (Where) and beneficiary groups (Who) are identified. Then, the total number of planned beneficiaries are estimated for the entire duration of the programme. Targeting criteria used for programmes to *treat* undernutrition are different from those used for programmes to *prevent* undernutrition. Thus, coverage estimates and supply needs will differ, depending on the type of intervention.

- Programmes to treat MAM target only those individuals who are classified as having acute malnutrition. While geographic coverage may be high, caseloads may be low because the programme will only include those currently affected by MAM.

- Programmes to prevent undernutrition target groups of people, and are not based on nutritional status. Groups may be delineated by age, for example, or family income, or whether or not they are pregnant or lactating. Ideally, as many people from the target group in that geographic area would be included (expected coverage), but then it may be difficult to cover all geographic areas as the overall caseload would be quite high. Programme staff can help advise on finding the balance between needs, geographic coverage, expected coverage and required resources.

Primary beneficiary target groups for each nutrition intervention are indicated in WFP's SNF Sheets in Section 3.1, Figures 4a and 4b. There is no international standard for the method for beneficiary calculations, although several tools are available. Key aspects to consider are summarized in Section 3.2.1. Separate calculations should be made for each programme and each target group. This is because ration sizes and SNF differ. As the context changes, these planning estimates will have to be refined. Where there have been nutrition interventions in the past, planning estimates can be cross-checked against historical planning figures and actual programme delivery figures.

It is good practice to share beneficiary calculations through relevant nutrition coordination mechanisms. This ensures that relevant programme linkages are made and that planning estimates are as complete as possible. For example, programmes to prevent acute malnutrition may stabilize or reduce the number of people who will develop SAM. For this reason, providers of parallel interventions must coordinate on beneficiary and supply planning.

### 3.2.1 To treat moderate acute malnutrition in children aged 6-59 months and pregnant and lactating women

Estimated beneficiary numbers depend on the following.

- The **estimated population** of the target group in programme areas. This figure is usually derived from Government census data. If population data do not include a breakdown by gender and age, and if there are no government recommendations, then estimates can be applied. Generally: 18 percent of a population are children aged 6-59 months; 4 percent are pregnant women; and 4 percent are lactating women.
- The **prevalence**<sup>20</sup> of MAM in the **population** of the target group, as derived from recent nutrition surveys. **Prevalence of MAM for children aged 6-59 months** should be based on weight-for-height, not mid-upper arm circumference (MUAC). Prevalence estimates for pregnant and lactating women should be based on MUAC, though this information is rarely available. It may be necessary to base estimates for PWL on data from previous caseloads, or to extrapolate from information – based on Body Mass Index (BMI) – about the prevalence of acute malnutrition in the adult non-PLW population.

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**20** Prevalence refers to the number of individuals who are malnourished at a particular point in time. Incidence refers to the number of individuals expected to become malnourished over a specific period of time. At present there is no global consensus on estimating incidence. Guidance is in development (see technical briefs from the CMAM forum, online at <http://www.cmamforum.org/>).

- The estimated number of new cases of malnutrition in that target group over the duration of the project (**incidence**). Recent incidence figures are rarely available, so an estimate is used instead. In general, incidence for MAM in children is estimated to range from 1.5 to 3 percent per year. In more stable contexts, incidence can be estimated with a lower figure; in more volatile, emergency contexts the figure will be higher. For PLW an incidence of 1 percent may be used.
- It is generally not possible to reach all potential beneficiaries. The term **expected coverage** refers to the proportion that can be reached, and is based on capacity and context. Targeted supplementary feeding programmes (TSFPs) often only reach between 20 and 60 percent coverage. In emergencies, Sphere standards recommend TSFP coverage of >50 percent in rural areas, >70 percent in urban areas, and >90 percent in camps.

### Figure 6. Estimating beneficiary numbers for MAM treatment programmes



**Total beneficiaries =**

**Population**

**×**

**Prevalence**

**×**

**Incidence**

**×**

**Coverage**

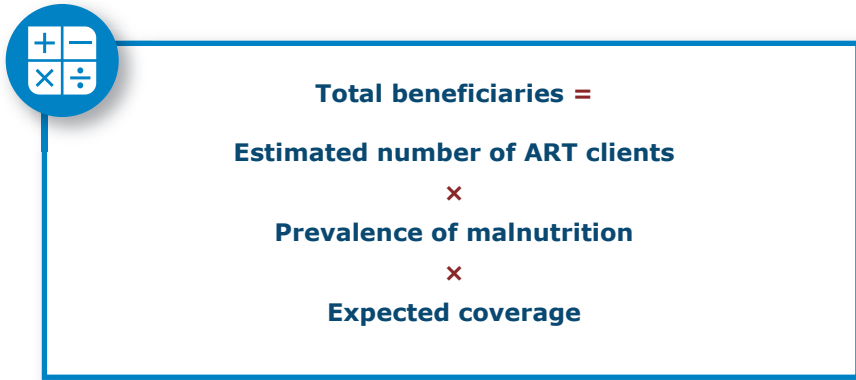
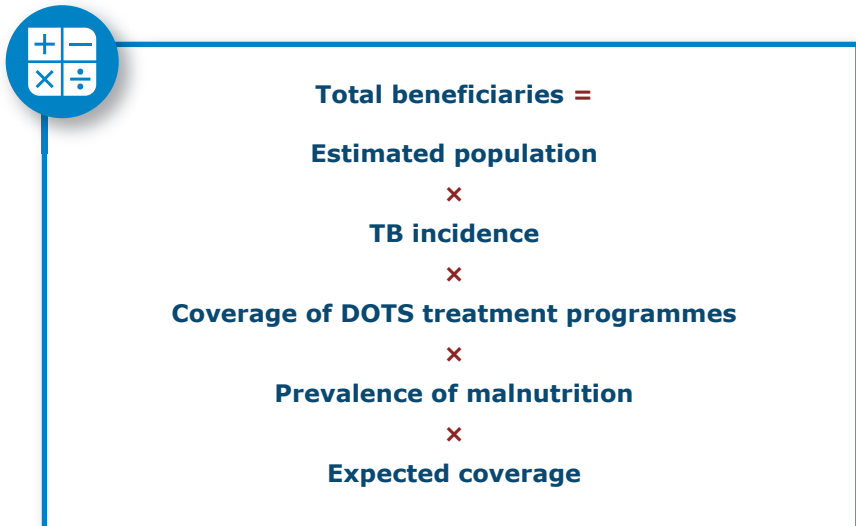


### **3.2.2 To treat moderate acute malnutrition in individuals on HIV or TB treatment**

This section refers to calculations for children 5 years and older, as well as adults and women who are not pregnant or lactating. Please see Section 3.2.1 for calculations for children under 5 and pregnant and lactating women.

The estimated beneficiary number depends on:

- ✓ The estimated population of the target age group in programme areas. This is usually drawn from Government census data.
- ✓ HIV prevalence and ART coverage, drawn from UNAIDS data. Note that caseload estimation is based on HIV prevalence not incidence.
- ✓ TB incidence and DOTS coverage, drawn from WHO's Global Health Observatory Data Repository.
- ✓ The prevalence of global acute malnutrition (GAM) for the target age group living with HIV or TB. Prevalence figures are unlikely to be available. Proxy figures may be used instead. For HIV and TB programming for adults, use the prevalence of GAM in children aged 6-59 months. Alternatively, studies indicate that, on average, 15-30 percent of adults on treatment for HIV or TB will be malnourished.
- ✓ As in other nutrition interventions, it is generally not possible to reach all potential beneficiaries. The term expected coverage refers to the proportion who can be reached, taking into account capacity and context.

**Figure 7. Estimating caseload in HIV programming****Figure 8. Estimating caseload in TB programming**

Note that for HIV programming, prevalence is used in the beneficiary calculation. That is because HIV is a life-long disease and an individual may become malnourished at any point during its course.

For TB programming, incidence is used. With the exception of multi-drug-resistant TB, TB can be treated in a DOTS programme on a one-off basis. Therefore, new cases (TB incidence) are more relevant to the beneficiary calculation.

Beneficiaries of HIV and TB programmes are frequently provided with a household ration as well as SNF. The SNF is usually provided for treating malnutrition. The household ration is seen as an income transfer to compensate for lost income and increased illness-related expenses, and acts as an enabler for HIV or TB treatment adherence. The ration contains commodities similar to those provided in a general food distribution.<sup>21</sup>

### **3.2.3 To prevent acute malnutrition, prevent chronic malnutrition, or to address micronutrient deficiencies**

Estimated beneficiary numbers depend on:

- The **estimated population** of the target group in programme areas, based usually on Government census data. If official data do not specify gender and age, and if there are no government recommendations, use estimates instead. Generally: 10 percent of a population are children aged 6-23 months; 4 percent are pregnant women; and 4 percent are lactating women.

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**21** For more information on the family ration, please refer to WFP (2008) *Food Assistance in the Context of HIV: Ration Design Guide*. Online at: [http://www.unscn.org/layout/modules/resources/files/Food\\_Assistance\\_in\\_the\\_Context\\_of\\_HIV\\_Ration\\_Design\\_Guide.pdf](http://www.unscn.org/layout/modules/resources/files/Food_Assistance_in_the_Context_of_HIV_Ration_Design_Guide.pdf). Please note that this publication is under revision (2013).

- The **expected coverage**. This is the proportion of the target population group that the programme can reasonably expect to reach, bearing in mind capacity and context. Generally, it is impossible to reach all potential beneficiaries.

### Figure 9. Estimating beneficiary numbers for prevention programmes



$$\text{Total beneficiaries} = \text{Population} \times \text{Coverage}$$

Programmes for the prevention of acute malnutrition tend to be fairly short compared to those designed to prevent stunting or address MNDs. Thus, they have different supply needs.

- **Prevention of acute malnutrition** programming usually takes place over a 3- to 6-month period. Participants should remain in the programme for its duration.
- **Prevention of stunting and MNP interventions to address micronutrient deficiencies** take place over longer periods, in some cases up to 18 months. If an intervention is targeted at children aged 6-23 months, some children will leave the programme as they approach their second birthday. Similarly, other children will join the programme when they reach 6 months of age. Usually, the number of children exiting and entering is more or less equal, so beneficiary calculations need only minor modification.

- Note that in **addressing micronutrient deficiencies with MNPs in young children**, both the duration of the intervention and the dosage can vary. For example, if a child is to receive one MNP sachet every other day for a year then they will need 180 sachets. For longer interventions for children aged 6-24 months, up to 270 sachets can be provided. If deficiencies are severe and the intervention period is short (e.g. 6 months), it may be necessary to provide one sachet per day; that is, 180 sachets in all.<sup>22</sup>
- **MNPs** may also be used for **school-age children**. Such programmes are preventive and are targeted at all children within a specific age range who attend school. Programme duration is often 180-190 days.

### 3.2.4 The use of SNF in non-nutrition programming

Some other, non-nutrition interventions also use SNF. Two examples — general food distribution and emergency school feeding — are covered in Annex 4b. If SNF are added to general food distributions, or to a cash and voucher programme, before formal nutrition programming is in place then beneficiary calculations are context-specific. The calculation depends on how the commodity can be targeted. Ideally, targeting should focus on households that only have children under 5 (or under 2) years old.


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<sup>22</sup> For more information, see: Home Fortification Technical Advisory Group (2011) *Programmatic Guidance Brief on Use of Micronutrient Powders (MNP) for Home Fortification*. Online at: [http://hftag.gainhealth.org/sites/hftag.gainhealth.org/files/HF-TAG\\_Program%20Brief%20Dec%202011.pdf](http://hftag.gainhealth.org/sites/hftag.gainhealth.org/files/HF-TAG_Program%20Brief%20Dec%202011.pdf)

However, precise figures may not be available. Another approach is to assume that all households have a child under 5 (or under 2). This type of SNF use is essentially a stopgap until a nutrition intervention can be established or scaled up. Therefore, beneficiary calculations are best determined through dialogue and coordination with nutrition and food security staff/clusters.

### 3.3 Estimating overall SNF supply needs

**Figure 10. WFP's formula to estimate overall SNF needs for a nutrition intervention**



$$\begin{array}{c}
 \text{Required tonnage in mt} = \\
 ( \text{Estimated total beneficiaries} \\
 \times \\
 \text{Ration size per person per day in grams} \\
 \times \\
 \text{Duration of support in days} ) \\
 \hline
 1,000,000
 \end{array}$$

Information for this calculation can be drawn from:

- Estimated total beneficiaries. See Sections 3.2.1-3.2.4, above.
- Ration size per person per day (in grams). See WFP's SNF Sheets in Figures 4a and 4b at the end of Section 3.1.

- Duration of support (in days). In other words, how long the beneficiary will participate in the programme. See WFP's SNF Sheets in Figures 4a and 4b at the end of Section 3.1. Note that duration will vary based on context. <sup>23</sup>

In the calculation above, the formula's denominator (1,000,000) converts the total in grams to metric tons.

Other organizations may have different methods for translating the number of targeted beneficiaries into SNF needs. For instance they may base calculations on primary packaging (e.g. the number of sachets) rather than on weight.

### 3.4 Additional considerations for the order cycle

Because of shelf life constraints, keep the time SNF are stocked to a minimum. It is better not to order all the SNF for the intervention in one go, even if the programme is fully funded. An ordering cycle that takes into account both expected and unexpected fluctuations should be developed with Programme, Procurement and Logistics (see Chapter 5.1.2).

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**23** Information for MNP use in school-age children is not currently captured in WFP's SNF Sheets shown at the end of Section 3.1. The MNP sachets used in school feeding are designed for multiple servings and weigh 8g rather than 1g. These have a shorter shelf life than the 1g sachets. One sachet provides 0.4g each for 20 children per school day. For up-to-date information, please see the WFP Food Quality website at <http://foodqualityandsafety.wfp.org/en/home>

### 3.4.1 Expected fluctuations

It may be evident from the context that amounts of SNF needed per month may vary.

The following should be considered.

- Ascertain how much **available stock** is already in the country, and how much has been ordered and is on its way.
- Shelf life is a key factor in the order cycle, and needs to be **balanced against** production and transportation **lead times**, as well as **programme demand**.
- Although ordering smaller quantities is recommended, multiple orders will need to be tracked and transported, **increasing workloads** for Procurement and Logistics.
- Programme, Procurement and Logistics staff need to consult on the **feasibility of the first-choice SNF** from a programme perspective. This will clarify whether it is possible to obtain enough of the preferred product.
- Annual needs need to be reviewed and updated to reflect **periods in which programme needs will be greater**. Use historical programme data to help forecast monthly fluctuations. This will lessen the risk of unforeseen peak demand. Seasonal caseload increases are common in MAM programmes. Large-scale blanket supplementary feeding programmes are often conducted during a specific part of the year to prevent increases in acute malnutrition.



- **Seasonal changes may affect accessibility.** Heavy rains and snow will restrict both pipeline and beneficiary access. **Unpredictable accessibility in insecure areas** must also be taken into account. Contingency planning and prepositioning strategies need to be pragmatic, striking a balance between access considerations and SNF shelf life.
- **Only use one SNF for each target group** in each nutrition intervention. Children should not be enrolled in more than one programme at a time; nor should they take more than one product at a time. For example, the LNS or FBF used to treat MAM, or to prevent acute malnutrition and stunting, have been developed to meet micronutrient needs. Children who are receiving LNS or FBF do not need to take MNP as well.

### **3.4.2 Unexpected fluctuations**

Unexpected fluctuations are common in the humanitarian sector. Always keep other stakeholders informed about changes that could affect implementation. Examples of fluctuations are: changes in the funding situation, and changes in the context that may necessitate targeting adjustments.

The unit responsible for placing orders needs to communicate regularly with Programme staff. This will help them understand shifts in programme needs, and it will give them an opportunity to inform Programme about updated stock ETAs.

Keep in mind the following:

- ✓ Planned beneficiary numbers — and thus, supply needs — may need to be revised if **funding availability** changes.<sup>24</sup>
- ✓ **Potential pipeline breaks** will require contingency planning. Logistics staff should alert Programme staff so that they can put in place mitigation measures. For local pipeline breaks, such measures might include loans between organizations. For larger-scale breaks, loans from other country programmes might be needed. Changes in commodity and SNF distribution should also be discussed with local authorities and partners. This will help determine what kind of mitigation is most appropriate. Programme should also communicate with communities and beneficiaries to explain the rationale for any planned changes.
- ✓ **Proposed modifications or substitutions** to recommendations of SNF in programmes should be discussed with Programme staff in regional bureaux and headquarters.
- ✓ Programme needs to be aware that for SNF **only a limited number of additional beneficiaries can be covered**. If beneficiary figures need to be adjusted, prioritisation might be needed until the next order is available. At WFP, in reality, the country office will then consider using FPF or loans from other programmes or countries to reduce lead time if the situation is life threatening.

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<sup>24</sup> For WFP staff, a procurement price list is available on [wfp.go](http://wfp.go). Other logistics-related costs can be found in the relevant Land, Transport, Storage and Handling (LTSH) matrix.

### 3.5 Golden rules

- ✓ The design of all nutrition interventions should be based on clear understanding of both the nutrition situation and the capacity to respond.
- ✓ Nutrition interventions that use SNF can be an important part of an overall response to nutrition problems. However, complementary programming in nutrition and other sectors is also required if improvements are to be sustainable.
- ✓ It is critical to gauge the government's awareness and standards concerning SNF, as well as their technical and logistical capacity for using these products. Advocacy and technical support can then be tailored accordingly.
- ✓ More than one SNF may be recommended for the same programme. If so, the choice of SNF depends on contextual factors detailed in Section 3.1.
- ✓ SNFs should not be used for programmes for which they are not recommended.
- ✓ Decision-making about which SNF to use must take into account: the target group; the context (including the capacity to cook); cultural practices and food preferences; conformity with national standards; and operational issues.

- ✓ Estimated SNF supply needs are calculated from the total estimated number of beneficiaries, SNF ration size and programme duration. The formula used by WFP to estimate the required metric tonnage is:

$$\text{Required tonnage in mt} = \left( \text{Estimated total beneficiaries} \times \text{Ration size per person per day in grams} \times \text{Duration of support in days} \right) \div 1,000,000$$

When translating estimated supply needs into actual supply orders, potential seasonality in beneficiary loads should be taken into account.

- ✓ As well as SNF distribution, there are many aspects of nutrition programming that can contribute to better nutritional status. These include linkages with other programmes, and communication to bring about behavioural change.
- ✓ Communication between Programme, Procurement, Food Quality, and Logistics staff is essential — both for initial planning, and for predicting and mitigating the impact of pipeline breaks on nutrition interventions.

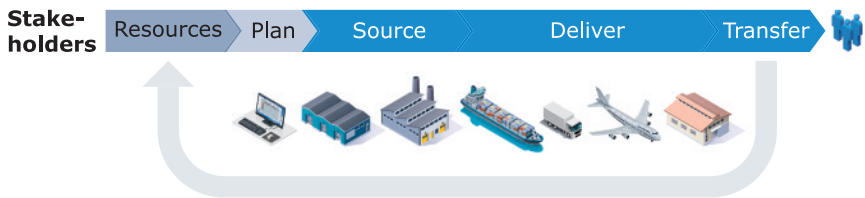


# Chapter 4.

## Managing the supply chain: food quality

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### In this chapter



This chapter describes the quality management system through the supply chain. Keep in mind that to be effective, quality management requires resources, cooperation, strict rules and continuous improvement.

- 4.1** presents specific issues associated with SNF.
- 4.2** introduces quality management along the supply chain.
- 4.3** deals with product analysis.
- 4.4** explains why traceability is important for SNF.
- 4.5** addresses food incidents and how to deal with them.
- 4.6** summarizes the golden rules.

For further information about quality and testing requirements for commodities, please refer to the Specifications section of WFP's Food Quality site: <http://foodqualityandsafety.wfp.org>

The following websites provide information or guidance about detection of possible incidents.

Guides on determining whether a food incident has occurred:

- US Food and Drug Administration (2009) *Guidance for Clinical Investigators, Sponsors and IRBs: Adverse Event Reporting to Institutional Review Boards – Improving Human Subject Protection*. Online at: <http://www.fda.gov/downloads/RegulatoryInformation/Guidances/UCM126572.pdf>
- Northwestern University Institutional Review Board (2013) *Unanticipated Problems Involving Risks to Subjects or Others (UPIRSO)*. Online at: <http://irb.northwestern.edu/process/when-things-go-wrong/upirso>

Facts about the major foodborne illnesses:

- US Food and Drug Administration (2011) *Foodborne Illnesses: What You Need to Know*. Online at: <http://www.fda.gov/food/resourcesforyou/consumers/ucm103263.htm>
- US Food and Drug Administration (2012) *Bad Bug Book: Handbook of Foodborne Pathogenic Microorganisms and Natural Toxins*. Online at: <http://www.fda.gov/downloads/Food/FoodborneIllnessContaminants/UCM297627.pdf>

Guide to confirming diagnosis:

- US Centers for Disease Control (2011) *Guide to Confirming a Diagnosis in Foodborne Disease*. Online at:  
[http://www.cdc.gov/outbreaknet/references\\_resources/guide\\_confirming\\_diagnosis.html](http://www.cdc.gov/outbreaknet/references_resources/guide_confirming_diagnosis.html)

## 4.1 Specific issues that can be associated with SNF

Tables 1a, 1b and 1c, on the following pages, give an overview of issues related to food safety,<sup>25</sup> acceptability and nutritional value that could lead to a food incident. Please see Section 4.5 for a detailed discussion.

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**25** For more information about risks associated with water activity (abbreviated as 'aw') in food products, please see Virginia Tech College of Agriculture and Life Sciences' explanation online at:  
<http://www.apps.fst.vt.edu/extension/valueadded/wateractivity.html>



**Table 1a. Food incident triggers: the main safety issues**

<b>MAIN SAFETY ISSUES (hazards to health)</b>	
Many of these hazards are linked to issues at production level. This is why supplier selection and monitoring the suppliers' performance is critical (Chapter 5).	
Potential food safety and/or quality defects	Failures leading to the issue
<p><b>Pathogens:</b> e.g. Salmonella, Staphylococcus aureus, Cronobacter sakazakii, Bacillus cereus and its toxins.</p> <p><b>Toxins:</b> e.g. from pathogenic strains of Escherichia coli.</p>	<ul style="list-style-type: none"> <li>• Contamination of raw materials.</li> <li>• Packaging breaches.</li> <li>• High moisture content and high water activity of foods during processing — i.e. conditions that encourage growth of pathogenic microbes.</li> </ul>
<p><b>Mycotoxins produced by fungi:</b> aflatoxin B and G, aflatoxin M, deoxynivalenol (DON), zearalenone (ZEA), and ochratoxin.</p>	<ul style="list-style-type: none"> <li>• Contamination of a raw material, such as corn or peanuts, due to mould growth.</li> <li>• Failures in selection and monitoring of the performance of suppliers of raw materials.</li> <li>• High moisture content and high water activity of foods during processing — i.e. conditions that encourage growth of moulds.</li> </ul>
<p><b>Melamine</b></p>	<ul style="list-style-type: none"> <li>• Adulteration of raw materials, such as milk.</li> <li>• Poor quality control of raw materials at processor level.</li> </ul>

<b>Potential food safety and/or quality defects</b>	<b>Failures leading to the issue</b>
<p><b>Heavy metals:</b> e.g. lead, mercury, arsenic, cadmium and barium.</p>	<ul style="list-style-type: none"> <li>• Contamination of raw materials.</li> <li>• Poor quality control of raw materials at processor level.</li> </ul>
<p><b>Pesticides:</b> carbamate group, organochlorine group, organophosphorus group, and pyrethroid group.</p>	<ul style="list-style-type: none"> <li>• Contamination of raw materials.</li> <li>• Poor quality control of raw materials at processor level.</li> </ul>
<p><b>Physical hazards:</b> e.g. foreign bodies.</p>	<ul style="list-style-type: none"> <li>• Poor process control during and after manufacture and during packaging.</li> </ul>

**Table 1b. Food incident triggers:  
the main acceptability issues**

<b>MAIN ACCEPTABILITY ISSUES</b> Many of these issues are addressed in programme design and supplier selection (Chapters 3 and 5)	
<b>Potential food safety and/or quality defects</b>	<b>Failures leading to the issue</b>
Low/no SNF acceptability in beneficiary population.	<ul style="list-style-type: none"> <li>• No relevant acceptability study performed.</li> <li>• Selection of the SNF did not take into account beneficiaries' sensory and sociocultural preferences.</li> </ul>
Rancidity or other sensory changes.	<ul style="list-style-type: none"> <li>• Poor quality control of raw materials at processor level.</li> <li>• No relevant shelf life study performed at producer level.</li> <li>• SNF stored for too long.</li> <li>• SNF exposed to high temperatures beyond product tolerance levels.</li> </ul>
Food is not convenient.	<ul style="list-style-type: none"> <li>• Selection of the SNF did not take into account practical constraints related to beneficiaries' circumstances.</li> </ul>

**Table 1c. Food incident triggers:  
the main nutrition issues**

<b>MAIN NUTRITION ISSUES</b> Many of these issues are related to supplier selection and logistics, which are covered in Chapters 5 and 6.)	
Potential food safety and/or quality defects	Failures leading to the issue
Incorrect vitamin and mineral mix or levels.	<ul style="list-style-type: none"> <li>• Poor quality control of raw materials, formulation or mixing processes at processor level.</li> <li>• Poor quality control of raw materials, formulation or mixing processes at premix supplier level.</li> <li>• No relevant shelf life study performed at producer level.</li> <li>• SNF stored for too long.</li> <li>• SNF exposed to temperatures greater than 30°C (in the case of vitamin degradation).</li> </ul>
Product does not provide enough protein, fat or energy.	<ul style="list-style-type: none"> <li>• Poor quality control of raw materials, formulation or mixing processes at processor level.</li> </ul>
Poor digestibility.	<ul style="list-style-type: none"> <li>• Heat treatment not sufficient to destroy anti-nutritional factors.</li> <li>• Poor quality control of formulation and/or heat treatment at processor level.</li> </ul>

## 4.2 Principles of quality management

**Figure 11. WFP's food safety and quality system**

WFP's current food safety and quality system is based on:

- approval of newly introduced products in WFP basket by an internal review committee and an external technical advisory group;
- the inclusion of a precise product definition in specifications used for procurement;
- regular inspections of manufacturing sites;
- systematic inspection during processing;
- systematic product analysis in parallel with producer release procedures; and
- management of food incidents (see Section 4.5) throughout the supply chain.

It is important to note that to be effective, quality management requires resources, cooperation, strict rules, and commitment to continuous improvement.

The quality management system in place at WFP follows the standardized Codex General Principles of Food Hygiene and ISO standards which provide the standard definition for quality management in the commercial sector.<sup>26</sup>

Table 2 on the following pages summarizes quality management processes and objectives at different steps in the SNF supply chain. At every stage, roles and responsibilities must be clearly defined.

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**26** With some adaptation, these principles are applicable to any organization handling food and can be found in Codex Alimentarius ISO 9001.

**Table 2. Quality management in the SNF supply chain**

<b>Main operational process</b>	<b>Quality objectives</b>	<b>What to do</b>
<p><b>Food specification</b>                      (WFP's specifications are published online at: <a href="http://foodqualityandsafety.wfp.org">http://foodqualityandsafety.wfp.org</a>)  <i>Not described in this guideline.</i></p>	<p>SNF characteristics are standardized.</p>	<p>Complement Codex standards, factoring in the organization's and beneficiaries' specific constraints and objectives.</p>
<p><b>Supply chain planning</b>                      See Chapter 2 of this guideline.</p>	<p>Stocks and pipeline breaks are minimized.</p>	<p>Anticipate constraints on the operation, such as the external environment, and needs estimation.</p>
<p><b>SNF procurement</b>                      See Chapter 5.</p>	<p>The correct SNF is purchased.</p>	<p>Use specifications. Use only validated suppliers that can guarantee and deliver product quality compliant with Codex, and ISO standards, particularly ISOs 9001 and 22000.</p>

<b>Main operational process</b>	<b>Quality objectives</b>	<b>What to do</b>
<p><b>SNF transport and storage</b> See Chapter 6.</p>	<p>The quality of SNF is maintained so that it remains fit for consumption by beneficiaries.</p>	<p>Take into account SNF specificity during transport and storage.</p> <p>Trace and track food to allow fast recall and efficient quarantine.</p>
<p><b>SNF distribution to beneficiary</b> See Chapter 7.</p>	<p>Unsafe SNF does not reach beneficiaries. The correct SNF is received and consumed properly.</p>	<p>Monitor hygiene practices, food acceptability and food efficiency so that if an issue arises appropriate action can be taken.</p>
<p><b>Food incidents</b> See Chapter 4.</p>	<p>Beneficiaries are protected from unsafe SNF. The organization's reputation is protected.</p>	<p>Food incidents are properly detected and investigated. If an incident occurs, put appropriate actions, such as recalls, into place rapidly.</p>



## 4.3 Principles of product analysis throughout the supply chain

Product analysis involves testing the finished product following manufacture and, if necessary, along the supply chain. Its purpose is to ensure that the product complies with quality requirements. At WFP it is also used to monitor the efficacy of the quality management system. Within WFP, product analysis:

- is carried out initially at supplier level, and is a required step during WFP's procurement process (see Section 5.2); and
- is used when a food incident occurs (Section 4.5).

### 4.3.1 How to manage the sampling process (WFP)

It is impossible to test every pack of SNF; instead, samples must be selected for testing. Different sampling plans exist for different SNF. Choosing the right plan is key to obtaining representative results.

It is important to remember that the chosen plan must be strictly adhered to; only then will samples be representative of the whole consignment. A consignment of SNF may seem more homogeneous than it actually is. For example: ingredients may have been drawn from different batches of raw materials; some bags may have defective seals; or some containers may have been exposed to the sun.

- ✓ Make sure a detailed sampling plan is provided. It should include the number of primary units/packs to be sampled, and the quantity that the designated quality focal point needs to ship to the testing laboratory.

- ✓ When bulk sampling, take samples during transfer of the food from one container to another.
- ✓ Primary units should be collected randomly, from different positions inside the warehouse, positions inside the stack, positions inside the pallet, positions inside the secondary pack, and positions inside the primary pack.

If sampling is conducted by an external contractor, make sure they follow these three instructions.

#### **4.3.2 How to manage the analysis process**

When dealing with a laboratory directly, or via an inspection/superintendent company, remember that laboratories and their analytical methods and protocols may differ substantially. To ensure reliable testing and meaningful results:

- ✓ Obtain from the appointed quality focal point full instructions for the laboratory. These should specify which tests are required and which testing ('reference') methods must be used. Recommended target levels should be included for each parameter being measured.

Note that at WFP, target levels at the point of purchase are included in the procurement specification. They may differ from targets at the end of shelf life.

- ✓ Only select testing parameters that will reveal whether there is a risk to safety and food quality.
- ✓ Use only laboratories that are authorized by the local authorities and possess relevant accreditation.

- ✓ If local capacity is not sufficient, perform analysis in accredited laboratories abroad.

### **4.3.3 Use of Certificate of Analysis**

At the point of purchase a Certificate of Analysis (CoA) is used to confirm that the SNF conforms with the contractual agreement. It should cover all agreed food composition and safety parameters, including nutritional values, vitamins and mineral content, etc., and state that the product is free of harmful microorganisms and contaminants.

Make sure the following points are reported on the CoA:

- ✓ The method used to analyze each parameter, and the accreditation for each method.
- ✓ The target limits for each parameter, as specified on the contract.
- ✓ The units in which numerical results are expressed.
- ✓ The result for each parameter tested.
- ✓ The degree of uncertainty (precision and bias) associated with the result, if possible.
- ✓ The number of samples taken, and a statement indicating whether the laboratory:
  - tested a composite sample; or

- tested a pooled sample<sup>27</sup> (and which samples were selected for pooling).

If a food incident occurs, stock is quarantined until laboratory analysis determines whether it is safe for use or whether it should be destroyed. In these circumstances, the CoA issued by the laboratory is fundamental to the decision as to whether or not stock can be released from quarantine.

In all cases, the quality focal point must be involved, and food incident management procedures must be strictly followed.

#### 4.4 Visual inspection during handling

Some food defects or food deterioration signs can be detected during SNF handling. Examples are: damaged packaging and visible dirt, infestations, or mould.

- ✓ Examine food and packaging carefully for visible defects, including:
  - damage or excreta from insect or rodent infestations;
  - deterioration, including contamination with mould; and

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**27** Composite testing involves mixing together equal amounts of all the product samples, or a series of comparable sets of samples, then analysing part of the mixture or mixtures. Pooling involves choosing a set of representative samples, from which equal amounts are taken, mixed together and analyzed as a whole.

- breached or unsuitable packaging — look for leaks, and for possible ingress of other substances into the product.<sup>28</sup>

The goal is to identify potential food incidents as early as possible during the supply chain, and before the distribution of unsafe products to beneficiaries.

#### 4.5 Traceability (tracing and tracking)

Most of the SNF in this guideline are processed foods. They consist of a variety of raw materials and have complex production formulae.

In the event of a food incident, it is essential to remove the affected batch to prevent the incident from escalating, and to establish exactly where in the supply chain the problem leading to the incident occurred.

Quality defects involving nutrient or microbial levels cannot be detected visually. Only lab tests will detect them, and testing takes time. Meanwhile, products from the same batches may still be moving through the supply chain.

Traceability is of particular importance for SNF. It makes it possible to connect lab results with batches of stored or distributed products.

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**28** FAO (1993) *Manual of food quality control. 15. Imported food inspection*. Online at: <http://www.fao.org/docrep/014/t0867e/t0867e.pdf>

Best before dates (BBD) and production batch numbers must be noted and shared at all stages of the supply chain. If problems occur then it will be possible to determine where, how, and by whom mistakes were made.

Diligent tracking of all products, from the point of purchase through to distribution, enables supply chain managers to determine exactly which batch is where. They can then quickly issue quarantine or recall instructions to the country office or partner organizations.

Tracing the movement of products through the supply chain assists in identifying the cause of the food incident – for instance, mishandling, poor processing, or poor quality raw materials, etc. Tracing also enables warehouse staff to locate other stock from the affected batch and quarantine it.

## 4.6 How to react in the event of food incidents

According to the World Health Organization's Initiative to Estimate the Global Burden of Foodborne Diseases, worldwide, diarrhoeal diseases alone kill 2.2 million people every year.<sup>29</sup> A considerable proportion of those diseases are foodborne.

To prevent defective SNF from contributing to this toll, any unanticipated issue associated with the products should be investigated, reported, notified and immediately addressed.

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**29** World Health Organization (2013) *Baseline Information for Food Safety Policy and Measures*. Online at: [http://www.who.int/foodsafety/about/flyer\\_foodborne\\_disease.pdf](http://www.who.int/foodsafety/about/flyer_foodborne_disease.pdf)

#### 4.6.1 What are food incidents?

A food incident is defined as: any notified situation within the food supply chain where there is a risk — actual, potential or perceived — associated with the safety or quality of the food distributed and/or consumed.<sup>30</sup> The primary purpose of intervention is to protect the welfare of those who consume the product. Intervention also helps to maintain — or, if necessary, restore — beneficiaries' and other stakeholders' trust in the organization.

A food incident may arise due to a major product quality defect, or a food safety hazard — i.e. the condition of the food, or a biological, chemical or physical agent in the food — that has the potential to harm health.<sup>31</sup>

It is critical that — regardless of their magnitude — all food incidents are dealt with systematically, in terms of both food safety and communication with relevant authorities and stakeholders.

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**30** Definition adapted from the Australian Government's Department of Health and Ageing (2009) *National Food Incident Response Protocol*, online at: <http://www.health.gov.au/> and the United Kingdom Food Standards Agency (2012) *Food Standards Agency Incident Response Protocol*, online at: <http://www.food.gov.uk>

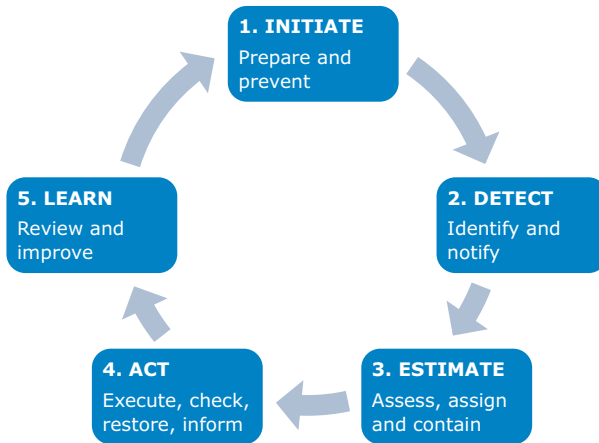
**31** ISO 22000:2005 definition of food safety hazard.

#### 4.6.2 How to systematically deal with SNF food incidents: the I.D.E.A.L. concept of incident management

I.D.E.A.L.<sup>32</sup> is an acronym for Initiate, Detect, Estimate, Act and Learn. Through the I.D.E.A.L. concept, a food incident management (FIM) system is established which provides clear, risk-based frameworks for proactive communication and decision-making.

The following diagram gives an overview of the concept, which is then explained in relation to SNF.

**Figure 12. Overview of the I.D.E.A.L. concept**



**32** WFP's I.D.E.A.L. concept was developed with Dominique Bounie, Associate Professor in food process engineering at Lille1 University, France. For more information, please refer to Bounie, D. (2012) *Food Incident Management – Proposal for setting up an integrated process for securing the decision making process at WFP in case of food incidents*. For further information contact [wfp.foodquality@wfp.org](mailto:wfp.foodquality@wfp.org)

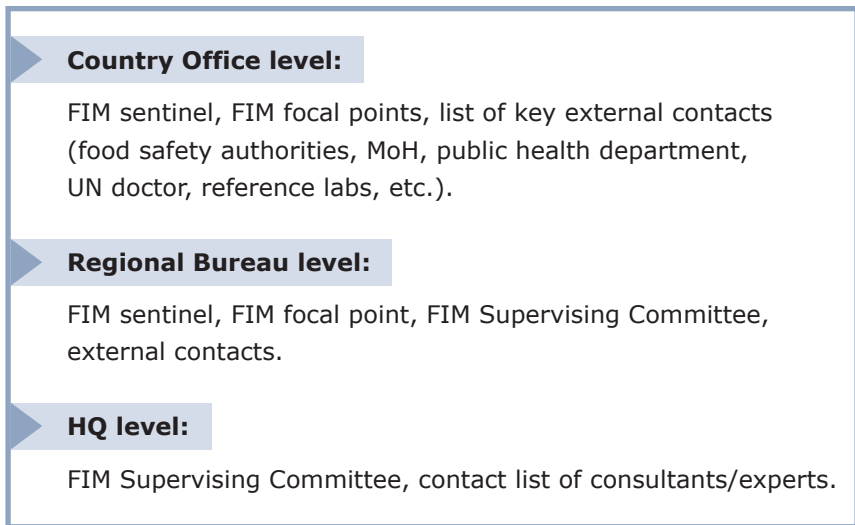


### 4.6.2.1 Initiate

Make sure that the right people are in place to carry out the steps in the process.

- Create a proper reporting structure within the organization. See the example in Figure 13.

**Figure 13. Example of a WFP FIM reporting structure**



- Identify a focal point at field level in each country
- Make sure that the focal point is acquainted with the specificities of SNF (see Chapter 1).
- Focal points should be knowledgeable on how to use a risk matrix tool (see 4.6.2.3, Estimate, below).

### 4.6.2.2 Detect

Incidents can be detected at various levels if the right structure is in place to filter possible evidence.

**Figure 14. Structuring for incident detection**



### 4.6.2.3 Estimate

So that the severity of an incident or situation can be evaluated, certain frameworks must exist to allow the qualitative and quantitative analysis – and, eventually classification – of a risk. Most incident management protocols define a matrix for severity estimation based on risk probability and risk impact (WFP works on a 5×5 matrix [see Annex 8]):



$$\text{Severity} = \text{Impact} \times \text{Likelihood}$$

#### 4.6.2.4 Act

Remember the following points when responding to an incident:

- If a food incident issue is not addressed promptly, its consequences may rapidly become critical, and the incident may escalate beyond the organization's control. When an incident turns into a crisis, it requires crisis-level information management.
- Lines of communication must be strictly followed, internally and externally.
- Messages that are circulated and communicated externally, including those to beneficiaries, should be timely, consistent, concise and fully argued.
- Clear procedures are the best safeguards against improvisation, confusion, disengagement or abuse of power.
- Sometimes, the highest risk in managing a serious food incident is not correlated with the direct impact of the initial hazard but to procrastination and delay in responding to it.
- Risk analysis should be based as much as possible on evidence, i.e. precise facts and data. In some cases, these elements may not be available immediately and should be investigated more thoroughly. Means for such an investigation should have been pre-prepared; if not, they should be rapidly allocated.

- The decision for responding to a crisis is not limited to technical arguments. It should be based on a multivariate cost-benefit analysis.
- The decision should be straightforward, balanced and unique. The decision process must have been clearly defined in advance to avoid any ambiguity, confusion or conflict regarding the organization's position.

If it is necessary to dispose of or destroy SNF, follow the Product disposal checklist in Annex 7.

#### **4.6.2.5 Learn**

To prevent the same issues arising again, and to be better prepared for the next incident, the following steps can help:

- Make sure that proper tracking of incidents is in place, and that records of all past incidents are kept.
- At the end of the year, evaluate the incidents.
- Link them to root causes — for example: supplier issue, transport or storage problems, etc.
- Take action to mitigate those risks.

## Figure 15. Some things to look for in incident reports

When examining incident reports, consider the following:

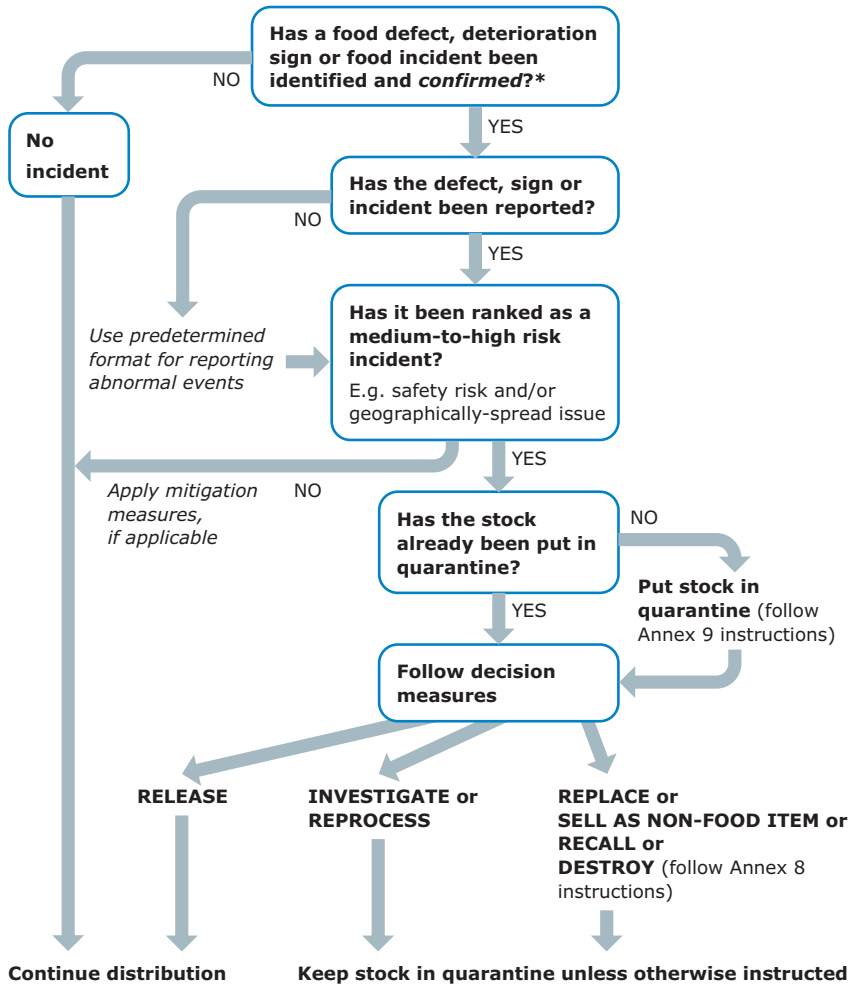
- Have tracking and reporting structures been fit for purpose in assisting with incident responses?
- How many incidents occurred over the past six months or year? Have issues arisen again; are they recurrent? If so, do they indicate an error or flaw in the supply chain, or perhaps a fundamental flaw or bottleneck?
- Was the Emergency Response (ER) list in place and adequately updated?

Remember that even if all incidents were minor ones, analysis of the reports might still reveal a pattern of causation. If problems have a common root cause then action, such as talking to a supplier, can be taken to prevent them from happening again.

An overview of the I.D.E.A.L. processes and roles is presented in Hand-out 1: Food Incident Management in Chapter 10.

### 4.6.3 How to respond to a food incident

The incident response decision tree is shown in Figure 16. All roles and responsibilities need to be defined in ways that are appropriate to the context and to the structure of the organization. WFP's recommended structure and responsibilities are outlined in Annex 8, Overview of the FIM process. In case SNF need to be quarantined, follow the steps explained in Annex 9, Quarantining SNF.

**Figure 16. The incident response decision tree****\*IMPORTANT FIRST INFORMATION:**

- Problem description
- Name, brand, size, lot code(s) affected
- Complaints received and reported illnesses (if any)
- Product distribution (local/national/regional, etc.)
- Date when the product was distributed
- Product label(s)
- Total quantity of product purchased and distributed
- Contact person at your level

To be able to respond properly to a food incident, the organization must create a robust food incident management structure, and it must train staff to accurately report any incident and act appropriately. The following checklist may help identify where additional work needs to be done:

- Have all staff been trained in how to identify and report a food incident?
- Who is the organization's internal focal point in the country?
- Do all staff know who the focal point is?
- Is there an internal multidisciplinary advisory committee that can assist in risk estimation and decision making?
- Do the focal point and the committee know how to estimate risk level?
- Is there an updated list of emergency contacts and key stakeholders?
- Are the focal point and the advisory committee regularly trained on how to carry out case studies?

## 4.7 Golden rules

- ✓ Quality management is the only way to guarantee food quality and safety.
- ✓ Food safety is a key element of food quality.
- ✓ Quality management applies to the whole supply chain: from primary production to consumption. Therefore, all actors in the supply chain share responsibility for food safety and quality. Staff should be encouraged to contact the quality focal point for technical advice when needed.
- ✓ Tracing and tracking of batch numbers is a prerequisite for an effective quality management system.
- ✓ Any incident or sign of deterioration or a product defect should be reported to a technical expert within the organization and managed accordingly.
- ✓ Product sampling and testing are important elements of a quality assurance system. Usually, they take place early on in the supply chain, or when a food incident occurs. However, there are many other opportunities for identifying defective SNF and removing them from the pipeline. An effective quality assurance system must ensure that all staff are trained to be alert to potential problems, and that they are equipped to prevent defective products from reaching or harming beneficiaries.



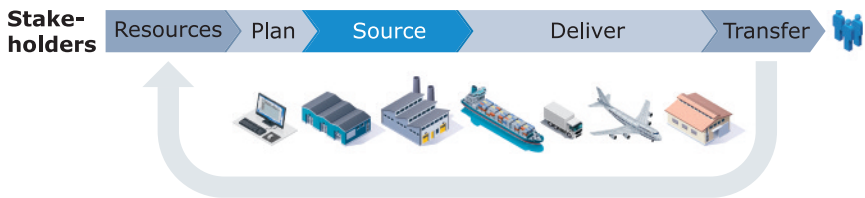


# Chapter 5.

## Managing the supply chain: procurement of SNF

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### In this chapter



This chapter discusses the stages involved in purchasing SNF, and touches on the conditions of shipment / transport to the receiving country.

As highlighted in Chapters 1 and 3, products may not be immediately available during periods of peak demand, creating a significant bottleneck. Due to the vulnerability of SNF to high temperatures, storage duration should be kept to a minimum. Clearly, in some contexts this presents a dilemma: in deep field locations, particularly in hot countries, it is extremely difficult to set up the right storage conditions. Yet, due to the humanitarian environment, a ‘just in time’ delivery schedule is not practicable. Nevertheless, storage time can be optimized, and well-organized procurement is key to ensuring that the right quantity of the product is in place at the right time.

SNF are procured using the same process as other commodities. It is essential to be familiar with the basics of procurement so that supply problems can be remedied swiftly. For instance, a clear understanding of the process will be very helpful if SNF suppliers need to be found locally.

- 5.1** presents standard procurement procedures, including: supplier selection, ordering strategies and optimizing the SNF order cycle. It uses WFP's procurement procedures as an example.
- 5.2** describes end-product analysis prior to release of the products for delivery and distribution.
- 5.3** focuses on monitoring supplier performance.
- 5.4** discusses the development of local suppliers.
- 5.5** presents the golden rules.

For WFP's internal guidance on procurement, please go to:  
<http://go.wfp.org/web/procurement/food/manuals-and-procedures>

For information about Incoterms, please see Annex 5, Incoterms. Incoterms are a set of standardized contractual terms produced by the International Chamber of Commerce (ICC). They are used in delivery agreements to define the point at which risk and responsibility for the product changes from supplier to buyer. The terms are used worldwide and are available in many languages. ICC's Incoterms microsite is at:  
<http://www.iccwbo.org/products-and-services/trade-facilitation/incoterms-2010/>

## 5.1 The procurement process

Procurement means purchasing appropriate commodities, goods and services on a competitive basis, and in a cost-efficient and timely manner, on local, regional and international markets.

Procurement translates needs defined by Programme into actual orders, and defines the terms under which SNF enter the logistics set-up. In the case of in-kind donations, similar procedures apply.

### Figure 17. Procurement process components

The procurement process includes:

- evaluating suppliers on an ongoing basis in order to maintain an approved supplier list;
- confirming quantities, timing and food specification;
- confirming the budget;
- selecting the appropriate supplier;
- defining contractual terms, including defining relevant Incoterms (see Annex 5);
- signing the supply contract between buyer and supplier;
- clearing the release of products through end-product analysis;
- monitoring the performance of the SNF producer; and
- paying for goods and products that have been received.

### 5.1.1 Selection of the supplier

Organizations involved in food assistance are the main buyers of SNF products. It is the buyer's responsibility to make sure that producers match their quality expectations. The following considerations are key if a producer is to be considered.

- ✓ **Reliability.** Producers must be able to demonstrate that they are reputable manufacturers and can meet the organization's requirements. They must provide references from other buyers, along with proof of financial stability, credentials, etc.
- ✓ **Capacity.** Can the producer fulfil the organization's order?
- ✓ **Facilities and equipment.** Do they have the necessary set-up to produce SNF that complies with the organization's quality requirements?
- ✓ **Quality management.** Do they have an effective quality management system in place to ensure that their product is correctly formulated and labelled, safe to eat, of the required standard, and packaged and stored correctly? See Chapter 4.

SNF must only be purchased from validated suppliers.

The validation process includes audits that are carried out at least once every two years. These visits constitute an important process in the organization's quality management system: some of the potential quality issues associated with SNF can only be controlled at production level. Some organizations appoint technical specialists directly. Others may rely on technical visits carried out by other organizations, or they may organize joint visits.

For the audit, ensure that:

- ✓ the organization's quality focal point at country office level is involved;
- ✓ a technical specialist is appointed by the organization and will conduct the technical visit;
- ✓ the production line for the SNF of interest is being run that day; and
- ✓ you contact the organization's global quality focal point before initiating a visit.

If the audit raises concerns, several actions might be taken. The organization could:

- propose that the supplier takes remedial action;
- follow up on remedial actions and re-evaluate the supplier's standing in the organization's approved supplier list;
- decline to add the supplier to the approved supplier list; or
- immediately remove the supplier from the approved supplier list until they are able to meet quality standards.

### 5.1.2 Ordering strategy

Make sure that the procurement officer collaborates closely with Programme and Logistics personnel so that all are aware of each other's needs and have the latest stock reports to hand. This will help Procurement to formulate an order strategy that takes into account production and transport lead times (see Section 1.3.4) and balances them against shelf life, monthly demand, and Programme's need for safety (i.e. buffer) stock.

- ✓ The shelf life is the delay between production and the BBD printed on the pack. Make sure that the SNF will be distributed before the end of their shelf life, taking into account lead times and a safety margin.
- ✓ Monthly demand for the SNF is calculated from the following, as applicable: beneficiary needs, accessibility, prepositioning and contingency planning.
- ✓ Safety stock (SS) functions as a buffer stock. For procurement purposes, it is the amount of SNF needed to cover unexpected events such as late or lost delivery, or sudden increase in consumption. Buffer stock that has been used must be restocked immediately. Levels must be re-evaluated on a regular basis, taking into account BBDs. When calculating how much safety stock is needed, factor in consumption and supply constraints (purchase, transport, security, etc.).

Procurement negotiates the terms of the contract governing the deal. The contract must always include the agreed Incoterms. These define the point at which risk and responsibility for the product changes from supplier to buyer (see Annex 5, Incoterms).

Procurement must ensure that when the organization takes delivery of the SNF the products have the latest possible expiry date. Always include a minimum acceptable shelf life in the contract.

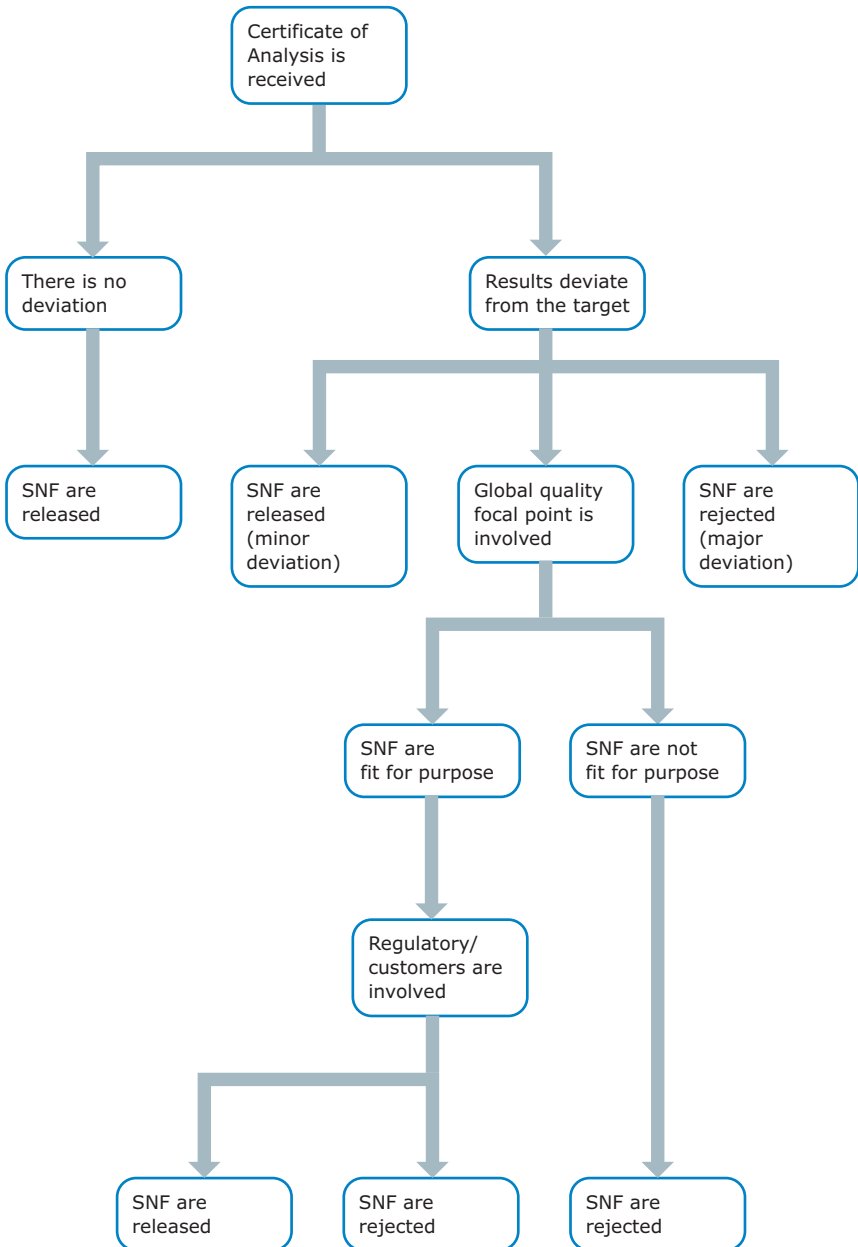
## **5.2 Product analysis at supplier level (WFP)**

WFP needs to protect itself from the risk of sub-standard goods being shipped to distant locations. Therefore, prior to dispatch, and prior to gaining ownership of the goods, WFP appoints an independent inspection company to analyze the SNF. The company visually inspects the product and manufacturing premises, withdraws samples from the goods allocated to WFP, analyzes the samples in an authorized lab and provides a Certificate of Analysis (CoA) (see Section 4.3.3). The inspection is carried out at WFP's expense and must be completed by the delivery date stated in the order.

Once the CoA is received, the organization can take the following decisions in relation to accepting and distributing the SNF.



**Figure 18. COA evaluation decision tree**



### 5.3 Supplier performance monitoring (WFP)

Assessment of SNF supplier performance helps to continuously improve quality of SNF. Assessment is based on trend analysis — of deviations from expected standards, and of corrective actions taken by manufacturers and remedial action required later in the supply chain. If a supplier does not take action to correct deviations and prevent them from recurring, the organization should find an alternative supplier.

Note: be transparent and document all exchanges with the supplier.

### 5.4 Development of local suppliers

Developing local suppliers can create more flexibility in operational planning. However, it is not an easy task and should be done in close cooperation with all key stakeholders — not least, product patent holders. The chief benefit of local production is that transport lead time may be reduced. However:

- production lead time is not always reduced — many local producers need to import key ingredients, such as the premix;
- shelf life may be shorter for locally-produced SNF than for those procured abroad;
- local producers must be capable of meeting the necessary quality standards.

Rather than building production capacity from scratch, it might be better to enhance suppliers who are already validated – for example, by helping them to set up a second production line. Sustainability is fundamental, and so it is important to carry out a feasibility study.

- ✓ Analyze the situation to determine whether:
  - nutrition intervention using SNF is justified;
  - demand is sufficiently large;
  - the main ingredients, excluding the premix, are locally available; and
  - the regulatory environment is favourable.
  
- ✓ Work closely with the supplier on:
  - a specification proposal that conforms with existing specifications;
  - production cost estimates (see Section 5.4.1) and a market study (Section 5.4.2) to ensure that the demand justifies the required level of investment;
  - quality standards, ensuring that international production standards can be achieved (Section 5.4.3).

- ✓ Work with the supplier to develop a business plan for the project:
  - establish clear objectives: e.g. setting up a new production line, improving an existing production line, or developing and validating a new SNF;
  - describe resources, including staff competencies, and the implications of the project for both the supplier and the external stakeholder;
  - produce an investment plan (SNF investment can be as much as US\$3 million);<sup>33</sup>
  - prepare a budget plan;
  - establish a timeline (typically, two years for SNF);
  - define monitoring;
  - ensure that the plan and its objectives, and resources available for the project, match the need – for a project to be self-sustaining in the long term, there will need to be a return on investment.

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**33** WFP P4P project for the local production of LNS Containerized Food Production Units in Afghanistan, 2011.

Just as developing local SNF suppliers can be mutually beneficial, so, too, can be providing technical assistance, particularly in terms of exchanging knowledge. It will be necessary to engage experienced technical staff to manage the project, as well as any international or local stakeholders who could provide specific types of technical support, such as training.

WFP staff can refer to [wfp.foodquality@wfp.org](mailto:wfp.foodquality@wfp.org) for support.

#### **5.4.1 Production cost**

A cost breakdown covering the following areas is used to estimate both the final cost of the SNF and the impact of any potential investment:

- monthly production costs;
- ingredient costs per metric ton of finished product — ingredients should be itemized, and likely wastage should also be accounted for;
- packaging costs per metric ton of finished product — packaging materials should be itemized, and likely wastage should also be accounted for;
- running costs per metric ton of finished product — include the cost of water, electricity, gas oil, and maintenance;
- payroll charges per month — itemized by function;
- depreciation per month — including buildings, plant and other equipment;

- taxes (%);
- profit (%); and
- distribution costs for direct purchase by the population.

### **5.4.2 Market study**

It is essential to conduct a market study to determine whether there is a sustainable market for SNF. Viability can be determined by comparing production costs (Section 5.4.1) with potential income, taking into account the following factors:

- the distribution network in the country, including wholesalers, retailers and infrastructure;
- regulation;
- the SNF product's acceptability in terms of local food preferences — for example, a preference for peanut- or chickpea-based LNS;
- the needs and resources of food assistance organizations, government and the population; and
- competition from local, regional and international suppliers of SNF.

### **5.4.3 Corrective Action and Preventive Action (CAPA) plan**

When supplier audits are carried out, the manufacturer is given a report that includes a list of non-conformities discovered during the inspection. The manufacturer must then provide a CAPA plan stating how they will improve their quality management system.

The manufacturer's CAPA plan should itemize the financial and human resources required to implement any new processes, and the equipment needed to improve quality. It should include a hazard analysis and a critical control point (HACCP) plan to reduce the incidence of hazards. If applicable, the CAPA plan should include a strategy to improve efficiency and reduce losses so as to reduce operating costs.

## 5.5 Golden rules

- ✓ Know the product specifications and standards.
- ✓ Remember that suppliers are responsible for guaranteeing that their product's ingredients and characteristics conform with the buyer's order specification.
- ✓ Know the market for SNF, and be aware of what can be procured locally, regionally and/or internationally.
- ✓ Make sure that the government permits the import and use of SNF, and obtain all the necessary documents.
- ✓ Know the suppliers and purchase only from validated suppliers with the necessary quality management systems, capacity, traceability, and financial stability.
- ✓ Make sure that batch numbers can be easily traced within the organization's tracking system in case of product recalls or other food incidents.
- ✓ Monitor suppliers' performance, and continuously re-evaluate their status within the approved supplier list.
- ✓ Where context and capacity support it, encourage development of local production.



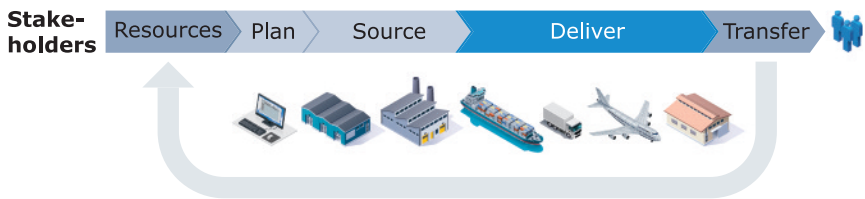


# Chapter 6.

## Managing the supply chain: logistics

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### In this chapter



This chapter focuses on reception (transferring goods from one mode of transport to another), loading, and transporting them to where they will eventually be stored. For much of the supply chain, SNF will be either on the move or stored in warehouses. At each stage, certain actions and precautionary measures must be taken. Many of the actions that are described in this chapter are also applicable to standard food commodities.

- 6.1** gives general recommendations for reception and handling of SNF, and provides general advice on customs clearance.
- 6.2** discusses transporting SNF by air, sea and land.
- 6.3** focuses on storage and warehouse management for SNF.
- 6.4** deals with delivering SNF to partners.

6.5 presents the golden rules.

For more general information on managing logistics, please see *The Logistics Operational Guide* (LOG), online at:  
<http://www.log.logcluster.org>

For updated information on dimensions and packaging of SNF, please see the product specifications on the WFP's Food Quality website at: <http://foodqualityandsafety.wfp.org/en/home>.

WFP staff can refer to the organization's transport manual for further guidance on transport and storage. This is on the intranet at: <http://home.wfp.org/manuals/transportmanual/manual.asp>

## 6.1 Reception and handling

### 6.1.1 Reception and handling – general recommendations

In this guideline, reception refers to the physical handing over of products when the mode of transport changes. Handling refers to loading and unloading, as well as movements of products within the warehouse.

For most organizations procuring SNF internationally, arrival at the port of entry is the first point at which the SNF comes into their possession. However, the exact point at which ownership changes from supplier to buyer depends on the Incoterms (see Annex 5). If, for example, SNF are manufactured locally, and the organization picks them up from the factory, then the organization could own the goods immediately according to the Incoterms.

In order to prevent delays in onward transport that would waste product shelf life, there are key issues that need to be addressed.

- ✓ Inform all actors involved in the SNF supply chain about the special requirements for receiving and handling SNF. These actors include other WFP units, local authorities, and third-party service providers — such as the superintendent, forwarding agent, shipping agent, and handling operator, etc.
- ✓ Have packing lists and up-to-date information about the Estimated Time of Arrival (ETA).

- ✓ Estimate required capacity for reception, i.e. how many staff and trucks will be needed, and what off-loading equipment and storage will be required at the port.
- ✓ Make sure the customs procedures are clearly understood and that the contact list is up-to-date.
- ✓ If several consignments of commodities are to be received simultaneously, try to clear the SNF first so that the products are not damaged by heat or moisture at the quayside.
- ✓ In the case of ocean freight, if unforeseen events such as port congestion block the goods at the quay side, and they are exposed to high temperature for an extended period of time, inform relevant actors along the supply chain that the stock has been exposed to heat. They should prioritize the cargo for distribution while it is still fit for consumption.
- ✓ At every stage, the person in charge should inspect the cargo by visually verifying that the transport conditions were in order and that there is no product deterioration. Any anomalies should be documented and reported immediately.
  - Inspect the outside of the container before opening it to ensure that the seal is intact.
  - Inspect the cargo itself for leakage, etc. This is difficult as SNF have primary and secondary packaging. See Chapter 10, Hand-out 1: Food Incident Management, and Annex 10, Checklist for reception.

- ✓ Note that when planning for storage and onward transport by truck or train, SNF need more space as they cannot be stacked as high as conventional commodities. Take this into account when calculating stowage space requirements.
- ✓ Make sure you have the latest national disposal regulations in case any products are rotten or damaged and need to be withdrawn from the supply chain (see Chapter 4). Sometimes outer packaging will need to be replaced before SNF in otherwise good condition can continue their journey.

Staff involved need to be informed about proper handling procedures at all stages before loading or unloading the products:

- ✓ **Handle with care!**
- ✓ Do not throw the cartons.
- ✓ Do not put the products on wet surfaces — the cartons will soak up water.
- ✓ Do not to stack the products higher than 3m. See Chapter 10, Hand-out 2: Storage recommendations for small storage areas.<sup>34</sup>
- ✓ Do not stack SNF against walls. Leave a gap of at least 40cm between walls and stacks.

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**34** Several factors influence stacking height, and they differ from country to country. For example, in very humid places, cartons will become less robust; therefore, stacking as high as 3m is not recommended. Stacking method (cross stacking vs. straight stacking) will also influence the stacking height.

- ✓ Store SNF only with other food products. Never store them with non-food products, and do not use rodenticide or insecticide chemicals in the storage facility.
- ✓ Do not step on the boxes, including during stacking.
- ✓ Provide spare boxes and tape for any re-packaging that may be required. Remember that only secondary (outer) packaging can be replaced.

Note that cartons of SNF can be stacked in different ways; however, some configurations produce stronger stacks than others. Two examples are shown below in Figure 19. Of these, the cross stack is stronger and safer.

**Figure 19. Examples of different stack configurations**



In order to be able to identify where a specific supplier batch is located in case of a safety issue, SNF should be segregated, **at least, by BBD and producer** and, **if possible, by batch number**.

Remember the risks associated with exposure to high temperatures.

If SNF have been stored for more than 6 months above 30°C,<sup>35</sup> or for more than 3 months above 40°C, the product quality may have degraded, and the focal point for food quality must be asked to check them before they are distributed (see Chapter 4).

<b>PRODUCT TRANSPORT/ STORAGE TEMPERATURE<sup>36</sup></b>	<b>&lt;30°C<sup>37</sup></b>	<b>More than 180 days (6 months) above 30°C<sup>38</sup></b>	<b>More than 90 days (3 months) above 40°C<sup>39</sup></b>
<b>RISK</b>	Nutritional content and taste remain satisfactory.	Nutritional content and taste may no longer be satisfactory. You should contact your quality focal point.	

**35** This applies if the SNF have been stored in conditions in which the temperature is consistently above 30°C for 120 days or consistently above 40°C for 60 days.

**36** Any temperature measurement inside the cartons, the transport vessel or vehicle, or the warehouse.

**37** Unless stated differently on the packaging.

**38** This refers to the total number of days during which the temperature was consistently above 30°C.

**39** This refers to the total number of days during which the temperature was consistently above 40°C.



### **6.1.2 A word about customs**

Procedures for import and export customs differ from country to country. Note that some countries have not yet adapted their procedures and regulations for new types of products, such as SNF. However, the following actions are generally applicable to all country contexts:

- ✓ Have a sound understanding of customs procedures. If in doubt, or for the first SNF delivery, verify the appropriate procedures with customs authorities in advance. Note that a certificate of origin is usually required.
- ✓ Develop and maintain a good working relationship with customs officers at all levels.
- ✓ If SNF have not previously been used in the country, and are not specifically included in national food quality standards, it is essential to introduce the SNF to local customs officials, health authorities, the bureau of standards, etc. prior to import. This will involve providing them with copies of the products' composition and Certificate of Analysis to ensure that the SNF comply with national food safety standards. It may also be necessary to provide proof that the products do not contain GMOs.
- ✓ Be aware that customs may require quality control testing either prior to arrival or in-country.
- ✓ Communicate the relevant procedures to all parties in a timely manner. If the supplier or donor is arranging the

documentation, make sure they have completed all documents required by the loading port.

- ✓ If the organization is exempt from paying import taxes, start the clearance procedures early to prevent delays.
- ✓ If any problems are encountered, alert the organization's procurement and shipping units so that corrective measures can be taken to solve potential issues ahead of the shipment's arrival.

How well customs regulations are managed will directly influence the speed with which the SNF are cleared and beneficiaries' needs are met. In a rapid onset emergency the organization might not have sufficient – or any – buffer stock in place, so it is absolutely critical that goods are cleared quickly.

Whether in an emergency or a development context, understanding the basic customs management issues is essential: the effectiveness of the response often depends upon it. Pipeline breaks must be avoided: the effectiveness of nutrition interventions relies on timely distributions.

As well as being familiar with these general points, staff carrying out import and export activities must understand the particular procedures, rules and regulations for movement of goods in and out of specific countries.

If a Carry and Forwarding (C&F) agent is used, determine whether they have experience with SNF. If not, then some sensitization may be needed.

## 6.2 Transport

### 6.2.1 Air, sea or land — general considerations

During an operation there will be several different transport phases: from the factory to the port or land entry point; from the factory or entry point to the main warehouse or hub; from the main warehouse or hub to partners; and from partners to beneficiaries.

Transport planning for SNF needs to consider the following:

- ✓ Make sure that transporters and partners are aware of the cargo's value. If losses occur, a claim will need to be made for reimbursement.
- ✓ Ascertain the number and locations of different delivery and warehousing points that must be reached.
- ✓ Analyze roads and other infrastructure, and the security situation, to determine which primary and alternative routes are available for transport.
- ✓ When choosing the mode of transport, balance timeliness and cost-efficiency.
- ✓ Work out how many vehicles will be needed to deliver products to their destination.
- ✓ Obtain up-to-date information about network congestion and/or delays to distribution.
- ✓ Understand the likely weather conditions and put in place

capacity to provide special protection of the cargo from water, direct sunlight and high temperature.

- ✓ Note that for SNF there is a different transport order: BBD breaks the First In First Out rule.

Cargo should be loaded according to its BBD as this will facilitate stock management by BBD at the final destination. It will also help staff track and identify the affected batch of SNF in the event of a food safety incident.

### 6.2.2 By air

In emergency situations with difficult access, it may be necessary to transport SNF by air. Usually, SNF are first flown on a charter flight from the supplier to a staging area. Transport between staging area and Final Delivery Point (FDP) is then done by road or local air services.

For local transport on cargo planes, note the following.

- ✓ If the cargo is palletized and there is enough time, the cargo may be removed from the pallets before being loaded onto the aircraft to reduce the weight of the load.
- ✓ Cartons and boxes of SNF and palletized SNF cannot be airdropped. Only bagged SNF can be airdropped, and then only after applying extra protection, such as using several layers of bags. Note that there can be losses of up to roughly 10 percent during airdrops.

For transport on helicopters, note the following.

- ✓ Because helicopter journeys between the helipad (staging area) and the delivery site<sup>40</sup> and back again do not take long, the usual concerns about exposing SNF to extreme ambient temperatures can be ignored during the flight.
- ✓ If the staging area has handling equipment and the cargo is palletized, remove the cargo from the pallets as it is being loaded onto the helicopter so as to reduce the load weight.
- ✓ Make sure damaged cartons are not loaded onto the helicopter. They may not be accepted by the helicopter crew.
- ✓ Make sure the staging area for SNF is protected from extreme temperatures. Use a proper warehouse or a place that offers shade and is well ventilated.
- ✓ Be aware of the aircraft's precise payload and its rotation capacity. These data are needed when estimating lead time and costs for the entire operation.
- ✓ In some situations, goods are loaded into slings, as opposed to being stacked inside the cargo hold.
- ✓ Make sure that the SNF are well secured when loaded.
- ✓ An overview of the most commonly used helicopters can be found in Annex 11.

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**40** Extended delivery point (EDP) or final delivery point (FDP).

### 6.2.3 By sea

Incoterms in the shipping contract (see Annex 5, Incoterms) define where the ownership and risk transfers from the supplier to the buyer. They establish financial liability in the event of an accident or other mishap during the journey.

Table 3 demonstrates how much less SNF can be transported in a typical container, compared to standard commodities.

**Table 3. Comparison of container loads of conventional commodities and SNF**

Product	Capacity of 20-foot container
Yellow split peas	23 mt
Wheat flour	21.5 mt
Vegetable oil	18.2 mt
SNF: FBF, such as SuperCereal Plus or SuperCereal	17–22 mt
SNF: Plumpy'sup	10.5 mt (704 cartons)
SNF: Plumpy'doz	10.3 mt (800 cartons)

Note also that pallet dimensions vary between different, pre-palletized SNF. For example:

- Plumpy'sup pallets measure  $0.80 \times 1.20 \times 1.84$  m;
- Plumpy'doz pallets measure  $1.00 \times 1.20 \times 2.18$  m.

If products are palletized, fewer metric tons of SNF can be carried in the container.

Once the cargo has arrived at the port:

- ✓ Check the container on arrival. See Annex 10, Checklist for reception.
- ✓ When containers carrying SNF have been discharged from the ship, make sure that they do not linger in the sun.
- ✓ Do not use containers as storage facilities for SNF. The temperature inside a container can easily rise above 40°C.

If goods are transported on rivers:

- ✓ Make sure the captain knows how to handle SNF properly.
- ✓ Inspect the boat or barge for leaks before loading begins.
- ✓ Make sure the boat's cargo deck or hold is lined with a tarpaulin, especially if it is made of wood.
- ✓ Ask the captain to put a layer of pallets on top of the tarpaulin lining. This reduces the risk of SNF being damaged if water enters the deck or hold.
- ✓ Ensure that the SNF are stored on top of other commodities and, if possible, in the middle of the boat to protect the SNF products from getting wet.
- ✓ Ensure that the products are covered by a tarpaulin.

- ✓ Make sure that the necessary capacity is available for offloading, and that infrastructure is adequate in the place at which the boat or barge will be offloaded.

#### **6.2.4 By land**

Conditions in the field are challenging for optimal transport of SNF. The following measures can be taken to reduce the impact of high temperatures on product quality.

- ✓ Make sure the cargo is covered.
- ✓ When feasible and appropriate, transport SNF during cooler hours of the day. Cargo must not be left in the sun — particularly at ports, but also when drivers stop to refuel, eat or rest.
- ✓ Remember that cartons at the top of stacks will be exposed to more direct heat than the others.
- ✓ Stacks should not be higher than 3m.

### **6.3 Warehouse management, and storing SNF**

Due to the high value of SNF, storing these products in a safe and protected environment is essential. Managing the warehouse is different from managing the actual stock. The former involves finding the right warehouse and ensuring that it provides the necessary climate conditions for storage. The latter involves maintaining product flow and documentation. Done correctly, both actions ensure that SNF's quality is maintained.



### 6.3.1 Warehouse considerations

As with any food commodity or product, standard warehouse guidelines — such as those concerning rodent barriers, drainage and flood water disposal — need to be in place. WFP staff will find further guidance in the *Warehouse Manual*.<sup>41</sup>

Advice is also available on the Logistics Cluster’s website at: <http://log.logcluster.org/response/warehouse-management/>.

When goods are in transit, short-term exposure to high temperatures is unavoidable. However, during their journey from manufacturer to beneficiaries, SNF are stored in a series of warehouses and, cumulatively, these periods amount to more than half the entire journey time. SNF must be stored in the right conditions. The most fundamental of these is temperature control, which is essential to keep the nutritional value as high as possible.

Note that if warehousing is subcontracted, the contractor must be fully informed of the procedures and conditions necessary for SNF handling and storage, and of the potential consequences of not adhering to these rules.

Warehouses for SNF storage must be suitably secure and structurally sound, and they must have enough capacity to allow safe storage and handling. Premises should be clean and dry, and ambient temperature must be maintained within acceptable limits. When choosing a warehouse, there are a number of factors that may help in identifying facilities that have lower ambient temperatures. Some are listed below:

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**41** WFP’s *Warehouse Manual* is online at: [http://home.wfp.org/manuals/op\\_warehousemgmt/Default.htm](http://home.wfp.org/manuals/op_warehousemgmt/Default.htm)

- ✓ Location and Orientation
- ✓ Building envelope
- ✓ Entrances and exits, windows and doors
- ✓ Insulation
- ✓ Ventilation
- ✓ Dimensions and distribution of the stock.

For further information, please see Sections 6.3.2 and 6.3.3.

WFP staff should contact [Field.Engineering@wfp.org](mailto:Field.Engineering@wfp.org) if they require more detail or a more in-depth assessment, if adequate facilities cannot be identified, or if alteration of existing facilities or construction of new ones is required.

### **6.3.2 Factors that affect temperature in storage facilities**

#### **Location**

Location is the single biggest factor influencing storage temperatures. Local climate, the warehouse's design and its situation within its built or natural environment must all be considered:

- ✓ **Local temperatures.** Throughout the supply chain, choose storage facilities in locations where temperatures are as low as possible.

- ✓ **Shaded buildings.** The temperature inside a building is significantly impacted by ‘solar gain’. This refers to the temperature gain inside that is caused by solar radiation passing through windows and skylights, etc. If windows are shaded by awnings or eaves, or by adjacent buildings or trees, then less solar radiation will penetrate the building.

## Orientation

To reduce solar gain, the warehouse should be orientated to the north in the northern hemisphere, or to the south in the southern hemisphere.

This means that the longest façade, the doors and windows, and the sloped part of the roof should all face in the direction indicated above.

## Building envelope

The type of construction and building materials, and the quality of construction and materials all influence temperature within a building. The following factors are especially important.

- ✓ **Airtight.** The building envelope should be hermetically sealed to reduce the transfer of heat into the building by convection, i.e. hot air that enters, circulates and raises the overall temperature. Ideally, once SNF have been placed in storage, the facility should be kept as airtight as possible. This will help maintain cooling that have been achieved, even if external temperatures rise.
- ✓ **Twin skin.** In this type of construction, buildings have two

outer walls. Air is sandwiched between the two layers and acts as an insulator. Sunlight heats up the outer skin and the air between the layers. As the air gets hotter, it rises and leaves the structure through vents, sucking in cooler air behind it. This diverts heat away from the building's inner wall, thus keeping the interior cool.

- ✓ **Colour.** The colour of roofs and façades can have a very significant impact on the temperature inside a building. Light colours reflect thermal radiation; dark colours absorb it. Thus, warehouses with light-coloured exteriors will be cooler inside than dark-coloured buildings.
- ✓ **Eaves.** Roof eaves with extended overhangs help to prevent direct sunlight from entering windows, thus reducing solar gain.

### Entrances and exits, windows and doors

External daytime temperatures are often considerably higher than the temperature indoors. It is important to control building openings to prevent the entry of hot air.

- ✓ It is preferable to use facilities with separate pedestrian doors. They allow large loading dock doors to be opened less frequently, and limit the amount of hot air entering the building.
- ✓ Gaps between doors and walls, particularly around loading dock doors, should be sealed to stop hot air leaking through from outside.

- ✓ Windows or translucent panels invite solar gain, and thus high internal temperatures. Warehouse staff need some daylight; however, windows should be situated away from direct sunlight — ideally, beneath the eaves .

## Insulation

Insulation moderates the effect of external temperature on internal temperature. Certain materials and construction properties insulate buildings naturally.

Note that even a perfectly insulated building will, at best, only achieve the average whole-day temperature for that location.

Insulation comes in a number of forms: that which reflects heat (thermal radiation); that which prevents the transmission of heat in the air (convection); and that which prevents the transmission of heat through the building fabric (conduction).

The following is a brief guide to insulation commonly found in storage facilities.

- ✓ **Inherent insulation qualities**

Buildings with thick, heavy walls are naturally insulated. Due to their mass, thick walls do not conduct heat well, and so they take a long time to heat up and cool down.

Facilities that are well constructed and have complete building envelopes, including well-sealed doors and windows, limit the convection of heat into the building.

A continuous air cavity between twin-skin walls provides good insulation. The void reduces heat conduction to the inner wall.

### ✓ **Modern insulation materials**

In more developed locations, modern insulation materials may be installed to improve the building's capacity to self-regulate temperature. U-value is the term given to thermal resistance to heat flow. The lower the U-value of an insulation product, the more effective its properties. Common insulation materials include the following.

- **Sandwich panels** consist of a core of insulating material sandwiched between metal foil or plastic facings. They are commonly used in modern storage facilities.
- **Mineral wool** is a lightweight material made of natural or synthetic fibres that partition air, preventing heat conduction.
- **Foil insulation** is a lightweight reflective material that reflects radiant heat, preventing it from conducting into the building.
- **Polystyrene insulation** consists of extremely light polymer foam blocks that are installed into the fabric of the building.
- **Spray foam** is commonly used to retrofit existing buildings. Polyurethane foam is sprayed onto the inside

of the structure, and expands to provide a layer of insulation and seal gaps.

The presence of any or all of these materials in a building will assist in improving the facility's capacity to self-regulate temperatures.

## Ventilation

Proper ventilation provides an energy- and cost-effective means of reducing the temperature inside a facility. It achieves this by moving cooler air into the building when external temperatures are lower.

Note that if the temperature outside is hotter than it is inside, ventilation does not lower the temperature inside. In fact, it is counterproductive: although the increased air flow makes it feel cooler, hot air entering the building will actually raise the temperature.

There are two main types of ventilation.

### ✓ **Natural ventilation**

- When air becomes warm, it expands and becomes less dense. This makes it float above cool air and rise. This allows it to be channelled out of the building through high vents. Cool air is drawn in behind it at a lower level. This is a very effective means of temperature regulation and can be achieved very simply through the use of high-level ridge vents and low-level louvres.

- The simplest form of ventilation uses natural, cool breezes to reduce the temperature of air inside a building, and can be achieved by opening doors and windows during the coolest part of the night. To create maximum airflow, openings should be located at opposite ends of the building. As in the previous example, hot air will rise above the cooler air, and exit via vents or high windows.
- ✓ **Powered ventilation** uses fans to increase air circulation. As long as the fans draw cool air into the building, they will speed up convective heat loss and thus reduce the temperature. However, if they draw in hot air, they merely create a wind chill effect; the actual temperature will increase.

When selecting a warehouse building, it is important to note ventilation systems and determine whether they are effective. Because warm air rises, the temperature will be highest just under the roof ridge. For there to be any prospect of temperature control, the building should have ridge vents or ventilation chimneys to allow hot air to escape.

## **Dimensions and distribution of stock**

It is important to consider the dimensions of a facility relative to the required storage area.

- ✓ Warehouse space must be greater, in terms of both floor space and height, than the volume of SNF stock to be stored. Staff need to be able to move around to shift stock, and air needs to be able to move freely around the stock to facilitate climate control. However, space requirements should be



calculated carefully. If too much space is rented then costs will escalate due to increased energy requirements for cooling.

- ✓ If mixed stock are stored then the temperature of all the stock should be maintained at the lowest temperature required by any individual product.
- ✓ Due to temperature fluctuations in the building, the temperature of the stock itself will fluctuate. When air is hot, the stock will absorb heat; when air is cool, the stock will emit the heat it has stored. If possible, stacks of stock should be segregated to help warehouse cooling systems work more efficiently.
- ✓ Plan storage configurations carefully to accommodate access requirements. If stock needs to be regularly accessed then consider segregated storage areas. This allows operations to take place in one storage area without raising the temperature in another.

Given the very specific needs of SNF, it is preferable to choose a warehouse that offers compartmentalized storage. This makes separate climate control for SNF more feasible.

### **6.3.3 Improvements and modification of storage facilities**

As previously noted, a perfectly insulated building will achieve only the average temperature of its external environment. With good ventilation and management, the temperature can be further reduced. However, in contexts in which SNF are usually required, the quality of storage facilities is often poor.

Sometimes new construction is required. More often, building alterations and/or mechanised cooling will be needed to sufficiently reduce temperatures. Where this is the case, expert advice should be sought from specialists.

If alterations are likely to be needed then consider the following guidance, which expands on the points made in Sections 6.3.1 and 6.3.2.

#### **Climatic conditions**

Before planning alterations, refer to local seasonal temperature records, if available, to establish minimum/maximum/average temperatures. Measure temperatures inside and outside the building at regular intervals over a 'typical' day/night cycle so as to understand the change in temperature over time. Ideally these measurements should be taken on a continuous basis, throughout the year, to establish the seasonal variability; however, this is often not possible in the context of WFP's operations.

At the very least, measurements should be taken until minimum/maximum/average internal readings correlate with the local seasonal temperature records. In locations with little temperature variation, such as tropical environments, this can be

accomplished fairly quickly. However, in locations that experience wider temperature variation, a longer period of measurement may be required. In all cases, temperature readings should be taken for at least one month. When taking measurements, exceptional weather events should be avoided as these will skew the results.

Analysis of these data will assist in selecting the most appropriate cooling technologies.

Temperature should be measured and recorded:

- ✓ inside the storage facility — at the entrance, in the middle and at the far end of the warehouse, and at a height of 3m (SNF are stored at a maximum stack height of 3m);
- ✓ outside the storage facility — at a distance of at least 1m from each of the building's walls;
- ✓ three times per day — at the hottest, coolest and mid-point of each 24-hour cycle.

Note that these are minimum requirements. Gather as many readings as possible, especially in larger warehouses where internal temperatures may vary considerably in different parts of the building.

### **Techniques to improve climate conditions inside storage facilities**

The building should be assessed to ascertain whether it can be retrofitted with the following, in order of priority.

- ✓ Natural ventilation — could the roof accommodate ridge vents/ventilation chimneys and wall louvres?
- ✓ Minor changes in doors and windows?
- ✓ Insulation to reduce heat conduction — could a second skin be fitted to the roof, or could mineral wool or spray foam be applied internally?
- ✓ Subdivision — would it be possible to separate SNF stock?
- ✓ Mechanised cooling — is there adequate power to meet the energy requirements of mechanised cooling?
- ✓ Air conditioning climatization and insulation — is there adequate power to meet the energy requirements of climatization machines?

## **Local capacities**

When assessing a facility for alteration, it is critical also to investigate whether the local market has the capacity to provide the materials, manpower and skills to implement the measures.

## **Permissions and cost effectiveness**

In most cases the facilities will be leased. Gaining permission from the owner and possibly sharing the cost with the owner is often a critical constraint on implementing alternations.

The cost effectiveness of implementing these measures should be considered in the context of the overall supply chain relative to alternative options.

Achieving an efficient facility that self-regulates temperature is a complex challenge requiring specialist input. Should you have any queries in relation to this please contact the WFP Field Engineering Team at [Field.Engineering@wfp.org](mailto:Field.Engineering@wfp.org)

## **6.4 Stock management**

### **6.4.1 Calculating stowage factor**

Each type of cargo has what is called a stowage factor. Generally speaking, this is the volume per metric ton of a particular commodity. For example, bulk wheat has a different stowage factor from bulk maize.

Because every SNF product contains a different mixture of commodities, each has a different stowage factor.

Some SNF are packed in cartons and some are packed in sacks.

1. If the SNF are packed in little sachets, pots or packs inside a carton, measure the gross weight and the dimensions of a fully packed carton of the product, not its contents.
2. If the SNF are packed in sacks, measure the weight and volume of one full sack of the product. If the manufacturer or your organization cannot provide a figure for the volume, use the method shown below in 6.4.1.1, ii to estimate the volume. Record the result and share it with the manufacturer, your organization's head office and with relevant partner organizations to prevent future wastage.

### 6.4.1.1 Determining the volume of the SNF

#### **i. If the SNF are packed in cartons:**


Measure a carton's height, width, and length in metres, then perform the calculation shown in Figure 20 below.

#### **ii. If the SNF are packed in sacks:**

Because sacks are irregularly-shaped, it is extremely difficult to estimate their volume mathematically. Instead:

- Tip the contents of a sack of SNF into a sturdy box and shake the box until the surface of the product is level.
- Slide a ruler down the side of the box and measure the depth of the SNF in metres.
- Measure the internal width and length of the box in metres.
- Perform the calculation shown in Figure 20, below.

**Figure 20. Calculating the volume of a unit of SNF**



$$\begin{aligned} \text{Volume in cubic metres (m}^3\text{)} &= \\ &\text{Height (or depth) in metres} \\ &\quad \times \\ &\text{Width in metres} \\ &\quad \times \\ &\text{Length in metres} \end{aligned}$$

If measuring in centimetres, use the same formula but divide the result by a million (1,000,000) to convert cubic centimetres into cubic metres. Volume in cubic metres =  
( height in cm  $\times$  width in cm  $\times$  length in cm )  $\div$  1,000,000.

#### **6.4.1.2 Measuring the gross weight of SNF**

Weigh one unit of the SNF – i.e. one full carton or one full sack – in kilos. Then perform the following calculation to convert the weight of the unit from kilos to metric tons. (Note that 1 metric ton = 1,000 kilos.)

**Figure 21. Converting weight from kilos to metric tons**


$$\begin{aligned} \text{Gross weight of unit in mt} &= \\ &\text{Gross weight of unit in kg} \\ &\hline &1,000 \end{aligned}$$

### 6.4.1.3 Calculating the shipping stowage factor

For shipping purposes, the stowage factor indicates how many cubic metres of space one metric ton of a particular type of cargo occupies in a hold of a cargo ship.

Use the results of the calculations in Figures 20 and 21 to work out the stowage factor, as follows.

**Figure 22. Calculating stowage factor for shipping**



**Stowage factor for shipping in m<sup>3</sup>/mt =**

**Volume of one unit in cubic metres (m<sup>3</sup>)**

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**Gross weight of one unit in metric tons (mt)**

#### Worked example

Calculate the stowage factor for Nutributter.

- Carton volume:  $0.385 \text{ m} \times 0.29 \text{ m} \times 0.208 \text{ m} = 0.0232232 \text{ m}^3$
- Gross weight per carton:  $11.95 \text{ kg} \div 1,000 = 0.01195 \text{ mt}$
- Stowage factor:  $0.0232232 \text{ m}^3 \div 0.01195 \text{ mt} = 1.94 \text{ m}^3/\text{mt}$ .




## 6.4.2 Determining warehouse space requirements

In warehousing, storage requirements for SNF are based on floor surface area, measured in square metres.

WFP's formula for the stowage factor for warehousing is based on the stowage factor for shipping, as calculated in 6.4.1.3 above. The objective is to convert a product's *volume* per metric ton to its *floor area* per metric ton.

This is accomplished by dividing the shipping stowage factor by the maximum stack height for SNF: 3 metres. Cancelling out the dimension of height leaves the product of the other two dimensions, length and width, i.e. area. Thus, the stowage factor for shipping, in *cubic* metres per metric ton, is converted from three dimensions to two — to the stowage factor for warehousing, in *square* metres per metric ton.

**Figure 23. Calculating stowage factor for warehousing**


$$\text{Stowage factor for warehousing in m}^2/\text{mt} = \frac{\text{Stowage factor for shipping in m}^3/\text{mt}}{3 \text{ m (maximum stack height for SNF)}}$$

To estimate how much floor space is required for a shipment of a particular SNF product, simply multiply the product's stowage factor for warehousing by the weight of the shipment in metric tons. The result is expressed in square metres.

## Worked example

Calculate the storage space needed for a 400 mt shipment of SNF. The shipping stowage factor for this product is 0.13 m<sup>3</sup>/mt.

- Calculate the warehouse stowage factor:  
 $0.13 \text{ m}^3/\text{mt} \div 3 \text{ m (max. stack height)} = 0.0433 \text{ m}^2$
- Multiply the warehouse stowage factor by the shipment volume to give the area of floor space required:  
 $0.0433 \text{ m}^2 \times 400 \text{ mt} = 17.32 \text{ m}^2$

**Table 4. Stowage factors and warehouse factors for the most frequently-used SNF products**

Product	Gross weight/ carton (kg and [mt])	Carton dimensions – LxWxH (m)	Carton Volume (m <sup>3</sup> )	Shipping stowage factor (m <sup>3</sup> /mt)	Warehouse floor space needed per mt of SNF product (m <sup>2</sup> /mt)
<b>Nutributter</b>	11.95 [0.01195]	0.385 x 0.290 x 0.208	0.0232232	1.94	<b>0.65</b>
<b>Plumpy'doz</b>	12.70 [0.0127]	0.402 x 0.306 x 0.253	0.0311220	2.45	<b>0.82</b>
<b>Plumpy'sup</b>	14.70 [0.0147]	0.385 x 0.290 x 0.208	0.0232232	1.58	<b>0.53</b>
<b>Super Cereal Plus</b>	19.25 [0.01925]	0.400 x 0.280 x 0.210	0.02352	1.22	<b>0.41</b>

### 6.4.3 Managing stocks

Due to their comparatively short shelf life, SNF require very careful stock management. A plan needs to be established to prevent food incidents and wastage.

One way to limit storage time is to prepare an order cycle consisting of several deliveries (see Section 5.1.2 for further information).

If circumstances permit, another way to preserve shelf life is to keep the SNF in a warehouse with the right conditions for as long as possible, and only move it to the next node when necessary.

**Make sure that the products entering the warehouse are segregated, at least, by BBD and producer. If possible, separate SNF by batch number.**

Consider the following.

- ✓ How long will the cargo stay in the warehouse?
- ✓ What is the BBD of the incoming SNF?
- ✓ Remember that for SNF, First Expired First Out (FEFO) is more important than First In First Out (FIFO).
- ✓ Pre-positioned stocks require meticulous BBD follow-up.

During the monthly inventory exercise:

- ✓ check quantities of SNF and the products' BBDs;

- ✓ highlight stock that will expire within the next three months; and
- ✓ pass on the stock report to Programme and Procurement, and discuss which actions should be taken.

## 6.5 Delivering and storing at partner level

This step usually involves local, national and international organizations as well as government entities, which are the main partners. Delivery to partners needs to be planned well in advance to enable the partner to organize the warehouse and distribution. It may take them some time to make these arrangements because the specific requirements for assuring the quality and integrity of SNF are so specific.

Remember the important relationship between dispatch timing and shelf life. Try not to deliver products that have a BBD of less than 3 months without prior agreement with the partner.

- ✓ **Planning the delivery**
  - Have a face-to-face meeting with the partner well ahead of the planned delivery. This allows both parties to prepare the delivery in detail and to fine-tune the operation.
  - Make sure the SNF are in stock and alert the partner immediately if there are problems.

- Ask the partner for their distribution plan and go through it step-by-step with the person from the programme unit responsible for implementing it.
- If possible, provide the partner with one month's buffer stock in order to prevent pipeline breaks. Make sure the buffer stock is rotated, i.e. that the stock with the earliest BBD is given to beneficiaries first.
- Create a contingency plan in advance in case the partner cannot distribute as much SNF as expected. If the plan needs to be implemented, let all relevant departments and subcontractors know immediately; deliveries for the coming month might be affected.

✓ **Ensuring the right capacity**

- Make sure the partner is aware of the documentation process — for instance, signing waybills or reporting losses.
- If possible, try to see the partner's warehouses and set-up, and confirm that they can guarantee the required temperature conditions. This goes both ways: it is important to build a relationship founded on mutual trust in one another's professional abilities.
- When working with partners, it is important that their staff clearly understand the logistical aspects of storing SNF. This includes storage capacity and layout, shelf life, batch numbers, and temperature control. Provide documentation and technical support as needed.

- Liaise with programme staff to ensure that relevant trainings and technical support in logistical aspects of SNF are incorporated into capacity-building plans by the organization or the relevant nutrition coordination forum.

✓ **Making the delivery**

- Make sure the partner has proper security in place for the storage and distribution of SNF.
- Deliver the SNF to the partner's main warehouse. This limits the number of deliveries to FDPs.
- Provide stock management templates.

## 6.6 Golden rules

- ✓ Know the necessary customs procedures and identify the right focal points. Be up-to-date with any changes in customs regulations.
- ✓ Have the latest ETA on hand and communicate any changes to other colleagues. Be aware that changes in the ETA might have consequences for Programme.
- ✓ Use the SNF product's shipping stowage factor as the basis for calculating the amount of warehouse floor space required to store a shipment of the SNF. Remember that every product has a different stowage factor.

The stowage factor for shipping in  $\text{m}^3/\text{mt}$  = the volume of one unit in cubic metres ( $\text{m}^3$ )  $\div$  the gross weight of one unit in metric tons (mt), where one unit is a full carton or sack of the SNF product.

The stowage factor for warehousing in  $\text{m}^2/\text{mt}$  = the product's stowage factor for shipping in  $\text{m}^3/\text{mt} \div 3 \text{ m}$ .

The warehouse space required to store a shipment of the SNF, in  $\text{m}^2$  = the stowage factor for warehousing in  $\text{m}^2/\text{mt} \times$  the gross weight of the shipment of that product in mt.

- ✓ Choose warehouses that can maintain the low temperatures needed for storage of SNF. If the available storage facility cannot control temperature satisfactorily, consider modifications to the building (see Section 6.3.1).

- ✓ Measure and record the temperature in all warehouses storing SNF to ensure a transparent decision-making process.
- ✓ Make sure that SNF entering the warehouse are segregated at least by BBD and producer. If possible, separate products by batch number.
- ✓ Follow the First Expire First Out rule when planning deliveries.
- ✓ Make sure that all staff following proper handling and transport guidance.
- ✓ Liaise regularly with Programme to provide updates on stock availability and accessibility in light of rainy seasons or shifts in the overall security situation.
- ✓ Share necessary documentation and procedures regarding the SNF products with partners.
- ✓ Inform the partner as far in advance as possible about any known or anticipated breaks in the pipeline. Take appropriate steps to assist the partner in minimizing risks resulting from such events.
- ✓ Provide partner staff with advice and guidance on storage and handling of SNF.
- ✓ Provide training, where necessary, for partner staff on distribution practices, reporting (including the WFP Commodity Tracking System), and warehousing.



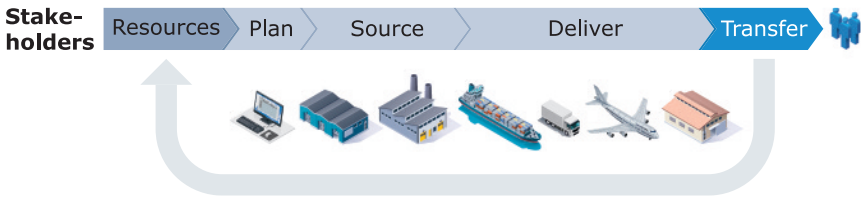


# Chapter 7.

## Managing the supply chain: distribution to beneficiaries

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### In this chapter



This chapter focuses on the last leg of the supply chain: distribution of SNF to the beneficiaries. For the most part, this last leg is undertaken by partners, as only on rare occasions does WFP directly implement a nutrition intervention. Nevertheless, it is important to ensure that these issues are addressed in programme planning by partners.

- 7.1** gives general guidance on **food safety** and **action** to be taken at the **distribution**.
- 7.2** deals with **stock replenishment** at partner level.
- 7.3** discusses considerations for **waste management**.
- 7.4** presents the **golden rules**.

## 7.1 Food safety

While the programme is being designed, it is essential to consider all the steps that are needed to ensure that SNF reach the beneficiaries, and that the products are stored and consumed safely and correctly at both household and community levels. LNS require no preparation, and can be eaten directly from the package. However, FBFs and MNPs require food preparation facilities. FBFs have to be prepared before they are eaten, and this involves water and cooking. MNPs are added directly to food after preparation.

Nutrition interventions can be delivered through different mechanisms, including the public health system, general food distribution, or community-based structures. Food safety risks and potential mitigation actions vary depending on the mechanism.

Delivery mechanisms are selected depending on the strengths and limitations of each channel in terms of reaching the target group. Considerations include:

- ✓ the technical and logistical capacity of the partner to deliver the nutrition intervention and safely manage the SNF;
- ✓ geographic coverage;
- ✓ physical access to targeted beneficiaries; and
- ✓ the potential impact of the programme on the delivery mechanism — in other words, does the partner have enough human and financial resources to deliver the nutrition

intervention as well as carrying out their usual function?

During programme design it is important to be aware of specific food safety risks associated with each delivery mechanism. Measures can then be put in place for capacity building, intersectoral coordination and technical support where necessary.

Regardless of the delivery mechanism or programme, behaviour change communication (BCC) is a critical component of nutrition interventions. BCC helps enable beneficiaries to use SNF appropriately. SNF should always be distributed with information in the local language on:

- the objective of the nutrition intervention, how often SNF will be distributed, and how long beneficiaries will need to participate in the programme;
- proper use of the SNF — it is especially important to ensure that SNF do not displace optimal infant and young child feeding practices; and
- the importance of giving the SNF only to the intended beneficiary in the household, and the importance of other preventive measures such as vaccination and health-seeking behaviour.

The individual receiving the SNF will need to participate in the nutrition intervention until the proposed timeframe is completed — or, in the case of treatment of MAM, until discharge criteria are met. Be aware that caregivers may be reluctant to continue the full course of treatment if they think a child is beginning to show signs of recovery from MAM. It is critical that all caregivers are

informed that if they stop giving the child SNF, his or her condition may deteriorate again.

Acceptability tests for SNF should be undertaken at the design phase. Programme planning should also include dissemination of information on SNF, and sensitization of the community and its leaders, especially mothers.

Key messages for food safety include the following.

- ✓ Use safe water when preparing FBF and foods to which MNPs are added.
- ✓ Prepare FBF and foods to be consumed with MNPs hygienically. This includes washing hands before food handling, and using clean bowls and pots.
- ✓ Food to which MNPs have been added should be consumed straight away.
- ✓ FBF, once prepared, should be consumed immediately.
- ✓ Once opened, a sachet of LNS does not require refrigeration, but it should be covered and protected, and consumed within the same day.
- ✓ Do not leave SNF under the sun.
- ✓ Store the SNF in a cool and a dry place. This could be a cold room or area without direct sunlight, identified in the household or at community level.

Those in charge of the nutrition intervention must make every effort to ensure that safe water and hygiene facilities are available during SNF distributions. This is especially important in the treatment of MAM because beneficiaries' immune systems are very weak. In practice, this aspect of distribution can be difficult due to the context and the partner's capacity and facilities.

To facilitate distribution and to safeguard the product, the SNF should be handed out in a secondary, preferably reusable, package, such as a small cardboard or plastic box.<sup>42</sup>

To reduce the risk of selling SNF, some organizations request that the caregiver return all empty packages of LNS when they attend the next distribution. Suppliers may also be requested to print a '**NOT FOR RESALE**' message on primary and secondary SNF packaging.

Surveillance mechanisms to detect food-borne illnesses would help organizations identify and respond to any negative events related to the use of SNF in the community. However, in practice there are no formal food safety surveillance systems at community level, nor any protocol for determining whether an illness is linked to the product. Complaints lodged by beneficiaries during the distribution should be communicated to food incident management immediately (see Section 4.5, Traceability).

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**42** WFP/UNHCR (2011) *Guidelines for Selective Feeding: The Management of Malnutrition in Emergencies*.  
Online at: <http://www.unhcr.org/4b7421fd20.pdf>

## 7.2 Stock replenishment

Partners need to regularly and accurately communicate up-to-date information on how many beneficiaries have been reached and how much SNF has been used.

If the partner has managed to distribute as much SNF as expected in the partnership agreement then planning can proceed for the next delivery. In many cases, however, cooperating partners are not able to distribute the exact planned amount. This may be because some beneficiaries do not attend distributions, or because the number of beneficiaries requesting assistance is greater than anticipated. In both cases, appropriate action has to be taken.

- If there is a surplus of SNF at the end of the distribution:
  - adjust the delivery plan for the following period; and
  - investigate whether other partners in the same area have experienced a similar shift in demand.
- If there was not enough SNF to meet demand:
  - analyze shifts in demand;
  - if necessary, look into options to augment deliveries for the following period; and
  - identify new sources from which SNF can be bought — for instance, through local procurement — to satisfy immediate need.

Records provided by the partner need to be cross-checked with delivery records in the organization's tracking system to make sure there have been no mistakes. If discrepancies are discovered, then Logistics, Programme and the partner should work together to determine the cause.

### 7.3 Considerations for waste management

Two different kinds of waste need to be considered.

The first is waste connected to a food incident, where SNF cannot be used and must be disposed of. This is covered in Section 4.5, and a product disposal checklist is provided in Annex 7.

There is currently no global consensus on the proper disposal of SNF. In the interim, contact the organization's food quality focal point.<sup>43</sup>

The second type is waste that accumulates during a distribution or at beneficiary households. This consists mainly of packaging materials. Households may wish to keep cartons or plastic pots for re-use for other purposes. The real issue is the waste from non-biodegradable sachets.

When setting up a disposal system, remember the following points.

- ✓ Are there national or local guidelines for waste management that must be applied?

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<sup>43</sup> For WFP, please contact [nutrition@wfp.org](mailto:nutrition@wfp.org).



- ✓ The following mechanisms are suggested for efficient disposal of sachets and pots.
  - Collect used or empty sachets and pots from households and bring them to a central place.
  - Ask beneficiaries to return used sachets and pots at each distribution. (This can be linked to a monitoring component).
  - Incinerate the waste.

## 7.4 Golden rules

- ✓ Assess the partner's knowledge of the products and their use. If required, train the partner before delivering the products.
- ✓ Agree a stock replenishment strategy with the partner. Communicate and coordinate with partners on short BBDs.
- ✓ Recognize that waste management will need to be addressed. Follow national/local guidelines where they exist.
- ✓ Beneficiaries need to understand: the objective of the nutrition intervention; how to use SNF safely; how to use SNF properly; and how long they will need to use the SNF.
- ✓ Behaviour change communication (BCC) is a critical component of nutrition interventions. It should be linked to sensitization of local authorities and to acceptability trials undertaken during programme design.
- ✓ Although formal surveillance systems are rarely in place, Programme staff should be open to dialogue and feedback from partners and beneficiaries. Concerns about the use or safety of SNFs should be followed up immediately so that appropriate action can be taken, either to clear up misunderstandings or investigate a potential food safety incident.
- ✓ Do not use SNF without sensitization of beneficiaries on issues such as use, consumption and home storage, etc.

- ✓ Key instructions and BCC must be translated into local languages and distributed with the SNF as part of the nutrition intervention.

# Chapter 8. Annexes

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**Annex 1. Causes of undernutrition**

**Annex 2. Indicators of acute malnutrition**

**Annex 3. Thresholds**

**Annex 4a. Summary of nutrition interventions at WFP**

**Annex 4b. Non-nutrition interventions that may use SNF**

**Annex 5. Incoterms**

**Annex 6. ISO 9001 in relation to SNF**

**Annex 7. Product disposal checklist**

**Annex 8. Overview of the FIM process**

**Annex 9. Quarantining SNF**

**Annex 10. Checklist for reception**

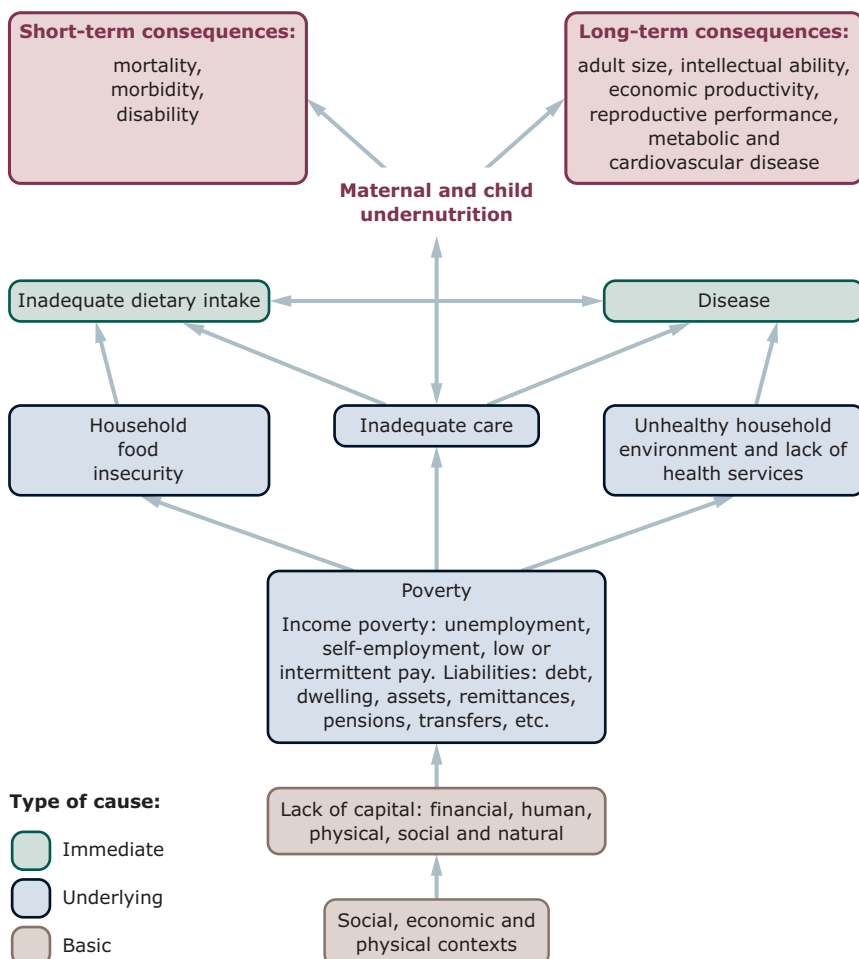
**Annex 11. Most commonly used helicopters**



## Annex 1. Causes of undernutrition

Undernutrition results from a wide range of factors. At its most basic, undernutrition is an imbalance between the nourishment an individual's body needs and the nourishment it actually receives from what the person eats.

**Figure 23: Factors that contribute to undernutrition**



## Annex 2. Indicators of acute malnutrition

**Table 5. Acute malnutrition indicators**

Indicator	Data required	Data sources
<p><b>Nutrition status/ mortality</b></p>	<ul style="list-style-type: none"> <li>• GAM, SAM, under-five mortality rate and crude mortality rate, for children aged 6-59 months.</li> <li>• Stunting for children aged 6-59 months (broken down for 6-23 months and 24-59 months), and wasting in infants aged less than 6 months.</li> <li>• Nutrition information for pregnant and lactating women.</li> <li>• Screening and admission data for selective feeding programmes.</li> <li>• Clinical information on micronutrient status and deficiencies. This includes: cases of scurvy, pellagra and beriberi; rates of vitamin A, iron and iodine deficiencies; and anaemia prevalence.</li> </ul>	<p>Nutrition surveys, Multiple Indicator Cluster Survey (MICS), Demographic Health Survey (DHS), nutrition screenings as part of rapid assessments, admission data from nutrition interventions</p>

<b>Indicator</b>	<b>Data required</b>	<b>Data sources</b>
<b>Individual food intake</b>	<ul style="list-style-type: none"> <li>• Vitamin A coverage for children aged 6-59 months.</li> <li>• Antenatal and postnatal supplementation data.</li> <li>• Proportion of households using iodized salt.</li> </ul>	Nutrition surveys, Comprehensive Food Security and Vulnerability Analyses (CFSVAs), Emergency Food Security Assessments (EFSAs), food security assessments.
<b>Health status/ disease</b>	<ul style="list-style-type: none"> <li>• Morbidity prevalence — for example, acute respiratory infections (ARI), diarrhoea, malaria.</li> <li>• Whether or not there have been epidemic outbreaks.</li> </ul>	Nutrition surveys, MICS, DHS, health system data.
<b>Household food security</b>	<ul style="list-style-type: none"> <li>• Available household food stocks, and availability of food in local markets.</li> <li>• Access to markets.</li> <li>• Food consumption scores, information on intra-household consumption patterns.</li> <li>• Changes in the total amount of food that people have been eating since the emergency began, on average.</li> </ul>	CFSVAs, EFSAs, Food Security Monitoring Systems (FSMS).



<b>Indicator</b>	<b>Data required</b>	<b>Data sources</b>
<b>Care practices</b>	<ul style="list-style-type: none"> <li>• Exclusive breastfeeding, timing of introduction of complementary foods, etc.</li> <li>• Maternal nutrition information.</li> </ul>	Nutrition surveys, MICS, DHS, Health system data.
<b>Hygiene conditions</b>	<ul style="list-style-type: none"> <li>• Water sources.</li> <li>• Average quantity of water used per household per day for all uses (in litres), and average number of litres per person per day.</li> <li>• Average number of users per functioning toilet.</li> <li>• Hygiene practices.</li> </ul>	Nutrition surveys, MICS, DHS, Health system data, CFSVAs, EFSAs.

## Annex 3. Thresholds

When using thresholds to assess the prevalence of acute malnutrition, remember the following.

- ✓ National thresholds may differ from and supersede global norms.
- ✓ Interpretation depends on the context. For example, in some areas prevalence may double in the short term but not necessarily exceed a threshold.

### Assessing the prevalence of acute malnutrition

Treatment of MAM with targeted supplementary feeding programmes (TSFPs) can be considered in these situations.

- **Non-emergency settings:** where GAM prevalence is at least 10 percent among children aged 6-59 months, or where GAM is 5-9 percent but aggravating factors exist.
- **Emergency settings:** the context, including pre-existing GAM levels and the risk of deterioration, should guide the decision to include TSFP in the emergency nutrition response.

Prevention of acute malnutrition with blanket supplementary feeding programmes (BSFPs) can be considered in the following situations.

- **Non-emergency settings:** when wasting increases seasonally in a predictable manner, usually during the agricultural lean season.
- **Emergency settings:** when the prevalence of GAM is high — more than 15 percent, or 10-14 percent with aggravating factors — and/or expected to increase.
- **Operational issues:** BSFPs can also be considered if there is poor access to programmes to treat MAM and SAM, or when other key activities — such as food security or health interventions — are greatly needed but not in place.

### **Assessing the prevalence of stunting**

Prevention of stunting with complementary feeding interventions can be considered in these situations.

- **Non-emergency settings:** where stunting prevalence is at least 30 percent. Note that other criteria may be used. These include: food security and food intake information; prevalence of anaemia or other MNDs; and social safety net information.
- **Emergency settings:** emergency nutrition interventions need to be developed with the understanding that nutritional needs that are not met during the emergency may increase the prevalence of stunting and micronutrient deficiencies.

## Assessing micronutrient status and food intake information

- In **non-emergency** and **emergency settings**,<sup>44</sup> home fortification<sup>45</sup> is recommended where the micronutrient requirements of children aged 6-23 months are not met by the typical diet, and where appropriate complementary foods with sufficient macronutrients are locally available and affordable but lack essential micronutrients. Another factor that influences decision-making on initiating home fortification interventions is the role of national governments. They may have included these interventions in their national micronutrient guidance and/or policies.
- **Operational issues:** where anaemia is greater than 40 percent, WFP may need to review the nutrient content of its GFD rations.

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**44** Recommended in countries where previous experiences with home fortification programmes exist.

**45** The Home Fortification Technical Advisory Group (HF-TAG) is a global network that provides technical guidance on how to implement HF interventions at scale. HF-TAG members include UN agencies, NGOs, manufacturers of HF products, and academic institutions. Online at <http://hftag.gainhealth.org/>

## Annex 4a.

### Summary of nutrition interventions at WFP

#### **Treatment of moderate acute malnutrition with targeted supplementary feeding programmes (TSFP)**

**Objectives.** Community Management of Acute Malnutrition (CMAM) frameworks may include a TSFP component designed to treat severe acute malnutrition. TSFPs have several objectives:

- (i) to rehabilitate individuals with MAM from specific target groups;
- (ii) to prevent individuals with MAM from developing SAM;
- (iii) to prevent mortality associated with MAM;
- (iv) to provide follow-up support for individuals who have been treated for SAM, to prevent a relapse; and
- (v) to prevent deterioration of maternal nutritional status and subsequent poor birth weight.

**Target groups.** Children aged 6-59 months with MAM; PLW<sup>46</sup> with MAM (up to six months after giving birth); and malnourished children aged 5-19 years and adults on

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**46** In the case of children under 6 months with MAM, the mother (as opposed to the child) is admitted into the programme, and exclusive breastfeeding is promoted. The mother is discharged once the child reaches 6 months; if the child still has MAM then he or she will be enrolled in the programme.

antiretroviral therapy (ART) and/or Direct Observed Treatment Short-course (DOTS) for TB.

TSFPs provide a specialized nutritious food to individuals on a regular basis. Programme admission and discharge criteria are based on nutritional status. Treatment generally takes 3-4 months. TSFPs should include screening for medical conditions that may need further treatment, routine health-related interventions (supplementation with vitamin A, deworming), and nutrition education programmes for caregivers to promote healthy behaviour. If the recipient's nutritional status deteriorates or stays the same, they should be referred for SAM treatment or to medical services to address underlying illnesses.

### **Prevention of acute malnutrition with blanket supplementary feeding programmes (BSFP)<sup>47</sup>**

**Objectives.** To prevent nutritional deterioration and related mortality in vulnerable populations and high risk groups.

**Target groups.** Children aged 6-23 months. Under conditions of extreme food insecurity, or if treatment of MAM is limited, programme scope can be extended to children aged 6-35 months or 6-59 months. PLW can be included if maternal undernutrition is high and the provider's resources/capacity are adequate.

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**47** Evidence is being compiled on alternative responses; WFP's programming options may expand in future.

## **The food-based element of prevention of chronic malnutrition with complementary feeding<sup>48</sup>**

**Objectives.** To prevent stunting in children aged less than 24 months, and to promote the nutritional status of adolescents and women in their reproductive years. The purpose is to: (i) address the intergenerational cycle of undernutrition; (ii) bring about a positive impact in health, education and productivity during the life cycle; and (iii) support social and economic development at country level.

**Target groups.** Children aged 6-23 months and PLW, as well as adolescent girls when possible.

### **Addressing micronutrient deficiencies through home or point-of-use fortification**

**Objectives.** To improve the quality of the diet, and thus nutrient intake, for nutritionally vulnerable groups to the point at which the combination of the existing diet and the home fortificant meets the daily Recommended Nutrient Intake (RNI) for all nutrients. The purpose of improving nutrient intake and infant and young child feeding (IYCF) practices is to enhance micronutrient status, thereby promoting the growth, development and health of target groups.

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**48** Note that a comprehensive programme to prevent stunting can have other components. These may include promotion of IYCF, nutrition-sensitive approaches, and strengthening the capacity of national governments to assess, identify, design, deliver, monitor and evaluate intersectoral programming that directly and indirectly prevents stunting.

**Target groups.** The primary target groups are children aged 6-23 months, and, in the case of high prevalence of MNDs, children aged 6-59 months. Secondary target groups are school-age children, adolescents, and adults.



## **Annex 4b.**

### **Non-nutrition interventions that may use SNF**

#### **General food distribution<sup>49</sup>**

##### **Objectives**

- To meet immediate and medium-term food needs.
- To improve access to food for IDPs and returnees in a specific area.
- To support improved nutrition and health status of children, pregnant and lactating women, people living with HIV/AIDS, and other vulnerable groups.
- To help improve the health and nutritional status of mothers and children.

##### **Overview**

General food distribution (GFD) refers to rations given to selected households affected by an emergency. Its purpose is to make up for shortfalls in household food access — in other words to make up the difference between a household’s food consumption requirements and what they are able to provide for themselves without adopting distress (damaging coping) strategies.

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**49** For more information see UNSCN’s *Harmonized Training Package, Module 11: General Food Distribution*. Online at [http://www.unscn.org/en/gnc\\_http/modul.php?modID=13](http://www.unscn.org/en/gnc_http/modul.php?modID=13)

GFD is always targeted at a specific geographic area, or areas, where a shock or crisis has disrupted people's normal means of access to food.

GFD is normally provided in the form of dry rations, distributed once a week or every 15 days, and enables households to prepare meals at home. Exceptionally, cooked meals or other ready-to-eat foods may be provided for a period during an acute emergency until beneficiaries can cook for themselves.

### **SNF implication**

Generally the staple food commodities distributed in the GFD do not meet the nutritional needs of young children. It may be possible to target households with children under two to receive SNF through the GFD, in which case including SNF in the ration can be a viable distribution mechanism. Where it is not feasible to target SNF only to households with children under two, SNF may still be added to the GFD. However, it may be more cost-efficient to establish a separate SNF delivery mechanism so that under-twos in the beneficiary population can be specifically targeted.

## **Emergency school feeding**

### **Objectives**

- To reduce short-term hunger of children attending school.
- To improve attendance, enrolment and concentration.
- To contribute to household food security.

### **Overview**

Typical school feeding programmes distribute food to schools for on-side (wet) feeding. Some programmes provide a ration to the household as well, to encourage school attendance and participation in the programme. School feeding can be started quickly if the school is well established and able to prepare the food.<sup>50</sup>

### **SNF implication**

FBF are generally used in school feeding programmes to help meet micronutrient needs. Worldwide, MNPs are increasingly being distributed in school feeding programmes. They are useful in areas with high levels of anaemia when the locally available foods are unable to meet micronutrient intake needs and levels of anaemia are high.

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**50** More information, including WFP's report *State of School Feeding Worldwide 2013*, is online at: <http://www.wfp.org/school-meals>

## Annex 5. Incoterms

Incoterms are a set of standardized contractual terms produced by the International Chamber of Commerce (ICC). They are used in delivery agreements, and in contracts that include delivery agreements, to define the point at which risk and responsibility for the product changes from supplier to buyer.

The terms are used worldwide and are available in many languages.

They are summarized in Figure 24, overleaf. Note the codes in the second row, which are abbreviations for charge and fee categories.

For more information, please see ICC's Incoterms microsite at: <http://www.iccwbo.org/products-and-services/trade-facilitation/incoterms-2010/>

**Figure 24. Incoterms 2010 rules**

	Any transport mode		Sea/ inland waterway transport			
Code	EXW	FCA	FAS	FOB	CFR	
Charges/ Fees	Ex Works	Free Carrier	Free Alongside Ship	Free On Board	Cost & Freight	
Packaging	Buyer or Seller	Seller	Seller	Seller	Seller	
Loading Charges	Buyer	Seller*	Seller	Seller	Seller	
Delivery to Port/Place	Buyer	Seller	Seller	Seller	Seller	
Export Duty & Taxes	Buyer	Seller	Seller	Seller	Seller	
Origin Terminal Charges	Buyer	Buyer	Seller	Seller	Seller	
Loading on Carriage	Buyer	Buyer	Buyer	Seller	Seller	
Carriage Charges	Buyer	Buyer	Buyer	Buyer	Seller	
Insurance						
Destination Terminal Charges	Buyer	Buyer	Buyer	Buyer	Buyer	
Delivery to Destination	Buyer	Buyer	Buyer	Buyer	Buyer	
Import Duty & Taxes	Buyer	Buyer	Buyer	Buyer	Buyer	

\* Seller is responsible for loading charges, if the terms state FCA at seller's facility.

		Any transport mode				
	CIF	CPT	CIP	DAT	DAP	DDP
	Cost Insurance & Freight	Carriage Paid To	Carriage Insurance Paid To	Delivered at Terminal	Delivered at Place	Delivered Duty Paid
	Seller	Seller	Seller	Seller	Seller	Seller
	Seller	Seller	Seller	Seller	Seller	Seller
	Seller	Seller	Seller	Seller	Seller	Seller
	Seller	Seller	Seller	Seller	Seller	Seller
	Seller	Seller	Seller	Seller	Seller	Seller
	Seller	Seller	Seller	Seller	Seller	Seller
	Seller	Seller	Seller	Seller	Seller	Seller
	Seller		Seller			
	Buyer	Seller	Seller	Seller	Seller	Seller
	Buyer	Buyer	Buyer	Buyer	Seller	Seller
	Buyer	Buyer	Buyer	Buyer	Buyer	Seller

## Annex 6. ISO 9001 in relation to SNF

**Table 6. ISO 9001 principles and definitions of quality management,<sup>51</sup> and applications to SNF**

### Principle 1. Customer focus

**Definition.** Organizations depend on their customers and therefore should understand current and future customer needs, should meet customer requirements and strive to exceed customer expectations.

**Application.** Customers in this case are the beneficiaries receiving SNF. They have specific needs related to their age, habits and nutritional status that must be taken into account in SNF definition.

### Principle 2. Leadership

**Definition.** Leaders establish unity of purpose and direction of the organization. They should create and maintain the internal environment in which people can become fully involved in achieving the organization's objectives.

**Application.** Food quality management of SNF requires deep involvement of all actors in the supply chain, and can only be achieved with strong commitment and leadership from the organization's top management.

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**51** ISO (2012) Quality Management Principles.  
Online at: [http://www.iso.org/iso/qmp\\_2012.pdf](http://www.iso.org/iso/qmp_2012.pdf)

### Principle 3. Involvement of people

**Definition.** People at all levels are the essence of an organization and their full involvement enables their abilities to be used for the organization's benefit.

**Application.** Food quality management of SNF relies primarily on staff. They must be equipped with the tools they need, such as this guideline and other reference and training resources.

### Principle 4. Process approach

**Definition.** A desired result is achieved more efficiently when activities and related resources are managed as a process.

**Application.** Processes related to food quality management of the SNF are described below. For example, specification management is one process, storage management is another.

### Principle 5. System approach to management

**Definition.** Identifying, understanding and managing interrelated processes as a system contributes to the organization's effectiveness and efficiency in achieving its objectives.

**Application.** Processes that contribute to an overall objective are part of a collaborative effort, and those involved in designing and delivering them must interact. In SNF specification management, for example: there is interaction between specification and storage processes; storage conditions are used to design shelf life studies; and storage losses related to SNF quality are used to determine whether specifications are adequate.



## Principle 6. Continual improvement

**Definition.** Continual improvement of the organization's overall performance should be a permanent objective of the organization.

**Application.** This involves learning from successes and failures, and is linked with monitoring and evaluation. For example, one of the key performance indicators for SNF is supplementary feeding recovery rate.

## Principle 7. Factual approach to decision making

**Definition.** Effective decisions are based on the analysis of data and information.

**Application.** An example of this is in storage management where temperature used during shelf life study must be based on warehouse profiling and its internal temperatures. Losses must be accurately tracked so that the resulting data can be used to adjust specifications.

## Principle 8. Mutually beneficial supplier relationships

**Definition.** An organization and its suppliers are interdependent, and a mutually beneficial relationship enhances the ability of both to create value.

**Application.** For example, SNF product development are managed in cooperation between the private sector and food assistance organizations.

## Annex 7. Product disposal checklist

### Checklist for product disposal

- Have the damaged goods been recorded on the stock/stock card?
- Have the potentially affected/damaged goods been marked?

Include the initials of the inspector or observer and the date and time at which marking was observed.

- Have the damaged/suspect products been put in quarantine and separated from non-affected goods? (See Annex 9, Quarantining SNF.)

Until properly disposed of, spoiled commodities remain the responsibility of the storekeeper. They must be accounted for in the records.

Segregate damaged/suspect goods, storing them well away from other goods – if possible, in a separate area. Damaged goods can attract pests.

Take measures to protect all stock from rodents and insects, but do not use rodenticide or insecticide chemicals anywhere near food.

- Has the type and severity of the damage been confirmed prior to any decision?

Inform your supervisor or designated FIM focal point.

- Has a Rapid Incident Assessment Questionnaire been completed?

A template is available online at: <http://foodqualityandsafety.wfp.org/>

- Do the public need to be notified, for example to mitigate health risk?

(This step should be applied if the product has already reached consumers.)

- Can the damage be mitigated?
- Has a laboratory certificate and/or a condemnation certificate been obtained to confirm that the product is unfit for consumption?

A condemnation certificate must be obtained stating how much of the product is affected and the reasons why the goods cannot be used for the purpose intended. Note that spoiled food must not be disposed of until official instructions have been received from a competent and recognised authority.

- Have all affected commodities been located (if at various sites)?
- Have the local authorities been notified of the scope and reason for the disposal?
- Have either the local authorities or the product manufacturer provided instructions on a suitable disposal method?

Local authorities and the manufacturer need to be informed. They should be consulted about destruction modalities. Some of the spoiled food products may constitute a biohazard (pathogenic microorganisms) or other environmental hazard (chemicals, toxins, or heavy metals, etc.). Therefore, disposal restrictions may be applicable (check the product sheet or manufacturer's disposal guidelines). Unless official approval and

necessary authorization have been received for the disposal method, no action should be taken.

- Are public or commercial high-temperature incinerators available?

In some countries, destruction is organized and must be done in specially designated facilities.

- Is there an authorized destruction point?

Check your Emergency Response contacts list for designated local destruction point(s).

- Has transport to the destruction point been planned?

- Have all organization and/or donor markings and logos been removed/obliterated?

Before re-sale or prior to transporting the goods to the destruction point, all markings must be removed/obliterated.

- Are organization staff and local authorities present to supervise the destruction procedure?

- Do you have a copy of the destruction records?

The waybill for removing food to the destruction site serves as a stock adjustment document. The local authority representative present at the disposal must issue a destruction certificate stating the quantity destroyed and the method of destruction. A destruction certificate must be kept for audit purposes, even if ownership of the commodities has been transferred.

## Annex 8. Overview of the FIM process

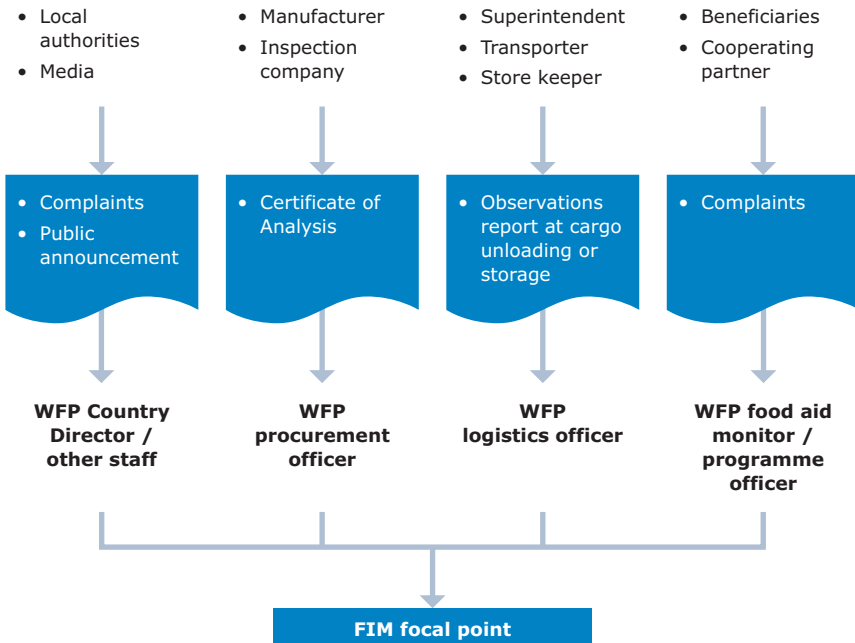
Figure 25. The FIM process

### INITIATE: set the reporting structure at field level

#### Functions at field level

- FIM sentinels — the WFP example: Management, Procurement, Logistics.
- FIM focal point — preferably someone with understanding of food quality and the complexities/particularities of SNF.
- FIM Supervising Committee.
- List of emergency (ER) contacts.

### DETECT: use your structure to filter/capture possible issues/triggers



**ESTIMATE: use matrix to assess the situation and determine action options**

FIM focal point and FIM-SC

**Risk matrix**

Impact		Likelihood				
	1	2	3	4	5	
Critical 5	5	10	15	20	25	
Severe 4	4	8	12	16	20	
Moderate 3	3	6	9	12	15	
Minor 2	2	4	6	8	10	
Negligible 1	1	2	3	4	5	
	1 Very Unlikely	2 Unlikely	3 Moderately likely	4 Likely	5 Very likely	

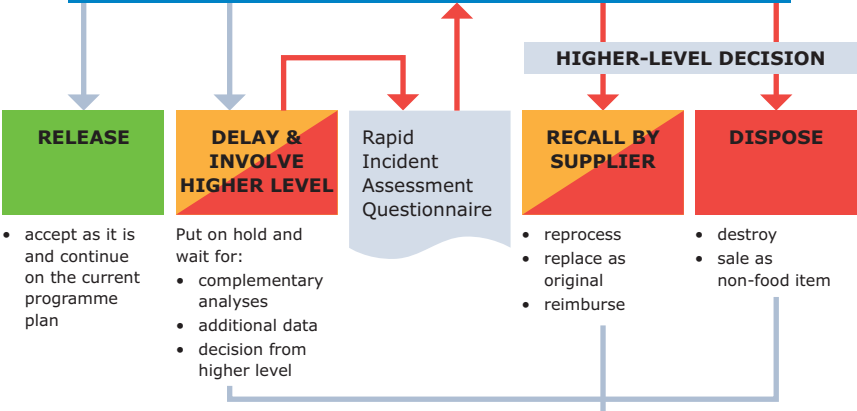
**Considerations**

- # of people affected
- Type of health impact
- Areas/countries affected (spread)
- Food value \$/quantity mt
- Past frequency of the event
- Impact on programme objectives
- ...

**Severity = Impact x Likelihood**

**ACT: using your reporting lines and ER contacts to execute decisions**

FIM focal point and FIM-SC : RISK MITIGATION ACTIONS



- accept as it is and continue on the current programme plan

- Put on hold and wait for:
  - complementary analyses
  - additional data
  - decision from higher level

Rapid Incident Assessment Questionnaire

RECALL BY SUPPLIER

- reprocess
- replace as original
- reimburse

DISPOSE

- destroy
- sale as non-food item

**Use ER pre-identified contacts list to rapidly apply measures**

## Annex 9. Quarantining SNF

- ✓ Identify all suspected/affected batches (in and out of the premises).
- ✓ Make sure that the release of all the suspect/affected batches has been suspended.
- ✓ To avoid cross-contamination, segregate and store the suspect/affected batches separately from unaffected products.
- ✓ Protect the suspect/affected goods against further degradation. Keep them cool and protect them from pests. However, do not use rodenticide or insecticide chemicals.
- ✓ Keep a record of the quarantined batches on stock/stack cards, and note the quantity.
- ✓ Mark the quarantined goods with a quarantine label and yellow-and-black striped hazard tape, so that staff can easily identify them.

## Figure 26. Marking quarantined goods

### Quarantine label example

<p><b>NOT FOR RELEASE</b></p> <p><b>GOODS IN QUARANTINE</b></p> <p><b>Date (dd/mm/yy):</b> _____</p> <p><b>Name/Surname:</b> _____</p> <p><b>Signature:</b> _____</p> <p><i>Not valid unless signed by authorized officer</i></p>
---

### Yellow and black hazard tape used to mark quarantined stock





## Annex 10. Checklist for reception

When receiving a container, carry out the activities in this list.

- Inspect the cargo before it is unloaded to determine whether it was properly secured while in transit.
- Note the general state of the arriving container. Is it dirty? Does it have a suspicious odour?
- Note the transport conditions, including: how long the cargo was in transit; whether the cargo was covered and protected during transportation; what temperatures the goods were exposed to during the journey, etc.
- Check that the quantity of products that has arrived is correct.
- Ensure that goods are on pallets or slip sheets (extremely tear- and moisture-resistant sheeting that can be used as a substitute for wooden pallets).
- Check that the pallets are covered in plastic.
- Visually inspect the packaging. Is the carton or sack dry? Is the packaging intact? Are the labels readable?
- If anomalies are noticed, continue by inspecting the primary packaging inside.
- If there is a temperature recorder (LogTag®), download the data and review the temperature fluctuations during

transport. (LogTag® software can be downloaded from <http://www.logtagrecorders.com/software/software.htm>)

If a food incident is confirmed, see Chapter 4 for further information.

## Annex 11. Most commonly used helicopters

**Table 7. Mi-8T and Mi-8 MTV specifications**

Type	Mi-8T	Mi-8 MTV
<b>External dimensions (m)</b>		
Rotor diameter	21.29	21.29
Length	18.17	18.22
Height	5.65	4.75
<b>Internal dimensions</b>		
Cabin (l×w×h)	5.34 × 2.3 × 1.8	5.34 × 2.3 × 1.8
Door size (w×h)	2.34 × 1.82	2.28 × 1.62
Passenger capacity	19 + 3 crew	19 + 3 crew
<b>Helicopter and payload weights (kg)</b>		
Empty weight	7,260	7,200
Max. payload	3,000	4,000
Max. take-off weight	12,000	13,000
<b>Speed, altitude and range</b>		
Max. cruising speed (knots)	120	120
Hovering ceiling (feet)	13,055	13,055
Service ceiling (feet)	14,763	17,763
Range (nautical miles)	280	280

# Chapter 9. Glossary

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**Acute malnutrition.** Acute malnutrition, also known as **wasting**, develops as a result of recent rapid weight loss or a failure to gain weight.

In children, it is assessed using the nutritional index of Weight-for-Height (WFH) or mid-upper arm circumference (MUAC). Acute malnutrition is also assessed through examination for the clinical signs of visible wasting and nutritional oedema.

In adults, wasting is assessed through MUAC or Body Mass Index (BMI). In pregnant and lactating<sup>52</sup> women (PLW), wasting can be assessed through MUAC. The degree of acute malnutrition affecting an individual is classified as either moderate (MAM) or severe (SAM) according to specific cut-offs and reference standards. At the **population level**, acute malnutrition is categorized in three ways:

- **Global acute malnutrition (GAM)** represents the proportion of children aged 6-59 months in the population classified with MAM+SAM according to their WFH Z-score,<sup>53</sup>

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**52** Please note that 'breastfeeding' or 'nursing' are the preferred terms for 'lactating' when communicating with the media or non-specialists.

**53** A Weight-for-Height Z-score is used to describe how much a child's WFH measurement differs from the average WFH of children of the same height and gender. For more information, see WHO's Child Growth Standards, online at: <http://www.who.int/childgrowth/standards/en/>

and/or nutritional oedema.<sup>54</sup> GAM is an indicator of acute malnutrition in a population, and is used to assess the severity of the situation.

- **Moderate acute malnutrition (MAM)** represents the proportion of children aged 6-59 months in the population who are classified with a WFH Z-score of  $<-2$  but  $\geq-3$ .
- **Severe acute malnutrition (SAM):** represents the proportion of children 6-59 months in the population who are classified with a WFH Z-score of  $<-3$  and/or presence of nutritional oedema.

### **Best Before Date (BBD/Date of Minimum Durability).**

BBD means the date which signifies the end of the period under any stated storage conditions during which the product will remain fully marketable and will retain any specific qualities for which tacit or express claims have been made. However, beyond the date the food may still be perfectly satisfactory.<sup>55</sup>

**Chronic malnutrition.** This is also referred to as **stunting** because children with chronic malnutrition are significantly shorter than their well-nourished counterparts. Chronic malnutrition develops as a result of inadequate nutrition or repeated infections — or both — typically, during the critical first

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**54** MUAC can be used to identify children to enrol in nutrition programming (cut-offs are established) because a low MUAC indicates that acute malnutrition is present. However, thresholds to signal the severity of the nutrition situation have not been established.

**55** Definition from WHO/FAO (2007) *Codex Alimentarius. Food Labelling*. Fifth edition. Online at:  
<ftp://ftp.fao.org/docrep/fao/010/a1390e/a1390e00.pdf>

1,000 days from conception to two years of age. Stunting is assessed using the nutritional index of Length/Height-for-Age Z-score (HAZ) to determine how much shorter-than-average an individual is.

Unlike wasting, stunting is a slow, cumulative process that may not be immediately apparent. Chronic malnutrition cannot generally be reversed, only prevented. Length/Height-for-Age reference tables are published by WHO and are online at: [http://www.who.int/childgrowth/standards/height\\_for\\_age/en/index.html](http://www.who.int/childgrowth/standards/height_for_age/en/index.html)

**End product** (ISO 22000). This is the term for a product that will undergo no further processing or transformation by the organization.

**Expiry date.** The date given on the individual container (usually on the label) of a product up to and including which the active pharmaceutical ingredient (API) and finished pharmaceutical product (FPP) are expected to remain within specifications, if stored correctly. It is established for each batch by adding the shelf-life to the date of manufacture.<sup>56</sup>

**Food chain** (ISO 22000). In this context, a food chain is the sequence of stages and operations involved in the production, processing, distribution, storage and handling of a food product and its ingredients, from primary production to consumption.

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**56** From WHO (2009) *WHO Expert Committee on Specifications for Pharmaceutical Preparations. Forty-third report.* p110. Online (with updates) at: [http://www.who.int/medicines/areas/quality\\_safety/quality\\_assurance/regulatory\\_standards/en/](http://www.who.int/medicines/areas/quality_safety/quality_assurance/regulatory_standards/en/).

The food chain includes the production of feed for food-producing animals and for animals intended for food production. It also includes the production of materials intended to come into contact with food or raw materials.

**Food incident.** This is any notified situation within the food supply chain where there is an actual, potential or perceived risk associated with the safety or quality of the food distributed and/or consumed. When alerted to the possibility of a food incident, the organization must act immediately and swiftly to protect consumers' interests.

**Food safety hazard** (ISO 22000). This refers to an anomaly in a food's make-up, or a biological, chemical or physical agent in a food, that has the potential to cause an adverse health effect.

The term 'hazard' should not to be confused with the term 'risk'. In the context of food safety, risk is an assessment of the probability of an adverse health effect (e.g. becoming sick) resulting from exposure to a specific hazard, and the likely severity of that effect (e.g. absence from work, hospitalization, miscarriage, disability, death, etc.).

**Fortified blended foods** (FBFs).<sup>57</sup> FBFs are a mixture of cereals and other ingredients (such as soya beans or pulses) that

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**57** WFP has renamed its range of fortified blended foods as follows:

- **CSB+** = Super Cereal — Corn Soya Blend;
- **CSB++** = Super Cereal Plus — Corn Soya Blend;
- **WSB+** = Super Cereal — Wheat Soya Blend;
- **WSB++** = Super Cereal Plus — Wheat Soya Blend;
- **RSB+** = Super Cereal — Rice Soya Blend; and
- **RSB++** = Super Cereal Plus — Rice Soya Blend.

have been milled, blended, pre-cooked by extrusion or roasting, and fortified with a premix and with a wide range of vitamins and minerals. Early formulations were bulky, poorly absorbed, and contained an incomplete range of vitamins and minerals. In order to overcome these constraints, FBFs have been improved and now include a more comprehensive vitamin and mineral profile. Nowadays, some ingredients are specially processed to decrease their anti-nutrient properties. Some improved FBFs designed to be used for treatment of moderate acute malnutrition (MAM) in children aged 6-23 months also include milk.

**Growth failure.** This is a manifestation of undernutrition in children that causes individuals to be shorter and/or thinner than their well-nourished counterparts and to be unable to realize their growth potential. Growth may fail due to deficiencies of various micronutrients, energy, protein and/or macro-minerals.

**Lot.** A batch or production unit which may be identified by the same code is called a 'lot'. When there is no code identification, a lot may be considered as: (a) that quantity of product produced under essentially the same conditions, at the same establishment, and representing no more than one day's production; or (b) the quantity of the same variety of product from one and the same manufacturer available for sampling at a fixed location.

**Lipid-based nutrient supplement (LNS).** This is a collective term for SNF that are lipid-based spreads or pastes. There are various different formulations and dosages that can be used for different purposes. There are three categories of LNS, based on calorific value: LNS Small quantity, LNS Medium quantity, and LNS Large quantity (the latter is the same as a RUSF). Currently-available LNS products are ready-to-use foods (RUF).



**Malnutrition:** Occurs when the nutrient and energy intake does not meet or exceeds an individual's requirements to maintain growth, immunity and organ function. Malnutrition is a general term and covers both undernutrition and overnutrition (overweight/obesity).

**Micronutrient deficiency:** A lack or shortage of a micronutrient (also called vitamins or minerals). Micronutrients are essential components of enzymes and hormones and are therefore key in bodily processes, immunity, proper growth and metabolism of an individual. Micronutrient deficiencies often occur simultaneously and can arise due to lack of intake, absorption, or utilization of one or more vitamins or minerals. It is referred to as 'hidden hunger' because a large percentage of the population may be deficient without showing any clinical symptoms or signs of deficiency.

**Micronutrient powders (MNPs)** are a mix of multiple micronutrients used in programmes to prevent micronutrient deficiencies (MNDs) among children aged 6-59 months, and, increasingly, to prevent MNDs among school-age children through school feeding programmes. MNPs are distributed in small sachets that are added to solid or semi-solid foods after preparation and prior to consumption. MNPs are tasteless and odourless, and are easily dissolvable in most warm foods. MNPs do not provide energy, but they do provide the complete FAO/WHO recommended daily intake (1 Recommended Nutrient Intake [RNI]) of each micronutrient per dose. Most countries use the 15 micronutrient formulation.

**Nutrient gap.** This term refers to a difference between nutrient requirements and nutrient intake. While diets may be adequate in terms of energy (kcal), they may still be inadequate in terms of

nutrients, leaving individuals at risk of undernutrition. Nutrient gap analysis can be a critical step in developing WFP programming that is appropriate to the context.

**Nutritional oedema.** Also known as bilateral oedema, nutritional oedema indicates a serious type of acute malnutrition in which nutritional deficiencies lead to swelling of limbs (feet, hands) due to retention of fluids. It is caused by protein deficiency. Children with nutritional oedema are automatically classified with severe acute malnutrition (SAM), and often require therapeutic feeding and medical treatment to recover.

**Ready-to-use foods (RUF).** This is the generic term for foods that do not need to be prepared, cooked, or mixed with water. RUFs used in nutrition interventions are generally made with peanuts, sugar, milk powder, vegetable oils, and vitamins and minerals, though they may be made with chickpeas or other commodities. The food can be eaten directly from the package. RUFs do not require water or cooking, and have low moisture content, so the risk of contamination is low.

- **Ready-to-Use Therapeutic Food (RUTF)** is an energy-dense mineral- and vitamin-enriched RUF, specifically designed to treat SAM without medical complications at the community level. RUTF is given over a period of approximately eight weeks until the child recovers. During treatment with RUTF the child will not need other forms of food, apart from breast milk if he or she is still suckling.
- **Ready-to-Use Supplementary Food (RUSF)** is a type of RUF that is specifically designed to treat moderate acute malnutrition in children aged 6-59 months. RUSFs are fortified with micronutrients and contain essential fatty acids

and quality protein to ensure a child's nutritional needs are met.

**Shelf life.** The Codex Alimentarius defines shelf life as being 'The period during which the product maintains its microbiological safety and suitability at a specified storage temperature and, where appropriate, specified storage and handling conditions. It is the responsibility of the manufacturer to determine the shelf life of the product and the conditions for storage. Limitation of shelf life is a control measure that, in many cases, is decisive for the safety and suitability of the product.'<sup>58</sup>

**Specialized nutritious foods (SNF).**<sup>59</sup> SNF are a range of specialized food commodities and supplements formulated to provide specific amounts of energy, micronutrients and macronutrients necessary for growth and health. They are used to prevent or treat undernutrition.

**Stowage factor.** This term describes the volume (in cubic metres) per metric ton of a commodity.

**Stunting.** Please see chronic malnutrition, above.

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**58** Codex Alimentarius (2009) *Code of Hygienic Practice for Milk and Milk Products*. Online as CAC/RCP 57-2004 at: <http://www.codexalimentarius.org/standards/list-of-standards/>

**59** For more information on specialized nutrition products currently in use, please refer to WFP's SNF Sheets, reproduced in this guideline in Section 3.1, Figures 4a and 4b. Other products may be approved for use in future.

**Traceability.** This is the ability to identify and trace the history, location and application of products and materials, from origin to distribution, by means of recorded identifications (ISO 22000:2005).

**Undernutrition.** An insufficient intake of energy, protein and/or micronutrients, poor absorption or rapid loss of nutrients due to illness or increased energy expenditure can all contribute to undernutrition. Low birth weight, stunting, wasting, low weight, and other conditions associated with micronutrient deficiencies can all be caused by undernutrition.

**Undernourishment.** This term describes food intake that is insufficient to meet dietary energy requirements continuously. Each year, the Food and Agriculture Organization of the United Nations (FAO) reports undernourishment statistics as an indicator for the first Millennium Development Goal (MDG) which aims to halve the prevalence of undernourishment in the developing world by 2015.<sup>60</sup> Undernourishment is not assessed at the individual level.

**Use-by date (recommended last consumption date, expiration date).** Codex Alimentarius' CODEX STAN 1-1985 defines use-by date as the date which signifies the end of the estimated period under any stated storage conditions, after which the product probably will not have the quality attributes normally expected by the consumers. After this date, the food should not be regarded as marketable.

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**60** FAO's *State of Food Insecurity in the World 2012* presents new estimates from 1990-2012, reflecting key improvements in data and methodology. For more information on the revised methodology, see <http://www.fao.org/publications/sofi/en/>



# Chapter 10. Hand-outs

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**Hand-out 1. Food incident management**

**Hand-out 2. Storage recommendations for small storage areas: key points for adequate storage of specialized nutritious foods**

**Hand-out 3. Specialized nutritious foods. Golden rules**

**Hand-out 4. Supply chain planning. Golden rules**

**Hand-out 5. Managing the supply chain: determining the SNF demand. Golden rules**

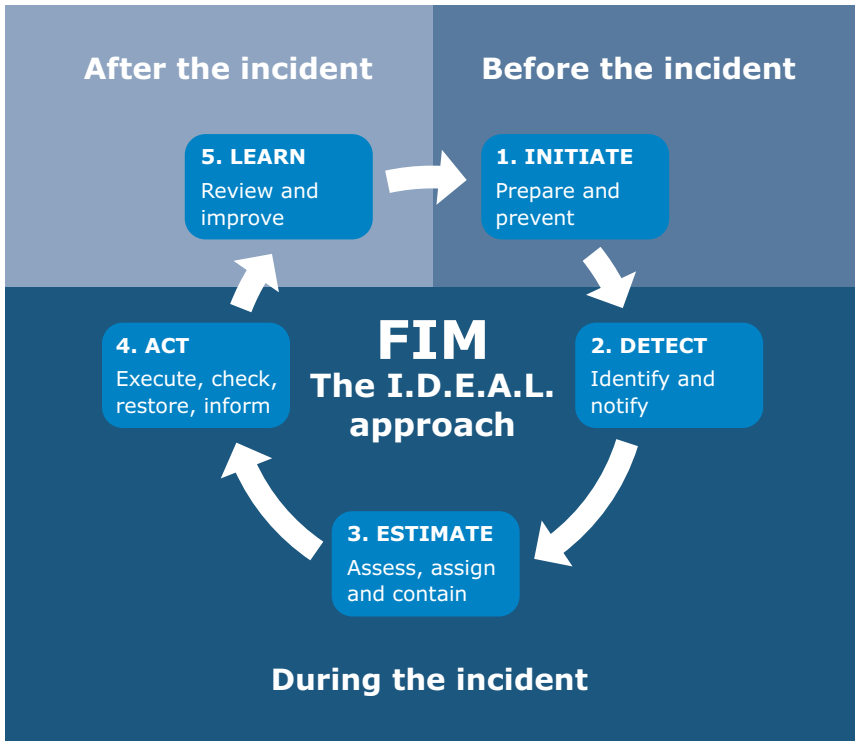
**Hand-out 6. Managing the supply chain: food quality. Golden rules**

**Hand-out 7. Managing the supply chain: procurement of SNF. Golden rules**

**Hand-out 8. Managing the supply chain: logistics. Golden rules**

**Hand-out 9. Managing the supply chain: distribution to beneficiaries. Golden rules**

## Hand-out 1. Food incident management



### Before the incident

#### 1. INITIATE

Have the right people in place to facilitate an incident response:

- Create a proper reporting structure within your organization.
- Identify a focal point at field level in each country.
- Make sure the focal point is acquainted with the specificities of SNF.
- Focal points should be knowledgeable/trained on how to use a risk matrix tool.

## During the incident

### 2. DETECT

Abnormal episodes can be detected at various levels of the supply chain if the right structure is in place to filter possible triggers.

### 3. ESTIMATE





To evaluate the severity of an incident/situation, certain frameworks must exist to allow the qualitative and quantitative analysis, and, eventually, classification of a risk. Most incident management protocols define a matrix for the severity estimation.

$$\text{Severity} = \text{Impact} \times \text{Likelihood}$$

Impact						
Critical <b>5</b>	5	10	15	20	25	
Severe <b>4</b>	4	8	12	16	20	
Moderate <b>3</b>	3	6	9	12	15	
Minor <b>2</b>	2	4	6	8	10	
Negligible <b>1</b>	1	2	3	4	5	
	<b>1</b> Very Unlikely	<b>2</b> Unlikely	<b>3</b> Moderately likely	<b>4</b> Likely	<b>5</b> Very likely	
<b>Likelihood</b>						



## 4. ACT

Initial risk	WFP execution measures
	<b>Release</b> <ul style="list-style-type: none"><li>• accept as it is</li></ul>
	<b>Delay</b> <ul style="list-style-type: none"><li>• wait for complementary analyses, then release or reject</li></ul>
	<b>Dispose</b> <ul style="list-style-type: none"><li>• destroy</li><li>• sale as non-food item</li></ul>
	<b>Recall</b> <ul style="list-style-type: none"><li>• reprocess</li><li>• replace as original</li><li>• reimburse</li></ul>

## After the incident

### 5. LEARN

Prevent issues from reoccurring and be better prepared for the next incident:

- Make sure you have a proper incident tracking system in place, and that records of all past incidents are kept.
- At the end of the year, evaluate your incidents.
- Link them to root causes, for example: a supplier issue, transport or storage problems.
- Take action to mitigate those risks.

## Hand-out 2. Storage recommendations for small storage areas: key points for adequate storage of specialized nutritious foods

### 1. STORAGE AREA PREPARATION

- Plan the layout of stacks for each type of SNF before the goods arrive.
- Clean the floor and the walls before receiving cargo, and ensure there is ventilation in the storage facility.
- Be sure that water will not leak or flood into the storage facility.
- Prepare pallets, and check the facility's main entrance lock.

### 2. STORING SNF

- Keep in mind that SNF need to be stored in a clean, ventilated and dry space.
- SNF must be protected against prolonged exposure to humidity, sunlight and high temperatures.

<b>PRODUCT TRANSPORT/ STORAGE TEMPERATURE<sup>1</sup></b>	<b>&lt;30°C<sup>2</sup></b>	<b>More than 180 days (6 months) above 30°C<sup>3</sup></b>	<b>More than 90 days (3 months) above 40°C<sup>4</sup></b>
<b>RISK</b>	Nutritional content and taste remain satisfactory.	Nutritional content and taste may no longer be satisfactory. You should contact your quality focal point.	

Source: WFP (2013) *Managing the Supply Chain of Specialized Nutritious Foods*

**1.** Any temperature measurement inside the cartons, the transport vessel or vehicle, or the warehouse. **2.** Unless stated differently on the packaging. **3.** This refers to the total number of days during which the temperature was consistently above 30°C. **4.** This refers to the total number of days during which the temperature was consistently above 40°C.

- SNF need to be palletized.
- Stacks of SNF must not exceed 3m in height.
- Of the two stack configurations shown in the illustration below, the cross stack is stronger and safer.



**Straight stack**



**Cross stack (stronger)**

- Never stack SNF against walls. Always ensure that there is a space of at least 40 cm between the walls and the stacks of SNF.
- Make sure that SNF are handled with care, and avoid damaging cartons or sacks containing the products.
- SNF goods should only be stored next to food items. They must never be stored near chemicals, fuel or other non-food items. Never use rodent poison or insecticides in the storage facility.

### **3. MANAGING SNF STOCK**

- SNF should be segregated by BBD (Best Before Date) and producer and, if possible, by batch number.
- The rule for managing SNF stock is FEFO (First Expired First Out).
- BBD should be followed on stock cards.

- Stock inspection and physical inventory should be done regularly: at least twice a month.
- If visible food defects are detected, stock must be put in quarantine. Quarantined stock must be clearly marked with a quarantine label and yellow and black hazard tape.
- All SNF defects must be reported to the organization that delivered the food so that they can mitigate the defect.
- If any SNF needs to be destroyed, the organization that delivered them should be informed.

#### **4. SPACE CONSIDERATIONS**

- The spaces between stacks should be wide enough to allow a person to walk between stacks and around every stack in the layout.
- Access space must allow easy loading and unloading.
- Ensure there is enough space for loading truck/cars outside the storage facility and that there is vehicle access to the storage facility.

## **Hand-out 3.**

### **Specialized nutritious foods. Golden rules**

- ✓ Specialized nutritious foods (SNF) covered in this guideline are: lipid-based nutrient supplements (LNS), fortified blended foods (FBF) and micronutrient powders (MNPs).
- ✓ SNF are developed to more effectively meet the specific nutritional objectives of programmes, such as: treatment of MAM, prevention of acute malnutrition, stunting, and micronutrient deficiencies.
- ✓ Each SNF is defined by its product specification.
- ✓ SNF are particularly sensitive to high temperatures, which can affect their nutritional value.
- ✓ Shelf life, supplier's stock availability and lead time are the main constraints for managing SNF.

## **Hand-out 4.**

### **Supply chain planning. Golden rules**

- ✓ All supply chain actors have a role in maintaining the quality of SNF until it reaches beneficiaries.
- ✓ Ensure that staff involved in Programme, Procurement, Logistics and Food Safety, as well as cooperating partners, are all engaged in the planning process and are assigned clear roles and responsibilities.
- ✓ Ensure relevant information exchange — including programme updates — between all players in the supply chain if the nutrition situation changes or if there is a risk of pipeline break.
- ✓ Anticipate the impact of the external environment (climate, security, infrastructure, etc.) on the operation.
- ✓ Make sure the SNF can be imported and/or are allowed for use in the country, and identify all relevant documents and processes required for their import and distribution.
- ✓ Ensure proper stock management to meet anticipated needs, and avoid lengthy storage.
- ✓ Make sure that storage facilities meet the necessary conditions for preserving the characteristics and nutritional value of SNF. Take into account that regulating interior climate conditions is a complex process and may require specialist input (see Section 6.3.1. Selection and alteration of storage facilities to store SNF).

## **Hand-out 5.**

### **Managing the supply chain: determining the SNF demand. Golden rules**

- ✓ The design of all nutrition interventions should be based on clear understanding of both the nutrition situation and the capacity to respond.
- ✓ Nutrition interventions that use SNF can be an important part of an overall response to nutrition problems. However, complementary programming in nutrition and other sectors is also required if improvements are to be sustainable.
- ✓ It is critical to gauge the government's awareness and standards concerning SNF, as well as their technical and logistical capacity for using these products. Advocacy and technical support can then be tailored accordingly.
- ✓ More than one SNF may be recommended for the same programme. If so, the choice of SNF depends on contextual factors detailed in Section 3.1.
- ✓ SNFs should not be used for programmes for which they are not recommended.
- ✓ Decision-making about which SNF to use must take into account: the target group; the context (including the capacity to cook); cultural practices and food preferences; conformity with national standards; and operational issues.

- ✓ Estimated SNF supply needs are calculated from the total estimated number of beneficiaries, SNF ration size and programme duration. The formula used by WFP to estimate the required metric tonnage is:

Required tonnage in mt = ( Estimated total beneficiaries × Ration size per person per day in grams × Duration of support in days ) ÷ 1,000,000

When translating estimated supply needs into actual supply orders, potential seasonality in beneficiary loads should be taken into account.

- ✓ As well as SNF distribution, there are many aspects of nutrition programming that can contribute to better nutritional status. These include linkages with other programmes, and communication to bring about behavioural change.
- ✓ Communication between Programme, Procurement, Food Quality, and Logistics staff is essential — both for initial planning, and for predicting and mitigating the impact of pipeline breaks on nutrition interventions.



## **Hand-out 6.**

### **Managing the supply chain: food quality.**

#### **Golden rules**

- ✓ Quality management is the only way to guarantee food quality and safety.
- ✓ Food safety is a key element of food quality.
- ✓ Quality management applies to the whole supply chain: from primary production to consumption. Therefore, all actors in the supply chain share responsibility for food safety and quality. Staff should be encouraged to contact the quality focal point for technical advice when needed.
- ✓ Tracing and tracking of batch numbers is a prerequisite for an effective quality management system.
- ✓ Any incident or sign of deterioration or a product defect should be reported to a technical expert within the organization and managed accordingly.
- ✓ Product sampling and testing are important elements of a quality assurance system. Usually, they take place early on in the supply chain, or when a food incident occurs. However, there are many other opportunities for identifying defective SNF and removing them from the pipeline. An effective quality assurance system must ensure that all staff are trained to be alert to potential problems, and that they are equipped to prevent defective products from reaching or harming beneficiaries.

## **Hand-out 7.**

### **Managing the supply chain: procurement of SNF.**

#### **Golden rules**

- ✓ Know the product specifications and standards.
- ✓ Remember that suppliers are responsible for guaranteeing that their product's ingredients and characteristics conform with the buyer's order specification.
- ✓ Know the market for SNF, and be aware of what can be procured locally, regionally and/or internationally.
- ✓ Make sure that the government permits the import and use of SNF, and obtain all the necessary documents.
- ✓ Know the suppliers and purchase only from validated suppliers with the necessary quality management systems, capacity, traceability, and financial stability.
- ✓ Make sure that batch numbers can be easily traced within the organization's tracking system in case of product recalls or other food incidents.
- ✓ Monitor suppliers' performance, and continuously re-evaluate their status within the approved supplier list.
- ✓ Where context and capacity support it, encourage development of local production.

## Hand-out 8.

### Managing the supply chain: logistics. Golden rules

- ✓ Know the necessary customs procedures and identify the right focal points. Be up-to-date with any changes in customs regulations.
- ✓ Have the latest ETA on hand and communicate any changes to other colleagues. Be aware that changes in the ETA might have consequences for Programme.
- ✓ Use the SNF product's shipping stowage factor as the basis for calculating the amount of warehouse floor space required to store a shipment of the SNF. Remember that every product has a different stowage factor.

The stowage factor for shipping in  $\text{m}^3/\text{mt}$  = the volume of one unit in cubic metres ( $\text{m}^3$ )  $\div$  the gross weight of one unit in metric tons (mt), where one unit is a full carton or sack of the SNF product.

The stowage factor for warehousing in  $\text{m}^2/\text{mt}$  = the product's stowage factor for shipping in  $\text{m}^3/\text{mt} \div 3 \text{ m}$ .

The warehouse space required to store a shipment of the SNF, in  $\text{m}^2$  = the stowage factor for warehousing in  $\text{m}^2/\text{mt} \times$  the gross weight of the shipment of that product in mt.

- ✓ Choose warehouses that can maintain the low temperatures needed for storage of SNF. If the available storage facility cannot control temperature satisfactorily, consider modifications to the building.

- ✓ Measure and record the temperature in all warehouses storing SNF to ensure a transparent decision-making process.
- ✓ Make sure that SNF entering the warehouse are segregated at least by BBD and producer. If possible, separate products by batch number.
- ✓ Follow the First Expire First Out rule when planning deliveries.
- ✓ Make sure that all staff following proper handling and transport guidance.
- ✓ Liaise regularly with Programme to provide updates on stock availability and accessibility in light of rainy seasons or shifts in the overall security situation.
- ✓ Share necessary documentation and procedures regarding the SNF products with partners.
- ✓ Inform the partner as far in advance as possible about any known or anticipated breaks in the pipeline. Take appropriate steps to assist the partner in minimizing risks resulting from such events.
- ✓ Provide partner staff with advice and guidance on storage and handling of SNF.
- ✓ Provide training, where necessary, for partner staff on distribution practices, reporting (including the WFP Commodity Tracking System), and warehousing.

## **Hand-out 9.**

### **Managing the supply chain: distribution to beneficiaries. Golden rules**

- ✓ Assess the partner's knowledge of the products and their use. If required, train the partner before delivering the products.
- ✓ Agree a stock replenishment strategy with the partner. Communicate and coordinate with partners on short BBDs.
- ✓ Recognize that waste management will need to be addressed. Follow national/local guidelines where they exist.
- ✓ Beneficiaries need to understand: the objective of the nutrition intervention; how to use SNF safely; how to use SNF properly; and how long they will need to use the SNF.
- ✓ Behaviour change communication (BCC) is a critical component of nutrition interventions. It should be linked to sensitization of local authorities and to acceptability trials undertaken during programme design.
- ✓ Although formal surveillance systems are rarely in place, Programme staff should be open to dialogue and feedback from partners and beneficiaries. Concerns about the use or safety of SNFs should be followed up immediately so that appropriate action can be taken, either to clear up misunderstandings or investigate a potential food safety incident.

- ✓ Do not use SNF without sensitization of beneficiaries on issues such as use, consumption and home storage, etc.
- ✓ Key instructions and BCC must be translated into local languages and distributed with the SNF as part of the nutrition intervention.



# Index

## A

acceptability 146  
 Acha Mum (chickpea-based) 39  
 acute malnutrition 156, 159, 163, 185  
 air transport 113  
 analysis 71  
 assessment 30  
 available stock 53

## B

blanket supplementary feeding  
   programmes 32, 163  
 batch 74, 75, 109  
 batch number 101, 109, 136, 141  
 BBD iii, 75, 92, 109, 113, 136, 137, 186  
 beneficiaries 35, 45, 55, 80, 143, 144,  
   148, 151  
 beneficiary 42, 43, 92, 145, 149  
 best-before date. See BBD  
 blanket supplementary feeding 35  
 buffer stock 92

## C

cargo planes 113  
 Certificate of Analysis 72, 93  
 chickpea 33, 39, 40, 99, 191  
 chronic malnutrition 164  
 climate variability 20  
 communication 57  
 complementary feeding 164  
 container 106, 115, 116

contamination 62, 63  
 coordination 30  
 costs 98, 99  
 cultural practices 33, 34, 56  
 customs 110, 111, 140

## D

daily ration 38, 40  
 date of minimum durability. See BBD  
 demand 21, 25, 53  
 disposal 107, 175  
 distribution 143, 144

## E

eeZeeCup™ (peanut-based) 40  
 eeZeeRUSF™ (peanut-based) 38  
 emergencies 21  
 emergency preparedness 30  
 end product 187  
 estimated population 44, 48  
 evaluation 31  
 expiry date 187

## F

FBF 4, 10, 146  
 food chain 187  
 food incident 73, 188  
 management 178, 196  
 food intake 161  
 food preferences 33  
 food quality 59, 85



food safety 62, 64, 65  
food safety hazard 188  
food-borne diseases 37, 75  
food-borne illness 37, 147  
formula 6  
fortification 164  
home 164  
point-of-use 164  
fortified blended foods 4, 32  
fortified food 35  
funding 55  
Funding 23

## G

GAM 185  
general food distribution 34  
geographic constraints 20  
GMOs 110  
global acute malnutrition 185  
government 34, 56  
governments 34  
growth failure 189

## H

handling 105, 107, 141, 146  
helicopters 114, 184  
helipad 114  
households 33, 36, 51, 144, 145, 149  
human resources 23

## I

incident 75, 76, 77, 79, 80, 81, 82, 84,  
85  
Incoterms 88, 89, 115  
information 19, 24  
institutional environment 29  
ISO 9001 172

## L

labelling 7  
laboratory 70  
land transport 117  
languages 152  
lead times 10, 53, 92  
lipid-based nutrient supplements 4  
LNS 4, 10, 33, 34, 36, 146  
loans 55  
local production 10, 101  
logistical capacity 56  
logistics 57, 92, 103  
lot 189

## M

malnutrition 190  
MAM 31, 33, 42, 44, 53, 54, 145, 147,  
186  
market study 99  
micronutrient 32  
deficiencies 164, 190  
status 161  
micronutrient powders (MNP) 5, 41,  
190  
MNP 5, 34, 49, 50, 54, 146  
moderate acute malnutrition 31, 162,  
186  
moisture 62  
monitoring 31

## N

non-nutrition interventions 166  
Nutributter® (peanut-based) 41  
nutrient 35  
nutrient gap. See also BBD  
nutrition 33, 65, 144  
nutrition cluster 21  
nutrition interventions 162

nutritional oedema 191

nutritional value 61

## O

order cycle 52

ordering 92

## P

packaging 7, 62, 73, 74, 108, 147

packaging details 38, 40

partner 55, 137, 138, 141, 151

peanut 33, 36, 38, 40, 41, 62, 99, 191

pipeline 141

pipeline breaks 55, 57

planning 15, 57, 137

Plumpy'doz® (peanut-based) 40

Plumpy'sup® (peanut-based) 38

pregnant and lactating women 44

prevention 32, 49

processing 7

procurement 22, 57, 89, 92

product analysis 70

production 98

programme 57

## Q

quality 66, 74, 85, 90, 110

quality management 12

quarantining SNF 180

quarantine label 181

## R

raw materials 6, 62, 64, 74, 75

re-packaging 108

ready-to-use foods 191

Ready-to-Use Supplementary Food  
191

Ready-to-Use Therapeutic Food 191

reception 105, 106

rice 33

risk 79, 80, 84

risks 141, 145

RUF 191

RUSF 191

RUTF 191

## S

safety 71, 76, 85, 113, 144

safety stock 92

SAM 186

sampling 70, 85

sea transport 115

seasonal changes 54

sector coordination 21

severe acute malnutrition 186

shelf life 9, 38, 40, 92, 95, 192

shipment 87

SNF ii, 10, 12, 13, 25, 33, 34, 51, 53,

54, 55, 56, 61, 72, 87, 93, 105, 109,  
110, 145

specialized nutritious foods 3, 192

stacking 107, 108

stacks 107, 117, 199, 200

stakeholders 18, 20, 54

stock 22, 24

stock management 130, 148

storage 24, 107, 141, 146, 199

storing 22

storing SNF 117

stowage 130, 133, 134, 140, 192

stunting 160, 192

Super Cereal 39, 41

Super Cereal Plus 39, 41

supplier 110

supplier list 91

suppliers 89, 90, 91, 93, 95, 96, 98, 101

supply 21, 57  
supply chain 16, 18, 25, 59, 70, 87,  
103, 143

## T

target group 38, 40  
targeted supplementary feeding  
programmes 162  
temperature 8, 22, 64, 109, 114, 116,  
118, 119, 138, 141  
temperature control 118  
traceability 12, 74  
tracing 74, 75, 85  
tracking 74, 75, 81, 85  
transport 22, 87, 107, 112, 114, 141  
transport planning 112

## U

undernourishment 193  
undernutrition 2, 28, 42, 155, 193

## W

warehouse 20, 117, 118, 136, 140, 141  
alterations 127  
permissions 129  
building envelope 120  
climatic conditions 127  
colour 121  
dimensions 125  
eaves 121  
entrances and exits 121  
improvements 127  
insulation 122  
insulation materials 123  
location 119  
modification 127  
orientation 120  
storage requirements 134

ventilation 124  
windows and doors 121  
waste management 149  
wasting 185  
Wawa Mum (chickpea-based) 40  
wheat 33



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