Nutritional Requirements for small children

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Introduction

For the wellbeing of any society a stable guaranteed perspective to grow and be part of future developments is an adequate nutrition for any newborn infant and child. One of the most serious disasters of countries in developing areas of the world is the fact, that this goal is far from being met by the momentary situation. Well-nourished babies and children are the basis of the future fate, education and planning of an independent life. Responsible governments are therefore forced to solve these problems for the next future in a globalised world. Any program has to be adapted to the local, agricultural tradition and customs. This has to be met by supporting the very poor, who might not have access to the mandatory food supply. Any analysis about infant and child nutrition has to start with the nutritional status of the pregnant woman. The majority of infant under-nutritional problems is frequently connected to small for gestational age birth weight and retarded weight gain afterwards. It is therefore essential to cover the nutritional status of women in the very beginning. A secondary aspect with similar importance is education about the needs of “a” normal” diet for the mothers and the children. Any official program has to combine supplementation of food with educational principles of understanding. The following aspects shall shortly be covered:

- Incidence of malnutrition,
- morbidity and mortality in infancy,
- consequences of the social aspects,
- incidence of diseases in connection with malnutrition, e.g. infections,
- local customs of nutrition inclusive cereals, milk-products and meat,
- introduction of a nutritional mix (15)
What are the minimum requirements in protein, fat and carbohydrates?

What are the methods for an overall supply of these food-contents?

Which conclusions can be drawn out of these arguments in an area like the Sub-Saharan region?

Incidence of malnutrition in Central Africa

In a nutritional profile on Nutrition in Ghana a current estimate states, that about 28% of children under 5 years of age are underweight, as compared to Senegal (20%) and 12% in the Ivory Coast (2). Another number demonstrates this aspect even more: almost 45% of the mortality rate in young infants is always somehow connected to malnutrition (2). In the above mentioned survey it is stated that only up to 6% of mothers exclusively breast feed their babies for the first 6 months. In all western countries the overwhelming data demonstrate that a 6 month period of complete breast feeding, as recommended by the WHO, by otherwise healthy mothers, is in general sufficient for an adequate weight gain of a newborn child. The European Pediatric Gastroenterology Society recommends supplementary feeding at the age of 4-6 months. The incidence of diseases like serious infections is particularly correlated to an ongoing malnutrition (13). Infectious diseases show a much more severe coarse than in well nourished babies and infants. This holds for bacterial, virus and parasite infections as well. One of the major consequences of this fact is the disastrous situation for the families, who lack social support, regular living cost supply and lack of any substantial help. The consequences for the sociological structure are evident. Young mothers have frequent pregnancies, with high mortality rate of their children and a devastating somatic and psychosocial separation of these families. Further consequences are limited school training for
the children and limited chances for an independent and self supporting life of the individual grown ups.

**Acute diseases**

Malnourishment is aggravated by acute disturbances in salt and water regulation. Particular in tropic regions like the Sub-Saharan region acute deficits in water and salt intake bring small infants immediately into acute life threatening danger. Acute gastrointestinal infections with or without high fever lead to salt and water deficits, which can be followed by an extreme weight loss in already malnourished children. Within a few hours an exceptional deficit in extra-cellular fluid leads to a life-threatening dehydration, which needs simple but emergency steps, like oral rehydration by tube feeding. The recommended solutions by the WHO contain sufficient salt to reinstall the normal extra-cellular status. The measures to be taken can be adapted by nurse practitioners and parent teaching. The lack of knowledge with these simple methods is part of the high mortality rate under these circumstances. Sterile salt solutions (Sodium 60 to 90 mmol/L) and Glucose(5%) are easy to handle and should be available in any drugstore or department store. In a setting of a widespread availability even in rural areas and small villages, life saving results can be reached by a tremendous number of children. This goal can mainly be reached by continuous training and teaching young families, in particular the women.

**Local nutritional variety**

Any report on the nutritional rules and recommendations has to take into account that the local availability of a variety of foods differ quite tremendously. It is even more important to consider, that the breast fed child may lack some micronutrient contents as the mother is dependent on the local available grains, cereals and eventually meat. An analysis from
**Benine** school-children (8) showed impressively, that post and pre - harvest energy intake was seasonal not variable, but in general showed in general a low caloric intake with low protein content. This could be aggravated in years of extreme draughts. As the study by Mitchipike et al. showed in 2008 (8), the investigated schoolchildren showed a high incidence of stunting and iron deficiency. The children, who attended school regularly were less stunted than the ones who did not attend school. The average daily diet for children was delivered in three 3 meals. The meal consisted of a thick porridge of maize, sorghum or millet during the post- harvest season or a mixture of these foods and dried cassava flour during the preharvest season. The results of this controlled study in **Benine** school - children is documented partially in the following tables and figures.

The food was cooked by mothers for the whole family. Seasonality was not a real important impact on the average food intake. Cereals were the main sources of energy intake, followed by yam in the post harvest season and by cassava in the pre harvest season. This added up to 75 % of the energy intake for the children. In contrast, the fraction of animal protein intake was marginal. This reflects the limited supply of Iron and Zinc, as animal products represent only a small fraction of the regular daily food. and cereal content of Iron and Zinc is rather low. The overall energy intake in this study mounted up to 5,0 MJ/ d, which may even be as low as 2 SD lower in individual children Table 1 represents the average energy and protein intake in the two groups, which showed difference.
Table 1: Energy and protein intake in 2 groups of schoolchildren in Beninie before and after the harvest season

<table>
<thead>
<tr>
<th></th>
<th>Preharvest</th>
<th>Postharvest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy (MJ/d)</td>
<td>5.0</td>
<td>5.3</td>
</tr>
<tr>
<td>Energy (kJ/kg per day)</td>
<td>283</td>
<td>275</td>
</tr>
<tr>
<td>Protein (g/d)</td>
<td>29</td>
<td>31</td>
</tr>
<tr>
<td>Fat (g/d)</td>
<td>20</td>
<td>26</td>
</tr>
<tr>
<td>Carbohydrates (g/d)</td>
<td>235</td>
<td>241</td>
</tr>
</tbody>
</table>

In comparison to a study in Kenya these numbers are a little bit higher, but in general not sufficient. The fact, that the diet has normally a high fibre content, the energy availability might be even lower. The fraction of protein intake (10%) and fat (15%) was low and therefore not well balanced. The low fat content may consequently be followed by a low reabsorption rate of fat-soluble vitamins.
### Seasonality in food consumption of Beninese children

**Table 2** Daily intakes of foods (g/d) in the post- (November/December 2002) and pre-harvest (June/July 2003) seasons: school-aged children (6–8 years old), northern Benin

<table>
<thead>
<tr>
<th></th>
<th>All (n 75)</th>
<th>Boys (n 41)</th>
<th>Girls (n 34)</th>
<th>School attendance (n 54)</th>
<th>No school attendance (n 21)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Median P95</td>
<td>Median P95</td>
<td>Median P95</td>
<td>Median P95</td>
<td>Median P95</td>
</tr>
<tr>
<td><strong>Post-harvest season</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maize</td>
<td>82 315</td>
<td>82 320</td>
<td>90 315</td>
<td>115 323</td>
<td>45 265</td>
</tr>
<tr>
<td>Millet</td>
<td>0 233</td>
<td>0 243</td>
<td>0 158</td>
<td>0 235</td>
<td>0 239</td>
</tr>
<tr>
<td>Sorghum</td>
<td>0 202</td>
<td>0 216</td>
<td>0 180</td>
<td>0 202</td>
<td>0 253</td>
</tr>
<tr>
<td>Cassava</td>
<td>0 86</td>
<td>0 112</td>
<td>0 80</td>
<td>0 82</td>
<td>1 104</td>
</tr>
<tr>
<td>Yam</td>
<td>236 734</td>
<td>233 1136</td>
<td>244 706</td>
<td>232 864</td>
<td>252 619</td>
</tr>
<tr>
<td>Beans</td>
<td>0 63</td>
<td>0 51</td>
<td>4 71</td>
<td>0 71</td>
<td>5 52</td>
</tr>
<tr>
<td>Bambara groundnuts</td>
<td>10 107</td>
<td>10 112</td>
<td>7 103</td>
<td>11 111</td>
<td>2 96</td>
</tr>
<tr>
<td>Peanut</td>
<td>6 42</td>
<td>6 45</td>
<td>6 39</td>
<td>6 49</td>
<td>5 40</td>
</tr>
<tr>
<td>Vegetables</td>
<td>12 63</td>
<td>13 65</td>
<td>10 47</td>
<td>13 68</td>
<td>8 58</td>
</tr>
<tr>
<td>Fruits</td>
<td>0 53</td>
<td>0 77</td>
<td>0 50</td>
<td>0 58</td>
<td>0 62</td>
</tr>
<tr>
<td>Animal products</td>
<td>4 80</td>
<td>1 75</td>
<td>8 109</td>
<td>3 69</td>
<td>4 122</td>
</tr>
<tr>
<td><strong>Pre-harvest season</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maize</td>
<td>82 336</td>
<td>84 385</td>
<td>41 282</td>
<td>61 341</td>
<td>115 365</td>
</tr>
<tr>
<td>Millet</td>
<td>7* 233</td>
<td>0 250</td>
<td>23* 165</td>
<td>11* 234</td>
<td>0 250</td>
</tr>
<tr>
<td>Sorghum</td>
<td>20* 344</td>
<td>16 383</td>
<td>33 207</td>
<td>34* 364</td>
<td>0 304</td>
</tr>
<tr>
<td>Cassava</td>
<td>70* 217</td>
<td>63* 212</td>
<td>71* 240</td>
<td>66* 216</td>
<td>87* 236</td>
</tr>
<tr>
<td>Yam</td>
<td>0* 242</td>
<td>0* 368</td>
<td>0* 170</td>
<td>0* 268</td>
<td>0* 275</td>
</tr>
<tr>
<td>Beans</td>
<td>3 82</td>
<td>2 96</td>
<td>6 59</td>
<td>4 87</td>
<td>3 80</td>
</tr>
<tr>
<td>Bambara groundnuts</td>
<td>5 67</td>
<td>5 72</td>
<td>7 67</td>
<td>4 54</td>
<td>15 75</td>
</tr>
<tr>
<td>Peanut</td>
<td>21 19</td>
<td>17 41</td>
<td>21 21</td>
<td>21 21</td>
<td>1 18</td>
</tr>
<tr>
<td>Vegetables</td>
<td>36* 96</td>
<td>33* 102</td>
<td>41* 101</td>
<td>36* 108</td>
<td>34* 90</td>
</tr>
<tr>
<td>Fruits</td>
<td>0 72</td>
<td>0 84</td>
<td>0 21</td>
<td>0 72</td>
<td>0 82</td>
</tr>
<tr>
<td>Animal products</td>
<td>2 44</td>
<td>2 41</td>
<td>4 47</td>
<td>2 47</td>
<td>2 42</td>
</tr>
</tbody>
</table>

Table 2 (8)

**Fig 1** Diet contents in **Benine** schoolchildren in the preharvest season (8)
Fig 2: Die contents in Benine schoolchildren in the postharvest season (8)

Table 3: The estimated average requirement (EAR) in Protein, Iron and Zinc (8)

<table>
<thead>
<tr>
<th>Micronutrients</th>
<th>EAR</th>
<th>% below the EAR</th>
<th>RNI</th>
<th>% below the RNI</th>
<th>Protein* (g/d)</th>
<th>Fet (mg/d)</th>
<th>Znt (mg/d)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Post-harvest season</td>
<td>Pre-harvest season</td>
<td>Post-harvest season</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>20</td>
<td>21</td>
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<td>4</td>
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<td>7</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>23</td>
<td>36</td>
<td>61</td>
</tr>
</tbody>
</table>

Post-harvest season, November/December 2002; pre-harvest season, June/July 2003; EAR, Estimated Average Requirement; RNI, Recommended Nutrient Intake for Fe and Zn and safe level of protein intake.
*Protein requirements were calculated based on the actual weight and age of the children and the FAO/WHO/UNU (1985) recommendations
†Fe and Zn requirements were derived from the FAO/WHO (2002) recommendations
‡Median basal requirement for a diet with intermediate bioavailability

Micronutrients

The dietary content of trace elements like Vitamin D, Iron, Zinc and others play a more important role in recent years. The daily requirements of these elements are partially not reached by various reasons. The increased propagation of breastfeeding with all its advantages for the upraising of an infant is dependent on a well nourished nursing mother,
otherwise the malnourishment is directly transferred to the baby. The lack of Ca content in
the mothers diet is directly correlated to the limited amount of animal products, as one of the

major factors in the development of rickets and osteomalacia (10) The protection against
sunlight in small children together with the Ca-depletion and Vitamin D deficiency leads to a
higher incidence of rickets and phosphopenic osteopenia (10.11.). In the status of low
calcium intake, the Vitamin D dependency might even be higher than in well nourished
children in Western countries. An adequate Vitamin substitution is for the moment not at all
guaranteed for the general population in various countries. Even though the discovery of the
UV-dependent production of 25 OH Vitamin D in the 1930s this problem is by far not
solved, as the factors of breastfeeding, dietary adequate Ca supply and Vitamin D
substitution as combined factors have obviously led to an incidence increase of rickets.(10.11)
The prevalence of nutritional rickets seems to be a world wide problem, in North-America,
Europe as well as in developing areas. Various factors have shown to be responsible for this
increasing prevalence: Increased skin pigmentation, prolonged breast feeding, low Ca diet of
the nursing mothers and low Vitamin D supply for the infants and children(11) Religious
customs and atmospheric pollution, vegetarian diets and maternal Vitamin D deficiency have
aggravated this problem, particularly in the Indian subcontinent(10).

The various factors influencing the development of rickets are shown in Figure 3, with
the cofactors of Calcium deficiency in the diet, Phosphate loss in the kidney and nutritional
Vitamin D deficiency.
Fig 3: Schematic illustration of the pathophysiologic understanding of the development of Vitamin D deficient and calcipenic rickets (10)

In most parts of Africa diet is low in calcium and high phytate, where cereal staples are the major constituent of the diet and dairy products are expensive or unobtainable. In South Africa children and adolescents with rickets were found to have calcium intakes of between 150-250 mg/d, which were significantly lower than those of age-matched controls living in the same community( 11). In these children calcium supplementation was shown to heal the disease.

There have been various attempts worldwide to cope with the problem of micronutrient deficiency, as Vitamin D deficiency. The concept of the food multimix has been discussed in a recent publication by Zotor and Amuna(15), Table 4. They state, various initiatives by the South-African Government and International Agencies such as the UN, the industrial nations, the International Monetary fund, the World Bank and the World Trade
organisation to boost economic development, have so far failed to provide the much-needed solution to these challenges. Food insecurity, chronic hunger, starvation and malnutrition continue to affect millions of individuals throughout the developing world, especially the Sub-Saharan region. (15)

Table 3. A comparison of the energy and nutrient contents of nutrient-enriched food multimixes for weanlings and children that are based on common traditional foodstuffs with those of Ghanaian products (per 100g serving).

<table>
<thead>
<tr>
<th></th>
<th>Weanlings (6-9 months)</th>
<th>Nutrition rehabilitation (6-36 months): lower strength</th>
<th>Nutrition rehabilitation (6-36 months): higher strength</th>
<th>Weanmix</th>
<th>Koko®</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SE</td>
<td>Mean</td>
<td>SE</td>
<td>Mean</td>
</tr>
<tr>
<td>Proximate analysis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy density (kJ/g)</td>
<td>15.4</td>
<td>0.51</td>
<td>14.6</td>
<td>0.19</td>
<td>16.5</td>
</tr>
<tr>
<td>Energy (%) from:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protein</td>
<td>13.8</td>
<td>0.39</td>
<td>12.0</td>
<td>1.85</td>
<td>15.2</td>
</tr>
<tr>
<td>CHO</td>
<td>49.5</td>
<td>0.74</td>
<td>58.2</td>
<td>1.61</td>
<td>56.6</td>
</tr>
<tr>
<td>Fat</td>
<td>36.8</td>
<td>0.61</td>
<td>29.8</td>
<td>0.98</td>
<td>28.2</td>
</tr>
<tr>
<td>Percentage of EAR* per serving</td>
<td>46.3</td>
<td>36.3</td>
<td>41.0</td>
<td>45.2</td>
<td>40.2</td>
</tr>
<tr>
<td>Mineral content†</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of RNI‡</td>
<td>55.6</td>
<td>32.1</td>
<td>58.2</td>
<td>54.8</td>
<td>86.4</td>
</tr>
<tr>
<td>INQ</td>
<td>1.20</td>
<td>0.88</td>
<td>1.42</td>
<td>1.21</td>
<td>2.15</td>
</tr>
<tr>
<td>Vitamin content§</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of RNI‡</td>
<td>96.3</td>
<td>59.9</td>
<td>77.2</td>
<td>49.1</td>
<td>132</td>
</tr>
<tr>
<td>INQ</td>
<td>2.08</td>
<td>1.65</td>
<td>1.89</td>
<td>1.09</td>
<td>3.29</td>
</tr>
</tbody>
</table>

Table 4 (2)

The food multimix concept (FMM) introduces a new concept to explore alternate ways to food-related problem-solving. The FMM is an innovative approach that makes better use of traditional food sources as a tool to meet community nutritional needs. Traditional food preparations and locally available cheap and affordable staples like fruits, pulses, vegetables and legumes in the formulation of nutrient enriched multimixes are been introduced.
Developed recipes can provide up to 40% of the daily nutritional requirements of vulnerable groups, including patients with HIV/AIDS and children undergoing nutritional rehabilitation. Food security is defined as the situation in which all individuals and communities at all times have physical, social and economic access to sufficient, safe, and adequate food that meets energy and nutrient requirements for an active and healthy life, and it remains elusive for many millions of individuals in developing countries. Acute interventions often fail to meet the real goals. The majority of food interventions focus on food energy, with an average ration providing approximately 5.02 MJ/d, a shortfall of \( \geq 2.92 \) MJ/d for an average adult, which is more than 30% less the calculated need. Food aid rations are often imported grains, cereals and legumes. The pitfall is that this does not take into account the local traditional and commonly-consumed food ingredients. Rations that comprise cereals and grains and oils, although energy dense, do not provide a good balance of the minerals and vitamins (Micronutrients) essential to drive the energy-giving metabolic processes that promote human growth, development and reproductive potentials. The natural coping strategy for the organism in extreme conditions of limited food supply and chronic hunger is to economise their energy use through hormonal and other metabolic adaptations. These adaptations seem partially to be protective for a while, but this may lead to metabolic different phenotypes, that might increase the risk and susceptibility to malnutrition and infectious diseases during periods of prolonged hunger and poverty, and non-communicable diseases, including type 2 diabetes and CVD during periods of affluence and/or nutritional adequacy. It is not surprising therefore that developing countries carry a much higher burden of morbidity and mortality from non-communicable diseases (78%) than food self-sufficient industrialised countries (58%). The concept to effectively use the locally-available and commonly-consumed but scant food resources to meet human needs is adapted by the FMM. The ingredients serve as natural fortification thus providing a nutrient-enriched end product at
Nutritional requirements for small children/M.Brandis

relatively low cost without the need for external fortification: The advantage is a higher acceptance rate by the target population and it is produced by local food processing technology. The composition of a typical food multimix and its cost per 300 g serving is illustrated in table 5

![Table 5](image)

Table 5 (15): The average cost for the multimix substitution on the basis of the local food customs

In table 6 the calculated energy, protein and mineral supply values in various groups of children by a multimix supplementation are illustrated.

Other micronutrient deficiencies may play a substantial role in the regular upraising of small children and may influence the health status of the breastfeeding mother. This is mainly the fact with Iron deficiency (6,14) The impact of iron deficiency and the degree regulates the haemoglobin content and the consecutive Oxygen saturation within the tissue of the individuals. It is obvious, that only severe degrees of anaemia in a disease state might influence the oxygen and by this energy supply. More and more, but still a disputed evidence seems to be the assumption, that iron per se has an impact on mental development, particularly in small infants. The regional food supply, basically consisting of vegetarian food with grains, cereals and nuts, local fruits but in average very little meat protein, is in principle an iron deficient diet. This has been addressed by Faber (6) and Murray et al(9) Again it has
to be pointed out, that all these factors are probably not efficient as single factors but
influence the body composition in respect to growth as well as mental development as
combined factors. Malnutrition as such and Vitamin D and iron deficiency additionally leads
to somatic inactivity with ends up with lethargy and influences a diminished somatic and
mental activity. There has been some debate about the effect of iodine deficiency. (14), which
may lead to thyroid gland hyperplasia and secondary hypothyroidism with again lethargy and
mental retardation. There have been no clear studies on the real importance of this
micronutrient part, but may still have some influence on the normal body activity,
particularly in small infants.

In malnourishment one acute problem always arises and that is the water supply. In
underweight infants and children of the young age an acute or even chronic drinking water
depprivation endangers these children frequently in a life-threatening effect. Acute
dehydration with severe disturbances in salt and water metabolism is one of most frequent
killers in young babies or small infants. This is a particular problem, as the measures to rescue
these children are frequently not available in rural areas, even though the WHO rules have
settled an effective principle plan for any nurse practitioner and even well educated young
parents. Oral substitution of an acute water and salt loss by gastrointestinal disease has been
adopted in the last 20 years quite successfully. Notwithstanding the knowledge and
competence of local health workers, quite a few children sometimes reach too late the
treatments options. In a malnourished child, the water and electrolyte reserve of the extra-
cellular fluid space is very limited, leading in a 1 year or 2 year old infant to a loss of 20 to 30
% in a few hours. This leads to hypovolemia, shock, drowsiness and a life-threatening status.
Emergency steps have to be taken, either by oral Electrolyte solutions, if possible, or finally by
intravenous infusions in a setting, where this is possible. By adequate means the majority of
children could be rescued with cheap and simple methods(1). The prevention of such acute
Nutritional requirements for small children/M.Brandis

disturbances in salt and water metabolism is basically connected to an adequate nutrition and regular clean water and electrolyte supply. Any acute loss by the gastrointestinal tract in combination with fever indicates always an emergency case to realise the chance of quick recovery.

| Table 6: The comparison of the multimix program in comparison with a WHO program(15) |

Supply problems

It is evident, that with all the new information of requirements of nutrition the major factor of malnutrition is lack of access to the basic need for the essentials of nutrition. The distribution of the local accessible food ingredients is the decisive factor, which could be solvable with adequate organisation. The various governments have to install a regular system of equal distribution of the major food structure within their country. This has to take into account the local agricultural tradition as well as emergency steps in climate
disasters or war disruptions. The main factor in the pitfalls of adequate distribution is not so much the lack of resources but rather a lack of infrastructure in the most prominent regions of the world. All international activities to help starvation has to use the local facilities rather than import nutritional substitutes which endanger the own agricultural circulation,
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Conclusion

Nutritional aspects of infants and small children in developing areas of the world have
to take into account a variety of factors:

1 Malnutrition is a frequent problem in areas with social deprivation and long
persisting poverty. This holds true for countries in Africa, in special the Sub-Saharan region,
for Latin-America and the Indian Subcontinent as well as parts of Asia.

2 International support programs with food supply for the individual deprived
population have frequently failed, as the locally used food supply and customs is sometimes
neglected.

3 Any future program has to be adapted to the local customs and the available natural
food sources, which include grain, cereals, legumes and fruit. As this selection of natural food
lacks sometimes the necessary protein content as well as the micronutrients like Vitamin D,
Iron and or and Zinc additional supply should be organised, for example with FMM.

4 The adequacy of a normal energy based and protein as well micronutrient adapted
diet substitution is the precondition of the future well being of a society. The investment for
the new generation is mandatory for the whole world.

5 Governments have the responsibility in protecting their next generation, as a basic
normal food supply gives any newborn child the only adequate chance for a future
independent life. Ongoing poverty and socioeconomic deprivation limits all the potentials
for developing countries to adapt to the needs of an economic strength.

6 Micronutrient deficiencies like Vitamin D-deficient rickets, Calcium deficiency,
Iron deficiency and Zinc deficiency might be influential for retardation of mental
development, which again limits the future well being of a society.
References


2. Center for Social Policy Studies University of Ghana


