To achieve the Millennium Development Goals, undernutrition needs to be addressed urgently and effectively. The development of ready-to-use therapeutic foods (RUTF) have revolutionized the treatment of severe acute malnutrition (severe wasting), and catalyzed the development of other food-based commodities for treating and preventing less severe as well as other forms of undernutrition.

For WFP, after having focused on ensuring that energy and protein needs are met and stepping up the fortification of processed commodities with micronutrients, the latest developments are directed toward meeting the nutritional needs of specific target groups. This includes children younger than two years of age, moderately malnourished individuals, pregnant and lactating women, populations suffering from micronutrient deficiencies, and the chronically ill (people suffering from HIV/AIDS and TB). To effectively prevent or treat the different forms of undernutrition among these groups, it is important that the underlying causes and consequences are understood, appropriate food commodities are selected, and realistic and effective programming options are developed.

This focus on better addressing the nutritional needs of specific target groups and the concurrent increase of the availability of specially-formulated foods mean that WFP will be in a better position to save even more lives, and do a better job in improving the growth, development, health and future well-being of its beneficiaries. This is also of utmost importance to WFP in achieving its Strategic Objectives. The choice of solutions increases in variety and complexity, with regard to both appropriate food commodities as well as programming approaches. New commodities and programming approaches should be used in combination with interventions that focus on water and sanitation, promotion of appropriate (breast)feeding practices, and preventive health services. This brief provides an overview of the current options and considerations, and is accompanied by briefs that look at each topic or category of commodities in greater detail (see Box 1).

1. Important target groups

Different groups within a population have different nutritional needs, depending on their age and physiological status (i.e. malnourished, chronically ill, and pregnant/lactating). The following main groups can be distinguished:
Box 1: Accompanying briefs with more detail per topic or commodity

No. 1. Improving the Nutritional Quality of WFP’s Food Basket, this brief
No. 2. Why WFP Operations Should have a Strong Focus on Children Aged 0–24 Months
No. 3. Improving Existing Recommendations on Treatment of Moderate Malnutrition in Children Under 5
No. 4. Improving Corn Soya Blend and other Fortified Blended Foods, Why and How
No. 5. Ready-to-Use Foods (RUFs) and WFP’s Approach to Treating and Preventing Malnutrition
No. 6. Micronutrient Powder for Home Fortification, also Known as MixMe™ or Sprinkles™

WFP/UNICEF Issue Brief. Increased Food Prices – Interventions required to prevent deterioration of health and nutritional status

a) Children younger than two years of age. The most important group to consider is children younger than two years of age because preventing undernutrition in this age group will benefit them, as well as society as a whole, for the rest of their lives. Stunting or chronic malnutrition due to poor fetal growth and poor growth during the first two years of life results in reduced mental development, leading to poorer school performance, and reduced adult income earning potential. It also leads to short adult stature and, in women, to low birth weight of their babies. Poor growth is the result of inadequate nutrition, i.e. insufficient intake of appropriate foods, frequent infections, and suboptimal caring practices. The first two years of life are most critical in this regard because nutrient needs are high due to rapid growth and frequent illness, and children’s bodies need to adjust to the transition from frequent breastfeeding to fewer, largely plant-based, meals per day. Furthermore, it is difficult to catch up on poor growth and reduced mental development accumulated during early life unless circumstances (diet and environment) change drastically (see Brief No. 2 for further information).

b) Moderately malnourished children. Moderate malnutrition encompasses two different conditions, wasting (acute malnutrition) and stunting (chronic malnutrition), both of which also present as underweight (low weight for age). In most populations, the greater proportion of underweight is due to stunting resulting from accumulated undernutrition and infections during the first few years of life. Wasting is also known as acute malnutrition because it generally results from weight loss due to illness or reduced food intake. Many wasted children also suffer from some degree of stunting. Moderately malnourished children have an increased risk of dying because of increased vulnerability to infections as well as the risk of developing severe acute malnutrition, which is immediately life threatening. WFP is partnering with other UN agencies, NGOs, and private sector groups, particularly DSM,¹ to enhance and expand its strategy and programming on this topic (for further details, see Brief No. 3).

c) The chronically ill, i.e. people suffering from TB and/or HIV/AIDS. For these individuals, medical treatment should be combined with good nutrition and the safeguarding of food security among themselves and their family mem-

¹DSM is a Dutch Life and Materials Sciences Company that develops and produces nutritional, specialty food and pharmaceutical products, performance materials, polymer intermediates, and base chemicals and materials.
bers. In a broader framework, measures that mitigate poverty by ensuring food security in populations with a high prevalence of HIV infections may reduce the spread of the infection by reducing the likelihood of risk behaviour, such as sex work and transactional sex.

d) Micronutrient malnutrition among people of all ages. Micronutrient deficiencies are very widespread. Where few animal-source foods and fortified foods are consumed, micronutrient deficiencies can be assumed to be present, particularly among groups with high needs, such as young children, and pregnant and lactating women (see Brief No. 6). In these same populations, stunting is usually widely prevalent as well. Thus, different nutrition issues generally co-occur in the same populations and often in the same individuals because they originate from nutritionally inadequate diets that usually lack diversity.

e) Pregnant and lactating women. Pregnant and lactating women have higher nutritional needs because of the growth and development of the fetus, and to provide breast milk for their infant. Many women start pregnancy with a suboptimal nutritional status and therefore need nutritional support both for themselves as well as for their baby.

2. Commodities

Foods consumed should provide the nutrients required to prevent or recover from undernutrition for each of the above-mentioned target groups. For example, foods provided to children suffering from moderate acute malnutrition should provide nutrients required for growth of muscle, skeletal and skin tissue and fat mass, energy for physical activity, and adequate vitamins and minerals to allow for good health and mental development.

For the past 30 years, fortified blended foods (FBFs, such as Corn Soy Blend or Wheat Soy Blend) have been provided to any group with higher nutritional needs, such as the moderately malnourished, and pregnant and lactating women. It was also provided as a reasonably good source of micronutrients to the general population. The rationale for this was that its content of relatively good quality protein – due to the addition of soy, which has a very high protein quality value (i.e. soy contains all the essential amino acids in almost the right amounts) in addition to carbohydrates – and the fact that it was fortified with vitamins and minerals. Furthermore, it was affordable and its cost was not very much higher than the price of other commodities in the food basket.

However, selecting the right mix of foods to promote good growth and development is a complex matter because it involves translating nutrient needs to a diet consisting of a mix of foods, some of which are self-acquired and some of which could be provided through food assistance programs. Also, the choice of ingredients is critical as one food, for example soy can not easily replace another, such as milk. The difficulty is due to the fact that foods do not only contain nutrients (protein, vitamins, minerals, etc.), but also anti-nutrients (phytate, polyphenols, α-amylase inhibitors, etc.), that negatively impact di-
gestion and the utilization of food consumed. Thus, foods with a comparable protein profile, such as soy and milk, may still have very different growth and health promoting properties, due to their different content of specific nutrients, active compounds, and anti-nutrients. In the case of soy, using special soy protein isolates rather than flour prepared from whole soy reduces anti-nutrient content.

The commodities that are provided to prevent and treat undernutrition, including micronutrient deficiencies, therefore need to be revised in the light of the current better understanding of nutritional needs, specific properties of certain foods, and bioavailability of micronutrients. With this in mind, WFP is working on the following revisions of its food basket (see Figure 1):

**Figure 1:** Revisions being made to WFP’s food basket

Current nutrition strategy (2007)

- 20–25% WFP food fortified
- General population
- Fortified food
- General population
- Improved fortified blended food (FBF)
- Pregnant + lactating women
- People with chronic illness
- General food basket: cereals, pulses/legumes, vegetable oil, salt, FBF
- General population
- Micronutrient powders
- Complementary food supplements
- Pregnant + lactating women
- Adolescent girls 6–59 months
- Children 6–59 months
- Children 6–59 months
- Children under 2 years
- Children under 2 years
- People with chronic illness
- People with chronic illness
- 80–100% of micronutrient and other nutritional needs met

Projected nutrition strategy (2010–2012)
a) Improving FBFs, such as Corn Soy Blend (CSB) and Wheat Soy Blend (WSB), by improving the micronutrient profile and dehulling the soy beans (to reduce fiber content), as well as by assessing the possibility of adding some additional ingredients (milk powder, oil, and sugar) to this improved FBF during production, rather than as separate commodities, to increase the energy density for consumption by young (6–23 months) or malnourished children (for further information see Brief No. 4).

b) Continuation and expansion of food fortification for the general population as well as for specific target groups through

- fortification of staples (wheat and maize flours, potentially rice), oil and condiments (continuation of oil and salt fortification with vitamins A and D, and iodine, respectively);
- home- or point-of-use- fortification using micronutrient powder (MNP), such as MixMe™ and Sprinkles™, trademarked by DSM and the Sprinkles Global Health Initiative, respectively.

c) Development, piloting and evaluation of the use of ready-to-use foods (RUFs) for treating moderate acute malnutrition. Interest is growing in the application of ready-to-use foods, such as pastes (derived from RUTF) and bars or compressed biscuits (providing ~500 kcal/d) for the treatment of moderate acute malnutrition among under-fives. Their distribution should be targeted, unless this is not feasible due to safety, accessibility, or health system capacity issues. These products replace FBFs. New products of a certain specification should only be used when there is good reason to expect that they have the same or a better impact on moderate acute malnutrition than FBFs, and their transportation, storage, distribution, and use is more convenient. Supplementary Plumpy™ is a good example of a product that is expected to be effective and can be used for the treatment of moderate acute malnutrition (see Brief No. 5).

d) Development, piloting and evaluation of complementary food supplements (CFS) to add essential nutrients to the daily diet or food ration of specific target groups. CFSs promote growth and immunity and address micronutrient deficiencies. They can be in powder or paste form, providing essential nutrients (high quality dairy or soy protein, essential amino acids, essential fatty acids), micronutrients (vitamins, minerals), and macro-minerals (calcium, potassium, phosphorus and magnesium) in a daily portion of 10–50 g, depending on the nutritional needs of the target population. CFSs should typically be provided through blanket distribution to under-twos, under-threes or under-fives in populations that consume a diet with very few animal-source and fortified foods. Where food insecurity is low but stunting prevalence is high, the CFSs should mainly be targeted at under-twos and just provide the essential nutrients (i.e. 10–20 g/d should be sufficient). Where food insecurity and the risk of malnutrition is high, the age group should be widened to all under-threes, and provide

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2This statement was endorsed by the participants in a meeting on the treatment of moderate malnutrition organized by WHO, in collaboration with WFP, UNICEF and UNHCR, in Geneva, on 30 Sept – 3 Oct, 2008.
a larger amount of nutrients and energy (CFS of up to 50 g/d, ~250 kcal). Most CFS products are still under development or being tested for exact impact. Plumpy’Doz™, which is used for children at high risk of malnutrition during the lean season (46 g/d), and Nutributter™, TopNutri™ and MixMe Plus™ ‘(Nutributter™, TopNutri™ and MixMe Plus™ are trademarked by Nutriset, Compact and DSM, respectively), which are used for improving dietary quality, are examples of CFS products currently under development.

Potentially, the latter two categories of products could also be used among pregnant and lactating women, and the chronically ill (people suffering from TB and/or HIV/AIDS).

The improvements to currently-used food commodities, such as CSB, and the use of new commodities have cost implications. They result from the higher costs of the commodities themselves, and the additional programming requirements, such as training and the promotion of new foods. On the other hand, there may also be savings because the new commodities are only provided for the targeted individuals (an accompanying family ration, if provided, would consist of other cheaper foods, not the special commodity) and transportation, storage, and spoilage will be lower due to lower volumes and better packaging (for further information on costs of special food commodities, see Appendix 2).

3. Programmes, which commodities to choose?

Some of the commodities described above (see also Appendix 1) are widely available but in need of improvement (especially FBFs), others have proven to be very effective for alleviating micronutrient deficiencies (MNPs, such as MixMe™ and Sprinkles™). Others still, i.e. RUTFs, have become the preferred choice for treating severe acute malnutrition, due to which demand is currently higher than production capacity. The rest are still being developed and tested (most RUFs and CFSs).

Table 1 shows different kinds of programmes and the most appropriate product options. Most of the newer options are not yet available at large scale, and more information is required about their precise impact on nutritional status and health, especially in comparison to the long-used FBFs, and when used under programmatic circumstances. Therefore, their use in a few programs at a time is encouraged, and this should be combined with strong monitoring and evaluation with carefully controlled testing of impact performed concurrently (possibly in another location; see also commodities section above).
### Table 1: Programmatic interventions for different target groups with various food commodities

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Purpose and target groups</th>
<th>Commodities and considerations</th>
</tr>
</thead>
</table>
| Blanket supplementary feeding (this is complementary to the family diet and/or the general food ration) | • To reduce high or increasing wasting prevalence (≥ 15%) in highly food-insecure and difficult to reach populations  
• To treat the most vulnerable of the population at high risk of developing undernutrition, such as young children (under-twos or under-threes), pregnant and lactating women, and the chronically ill (people suffering from TB and HIV/AIDS) | • Blanket supplementary feeding of all under-twos/threes is likely to be more effective to treat the population than targeted supplementary feeding of individual already-underweight under-fives  
• In certain situations, identifying and reaching individual moderately-malnourished children may not be possible.  
• Provide an RUF of 250 kcal/d, such as Plumpy’Dor™. RUFs that supply more energy, such as Supplementary Plumpy™ (500 kcal/d), should only be used for blanket feeding where targeting of individual malnourished children is impossible, and prevalence of moderate acute malnutrition very high  
• Alternatively, provide improved FBFs that also include additional dairy protein, oil, and sugar for under-twos (if necessary, the oil and sugar may be given separately)  
• Use standard FBF with sugar and oil (least preferred)  
• Add allowance for sharing (500–1000 kcal/d/family); when FBFs are provided, the take-home ration of FBF of 1000-1200 kcal/d allows for some sharing; when another, more expensive, specially-formulated food is provided, the family should preferably receive different foods (flour/pulses/oil) to address food insecurity and sharing |
| Targeted supplementary feeding | • Children under five years of age with moderate acute malnutrition or underweight  
• Vulnerable groups, such as people in HIV/AIDS or TB treatment programs | • A ready-to-use paste, compressed biscuit or bar, that provides 251–500 kcal/d, such as Supplementary Plumpy (500 kcal/d)  
• Improved FBF with dairy protein, oil and sugar  
• Standard FBF mixed with sugar and oil (least preferred)  
• Use of a new commodity should be combined with carefully conducted monitoring and evaluation, and concurrent testing of impact (may be in another location)  
• Add allowance for sharing (500–1000 kcal/d/family) (see above) |
| Dietary improvement – using complementary food supplements (CFSs) or specific high-quality foods for specific target groups | • Young children (< 5 yrs)  
• Pregnant and lactating women  
• Chronically ill  
All these groups would not meet their needs with general food fortification because their micronutrient needs are too high compared to the amounts of micronutrients that they can get from the consumption of foods that are fortified for the general population, such as wheat flour, cooking oil etc. | • These relatively new commodities for home-fortification of an individual’s meal can be used where it is primarily dietary quality that is compromised, and should be used in combination with nutrition counseling  
• The appropriate age group for a 20 g (110 kcal/d) spread such as Nutributter™ is < 2 yrs because it contains nutrients that are particularly needed by this age group for their growth and development; powdered CFSs (10–20 g/d) may be provided to a slightly wider target group, unless it specifically contains the nutrients most critical for under-twos; and MNP can be used by anyone with inadequate MN intake |
| Therapeutic feeding (note that this is not normally implemented by WFP) | Children with severe acute malnutrition (SAM) | • Provision of RUTFs to cases of SAM without complications (requires community-based management of SAM)  
• F100, F75, where RUTF is not available or in case of clinical complications  
• BP100 |
| Food distribution for the general population, including adequately fortified foods | Entire family, for example, as in refugee or acute emergency situation as well as Food For Asset and Social Safety Net programmes | Suited to situations of extreme vulnerability where populations cannot provide for their own food needs. In order to meet the needs of specific target groups, commodities mentioned under ‘dietary improvement’ may be added |
### Appendix 1: Various food commodities available or required for addressing malnutrition problems among different age groups

<table>
<thead>
<tr>
<th>Food commodities</th>
<th>Examples</th>
<th>For Whom?</th>
<th>Problem to be addressed</th>
<th>What will the commodity do?</th>
<th>Proven solution or under development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ready to Use Therapeutic Food (RUTF) (note, WFP does not implement programs for SAM)</td>
<td>• Plumpy’Nut™</td>
<td>✓</td>
<td>Severe Acute Malnutrition (SAM)</td>
<td>Restore weight loss and immunity, stimulate growth and development</td>
<td>• Proven, effective and practical as it can be administered at home or in the community</td>
</tr>
<tr>
<td></td>
<td>• BP 100</td>
<td>✓</td>
<td>Severe Acute Malnutrition (SAM)</td>
<td></td>
<td>• Proven</td>
</tr>
<tr>
<td></td>
<td>• Plumpy’Nut™ and BP100</td>
<td>✓</td>
<td>Moderate Acute Malnutrition (MAM)</td>
<td></td>
<td>• When RUTF is not available. Proven. Use smaller amount (90 g/d). But, cost-effective.</td>
</tr>
<tr>
<td>Therapeutic Milk (F75 and F100)</td>
<td>• F75 and F100</td>
<td>✓</td>
<td>Severe Acute Malnutrition (SAM)</td>
<td>Restore weight and immunity, stimulate growth and development</td>
<td></td>
</tr>
<tr>
<td>Ready to Use Foods (RUFs)</td>
<td>• Supplementary Plumpy™, Indian RUF</td>
<td>✓</td>
<td>Moderate Acute Malnutrition (wasted children)</td>
<td>Recover weight and immunity, stimulate growth and development</td>
<td>• Note that Indian RUF is still being developed and tested</td>
</tr>
<tr>
<td></td>
<td></td>
<td>✓</td>
<td>Moderate Acute Malnutrition (wasted children)</td>
<td></td>
<td>• Bars and compressed biscuits could also be developed for treating the moderately wasted</td>
</tr>
<tr>
<td>Fortified Complementary Food</td>
<td>• Porridge based on cereal(s), milk, sugar, oil, MNs</td>
<td>✓</td>
<td>High risk of developing growth faltering and micronutrient deficiencies, especially when lacking animal-source and fortified foods</td>
<td>For growth, immunity and development</td>
<td>• Many commercial examples exist, some including milk, some to be prepared with milk, largely for wealthier consumers.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td>• Few non-commercial fortified porridges with milk exist</td>
</tr>
<tr>
<td></td>
<td></td>
<td>✓</td>
<td>Moderate Acute Malnutrition (wasted children)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fortified Blended Food (cereal + plant protein source + MNs)</td>
<td>• Corn Soy Blend</td>
<td>✓</td>
<td>Moderate Acute Malnutrition (wasted children)</td>
<td>Gain weight and micronutrients</td>
<td>• Current specifications are inadequate. Revised specifications have improved content and bioavailability of micronutrients, and less fiber (see Brief No. 4)</td>
</tr>
<tr>
<td></td>
<td>• Wheat Soy Blend</td>
<td>✓</td>
<td>Moderate Acute Malnutrition (wasted children)</td>
<td></td>
<td>• For under-twos and children with moderate acute malnutrition, add milk, oil, and sugar to improved FBF during processing. This can be used at limited scale while impact compared to RUFs is being tested</td>
</tr>
<tr>
<td></td>
<td></td>
<td>✓</td>
<td>Falttered linear growth and micronutrient deficiencies in underweight children, in case of food/nutrition insecurity</td>
<td>Provide energy, protein and micronutrients</td>
<td></td>
</tr>
</tbody>
</table>

✓ good option for this age group

✓ can be considered for this age group if no better option can be realized
<table>
<thead>
<tr>
<th>Food Commodities</th>
<th>Examples</th>
<th>For Whom? Children aged 6–23 mo – 24–59 mo</th>
<th>Problem to be addressed</th>
<th>What will the commodity do?</th>
<th>Proven solution or under development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complementary Food Supplement (CFS)</td>
<td>• Lipid-based nutrient supplement (LNS), such as Nutributter®</td>
<td>✓</td>
<td>• High risk of growth faltering and micronutrient deficiencies, especially when lacking animal-source or fortified foods</td>
<td>Growth, development, immunity and preventing micronutrient deficiencies</td>
<td>• Being developed and tested • High-quality cost-effective CFS is needed • ~20 g/d is typically given in addition to (local) diet • LNS contains micronutrients, essential fatty acids (important for mental and motor development) macro-minerals (calcium, phosphorus, potassium, magnesium), and dairy protein (latter two are important for linear growth, i.e. height)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>✓</td>
<td>• Moderately stunted children</td>
<td>Increase linear growth and immunity, and address micronutrient deficiencies</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>✓</td>
<td>• High risk of existing growth faltering and micronutrient deficiencies, especially when lacking animal-source or fortified foods</td>
<td>Enhance growth, immunity and development and prevent micronutrient deficiencies</td>
<td>• Powdered supplement can have same composition as lipid-based supplement (LNS), except for relative amount of essential fatty acids, and powdered supplements that currently exist also do not include dairy protein</td>
</tr>
<tr>
<td></td>
<td>• Plumpy Doz®</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Indian RUF</td>
<td>✓</td>
<td>• High risk of developing micronutrient deficiencies, poor growth and diseases, in case of food insecurity or lean seasons</td>
<td>For growth, immunity and development</td>
<td>Approx 50 g/d (250 kcal) is typically given in addition to (local) diet • Composition comparable to LNS but in larger amounts</td>
</tr>
<tr>
<td></td>
<td>• MixMe®</td>
<td>✓</td>
<td>• Too high prevalence of micronutrient deficiencies (i.e. anemia prevalence in under-fives &gt; 30%)</td>
<td>Treatment and prevention of micronutrient deficiencies</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Sprinkles®</td>
<td>✓</td>
<td>• High risk of developing micronutrient deficiencies, in case of (relative) food security, where prevalence of stunting among under fives is limited (&lt; 20%)</td>
<td>Prevention of micronutrient deficiencies</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• MixMe®</td>
<td>✓</td>
<td>• High risk of developing micronutrient deficiencies</td>
<td>Prevention of micronutrient deficiencies</td>
<td>• Available formulations are used and effective • Specific formulation has been developed by WFP and DSM for malaria-endemic areas (first use will be in Kakuma, Kenya)</td>
</tr>
<tr>
<td></td>
<td>• TopNutri®</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

✓ good option for this age group
Appendix 2: Improving the quality of the food basket – what do the new commodities cost?

Different commodities have been developed for improving the food basket for specific target groups (see Ten Minutes to Learn About briefs). The table below provides an estimate of the costs of some of the specific commodities, an indication of the target groups and the length of time that the products would need to be consumed, and an indication of the total costs of the product.

It should be noted that the different combinations of diet and additional food commodity are not interchangeable because they serve different purposes and different target groups; the estimates do not include programming costs, either for transport and distribution or for training and social marketing; and, the amounts recommended for consumption per day are per individual child, not including sharing with the family.

Thus, the information is intended to provide a rough idea of the costs of the diet/ration and special food commodities. Precise product costs should be enquired about when planning a program, details about target group, food commodities to be provided, and duration should be planned based on local circumstances, and costs of program implementation and transport and handling of the commodities will also need to be built in.

Table: Costs of specific commodities, per dose and per number of dosages required per year (to complement the daily diet) or per treatment

<table>
<thead>
<tr>
<th>Commodities for improving dietary quality</th>
<th>Cost per daily dose (USD)</th>
<th>No. dosages required per year or per treatment</th>
<th>Total cost/yr or per treatment (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MNP (minimum 15 MNs)</td>
<td>0.025 for single-dose packaging 0.0045 for multi-dose packaging (20 or more dosages per sachet, for example for schools)</td>
<td>180/yr for non-malaria areas 365/yr for malaria endemic areas (because it requires a formulation with lower amount of iron)</td>
<td>Non-malaria, individual dosing: 4.50 Non-malaria, group dosing: 0.81 Malaria area, individual dosing: 9.13 Malaria area, group dosing: 1.64</td>
</tr>
<tr>
<td>CFS - powdered (MNs + macro-minerals, proteins, enzymes) ≤ 10 g</td>
<td>0.045? for single-dose packaging and less for multi-dose jar/bag packaging</td>
<td>Depending on content, same as above</td>
<td>Cost approximately twice as high as above, but due to very limited experience with this kind of product, difficult to estimate</td>
</tr>
<tr>
<td>LNS, 20 g (MNs + macro-minerals, proteins, fatty acids)</td>
<td>0.11 (Nutributter™)</td>
<td>180 (daily from 6–11 mo of age) 365 (daily from 6–17 mo of age)</td>
<td>19.80 39.60 Note: Duration varies by population and prevalence of malnutrition</td>
</tr>
<tr>
<td>LNS, 45–50 g</td>
<td>0.20 (Plumpy’Doz™)/ 0.13 (Indian RUFC)</td>
<td>Approx. 120 (daily use for 4 mo/yr)</td>
<td>24.00 (Plumpy’Doz™)/ 15.60 (Indian RUFC)</td>
</tr>
<tr>
<td>LNS, 90 g</td>
<td>0.41 (Plumpy’Nut™)/ 0.33 (Supplementary Plumpy™)/ 0.26 (Indian RUFC)</td>
<td>90 (daily dose, till recovered from moderate acute malnutrition)</td>
<td>36.90 (Plumpy’Nut™)/ 29.70 (Supplementary Plumpy™)/ 23.40 (Indian RUFC)</td>
</tr>
</tbody>
</table>
**Micronutrient Powder (MNP)** for home-fortification or point-of-use fortification, i.e. adding 1 RNI of at least 15 vitamins and minerals to food that is ready for consumption. Can be targeted at any target group (underfives, school children, pregnant and lactating women, or entire population). Also known as MixMe™ or Sprinkles™.

**Complementary Food Supplement (CFS, powdered, ≤ 10g)**. Examples of this product are TopNutri (from Compact, using soy protein as carrier) and MixMe Plus from DSM (malt flour as carrier). Neither have been tested for nutritional impact yet. In addition to micronutrients, these products also contain macro-minerals such as potassium, calcium, magnesium from which 100’s of mg are needed, and high-quality protein (e.g. soy protein isolate), amino acids, and/or enzymes (e.g. malt, α-amylase) for reducing viscosity.

**Lipid-based Nutrient Supplement (LNS)** is also a complementary food supplement. It is lipid-based (i.e. a paste, often containing oil, peanut and protein source) and contains MNs, macro-minerals, high quality protein (milk powder, whey powder or soy protein isolates), essential fatty acids (e.g. from soy bean oil, canola oil), to be added to the daily diet to ensure that nutrient needs are met:
- Dosage of 20 g/d (~110 kcal) is regarded as complementary to basic diet of young children (6–23 mo);
- dosage of 45–50 g/d (~250 kcal) is regarded as required for blanket treatment of population (6–23 or 6–36 or 6–59 mo) in case of severe food insecurity/lean season to avoid deterioration to severe (acute) malnutrition;
- dosage of 90 g/d (~500 kcal) is used for treatment of moderate acutely malnourished (WHZ < -2 and ≥ -3) children.

Other forms of ready-to-use food, such as compressed biscuits/bars, can serve the same purpose as LNS. Note that Indian RUFC is still under development and it is therefore not yet known whether it is interchangeable with Plumpy’Doz or with Supplementary Plumpy or Plumpy Nut (i.e. LNS of 45 or 90 g/d, respectively).

Note that the cost of improved CSB with additional milk powder, oil and sugar (see Brief No. 4) has not been listed here because it is not being produced at scale yet (pending production trials) and it can either be provided as one product or it could be provided as CSB mixed with milk powder to which sugar and oil are added just before distribution.