

Abstract:

Undernutrition is estimated to contribute to one third of child deaths globally (UNICEF 2009) and even though huge efforts have been applied, no solutions have been able to drastically turn the tide. This paper examines the causes of undernutrition in children under five years of age in a case study of Sierra Leone. It is found that the immediate, underlying and basic causes follow the UNICEF conceptual framework in all its complexity. The paper argues to acknowledge the complexity of the issue, and proposes to address undernutrition on all levels applying several initiatives for a sustainable change.

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List of Abbreviations.

ARI: Acute Respiratory Infection
CHERG: Child Health Epidemiology Reference Group
CRSL: Country Reports on Human Rights Practices, Sierra Leone
CSO: Civil Society Organization
DALY: Disability Adjusted Life Years
DEPAC: Development Partnership Committee
DFID: UK Department for International Development
DHS: Demographic and Health Survey 2004
EURODAD: The European Network on Debt & Development
FAO: Food and Agricultural Organization
GoSL: Government of Sierra Leone
HIPC: Heavily Indebted Poor Countries
IFPRI: International Food Policy Research Institute
IMF: International Monetary Fund
IYFC: Infant and Young Child Feeding
LAF: Lactic Acid Fermentation
MDA: Ministries, Department and Agencies
MDG: Millennium Development Goals
MOFED: Ministry of Finance and Economic Development
MOHS: Ministry of Health and Sanitation
NGO: Non-Government Organization
ORT: Oral Rehydration Therapy
PETS: Public Expenditure Tracking Surveys
PHU: Periphery Health Units
PRSP: Poverty Reduction Strategy Paper
SF: Sourdough Fermentation
SL: Sierra Leone
SLWSP: Sierra Leone Water and Sanitation Policy 2007
UNDAF: United Nations Development Assistance Framework
UNDP: United Nations Development Programme
UNHCR: United Nations Refugee Agency
UNICEF: United Nations Children's Fund
WFP: World Food Programme
WHO: World Health Organization

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1 Introduction

Undernutrition in children is a serious global problem. It is estimated that around 195 million children under five years are stunted and more than 28 million suffer from severe acute malnutrition (UNICEF 2009).

The problem has ranked high on the global agenda for 50 years with broad consensus to tackle it, still without leading to a satisfactory solution in the foreseeable future. One reason is that malnutrition is not an isolated problem but caused by a series of complex, multiple and interactive causes (Beaudry 1999) and therefore must be treated in a broad multisectoral approach.

The aim of the paper is to examine causes of undernutrition in children under five years of age in the case of Sierra Leone and contribute with suggestions to interventions that can turn the tide and reach the goal of eradicating child undernutrition.

This will be addressed from a multi-disciplinary perspective by using UNICEFs conceptual framework to identify basic, underlying and immediate causes of undernutrition.

Undernutrition in a child is seen when the child is unable to obtain sufficient food to meet its nutritional needs. Children rely on nutrients to facilitate their development and up until the age of five they are especially vulnerable, which is why this age is often used as a cutoff point, also in this paper (UNICEF 2009).

When a child is suffering from undernutrition it lacks both macro- and micronutrients, which exhibits different manifestations. The child can suffer from acute undernutrition, wasting, chronic undernutrition, stunting, or both (ibid). To distinguish between acute and chronic undernutrition the measurements weight-for- height (W/H) and height-for-age (H/A) applies. Acute undernutrition is a sign of short-term nutritional deprivation and weight loss and weight compared to height is a good measure. Chronic undernutrition is a sign of long-term nutritional deprivation affecting the growth of the child, and therefore height compared to age is useful. A child is undernourished if the W/H or H/A measures are more than -2 SD from the median¹ (WHO Growth standards). Underweight is another way to measure child undernutrition. It's measured as weight-for-age (W/A).

¹ The median is found in the international WHO growth standards made in 2006 as an average of the antropometric measurements of healthy children from Brazil, Ghana, India, Norway, Oman and US

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Children born with Low Birth Weight (LBW) or to undernourished mothers have a high risk of remaining undernourished, which is also a problem in SL. Albeit, in this paper we will concentrate on children under the age of five, and LBW will not be addressed any further.

2 Strategies for fighting child malnutrition.

2.1 Lessons learned from earlier international nutrition approaches

An examination of earlier approaches is relevant, for two reasons. First it contributes to an understanding of the logic behind the approach today, and second it gives an understanding that many of the present problems concerning development are related to earlier approaches of development.

When major international nutrition efforts took off after World War II, lack of food seemed the obvious starting point. During the 1950s and 1960s undernutrition was viewed as a problem that could be solved by service delivery (food delivery). Efforts were derived from donor-interest, and assistance was centered on surplus from the western world's production and knowledge was transferred more or less directly from western societies to other contexts in developing countries. In the 1960s some community level programs were initiated for small-scale food production, food supplementation and nutrition education. Albeit these programs were highly supply-oriented in nature, and were later acknowledged to have been unsuccessful in affecting malnutrition (Levinson and McLachlan 1999). This brought forward the first major lesson learned; *that donor-driven efforts alone wasn't enough.*

The international focus on nutrition changed during the 1960s to see undernutrition as protein deficiency due to insufficient knowledge of diet in these countries. The development assistance was now carried by new western technology that produced protein and synthetic amino acids as nutrition supplements (this approach is referred to as the technology-driven approach). This was supply-driven delivery of pre-formulated solutions (Ibid.). These strategies serve as costly lesson that huge efforts need to be placed in *understanding the local contexts before a strategy is imposed and that approaches developed in Western contexts cannot be transferred to developing countries without severe implications.*

In the 1970s focus was placed on multi-sectoral planning. The developing countries governments were for the first time able to initiate policies and programs to meet their specific needs. This acknowledged the complex and multisectoral nature of malnutrition, but that was inconsistent

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with the line structures in the government ministries. The line ministries did not want a “nutriocentric” approach, combined with unwillingness to be coordinated on the issue (Ibid.). *What was learned from this period, was an understanding of the need to scale down capacity from the international donors in their ivory towers, but also that central government level was too aggregate a level for insightful problem analysis and effective program management.* Once again it is an example of inadequate understanding of local context and uncritical transference of approaches from the western world. A prerequisite for the state-centered approach is a state with institutions that can implement, monitor and adjust policies. This is exactly what is often the challenge in developing countries, especially when suffering from weak states and lack of well functioning institutions.

The challenges of the 1970s gave both negative and positive legacy to the 1980s. The negative was a reversion in the 1980s from multisectoral focus to projects without the need for any intersectoral collaboration (Ibid.). Activities like breastfeeding are unquestionably important, but the focus on the more complex causes must not be forgotten. *On the positive side was a lesson to keep projects in a demand-based and target-directed approach.*

2.2 The approach of the 1990s and today: the community-based approach

The 1990 gave birth to the community-level empowerment and “ownership” of projects. It was argued, that emphasis needed to be placed on the community-level, but that it’s inadequate without a certain level of ownership by the shareholders in the project. This resulted in a change of paradigm for the donor countries, from viewing the developing countries as *recipients* to *partner* countries (Levinson and Mclachlan 1999).

An important milestone in the consolidating of the ownership approach was the Paris Declaration on Aid effectiveness (PD 2005). It commits the Donors to use the partner country’s institutions to the maximum extent possible, thereby avoid creating parallel systems that in some cases undermine national procedures. Partner countries commit themselves to be visibly in charge of the development process. The reshuffle of responsibility to the developing country is intended to create ownership, align donor action with local contexts and reduce problems with harmonization due to multiple contributions and strategies. Monitoring results and mutual accountability was also placed in focus, creating transparency and accountability for the actions being taken.

In the community-based approach, the alignment of projects to local contexts is sometimes referred to as “scaling down” (Thomas 1999). The government’s role is here described as facilitating the “scaling up”, referring to a coordinating role of monitoring and selecting successful

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projects to transfer to other communities. The key point in this is not to copy the successful projects entirely, but scale down and adjust the projects so they again align with the new local contexts (Eklund 2003).

3 The Causes of Undernutrition

The problem of undernutrition derives from highly complex, multiple and interactive causes. This has been acknowledged by UNICEF, who in consequence of the fact that undernutrition affects young children most seriously, has been in the forefront of developing a conceptual framework for undernutrition (Fig 1).

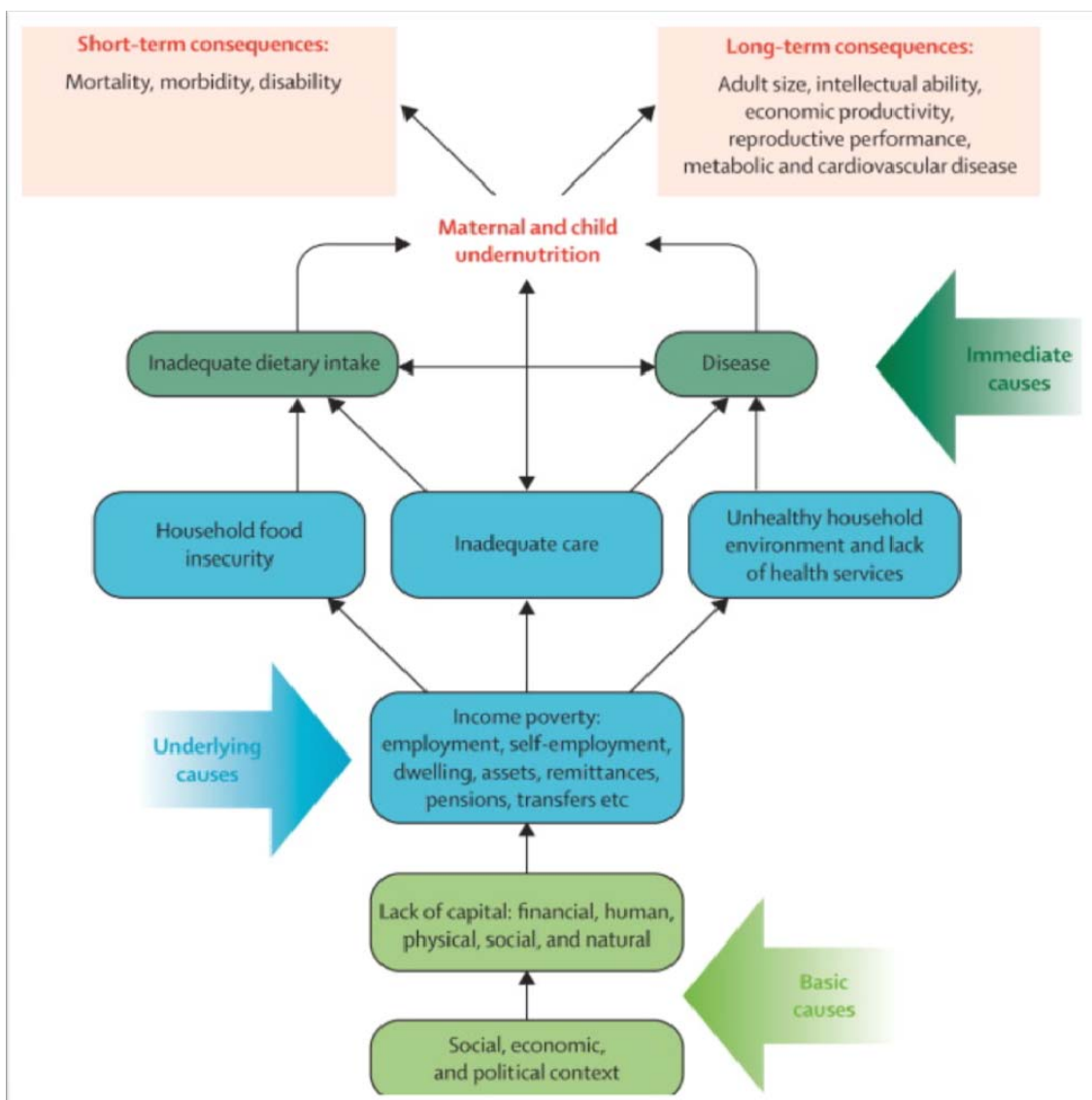


Figure 1. The UNICEF conceptual framework

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UNICEFs framework divides the causes into immediate, underlying and basic causes. They cover a wide range of physiological, cultural, sociological, economic and political causes. The model doesn't claim to express exact relationships but should rather be seen as a guide to what to look for to identify the causes in particular contexts. It "*...consists of well established knowledge combined with hypotheses about the probable underlying causes of malnutrition*" (UNICEF 1990:12). The following is a clarification of the factors we include discussing child nutrition.

3.1 Basic causes

The basic causes for undernutrition are found at national and international level. The social, economic and political context creates the structural causes for undernutrition and these causes are deeply interrelated, and affect the others mutually. These are often characterized by a weak state, that lack incentives for leaders to perform pro-poor development (Collier 2009) making the presence of political will ("good governance") an issue to consider. Weak states also suffer from weak institutional arrangements, and therefore often do not have the capacity to actually govern the state (Buzan 1991). This makes it hard to implement political initiatives and deliver services to the citizens.

3.1.1 Political factors: institutional and actor-based perspective

Even if the government has political will to exercise pro-poor policies and somewhat well functioning institutions, the intersectoral nature of undernutrition often challenge the structures in the line ministries, making coordination and access to information hard to obtain (Gibrill *et al.* 2004).

An actor-based perspective offers further insight on the tangible political problems in generating. The most important institutional actors are the donor, the partner country, represented by the government, and the citizens (recipients of the aid), which are sometimes represented by a civil society organization (CSO). Most focus is placed on the relationship between the donor and the government, ignoring the relationships to the citizen, which potentially collides with the lack of political will and weak institutions that can hinder development.

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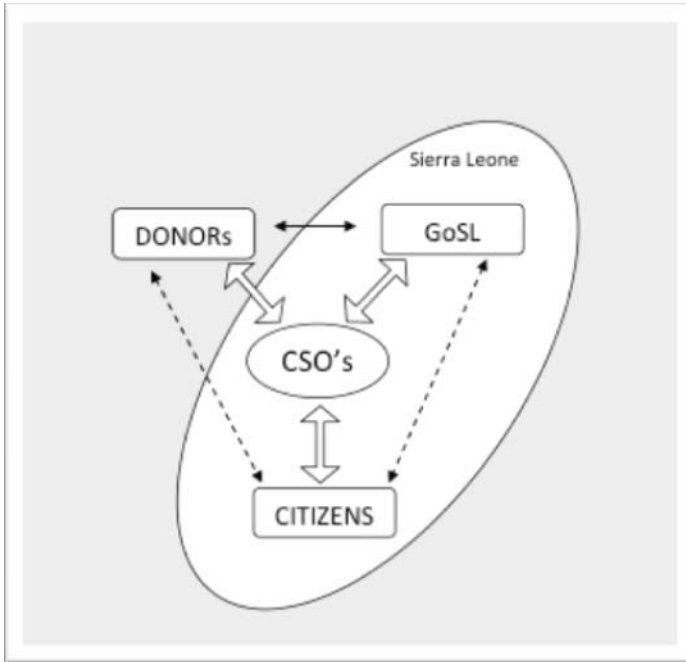


Figure 2

To examine the relationships between the actors it is fruitful to address the levels of *transparency* and *accountability*² in the relations. Transparency can be seen as a precondition for accountability, and is closely related to the presence of *trust* between the actors (EURODAD 2008). The donors prefer both that the partner country's government is accountable directly to the donor, and that the government is accountable to the citizens. This raises expectations that governments will have incentive to exercise good governance. With the Paris Declaration both donors and partner countries have obligated themselves to enhance mutual accountability and transparency in the use of development resources (PD 2005:§47).

The Paris Declaration strongly emphasizes the partner country's leading role in the developing process to promote *ownership*, resulting in more effective aid. To the degree that the developing country actually can provide data on more effective projects due to ownership, it can be expected to generate donor trust (PD 2005:§18).

3.1.2 Economic causes: the question of growth

Economic growth for many years enjoyed unequalled focus used as a narrow measure for development (Kenny 2005). Today it's not seen as a solution in itself but as an important catalyst for improving nutrition (DFID 2010), also reflected in the Millennium Development Goal no. 1

² Accountability: According to World Development Report 2004 relationships of accountability have five features; delegation, financing, performing informing and enforcing (WDR2004).

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“Eradicate extreme poverty and hunger”, with the prevalence of underweight among children under five years of age as indicator.

3.2 Underlying causes

The underlying causes in the Model depict causes that are visible from the community and household level. Factors such as income poverty, employment, food security, care, available health services and hygiene and sanitation, all contribute to the prevalence of undernutrition. It is a direct source of the basic causes and leads to the immediate problems of infections and insufficient dietary intake.

3.2.1 Income poverty and employment.

As mentioned in the basic causes the problem of income poverty and hunger is directly correlated. Income poverty and unemployment are also very closely linked, and by default unemployment and hunger are correlated. In countries with a high unemployment rate, often results in a large part of the population being dependent on subsistence farming. Little extra income is generated and the rural population can become increasingly food insecure and it can thereby affect dietary intake, as well as the access to health facilities. Sen argues that employment is a good way to relieve the household of the vulnerability of lacking availability (Sen 1999). By increasing a household's income and diversifying where this income is generated, the access to food and health facilities are also increased, and by default of the UNICEF model, this should be reflected in the undernutrition prevalence.

3.2.2 Household food security.

The household food security is comprised of four factors: availability, access, stability and utilization. A household should at all times have enough food immediately available, have the sufficient resources to acquire it and be able to consume it, in order to have an active and healthy life (Smith et al. 2000; FAO; WHO). It is important that the household is food secure, and therefore it does not help us much to look at the national average, other than if it determines a de facto deficit (Sen 1999). If a household is food insecure it becomes vulnerable to food shocks, such as low production, failed harvests, price fluctuations of goods, etc. Studies from South Africa have shown that common strategies to cope with insufficient food security is for the caregiver to change their strategies, limit food variety, portion size and skipped meals (Oldewage-Theron et al. 2006). All of these common strategies seriously affect the nutritional status of a household.

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3.2.3 Care.

Inadequate care is often an underlying cause of child undernutrition. Care for children is defined as: *“The practices of caregivers that affect nutrient intake, health and cognitive and psychosocial development of the child”* (Engle, et al. 1999, p1310). Children needs to be fed proper foods, needs to be taken to the health clinic when ill or otherwise treated correctly and needs to live in a disease preventive environment in order to avoid the immediate causes of undernutrition. This can only be fulfilled if the child has a caretaker, who provides proper care. In order to provide care certain resources are needed for instance knowledge, autonomy, economic resource control, time, good mental health and support from the society to carry out proper care practices. Care practices include feeding practices, psychosocial care, care for women, food preparation, hygiene, and home health practices. Some of the care practices that determines nutrient intake is feeding practices. Some of the care practices that determine the child’s morbidity and mortality from infectious diseases are the hygiene practices and the home health practices. (Engle, et al. 1999)

3.2.4 Health services

When it comes to child undernutrition caused by lack of health services, it is the primary health service level that functions insufficiently (UNICEF 2008). The job of the primary health service is to deliver treatment to all children for simple infections as pneumonia, malaria and diarrhea, as well as deliver advice and education to caretakers about care practices. Thereby they could prevent and treat disease and secure sound child development and avoid the development of child undernutrition. The services should be available to all people, also rural inhabitants living in remote areas, and when considering developing countries, it should be free of cost, in order for the people to be able to seek help at any relevant occasion. This is critical in order to reach every child with needed public health interventions such as immunization, vitamin A supplementation and in the case of undernutrition, supplementary food and information for caretakers. (UNICEF 1998)

3.2.5 Sanitation and hygiene

Sanitation and hygiene are also important factors to address when bearing in mind that this is the primary way to reduce the spread and control the severity of infections within the household and community (Cairncross et al. 2010).

The direct correlation between personal hygiene, sanitation, clean water and malnutrition is well documented especially in young children (Tharakhan and Suchindran 1999; Golden et al. 2000; Checkley et al. 2004; Fewtrell et al. 2006; among others). Better hygiene decreases the percentage of children with diarrhea and other forms of infections that impairs the intake and uptake of nutrients (ibid). Fewtrell et al. (2006) reported in their meta-analysis that implementations that reduced

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diarrhea significantly were hygiene education and hand washing practices (33%), increased sanitation (22%), and water supply and quality improvements (22% and 17%). Cairncross *et al.* (2010) find the same trend in their meta-analysis, 48% decrease for washing hands with soap, 36% for good disposal of excrements and 17% for improved water sources. Tharakhan and Suchindran (1999) also show a significant correlation between the level of sanitation (flushing toilets as opposed to pits) and malnutrition in the household. Walker *et al.* (1992) demonstrated that the number of worm infections increased with the number of children in the household <15yrs, a good indicator for implementations for large families in small living conditions. Checkley *et al.* (2004) proved a significant and direct correlation between water quality, water storage facilities and sanitation on stunting in children in Peru.

3.3 Immediate causes

The immediate causes of child undernutrition are inadequate dietary intake and disease. It has long been known that infectious disease leads to inadequate dietary intake and that inadequate dietary intake makes a person more vulnerable to infectious disease and that the two factors work in synergistic relationship creating a vicious circle. Expanding the disease cycle, as in fig. 2, illustrates that the mechanisms are very complex.



Figure 3 From Tomkins and Watson (1989)

Eventually, as a result of infection and disease, a child often experiences weight loss and growth faltering, or in other words - undernutrition.

Whether one or the other starts the vicious circle is unknown and likely it differs from child to child (Scrimshaw *et al.* 1968). Diarrhea, malaria and Acute Respiratory tract Infections (ARI) were the infectious diseases killing most children in Africa in 2008 (Black *et al.* 2010). Undernutrition is shown to put children in increased risk of developing diarrhea, have more severe episodes and persistent diarrhea, which increase the risk of mortality. In the case of malaria it is shown that

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undernutrition exacerbate malaria and considerably increases the likelihood of mortality.

Undernourished children have an increased incidence of ARI and the nutritional status increases the severity of the ARI and the risk of dying (Semba & Bloem 2001).

Undernutrition does not only refer to a child's lack of protein and energy, also micronutrients play a major role. It is found that especially lack of zinc is associated with increased morbidity and mortality from infectious disease including diarrhea, ARI and malaria and can also manifest itself as stunting. A lack of vitamin A is associated with increased morbidity and mortality from diarrhea too (Black et. al. 2008). Iron deficiencies can cause anemia which when very severe increases the risk of childhood mortality. Furthermore chronic iron deficiencies are shown to cause irreversible cognitive impairment (Lozoff et al. 2006). So micronutrient deficiencies also contribute to the increased risk of morbidity and mortality from infectious diseases in undernourished children, as well as to the long-term consequences of undernutrition.

Not all children suffering from undernutrition will die of the condition, although undernutrition is estimated to contribute to 1/3 of child deaths globally (UNICEF 2009). If undernutrition does not result in mortality, it has other consequences. If stunting is not prevented or eliminated before the age of 2, the child will be stunted for the rest of its life. This does not mean the child will be underweight for the rest of its life, but it will have a short stature, lower physical capacity and, in relation to women, reproductive problems. Stunting has also shown to affect intellectual ability and by this economic productivity, social ability and ultimately progress for the society. Therefore child undernutrition does not only affect the child but the whole society and if the prevalence is not reduced it will eventually contribute to the lack of human capital (Victoria et. al. 2008). There is a need to address the immediate causes as well as the underlying and basic causes to turn the situation around.

4 Case study: Sierra Leone

4.0.1 Country facts.

SL lies on the west coast of Africa. It is approximately 71.740 km², and borders Guinea to the north/northeast and Liberia to the east.

It is in the tropical region and seasonally humid, with rainfalls extending from May to December and a dry season from December to April. The coast is dotted with mangrove swamps, which generates a great fishing potential in the sea; inland the landscape is forested hills and towards the mountains in the east an upland plateau (CIA WFB; Visit SL).

The population of SL is 5,3 mill people, and the country has a grueling HDI of 0,365 which gives it a rank of 180 (of 182) (UNDP 2009), the third least developed country on earth. The

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median age is 19 yrs and life expectancy at birth is app. 50 yrs and the fertility rate is 4.97 children/woman.

Agriculture is the largest employment sector with 64% of the workforce, services employ 22% and governmental 7% (PRSP2).

Sierra Leone is a very weak state characterized by 10 years of civil war (1991-2002) and massive poverty, and is hugely affected by child mortality and undernutrition with over 36% of the children under five years showing signs of chronic undernutrition (Demographic and Health Survey 2008 [DHS]).

The war was a spillover effect from the civil war in Liberia, and was instigated by the Revolutionary United Front (RUF) to seize control over the natural resources of SL, mostly diamonds and other minerals (CIA WFB). The conflict is an important root cause to the lack of development. Sierra Leone has subsequently implemented free and fair elections in 2006, and 2007 saw the first peaceful regime change ever in the recent history (Freedom House 2010).

SL is a country with many different ethnicities. The Mende and Temne are the largest ethnic groups, representing roughly 30% of the population each. Various other African ethnicities (eg. Limba, Loko and Sherbro to name a few) represents another 30% and at last the Crio constitutes 10% of the population. Nevertheless, when asked most people in SL consider themselves SL'ians first and foremost (Josefsen 2004)

SL has a great developing potential with lots of natural resources, minerals, good climate and fertile soils. Albeit, the years of ravaging wars have resulted in an impoverished country, struggling to nourish and generate sufficient livelihoods for its people. Sierra Leone is an interesting case, both because of the development potential it holds, but also because of the great need for action to relieve and face its problems, amongst those child undernutrition.

4.0.2 Extent of the Problem of Undernutrition

The extent of child undernutrition in Sierra Leone is a massive problem. In the DHS (2008) it is estimated that 36.4% of the children under five is stunted. In other estimates made by WHO and UNICEF, stunting prevalence varies from 34% in 2000 to 46.9% in 2005, but since the estimates from the DHS are the newest and are measured against the newest growth standards, we use this as an estimate of the number of stunted children in SL and shed light on what a serious problem the country is facing.

When it comes to wasting the DHS estimates that 10.2% of the children under five are wasted. When wasting in children under five in a country exceeds 10% it is considered a public health emergency and it requires immediate intervention. Furthermore, the MICS surveys from 2000 and 2005 shows a prevalence of wasting of 10% and 9%, which illustrates this is not a new phenomenon.

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The fact that SL has one of the highest child mortality rates in the world estimated to be 269/1000 in 2006 (WHO 2006) and 194/1000 in 2008 (UNICEF 2008), is of course related to the high prevalence of undernutrition among the children. According to the Sierra Leonean health sector review made in 2004 by the British Council, undernutrition is an underlying cause of 50 % of the child deaths in Sierra Leone.

The following is a characterization of the undernourished children in SL according to the DHS.

In the age groups from 2-5 years the prevalence of stunted children are the highest. Children who has siblings not more than 4 years younger are more likely to be stunted than those who has no or older siblings. Children who were small or very small at birth are more likely to be stunted than those who were average. More children in rural areas than urban areas are stunted and more children in the northern and southern regions are stunted compared to eastern and western regions. Amongst the children whose mothers' do not have an education there is a higher prevalence of stunting compared to any education. Furthermore it is less likely for the child to be stunted if its mother belongs to the richest quintile of the country.

In the age group 9-11 months the prevalence of wasted children is the highest. Children who have siblings not more than 23 months younger is more likely to be wasted compared to children with even younger siblings. Children who were very small at birth are more likely to be wasted than those who were not. 18.8% of children who had mothers with a Body Mass Index < 18.5 were wasted. It is most likely to be wasted if you live in the southern region. Furthermore the prevalence of wasting is highest amongst the poorest and richest quintile.

To sum up: The population of children in Sierra Leone suffering the most from undernutrition is living in rural areas in the northern or southern regions together with siblings who are not more than 4 years younger than them. Their mothers probably don't have an education and they probably don't have a lot of money either even though wasted children both live among the richest and poorest not many stunted live among the richest.

4.1 Basic causes

4.1.1 Political causes

The actors in the political environment pertaining to the issue of undernutrition are the Government of Sierra Leone (GoSL), the citizens and CSOs; and the donors. In the following, the actors

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will be examined in an institutional and political context. After that, the relationship between the actors will be addressed concerning *accountability and transparency*, and *ownership*.

GoSL is Ministries, Department and Agencies (MDAs). *GoSLs* record of providing good governance and effective institutions have improved substantially since the end of the civil war, even though corruption remains a vast challenge (Freedom House 2010). Almost half of the government budget is financed by international grants and loans. That makes SL highly aid dependent³, which, coupled with weak government structures, puts *GoSL* in a weak negotiation position to the donors.

The main responsibility of undernutrition is placed at the Ministry of Health and Sanitation but the multi-sectoral nature relates other ministries to the model such as Ministry of Agriculture, Ministry of Education, Ministry of Mineral Resources and Ministry of Finance and Economic Development (MOFED). This results in need for effective coordination on several levels. MOHS has a department of nutrition, coordinating all nutrition activities within the Ministry, and the fusion of health and sanitation acknowledges the role of sanitation as an underlying cause for many health issues. Coordination across ministries is led by the Cabinet. Coordination and negotiation with the donors take place in the Development Partnership Committee (DEPAC) under the President's office. The MOFED coordinates at the operational level, and local cross-sector coordination is led by District Working Groups. This fragmented institutional structure does not promote flow of information and transparency.

The *citizens* in SL are the individuals who are supposed to benefit from the development, and in this case overcome undernutrition. The individual does not usually have a direct relation to *GoSL* (or to the donor), but is in some cases represented by *CSOs*. The civil society is not strong and well organized compared to western standards, but did play a strong and influential role in bringing democratic change to the country after the civil war (EURODAD 2008). The distinction between *GoSL* and the citizens of SL is a simplification of a more complex relationship with government, districts, communities and citizens. It nevertheless, illustrates the implications of at state-centered approach to aid and the implications of accountability in the relationships.

The *donors* are the foreign governments, international organizations and international NGOs, who donate capital or projects. The most influential donors in SL are DFID, the European Commission, the World Bank and the African Development Bank. These are also the only donors that channel some of their aid directly through the government budget (direct budget support) (EURDAD

³ This need is not reflected in how much aid SL receives per capita compared to its neighbors, that ranks higher on the HDI (EURODAD 2008)

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2008). The UN agencies are also significant players (UNDP, UNICEF, WFP and UNHCR). The donors have three donor-only coordination spaces in SL; one for the donors that provide multi-donor budget support, where conditions are negotiated *before* entering dialogue with GoSL. The second is coordination meeting between the UN agencies, and finally the EC coordinates with all European donors. This strengthens the donors bargaining position in relation to GoSL.

4.1.1.1 Transparency and accountability

Lack of reliable information in developing countries is often a problem and SL is no exception. The weak government institutions and fragmented coordination setup, makes the issue of transparency pertinent in the relationships between the actors. This makes it hard for GoSL to be accountable to the donor, which generates a severe lack of trust in this relationship. The low level of transparency makes corruption more likely, which further weakens the trust. The relationship between GoSL and the citizen shares the same characteristics as well as a low level of democratic accountability. The fact that GoSL is not accountable to neither the donors nor the citizens, and the high level of corruption, generates a significant distrust from the donors to GoSL with implications for negotiations on aid (EURODAD 2008 and Lawson 2007). The distrust makes the donors reluctant to abide to the commitments of the Paris Declaration, turning over the control of aid.

This doesn't seem to be the case at first sight, where SL in 2006 received 20% of total official development assistance as direct budget support and 36% of total aid as project support through GoSL MDAs (DACO 2006). Both percentages are relatively high compared to other developing countries (EURODAD 2008). Direct budget support is considered to be well in line with the commitments of the Paris Declaration. direct budget support has a two pronged effect. First the direct effect from flow of funds and second the policy and institutional effects. These indirect effects due to strengthening of domestic processes of policymaking, budget-formulation and budget execution (Lawson 2007) and thereby contributes to more transparency and accountability. Unfortunately the low level of trust in the Donor-GoSL relationship, leaves the donors with two strategies; either to provide aid heavily laden with conditions that opens the government to donor influence, or to keep control by setting up parallel project units to bypass government structures they do not trust (EURODAD 2008).

4.1.1.2 Ownership - for whom?

According to the Paris Declaration, ownership is defined as "*Partner countries exercise effective leadership over their development policies, and strategies and co-ordinate development actions*" (PD2005:3). This has lead to the SL Poverty Reduction Strategy Paper (PRSP 2005), where GoSL has committed to encourage the participation of civil society and the private sector. The first PRSP was elaborated in 2004, after an inclusive consultation process where CSOs were participating (EURODAD

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2008). This seems promising in the ownership-perspective, but it can be discussed if the PRSP actually is a valid generator for ownership, for three reasons. First, the PRSP was a donor condition for debt-relief under the HIPC⁴ initiative, and can be argued to be donor-driven. Since the PRSP was initiated not by SL but by the donors, GoSL took starting point in the donors country strategies due to the country's aid dependency, and by that aligned the SL strategy to donor strategy instead of the other way around (EURODAD 2008).

Second, the PRSPs are both broad and not clearly prioritized, so all potential donor projects fit in. The donors seem to prioritize large investments in improving governance structures. This is certainly an area with developing potential, but many citizens prioritize projects that can improve their physical well-being, without this is reflected in the way aid is used. Another donor tendency is to invest in concrete projects over developing capacities, which for the case of fighting undernutrition, result in large numbers of health centers but in many cases not enough qualified people to staff them (EURODAD 2008).

Third, GoSL was responsible for the elaboration of the PRSPs generating ownership mainly on governmental level, and not on the citizen level. CSOs were included as mentioned above, but placing the process at a more decentralized local level could generate a greater level of local ownership where the project actually is implemented. That would also make projects more aligned with local contexts.

The arguments above suggest that ownership should be less imposed from the donors, GoSL should make more unambiguous priorities, and finally, ownership should be developed on citizen/CSO level.

To condense the political causes, two main points can be drawn. First the strong bargaining position of the donor and the weak position of the GoSL combined with the level of distrust, makes GoSL often comply to the donors conditions (EURODAD 2008) as in earlier supply-driven approaches. The relationship between GoSL and the donors is supposed to be equal according to the Paris Declaration, but this is not the case. Strengthen transparency and accountability will address this, and can be done in several ways:

Better transparency could be obtained by uniting domestic and donor coordination in one organization and would give better possibilities for scaling up. However, removing the donor coordination from the president's office could weaken GoSL in the negotiation process.

Enhanced trust can be achieved by strengthening CSO's to increase accountability for the GoSL and by addressing corruption. A widely recognized tool for this is Public Expenditure Tracking

⁴ Heavily Indebted Poor Countries.

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Surveys (PETS). Sundet shows that PETS needs to be conducted with adaption to local contexts. This makes PETS done by CSOs more successful than initiatives by external experts (Sundet 2008).

The second point is that the potential from generating ownership to make more effective projects by align with local contexts is not fulfilled and GoSL structures are undermined. Again aid becomes supply-driven and not aligned with local context contrary to lessons learned from earlier approaches. This can be addressed by strengthen ownership to increase projects efficiency and thereby the level of trust by ensuring alignment with SL context by formulating a more clearly prioritized PRSP and increase local involvement by including CSOs more in the negotiating process.

4.1.2 Economic causes

The increase in political stability after the end of the civil war, has led to a revival of the economy. The country experienced positive economic growth figures from 2004-2008 and relatively low inflation until the impact of the global financial crisis. SL does perform satisfactory according to the IMF quantitative performance criteria, but the economic slowdown continued in 2009, however with signs of a turnaround in exports and economic activity. Especially exports of diamonds and agricultural products have picked up. In February 2010 inflation jumped to 17%.

4.1.2.1 IMF and SL

The SL economy is as other developing countries monitored by the IMF, and IMF conditionalities and financial benchmarks are used by donors as economic conditions before dispersing aid (ActionAid). This makes SL highly dependent on the IMF ratings, and restrains GoSL possibilities for exercising economic policies. In 2007 the European Commission, World Bank and DFID froze their budget support payments to SL after the IMF sounded the alarms. This forced GoSL to operate on a cash budget, with little funding left to fight undernutrition and other problems.

Fortunately the donors were alarmed by this, and called for a review of the feasibility of IMF targets. The link between the IMF's rating and the donors aid disbursements can create a vicious circle: if SL doesn't live up to the IMF benchmarks, they risk that the donors refuse to disperse funding, resulting in bigger fiscal deficit and moving further off track with the IMF's standards (Ibid).

The financial crisis could lead to situations, where GoSL needs financial maneuver room that could collide with the IMF's standards. A 2009 UNDP report estimated that decline in export could result in a fall in national income of almost ten percent, which according to the 2003 household survey would increase poverty by twelve percent of the population. The report recommended, that GoSL initiated a fiscal expansion similar to the "stimulus packages" implemented by the governments of the major industrial countries, designed to replace the fall in private sector demand with public sector expenditure.

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4.1.2.2 Economic growth

GoSL has acknowledged the need for economic growth as a generator for development and employment. The second PRSP (PRSP2) emphasized the focus on economic growth, generated by a broad list of initiatives. Elements in this are to strengthen agriculture, strengthen infrastructure and private sector growth. Growth in agriculture results in higher food production, export and less unemployment, and by that affect the underlying causes of undernutrition. The impact from better infrastructure is similar. Reforms in the financial sector attract (foreign) investments that SL need so badly for development. After these reforms, SL is top performer in West Africa on the Doing Business index (World Bank 2008). The efforts for improving private sector growth include community based initiatives such as microfinance, community Banks and rural credit delivery. Evidence from Eklund suggests that this is a feasible solution in the case of SL (Eklund 2010).

The economic factors describes the economy of SL as recovering slowly but that it is affected by the global financial crisis. Two points can be drawn from the economic causes. First it is a problem that the IMF conditionalities restricts GoSLs options for responding actively the crisis, which could be addressed by, first reviewing the feasibility of IMF targets and untying donor aid from the IMF targets.

Secondly, a continued focus on economic growth is effective to mitigate the economic causes by strengthening agriculture, infrastructure and private sector growth by community-based initiatives, such as microfinance, community banks and rural credit delivery.

4.1.3 Social Structures

SL is a country with many ethnicities but as mentioned earlier, people are first and foremost Sierra Leoneans. The Temne are mostly located in the Northern region and the Mende in the South. Ethnicity does not seem to be a conflictual matter, although there is some evidence that points to a degree of separation between the two tribes. Where the Mende have a long tradition of accepting new groups into their societies, the Temne are a more close-knit and territorial community. This is reflected in their familial structures. The Mende traditionally formed large households and communities. (Scäfer 1999).

It is a common routine to share the childrearing between different members of the household but also between different households (Bledsoe et al. 1988). It is often the mothers' families that undertake the task of looking after their children, but it can also be from unrelated social groups (Scäfer 1999). Fostering (living away from their mother) gives the children possibilities for better education and a more stable home environment in many cases but there is also evidence to the fact that fostered children suffer greater from malnutrition and show higher degrees of mortality than

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those reared at the mothers house (Bledsoe et al 1988). Approximately 40% of children in SL are fostered (DHS)

The women of SL are statutorily equal to men, and that seems to be the prevalent attitude in the Mende society at large. Women can own and inherit land, be chiefs and authority figures as well as men and generally have equal access to education. In the Temne society this is not always the case. The Temne have a very hierarchical society and paramount chiefs are the head of the community, and are always men. It is hard to buy land if you are not part of a family and even harder if you are a woman (2007 Country Reports on Human Rights Practices, Sierra Leone [CRSL 2007]; UNHCR assessment 2003; Unruh and Turray 2006).

There is a stronghold for secret societies; an estimated 60-80% of the population is reported to belong to a secret society. There is a rich tradition for male and especially female groups, *Poro* and *Sande* respectively, to form social and supportive networks across families. It has also been reported that female farmers and youth cooperatives have had relative success across the entire nation. Quite a few of these projects could not raise funding, though, and was therefore never realized (Richter et al. 2001; Unruh and Turray 2006). This community-oriented culture is a positive feature since it can be utilized to reduce undernutrition. Independent female CSOs have been shown to be a successful way to implement education and share experiences of preventing undernutrition in Papua New Guinea (Imai and Eklund 2008)

Households that had experienced direct violence in the conflict are more likely to become politically active and mobilize their community in the post war society (Bellows and Miguel 2009). The RUF targeted community leaders, chiefs and authority figures in their violent behaviors. This implies that community authoritarian figures have a strong incentive to continue work in their society, which can be used for nutritional education and interventions. Some cultural features have been suggested to use for HIV/AIDS campaigns, for instance the fact that in rural areas traditional healers are still widely used, especially if there is no access to health facilities They could prove an important tool in raising awareness and educating communities on undernutrition. Traditional theater is also enjoyed across the regions and could be used to spread the message as well (Richter et al. 2001).

The social structure in SL is very community oriented and can be employed to optimize the education and interventions for child undernutrition.

4.2 Underlying Causes

4.2.1 Household Food Insecurity

As mentioned earlier the household food security consists of the four factors availability, access, stability and utilization. The numbers from Smith et al. (2000) suggest that SL has a negative

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dietary energy balance which means they are not producing, importing and distributing enough food to secure a healthy living for the people and is therefore much more vulnerable to food shocks (Smith *et al.* 2000; FAO). These numbers have not improved much in the last 10 years (PRSP2).

4.2.1.1 Availability.

According to WFP's report (2008) SL suffers from a production deficit, they are simply not producing enough food and importing food fills the shortage. In general the manufacture increased from the period 2002-2007, but according to the PRSP2 it declined in 2007, especially crop production, which is the largest part of net production and source of calories in SL (PRSP2). The main foods are rice (also the main bulk of import), cassava, sweet potato and groundnuts.

The by and large most commonly produced crop is cassava, with an annual net production rising from almost 900 MT in 2002 to almost 300,000 MT in 2006. This is more than three times the amount of rice and 10-12 times the amount of sweet potato and groundnuts being produced in SL. Cassava is notoriously poor in nutrients and contains almost exclusively starch. A diet consisting of mainly cassava does not contain the acquired daily intake of protein, and must be supplemented with rice, that is usually bought at the market (Barclay *et al.* 1999; Welsh 2001a⁵). Moreover cassava contains small amounts of cyanide compounds and if not prepared correctly it can be toxic to the consumer (Mlingi *et al.* 1992). It is on the other hand a very lenient crop. It grows on marginal land, is very drought resistant, and the farmer can delay the harvest for 36 months, without the crop wilting or going bad. The leaves are also eaten as greens and they contain a slightly higher amount of protein and vitamin A and B (Barclay *et al.* 1999).

Another reason why cassava is popular apart from the practical reasons is the fact that land tenure in SL is very complex and many people can only grow one-year crops. With 1/3 of the population internally displaced after the civil war (WFP 2008) and extremely unclear tenure rights, there is a *de facto* shortage of agricultural land in SL. People resettling after the conflict has found it difficult to procure land, whether that is to buy or to rent, because of murky tenure, renting and production rights (Beoku-Betts 1982; Unruh and Turray 2006). In some areas it is not even possible to sell land to anyone outside their family. Often landowners will not allow their tenants to grow anything other than annual crops, because this might raise questions of ownership of the land. Tenants often have to renegotiate rental agreements every year and pay a percentage of their harvest to the landlord, and there is no judiciary system to enforce either parties' rights or fairness of the process (Unruh and Turray 2006).

⁵ Cited in Graham *et al.* 2006

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In the Northern region of SL tenure rights are particularly difficult, especially for women. If a woman is widowed or divorced, she will have to leave her land and return to her family. It is almost impossible to rent a house or land and these women and their children are truly destitute. Some female and youth cooperatives have had success with buying land, that then could be farmed by these vulnerable groups, and thereby bypass tenure problems (Beoku-Betts 1982, Unruh and Turray 2006). SL needs to construct more transparent land rights and a better judicial system to ensure tenants and landowners rights, males as well as females.

Meat and fish consumption is low in SL (York and Gossard 2004). Higher meat, dairy and fish consumption would improve the low calorie, high starch diets (Allen and Gillespie 2001). SL lies on the Atlantic and has several large rivers and lakes and there is good potential for improved calorie supplementation from fish, which SL is not utilizing (PRSP2). Unfortunately, the civil war saw the destruction of much of the fishing fleet, their materials and landing sites, and there is no control or account for how much of the fish end available for local consumption. There needs to be more political incentive and backup for this fleet to be built up again and control to ensure that the people of SL benefits from their natural resources⁶ (Thorpe et al. 2009). Generally, the livestock production is rising but the number of livestock is low, app. 1 mill. animals, and the rise is very slow (PRSP2). Livestock can be a good way of diversifying food sources and milk and dairy products have been shown to reduce child undernutrition. (Barclay et al. 2009; Eklund 2010).

When asked, the farmers themselves are looking for more technologies to improve their yield pr ha and 2007 saw improvements in the use of machinery in farming. The effect of farming technologies does not give similar declines in child undernutrition, the improved production must be concentrated in the areas with the highest prevalence of malnourished children (Smith and Haddad 2001). Greater tractorization is not available to all parts of the community since use is combined with cost and education to run the machines. Also there are topographic constraints, not all fields are 'tractor-friendly'.

4.2.1.2 Access.

Poor infrastructure reduces access to markets where farmers can sell their harvest (Maconachie and Binns 2007). Combined with the fact that there are virtually no post-harvest processing facilities left standing after the conflict, poor infrastructure further isolates those farmers that do produce sufficient amounts of food (PRSP2). No reliable means of public transport are available, so most people walk to the cities carrying however much they can. Often when they reach the market, their goods and produce are no longer fresh and they cannot sell at a good price (Ibid;

⁶ PRSP 2008-12 estimates that \$29 mio is lost due to illegal fishing every year.

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CARE-Yale). Moreover, the problem is two-pronged: it not only prevents export of goods from an area, it also prevents import. If an area is infrastructurally isolated from more productive or market-accessible areas, development and food security are much more vulnerable (Barrios 2008).

4.2.1.3 Stability.

Stability refers to the continuous access and availability of food in the household.. According to Unruh and Turray (2006) the food shocks in SL have led people in the rural areas to retain land in case of problems, even if they do not have the manpower to farm it. Food shocks can be a number of different situations that lowers food availability and access: natural or human endorsed disasters and food and oil price rises are amongst the factors that play a role in destabilizing food security in a household.

The farming techniques used in SL offers another problem to stability, especially when considering the longer perspective. Not only does unsustainable agriculture⁷ techniques seriously deplete mineral content and soil quality, which then makes farmers more dependent on chemicals to sustain production, it can also damage the environment and ultimately effect the ecosystem services. Unsustainable techniques also require large parts of land to circulate crops and time to lay fallow thus decreasing available farmland for cultivation (Unruh and Turray 2006). Furthermore, only growing annual crops also deplete the land, and ultimately, by only growing few types of crop, vulnerability to food shocks increases, since there is a greater possibility of failing harvests and unfavorable markets with monoculture productions (Fraser et al. 2005). By diversifying crops, different life strategies apply to the various plants and the system is more resilient to fluctuations and climate change. Trees also function as nutrient pumps by dragging nutrients up from deeper within the ground and bring it to the surface where it can be utilized. (Stewart et al. 2006). Losing ecosystem services is not favorable for any developmental process. It means losing watersheds and many of the natural services people depend on, increase impacts of climate change, and decrease agricultural yield considerably, and will not improve the current food production stability (Mooney et al. 2009).

The GoSL are not directing enough funds to the agricultural sector, only 3% of the GNP (PRSP2). The 2007 decline in production was because the government further reduced the endorsement of the Agricultural Ministry, resulting in a depression in the accessibility of fertilizers, pesticides and other chemicals. The SL government has pledged to expand tree crop export (such as coffee and timber trees)(PRSP2) but this idea seems to be very different from the practice of the rural farmers. The general trend in the farming practices is that farmers try to avoid further food insecurity, instead of working towards improved food security. There is no incentive to take risks to better the

⁷ Slash and burn, deforestation and high grazing pressure (CIA WFB)

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situation, just to prevent it from getting worse (Unruh and Turray 2006). By reducing the monetary flow the government is effectively reinforcing this belief and creating further food shocks.

Low diversification of crops and unsustainable production methods will destabilize food security in SL. The government and CSOs should take action to promote crop and production diversification so the farmers can have a long-term sustainable production.

4.2.1.4 Utilization.

The question of individual food consumption and the nutritional uptake is the last of the four factors playing a part of household food security. If food is scarce and there is a hierarchical order in which the food is distributed at meal-time there can be unhealthy implementations. In some homes the male eats first, then the elderly, the children and in the end the female(s) (IFPRI 2006). Other factors such as health can suppress the nutrient intake, appetite, or ultimately uptake. Last but not least there is also the question of bioavailability of nutrients in the food consumed, how easily it can be absorbed and assimilated by the body.

Another strategy besides increase the quantity of food is to heighten the quality and prolong the self-life. Proper post-harvest processing can do this, but the conflict saw most of SL processing facilities destroyed. An alternative strategy is to ferment the food. Fermenting food is a traditional method of preservation in most of Africa. It is considered an old fashioned way of treating your food and has declined in popularity as industrialized preparation methods have come about (Nout et al. 1997). Fermentation is foremost a way to preserve foodstuffs but it offers additional positive side effects in nutrition content. Especially Lactic Acid Fermentation (LAF) and Sourdough Fermentation (SF) of cereals, root crops, and vegetables offer good improvement of nutritional value by increasing the bioavailability of micronutrients such as iron and zinc and vitamin C and B and adds essential amino acids. Moreover it serves as a good method for eliminating the cyanide compounds of cassava mentioned earlier (Nout 2009)

LAF has been shown to greatly reduce the presence of microorganisms that causes diarrhea: *E. coli*, *shigella sp.* and *salmonella sp.* in the food (Nout et al. 1997). LAF and SF foods can also be used as a weaning food for infants because of the antibacterial properties and the nutritional value. A study in Ghana (n=30) showed higher growth levels and very little prevalence of diarrhea on LAF diets compared to regionally normal diets. To no surprise though, the safety of fermented food still depends on the level of hygiene and sanitation in preparation of the food (Mensah 1997; Svanberg and Lorri 1997; Nout et al. 1997).

A joint FAO/WHO taskforce notes that fermentation is a good way of preserving food in areas where hot or cold storage are not available, and stress the need for further research into LAF (Nout et al. 1997;). The possibility to store food gives the female head of the household the ability to

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prepare food in advance, and instruct young children that are not able to prepare food themselves, to feed their younger siblings thereby increase the feeding frequency and thus the level of care (Svanberg and Lorri 1997). If there is social constraints in SL to LAF, SF and other types of fermentations it could pose a problem to the promotion of fermentation methods, as well is the long preparation time of fermenting food. Nevertheless, fermentation could prove to be a readily available and culturally imbedded tool to reduce undernutrition and should be investigated further.

As a conclusion, there seems to be a spatial correlation in the concentrations of undernourished children, namely the Northern and Southern region, it would be wise to investigate these areas and concentrate and diversify agricultural production *locally*, so farmers are less isolated and dependent on infrastructure. It must be of greatest importance to increase availability in SL, since it has been shown that just a small increase in available food, 75 kcal per capita, will decrease child malnutrition 1% on a national level (Smith and Haddad 2001). The government should pay more attention to the agricultural sector by increasing funding for sustainable production but also for cooperative initiatives. Furthermore, there is a need to look at ways to increase the nutritional value and shelf life of produce, perhaps by looking at area specific traditional methods.

4.2.2 Inadequate care

Care practices include, among others, feeding practices, home health practices and hygiene practices (see below) and are measured in the DHS.

4.2.2.1 Feeding Practices

Feeding practices are considered breastfeeding practices (initiation, exclusivity, frequency and duration) and complementary feeding practices. Complementary feeding practices are measured as recommended in WHO and UNICEF's "Indicators for assessing Infant and Young Child Feeding (IYCF) practices". Exclusive breastfeeding for the first 6 months of a child's life has a major influence on the child's chances of surviving by providing the child with adequate dietary intake and by avoiding serious infectious diseases. Complementary feeding practices are important since it determine the child's dietary intake between 6 and 23 months of age. (Brown *et al.* , 1998)

It is not the initiation nor the duration or frequency of breastfeeding that is a huge problem in Sierra Leone but that fact that only 11.2 % of the children are exclusively breastfeed during their first 6 months of life. For a country to be on track to reach MDG 4 – reduction of child mortality – at least 50 % of the children under 6 months should be exclusively breastfed (Bryce *et al.* 2006).

Turning to complementary feeding practices on the other hand, it is both the frequency of feeding during the day and the diversity of food given that is a problem in SL. Only 36.3% of the children are feed enough times during the day and only 53.8% are feed different food groups. Overall only 22.7 %

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of the children aged 6-23 months are feed according to the minimum standard of all 3 IYCF practices measured in the DHS. The minimum standards express the least complementary feeding practices needed, for a child to have an adequate dietary intake in order to meet its nutritional needs. (Brown et al. 1998)

4.2.2.2 Home Health Practices

For a caretaker to provide proper care she should be able to realize when the child needs to receive health care and make sure it gets it. The health care can be provided by the caretaker or available health services (UNICEF 1998).

The DHS shows that 45.8 % of the children with symptoms of ARI where taken to a health facility or provider for advice or treatment. To be on track of reaching MDG 4 this should be more than 70 % (Bryce et al. 2006). The survey also demonstrates that only 43.5 % of the children with fever were taken to a health facility, only 27.9% of the children in the survey slept under a bed net and only 56.5% of the children with diarrhea where given ORT and continued feeding. Furthermore, it is clear from the survey that those caretakers performing the worst belong to the poorest least educated part of women in Sierra Leone. Maybe this has to do with that fact that to provide proper care a caretaker needs resources as knowledge and economic resource control which, as earlier shown for most parts doesn't belong to the women in SL. (Engle et al. 1999)

To conclude: Inadequate care is an underlying cause of child undernutrition in Sierra Leone and therefore it is relevant to consider interventions that can provide resources as knowledge and economic resource control for the caretakers to provide better care.

When reading the PRSP2 it is mentioned that promotion of exclusive breastfeeding as well infant and young child feeding practices is a focus area to reduce the high childhood mortality rate. Turning to the strategy from UNICEF this is definitely also a focus area for them (UNICEF 2009). Bhutta et al. (2008a) has shown that the promotion of exclusive breastfeeding are shown to reduce child mortality rates, and they have also shown that complementary feeding strategies and educational support without food supplementation in food secure households reduces stunting and hereby childhood mortality. Why these intervention strategies have not made an impact in Sierra Leone yet is unknown by it is important to keep focusing on this and increase the attention towards these interventions.

4.2.3 Sanitation, hygiene and clean water.

In SL the country average for water and sanitation installations are 22% and 15%, respectively, with a large concentration in the urban areas and districts (SL Water and Sanitation

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Policy [SLWSP] 2007). According to the PRSP2 there has been a reduction in the use of improved drinking water sources has declined from 2002-2005, from 54% to 47%, which makes a lot of people dependent on ground or surface water collection. Due to the seasonal rainfall many households have to collect water away from the house in the dry season and store it until it is used. These storage facilities pose a threat to household health if the water was contaminated before collection, not adequately preserved or stored in small containers (Checkley *et al.* 2004). Cross contamination with human waste, either due to poor hygiene or sanitation or both also leaves the household water storage as a potential risk factor for infections (*ibid*). This is controlled by increasing hygiene practices such as washing hands with soap. The burden and responsibility of collecting water and disposing of human waste, lies with the women of SL. It is also women that teach the children about hygiene and prepare food and beverages in the home (SLWSP 2007).

4.2.4 Health services

Government based primary health and nutrition services in SL are centered at a total of 867 peripheral health units (PHUs). District hospitals support the PHUs as referral points and manage services outside competency of the PHUs. The PHUs makes health service geographical coverage “reasonable” (Gebril *et al.* 2004) albeit, the physical distance presents a major barrier for the usage, especially in rural communities. However, the health system is characterized by a general lack of appropriately qualified personnel, insufficient supplies of medicine and equipment, poor coordination and management (Wakabi 2010). This is most prevalent in the rural communities. The wealthier Western Area and Bo District have about three times as many personnel per capita, and the same trend appears in per-capita expenditure per district on health. Health personnel suffer from poor both pay and non-pay conditions, partly from donor tendencies to prioritize health facilities over personnel but this have now been addressed by a substantial increase of salary and other initiatives. An important utilization barrier is the cost of health care. This has recently been addressed by introduction of free medical care for pregnant and breastfeeding mothers, as well as children under the age of five.

Overall, the resources for the health sector are far from adequate. A major change to this can only be obtained by addressing the basic causes. However necessary progress can be achieved by approaching the health sector directly. At community level there are encouraging examples of participation of CSOs in the health sector, monitoring for undernutrition, and providing education on health and nutrition issues (Berggren *et al.* 1999; Sternin *et al.* 1999; Eklund 2008). The CSOs approach the citizen directly, bypassing the barrier of distance and costs. Monitoring by local CSOs raises knowledge of specific local context, and can be used to achieve a more efficient distribution of

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resources (Pangu *et al.* 1999). However the lack of skilled health personnel remains relevant and calls for a continued focus and increased flow of funds to education and continued support of personnel.

4.3 Immediate Causes

The immediate causes of child undernutrition in Sierra Leone are inadequate dietary intake and diseases. In theory all infectious diseases work in a synergistic relationship with undernutrition, but different infectious diseases affects the children in SL to different degrees. According to WHO/CHERG 2010 children in SL die from: pneumonia (16.0 %), Diarrhea (20 %), neonatal causes (23 %), other causes (18 %), malaria (13 %), injuries (3 %), HIV/AIDS (2 %) and measles (5 %). It is clear that infection with malaria and other agents causing pneumonia and diarrhea play a major role for the children in SL.

This corresponds well with result from the DHS 2008 that shows 24.5% of the children in the survey had fever (as a sign of malaria or other infections) during the night preceding the survey, 13% had diarrhea once in the two weeks preceding the survey and 6.5 % had symptoms of acute respiratory tract infections (ARI) also once during the two weeks preceding the survey. The disease burden, measured as Disability Adjusted Life Years (DALY), for Sierra Leonean children between 0-14 years is enormous and malaria, pneumonia and diarrhea accounts for half of the burden. (WHO DALY)

The children in Sierra Leone suffer from both stunting and wasting, due to lack of macronutrients but also micronutrients. In many developing countries micronutrient deficiencies are prevalent in all children in the population, which probably also is the case in Sierra Leone (Semba & Bloem 2001). The DHS shows that 75.9 % of the children suffer from anemia and about 50 % of these children has anemia due to iron deficiency (Rastogi & Mathers 2000). WHO considers anemia prevalence above 40 % to be a major public health problem (DHS). The numbers shows that neither disease treatment nor disease prevention is functioning in Sierra Leone and it is relevant to look at interventions directed at reducing both the mortality and morbidity from the three infectious diseases as well as interventions preventing them. Furthermore action should be taken against the inadequate dietary intake causing stunting, wasting and micronutrient deficiencies. When considering possible actions to be taken against the inadequate dietary intake, it is relevant not only to look at whether the child should have more food; it is also relevant to consider what sort of food should be provided.

Bhutta *et al.* (2008a) reviewed the effect of nutrition-related interventions on stunting and mortality in the first 3 years of life. It showed that reduction in mortality rates were mainly gained by promotion of breastfeeding (as earlier mentioned) and vitamin A supplementation. Reduction in stunting prevalence was mainly obtained by feeding interventions (food supplementation in food-insecure households and nutritional education in food-secure households) and zinc supplementation.

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When it comes to disease treatment the importance of ORT in the treatment of diarrhea is unquestionably important to secure that the child will not die from dehydration. (Munos et. al. 2010) Feeding during the disease stages has proven to reduce the weight loss (Semba & Bloem, 2001), and zinc supplementation decreases the duration and severity of the diarrhea episode and hereby the morbidity and mortality (Fisher et al. 2010). Mortality due to pneumonia should be reduced by case management in form of antibiotics (Theodoratou et. al. 2010). The disease treatment should be enhanced by better care and better health services since these are some of the underlying causes of infectious diseases. (see earlier). With 99% coverage of primary health care interventions (including those just mentioned) aimed at maternity, newborns and children in Uganda, it should be possible to reduce child deaths from pneumonia, diarrhea and malaria with 78-89 % (Bhutta et. al. 2008b). Since the child mortality rate in Uganda, as well as the percentage of child deaths contributed to the infectious diseases and other measures are much like those in SL, it is relevant to think that serious attempts to improve the primary health care interventions and coverage rates will have a serious impact on child deaths from malaria, diarrhea, ARI and hereby undernutrition in SL.

4.3.1 Interventions

When going through the PRSP2 as well as the UNDAF the most striking thing about the strategies aimed at nutrition is that reduction of stunting is not mentioned one single time. There are no mention of programs aimed at reducing stunting prevalence and no mention of providing food insecure households with food supplementation although this is one of the only direct nutrition interventions proven to actually reduce the prevalence of stunting. Turning to wasting the case management of both severe and moderate wasting is mentioned several times and is already implemented in many parts of the country. Interestingly, direct nutrition interventions aimed at reducing stunting is not a priority for the government in SL or the UN agencies who contributed to UNDAF, among them UNICEF, WFP and WHO. Furthermore WFP targets all their nutritional support towards children suffering from acute malnutrition and give no food supplementation for stunted children (WFP 2010).

The two micronutrients actually shown to have an effect on stunting are vitamin A and zinc. Vitamin A supplementation has for some years already been an intervention in SL (Bendeck et al. 2005) to children under five, and the only problem about this intervention is that coverage rates has decreased substantially during the last years and is estimated only to be 12% in 2008.(WHO/CHERG) Zinc supplementation is more difficult since it should be taken daily in order to have an effect. Furthermore, it is important to realize that even though a child receives zinc, other micronutrient deficiencies can then become the determining factor of stunting (Gibson 2000). In the PRSP it is

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mentioned that there will be a focus on provision and distributions of micronutrients but no mention on how. Maybe it would be more relevant to focus on variation in diet and hereby making sure the children has sufficient amounts of micronutrients.

Interventions aimed at providing better primary health care is by no doubt a priority for the GoSL and recently all health services for children and pregnant women have been made free of charge for the children in SL.

5 Conclusion

The children in SL need more food. Their daily dietary intake is too low and the way to immediately reduce the prevalence of undernutrition is by feeding interventions, since many homes are food insecure. Diseases in the form of infections are a great burden in SL and by treating the children suffering from malaria, ARI and diarrhea as suggested. By increasing the dietary intake and treating the infections the prevalence of stunting and wasting can be reduced. To develop a sustainable reduction of undernutrition the underlying causes food security, inadequate care, sanitation, hygiene and health services, must be addressed.

Food security should be heightened by optimizing production locally, thereby increase availability. Post-harvest processing facilities and methods should be improved; the value of area specific processing techniques should be recognized and researched. The government should support the agriculture sector more and make land and tenure legislation easier and more transparent. Furthermore, they should recognize and support local initiative such as women's farming cooperatives.

The least efficient care practices in SL are exclusive breastfeeding, complementary feeding, home health practices, sanitation and hygiene. By increasing resources for caretakers they will be able to act and improve their care practices to increase dietary intake and prevent infections. It is important to have efficient care practices in order to reduce the need for medical attention since the health services in SL is overall weak and suffers from insufficient funding. There is a profound lack of qualified personnel, medicine, equipment and monitoring at the local level and resources are unevenly distributed. Increased funding is needed and inclusion of local CSOs can be used for effective monitoring and education on undernutrition.

There is in SL a deeply rooted culture in local communities for social organization. This structure could prove useful for mitigating the impact of the underlying causes that stem from the weak state and weak institutional structure. The weak state is vulnerable to IMF conditionalities that are linked to donor disbursement. These limit the GoSL's abilities to adapt to economic fluctuations such as the recent global financial crisis. A continuously focus on economic growth should be

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maintained, by expanding community based initiatives such as microfinance, community Banks and rural credit delivery.

Well organized and strong CSOs could improve accountability in both the Citizen-GoSL and the GoSL-donor relationship, which increases the negotiating power of the government towards the donors. This is an important element in creating true ownership and live up to the intention of the Paris Declaration to put the partner country in charge of the development process.

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6 List of References

Aguayo, V. M. et. al., 2003; Sierra Leone – investing in nutrition to reduce poverty: a call for action; Hellen Keller International; Public Health Nutrition; 6(7); 653–657.

Allen, L. & Gillespie, S. (2001). "What Works? A review of the efficacy and effectiveness of nutrition interventions". ACC/SCN: Geneva in collaboration with the Asian Development Bank, Manila.

Barclay, D.V. et al. 1993; Dietary Intake Measurement In Rural Zaire: Macro-Nutrients; Nutrition Research; 13; p523-534

Barrios, E.B., 2008; Infrastructure And Rural Development: Household Perceptions On Rural Development; Progress in Planning 70; p1–44

Beaudry, M., 1999; Opportunities for the Summit: Improving the practice of public nutrition; in Marchione, T. J.; Scaling up, scaling down. Overcoming malnutrition in developing countries; Gordon and Breach Publishers.

Bellows, J and Miguel, E; 2009; War and local collective action in Sierra Leone; Journal of Public Economics 93, p1144–1157

Bendech, M. A. et. al., 2005; Rapid vitamin A supplementation coverage surveys drive program improvement in Sierra Leone; Sight and life; Newsletter 3/2005; 42-45.

Beoku-Betts, J, 1991; Agricultural Development in Sierra Leone: Implications for Rural Women in the Aftermath of the Women's Decade; Africa Today; Vol. 37; No. 1; p19-35

Berggren, G. G., 1999; Evaluation of the hearth program in Haiti: Mothers help scale up a nutrition program; in Marchione, T. J.; Scaling up, scaling down. Overcoming malnutrition in developing countries; Gordon and Breach Publishers.

Bhutta, Z. A. et. al., 2008; What works? Interventions for maternal and child undernutrition and survival; The Lancet; vol. 371; 417-440.

Black, E. et al. 2010; Global Regional and National Causes of Child Mortality in 2008: a Systematic Analysis; doi:10.1016/S0140-6736(10)60549-1

Black, R. E. et. al., 2008; Maternal and child undernutrition: global and regional exposures and health consequences; The Lancet; vol. 371; 243-260.

Brown, K. et. al., 1998; Complementary feeding of young children in developing countries: a review of current knowledge; WHO/NUT/98.1.

Bryce, J. et. al., 2006; Countdown to 2015: tracking intervention coverage for child survival; The Lancet; vol. 368; 1067-1076.

Causes Of Undernutrition in Children under five in the Case of Sierra Leone.

Katrine Grace Turner (20050821), Maja Kjer Nielsen (20040923) og Erik Lohmann Madsen (20002455)

Buzan, B., 1991; People, States and Fear – An agenda for international security studies in the post-cold war Era; Harvester Wheatsheaf.

Cairncross, S. et al. 2010; Water, Sanitation and Hygiene for The Prevention of Diarrhoea; International Journal of Epidemiology; 39: i193–i205

Checkley, W. et al.; 2004; Effect Of Water And Sanitation on Childhood Health In A Poor Peruvian Peri-Urban Community; The Lancet; Vol 363

Child Malnutrition In Developing Countries?; Agricultural Economics 26; p191–204

Collier, P., 2009; Wars, guns and votes. Democracy in dangerous places; HarperCollins Publishers, New York.

Eklund, P. A. & Katsushi, I., 2008; Women's Organizations and Social Capital to Reduce Prevalence of Child Malnutrition in Papua New Guinea; Oxford Development Studies; 36; 2; 209-233.

Eklund, P., 2007; Women's Organisations, Maternal Knowledge, and Social Capital to Reduce Prevalence of Stunted Children - Evidence from Rural Nepal; Journal of Development Studies; 43; 3; 456-489.

Eklund, P., 2010; Climate change with child malnutrition in Sub-Saharan Africa – need based programming considered with Sierra Leone case study; Unpublished draft.

Engle, P.L., Menon, P. & Haddad, L., 1999; Care and Nutrition: Concepts and Measurements; World Development; vol. 27; No. 8; 1309-1337.

Fewtrell, L. et al. 2005; Water, Sanitation, And Hygiene Interventions To Reduce Diarrhoea In Less Developed Countries: A Systematic Review And Meta-Analysis; Lancet Infect Dis; 5; 42–52

Fischer Walker, C. L. & Black, R. E., 2010; Zinc for the treatment of diarrhoea: effect on diarrhoea morbidity, mortality and incidence of future episodes; International Journal of Epidemiology; vol. 39; supplement 1; i63–i69.

Fraser, E.D.G. et al., 2005; A Framework For Assessing The Vulnerability

Gibril, A. et. al., 2004; Sierra Leone Health Sector Review. British Council.

Gibson, R.S., 2000; Zinc Supplementation for Infants; The Lancet; vol 335; 9220; p2008-2009

Graham R.D et al.; 2007; Nutritious Subsistence Food Systems; Advances in Agronomy; 92

Golden, B. E. et. al., 2000; Current issues in tropical pediatric infectious diseases, malnutrition: trials and triumphs; Transactions of The Royal Society of Tropical Medicine and Hygiene; 94; 12-23.

Causes Of Undernutrition in Children under five in the Case of Sierra Leone.

Katrine Grace Turner (20050821), Maja Kjer Nielsen (20040923) og Erik Lohmann Madsen (20002455)

IFPRI; 2006; Global Hunger Index: Facts, Determinants, And Trends, Case Studies In The Post-Conflict countries of Afghanistan and Sierra Leone;

Josefsen, S., 2004: Om Nye Borgerkrige; Master Thesis; Aarhus University.

Lawson, A., 2007; DFID Budget Support to Sierra Leone 2004-2007: Achievements & Lessons for the future; Overseas Development Institute; London.

Levinson, J. & McLachlan, M., 1999; How Did We Get Here? A History of International Nutrition; in Marchione, T. J.; Scaling up, scaling down. Overcoming malnutrition in developing countries; Gordon and Breach Publishers.

Lozoff, B. et. al., 2006; The Double Burden of Iron Deficiency in Infancy and Low Socioeconomic Status; Archives of Pediatrics & Adolescent Medicine; vol. 160; 1108-1113.

Maconachie, R. and Binns, T, 2007; Beyond The Resource Curse? Diamond Mining, Development And Post-Conflict Reconstruction In Sierra Leone; Resources Policy 32 ; p104-115

Marchione, T. J. 1999; Scaling up, scaling down. Overcoming malnutrition in developing countries; Gordon and Breach publishers.

Mensah, P. 1997; Fermentation - The Key To Food Safety Assurance In Africa?; Food Control; 8; No. 5/6; p271-278

Mlingi, N., Poulter, N. H. and Rosling, H; 1992; An outbreak of acute intoxications from consumption of insufficiently processed cassava in Tanzania; Nutrition Research, Volume 12, 6, pp677-687

Mooney, H et al.; 2009; Biodiversity, Climate change, and Ecosystem services; Current Opinion in Environmental Sustainability; 1; p46-54

Munos, M. K. et. al., 2010; The effect of oral rehydration solution and recommended home fluids on diarrhoea mortality; International Journal of Epidemiology; vol. 39; supplement 1; i75-i87.

Nout, M.J.R. 2009; Rich Nutrition From The Poorest – Cereal Fermentations In Africa And Asia; Food Microbiology 26; p685-692

Nout, M.J.R. and Motarjemi, Y. 1997; Assessment Of Fermentation As A Household Technology For Improving Food Safety: A Joint FAO/WHO Workshop; Food Control; 8; No. 5/6; p221-226
Of Food Systems To Future Shocks; Futures 37; p465-479

Oldewage-Theron, W.H. et al. 2006; Poverty, Household Food Insecurity And Nutrition: Coping Strategies In An Informal Settlement In The Vaal Triangle, South Africa; Public Health; 120; p795-804

Causes Of Undernutrition in Children under five in the Case of Sierra Leone.

Katrine Grace Turner (20050821), Maja Kjer Nielsen (20040923) og Erik Lohmann Madsen (20002455)

Pangu, K. A. et. al., 1999; Equity and Sustainability of the health system: A community Agenda in the central region of Togo; in Marchione, T. J.; Scaling up, scaling down. Overcoming malnutrition in developing countries. Gordon and Breach Publishers.

PRSP 2005; Poverty Reduction Strategy Paper, A National Programme for Food Security, Job Creation and Good Governance 2005-2007, 2005; Government of Sierra Leone.

PRSP2; 2009; Sierra Leone, Joint IDA-IMF Staff Advisory Note On The Second Poverty Reduction Strategy Paper; Report No. 50351-SL

Ricter, D. L. et al.; 2001; Limiting The Spread Of HIV/AIDS In Sierra Leone: Opportunities For Intervention; Journal Of The Association Of Nurses In Aids Care, Vol. 12, No. 5, September/October 2001, 48-54

Schäfer, R; 1997; Variations In Traditional Marriage And Family Forms: Responses To The Changing Pattern Of Family-Based Social Security Systems In Sierra Leone And Kenya; The History Of The Family, An International Quarterly, 2, 2, p197-209

Scrimshaw, N. S. et. al., 1968; Interactions of nutrition and infection; WHO monograph series; No. 57.

Semba, R. D. & Bloem, M. W., 2001; Nutrition and Health in Developing Countries; Humana Press.

Sen, A. 1999; Development as Freedom; Oxford University Press; ISBN-13: 978-0-19-289330-7

Smith, L.C. and Haddad; L. 2001; How Important Is Improving Food Availability For Reducing
Smith, L.C. et al., 2000 ;The Geography And Causes Of Food Insecurity In Developing Countries; Agricultural Economics 22; p199-215

Statistics Sierra Leone (SSL) and ICF Macro. 2009. *Sierra Leone Demographic and Health Survey 2008*. Calverton, Maryland, USA: Statistics Sierra Leone (SSL) and ICF Macro.

Sternin, M. et. al., 1999; Scaling up a poverty alleviation and nutrition program in Vietnam; in Marchione, T. J.; Scaling up, scaling down. Overcoming malnutrition in developing countries; Gordon and Breach Publishers.

Stewart, A.W.D. et al.; 2006; Lacandon Maya Forest Management: Restoration of Soil Fertility Using Native Tree Species; Ecological Engineering 28; p205-212

Sundet, G., 2008; Following the money: Do Public Expenditure Tracking Surveys matter?; U4 Anti-corruption research center.

Svanberg, L. and Lorri, W. 1997; Fermentation and nutrient Availability; Food Control; 8; No. 5/6; p319-327

Causes Of Undernutrition in Children under five in the Case of Sierra Leone.

Katrine Grace Turner (20050821), Maja Kjer Nielsen (20040923) og Erik Lohmann Madsen (20002455)

Tharakan, C. and Suchindran, C; 1999; Determinants Of Child Malnutrition- An Intervention Model For Botswana; Nutrition Research 19; 6; p843-860

Theodoratou, E. et. al. 2010; The effect of case management on childhood pneumonia mortality in developing countries; International Journal of Epidemiology; vol. 39; supplement 1; i155-i171.

Thorpe, A. et al., 2009; Fisheries And Failing States: The Case Of Sierra Leone; Marine Policy 33; p393-400

Tomkins, A. & Watson, F., 1989; Malnutrition and Infection; ACC/SCN State-of-the-Art Series Nutrition Policy Discussion Paper; No. 5; Geneva: ACC/SCN.

UNDAF: United Nations Development Assistance Framework, Sierra Leone, Draft 2008-2010; Peace Consolidation And Accelerating Development; United Nations Country Team, February 2007.

UNDP 2009: Weeks, J., 2009; The impact of the global financial crisis on the economy of Sierra Leone; Country Study; number 18; September 2009.

UNICEF 1991: A UNICEF policy review. Strategy for improved nutrition of children and women in developing countries; ISSN: 1013-3194.

UNICEF 1998: THE STATE OF THE WORLDS CHILDREN 1998, Focus on Nutrition; Oxford University Press; ISBN 0-19-829401-8.

UNICEF 2009: Tracking Progress on child and maternal nutrition: A survival and development priority. ISBN: 978-92-806-4482-1

Unruh, J. and Turray H. 2006; Land Tenure, Food Security And Investment In Postwar Sierra Leone; LSP Working Paper 22; Food And Agriculture Organization Of The United Nations

Victoria, C. G. et. al., 2008; Maternal and child undernutrition: consequences for adult health and human capital; The Lancet; vol. 371; 340-357.

Wakibi, W., 2010; Mothers and infants to get free health care in Sierra Leone; The Lancet; Vol. 375; 882.

Water Supply And Sanitation Policy For Sierra Leone; 2007; United Nation Economic Commission For Africa

WHO 2008. "Indicators for assessing IYCF (Infant and Young Child Feeding) practices". ISBN: 978 92 4 159666 4

World Food Programme Sierra Leone; Annual Report 2008

Causes Of Undernutrition in Children under five in the Case of Sierra Leone.

Katrine Grace Turner (20050821), Maja Kjer Nielsen (20040923) og Erik Lohmann Madsen (20002455)

York, R and Gossard, M.H. 2004; Cross-National Meat And Fish Consumption: Exploring The Effects Of Modernization And Ecological Context; doi:10.1016/j.ecolecon.2003.10.009

Websites:

ActionAid: The Vicious Cycle of IMF Conditions in Sierra Leone and Malawi.
http://www.actionaidusa.org/what/intl_policy/sl_malawi/ (accessed 10 June 2010)

Care-Yale; virtual field Trip to Sierra Leone;
<http://www.yale.edu/care/sierraleone/maintopics.htm> (accessed 12 June 2010)

CIA World Fact Book; <https://www.cia.gov/library/publications/the-world-factbook/geos/sl.html> (accessed 17 June)

CRSL 2007: <http://www.state.gov/g/drl/rls/hrrpt/2007/100503.htm> (accessed 22 June 2010)

DACO 2006: Development to Sierra Leone 2006: Rapport, Development Assistance Coordination Office. <http://www.daco-sl.org/report.htm> (accessed 01 June 2010)

EURODAD 2008: Old habits die hard: Aid and accountability in Sierra Leone. Report by EURODAD with Campaign for Good governance. EURODAD.
<http://www.eurodad.org/whatsnew/reports.aspx?id=2038> (accessed 05 June 2010)

FAO Foodsecurity: http://www.fao.org/organicag/ofs/index_en.htm (accessed 20 June 2010)

Freedom House 2010: Countries at the crossroad 2010. Country report – Sierra Leone.
<http://www.freedomhouse.org/template.cfm?page=140&edition=9&ccrpage=43&ccrcountry=204> (accessed 25 June 2010)

HDI 2009: Human Development Index 2009. UNDP. <http://hdr.undp.org/en/statistics/data/> (accessed 01 June 2010)

PD 2005: The Paris Declaration on Aid Effectiveness.
<http://www.oecd.org/dataoecd/11/41/34428351.pdf> (accessed 28 June 2010)

Rastogi R. & Mathers C. D.; Global burden of iron deficiency anaemia in the year 2000;
http://www.who.int/healthinfo/statistics/bod_irondeficiencyanaemia.pdf (accessed June 23, 2010).

UNDP: Millennium Development Goals. <http://www.undp.org/mdg/goal1.shtml> (accessed 05 June 2010)

UNHCR assessment 2003: Minorities at Risk Project, Assessment for Temne in Sierra Leone, 31 December 2003, available at:
<http://www.unhcr.org/refworld/docid/469f3acd26.html> [accessed 22 June 2010]

Causes Of Undernutrition in Children under five in the Case of Sierra Leone.

Katrine Grace Turner (20050821), Maja Kjer Nielsen (20040923) og Erik Lohmann Madsen (20002455)

UNICEF 2008: <http://www.unicef.org/infobycountry/sierraleone.html> (accessed 28 June 2010)

Visit Sierra Leone; <http://www.visitsierraleone.org> (accessed 20 June 2010)

WFP 2010: Protracted relief and recovery operations – Sierra Leone 200062.

http://one.wfp.org/operations/current_operations/project_docs/200062.pdf (accessed 27.06.2010).

WHO 2006: <http://www.who.int/countries/sle/en/> (accessed 28 June 2010)

WHO DALY:

http://www.who.int/healthinfo/global_burden_disease/estimates_country/en/index.html (accessed 23 June 2010)

WHO Food security: <http://www.who.int/trade/glossary/story028/en/> (accessed 20 June 2010)

WHO Growth standards: <http://www.who.int/childgrowth/en/> (accessed 27 June 2010)

WHO/CHERG; <http://www.countdown2015mnch.org/documents/2010report/Profile-SierraLeone.pdf> (accessed 27 June 2010)

World Bank 2008: Doing Business 2009. Sierra Leone Makes Key Improvements in Business Reform.

<http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/SIERRALEONEEXTN/0,,contentMDK:21896701~pagePK:141137~piPK:141127~theSitePK:367809,00.html> (accessed 14 June 2010)