

# Malnutrition and school feeding programmes

## Abstract

Assessing national nutrition status is important due to the concern caused by malnutrition. The present article explores the questions and limitations associated with assessment of nutritional status in a community and the role of national school feeding programme to improve health. Nutritionists have been using for decades biological indicators (anthropometric, biochemical and clinical) and social determinants as essential parameters, in comparison with predetermined standards, but rarely consider that manifestations of nutrition deficiencies may only occur in severe cases and in the future. There is as yet no single effective approach to malnutrition management and it is unlikely that a single delivery system would suit all situations worldwide. Data on the most effective time and type of intervention are still lacking. Throughout decades United Nations initiated many Plans towards fighting hunger and recently for the Sustainable Development Goal of Zero Hunger by 2030. We set low expectations for the outcome of these international plans since most of the financial investments never fully reach the people in need. The malnutrition situation is worsened by the well-known conflict, socio-economic and climatic shocks, which affect production and access to key resources. Malnutrition and hunger must be tackled from infancy, preferably in programmes gathering the whole community of farmers around each school. We briefly review this complex approach and some positive outcomes.

**Keywords:** malnutrition, school feeding programmes, governance, hunger

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## Introduction

The pledge made by all signatories of the Rome Declaration on World Food Security at the World Food Summit in 1996 was to eradicate hunger in all countries, with an immediate view to reducing the number of undernourished people to half their present level no later than 2015. An international commitment to improving global nutrition and food security was born, and targets for reducing child and maternal malnutrition were set however not achieved. Quantifying regional nutrition status is important for identifying the burden caused by malnutrition and initiating successful interventions. The present article explores the problems associated with assessment of nutritional status in a community knowing however that “Peace is the most important precondition to eradicate hunger”.<sup>1</sup> There is a multitude of research areas in the complex social, political, economic, and behavioural aspects of nutrition and food security. Frequently, the main goals of nutrition research are to quantify and assess the state of malnutrition in a population. This begins with collecting data. Data collection methodologies may use approaches that are quantitative, qualitative, based on survey results or anthropometric indicators, or a mix of all. Indicators of nutrition status can be categorized into biological indicators and social determinants. Excellent but complex structure for evaluating malnutrition is provided by World Food Programme (WFP)<sup>2</sup> of the United Nations, enhancing the most common mistakes made when conducting studies.

Malnutrition is one of the leading causes of under-five deaths especially in resource-constraint settings. Effort at addressing the high prevalence of malnutrition in most developing countries is hampered by paucity of data on its prevalence and thus most of these countries are not in harmony with the levels of malnutrition and the required urgent attention. Global malnutrition is of concern to public health practitioners. There are certain factors which should alert the primary health care team to the fact that nutritional intake may be reduced and that risk of malnutrition is increased. These include disease condition,

functional disabilities, inadequate or inappropriate food intake, poor dentition or difficulty swallowing, pharmaceuticals, alcoholism, depression, poor social and financial circumstances or recent discharge from hospital. The indicators used to assess the state of malnutrition and its underlying causes can be categorized into biological indicators (anthropometric, biochemical and clinical) and social determinants. Nutrition experts have been using these parameters for decades but never consider that manifestations of nutrition deficiencies may only appear in severe cases. Depending on the type of deficiency and the health consequences related to its condition, even clinical indicators may not provide the most well-defined representation of deficiency. For instance, it is important to consider the possibility of confounding factors when conducting nutrition evaluations. Nutrition research can be aimed at identifying the various social, cultural, political, and economic factors of nutrition in order to fully understand the underlying causes of malnutrition. The social determinants of malnutrition can be explored through both qualitative and quantitative research methods. Qualitative methods help develop a better and deeper understanding of social factors of nutrition, but are long-delayed and inapplicable for large-scale surveillances. Nevertheless, a comprehensive understanding of community’s nutritional status may be provided by evaluating issues such as local food insecurity, food diversity, and infant-feeding practices. Investigating dietary intake and diversity could be useful, however simply inquiring about “what people eat regularly” is subject to health care reporting errors due to poor retrospection over long periods of time.

## Malnutrition

This term includes both over-nutrition (obesity and overweight) and under-nutrition. Malnutrition increases the risk and worsens the severity of infections.<sup>3</sup> Infants and young children are most affected by malnutrition as they have increased nutritional needs to support growth.<sup>4</sup> Undernourished children, as well as children with severe malnutrition, have a higher risk of dying than children with an

optimal nutritional status.<sup>5</sup> Malnutrition is a phenomenon in which a deficiency, excess or imbalance of nutrients causes measurable ill effects on the body and upon growth may increase morbidity or mortality<sup>6</sup> and is still a major public health problem in the developing countries, especially in the Sub-Saharan Africa.<sup>7</sup> Governmental officials, NGOs and nutritionists tend to infer malnutrition through simple anthropometric indicators across different regions of a country. The causes and consequences of malnutrition are varied and complex. There is as yet no single effective approach to its management, and data on the most effective time and type of intervention are still lacking. Indeed, most work published concerns infancy and early childhood with an emphasis on considered optimal nutrition standards.

Exclusive breastfeeding, complementary feeding, food supplementation, micronutrient supplementation, family and community health and nutrition practices (in particular education of mothers and adolescent girls), and reduction of disease burden are all important factors in reducing stunting. However, it must be emphasised that there is a scarcity of properly designed trials of specific approaches to stunting in puberty, which may serve as an additional window of opportunity for catch-up growth through a multi-sectorial intervention.<sup>8</sup> Most international/NGO's studies on malnutrition are based on one observation with no follow-ups, like simple snapshots in loco, with anthropometric figures revealing catastrophic panoramas. However, these studies are largely based on epidemiological evidence and attempts to confirm or refute these hypothesis have only made limited progress because long term experimental, and/or intervention studies, are difficult to undertake or ethically not possible.<sup>9</sup> Furthermore, none takes into consideration the old concept of "compensatory growth", well studied in animals since the 60's.<sup>10</sup> Compensatory growth or catch-up growth during childhood and puberty is defined as growth in height above what is expected for age that occurs after a period of growth retardation.<sup>11</sup> Percentiles and Z -scores are often used to assess anthropometric measures to help evaluate children's growth and nutritional status.<sup>12</sup>

## School feeding programmes

Brazil pioneered a School Feeding Programme (SFP) established in 1953 followed by India in the 80's. The cooperation between Brazil and India is an example of partnership between two developing countries that focus their efforts in the global issue of fighting poverty. School Feeding Programmes (SFP) across the world have now been established and are seen as a social safety net for vulnerable sections of the population and as an educational intervention aimed at ensuring that children go to school and learning is improved by elimination of hunger in the classroom.<sup>13</sup> United Nations produced guidelines to develop and implement school feeding programmes that improve education recognizing school feeding as a vector for social development and suggesting the allocation of resources by the World Bank to such programmes in national budgets.<sup>14,15</sup> The Centre of Excellence against Hunger launched in Brazil in 2011 with WFP continues its partnership with African countries to assist them in moving forward in food security and achieving Zero Hunger by 2030.<sup>16</sup> But is this really achievable? We believe zero hunger in the world is similar to a better world with no diseases, no poverty and no wars, which is not plausible. Wars and hunger never ended for millennia and will prevail. The aim is to minimize and avoid these constraints in every country. In each region an analysis must be made on the challenges and opportunities for governance towards a healthy, accessible, and equitable food regime at all levels, starting

from implementing a reliable National Food and Nutrition Security Policy where School Feeding Programmes are included focusing on improved nutrition and nutrition education in schools.

## Home grown school feeding (HGSF)

To reduce malnutrition and improve child survival, school feeding programmes have been established in many countries of Africa to develop optimal feeding strategies and improve nutritional status of children. However, prevalence of child malnutrition remains high, especially in urban slums. A HGSF programme normally combines the objectives of a traditional school feeding programme (e.g. educational or social safety nets outcomes) with the additional goals of home-grown aspects (e.g. smallholder farmers' access to and participation in a stable market). The stable demand from schools, especially when HGSF become part of the national school meal programme, can create a pathway to increased productivity, food security and income security.<sup>17</sup> The African Union adopted HGSF as a continental strategy for enhancing the retention and performance of students while also bringing economic benefits to farmers and local communities.<sup>18</sup> At least 368 million children in the world are fed daily at school, through school meals programmes that are run in varying degrees by national governments.<sup>19</sup> These school meals not only encourages children and promotes their health, they are also crucial in helping access to education as they increase school enrolment, attendance and achievement. In addition, the health and educational benefits of school meals have a lifelong impact<sup>20</sup> although education level of the mother, family size and absence of a father may overrule the effect of the school feeding programme.<sup>21</sup>

It is recognized that school meals are the world's most widely-used social safety net, with multiple benefits for students, farmers and communities. The systems are different among continents, with different objectives, impact and sustainability. From the 55 African countries, only 12 are considered to have a high or medium human development index (HDI) and increased number of African Governments have committed themselves to develop their own school feeding programmes,<sup>22,23</sup> Mozambique set up a SFP in 2013 implemented in 12 schools until 2015 as a pilot experience. Currently, the programme (PRONAE) is being implemented in more than 70 schools. An agreement signed between the Mozambican government, the World Food Programme and Russia guarantees the conversion of a debt from Mozambique to Russia in funding for development programmes.<sup>24</sup> As a result, PRONAE will receive investments until 2021 to expand its reach to 300 schools, linked to smallholder farming. Despite many positive aspects, several drawbacks were encountered and served for future correction namely the adjusting of farmers to legal requirements. Each school meal programme is different: beans and rice in Madagascar, spicy lentils in the north of Africa, vegetable pastries and fruit in South Africa. In some countries it may be a healthy snack, or it could include take-home food such as vitamin A-enriched oil for the whole family. Indeed, many States are learning and adapting lessons from those running school feeding programmes so as to enhance access to and retention of children in school.<sup>25</sup>

From the worldwide slogans "*Hunger can be eliminated in our lifetimes*" to reality is an infinite step. Progress can however be slowly made. This requires comprehensive efforts to ensure that every man, woman and child enjoy their right to adequate food; women are empowered; priority is given to family farming; and food systems everywhere (even with regular thefts) are sustainable and resilient.

SFP has multiple benefits that extend beyond the school. In Africa the development of SFPs showed to have a real impact on children's access to school and completion of the school cycles, but also and above all it contributes to decrease the number of early marriages and of children living in the streets.<sup>26</sup>

### From school meals to home grown school meals

In 2014, during the Global Child Nutrition Forum (GCNF) in South Africa, Niger did propose and a new process with the creation of the African School Feeding Network. The WFP is gradually making the transition of all WFP-supported schools to governmental programmes when available. Linking schools to local production is not necessarily a new concept. Many countries have developed different ways of making this link, depending on the context, the capacity of farmers to supply schools, and the different degree of community participation. The peculiar and original element of HGSM programmes, compared to traditional school meals programmes, is the prioritizing of smallholder farmers in a way that maximizes sensible benefits on prices, occasions for commercialization, market links and entrance to productive assets along the value chain. The main problem encountered is lack of food diversity and the periods off school that still demands attention of teachers and farmers. School meals programmes facilitate access to education, increase attendance and retention rates, and improve the nutrition of school children and parents' knowledge. Furthermore, school meals programmes contribute to children's learning and health, increasing their productive potential later in life. Especially when school meals are part of a larger package of investment in education, they help maximize the return on investment and contribute to reducing poverty in the long term.<sup>27</sup> HGSM programmes allow for development of value chains and subsistence of peasants and small farmers by strengthening the connection between nutrition, agriculture and education to local production which is critical in transitioning local school meal programmes to reliable national programmes. However, climate changes constitute a major challenge with unpredictable rainfalls and droughts.<sup>28</sup>

### Designing and implementing a HGSM programme is a complex task

In terms of external funding and implementation, the United Nations World Food Programme (WFP) is the world's leading provider of school feeding programme financial contributions and programme development. WFP currently provides school feeding resources to an average of 22 million children in school, about half of whom are girls, across 70 countries. However, WFP is shifting from a food aid organization to food assistance organization. The UN through Resource Frameworks have vast budgets to the HGSM programmes, however, it is widely known that most of it (said well above 80%) is to cover salaries, transport and general expenses from external experts therefore the liquid contribution reaching the locals is much lower than proclaimed. Access to primary education has improved significantly in many parts of the world and of course Africa. Yet challenges in school access remain, 75 million children of primary school-age, 44% of them in Sub-Saharan Africa, are not in school and 55% of them are girls. Poor nutrition and health among schoolchildren contributes to the inefficiency of the educational system. School feeding is a very popular programme that has been used to support the education, health and nutrition of children living

in vulnerable food-insecure areas. However, school feeding is a complex intervention and planning successful programmes requires careful adjustments among targeting pathways, feeding methods, and expenditures. The inadequacy of programmes in low-income settings, suggest an important goal for development of specific technical guidelines from credible partners to assist governments in improving the establishment of SFPs.<sup>29</sup>

### Foreign "Support" of the SFCP

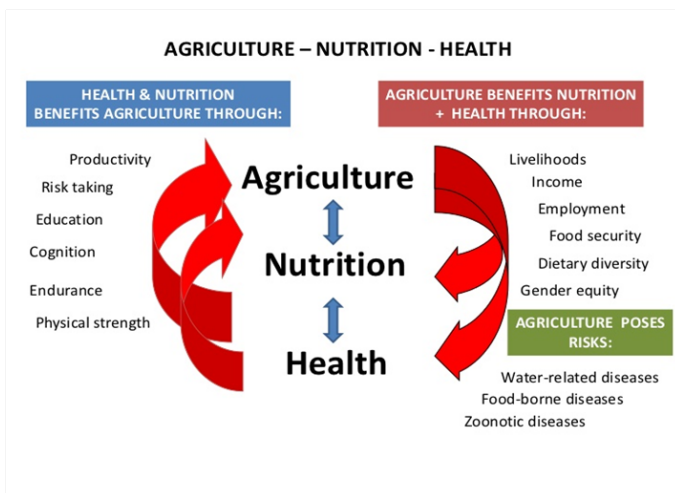
There are literally hundreds of institutions, personalities, associations, enterprises, funds, club donors, religion organizations, national and international initiatives that at present implement nutritional interventions in Africa, most of them as donors, caretakers, political or moral obligations, but in the midst there are a few with more than social interests, sometimes difficult to envisage. While most African countries strongly support the development of HGSM, which is with local native crops and traditional regional produces, the countries are widely opened to social support in this domain by many developed countries. A very good example is the USAID regular support, on its social counterpart role for the huge investments made in the country in other domains, with school feeding with a monotonous diet daily fed to children.<sup>30</sup> Based on their agricultural surpluses, a mixed flour is imported from the USA in bags ready to mix with water to produce a porridge mash, containing just maize and soya (transgenic probably and not in compliance with several African countries' guidelines). This tasteless, non-varied foodstuff is just mixed with water before meals and served warm mainly in urban schools. The Mozambican administration is grateful for such initiative and cannot refuse such "help" for ethical and financial reasons, although it is considered not a good example neither the way forward. Indeed, such monotonous diets lack the absolute necessary variety of food sources to cover the nutrient and trace element requirements. The feeding of a grey tasteless porridge everyday throughout the year would definitely not be acceptable in developed countries. To aggravate the system many activities are accompanied by private sector engagement and investments looking for profit, such as on fortification of diets with micronutrients of unknown bioavailability and shelf life when at high temperatures, without a proper evaluation of the nutrient contents of native foods.

### Linking agriculture, nutrition, health and education

There is limited evidence in terms of the benefits of providing a reliable market for small-holder farmers through HGSM approaches. There is also the need to examine the links between social accountability and programme performance. HGSM programmes have the potential to link the increased demand for school feeding goods and services to community-based stakeholders, including small-holder farmers and women's groups. A significant break on this method of progress is the lack of cooperatives among producers as all the chain could definitely benefit from such procedure. Besides, each country has its own way of organising its Ministry of Agriculture, some with possible no positive links among multi-sectorial integrated frameworks connecting agriculture, health, nutrition and education. This is the case of Mozambique. School feeding interventions linked to small-holder agriculture can have multiple goals in the following areas: a) Food security: supporting incomes of recipient households (those consuming food) and farmer households (those providing the

food); b) Education: increasing school enrolment, attendance and reducing drop-out and improving cognition and learning achievement; c) Health: improving nutritional status of school age children.<sup>31</sup>

The impact of the intervention in each of the above areas occurs through a number of complex pathways (Figure 1). Managing complexity and trade-offs across objectives is not straightforward. The HGSP has been established with the aim to deliver government-led, cost-effective school feeding programmes using food that is locally grown by smallholder farmer in some 20 African countries, including Cote d'Ivoire, Ghana, Kenya, Mali, Nigeria, Tanzania, Ethiopia, Malawi, Zimbabwe, Mozambique, each one with specific differences related to food available, financing, technical support and other factors. In 2015 it was reported that Mozambique reached its Millennium Development Goal of halving the number of hungry people. Chronic food insecurity at 24% (down from 61% in 1997) and malnutrition at 25% (down from 56% in the early 1990s).<sup>32</sup> However, although considered excellent trends or estimates, all these figures must be looked with cautious since no data has been published in peer review ISI accredited journals (Figure 2).



**Figure 1** Simple ideas to link agriculture, nutrition, education and health. However, managing complexity and trade-offs across objectives is not straightforward.



**Figure 2** Lunch time in a school in the north of Mozambique.

## The case of Cabo Verde

In Cabo Verde, with only some 540,000 population, a UN joint office that brings together WFP, UNICEF, FAO and WHO, supports the national SFP, which is funded by the government with minor participation of parents' contributions. Menus are designed by nutritionists and include fish, fruit and vegetables locally produced. The programme covers all public schools, some 90,000 students, and employs 850 people in the management, and over 730 cooks. The

country does not have its own Nutrition degree course so technical support is mainly from foreign experts not always with known experience of indigenous foods, requirements and preferences. The "Global School Feeding Sourcebook"<sup>33</sup> studied 14 countries, Botswana, Brazil, Cabo Verde, Chile, Ivory Coast, Equator, Ghana, India, Kenya, Mali, Mexico, Namibia, Nigeria and South Africa and considered Cabo Verde as a good example. The future will show the financial and efficacy sustainability of the present programme which has been politically a well-used banner. The success secret has been on the utilization of a great variety of foods instead of a monotonous diet.

## Conclusion

Despite the decades of honourable and persistent work from United Nations FAO and WFP on their efforts on fighting hunger worldwide, delivering food assistance in emergencies and working with communities to improve nutrition and build resilience, overall general panorama is not improving. HGSP programmes are complex interventions with the potential to link the increased demand for school feeding goods and services to community-based stakeholders, including smallholder farmers and women's groups. There is limited rigorous evidence, however, that this is the case in practice. Several studies have identified key benefits such as improved the dietary diversity, class attendance and nutritional status of school children, but also challenges of the HGSP programmes which need further attention, including financial constraints, storage problems and transportation delays in the delivery of supplies, food hygiene problems and wastage of academic time due to the feeding program.

Learning, monitoring and evaluation are essential steps of research tools to provide regular information on malnutrition and HGSP programme performance through a range of analysis to promote their efficient and effective implementation and operation. Further studies on the sustainability and potential long term impacts of the program for a better policy implication are needed. From the onset of the programme a baseline of data must be collected in order to measure previously defined target goals. Despite the popularity and widespread implementation of school feeding programmes, evidence on the impact of school feeding on school participation and nutritional status is mixed. Something that may be easily implementable in countries like Brazil or India, but may be extremely difficult in many parts of Africa namely in the district areas.

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## Conflict of interest

The authors declare that there is no conflict of interest.

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