

Food habits and nutrition security in West Africa Practices from Southwestern Burkina Faso

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DEDICATION

*To my Family: my husband Michael Germer, my son Sidi Germer and my Daughter
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ABSTRACT

Background: The southwestern part of Burkina Faso (BF) like the whole country faces severe vulnerability to food and nutrition insecurity, which is characterised by a cyclical up and down, and particularly by a high rate of malnutrition. Dietary patterns represent one of the key factors of food and nutrition security or insecurity, especially malnutrition, and are thus the optimal starting point of investigating food and nutrition security. Earlier studies on food security focus on the production of and access to food but less on food consumption. This has led to a lack of concrete opportunities to capture the complexity of the dietary and culinary patterns to reflect on the fundamental issue of how food insecurity is experienced and perceived by the food insecure people themselves.

Objective: Against this constellation, this study investigated household's (hh) practices and experiences of food and nutrition by focussing on their dietary patterns for a better understanding of and therefore to a better policy to reduce vulnerability to food and nutrition insecurity in Dano commune, located in the southwestern part of Burkina Faso.

Methods: The data collection involved observations, in-depth unstructured and semi-structured interviews with key informants (n=28) and households (n=133 household), focus group discussions (n=8) and informal discussions, as well as household surveys and food consumption assessment such as 24-hour/seven-day, recalls on dietary intake (n=133 household).

Results: Dietary patterns were characterised by a poor quantity and quality of diet. Quantitatively the largest number of households (69%) consumed less than the recommended three daily meals. Whereby 61 % of households had a meal twice, 31% thrice, 4% once a day and 2% had occasionally a daily meal-meaning that they had no meal or less than once a meal a day, but with the tendency of not having a meal.

Qualitatively dietary patterns were monotonous with rarely any diversification. Diet consisted predominated of cooked cereal grains or flour-in form of a paste (tô)-accompanied by a sauce. Maize, red sorghum and rice were the most consumed cereals types. Diversity comes from the types of sauces. Sauces are with but not always meat or fish. For seasonings, shea butter and the traditional spice soumbala and/or were the most used in the sauces in the rural area, whereas Maggi and other vegetable oils (mostly groundnut, palm oil) appear in urban sauces. Okra, onion, aubergine, cabbage and sorrel are the most consumed vegetables both as fruit and leaves. Tomato is used fresh and/or as a paste, but mostly fresh. Baobab leaves,

generally used in form of dried powder represent also a significant part of the vegetables used by the households in sauces. The common dish on festive days is rice with tomato sauce with meat or poultry, accompanied by tuber stew in some cases. Pasta with tomato sauce is getting more a festive dish in rural Dano.

Other food groups, such as dairy products, meat and poultry, eggs, fruits, roots and tubers were irregularly consumed. These dietary patterns invariably lead to low dietary diversity and high malnutrition rates, especially among the most vulnerable population groups that were women in their reproductive age, and children under five years.

Furthermore, this study found out that the regular consumption of the local beer *Dolo* was an influential part of the diet. This was due to the dominant socio-cultural and religious meaning of the dolo during funerals and social events.

The dietary patterns were determined by economic, local food availability, sociocultural and health-nutritional factors. Economic and local food availability factors were revealed as having the strongest influence on diet. The sources of food were mainly own-production of food, purchase of food and food aid in form of intersocial and institutional food transfer.

However, not only food consumption underlined contexts of vulnerability, but food production and access as well. Food production was vulnerable to the existing and increasing climatic variability, increasing plant/crops and livestock diseases and the associated decreasing yields. Additionally, population growth and the resulting lack of land and related social instability, the increasing disinterest of the youth for farming, as well as the low institutional support and the predominance of traditional land rights represented further constraints faced by food producers. Food access was vulnerable to increasing food prices and a limited supply of some food groups (especially roots and tubers), fresh fish and good quality meat.

Established coping and/or adaptive strategies to that vulnerable food and nutrition situation existed at both household and institutional level. Households applied petty commodity production and trading (43%), the sale of livestock (31%), the sale of vegetables (16%), consumption of wild plants and fruits (21%) as most coping strategies. Institutions focused on sensibilisation (conscious awareness) on nutritive food and hygienic behaviour; admission and treatment of malnourished children through consumption of local nutritive crops in the health centre, school meals and food aid programmes for the most vulnerable as well as on increasing food production strategies.

Conclusion: This study highlights the vulnerabilities of the whole food and nutrition security chain- especially of food consumption- in the study area. The results add to the growing body of research indicating that good food availability and access do not

guarantee adequate dietary patterns. Furthermore, the study draws attention - at both the household and institutional level- to the importance and promotion of intensive awareness on the importance and the necessity of adequate dietary patterns, especially for the most vulnerable groups of women in their reproductive age and children under five years.

Keywords: Livelihoods, food and nutrition security, - dietary patterns, West Africa, Burkina Faso, Ioba Province, Dano.

ZUSAMMENFASSUNG

Hintergrund: Der südwestliche Teil von Burkina Faso (BF) ist wie das gesamte Land einer starken Anfälligkeit gegenüber Ernährungsunsicherheit ausgesetzt, die durch ein zyklisches Auf und Ab und insbesondere durch eine hohe Unterernährungsrate gekennzeichnet ist. Die Ernährungsgewohnheiten stellen einen der Schlüsselfaktoren für die Ernährungssicherheit oder -unsicherheit -insbesondere der Unterernährung- dar und sind somit der optimale Ausgangspunkt für die Untersuchung der Ernährungssicherheit. Frühere Studien zur Ernährungssicherheit konzentrierten sich auf die Erzeugung und den Zugang zu Lebensmitteln, jedoch weniger auf die Nutzung von Nahrungsmitteln. Dies hat zu einem Mangel an konkreten Möglichkeiten geführt, um die Komplexität der Ernährungsmuster zu erfassen, um über die grundlegende Frage nachzudenken, wie Ernährungsunsicherheit von den ernährungsunsicheren Menschen selbst erfahren und wahrgenommen wird.

Zielsetzung: Vor diesem Hintergrund untersuchte diese Studie die Praktiken und Erfahrungen von Haushalten (hh) in Bezug auf Ernährung, indem sie sich auf ihre Ernährungsgewohnheiten konzentrierte, um diese besser zu verstehen und politische Entscheidungen zur Verringerung der Anfälligkeit für Ernährungsunsicherheit in Dano kommune, im südwestlichen Teil von Burkina Faso, zu verbessern.

Methoden: Die Datenerhebung umfasste Beobachtungen, unstrukturierte und halbstrukturierte Interviews mit Key Informanten (Schlüsselinformanten, n = 28) und Haushalten (n = 133 Haushalt), Fokusgruppendifkussionen (n = 8) und informellen Diskussionen sowie Haushalt Umfragen und die Bewertung der Nahrungsaufnahme durch 24-Stunden- und 7-Tage -Diät-Rückrufe (n = 133 Haushalte).

Ergebnisse: Ernährungsgewohnheiten waren durch eine mangelnde quantitative und qualitative Aufnahme an Nahrung gekennzeichnet. Quantitativ nahm die größte Anzahl von Haushalten (69%) weniger als die empfohlenen drei täglichen Mahlzeiten zu sich. Dabei hatten 61% der Haushalte zweimal eine Mahlzeit, 31% dreimal, 4% einmal täglich und 2% gelegentlich eine tägliche Mahlzeit.

Qualitativ waren die Ernährungsgewohnheiten monoton mit seltener Diversifizierung. Eine Mahlzeit bestand überwiegend aus gekochten Getreidekörnern oder Mehl in Form von Paste (tô) - begleitet von einer grünen gemüsesoße. Mais, roter Sorghum und Reis waren die am meisten konsumierten Getreidesorten. Vielfalt ergibt sich aus den Saucenarten. Saucen sind häufig, aber nicht immer, mit Fleisch oder Fisch zubereitet. Im ländlichen Raum werden Saucen vorwiegend mit Sheabutter und dem

traditionellen Gewürz Soumbala zubereitet, wogegen Maggi und andere Pflanzenöle (meist Erdnussöl oder Palmöl) in Saucen im Stadtgebiet genutzt werden. Okra, Zwiebeln, Auberginen, Kohl und Sauerampfer sind das am meisten konsumierte Gemüse-sowohl die Frucht als auch die Blätter-. Tomaten werden frisch und / oder als Paste verwendet, jedoch meistens frisch. Baobabblätter, die in der Regel in Form von getrocknetem Pulver verwendet werden, stellen auch einen bedeutenden Teil des Gemüses dar, das von den Haushalten in Saucen verwendet wird. An Festtagen wird Reis mit Tomatensauce und Fleisch oder Geflügel, in einigen Fällen auch Knolleneintopf, zubereitet. Teigwaren mit Tomatensauce werden im ländlichen Dano immer festlicher.

Andere Lebensmittelgruppen wie Milchprodukte, Fleisch und Geflügel, Eier, Obst, Wurzeln und Knollen wurden unregelmäßig konsumiert. Diese Ernährungsgewohnheiten führen ausnahmslos zu einer niedrigen Ernährungsvielfalt und hohen Unterernährungsraten, insbesondere bei den am stärksten gefährdeten Bevölkerungsgruppen, den Frauen im gebärfähigen Alter und Kindern unter fünf Jahren. Darüber hinaus stellte diese Studie fest, dass Dolo, ein lokales Bier, einen einflussreichen Teil der Ernährung darstellte, aufgrund der zentralen soziokulturellen und religiösen Bedeutung des Dolo während Beerdigungen und gesellschaftlichen Ereignissen.

Die Ernährungsgewohnheiten wurden durch ökonomische, lokale Nahrungsmittelverfügbarkeit, soziokulturelle und gesundheitsfördernde Faktoren bestimmt. Dabei spielten die wirtschaftlichen Faktoren und die lokale Nahrungsmittelverfügbarkeit den stärksten Einfluss auf die Ernährung. Nahrungsquellen waren hauptsächlich die Eigenproduktion von Nahrungsmitteln, der Kauf von Nahrungsmitteln und die Nahrungsmittelhilfe in Form von intersozialem und institutionellem Lebensmitteltransfer.

Allerdings war nicht nur die Nahrungsaufnahme Verwundbar gegenüber Ernährungsunsicherheit, sondern auch die Produktion von und der Zugang zu Nahrungsmitteln. Die Nahrungsmittelproduktion war anfällig für die bestehende und zunehmende Klimavariabilität, zunehmende Pflanzen- und Viehbestandskrankheiten und die damit verbundenen sinkenden Erträge. Das Bevölkerungswachstum und der daraus resultierende Mangel an Land und die damit verbundene soziale Instabilität, das zunehmende Desinteresse der Jugend an der Landwirtschaft sowie die geringe institutionelle Unterstützung und das Vorherrschen traditioneller Landrechte bildeten weitere Einschränkungen für die Nahrungsmittelproduzenten. Der Zugang zu Nahrungsmitteln war anfällig für steigende Lebensmittelpreise und ein begrenztes

Angebot an bestimmten Lebensmittelgruppen (insbesondere Wurzeln und Knollen), frischem Fisch und Fleisch von guter Qualität.

Sowohl auf Haushaltsebene als auch auf institutioneller Ebene gab es etablierte Bewältigungs- und / oder Anpassungsstrategien für diese anfällige Nahrungsmittel- und Ernährungssituation. Die privaten Haushalte verwendeten Produktion und Handel von Kleinwaren (43%), Verkauf von Vieh (31%), Verkauf von Gemüse (16%), Konsum von Wildpflanzen und Früchten (21%) als die meist genutzten Bewältigungsstrategien. Institutionen konzentrierten sich auf die Sensibilisierung für den Konsum nahrhafter Lebensmittel und hygienisches Verhalten; die Aufnahme und Behandlung unterernährter Kinder im Gesundheitszentrum, Schulmahlzeiten und Nahrungsmittelhilfeprogramme für die am stärksten gefährdeten Personen wie Witwen und Waisen sowie durch die Förderung von Strategien zur besseren Nahrungsmittelproduktion.

Schlussfolgerung: In dieser Studie wurde die Verwundbarkeit der gesamten Säulen der Nahrungssicherheit - insbesondere der Nahrungsaufnahme - im Untersuchungsgebiet aufgezeigt. Die Ergebnisse tragen zu der wachsenden Forschungsmenge bei, die besagt, dass eine gute Verfügbarkeit und ein guter Zugang zu Nahrungsmitteln keine angemessenen Ernährungsgewohnheiten garantieren. Darüber hinaus macht die Studie sowohl auf Haushaltsebene als auch auf institutioneller Ebene auf die Bedeutung und Förderung einer intensiven Sensibilisierung für die Bedeutung und die Notwendigkeit angemessener Ernährungsgewohnheiten aufmerksam, insbesondere für die am stärksten gefährdeten Gruppen wie Frauen im reproduktiven Alter und Kinder unter fünf Jahren.

Schüsselwörter: Lebenssicherung (livelihoods), Ernährungssicherheit, Ernährungsgewohnheiten, Westafrika, Burkina Faso, Ioba Provinz, Dano.

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LIST OF ABBREVIATIONS

| | |
|--------------|--|
| Burkina Faso | BF |
| CEEP | Centre d'Éveil et d'Éducation Préscolaire (centre for Early Childhood and Preschool) |
| COGES | Comité de Gestion des Ecoles (Commuty of school management) |
| CREN | Centre de Récupération et d'Education Nutritionnelle (Centre for Recovery and Nutritional Education) |
| CSPS | Centre de Santé et de Promotion Sociale Centre de Santé et de Promotion Sociale (Health and social promotion centre) |
| DDS | Dietary diversity score |
| DFID | Department for International Development |
| ECOWAS | Economic Community Of West African States |
| FAO | Food and Agriculture Organization of the United Nations |
| FFQ | Food-frequency questionnaire |
| FGD | Focus group discussions |
| GAM | Global Acute Malnutrition |
| GDP | Gross domestic product |
| GO | Governmental organisation |
| GOBF | Gouvernement du Burkina Faso |
| HDD | Household dietary diversity |
| HDDS | Household dietary diversity score |
| HFIAS | Household Food Insecurity Access Scale |
| HHmembers | Household members |
| HHH | Household head |
| IDS | Institute of Development Studies |
| IFPRI | International Food Policy Research Institute |
| INSD | L'Institut national de la statistique et de la démographie |
| MAM | Moderate acute malnutrition |
| MASA | Ministère de l'Agriculture et de la Sécurité alimentaire (Ministry of agriculture and food security) |
| MDDS | Minimum dietary diversity |
| MDG | Millennium Development Goals |
| MUAC | Mid-upper arm circumference |
| NGO | Non-Governmental Organisation |
| QCA | Qualitative content analysis |
| SAM | Severe acute malnutrition |
| SLA | Sustainable livelihoods approach |
| SLF | Sustainable livelihood framework |
| SOFITEX | La Société Burkinabè des Fibres Textiles |
| SSA | Sub-Saharan Africa |
| SUN | Scaling-Up Nutrition |
| UN | United nations |
| UNDP | United Nations Development Programme |
| UNICEF | The United Nations Children's Fund |
| WFP | World Food Program |
| WFS | World Food Summit |
| WHO | World Health Organisation |
| WRA | Women of reproductive age |

1- INTRODUCTION

1.1 OVERVIEW

The anthropologist Audrey Richards, once stated that “Nutrition as a biological process is more fundamental than sex” (Richards 2004:1). Richards with this statement wanted to reflect on the vast interest of study of sex, by showing that nutrition was not dictated by biologic alone, but satisfied a whole system of needs through institutional and social processes (Richards 2004). From this statement, it is clear that food besides its indispensable biological role in human survival is also indispensable for the socio-cultural survival of human beings.

However, the nutritional and socio-cultural aspects of food remain underestimated as most studies on food security still focus on the production of and access to food but less on food consumption. This has led to a lack of concrete opportunities to capture the complexity of the dietary and culinary changes and to reflect on the fundamental issue of how food insecurity is experienced and perceived by the food insecure people themselves.

This study is concerned about the food and nutrition security in southwestern Burkina Faso. The FAO defines food and nutrition as “a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (FAO 2015:53). Food in this definition refers to any substance that people eat and drink to maintain health and growth (Pangaribowo et al. 2013). However, with almost one million hungry people around the World - most of them in developing countries -, the achievement of food and nutrition security remains one of the challenging global concerns at both academic and institutional level and plays a key role in global politics.

Dietary patterns in the scenario of global food issues represent one of the key factors of food and nutrition security or insecurity, especially malnutrition, and are thus the optimal starting point of investigating food and nutrition security. Dietary patterns in this study refer to the qualitative description in terms of percentage and frequency of consumption of different foods. Thus it gives the kind of food and not the quantity of food consumed (den Hartog et al. 2006).

Against this constellation, the main objective of this study is to investigate the household's practices and experiences of food and nutrition by focussing on their dietary patterns for a better understanding and therefore to a better policy to reduce vulnerability to food and nutrition insecurity.

1.2 FOOD SECURITY IN BURKINA FASO (BF): A CYCLICAL DEFICIENT AND SURPLUS SITUATION

In the last report of the FAO on the state of food insecurity in the world in 2015, 795 million people of the global population were estimated to be undernourished. This estimation suggests that one out of nine persons were seen to be suffering from chronic hunger, meaning that they were unable to secure enough food to conduct an active life (FAO et al. 2015). Yet, this figure also signals an acknowledged decrease in the prevalence of undernourishment from 18.6 per cent in 1990-92 to 10.9 per cent in 2014-16 for example, but still nevertheless, according to the FAO, remains an intolerable reality. Given this fact, the aim of global food security remains a pressing challenge as stated by the FAO in the World Food Summit in 1996, which maintains that food security is a basic human right where "Everyone has the right to secure access at all times to safe and nutritious food and water adequate to sustain an active and healthy life with dignity" (FAO 1996b). Most of the food insecure live in developing countries, where the prevalence of undernourishment is now estimated at 12.9 per cent in 2014–16, making 780 million food-insecure people (FAO et al. 2015).

Burkina Faso (BF) being a developing country, and one of the poorest and most food-insecure countries in the world does not escape this reality. The country has experienced sequential hunger and/or famines all through the 1970s and the 1990s, and more recently in 2000, 2005, 2009 and 2011/2012, resulting in the devastating loss of human life and livestock. As a landlocked country in West Africa, BF shares a border with Mali to the north, Niger to the east, Benin to the south-east, Togo and Ghana to the south, and Côte d'Ivoire to the southwest. With a size of 274 000 km² and an annual growth rate of 3%, its total population was estimated at 18,5 million inhabitants in 2016 (UN-OCHA 2015). Natural constraints such as rainfall instability, floods, drought, locust invasion, and land degradation have been and remain major causes of its highly vulnerable situation to food insecurity. However, natural constraints can be overcome, provided that one has at hand with land production techniques and tools. There is moreover a need for sound political leadership and its

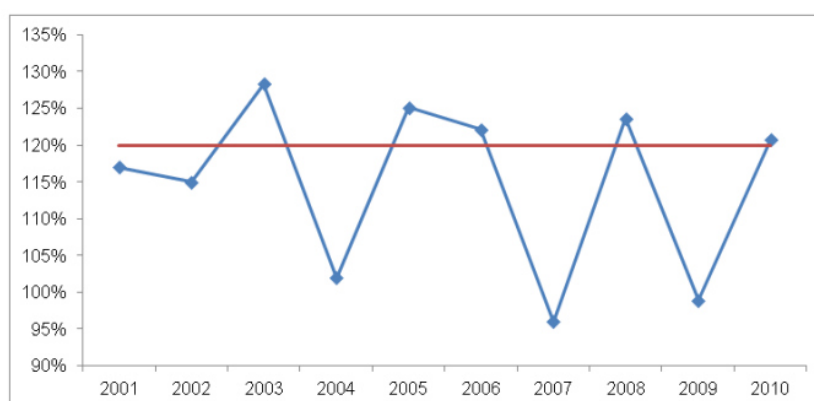
capability of organising the population (Ouedraogo 2006)¹. Nevertheless, natural constraints cannot be described as a unique potential driver of food insecurity. Other influencing factors such as technical, financial, political, and sociocultural factors play out in the broader canvas influencing Burkina's food security. These multiple factors, amounting to its socio-economic, environmental and political challenges have further compounded its predicament of being historically vulnerable to food insecurity.

A past study on food security in BF was conducted by (Sawadogo 1995) who stated that although the majority of Burkinabé produce for self-consumption, BF has been experiencing repetitive food crises since the 1970s. For example, for the cropping periods between 1970-1983, there was an annual average cereal deficit of 3%, which were needed to cover the national need in cereals. However, as Sawadogo stated, the food crises in BF are cyclical meaning that they were discontinuous. As a result, the country's agricultural production is characterised by scenarios flecked by ups and downs, with deficits and surpluses. Thus, the cereal coverage rate according to the population's needs over the years between 2001 and 2010 has rather been in balance or surplus. The cereal coverage rate for the five-year cropping years (1999, 2000, 2001, 2002, 2003) was in balance, between 90% and 120% and this for the five-year cropping years (2003, 2005, 2006, 2008 et 2010) were in surplus over 120% (Figure 1) (FAO/MAFAP 2013). However, the cereal coverage rate failed in the cropping year 2011/2012 again due mainly to the drought of 2011 and the refugee influx from Mali. The 2011 drought led to total crop production of 3.666.405 tonnes for 2011/2012, which was much lower than for the previous cropping year 201/2011 with a production of 4.385.904 tonnes i.e. a loss of 154.462 tonnes was recorded (WFP 2012). The socio-political troubles experienced by Mali in 2012 was accompanied by a massive influx of Malian refugees of 32 000 persons to Burkina Faso (WFP 2012). The supply of refugees with food and other needs has to be first maintained BF, which was then assisted by the international humanitarian community. BF itself experienced a failed coup d'état in September 2015, this led to a socio-political and economic instability of

¹ French quote "...Les contraintes naturelles déterminent la vulnérabilité alimentaire, mais il est possible de les lever à condition de s'armer des techniques et des outils de construction du terroir. Il faut également s'entourer d'un encadrement politique capable d'organiser la population ((Ouedraogo 2006b:20)..."

the country (UN-OCHA 2015). These events affected and have been affected negatively the already vulnerable food situation in the country. The actual cropping season 2014/2015 registered a total agricultural cereal production of 4 600 000 tonnes, there was a decrease of 4,8% compared to the year 2013/2013 but and an increase of 7,2% in the five-year average. However, this increase does not prevent the population from food insecurity, especially when considering a whole country, there is a huge disparity between the provinces according to their food security. For example, 13 of the 45 provinces of the country were estimated to be food deficient in the year 2014/2015. In fact, 48% of the agricultural households did not cover their cereal need with their own production and a total of 939 148 persons in 55 communes were revealed to be food insecure (UN-OCHA 2015).

Figure 1 Trends in the cereal's coverage rate of the population between 2001-10 (FAO/MAFAP 2013)



1.3 MALNUTRITION IN BURKINA FASO: A PERSISTENT CHALLENGING SITUATION

Malnutrition refers to a person's diet, which does not provide adequate nutrients for growth and maintenance or a person, who is incapable to adequately use the food consumed due to illness. Malnutrition includes undernutrition (too thin, too short, micronutrient deficiencies) and 'over-nutrition' (overweight and obesity), which should be considered 'unbalanced nutrition' as it often co-occurs with micronutrient deficiencies. Generally, malnutrition assessments referred to the nutritional status of children under five years. The reason for this is that the physical growth of children (under 5 years) is considered to be an accepted indicator of the nutritional wellbeing of the population they represent. Adults and older children can use evenly higher reserves of energy than young children during periods of reduced macronutrient

intake. Thus, the youngest persons are most at risk for malnutrition. For the assessment of acute malnutrition², children are more vulnerable to adverse

² **Acute malnutrition** : Acute malnutrition refers to a rapid extreme weight loss or a failure to gain weight. Acute malnutrition results usually to a too thin physical appearance of that wasted person. In children aged 6–59 months, it is assessed by low weight-for-height compared to the WHO international growth reference or mid-upper arm circumference (MUAC). MUAC < 115mm indicates that the child is severely malnourished; MUAC < 125mm indicates that the child is moderately malnourished, indicating thus both types of acute malnutrition. Severe acute malnutrition and Moderate acute malnutrition represent both types of Severe acute malnutrition, whereby the latter is the most dangerous form, which if untreated, can end to death.

At a population level, the Global acute malnutrition is assessed to indicate the total number of children aged between 6 and 59 months suffering from severe acute malnutrition and those who suffer from moderate acute malnutrition. When Global acute malnutrition is equal to or greater than 15 percent of the population, then the nutrition situation is defined as 'critical' by the WHO (UNICEF 2012 ; WFP 2016).

Chronic malnutrition or stunting: This form of malnutrition is characterised by a cumulative long-term growth failure. Inadequate nutrition over long periods of time (including poor maternal nutrition and poor infant and young child feeding practices) and/or repeated infections can lead to stunting. In children, it can be measured by comparing the height of a child against the WHO international growth reference for a child of the same age. Globally, about one in 4 children under-five are stunted, and a greater proportion of school-age children, adolescent and adults experience the results of having been stunted during their early childhood. Note that hunger (not having enough to eat to meet energy requirements) can lead to malnutrition, but the absence of hunger does not imply the absence of malnutrition (WFP 2016) (UNICEF 2012; WFP 2009).

Underweight: This form of malnutrition is whether characterised by wasting or stunting or a combination of both, based on comparing the weight-for-age of a child with the WHO international growth reference (WFP 2016).

Micronutrient deficiencies: Presents a further type of malnutrition referring to deficiencies or shortage of essential vitamins and minerals required by the body in minuscule amounts throughout the life cycle. Micronutrient deficiency of iron, vitamin A and zinc are ranked among the WHO's top 10 leading causes of death through disease in developing countries. Global acute malnutrition is the total number of children aged between 6 and 59 months suffering from SAM and those who suffer from moderate acute malnutrition at a population level. When global acute malnutrition is equal to or greater than 15% of the population, then the nutrition situation is defined as 'critical' by the WHO. People are often said to suffer from "hidden hunger" when they consume enough calories but suffer from micronutrient deficiencies. This form of hunger may not be visibly apparent in an individual, but it increases morbidity and

environments and respond quickly to dietary changes, they are also more at risk of becoming ill, which will result in weight loss. Consequently, their nutritional status is considered as a good instrument for population-based malnutrition. For the assessment of chronic malnutrition, children during the developmental years are susceptible to skeletal growth failure in ways that adults are not and are a good reflection of long-term nutritional issues. Therefore, the survey results of the under-five-years population are used to conclude the situation of the whole population, not just of that age group (WFP 2005).

Malnutrition remains the single highest cause of child deaths. Each year, 3.1 million children die from malnutrition-related causes – around 45% of all child deaths globally (ACF 2016). Lowered resistance to disease, increased risk of mortality learning difficulties are some consequences of malnutrition. Also, negative impacts on other aspects of health, cognitive development and economic development represent further results of malnutrition (WFP 2016).

Also within the food insecurity situation in BF, Malnutrition remains one of the main challenges, resulting from factors such as cultural habits, inadequate feeding practices of small children, precarious sanitation and hygienic situation and/or practices, lack of potable water, illiteracy and/or low educational level of mothers, lack of knowledge on adequate nutritious food and lack of adequate and/or sufficient medical and social services (UN-OCHA 2015). Diets are essentially constituted by the intake of cereals, making up 67 à 70% of the dietary energy intake, against 1-5% of roots and tubers, fruits and vegetables, fish and qualitative milk products.

mortality and also has negative impacts on other aspects of health, cognitive development and economic development. Hidden hunger affects over two billion people worldwide.

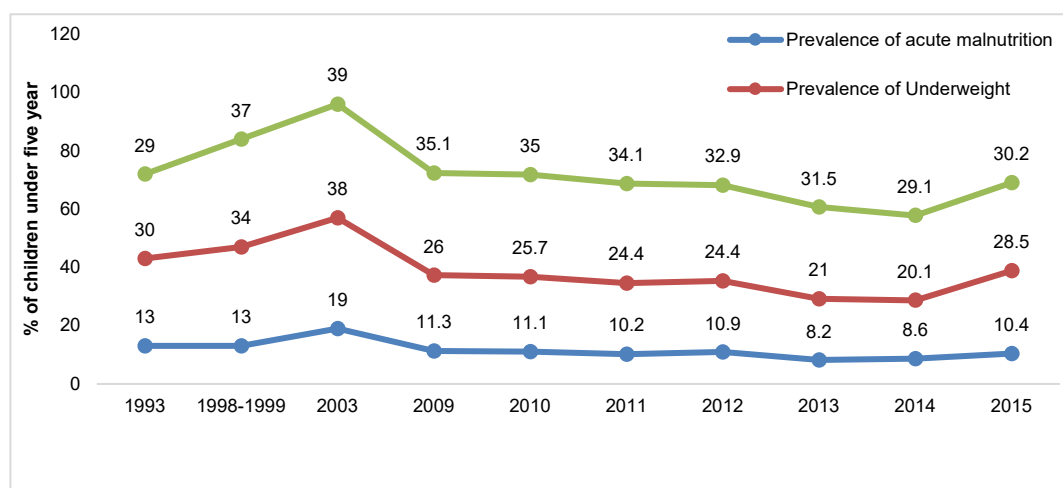
Undernourishment: An indicator of inadequate dietary energy intake (based on FAO's definition of hunger, characterized as consuming less than a minimum level of kilocalories) that is assessed at the population level using national food balance sheets to determine the supply of dietary energy available to a given population and modelling of how that energy is distributed across the population (WFP 2016). According to (FAO et al. 2015) the worldwide prevalence of undernourishment is estimated at 12.9 percent in 2014–16, making a number of 780 million people, especially in developing countries, where most of the food insecure are living (FAO 2015; UNICEF 2012; WFP 2009).

Consumption of oilseeds and pulses are the main sources of fat. Whereby oilseeds make up most of the fat intake while pulses make up almost 17% of the dietary energy intake, the consequence is of this diet pattern is low quality and non-diversification of the diet (GOBF/MASA 2008). High malnutrition rate remains in the country. In fact, 149 000 children were estimated to suffer from severe acute malnutrition in 2015 against 144 000 in 2014 while the number of children suffering from moderate acute malnutrition was estimated to 350 000, thus a global acute malnutrition cases of 499 000 children (UN-OCHA 2015). Malnutrition remains consistent in the country. According to surveys of the DHS-programme³ from the national institute of health (INSD) in Burkina Faso, which was carried first in 1993 and last in 2010. it can be seen that although the prevalence of moderate acute malnutrition was slightly decreasing since 2003, but was again increasing since 2012. However, malnutrition remains persistent and damaging in the view that still 45% of all childhood deaths in BF are malnutrition-disease related (UN-OCHA 2015) a death rate of children under 5 years - number of children, who die before ending the fifth anniversary- was 141.9/1000 in 2015 (GOBF/Ministère de la santé 2016). However, although still high, due to governmental medical cost coverage for that group of patients, the trends of infant and child mortality rate are decreasing according to these trends. For example between 1996 and 2006, it went down from 174.2‰ in 1996 to 142‰ in 2006

³ The DHS Programme (The Demographic and Health Surveys Program) is from USAID pioneered programme, which assists developing countries in the collecting and disseminating accurate, nationally representative data on fertility, family planning, maternal and child health, gender, HIV/AIDS, malaria, and nutrition. This data is widely used by governments, donors, researchers and civil society to inform health-related programming, policies, funding priorities and research <https://www.usaid.gov/what-we-do/global-health/cross-cutting-areas/demographic-and-health-surveys-program>.

(GOBF/INSD 2009a). The same trend was recorded between 2006-2010, where it went down from to 142‰ to 129‰ (GOBF/INSD 2012).

Figure 2 Trends in under five-year children's nutritional status in BF 1993-2015
(Own graphic based on the data of GOBF/INSD 1994, 2000, 2004, 2012; GOBF/MASA 2009; GOBF/Ministère de la santé 2012; UN-OCHA 2014, 2015)



However, the damages of malnutrition in Burkina Faso are not only limited to medical and human consequences but economic as well. This has been revealed in a study of the GOBF/MASA in 2015. According to that study titled *Cost of hunger in BF*, the GOBF spends yearly 409 billion FCFA (7,7% of the GP) for malnutrition and malnutrition-related issues of children. Furthermore, the high malnutrition rate, supported by the occurrence of malaria, respiratory infections, diarrhoea diseases lead to a high morbidity rate in BF, especially for women of reproductive age and children under 5 years. According to the demographic and health survey in 2010, the maternal death rate was estimated to 341 deaths per 100,000 live births, while the infant and child mortality rate was estimated to 129 per 1.000 live births in 2010 against 184‰ in 2003 (GOBF/INSD 2010). Micronutrients deficient especially iron lead to malnutrition-related disease such as anaemia in that country. In 2003, 2010 and 2014 children aged 6-59 months suffering from anaemia respectively with the following prevalence: 91.5%, 87.8% and 83.4 % and women of reproductive age were suffering respectably with 53.7%, 48.8% and 61.9%. Nutritional status of women in reproductive age plays a crucial role by the nutritional status of their children, as already mentioned above for example chronic malnutrition results from a long-term growth failure, which begin with the child conception up until a thousand days after

birth. However, the nutritional behaviour of women in reproductive age depends on several factors, especially the literacy level of these. As the INSD survey reveals this, the literacy level of mothers influences the prevalence of malnutrition of the child: 8% of mothers with secondary school level or more were malnourished against 14% of illiterate mothers (GOBF/INSD 1994, 2004).

Also, the southwestern area in Burkina Faso, falls under the schema of the food and nutrition situation of the rest of the country, seeing its polity suffer as much from food and nutrition insecurity. This food and nutrition insecurity situation has already been highlighted by (Sawadogo 1995) in his study on food consumption in the Southwest. Sawadogo described that anaemia by more than 59% of children < 5 years, more than 43% of children aged 5-15 years and more than 22% of children aged 15-19 years were present. Furthermore, 51% of children aged between 0-4 years and more than 26.03 children aged 5-10 years were being protein-energy deficient, thus were suffering from acute malnutrition. Another study conducted in the same region in 1988 with 1879 children, saw that 235 of them i.e. 13%, were underweight (Sawadogo 1995). More than 20 years later after Sawadogo's study, the nutritional situation in the southwestern region remains critical. The last census of 2006 recorded the south-west region as one with the highest infant and child mortality rate exceeding the average rate of 141.9 ‰ and more than 159 ‰ in 2006. There were 13 regions including the south-west with that rate (GOBF/INSD 2009). The same trend was observed by maternal maternity as well. With 285.4‰, the south-west region recorded one of the highest compared with the country's average of 307.3 ‰.

By 2010, the situation has not changed a lot according to the national survey. Nearly 84% (88% as the national average) of children aged between 6-59 months and 40% (49% as the national average) of women were recorded anaemic in the southwest region. The prevalence of global acute malnutrition varies from 5.5% for Central- East to 9.8% for the southwest. 10 of twenty-three surveyed provinces have global acute malnutrition higher than 10%. While provinces of Zandoma in the North, the Bougouriba, and Ioba in the southwest have a global acute malnutrition rate of more than 13%. This rate exceeds the WHO alert threshold. Furthermore, the Sahel (235 ‰) and Southwest (195 ‰) regions have the highest child and young mortality rates while in contrast, the Central-East (80 ‰) and the Centre (93 ‰) regions have the lowest of rates (GOBF/INSD 2012). Between 2010-2012, the prevalence of moderate acute malnutrition experienced a decreasing trend both at the national level from

35.1% in 2009 to 32.9% in 2012, and at the regional level of the southwest 39% to 34.3%. But while the severe acute malnutrition also declined at the national level from 11.3 in 2009 to 10.9% in 2012, it increased in the southwest region from 10.1 in 2009 to 10.3% in 2012. Finally underweight also decreased from 26% in 2009 to 24.4% in 2012 for the whole country and from 23.1% to 22.1% for the south-west region.

Most earlier studies on food security focus on food production and access and less on food consumption, as the statement: "Extension workers and research on African farming systems and agronomy often focus on the few main starches producing products and a few cash crops of a given agricultural system" (Mertz et al. 2001) describes this. As consequence, still lacking in Africa are concrete opportunities to reflect on the fundamental issue of how food insecurity is experienced and perceived by the food insecure themselves so that researchers and policymakers still know very little about such experiences and perceptions (Pottier 1995).

Consequently, studies do not capture the complexity of the dietary and culinary patterns and changes of people that occur and/or have occurred there (Freidberg 2003). *For example, it could be asked what is their local knowledge of nutritious food? Do they find their diet nutritiously adequate? Why are they eating what they eat? What will they do differently according to their diet?*

As Maxwell suggested that "Food planning in Africa cannot be improved unless the approach moves from the blueprint to process planning" (Pottier 1995:43). The projects and programmes should move from rigid planning from the top through more participation from the bottom on. Individuals and /or Households (HH) who experience and/or fear of experiencing food insecurity e.g. through lack of access and/or availability to/of adequate quantitative and qualitative food for a healthy and active life should be the focus of food security planning. Doing so this planning could better capture the diversity and complexity of food insecurity in order to implement the successful programme (Pottier 1995).

1.4 RESEARCH OBJECTIVES, QUESTIONS AND METHODS

Against this constellation, the main objective of the present research was to assess and examine food and nutrition practices of households for a better understanding and therefore to a better policy to reduce vulnerability to food and nutrition insecurity in Dano commune, southwestern Burkina Faso. Dano is a watershed of the WASCAL-project, within which, this study is implemented.

The following specific objectives and the according questions have been followed to achieve the main objective of the study:

- 1. Assessing the everyday food consumption patterns and traditional dietary practices of households**
 - What kind of food do households consume?
 - What are food cooking and eating practices?
 - Where and how often is food consumed daily and weekly?
- 2. Examining and analysing the factors, that determine the everyday food consumption patterns and traditional dietary practices of households**
 - What are the underlying factors, that determine the food consumption patterns? What are the most and less important factors?
 - Are there any differences according to urbanisation level, socioeconomic and cultural background?
- 3. Determining the different sources used by households to access food**
 - What is the provenance of consumed food?
 - Are there any disparities according to seasonality, urbanisation level and socioeconomic background?
- 4. Assessing and analysing the different types of vulnerabilities, that underlie food and nutrition security - especially food consumption and dietary practices - of households**
 - What kind of vulnerabilities affect food availability, access and consumption?
 - Are there any differences according to urbanisation level, socioeconomic and cultural background?
- 5. Assessing the efficiency of established coping and/or adaptive strategies, at both household and institutional level to improve food and nutrition security - especially food consumption and dietary practices**

- What kind of coping and/or adaptive strategies have been established at both household and institutional level to cope/adapt with/to existing vulnerabilities?
- What are the strengths and weaknesses of these strategies?
- What is the improvement potential for these strategies?

Methodologically the research objectives should be achieved through a triangulation of methods. Triangulation aims at addressing something from multiple points of views in order to improve accuracy (Neuman 2010). Thus, data collection, which spanned between November 2012 to Mai 2013, involved a combination of qualitative and quantitative research methodologies. Although the qualitative research methods were mostly used as they describe the lifeworld ‘from the inside out’, from the point of view of the people who participate. By so doing it seeks to contribute to a better understanding of social realities and to draw attention to processes, meaning patterns and structural features, here for a better understanding of local people’s point of view according to food and nutrition security (Flick et al. 2004). Thus, qualitative research methods including participant and non-participant observation, in-depth unstructured and semi-structured interviews, focus group discussions, informal discussions were used during the whole field collection time to assess all the research objectives. Quantitative methods included household surveys on demographics, food consumption assessment such as 24-hour recalls and food-frequency questionnaires (FFQ). In addition, secondary data and information from organisations and agencies have also been collected.

The theoretical framework for this study is based on a combination of development-oriented approaches including the Food Availability Decline approach (Malthus 1798), the Food Entitlement Decline approach (Sen 1981) and the sustainable livelihoods approach (SLA) (Chambers and Conway 1992).

The first approach is the food availability decline approach, one of the earliest tentative approaches to explaining how people are exposed to food insecurity. The approach discussed the bearing capacity of the earth in the context of human-environment relationships. The second approach of food entitlement decline explains food insecurity as a lack of demand opportunities due to loss of a set of entitlements that enable (or protect) economic and social access to food by producing, buying, exchanging food or getting institutional or intersocial food aid (Sen 1981). Finally the third approach, the sustainable livelihood approach include the capabilities, assets and activities required for a means of living and which can cope with and recover from

vulnerable situations, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the short and long-term (Chambers and Conway 1992). The combination of these approaches aimed at conceptualising the relationships between the environmental, human, economic, socio-political context and the resulting constraints, vulnerabilities and adaptive possibilities of food and nutrition security.

The aforementioned development approaches have been enriched by the anthropological approach of food consumption (Froment et al. 1996; de Garine 2004; De Garine 1996; Garine 1979; Macbeth and MacClancy 2004; Mead and Guthe 1945; Richards 1939, 2003). The anthropological approach of food consumption in contrary to environmental, political and economic influences of food habits, stress out that rather sociocultural aspects exercise more influence on food choice than environmental or economical aspects (Grigg 1995a). Thus the anthropological approaches investigate the interlinkages between sociocultural and gustatory aspects of dietary patterns as “the ways in which individuals or groups individuals in response to social and cultural processes, select, consume and utilise portions of food supply” (Mead and Guthe 1945:12).

1.5 OUTLINE OF THE THESIS

The thesis is composed of 11 chapters. **Chapter 1** with the introduction including background on food and nutrition situation in Burkina Faso and the study area, the problem statement, the objectives and questions of the study. **Chapter 2** focuses on the literature review around the term food and nutrition security since its inception, leading up to the paradigm shifts experienced -both at the scientific and institutional level- while presenting integrative theoretical and conceptual approaches by drawing on a combination of the sustainable livelihoods approach, perspectives on vulnerability, combined scholarship on the anthropology of food consumption. **Chapter 3** deals with the methodological procedure of the research including how the research was designed, description of the research area, methods of sampling, data collection and analysis. As a PhD student and on behalf of the large-scale institution WASCAL (West African

Centre for Scientific Service on Climate Change and Adapted Land Use)⁴, the research objectives should be achieved through a triangulation of methods. Triangulation aims at addressing something from multiple points of views in order to improve accuracy (Neuman 2010). Thus, data collection, which spanned between November 2012 to April 2013 involved a combination of qualitative and quantitative research methodologies to effectively assess the level of food and nutrition security -especially the local food practices in Dano commune, one of the watersheds of the WASCAL-project- in southwestern Burkina Faso. Following this, **Chapter 4** begins with the research findings by presenting the demography and the socioeconomic setting of the sample. What follows from **Chapter 5** to **Chapter 10** are the results, the related interpretations, discussions and conclusions to the research objectives. **Chapter 5** aims at assessing the dietary patterns of the households. The results show that diet was dominated by the consumption of cereals and cooked vegetable leaves and/or fruits and plant fat (shea butter). On the other hand, most of food groups such as roots and tubers, vegetables, fruits, pulses and legumes, together with milk and milk products, meat, eggs and poultry were rarely consumed. **Chapter 6** discusses the determinants of dietary patterns. Its finds out that the economic, environmental, sociocultural aspect and health-nutritive were the main influential factors of dietary patterns. **Chapter 7** on the sources of consumed food revealed own production of food, purchase of food and food aid in form of inter-social and institutional food transfer as the three main sources of food. **Chapter 8** focus on the results of the fourth specific research objective including the vulnerability of food and nutrition security revealed that determinants of food and nutrition security, namely food production, access and consumption were facing vulnerable situations. **Chapter 9** describes the established coping strategies both at household and institutional level to reduce the existing vulnerability of food and nutrition security. The

⁴ WASCAL (West African Science Service Centre on Climate Change and Adapted Land Use) is a large-scale research-focused Climate Service Centre designed to help tackle this challenge and thereby enhance the resilience of human and environmental systems to climate change and increased variability. It does so by strengthening the research infrastructure and capacity in West Africa related to climate change and by pooling the expertise of ten West African countries and Germany. Funded by the German Federal Ministry of Education and Research (BMBF), WASCAL is implemented in a collaborative effort by West African and German partners (WASCAL 2013).

households mentioned petty commodity production and trading, the sale of livestock and vegetables, consumption of wild plants and fruits, intersocial food aid (relatives and friends), the sale of cash crops (cotton, nuts, chilli etc.) and occasional job (mining, construction etc.) as their main coping strategies. At the institutional level, the main coping strategies were school meals and food aid programmes for the most vulnerable.

Chapter 10 provides the analysis of the results. Finally, the last **Chapter 11** presents the summary and the limitations of the study and the related recommendations to improve both food and nutrition research and security in the study area.

2- CONCEPTUAL AND THEORETICAL APPROACHES

2.1 FOOD AND NUTRITION SECURITY: THE EVOLUTION OF A CONCEPT

The concept of food and nutrition security as we know it today is a result of several decades of local, national and global researches, investigations, meetings and conferences and accords and politics. In a nutshell, food and nutrition security theory is both a historical and politically loaded concept.

The pedestal of the food and nutrition security concept lies in the wings of World War II. In fact, it began in 1943 at the so-called Hot Springs conference in Hot Springs/Virginia/USA. Forty-four governments met at that conference to discuss and found the goal of freedom from want through the foundation of a permanent organisation for food and agriculture, hence the Food and Agriculture Organisation FAO. They concluded that freedom from want meant a "...secure, adequate and suitable supply of food for every man, woman and child, where *secure* referred to the accessibility to the food, *adequate* referred to the quantitative sufficiency of the food supply and suitable referred to the nutrient content of the food supply" (FAO 2012:4). Because of the war, many parts of Europe were suffering from hunger, thus priority was given first to *freedom from hunger*. The conference's participants decided to focus on increased food production, most importantly first on energy providing food, for example, cereals in order to quantitatively satisfy the post-war urgent food demand. After the restoration of staple food, the focus would be reoriented to the production of foods rich in micronutrients and proteins in order to maintain good health. However, food supply was not only seen as a prerequisite for freedom from hunger and want but poverty as well. It is very clear at this point that poverty was already recognised as the main cause of hunger and want. Therefore, the participants viewed global economic growth and employment as long-term remedies for poverty reduction in order to ensure access to adequate nutrition for everyone.

In 1948, the term food and nutrition was declared by the United Nations (UN) as a human right with the following declaration: "Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food [...]", Article 25 of The Universal Declaration of Human Rights. During the 1950s-

1960s, the food and agricultural policies remained on the increase as well and the disposal of food surpluses to food-deficient countries through food aid programmes. In 1966, adoption of the International Covenant on Economic, Social and Cultural Rights by the UN and recognition of human right to adequate food and nutrition declaring “the right of everyone to an adequate standard of living for himself and his family, including adequate food [...]” (Art. 11(1)); and “the fundamental right of everyone to be free from hunger” (Art. 11(2))” (FAO 2012:5). This should be achieved by the commitment of states to take needed actions in order “to improve methods of production, conservation and distribution of food by making full use of technical and scientific knowledge, by disseminating knowledge of the principles of nutrition...” and “...to ensure an equitable distribution of world food supplies in relation to need” (Article 11) (FAO 2012:5). The followings years of the 1970s were characterised by the world food crisis originated by the poor harvest, grains deficit, market shortages and rising food prices. This led to a substantial decline in food availability, especially of cereals and other staple foods. To find a solution to the food crisis, a world food conference was held in Rome in 1974. During this conference, a new concept of food security was established, oriented on the food supply with the following definition: “Availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices” (FAO 2012:5). The food supply approach remained and continued to influence global food policies, which aimed to ensure regional, national and global self-sufficiency of food for everyone through the adequate food supply. However, its success was dependent on the policies in place to ensure that nutritional activities and programmes of the UN systems, focused on securing access for all people everywhere to a well-balanced diet that would provide the essential nutrients needed for a healthy and active life (FAO 2012).

The entitlement approach introduced in the 1980s brought the world community further with its food and nutrition security problems. Sen’s (Sen 1981) entitlement approach which focused on the access to food by vulnerable people was recognised as a new solution to food and nutrition security problems. In fact, Sen’s work “led to the recognition that sufficiency of the food supply was not enough to guaranty food security unless poor and vulnerable people also had the physical and economic access to that food” (FAO 2012:5). In the meantime, the world experienced a new food crisis again, due to poor harvests in the early 1980s. This new crisis was managed by the new reviewed and extended concept of food and nutrition security focused on

“adequacy of food supplies, stability in food supplies and markets, and security of access to supplies” (FAO 2012:6).

The following step of the concept of food and nutrition security was influenced by the terms poverty and vulnerability, where the World Bank in a report titled *Poverty and Hunger*, acknowledged that both poverty and lack of income were the causes of chronic hunger and transitory food insecurity. This meant that such vulnerable people needed to be supported, by addressing the complex underlying causes of poverty, which keeps them vulnerable to food security. Hence the 1990s were influenced by the terms Vulnerability and sustainable livelihood approaches around food and nutrition security. Food security should be analysed according to vulnerable groups and their ability to deal with that vulnerability. The further focus was given to households and/or individual level as the point of analysis (Chambers 2006; Chambers and Conway 1992; Watts and Bohle 1993).

The perception and knowledge of local people on food security approaches in the 1990s: For a more successful improvement of food security, especially in Africa (Pottier 1995) suggested that the approach should move from *the blueprint to process planning*. Meaning that food security planning needs to “begin with the diversity and complexity of food insecurity as experienced by the food insecure themselves. The primary needs to be on individuals and households who lack or fear they may lack, secure access to enough food at all times for an active, healthy life” (Pottier 1995). The 1990s were furthermore influenced by international reaffirmation of the human right to food, here are two examples of such world conferences:- In 1992, the first international conference on nutrition was held in Rome, where 159 countries and the European Economic Community, 16 UN organisations, 11 intergovernmental organisations, and 144 non-governmental organisations, met to debate ways of combating hunger and malnutrition and stating the World Declaration on Nutrition:

Hunger and malnutrition are unacceptable in a world that has both the knowledge and the resources to end this human catastrophe. We recognize that access to nutritionally adequate and safe food is a right of each individual. We recognize that globally there is enough food for all and that inequitable access is the main problem...We pledge to act in solidarity to ensure that freedom from hunger becomes a reality (FAO 1992:3).

This was followed in 1996 by the World Food Summit (WFS) held in Rome, here 182 governments committed in the so-called Rome Declaration on World Food Security “...to eradicate hunger in all countries, with an immediate view to reducing the number of undernourished people to half their present level no later than 2015” (FAO 1996a).

In the 2000s, hunger still remains one of the world's challenging problems. New commitments such as the Millennium Development *Goals* were signed in September 2000 by the UN members with the aim to eliminate extreme poverty and increase the wellbeing of the poorest people by not later than 2015. The declaration was established in 8 time-bound goals, the so-called Millennium Development Goals (MDG). "Eradicate Extreme Hunger and Poverty by 2015" (UN 2006) was the 1st goal of *the millennium declaration*. But hunger still remained and in 2009 it reached a new point:

In 2009, an estimated 55 million to 90 million more people will be living in extreme poverty than anticipated...Likewise, the encouraging trend in the eradication of hunger since the early 1990s was reversed in 2008, largely due to higher food prices. The prevalence of hunger in the developing regions is now on the rise, from 16 per cent in 2006 to 17 per cent in 2008. A decrease in international food prices in the second half of 2008 has failed to translate into more affordable food for most people around the world...Progress in reducing hunger is now being eroded by the worldwide increase in food prices (The UN 2009:4).

A new solution to the new food crisis had to be found, hence new commitments and goals had to be held such as the 2012 *Zero Hunger Challenge*. *The Zero Hunger Challenge* was initiated by the UN Secretary-General Ban Ki-moon in 2012 with the main aim to eradicate hunger in his/our lifetime. Especially his idea that "The choice of our daily food depends on the fact that since our birth that is what we know" (The UN 2012). Furthermore, in 2014 at *the second International Conference on Nutrition*, the Rome Declaration on Nutrition and the reaffirmation of old commitments, the UN and heads of states made the following commitments: We, Ministers and Representatives of the Members of the FAO and the WHO at the Second International Conference on Nutrition promise to confront the challenges of malnutrition in all its forms and identify opportunities for tackling them in the next decades. Thus ...we reaffirm the commitments made at the 1st International Conference on Nutrition in 1992, and the WFS in 1996 and 2002 and the World Summit on Food Security in 2009 and the right of everyone to have access to safe, sufficient, and nutritious food, consistent with the right to adequate food and the fundamental right of everyone to be free from hunger...(FAO 2014b). The main goal here was to eliminate hunger and avert all forms of malnutrition worldwide by focussing on undernutrition in children, anaemia in women and children and other micronutrient deficiencies. In 2015, the hunger goal of halving the number of hungry people made by the MDGs has not been fulfilled, as the (FAO 2015) specified this ...while 3 of the 8 goals of the MDGs have been achieved

before the final deadline of 2015, progress has been uneven within and across countries... hunger remains an everyday challenge for almost 795 million people worldwide in 2014–16 including 780 million in the developing regions. Hence, hunger eradication should remain a key commitment to decision-makers at all levels...So further efforts and a strong global partnership for development are needed to accelerate progress and reach the goal.

Therefore, in the same year, *the 2030 Agenda for Sustainable Development* was established by incorporating two old commitments: The 2030 Agenda for Sustainable Development aiming to end hunger by 2030 by ensuring food security and nutrition while respecting the goals of the sustainable development agenda and those of the MDGs (The UN 2012).

This storyline on the commitments made on food and nutrition security shows that the concept of food security has a long, historical background. Furthermore, it illustrates that food and nutrition security represents one of the challenging global concerns at both academic and institutional level and plays a key role in global politics. It has gone through a multitude of definition and redefinition; adjustments, approaches and frameworks, transforming it into a multidimensional and complex term. Around 194 studies have been undertaken on the concept and definitions of food security and around 172 studies on its indicators (Maxwell 1996). Indicatively there are nearly 200 definitions and 450 indicators around the concept of food and nutrition security(IFPRI 1999 in Weingärtner 2009). Today the most used definition of food security is this established at the 1996 WFS, where food security is defined as “a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (FAO 2015:53). Food in this definition refers to any substance that people eat and drink to maintain health and growth (Pangaribowo et al. 2013). The key determinants of food security namely availability of food, access to food and utilisation of food are obvious in this definition. Furthermore, the nutritional aspect of food is already noticeable in this definition of food security but not yet sufficient (Weingärtner 2009).

The nutritional aspect complements food security concept with further qualitative aspects such as hygienic, sanitarian conditions, health services, healthy environment and caring practices which play determinants roles for food security outcomes (Codjoe and Owusu 2011; Ingram, J. et al. 2010). As the term of food and nutrition security has also evolved, one of its first definitions was from the IFPRI in 1995, which

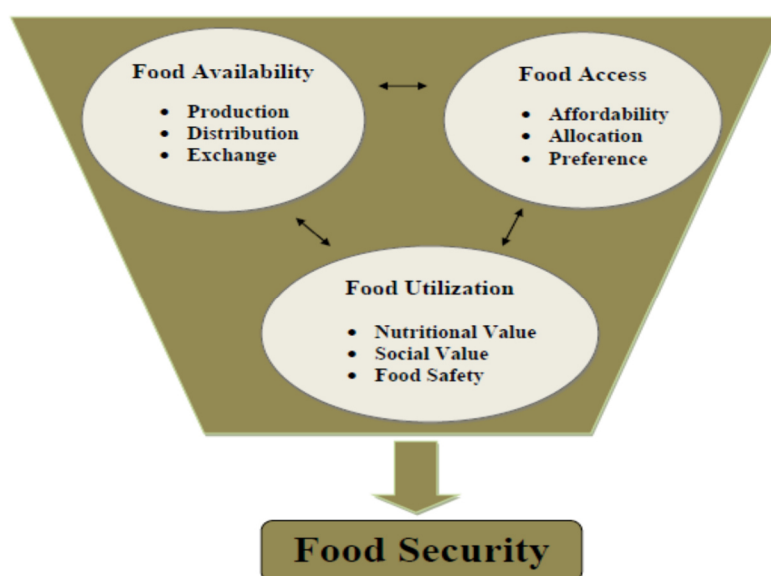
proposed a definition of nutrition security as “...adequate nutritional status in terms of protein, energy, vitamins, and minerals for all household members at all times” (Quisumbing 1995, in Weingärtner 2009:5). In 2006, the World Bank established a definition of nutrition security by underlining the complementarity of both terms food security and nutrition security: “Nutrition security is achieved for a household when secure access to food is coupled with a sanitary environment, adequate health services, and knowledgeable care to ensure a healthy life for all household members” (World Bank 2007:67). The Scaling-Up Nutrition movement (SUN)⁵ elaborated the definition of nutrition security as “secure access to an appropriately nutritious diet coupled with a sanitary environment, adequate health services, and care, to ensure a healthy and active life for all household members” (SUN Movement 2015). In 2012, FAO goes further by stressing indeed aspects of sanitation, health and care practices by defining nutrition security as “... when all people at all times consume food of sufficient quantity and quality in terms of variety, diversity, nutrient content and safety to meet their dietary needs and food preferences for an active and healthy life, coupled with a sanitary environment, adequate health and care” (FAO 2012:8). The recognition of the interlinkage and/or complementarity of food security and nutrition security evolved further resulting in the establishment of the new term food and nutrition security. Food and nutrition security has been recognised and used by more and more international institutions such as IFPRI, UNICEF, and FAO in their working vocabulary since the 1990s. Furthermore, the term has been promoted by the public health and nutrition communities to highlight the necessity for better integration of nutrition into food security policies and programmes for a better and acute achievement of food and nutrition security. For example, IFPRI, which has been using the term food and nutrition security term since the mid-1990s, defines it as follows “Food and nutrition security is achieved when adequate food (quantity, quality, safety, socio-cultural acceptability) is available and accessible for and satisfactorily used and utilised by all individuals at all times to live a healthy and active life” (FAO 2012:9). While FAO

⁵ Scaling Up Nutrition, or SUN, is a unique Movement founded on the principle that all people have a right to food and good nutrition. It unites people—from governments, civil society, the United Nations, donors, businesses and researchers—in a collective effort to improve nutrition (SUN Movement 2015), <http://scalingupnutrition.org/about>

defined it as “...when all people at all times have physical, social and economic access to food of sufficient quantity and quality in terms of variety, diversity, nutrient content and safety to meet their dietary needs and food preferences for an active and healthy life, coupled with a sanitary environment, adequate health, education and care” (FAO 2012:9).

Food and nutrition security has four main determinants, namely availability, access, utilisation and their stability and/or vulnerability. Food and nutrition security is further characterised by two factors which influence its determinants: - a physical factor which influences the determinants availability, access and utilisation and a temporal one which influences the determinant stability, and affects the all of the first 3 determinants.

Figure 3 The three dimensions of food security
(Own presentation based on (Ingram, J. et al. 2010))



Food availability: This is mostly analysed through production. It is the type, quality and quantity of food that can be consumed by a given unit. The food here can be locally produced or imported. At the national level, food availability is determined by domestic food production, commercial food imports, food aid and domestic food stocks. The distribution channels to get food where it is needed and the exchange mechanisms of food also determine the availability of food. Food availability mostly refers to national, regional food supply.

Food access: Food can be available, but not accessible to people, who cannot afford it financially for example. This dimension of food and nutrition security refers to the

ability of people to access adequate resources (entitlements) which allow them to produce, buy, exchange or to be given food aid. How people have access to food depend on the economic, political, social and cultural conditions, in which they are situated. Furthermore, the main influential factors of access to food, are people's livelihood assets /resources which allows them to purchase and/or produce sufficient food for their needs.

Food utilisation: Nutritional value, social value, and food safety are the three determinants of food utilisation. Food utilisation relates to how food is stored, processed and consumed and which biological consequences this has for the body (e.g. how the body uses the consumed food). For example, aspects such as quality and quantity of diet, culture (e.g. rituals, religion etc.), subjective perception on food (knowledge on food and diet etc.), environmental sanitation and hygiene (access to clean water, clean cooking environments, hygienic toilets, etc.), adequate health care services, feeding practices of children, lactating and pregnant women are main indicators of adequate utilisation of food. And we can see that this determinant of food and nutrition security focuses more on the non-food-aspect of food and nutrition security.

Stability: This determinant of food and nutrition security refers to the sustainability of the first determinants or how those are vulnerable to some kind of risks. Which means that food and nutrition security is stable, if there is a constant -at all the times- access to adequate food at national, household or individual level. That means no risk should result in losing access to food that could lead whether to chronic food insecurity or transitory food insecurity. Chronic food insecurity refers to the inability to meet food needs on a permanent regularity while transitory food insecurity refers to the inability to meet food needs temporarily. Furthermore, transitory food insecurity is divided into cyclical food insecurity, when the food insecurity situation happens regularly such seasonal food insecurity (e.g. lean or hungry season –the period before the harvest) and temporary food insecurity, when food insecurity situation results from a short-term unexpected shock such as economic or climatic crisis (e.g. droughts or floods) (FAO 2006; Maxwell and Frankenberger 1992). Note that there is a hierarchical relationship among these 3 determinants: “food availability is necessary but not sufficient for access, and access is necessary but not sufficient for utilisation” (Ingram, J. et al. 2010). Thus, there may be plenty of food in the markets, but if it is too expensive for people to buy it, they will remain food insecure or the food that is available and affordable may be of inferior quality and hence people may be micronutrient deficient.

2.2 APPROACHES EXPLAINING FOOD INSECURITY

Theories explaining food insecurity have moved from the environmental and demographic point of explanation to an economic and a socio-political one (Baro and Deubel 2006).

2.2.1 Malthus's Food Availability Decline approach

The Food Availability Decline approach is one of the earliest tentative approaches to explaining how people are exposed to food insecurity through the so-called Food Availability Decline approach. The approach discussed the bearing capacity of the earth in the context of human-environment relationships. In his *essay on the Principle of Population* (1798), Malthus emphasised the consequences of the growing gap between food production and food needs caused by a rapidly growing population compared with a stagnant or lower food production, leading to food shortages. Furthermore, he was compromising the general European view in that time (18th-century) of improving and perfecting society. Malthus gave a clear point of view on the future of human food security situation with a statement such as this: "The power of population is indefinitely greater than the power in the earth to produce subsistence for man" (Malthus 1798). The approach looks first at the environmental risks faced by vulnerable groups on the one hand and the "quality" of their assets bundles to cope with this risk on the other hand. As we have seen above, until the early 1970s, this was the influential approach for the global, both political and academic orientation on food and nutrition security concept, which was focused on the production and availability of food as this was reflected in the definition of food security at that time.

2.2.2 Sen's Food Entitlement Decline approach

Amartya Sen in his work *Poverty and Food* (1981), opposed Malthus by introducing his new approach of Food Entitlement Decline which explains food insecurity as a lack of demand opportunities due to loss of a set of entitlements that enable (or protect) economic and social access to food by producing, buying, exchanging food or getting institutional or intersocial food aid. According to Sen, historical famines have occurred where supply was not the issue, but rather poverty, conflicts or an inadequate social contract to protect people from hunger. The socioeconomic conditions of people are the main focus of analysis of food and nutrition security and

especially hunger and famine as stated by (Sen 1981). Starving is not because there is not enough food to eat, but rather the incapability of some people to not get enough food to eat. The entitlement approach has historically influenced the global food and nutrition security concept so that its definition was supplemented with the term access term in the FAO definition from 1983.

2.2.3 The sustainable livelihoods approach (SLA)

The first resonance of the SLA approach has its roots back in the conference of the Advisory Panel on Food Security, Agriculture, Forestry and Environment of the World Commission on Environment and Development Commission (WCED), which first met in October 1984 in Norway. This meeting was an urgent *global* call by the General Assembly of the UN to find solutions to the numerous tragedies and disasters the world was experiencing in the mid-1980s such as the drought-triggered African famines, the leak at the pesticides factory at Bhopal (India) and the Chernobyl nuclear crisis in particular and long-term sustainable approaches and policies to a global crisis in general. The resulting report in 1987 often known as the *Brundtland Commission Report* -after the name of its chairman the Norwegian prime minister Gro Harlem Brundtland-, who baptised our common future and outlined the need for a sustainable livelihood, security and development, as a foundation for a world without ecological, social and economic crises. Brundtland argued that to achieve sustainable development globally, more effective and responsible exploitation of environmental resources, greater cooperation among developing countries and between countries at different stages of economic and social development, interrelationships between people, resources, environment, and development is necessary (The WCED 1987). The main concepts of the *sustainable development and livelihood report* were defined as such that

...meets the needs of the present without compromising the ability of future generations to meet their own needs. The concept of sustainable development does imply limits - not absolute limits but limitations imposed by the present state of technology and social organisation on environmental resources and by the ability of the biosphere to absorb the effects of human activities. But technology and social organisation can be both managed and improved to make way for a new era of economic growth...(The WCED 1987:16).

The important role of the poor and poorest and their basic needs such as food, cloth, political participation, social and cultural identity etc. on one hand and the key acting

influence of politics to meet these needs, on the other hand, has been emphasised by the commission. As stated as follows:

...the commission believes that widespread poverty is no longer inevitable. Poverty is not only an evil in itself but sustainable development requires meeting the basic needs of all and extending to all the opportunity to fulfil their aspirations for a better life. A world in which poverty is endemic will always be prone to ecological and other catastrophes. Meeting essential needs requires not only a new era of economic growth for nations in which the majority are poor but an assurance that those poor get their fair share of the resources required to sustain that growth. Such equity would be aided by political systems that secure effective citizen participation in decision making and by greater democracy in international decision making...because sustainable development is not a fixed state of harmony, but rather eventually uneasy or straightforward process of change - including painful choices -, which in the final analysis, must rest on political will (The WCED 1987).

Moreover, the commission has defined *sustainable livelihood security* with more individual and household focus as:

...adequate stocks and flows of food and cash to meet basic needs. Security refers to secure ownership of, or access to, resources and income-earnings activities, including reserves and assets to offset risk, ease shocks and meet contingencies. Sustainable refers to the maintenance or enhancement of resource productivity on a long-term basis. A household may be able to gain sustainable livelihood security in many ways- through ownership of land, livestock or trees; rights to grazing, fishing or gathering; through stable employment with adequate remuneration; or through varied repertoires of activities (Chambers and Conway 1992).

This meaning of sustainable development has affected future poverty reductions related development programs of United Nations Agencies as well such as the United Nations Development Programme (UNDP). In fact, in the first Human Development Report from UNDP in 1990, the influences of the main idea of the WCED could be noticed, where development was no longer been treated in terms of the macroeconomic bias of earlier development thinking, but rather in terms of individual and household health, education and well-being. The influence of SLA goes further and was observable on the agenda of international development policy and politics such as the work of the UN's 1992 Environment Conference in Rio, the 1995 World Summit for Social Development and the 1996 WFS (Solesbury 2003).

Even though the SLA has originated from back in the mid-1984s and was dedicated in some international commitments, its owed its outbreak to Robert Chambers' from

the Institute of Development Studies (IDS)⁶ at the beginning of the 1990s. The IDS *Discussion paper 296 titled Sustainable rural livelihoods: Practical concepts for the 21st century* by Chambers and Conway in 1992 was the first publication, which managed to bring the SLA to its known international phase, making IDS through Chambers and Conway to the pioneer of the SLA. The paper which was aimed to incite discussion by exploring and elaborating the concept of sustainable livelihoods (Chambers and Conway 1992) turned out as a key influential footstep for the global reception and implementation of the SLA in research, policy and practice. The main predominant concerns of the authors were oriented to the more and more exposure of humanity to risky courses in the 21st century in the view of the awaited population number at that time. Following issues represented the main departing points of the authors:

- *The unpredictability*, thus the uncertainty of the human ecological future due to fast and faster accelerating - ecological, economic intellectual, political, professional, psychological, social or technological - changes, putting the human professionalism supposed to deal behind their frontiers. Thus, human professionalism not being able to catch up, and/or control the fast-accelerating changes will continue to be out of date and wrong in its anticipation of future, and,
- *The prediction* of a holocaust like, pandemic and/or a sequence of massive disasters due to the high persisting rural poverty, unsustainable exploitation of rural resources, increasing population growth rate, vulnerable ecological settings and increasing urbanisation rates especially in developing countries.

In front of these pessimistic scenarios, the authors suggest that,

...any strategy for environment and development for the 21st century which is concerned with people, equity and sustainability has, then, to confront the question of how a vastly larger number of people can gain at least basically decent rural livelihoods in a manner which can be sustained, many of them in environments which are fragile and marginal (Chambers and Conway 1991:2).

⁶ The Institute of Development Studies (IDS) is since 1966 international British leading institution, focused on development research, teaching and learning, and impact and communications, based at the University of Sussex. <http://www.ids.ac.uk/about-us>.

And the answer to that question could not be found in the existing conventional professional analysis, which the authors qualified as defects. In fact, Chambers and Conway viewed the roots of the above-mentioned problematic not in the issue themselves, but rather in the methods used to handle them. Chambers and Conway argued that the three long classic modes of thinking in development and analysis, namely *production thinking*, *employment thinking* and *poverty-line thinking*, have been resistant to change for a long time and have often been confronted with the context of accelerating change and uncertainty by a conventional conservatism in concepts, values, methods, and behaviour (Chambers and Conway 1992):

- *The production thinking* still remained as the solution to strategies of *hunger, undernutrition malnutrition and famine*, despite the work of Sen 1981, who proved through a case study that food access problems are more rooted in the loss of entitlements than in enough food production or supply see 2.2.2 above.
- *The employment thinking*, employment as a key solution to problems relating to the poor and thus supports the idea of generating as many workplaces as possible so that everyone has a job, which will resolve the poverty issue. The authors criticised this method as it does not reflect the reality of rural people. This latter does not just focus on one employment or job to assure their livelihoods, but rather through the interlinkage of diverse activities together.
- *The poverty line thinking* describes deprivation through the poverty line, which is measured in terms of incomes or consumption. Thus, the method aims to increase the number of people living above this line rather than below it. But deprivation and well-being, as poor people perceive them, have many dimensions which do not correspond with this measure (Jodha 1988 in Chambers & Conway 1992).

Chambers and Conway characterised the mentioned methods of production, employment and cash income as indicators of well-being to be too industrialist and reductionist as they were generated and resulted from developed countries perspectives, in central places and to be applied top-down to elicit data that fits into pre-set boxes. Thus, the resulting concepts and measures are narrow and do not capture the totality of the complexity of the most rural poor living setting. They account the failure of much conventional analysis to pick up or show the plural priorities of the rural poor and their many and varied strategies to obtain a living.

Chambers and Conway proposed instead to address sustainable livelihoods from a different perspective. Hereby, they explicitly acknowledged that their approach was not new, but it was rather a way of reacting against earlier thinking while building on it. The number of concepts still remains at three, but their names and/or content change. Chambers and Conway suggested that sustainable livelihoods would be better treated through the linkage of these concepts: - *capability*, *equity*, and *sustainability*. In fact, the approaches were not innovative, because

...for each of these there was a tradition of research extending back through the 1980s and even earlier in some cases. For example, reference is made in the paper to the work of Sen (1981), Jodha (1988) and Schumacher (1973) in relation to capability and to that of Pearce et al. (1989), Lele (1991) and Swift (1989) sustainability, for which Chambers and Conway emphasised the social as well as the environmental dimension (Solesbury 2003).

The authors referred to *capability* as meant by Sen (Sen 1984;1987; Sen and Dreze 1989 in Chambers and Conway 1992), where it is defined as

...being able to perform certain basic functioning, to what a person is capable of doing and being. It includes, for example, to be adequately nourished, to be comfortably clothed, to avoid escapable morbidity and preventable mortality, to lead a life without shame, to be able to visit and entertain one's friends, to keep track of what is going on and what others are talking about (Chambers and Conway 1992).

Hereby the word *capability* embodies different meanings, different peoples in different settings, according to people's complex livelihoods. Thus, the quality of life depends on the value people give to activities, they are able to choose, perform and achieve that desired quality of life (Chambers and Conway 1992). Another aspect of the Sen's capability approach is both reactive and proactive coping capability including being able to cope with stress and shocks and to find and make use of livelihoods opportunities. Meaning that people do not just cope with the vulnerable situation, but they are able to dynamically adapt to these situations as well "Gaining access to and using services and information, exercising foresight, experimenting and innovating, competing and collaborating with others, and exploiting new conditions and resources" are some examples of such livelihood capabilities (Chambers and Conway 1992:4).

With the concept of *equity*, the authors referred to an equal distribution of assets, capabilities and opportunities through a principal enhancement of the most deprived. Less deprivation and discrimination of women, minorities and *all who are weak* and the end of urban and rural poverty and deprivation should be ways to achieve the aim of equity.

The third term *sustainability* finally, was referred by the authors to its social meaning in the livelihood context, where the authors stated the following “...we will use sustainability in a more focused manner to mean the ability to maintain and improve livelihoods while maintaining or enhancing the local and global assets and capabilities on which livelihoods depend” (Chambers and Conway 1992:5). Doing so the authors wanted to delimit their meaning of sustainability from the various senses and interpretations of the term according to the differences in disciplines and/or context. For example, in a development context, it means good and is related to global environmental issues such as pollution, global warming, deforestation, overexploitation of resources, physical degradation etc. In the environmental context, it refers to the new global concerns, while in everyday jargon, it refers to lifestyles in their natural settings, the system of mother earth and its resources such as organic agriculture with low external inputs; to institutions which can raise their own revenue etc.

The authors characterised the three concepts, *capabilities*, *equity*, and *sustainability* as fundamental for development thinking in general and for sustainable livelihoods especially. Each concept has two sides, namely normative and descriptive. Normatively used, “each states a desirable goal or criterion for evaluation” while descriptively used “each can be observed or in principle measured” (Chambers and Conway 1992:3). Furthermore, each concept is also “both end and means: that is to say, each is seen as good in itself, as an end; and each is also seen as a means to good ends, to the extent that it can support the others” (Chambers and Conway 1992:3–4). The linkage of the concepts *capacity*, *equity* and *sustainability* embody a framework or paradigm for development thinking which is both normative and practical according to the authors. However, as with any linked concepts or approaches, these concepts are not always mutual but could be conflictual as well. That is why a combination of these three concepts should be adopted as objectives, to represent the lowest case of conflict by the highest case of mutual support (Chambers and Conway 1992).

Herein, the authors define sustainable livelihood as an integrating concept, based on the concept of the WCED as

...the capabilities, assets (stores, resources, claims and access) and activities required for a means of living. Sustainable livelihood is one, which can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which

contributes net benefits to other livelihoods at the local and global levels and in the short and long-term (Chambers and Conway 1992).

Since Chamber's and Conway's paper, the SLA is one of the leading implemented approaches in development-related projects and/or researches for measuring people's resources and assets examining how these are interrelated to strategies in order to achieve ideal outcomes such as food and nutrition security and the overall vulnerability situation. In this sense livelihoods are seen as "...an organising principle for the study of income and access to food and the basic welfare needs draws on Sen's (1981) tradition of analysing entitlements" (Maxwell et al. 2000:7) which constitutes peoples "...means of gaining a living" (Chambers and Conway 1992:5), consequently their sources of entitlements. Because people have to choose between limited livelihood resources to satisfy their various needs, especially food needs, livelihood security has come to be a more comprehensive term for the analysis of household resources, assets, production and exchange activities, needs, and consumption than food security even though food is almost without exception the most important consumption (Maxwell et al. 2000).

The sustainable livelihood framework (SLF)

Chambers' and Conway's' white paper on sustainable livelihood marked the starting point of the SLF. This prominence of the approach has been mainly influenced by the British Department for International Development (DFID) and its SLF. In fact, the British government through its development agency was one of the pioneer's institutions, which based on Chambers' and Conway's' work, set out the use and implementation of the SLA in international development issues in the late 1990s. Thus, the SLA presented the implementation and practical tool for poverty reduction related development studies and/or projects leading for international development agencies such as CARE and OXFAM. The reasons for this approach orientation have been stated in the *British governmental white paper on international development* in November 1997, which called for an emphasis on sustainable livelihood, as stated by the former general secretary of state for international development Mrs Clare Short: "This White Paper sets out the government's policies to achieve the sustainable development of this planet. It is first, and most importantly, about the single greatest challenge which the world faces – eliminating poverty" In the same context he former British premier minister Tony Blair stated as follows

...Together you and I will begin to build the new society, in which each of us has the chance to grow, to achieve, to contribute, to create dignity for ourselves, and not for ourselves alone, but for others also; a society in which each of us has a stake, share; and we will give back to our children what they deserve, a heritage of hope (Secretary of State for International Development of the British Government 1997:1-5).

The white paper was focused on twelve strands and has the first strand named *Challenge of Development* and was summarised with the following words:

We shall refocus our international development efforts on the elimination of poverty and the encouragement of economic growth which benefits the poor. We will do this through support for international sustainable development targets and policies which create sustainable livelihoods for poor people, promote human development and conserve the environment (Secretary of State for International Development of the British Government 1997:8)

With this background, DFID established the SLF as a core of the SLA and a tool for better investigating of livelihoods, particularly the livelihoods of the poor. It can be used in both as planning tools for new development activities or as an assessment tool for evaluating existing livelihoods related activities. The SLF should present the main elements that influence people's livelihoods and their linkages, thus the SLA. However, like the other model, the SLA is only the smallest representation of the reality and cannot fully capture the complexity of poor people's livelihoods and coping strategies which are different according to multiple causes such geographical, economic, cultural, political etc. As DFID itself stated:

The framework does not attempt to provide an exact representation of reality. It does, however, endeavour to provide a way of thinking about the livelihoods of poor people that will stimulate debate and reflection, thereby improving performance in poverty reduction. In its simplest form, the framework views people as operating in a context of vulnerability. Within this context, they have access to certain assets or poverty-reducing factors. These gain their meaning and value through the prevailing social, institutional and organisational environment. This environment also influences the livelihood strategies— ways of combining and using assets – that are open to people in pursuit of beneficial livelihood outcomes that meet their own livelihood objectives (DFID 1999:3).

Therefore, the statement above elicits the main five key elements of the framework, which should be taken into account by a livelihood analysis: the context of vulnerability, the assets or poverty-reducing factors, the prevailing social, institutional and organisational environment, the livelihood strategies and the beneficial livelihood outcomes.

The vulnerability context

The SLA aims at reducing vulnerability and poverty through sustainable exploitation of natural resources. This should be achieved through a closer analysis of vulnerable actors' and actors' group rationality and scope of action in the context of risk-entailing living conditions (Hartwig 2007). In the SLF, the vulnerability context refers to the external environment in which people exist. People's livelihoods and the broader availability of assets are principally affected by critical trends as well as by shocks and seasonality – over which they have limited or no control (DFID 1999b). The factors composing the vulnerability context are *shocks, trends, and seasonality*, these factors could have a direct impact on people assets status and strategies by the pursuit of their desirable livelihoods outcomes. Thus, *the vulnerability context* plays a crucial role in the SLF.

- *Shocks* (e.g. floods, civil conflict, illness, death, economic shocks etc.) are not predictable according to their occurrence. They can instantaneously destroy affected people assets, especially the very poor or the ones with very limited assets. Therefore, as one of the coping strategies, people are obliged to abandon their adopted and/or known living settings such as home, land, social network, economic activity etc.
- *Trends* (e.g. population trends, resource trends, national/international economic trends etc.) are more predictable and influence most rates of return (economic or otherwise) to people used livelihood strategies.
- *Seasonality* (e.g. seasonal shifts of food prices and food availability, employment opportunities, health etc.) represent one of the most crucial exposures of poorest vulnerable poor, as they mostly occur in times when people have access to the least assets, thus when their vulnerability is highest.

Also, the term vulnerability in poverty reduction has been mostly influenced by the IDS and Chambers in the 1990s. In fact, in the view of hundreds of million people who were more vulnerable through greater exposure to physical or political disaster, threats, higher costs of meeting contingencies such as health expenditures, loss of assets through individual or widespread disasters, left people less able to cope with future needs and crisis, because they had used up all their reserves. The IDS organised a workshop on vulnerability and coping in September 1988, leading again to an IDS Bulletin, IDS Bulletin Volume 20 Number 2 (1989) '*Vulnerability: How the Poor Cope*' edited by Robert Chambers'. The focus was at the household level, and

the aims were to try to understand better the nature of the vulnerability, how poor people cope with risks, shocks and stress, and what should be prioritised for policy and research.

The vulnerability is the furthest part of the framework outside people's control. The level of people exposure to vulnerability is the composition of several complex elements. Robert Chambers (1989) is one of the pioneers of the term vulnerability. He defines Vulnerability as follows

...Vulnerability, though, is not the same as poverty. It means not lack or want, but defencelessness, insecurity, and exposure to risk, shocks and stress...The vulnerability here refers to exposure, to contingencies and stress, and difficulty in coping with them (Chambers 1989:1).

Chambers expressed explicitly to not confound poverty with vulnerability, since "Failure to distinguish vulnerability from poverty has bad effects. It blurs distinctions and sustains stereotypes of the amorphous and undifferentiated mass of the poor" (Chambers 1989:1), he continued. While poverty is often defined by professionals in term of flows of income or consumption leading the focus of anti-poverty programmes on raising income or consumption, make poverty to be easily measured than other dimensions of deprivation, including vulnerability. However, vulnerability is more than poverty and more linked with net assets. While Poverty, in the sense of low income, can be reduced by borrowing and investing; but such debt makes households more vulnerable (Chambers 1989).

Chambers describes two sides of vulnerability: an external side, which is constituted of risks, shocks and stress events that affect people and an internal side that represents the coping and adaptive strategies of individuals to vulnerable events. The degree of the vulnerability results from the interaction of both sides. For example, there is a high vulnerability if the huge potential hazard is combined with a limited coping and adaptive capacity base (Bohle 2007). Based on Chambers definition, (Watts and Bohle 1993) have further developed the concept of vulnerability by explaining it further by three new components: a tangle of social structures and relations with critical resources, lack of entitlement and precarious dependencies, which can induce to disadvantage by affected groups. From this complex causal description of the vulnerability, Bohle and Watts worked out a double structure of vulnerability characterised by an external and internal side. The external side composed of the risk of exposure to crisis, stress and shocks; the risk of inadequate capacities to cope with stress, crisis and shocks and the risk of severe consequences

and the associated risks of slow or limited recovery (resilience) from the crisis, risk, and shocks. The external side here is influenced by political-economic aspects (e.g. social disparities through assets control by higher classes), human ecological aspects (human-environmental interaction) and the entitlement theory aspects relating to the vulnerability of people through lack of entitlement (e.g. access to living assets). Regarding the internal side, it is characterised by coping and/or adaptive strategies, thus how people anticipate, cope and adapt to the effects of a hazard. The internal side is influenced by the crisis and conflict theory (how people access and control assets and how resulting crisis and conflicts from this access are managed), action theory approaches relate to people agency (e.g. people's capability or ability to independently act and react as social agents influenced by both social, cultural, ecological, economic or political constraints and their individual experiences and perceptions. Finally, the models of access to assets approaches relate to coping capacity through the mitigation of vulnerability per access to assets.

Figure 4 A Conceptual Model for Vulnerability Analysis after Bohle and Watt (Bohle 2001)



The livelihood assets or poverty-reducing factors

Livelihood assets refer to the resource base a community and households have access to. As the SLA has people in the focus of its approach, it seeks to acquire a detailed and solid understanding of people's assets or capital endowments and the transformations processes or ways from these to positive livelihood outcomes. People seek to achieve different positive livelihood outcomes by limited accessible and/or available assets. Thus, not only one single asset could lead to the nearest positive

livelihood outcomes, but rather a combination of and/or selection between different types of assets is needed to get to that desired positive outcome. Thus, assets are interlinked and influence each other negatively or positively. The SLA differentiates five types of assets, the so-called capitals -human, natural, financial, physical and social, that are available to local people. The assets are denoted in the SLF with a capital letter (H, N, F, P, S) and are represented in the form of a pentagon, which shape shows the variation of people's access to assets.

The idea is that the centre point of the pentagon, where the lines meet, represents zero access to assets while the outer perimeter represents maximum access to assets. On this basis, differently shaped pentagons can be drawn from different communities or social groups within communities (DFID 1999b).

The 5 capitals are described below as follows:

1. *Human capital* refers to the skills, knowledge, ability to labour and good health available for the successful pursuit of different livelihood strategies for achieving livelihood objectives.
2. *Natural capital* refers to the natural resource stock (soil, water, etc.) and environmental services (hydrological cycle, pollution sinks etc.) from which resource flows and services useful for livelihoods are derived.
3. *Economic or financial capital* comprises the capital base (cash, credit/debt, savings, and other economic assets, including basic infrastructure and production equipment and technologies) which are essential for the pursuit of any livelihood strategy.
4. *Physical capital* comprises the basic infrastructure and producer goods (transport, equipment, adequate shelter and houses, water and sanitation, energy, access to information) needed to support and/or enhance livelihoods.
5. *Social capital* are social resources (networks and connectedness, affiliations, associations, relationships of trust, reciprocity and exchanges) upon which people draw when pursuing different livelihood strategies requiring coordinated actions (DFID 1999b; Scoones 1998).

Transforming structures and processes/institutions and organizations

Transforming Structures and Processes in the SLF refer to the social, institutional and organisational representation which shape livelihood strategies. (Davies 1997 in Scoones 1998:1) defines institutions as "...the social cement which links stakeholders

to access to capital of different kinds to the means of exercising power and so define the gateways through which they pass on the route to positive or negative [livelihood] adaptation". Thus, institutions although composed of man-made ingredients such as rules and norms, they play a crucial role in the SLF in specific and in the general livelihood processes in general. They allow and enable the availability, access, and sustainability of livelihood capitals from the most private to the most public subject and from the individual to the international level, passing by the household and community. Thus, they influence the level of vulnerability, coping and adaptive strategies of people to shocks. Institutions, in turn, are influenced by different factors such as historical, social, economic cultural, educational aspects of a community resulting in their good implementation and success. Institutions are made of state and its institutions (GO), NGOs, civil society, power relations, or the private sector. Another important institution in rural settings are informal institutions (traditional law) which still remain strong and influenced by livelihood processes of community members. Thus, due to their active influential presence and role at all levels and domains of livelihood processes, the preponderance of institutions -ideally good functioning ones- could not be stressed enough for the fulfilment of desired positive livelihood outcomes, especially for the social and economic vulnerable groups such as the socially excluded, unskilled, women etc. in developing countries especially in their rural areas.

Livelihood strategies or Pathways

Livelihood strategies or pathways represent the range and combination of activities and choices that people make/undertake in order to achieve their livelihood goals (including productive activities, investment strategies, reproductive choices, etc.) (DFID 1999b). Contrary to the employment thinking approach see 2.2.3 above in former development research and policy, people are not just focused on one livelihood activity and /or strategy to get to the desired livelihood outcomes, but they rather combine varied different activities and strategies in developing countries.

Recent studies have drawn attention to the enormous diversity of livelihood strategies at every level –within geographic areas, across sectors, within households and over time. This is not a question of people moving from one form of employment or 'own-account' activity (farming, fishing) to another. Rather, it is a dynamic process in which they combine activities to meet their various needs at different times (DFID 1999b).

The livelihood strategies are one of the most dependent elements of the SLF. In fact, they depend mainly on the available assets, which in turn are influenced by the desired outcomes or and the vulnerability level. (Scoones 1998) in his IDS Working Paper 72, *Sustainable rural livelihoods: a framework for analysis*, defines agricultural intensification/extensification, livelihood diversification, and migration as the three mainly employed livelihoods strategies covering the group of opportunities for rural people. He clarified his statement with the following example:

...Either you gain more of your livelihood from agriculture (including livestock rearing, aquaculture, forestry etc.) through processes of intensification (more output per unit area through capital investment or increases in labour inputs) or extensification (more land under cultivation), or you diversify to a range of off-farm income-earning activities, or you move away and seek a livelihood, either temporarily or permanently, elsewhere. Or, more commonly, you pursue a combination of strategies together or in sequence (Scoones 1998:9).

Thereby the combination of pursued activities is described as livelihood portfolio. Depending on the desired livelihood outcomes some portfolios are more concentrate on one or restricted activities while others on diverse activities resulting in the establishment of different livelihood pathways. However,

...different livelihood pathways are evident over different time-scales. Over seasons and between years, variations in options emerge. Equally, within domestic cycles, different combinations of strategies may be pursued sequentially, depending on changes in dependency ratios, health conditions, and other factors. Over longer periods – over several generations, for example –more substantial shifts in combinations may occur, as local and external conditions change (Scoones 1998:10).

Livelihood strategies can be seen as sensitive elements of the SLF as they could be composed of trade-off and combinations. While they are highly dependent on other livelihood elements, they could be highly conflictual with these as well, as they, on the one hand, influence the level of success of desired livelihood outcomes and on another hand, they in turn highly dependent on the resource endowments of the actors, but at the same time influence the entry-level of future resource endowment available.

Livelihood outcomes

Livelihood Outcomes are the achievements or outputs of Livelihood Strategies (DFID 1999b). As said above, the success of livelihoods outcomes depends on both on the desired outcomes and the employed livelihood strategies supposing positive influences of both environmental external factor (*vulnerability context*) and human-

made external factor (*policies and organisations*). The SLF identifies five types of livelihood outcomes, which depending on the circumstances may or not be important (DFID 1999b).

1. *More income*: Although income-oriented approaches of poverty have been much criticised, see 2.2.3 above, an increase in net income or cash stills remains one of most pursued goal by people (wage from employment, farm work, small trade, etc.). Thus, the increased income also relates to the economic sustainability of livelihood.
2. *Increased well-being*: People do not only pursue the acquisition of material goods such as money for their well-being, but also non-material goods influence that well-being feeling. These non-material goods include dignity, political and social inclusion and participation, health status, access and use to/of services and information, free exercise of social-cultural believes, maintenance of the cultural heritage etc. Increased Wellbeing relates to the socio-cultural sustainability of livelihood.
3. *Reduced vulnerability*: As already mentioned above, the less available assets people have or own, the more exposed they are to the vulnerability context, leading to high vulnerability level of poor people, as they have less access to assets thus fewer assets available or owned. Thus, reducing vulnerability context is one of the most aspired aims of poor people resulting in increased sustainability of the overall livelihood
4. *Improved food insecurity*: Improved food insecurity is one of the most characteristic dimensions of vulnerability. Thus, the SLF in the aim of underlining food insecurity's important implication by representing it in a separate category in the framework, as hunger and dietary inadequacy have been repeatedly promulgated and shown by participatory poverty assessments as a distinctive dimension of deprivation (DFID 1999b). Consequently for a better assessment of positive and satisfactory livelihood outcomes "...nutritional status is often considered as one of the best outcome indicators for overall livelihood security since it captures multiple dimensions such as access to food, healthcare and education..." (Frankenberger, Luther, Becht et al. 2002:22).
5. *More sustainable use of the natural resource base*: For most rural households, natural resources represent the base of the livelihoods. Using natural resources, sustainability refers to the ability of a system to maintain

productivity even after experiencing perturbing events such as 'stress' (a small, regular, predictable disturbance with a cumulative effect) or a 'shock' (a large infrequent, unpredictable disturbance with immediate impact). Thus, the depletion of any stocks of natural resources, that leads to a long-term deterioration in the rate of the natural resource base needed for products or services for livelihoods should be avoided (Scoones 1998). However, assessing natural resource sustainability could be challenging, as it is critical to link indicators of resource depletion (e.g. erosion, vegetation loss, a decrease of fertility etc.) or accumulation (vegetation cover, etc.) to both the temporal dynamics of system resilience (i.e. the ability to recover from disturbance) and livelihood needs (i.e. an assessment of whether natural resource change results in 'effectively permanent declines in useful products or services') (Scoones 1998). Furthermore "...it is a major concern that is not adequately captured in the other livelihood outcome categories. Although often viewed as a donor objective, it is of course shared by many who recognise the long-term benefits of prudent resource use" (DFID 1999:37).

As already mentioned, livelihood outcomes indicate whether people are successfully employing and achieving their pursued livelihood strategies in order to get to the desired outcomes. That being said, the linkage and interdependence between *livelihood outcomes*, *livelihood assets* and *livelihood strategies* can be detected. However, despite this interlinkage, there are trade-offs and contradictions between the different livelihood outcomes as well, for the reason that resources and assets and their access are limited compared to people, available resources and desired outcomes. Thus

... Different people will inevitably have different views as to the priority indicators, and, where conflicts are highlighted, choices then have to be made. By disaggregating the definition into a series of indicators, however, such choices become explicit, making negotiation between outcome possibilities possible as part of any policy development, planning or implementation process which has sustainable livelihood concerns at its centre... (Scoones 1998:7).

Therefore, the analysis of the livelihood outcomes should not only locate unmet needs and/or desired aims but also, the existing compromises between needs and aims. Additionally, the synergistic relationships between the outcome should be taken into account as well (Frankenberger, Luther, James et al. 2002).

2.3 CONCEPTUAL FRAMEWORK OF THE RESEARCH

The conceptual framework of the research as presented in Figure 5 has been guided by the “vulnerability and livelihoods approaches” as described above to understand food and nutrition security of households in the study area.

The framework describes the interlinkages of different factors of the sustainable livelihood framework influencing the determinants of food and nutrition security (food production, access and consumption), which underlie a vulnerability context in Dano. Population growth, climate variability, livestock and plant diseases and related yield decrease, lack of adequate institutional support by food production and access, seasonality of food offer and price, lack of knowledge on adequate practice, the inadequacy of food quantity and quality are some aspects of this vulnerability households face.

To reduce this vulnerability, current transforming structures and processes through social, institutional and organisational environment play a crucial role. So, for example, GO (communal embody of the ministry of agriculture, school meal and food aid programmes, health services etc.) and NGOs (Dreyer Foundation, VARENA ASSO, CISV, farmer’s associations) and informal institutions (traditional land laws and food production processes, cultural taboos) are used to keep and/or improve environmental protection, access to water, boost food production, access and consumption on one side and to control degradation and use of aggressive inputs on another, which in turn diminishes vulnerability. Cultural values such as the fair distribution of land between autochthones and immigrants and ancestorship may reduce land-related conflicts and the growing social instability.

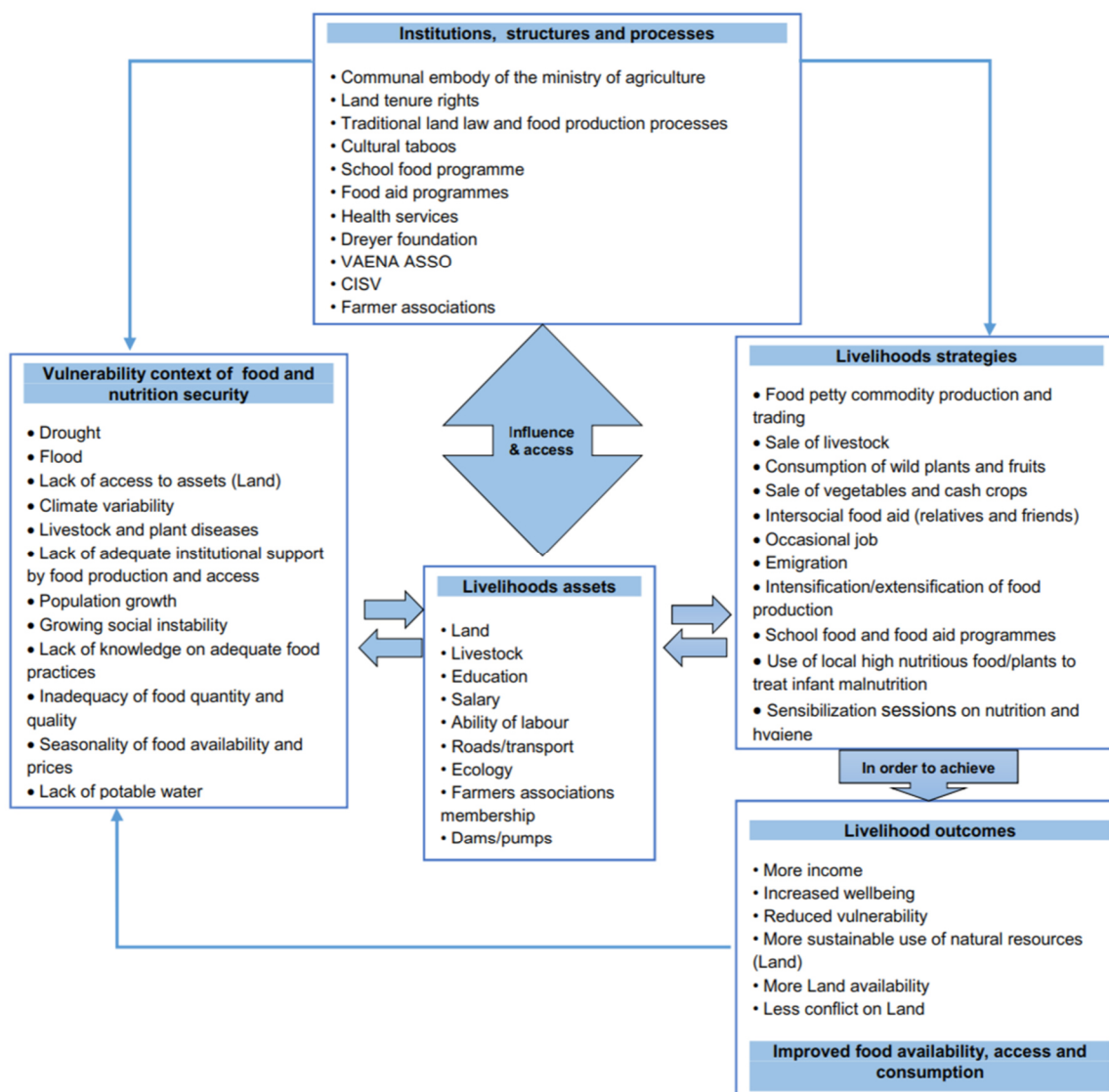
Applied livelihood strategies to reduce vulnerability and enhance food and nutrition security are mainly dependant on the available assets one hand and the transforming structures and processes on other. In these study households mentioned/applied in case of vulnerability to food insecurity the following strategies: petty commodity production and trading, sale of livestock, consumption of wild plants and fruits and sale of vegetables, intersocial food aid (relatives and friends), sale of cash crops and occasional job while institutions use intensification/extensification of food production, school food and food aid programmes, use of local high nutritious food/plants to combat infant malnutrition, sensibilization sessions on nutrition and hygiene. In Dano, assets which consisted of productive, non-productive and financial (land, farming materials and livestock, salary etc) were dependent on the socioeconomic group of

the household. Generally, the more the number of assets owned, the better off the household, thus the less vulnerable and more food secure, which is one of the most pursued livelihood outcomes. Livelihoods outcomes, in turn, influence the next vulnerability context of the household. The better the livelihood outcomes are improved and/or achieved, the lesser will be the next vulnerability context.

A detailed livelihood setting of the research can be seen in Figure 5 .

Figure 5 Conceptual framework of the research

(Own presentation based on Bamler 2015b; Chambers and Conway 1992; DFID 1999a; NYANGILE and JONAS 2013; Riely Frank et al. 1999; field data)



3- METHODOLOGICAL APPROACHES OF THE RESEARCH

This chapter describes the methodology that was used in the study. It includes a description of the study area and research design, which covers sampling procedures, sample size and sampling frame, data collection, data analysis and limitation of the study.

3.1 RESEARCH METHODOLOGY

3.1.1 Research design

For a better and deeper understanding of the research objective, it was aimed to obtain as much insight as possible into the problem under investigation. Because of this, it was necessary to have an understanding of local people's life situations and point of view according to food and nutrition security. Against this background, qualitative research was thus deemed suitable for probing the issues under investigation. This is because qualitative research essentially concerned with

...describing lifeworld 'from the inside out', from the point of view of the people who participate. By so doing it seeks to contribute to a better understanding of social realities and to draw attention to processes, meaning patterns and structural features (Flick, U. et al. 2004:3).

Furthermore, the assumption is that the local population is often endowed with vast knowledge and would provide important insights under investigation. Indeed, Robert Chambers emphasizes that "all rural people know things which outsiders do not know, and some know more than others. There are many ways for outsiders to learn from them " (Chambers 1983:203). For this study, therefore, this means that the target group are the experts concerning their livelihoods.

During the fieldwork, the target local population were motivated to share their knowledge, experiences and perceptions with the researcher. But to critically engage the local population and to gain diverse and critical insights into issues being investigated, a triangulation of methods was used for the data collection process. Triangulation aims at addressing something from multiple points of views to improve accuracy (Neuman 2010). Thus, data collection, which spanned between November 2012 to Mai 2013, involved a combination of qualitative and quantitative research methodologies.

For the qualitative research methods, participant and non-participant observation, in-depth unstructured and semi-structured interviews, focus group discussions, informal discussions were used, while quantitative methods included household surveys on demographics, food consumption assessment such as 24-hour recalls, dietary history and food-frequency questionnaires (FFQ). Also, secondary data and information from organisations both governmental and non-governmental have been collected.

The data collection was undertaken with the support of a research assistant. The research assistant was a graduate in Law and originated from Dano. As a graduate and native of the study area, he had strong knowledge of the environmental, sociocultural, and institutional settings of the research area. This allowed him to give first-hand insights and ideas according to potential target groups. Furthermore, his presence made the accessibility of the target groups easier and uncomplicated, as people knew and trusted him, which was a further advantage for the fieldwork.

3.1.2 Sampling

To investigate local practices and experiences of food and nutrition in the study area, there was a need for adequate representation of the target population. But due to issues of practicality, the whole population could not be covered and hence the need for the representative sample. In line with this, respondents for the study were purposively selected. The respondents came from different socioeconomic sectors (farming and non-farming ones, e.g. farmers, teachers, medical staff, traders; key informants from governmental and non-governmental organisations) and different geographical areas (distributed over all the 7 geographical subdivisions of Dano commune and one village of it). The final constellation of respondents and data collections was made up of 133 households.

With the data collection, a questionnaire containing both closed- and open-ended questions was used for the household surveys. The household survey probed into household demographic and socioeconomic characteristics, food availability and production characteristics, food access and assets characteristics, food consumption practices including health care and hygiene practices and coping and adaptive strategies to food insecurity situation. In addition to the household surveys, qualitative interviews were also employed to offer more in-depth insights on participant attitudes, thoughts, and actions. As a result, 23 key informant interviews were carried with staff from governmental and non-governmental organisations on the dimensions of food security. 8 Focus group discussions (FGD) on dimensions of food security have been

done with households. Secondary data analysis⁷ and information on food security from governmental and non-governmental organisations have been carried to extend the gathered data. Following is a detailed overview of the data collection process.

3.1.3 Focus group discussions (FGD)

“The Focus group is a special qualitative research in which people are informally interviewed in a group discussion setting” (Neuman 2011:459). During a FGD, a group of people are questioned to express their perceptions, beliefs and behaviours about a topic of interest in order processes to generate discussion on it. During my FGDs, it affords me an interactive atmosphere with respondents in order to grasp their perceptions of livelihoods and vulnerability considering food production, access and consumption and their established coping and/or adaptive strategies to the experienced vulnerabilities.

These FGD were often conducted within a timeframe of between one to two hours. In doing so, I aimed to gain insights into an exploratory way, preliminary data and /or further insights into my research questions.

The FGD offer an effective way for local people to discuss a topic in their own words and non-verbal expressions with each other. This allows for critical discussions that would not be available using standard one-on-one interviewing (FAO 2004). For a good and successful functioning of a FGD, the participants should have a comparable

⁷ Secondary data analysis here refers to the process of undertaking research using already-assembled databases or archives. These may be statistical databases, such as official statistics, or survey archives or non-statistical data sets such as oral or documentary history archives. The principle is the same: the use of extent data to explore a new thesis (*Harvey 2016*). (Hakim 1982 in Harvey 2016) defined secondary data analysis as “any further analysis of an existing dataset which presents interpretations, conclusions, or knowledge additional to, or different from, those presented in the first report on the inquiry as a whole and its main results”, which include more condensed studying of reports and data on specific sub-topic or social and/or policy issue as well as existing conceptual frameworks and theories.

For my research the secondary data analysis focused on databases on food and nutrition security in the world, in Africa, in West Africa, Burkina Faso and especially south-west BF and Dano. The Database consisted of both online and printed publications from official GO-and NGOs reports, surveys etc. (FAO, WFP, USAID, GOBF, CILSS, etc.), surveys and reports of practitioners such international development agencies and local ones and research studies, papers, theses etc.

background and perceptions in order for the researcher to have a homogenous group. Furthermore, the researcher, who generally plays the role of the moderator during the discussion, should try to be nondirective and be able to facilitate a free open discussion between the participants (e.g. making sure that one or some participants dominate the discussions). An overview of the FGD of my research is summarized in Table 1.

| <i>Table 1 addressed themes during the focus group discussions</i> (field data) | | |
|--|------------------------|----------------------------------|
| Addressed topics | Participants | Place of focus group discussions |
| <ul style="list-style-type: none"> General livelihoods activities, strategies and outcomes according to food production, access and consumption and the experienced changes Experienced vulnerability related to food and nutrition security and the established coping and/or adaptive strategies to the experienced vulnerabilities Self-definition and perception of household and community food and nutrition security | Farmer (only men) | Lofing (Dano rural) |
| | Farmer (men and women) | Lofing (Dano rural) |
| <ul style="list-style-type: none"> General livelihoods activities, strategies and outcomes according to food production, access and consumption and the experienced changes Experienced vulnerability related to food and nutrition security and the established coping and/or adaptive strategies to the experienced vulnerabilities Self-definition and perception of household and community food and nutrition security Housing, health and sanitation situation Access to water, sanitation, health services Food consumption patterns, food preferences of different groups such as children, pregnant women and lactating | Farmer women | Lofing (Rural Dano) |
| | Farmer women | Pontiéba (urban Dano) |
| | Salaried women | Urban Dano |

3.1.4 In-depth interviewing

In-depth interviews represent a kind of exploratory conversation between the interviewer and respondent, where the respondent is seen as an expert teaching the interviewer about his/her cultural setting. In my case, I used in-depth interviews to better explore local perceptions according to my research objective. The FAO, for example, note that in-depth interviews are “... *useful for identifying actual practices and for delineating facilitators and barriers to recommended practices such as in young child feeding*” (FAO 2004).

Picture 1 A Household semi-structured in-depth interview in Lofing, rural Dano (field data)



Furthermore, during in-depth interviews, the respondent is encouraged to exchange detailed information about the topics under investigation to discover the respondent's detailed perceptions of the given topics. However, the “interviewer's presence and form of involvement—how she or he listens, attends, encourages, interrupts, digresses, initiates topics, and terminates responses—is integral to the respondent's account” (Mischler 1986 in Laurence. 2011:449).

In-depth interviews contain a reciprocated sharing of experiences, where the researcher shares his/her background to build trust and encourage the respondent to open up, but not to force answers or use leading questions. His/her wants to encourage and guide a process of mutual discovery (Laurence 2011). To achieve a trustful and strong relationship to the respondents, serial visits and integration of myself in their everyday life was needed to prove my interest for them as persons and not as respondents only. Thus, the building of the trustful rapport begun with simple conversations about everyday life topics was done as a form of step-by-step entry into the research areas and topics. After the ‘ice was broken’, familiarity was installed, which paved the way for successful data collection process. In-depth interviews cover a range of interviews methods from informal conversations to more formal interviews characterised by unstructured, semi-structured or structured forms. Most of the in-depth interviews take place in a one-to-one setting and /or interaction between interviewer and respondent (in my case including the translator if needed). “But sometimes the interview may include 2 respondents, such as a married couple, or parent and child, or even a small group of respondents” (Harvey 2016). However, depending on the place, time and setting of the interview (e.g. respondent in a

compound), although my questions/ interview was focused on one respondent, the situation was such that other members of the household/compound listened in and often provided contributions to the interview. Depending on the aim of the interview, I have employed the unstructured informal interview which is as the same said,

...more of a conversation with little evident direction to the interview just the broad topic area. These are referred to as 'open-ended'. In some cases, the conversation, which is often one-sided, develops into a dialogue where the interviewer contributes as much as the respondent (Harvey 2016)...

A further in-depth interview used was the expert interview. While they were the subject of informal methods sometimes, they have been but mostly based on semi-structured and structured forms. Key informants provide ways of knowledge detection and acquisition. Thus, the questions are mostly pre-structured and purposeful. The key informant has knowledge that the interviewer needs for his research. The key informant is therefore rather in a passive role, because she/he only responds to the interviewer's questions, while the researcher's task is to restructure and formalise the gained knowledge. The difficulty appears by key informant interviews, when key informant and interviewer come from different disciplines, as they may both speak different technical languages. However, this can be solved by asking for clarification, when such cases appear.

My fieldwork involved expert interviews with key informants from the governmental and non-governmental organisations supporting and promoting food availability, food access, adequate nutritional, sanitarian and hygienic practices in Ouagadougou and Dano commune, with the aim to assess their experiences and perceptions on the above-named parameters of food security as well the administrative and practical functioning, successes and constraints related to their activities. Further key informants involved in food-related activities- including traditional landlord/, street food trader, shop holder and market trader have been as well interviewed.

Table 2 Addressed themes with key informants
(n=25, field data)

| No | Key informant/Function | Addressed themes | Institution/Main activities/Place |
|----|---|---|--|
| 1. | Prof. Dapola Da/Prof. Physical Geography/Environmentalist/S oil scientist, WASCAL partner | Parameters related to food production e.g. rainfall, yield, soil fertility, access to land, fertilisers, production materials, water, agricultural extension services and the perceived changes | Department of Geography, University of Ouagadougou |

| | | | |
|-----|--|---|---|
| 2. | Prof. Francois de Charles Ouédraogo Prof. in Human Geography with a focus on food security and vulnerability, WASCAL partner | Causes of food insecurity in BF and the established adaptive strategies by the food insecure | Department of Geography, University of Ouagadougou |
| 3. | Mr Blaise Kienou/Technical Manager | The vulnerability of food security in BF and established strategies by an international NGO | Famine Early Warning System (FEWSNET)/provider of early warning and analysis on acute food insecurity/ Ouagadougou |
| 4. | Dr Adoul Karim Ouédraogo/Regional Coordinator | | |
| 5. | Mr Hervé Levite/Technical advisor to the Director | Water-related issues e.g. irrigations systems for food security | The Economic Community Of West African States (ECOWAS), Water Resource Coordination Centre (ECOWAS/WRCC)/ reinforcing west African country's agriculture according to water management and Climate Adaptation/Ouagadougou |
| 6. | Mr Léopold Namema/Technical coordinator in charge | Opportunities, aims and challenges of national policies on food security, established programs which enhance food productions systems and farmers livelihoods | Ministry of agriculture and food security/ Ouagadougou |
| 7. | Mr Fernan Sawadogo/ In charge of the centre for health information and epidemiological surveillance- CISSE | Administration and functioning of the health and social centre/Centre de Santé et de Promotion Sociale (CSPS) | Health and social centre (CSPS)/Urban Dano |
| 8. | Mr Baudoin Somé/State nurse | Typologie and frequency of diseases and their contamination rate; typologie of patients; malnutrition and death rate of the patients especially of women and children < 5 years; successes and challenges of the hospital and its programmes for good nutrition and against malnutrition especially for women in the age of procreation and children <5 years | |
| 9. | Mr Abdoul Aziz Diallo /Facilitator on the sensitisation sessions on prenatal, natal and postnatal behaviour, mother-child transmissible diseases and family planning | Coping and adaptive strategies according to the adequate health of women in reproductive age and children under 5 years | |
| 10. | Mme Cécile Somé /Midwife, Rehabilitation centre for malnourished children (CREN)/ Intake and treatment of acute and severely malnourished | Coping and adaptive strategies according to malnutrition cases | |
| 11. | Mr Salfo Kaboré/Financial Director | Administrative and practical functioning of the school food meal programme of the Dreyer foundation | The Dreyer foundation in Dano/ German NGO with a focus on farming and domestic water supply, |

| | | | |
|----|---|---|--|
| 12 | Mr Somé /director of the Dreyer's Centre d'Éveil et d'Éducation Préscolaire/Centre for Early Childhood and Preschool Education (CEEP) | Hygienic and nutritionally based activities and programs in the Dreyer foundation's preschool and the canteens of the preschool | improved food production, professional training, school meal programmes, young child education, sensitisation sessions on food and nutrition, hygiene/Dano |
| 13 | Mr Clement Dabiré Agricultural extension worker and facilitator | Parameters related to food production e.g. rainfall, yield, soil fertility, access to land, fertilisers, production materials, water, agricultural extension services and the perceived changes | |
| 14 | Mme Solange Ibouldou/Hygienic and nutritional facilitator | Food consumption and nutrition-related activities, successes, opportunities and constraints | VARENA ASSO/focus on natural resources valorisation and management, food and nutrition, extension services |
| 15 | Mr Aimé Dabiré/Agricultural extension worker and facilitator | Food production and access-related activities, successes, opportunities and constraints | |
| 16 | Mr Salifou Fayama/school director | Description of functioning, opportunities, success and constraints of the school meal programme by a beneficiary's school | High school/Lycée provincial de Dano |
| 17 | Mr Mohamed Fofana/ school director | Description of functioning, opportunities, success and constraints of the school meal programme by a beneficiary's school | Primary school /Ecole primaire Dano C |
| 18 | Mr Sawadogo/communal coordinator of school meal programmes/State agent | Administrative and practical functioning, opportunities, successes and constraints of the school meal programmes | Regional direction of school meals programmes/Dano |
| 19 | Igias Tougouru/Agent of the social action | Administrative and practical functioning of a governmental social service for vulnerable people to food insecurity | Action Sociale de Dano/Social service and assistance of food for vulnerable people such as orphans, widows and old persons |
| 20 | Mr Somé/Food stuff trader and store holder | Perceptions on supply and demand of food | Central Market and food store/Dano |
| 21 | Mr Mamadou Ouédraogo/Project manager | Administrative aims and practical functioning, successes, opportunities and constraints of supplying domestic and farming water in Dano by an international NGO | CISV (Comunità Impegno Servizio Volontario/Italian NGO focused on promoting irrigation systems, domestic water supply, sanitation, hygiene, harvest management |
| 22 | Mme Mariam Cissé /Street food trader | Supply and demand for street and restaurant food | Urban Dano |
| 23 | Mr Jonas Somé/Farmer | Views and experiences of an experienced farmer and traditional landlord on food production e.g. rainfall, yield, soil fertility, plant diseases, animal diseases, access to land, fertilisers, production materials, water, agricultural extension services and the | Organic farmer/Rural Dano |

| | | | |
|--|--|--|--|
| | | perceived changes and general societal changes | |
|--|--|--|--|

3.1.5 Participant observation, informal conversation, field notes and photography

Exploring local food patterns was the aim of the research, to better get to this aim, it was necessary to get local people expressing themselves in the forms in which they normally speak, think, organise reality according to food practices /e.g. food access through field, shop, social event or market; food cooking scenery, food eating scenery) (Neuman 2011). For these reasons, participant and non-participant observation were also employed as part of the data collection process. As pointed out by Flick et al. (2004:194), participant observation “has increasingly been accepted as part of the most general strategy of ethnography and has thereby become part of a complex procedure that is strongly determined by questions of access and the presentation of results...”.

Participant observation can be understood in 2 ways. On one hand, the researcher her/himself become a participant and thus gain access to the field and people. On the other hand, the observation gets more concrete and more oriented to the essential aspects of the research questions (Flick et al. 2009). In fact, participant observation is a permanent part of the research, which could appear and or be practised in every aspect of the research such as during both informal chats and more formal in-depth interviews. Observations are thus advantageous as they provide background context for the collected data and gained knowledge during conversations and interviews on other hand and these can be checked and updated on the other. The 10 months' fieldwork allowed me good options of observation and to get a deep integration to the local setting of food consumptions aspects such as (going together to market, providing cooking energy, cooking, eating and drinking together with research participants and their household members).

Picture 2 A participating observation scenery, where a household was sharing its lunch with the researcher
(field data)



To get an unbiased general food consumption behaviour at different settings such as households, market, street, funerals, markets, restaurant, bars etc., I have practised non-participating observation which involved observing social behaviour first hand without being directly involved in. Doing so I have observed what people do, how they interact, how they cope with organisational situations etc. according to the above-cited food consumption settings. Observations and interviews have been further supported by field notes and photos.

Field notes are notes that aim at capturing every detail and specifics of what the researcher hears and sees in a field site and that are written to permit multiple interpretations later (Neuman 2011). According to photos they are the most common form of visual sociology, and the most peculiar as well as they have the dual quality of recording the world without interpretation, and at the same time with profound subjectivity. There is no other method for recording the world which has this ironic inconsistency and everything about visual methods reflecting on the tension between these competing qualities of the image (Flick et al. 2004). That could be one of the reasons, why photos are getting increasingly famous in scientific research additionally to the other methods, as (Flick et al. 2004:194) stated this: "Apart from data collection oriented to the spoken word and the textual medium, and beyond observation in the field, new media are becoming increasingly important as data: photos and films have for sometimes played a growing role, particularly in the international debate....the

photograph gathers an extraordinary amount of information; a photograph of a complex social event or a complicated material reality may be described only with several pages of text...” (Flick, U. et al. 2004:231-232). However, a photo apart being subjective, will never equal a text as a photo by himself does not communicate, thus does not reveal and explain social realities and perceptions totally. Thus, I used photos in my research as an information supplement to these from the interviews.

3.1.6 Food security assessment

Estimated food records on staple food and food-frequency questionnaire (FFQ)

An estimated food record is similar to a 24-hour recall. It consists of a detailed description of food and drinks consumed over a period (usually 3 to 5 days). The advantage of this method is that it provides detailed dietary intake data that is more representative of usual intake than a single 24-hour recall. The disadvantages are that a high degree of respondent cooperation is necessary, and the act of recording may alter the usual diet. Furthermore, the FFQ has been applied to assess the habitual dietary.

The underlying principle of the food-frequency approach is that the average long-term diet (intake over weeks, months or years) is a more important exposure period than short-term intakes. The benefit of this method is that it can provide more representative information on usual intake than a few days of diet records or recalls. However, the method is limited in that it may not provide details of accurate quantities or portion sizes. This study has used repeated 24hours recall methods and 7days recall methods on the monthly basis over the whole period of the study to get the food-frequency consumption of the respondents.

Diet quantity

Diet quantity was determined from the number of meals eaten per day in the households. Where a meal was defined as “food served or eaten at a given time during the day (e.g., breakfast, lunch, dinner)” and a household as “those of you that sleep under the same roof and take meals together at least 4 days a week” (Coates et al. 2007:15).

The meal times were categorised according to the FAO guide as breakfast, snack between breakfast and lunch, lunch, snack between lunch and dinner, dinner, and snack after dinner. The number of meals consumed per day in households was

recorded and used as an indicator of food security. A household that had less than 3 meals a day was considered food insecure while this having 3 or more meals a day was considered food secure (Swindale and Bilinsky 2006).

Dietary diversity

Household dietary diversity (HDD)

Dietary diversity is a qualitative measure of food consumption that reflects household access to a variety of foods and is also a proxy for nutrient adequacy of the diet of individuals (Kennedy et al. 2010). Doing so the HDD records all foods and beverages consumed for a specified period (generally one to 7 days). Doing so it aims at assessing the sum of consumed different food groups during that specified and thus determine the diet quality. This results in defining the household diet diversity score (HDDS). The household diet diversity score is meant to reflect the economic ability of a household to consume a variety of foods. Studies have shown that an increase in dietary diversity is associated with socioeconomic status and household food security (household energy availability) (Hoddinot & Yohannes, 2002; Hatloy et al., 2000 in FAO 2008). The following set 12 of food groups, as recommended by the FAO, 2008 guide to calculating HDD was used in this study:

| | |
|-------------------------|---------------------------|
| A. Cereals | G. Fish and seafood |
| B. Root and tubers | H. Pulses/legumes/nuts |
| C. Vegetables | I. Milk and milk products |
| D. Fruits | J. Oil/fats |
| E. Meat, poultry, offal | K. Sugar/honey |
| F. Eggs | L. Miscellaneous |

Data for the household diet diversity score indicator was collected by asking the person responsible for food preparation /provision in the household. A series of yes or no questions on all kinds of food and beverages, including ingredients consumed in the household in the last 24hours were asked. “Yes”, was given a score of one (1) to each food group the household consumed, from at least one food item within a particular food group, for the past 24hours preceding the survey. “No” was given a zero (0) score for a particular food group if the household did not consume any food item from that food group. The FAO recommend the collection of information on

household food consumption using the previous 24- hours as a reference period (24-hour recall). This is because this method provides more accurate information due to shorter recall time. Thus, it is less subject to recall error, less cumbersome for the respondent and also conforms to the recall period used in many dietary diversity studies (Bhutta et al. 2013; Kennedy et al. 2010; Ruel, Marie T. Ballard, Terri J. Deitchler 2014; Savy et al. 2005).

Furthermore, analysis of dietary diversity data based on a 24-hour recall period is easier than with longer recall periods (Kennedy et al. 2010). Moreover, using 24-hour recall period does not provide an indication of an individual's habitual diet, but it does provide an assessment of the diet at the population level and can be useful to monitor progress or target interventions (Kennedy et al. 2010). Households were classified based on the dietary diversity in line with the FAO guidelines for measuring household and individual dietary diversity as follows (FAO 2008). Households consuming less than 3 food groups are considered as having low dietary diversity, Households consuming 4-5 food groups are considered as having medium dietary diversity and Households consuming more than 6 food groups were considered as having high dietary diversity.

Individual Dietary Diversity for lactating and/or pregnant women and children aged 6-59 months

Individual dietary diversity scores aim to reflect nutrient adequacy. Studies in different age groups have shown that an increase in individual dietary diversity score is related to increased nutrient adequacy of the diet. Dietary diversity scores have been validated for several age/sex groups as proxy measures for macro-and/or micronutrient adequacy of the diet. Scores have been positively correlated with adequate micronutrient density of complementary foods for infants and young children (Food and Nutrition Technical Assistance/FANTA 2007), and macronutrient and micronutrient adequacy of the diet for non-breast-fed children (Hatloy et al., 1998; Ruel et al., 2004; Steyn et al., 2006; Kennedy et al., 2007 in Food and Nutrition Technical Assistance/FANTA 2007), and adolescents (Mirmiran et al., 2004 in Food and Nutrition Technical Assistance/FANTA 2007) and adults (Ogle et al., 2001; Foote et al., 2004 in (Food and Nutrition Technical Assistance/FANTA 2007).

This study assessed children feeding practices and diet patterns by interviewing the mothers to describe what the child ate and thereafter totalling the number of food groups consumed by the child (6-59 months) in question for the past 24 hours. The

motive was to determine dietary patterns of children. Thereafter the assessed children were classified as follows: Children having consumed ≤ 4 groups were considered as having low diversity and quality group; Children having consumed >4 groups were considered as having a high-diversity group.

Further detailed descriptions in different stages of children were assessed to get deeper insights into feeding practices of children such as breastfeeding. This was done in view of the fact that

...infant and young child feeding practices directly affect the nutritional status of children under 2 years of age and, ultimately, impact child survival. Improving infant and young child feeding practices in children 0–23 months of age is, therefore, critical to improved nutrition, health and development of children (WHO 2008).

Hence, feeding practices at the following ages were assessed: food habits of children under 6 months, children between 6-12 months, and children between 12-60 months. Accordingly, women were asked to describe their food patterns during pregnancy and lactating times.

3.2 DATA ANALYSIS

During the one-year data collection process, an enormous amount of the data was collected. Thus, in the process of the data collection, processing and analysis it was important to focus on the content of the statements by prioritising and summarising gained information. The preparation and analysis were performed based on the approach of qualitative content analysis (QCA) according to Mayring (2000). Whereby QCA refers to the step by step systematic analysis and examination of data for common themes, and these themes are grouped into units of meaning or systems of categories while following theoretically underpinned questions and coding rules (Flick, U. et al. 2004; Mayring 2000). Doing QCA involves 3 types of investigations (Flick, U. et al. 2004; Mayring 2000):

1. Summarising content analysis aims at reducing the material, but the relevant content remains preserved in such a way that a manageable short text is produced to develop categories gradually from some material.
2. Explicating content analysis in contrast to summarising content analysis aims at explaining unclear terms, sentences, etc. by the aid of additional material. Thus additional material has to be collected to make these textual locations intelligible. The basic idea in this is the systematic and collection of explanatory material. This makes it possible to distinguish between a narrow contextual analysis that only

involves the direct textual environment and a broad contextual analysis that collects additional material beyond the text (information about the communicators, subject, socio-cultural background, target group).

3. Structuring content analysis aims at filtering certain content of the material according to predefined criteria from the interviews. This involves formal, content-focused, typologizing and scaling procedures, depending on the type of structuring dimensions that have been developed in accordance with some theory, and these are then subdivided into individual categories. The basic idea in this is the exact formulation of definitions, typical textual passages ('key examples') and coding rules which will result in a coding guide that makes the task of structuring very precise.

According to the 3 types of QCA cited above, this study employed the following steps for the data analysis:

1. A full transcription of all recorded interviews and discussions by typing out every conversation word for word. As (Flick, U. et al. 2004) states:

- Transcription refers to the graphic representation of selected aspects of the behaviour of individuals engaged in a conversation (for example, an interview or an everyday chat). Transcripts are needed to make fleeting conversational behaviour permanently available on paper for scientific analysis. The aim of producing a transcript is to represent on paper as accurately as possible the strings of words uttered (verbal features)
- From the foregoing, therefore, the transcription was done personally with the support of my research assistant. It must, however, be stressed that data analysis begins with the transcription process, during which first major perceptions, opinions and attitudes could be detected while reading through the transcripts.

2. Coding transcribed data into common themes or concepts according to research objectives and/or questions. Every unit was labelled with a code. Codes are tags or labels for assigning units of meaning to the descriptive or inferential information compiled during s study. Codes usually are attached to 'chunks of varying size-words, phrases, sentences or whole paragraphs, connected or unconnected to a specific setting (Neuman W. Laurence. 2011). Hence the aim of codes is to see how a unit or data is connected to research objectives and questions. During the coding process, data is organised into conceptual categories and themes or concepts are created, allowing the researcher to move towards theories and generalisations (Neuman W. Laurence 2011). Accordingly, coding was implemented to create conceptual categories for use in later sequencing, comparison and analysis one hand and one

other hand because interviewees frequently pointed at coherences between different phenomena. However, several codes would then be applied to the same passage, or coded passages would overlap because they were associated with each other or were often mentioned by many different interviewees (Bamler 2015a; Pereira 2014).

Additionally, to the QCA, data have been further analysed through statistical analysis Statistical Package for Social Sciences (SPSS) 2010 and Microsoft Excel package 2010. Hereby descriptive statistics (mean, frequency, percentage) were calculated. Furthermore, visual chart and/ graph have been created to support data from descriptive statistics.

3.3 ETHICAL ASPECT AND INFORMED CONSENT

In Dano, WASCAL has partnered with the local German NGO the Dreyer Foundation, which plays a crucial role in the socio-economic development, especially the food security sector, of the region and as such well-known in the region. Thus, the cooperation with the Dreyer foundation represented an indirect help for easy access to respondents and their consent. Also, the research assistant played a crucial role in the community or field entry process.

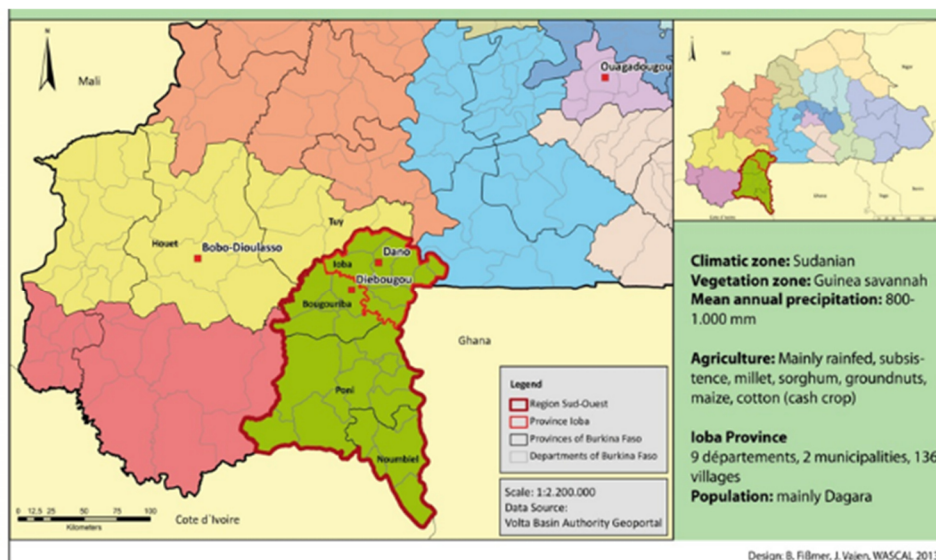
Before data collection, consent was always sought from all respondents including local authorities, household heads and food provider (habitually the head female family member) after explaining them the aim of the research. Ethical consideration was considered an important aspect of the research process. With regard to this, the issues relating to local norms and codes of conducts. Critical issues relating to engaging elders and persons of authority as lady researcher within a rural African setting was carefully taken into cognisance. Cultural patterns of behaviour, food consumptions and peoples personally situations regarding their economic and food security situation were respected and not made to feel undermined. These were done to let respondents feel part of the research and to let them be comfortable in being part of the research process and to ensure the validity of the data that would be collected.

4- RESEARCH AREA AND SAMPLE

4.1 RESEARCH AREA: PHYSIO GEOGRAPHY

This study aimed to investigate the household's food consumption patterns in the Ioba province of southwestern Burkina Faso. The study was conducted in Dano, which is one of the watersheds of the WASCAL. WASCAL is a large-scale research-focused program designed to enhance the resilience of human and environmental systems to climate change and increased variability. It does so by strengthening the West African research infrastructure and capacity relating to climate change and by pooling the expertise of 10 West African countries and Germany⁸.

Map 1 Study area: Ioba province of southwestern Burkina Faso



4.1.1 Geography

This study was carried out in the province of Ioba, which is situated in Southwestern Burkina Faso between the 10°40' and 11° 20' latitude Nord and 2°45' and 3°20' longitude west. The Ioba province builds together with the provinces of Poni, Bougouriba and Nounbiel the administrative region of the Southwest and is

⁸ <http://www.wascal.org/about-wascal/welcome-to-wascal/>, last accessed 12/05/2017.

constituted of 9 departments, 2 municipalities and 136 villages covering a total area of 3286 km² (GOBF/MENA 2013).

4.1.2 Relief

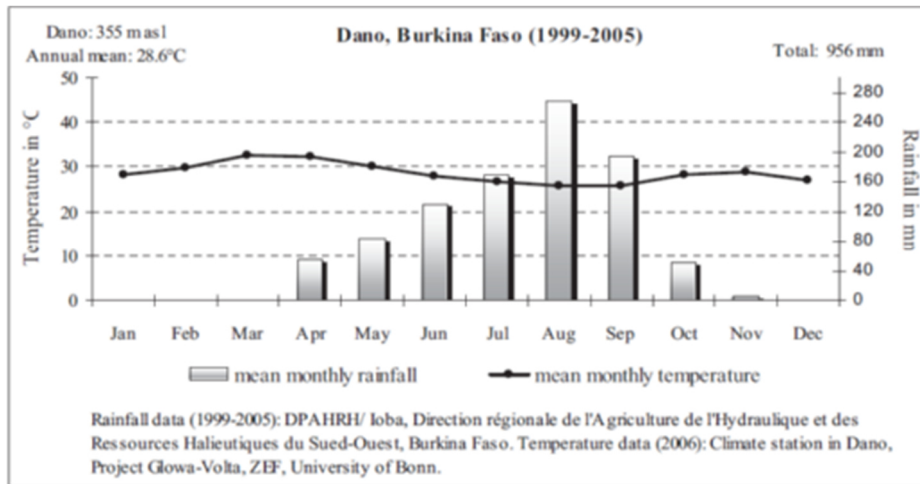
The study area is characterised by a massive plateau with an average altitude between 300 and 350 m. However, one encounters chains of hills in the communes of Dano and Gueguere, with 558 m as the highest peak on the top of the Ioba Mountain, which leads that region to its name (Hamidime 2003).

4.1.3 Climate

Burkina Faso is characterised by 3 climatic zones: the Sahelian zone in the north with average annual rainfall less than 600 millimetres per year (mm/year), the sudano-sahelian region on a savannah plateau with an average annual rainfall from 600-900 mm/year and, and the southern more humid sudanian zone with average annual rainfall between 900-1200 mm/year (GOBF/MECV 2007). The Ioba province is geographically situated in the third climatic zone of the country, and exactly in the northern part of this. Here prevails tropical climate that is characterised by the rotation between a short wet and a long dry season. The rainy season lasts from May/June to September/October.

The rainy season is triggered by the West African monsoon. The average monthly rainfall increases up to a maximum of 270mm at the peak of the rainy season in August with a relative humidity of 75 %. During the dry season, which is under the influence of dry continental winds of the Harmattan from the Sahara, the relative humidity lies under 20 %. With regard to the temperature, the region encounters a minimum monthly temperature of 20.1°C in December, and a maximum monthly temperature of 38.4°C March (GOBF/MECV, 2007; Hamidime, 2003; Schmengler, 2011).

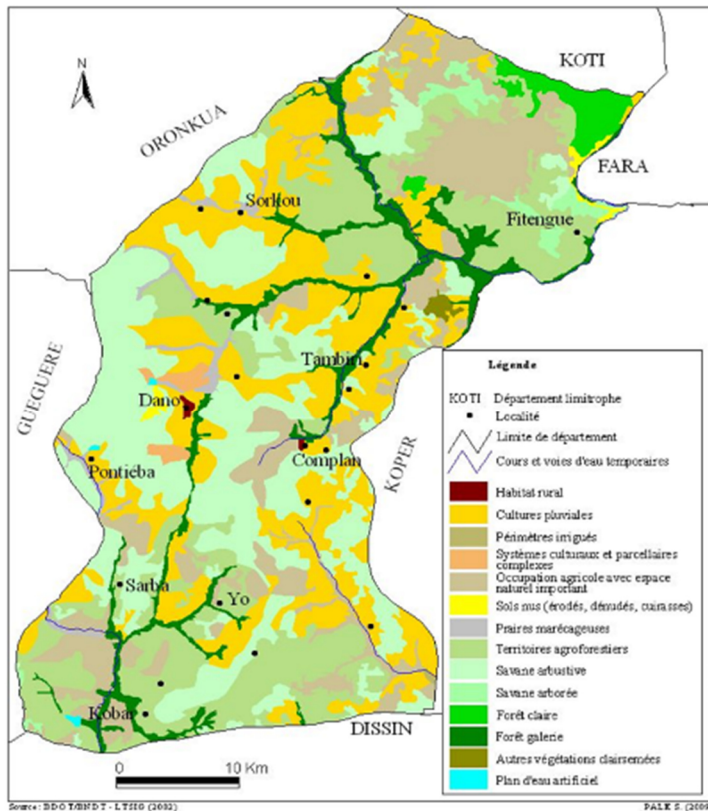
Figure 6 Rainfall data in Dano between 1999-2005
(Schmengler 2011)



4.1.4 Vegetation

The decent climatic or/and described pluviometric conditions and the diversity of the soils in the loba region has contributed to the region's good vegetation cover. The area is characterised by the typical soudanian vegetation in form of wooded, arboraceous or scrubby savannah (Schmengler 2011). In its southernmost province, woodlands intersect with a few gallery forests in the lowlands. The hills and plateau tops are often covered with thick vegetation. Along the streams and in the lowlands, thicker vegetation is found, with *Entenda africana*, *Saba senegalensis*, *Vitex doniana*, *Bombax costatum* and *Azelia africana* being the prominent species.

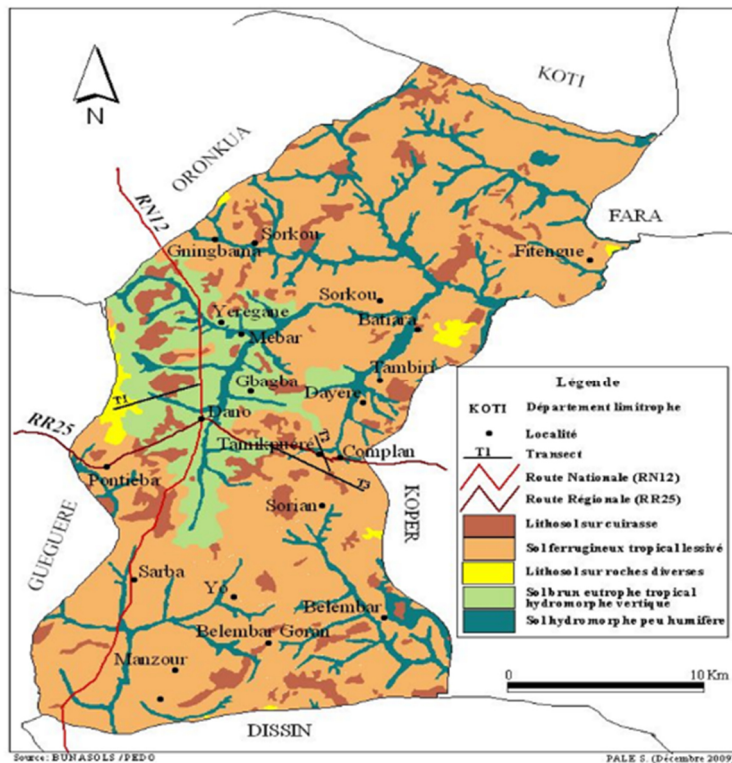
Map 2 Vegetation and land use in the research area



4.1.5 Soils

The soils in the Ioba province are classified by leached ferruginous tropical soils washed on sand or sandy-clay types, which are poor in organic substances and phosphorus. Therefore, they are generally infertile (Roose 1991; Son & Bourarach 2001 in Gerber-Gleisberg 2012). These soils are primarily characterised by Sandy to sandy loam on the surface and clay soils and/or gravelly in-depth, that cover nearly 70% of the province (Hamidime 2003). They possess a low water holding capacity and thus dry up rapidly. Consequently, on these soils, agricultural production, particularly weeding is difficult because of the stones (Stoop 1987 in Gerber-Gleisberg, 2012). Sandy-clay soils on the surface and deep clay soils in depth are very rich but represent only 15 % of all the soils types. Silty clay soils on the surface and clay loam soils in depth. They are located along the Bougouriba valley and constitute 10% of the area (Hamidime 2003).

Map 1 Soils types in the department in the research area



4.1.6 Hydrology

The Mouhoun river and its tributary the Bougouriba are the largest streams in the province. In the rainy season, the flow debit for the Mouhoun can reach 350 /s against 0.42 m³ / s in the dry season. While the Bougouriba can reach a water volume of up to 342 m³ / s in the rainy season, it has a low flow during the dry season. Most of the rivers have cultural meaning and are sites of rituals; however, fishing is periodically practised and seasonal ponds are managed to maintain the fish population (Hamidime 2003; Somé et al. 2006).

4.2 RESEARCH AREA: DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS

4.2.1 Population and migration in the study area

Since the census in 1985, the population of the loba province has increased constantly over the years. The population of the area was estimated to be 145 691 in 1985. This subsequently increased to 197186 in 1996 and 185000 inhabitants in 2006. The 2008 population was estimated at 205 223 inhabitants (GOBF/ISDN 2008). At the census in 1996, the national growth rate of the population was 2.39%, while that of the loba province was 0.94%, which was the lowest in the country at that time. However, one has to note that this rate rose to 2% as against 9% for the whole country in 2008 (GOBF/ISDN 2008).

The increase in population growth rate is mainly due “to large-scale migration from the more heavily populated and drought-affected north and central regions of the country, which has led to large reductions in fallow periods in the region” (Gray 1999). Furthermore, the massive return of migrants from the Ivory Coast in recent years because of the Ivorian crisis, the intensive cotton production, and the increase of gold mining sector in that region are further reasons for the increase of the population (GOBF/MENA 2008; Gray 2001). Consequently, the actual population density in the province is among the highest in Burkina Faso. Projections from the national institute for statistics and demographics (INSD) in 2008 based on data from 1985 and 1996 show that the population density in 2006 was about 57 persons / km² (INSD 2008). In terms of the ethnic composition, the province comprises different ethnic groups: the Dagara (forming the majority), Mossi, (migrant’s population), Pougouli, Bobo, Fulani, Samo, etc. The main religions are Catholicism (most common), Islam, animism, and Protestantism.

4.2.2 Livelihoods context in the study area

The livelihoods of people are dependent on rain-fed agriculture. Millet, sorghum, maize are cultivated as food crops for own consumption, whilst cotton and other cash crops such as rice, cowpea, groundnut, rice, vegetable and chilli are cultivated for sale. Livelihood strategies are diversified through non-farm activities such as fishing, hunting and petty trade (which is mostly done by women). These non-farm activities play a big role for households in increasing their income.

Millet and sorghum show good tolerance to drought and marginal soils (Gerber-Gleisberg 2012). Therefore, these crops are allocated to landholdings at higher altitudes in large fields. However, they can also be found on small plots with low soil fertility where no other crops can be cultivated. To increase or maintain soil fertility, millet and sorghum are very often intercropped with cowpea. In order to decrease the risk of damages caused by livestock, these plots are at a greater distance from the houses (Gerber-Gleisberg 2012).

Maize is also grown to improve food availability in the so-called *periode de soudure* (lean period). Among the local food crops, maize has the shortest growing cycle (between 60 and 90 days) and is first harvested towards September (Gerber-Gleisberg 2012). The cotton, introduced by the French settlers, is the most important cash crop culture in the region. Cotton cultivation in the area has caused the biggest changes in agricultural practices, farmers' wealth, as well on social systems. For instance, cotton production requires more land. As result, it pushes into lands previously cultivated with food crops or that was fallow. The equilibrium between pasture and croplands is quickly broken in many areas. The cotton production is under the monopoly of the Société Burkinabé des Fibres (Textiles Company Burkinabé of Fibres Textile (SOFITEX)); a state-controlled state agro-industrial and commercial entity.

The incomes of cotton farmers depend on the price determined in consultation between cotton companies and the National Union of Cotton Producers of Burkina. However, through the cotton production, some farmers have become much wealthier. But this has also been accompanied by considerable uncertainty, both at the local and global levels. Locally, cotton, while a potentially extremely lucrative venture has been risky. While some farmers have become wealthy, other farmers have abandoned cotton completely because of indebtedness or the fear of incurring debt. Farmers obtain cotton seed, fertiliser and pesticides on credit before the farming season and pay the costs back after the harvest. This has proved to be problematic for 2 reasons. First, cotton yields have been extremely variable due to drought and disease. Wealthier farmers are better able to bear the risk of taking loans on a crop which outcome is uncertain. Second, some farmers have made bad decisions, either using fertiliser to other crops or failing to use inputs correctly.

At the global level, the international cotton market has in recent years worked against African producers. Agricultural subsidies to cotton farmers in the United States have suppressed world cotton prices (Dixon and Holt 2010; Gray and Kevane 2001; Henry

2007; Ouédraogo and Sorgho Millogo 2007; Pale 2009). Cotton production is only possible through the application of chemical inputs such as Nitrogen, Phosphorus and Potassium (NPK) and urea fertilisers- which essential in plant nutrition- herbicides and pesticides.

Cash crops are sometimes used for household consumption, but the greatest share is produced for sale at the local market. Cash crops comprise groundnuts, vegetable, chilli, cowpea, and tuber crops. In total, cash crops are allocated to only 5.5% of the agricultural area. Groundnut is the most important cash crop (77% of the land under cash crops) followed by cowpea (about 14%). Cash crops are usually grown far from the house to minimise the risk of livestock damage. They are rarely fertilised with manure. Chemical fertilisers NPK, are occasionally applied to cash crops. Since their cultivation is rather labour intensive, most cash crops plots are small.

Livestock production is an important economic activity besides crop production. It represents an additional source of cash income. Furthermore, it also plays an important role during social ceremonies (marriage, burials, and rituals) (Somé et al. 2006).

From the foregoing, it is evident that agricultural livelihoods in the area are mainly subsistence agriculture. However, since the 1990s, the region of loba like the whole country has constantly witnessed high Inter-annual disparity in rainfall and temperature. Rainfall and temperature are the 2 climate parameters that have the highest impact on resources and main sectors of activity due to their progressive trend and especially their inter-annual and intra- seasonal variability. In fact, in Burkina Faso, an increase of the average temperature by 0.8°C in 2025 and 1.7°C in 2050 are projected, while rainfall will have a decrease of 3.4% in 2025 and 7.3% in 2050. The similar events have been reported by survey populations during field works (GOBF/MECV 2007; Ouedraogo 2006b) and by other studies on climate change done by (Mertz et al. 2009) which showed that Africa is already facing high vulnerability to climate vulnerability. But at the same it is the continent with the fewer adaptive capacities, thus Africa will be one of the earth parts which will be most affected by climate change. Here are/will be agriculture, ecosystem services and livelihoods the most vulnerable areas, which are/will be most at risk. Thus, the critical livelihood's and especially food and nutrition situation will be aggravated by the increasing climatic variability, land scarcity and population growth.

4.2.3 Demographic and socioeconomic background of the study sample

Age and sex of the study sample

The distribution of the household members by age and sex and the resulting population pyramid was characterised by a very wide bottom and the narrowed top. This type of population pyramid reflects the national standard one, which is a typical expansive population pyramid for developing countries. The wide bottom and the narrowed top of the pyramid are signs of the high level of mortality and fertility within the population (GOBF/INSD 2009). Results indicate that female members represented the dominant part in households. They made up 53% against 47% of male members. These numbers follow the suit of the national standard, where women are represented with 51.7% against 48.3% of men (GOBF/INSD 2009). In contrary, the male household heads were by far higher than female ones, respectively 91.4% against 9% compared with the national average of 11%. The dominance of male-headed households is probably related to the patrilineal structure of society in the study area. The female-headed households were usually professional migrant women, separated or divorced.

In relation to age, the average for household members was 26 years with a minimum age of less than one year and a maximum age of 85 years old. The average age for household heads was 50 years while most of the household members were aged between 15 and 65 years. The latter statement suggests that the majority (52%) of household members were within their economic active age and this will augment the household's food production in order to be more food secure. The high dependency ratio of 85 was a little lower than the national standard of 93 in 2014 (Wordbank 2016), which indicates that every 100 economically active working people aged between 15-65 supply economic and social support for 85 dependant people aged under 15 and over 65 years. This demographic factor could represent a huge burden and have important implications for households' food security depending on how high and sustainable the working people's occupation and income are. Because the higher the dependency ratio the higher the household's vulnerability to food insecurity, conducting to reduced diet dietary thus to deficient nutritional status. Note that the age structure of the study population was comparable with that of the national average, where the majority of the population (50%) had an average age of 15-65 and was 21.5 years old (GOBF/INSD 2009).

Table 3 Demographic and socioeconomic characteristics of the household's head and members

(n household=133, n household members=858, field data)

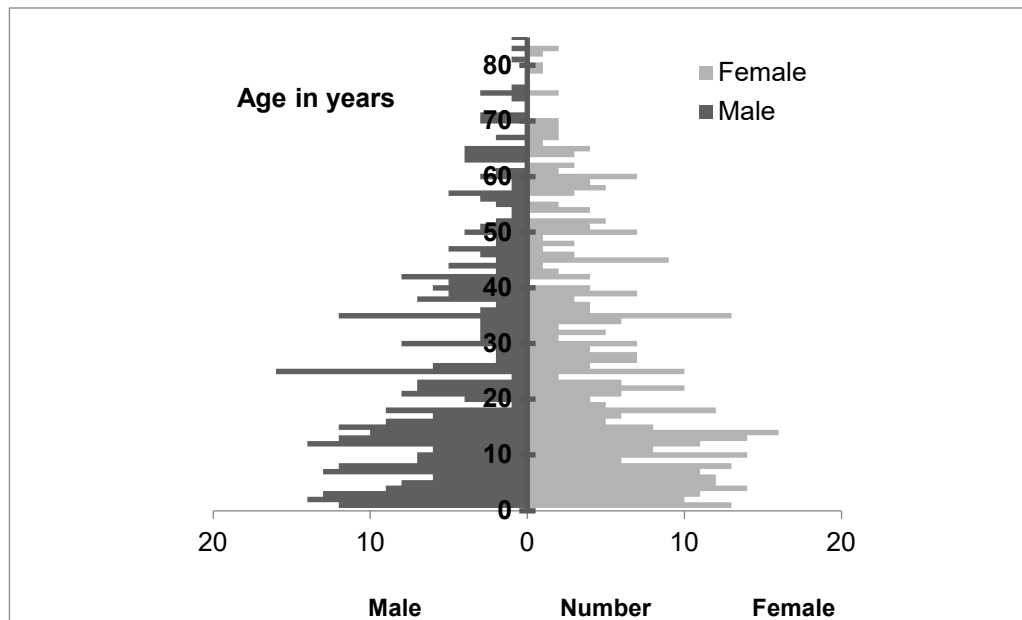
| Sex | | |
|---|------------------------|---------------------------------|
| Male household head | 91% | |
| Age | | |
| 0-14 | 37% | |
| 15-64 | 52% | |
| Over 65 | 5% | |
| Mean age household head | 50years | |
| Household size | | |
| Mean household size | 7 members | |
| Maximum HH size | 26 members | |
| Dependency ratio ⁹ | | |
| Total dependency ratio | 85 | |
| Child dependency ratio | 76 | |
| Old-age dependency ratio | 9 | |
| Educational level | | |
| | Household head (n=133) | Whole household members (n=858) |
| Illiterate | 49% | 41% |
| Read and write the official language French | 9 | 4% |
| Preschool/kindergarten | 14% | 26% |
| Primary school | 9% | 15% |
| Collège /Pre-A-levels | 6% | 5% |
| Lycée / A-levels | 8% | 3% |
| University | 4% | 1% |
| Professional training | 2% | 1% |
| Koran school / madrasah | 1% | 1% |
| Can read and write local language Dagara | 0% | 2% |
| Other | 0% | 2% |
| Occupation | | |
| | Household head (n=133) | Whole household members (n=858) |
| Farmer | 59% | 25% |
| Employee | 11% | 3% |
| Housewife | 14% | 19% |

⁹ Age dependency ratio is the ratio of dependents--people younger than 15 or older than 64--to the working-age population--those ages 15-64. Data are shown as the proportion of dependents per 100 working-age population (<http://data.worldbank.org/indicator/SP.POP.DPND>, 31.12.2015).

4- RESEARCH AREA AND SAMPLE

| Matrimonial status | | | |
|--------------------------------|------------------------|---------------------------------|-----------------|
| | Household head (n=133) | Whole household members (n=858) | |
| Single | 11% | 52% | |
| Married (monogamous) | 78% | 38% | |
| Married (polygamous) | 10% | 5% | |
| Religion | | | |
| | Household head (n=133) | Whole household members (n=858) | |
| Islam | 11% | 8% | |
| Catholic | 60% | 62% | |
| Protestant | 1% | 3% | |
| Traditional/Animist | 28% | 27% | |
| | | | |
| Ethnicity | | | |
| | Household head (n=133) | Whole household members (n=858) | |
| Dagara | 84% | 87% | |
| Dioula | 4% | 2% | |
| Other | 12 | 11 | |
| Residence | | | |
| Involved areas (quartiers) | Administrative Name | Urbanity | % of households |
| Moutori-Tansiè, Moutori-Bagane | Secteur 1 | Dano Urban | 4% |
| Dakolé, Dano-Pari, Dazoubopouo | Secteur 2 | Dano Urban | 8% |
| Gbiélgane, Dano-Bagane | Secteur 3 | Dano Urban | 2% |
| Chefferie, Pintouré | Secteur 4 | Dano Urban | 13% |
| Mébar-centre, Mébar-Pari, Larè | Secteur 5 | Dano Urban | 7% |
| Gbagba | Secteur 6 | Dano Urban | 4% |
| Pontiéba | Secteur 7 | Dano Urban | 15% |
| Lofing | Dano Village | Dano rural | 47% |

Figure 7 Age structure of households in 2012
(n household=133, n household members=858, field data)



Household size of the study sample

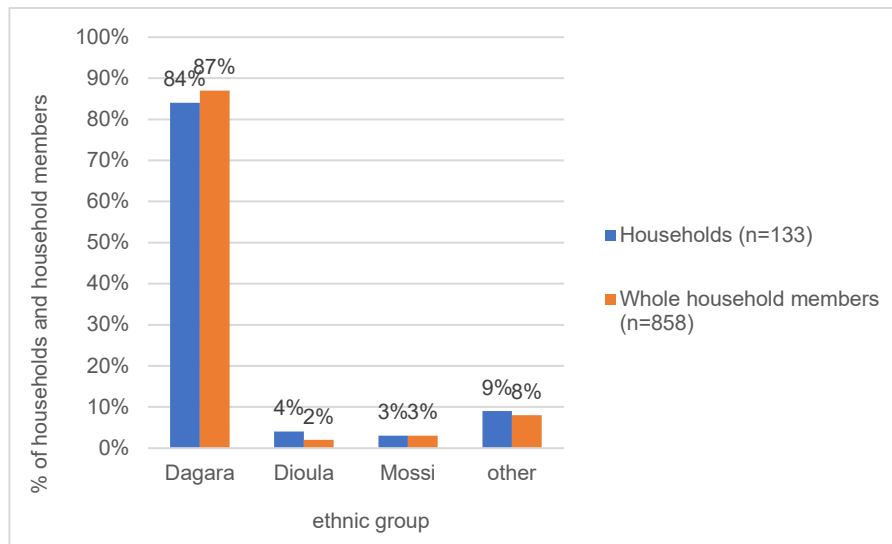
Results indicated that a minimum household size was one while a maximum one was 26 members. Seven members were the mean size of persons living in households, meaning that every household in the sample housed in average 7 persons while the majority (nearly 46%) of them was composed of 6-9 members. This mean of the sample slightly surpasses the national standard which decreased from 6.2 and 6.3 in 1985 and 1996 respectively to 5.9 in 2006 (GOBF/INSD 2009). Household size plays an important aspect by its food and nutrition security, as the more members a household had, the more people it has to feed, therefore the more costs it has on food, consequently, that could have influences on the level of financial exposure to food and nutrition insecurity for household members. But the size of household members can be an advantage as well, as the more members there are in the household, the more potential labour force could be there for farm work.

Ethnic groups of household heads and members

Figure 8 discloses the most dominant ethnic group of the sample. We can see the predominance of the autochthon local ethnic group, the Dagara with nearly 90% for both household head and members. The next following ethnic group was the migrant

ones of Mossi (3% for both household head and members) and the Dioula with 4% for household head and 2% for the all remaining household members. The Mossi are getting more and more in *Dano*, as the come to invest in trade in that region.

Figure 8 Dominant ethnic group of the study sample
(n households =133, n household members =844, field data)

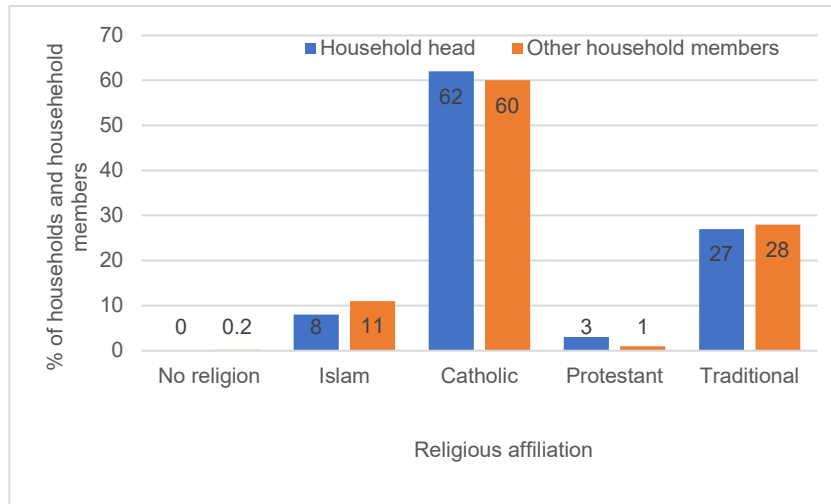


The religion of household heads and members

Catholic religion followed by the traditional ancestral religion were the most practised religions by the household members with respectively 60% and 27%. This value was similar for the household heads with 60% of them as catholic against 27% as traditional-religious. The third big religion was Islam, which was practised by the immigrated Mossi, Dioula and Fulani. Its share was 11% of the household heads and 8% for all of the household members. We had a minimal amount of household members (0.2%), who did not have any religious affiliation.

Figure 9 Religion of the study sample

(n households =133, n household members =844, field data)



Place of residence of the study sample

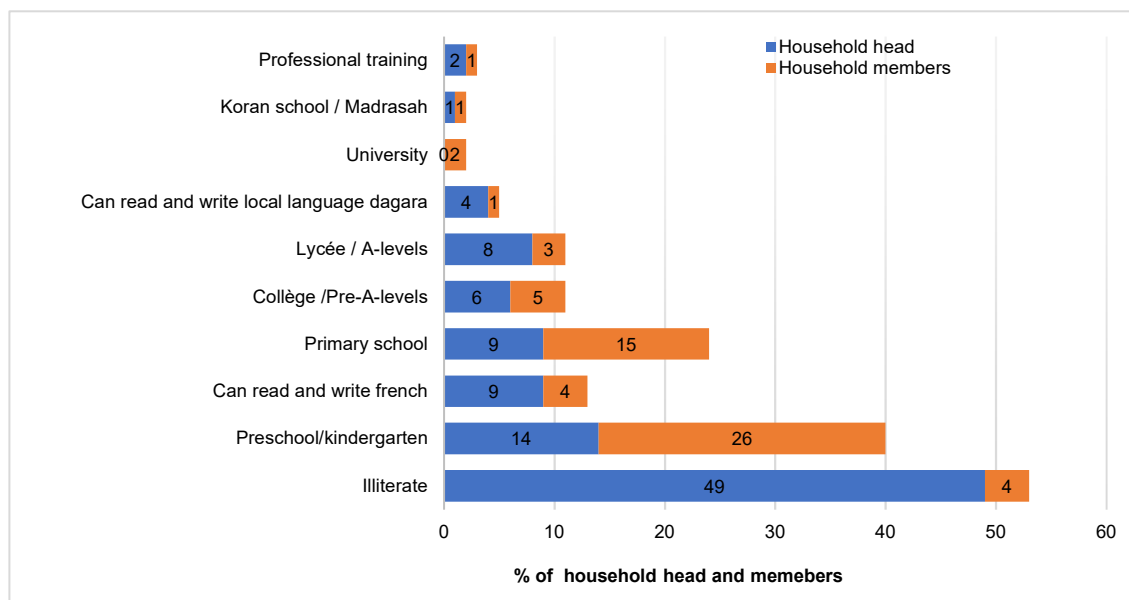
Table 4 reveals that interviews cover all of the administrative areas of *Dano* commune. The urban area of *Dano* has administratively 7 areas, where the areas 1-4 are in *Dano* town and the remaining 5-7 areas are located between 5-7 km from *Dano* town. For this study, this means that 27% of the household were from *Dano* town against and 26% from the remaining areas. The area from *Dano* rural was the Lofing village, located 7 km from *Dano* town. Lofing village had the most household with nearly half of them (47%). As the households had to be visited on the regular basis, all the travellings were made by bike or motorbike, this has resulted to not choose a household localised from more than 10 Km from *Dano* town.

| <i>Table 4 Place of residence of households</i> (n=133, field data) | | |
|--|-------------------|----------------|
| Name of the place of residence | Urbanity | % of household |
| Area 1 | <i>Dano</i> Urban | 4% |
| Area 2 | <i>Dano</i> Urban | 8% |
| Area 3 | <i>Dano</i> Urban | 2% |
| Area 4 | <i>Dano</i> Urban | 13% |
| Area 5 | <i>Dano</i> Urban | 7% |
| Area 6 | <i>Dano</i> Urban | 4% |
| Area 7 | <i>Dano</i> Urban | 15% |
| Lofing village | <i>Dano</i> rural | 47% |

The education level of the study sample

Results revealed that nearly half of the household members (41%) could not read and write against only 4% of them who could read and write the official language French. While slightly about 14% had a primary school level. A secondary school level in form of Collège/Pre-A-levels and Lycée/A-levels were obtained respectively by 5% and ca 3%. A high educational level in form of the university was attended by approximatively 1% of the household members. Another important educational level was the attendance of alphabetization class of the local language Dagara, which has been done by nearly 2% of household members and was very small compared to the national average of 11%.

Figure 10 Summary of the level of education of household members
(n household=133, n household members =844, field data)



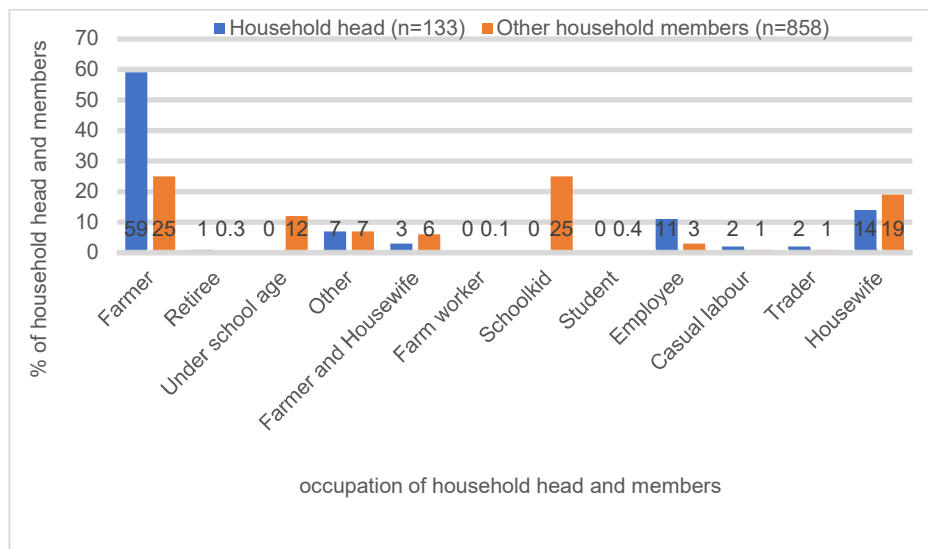
It should be expressed that the education level of household members, especially of household's head plays an influential factor by household's vulnerability to food and nutrition insecurity. The higher the educational level is, the higher are better jobs opportunities, thus better income opportunities leading to higher purchasing power. Thus, households have better economic food access, implying dietary diversity. Furthermore high educational level implies better access to food and nutrition-related knowledge, which in turn could positively influence household's food patterns (Haddinott and Johannes 2006 in Okutu and Codjoe 2013).

Occupation of the study sample

From Figure 11, farming represented by far the most exercised work for both household heads and household members in interviewed households. This was expressed by the largest share of farming in the households, namely for more than half of the household heads (63% from which 3% were farmer and housewives) and 31% for other household members (from which 6% were farmer and housewives). The following biggest occupational groups in the households was represented by Schoolkids with an amount of 25% of the household members. Schoolkids were followed by housewives and small children under the school-age with respectively 19% and 12%. In the households, we had 14% of household heads who were housewives against 19% for all household members. Household heads from another occupational group such as institutional employees and traders made up respectively 11% (and 3% for all the members) and 2% (1% for all the members). A small number of household heads with a value of 1% was retired.

Exercised occupation by household members, especially by the household heads determines income, access to resources and other social services and financial access to food (Okutu and Codjoe 2013).

Figure 11 Distribution of household head and members by occupation
(n household =133, n household members =844, field data)



Wealth status of households

Household's wealth is one of the most important indicators for food security as it

...is an important contributor to food security, resilience, and nutritional outcomes. Additionally, it can be a long-term indicator of successful livelihood strategies. Since in a wealthy household, all members are expected to have enough food to satisfy members' needs; to live in a hygienic and safe environment and to be able to educate children (WFP 2009:211-212).

Asset ownership generally reflects the wealth or social status of the household. Therefore, type, quantity and quality of assets a household owns plus some aspects of housing characteristics such as the wall of the residence, home-based assets provide good awareness of a household's wealth. According to the development plan report of the Dano commune, there are three groups of household based on their housing characteristics and home-based assets (Commune de Dano 2007):

1. The high-income household (5%): Modern housing from concrete bricks, furnished whether or not with running water, electricity or telephone
2. *The medium income* household (15%): Semi-modern housing, with cement reinforced stones or improved mud, roof with corrugated iron sheets, furnished whether or not with running water, electricity or telephone
3. *The poor* household (80%): Traditional housing built from the mud without any notorious furniture.

Accordingly, 65% of the households of this study belonged to the poor, while 35% belonged to the rich category. Mud and straw are mostly used for building due to the easy access to these materials. Mud houses are more frequent in Dano extended areas and villages, while modern and semi-modern houses are most frequent in Dano town.

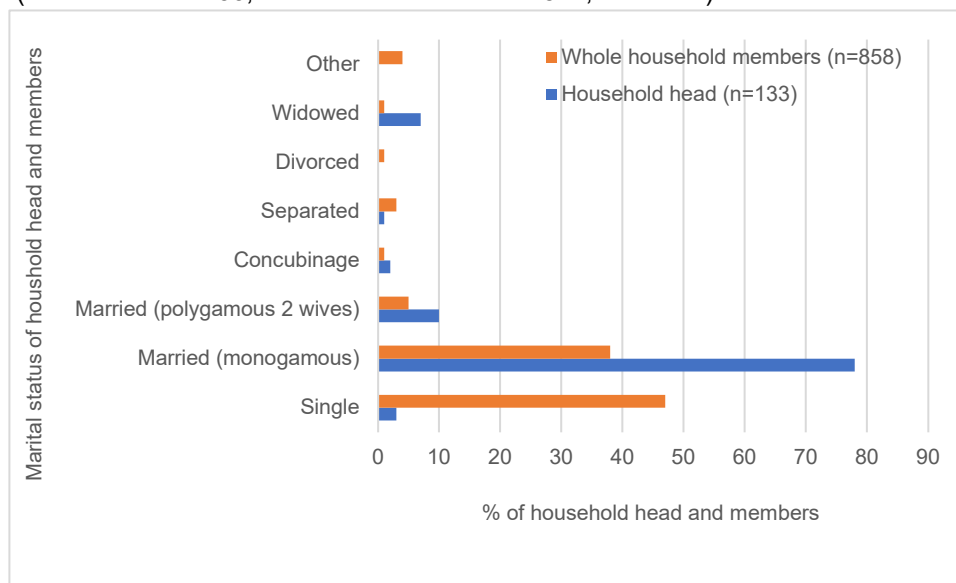
| <i>Table 6 Wealth-related housing characteristics of households</i> (n=94, field data) | |
|---|----------------|
| Housing characteristics | % of household |
| Roof of the house | |
| Metal roof | 48 |
| Straw | 29 |
| Metal roof and ceiling | 9 |
| Wood covered by clay | 9 |
| Wood | 5 |
| Energy | |
| Kerosene lamp | 33 |
| Electricity | 32 |

| | |
|--|----|
| Battery-driven lamp | 14 |
| Oil lamp | 14 |
| Solar panel | 4 |
| Generator | 2 |
| Candle | 1 |
| Wall | |
| No solid walls (dirt floor basement, mud, wood, etc) | 63 |
| Solid walls (concrete/burned bricks) | 35 |
| Straw | 2 |
| Floor | |
| Dirt floor | 52 |
| Concrete (cement) | 46 |
| Tiles | 2 |

Matrimonial status of household heads and members

As it can be seen in Figure 12, married household heads was the most dominant matrimonial status in the interviewed households. In fact, nearly 90% of household heads were married either in a monogamous status (for 78% of households) or in a polygamous status with two wives (for 10% of households). Regarding the whole members of the households, we had nearly half of them who were married, from which 38% in a monogamous system and 5% in a polygamous system with two wives. Single members were most represented by other the whole household members with nearly 50%, in contrast to household heads with only 3%, who were single.

Figure 12 Distribution of the study sample Matrimonial status
(n households =133, n household members =844, field data)



The study area lies in the southwestern area in Burkina Faso, which falls under the schema of food and nutrition situation of the rest of the country, seeing its polity suffer as much from food and nutrition insecurity. This food and nutrition insecurity situation has already been highlighted by (Sawadogo 1995) in his study on food consumption in the Southwest. Sawadogo described that anaemia by more than 59% of children < 5 years, more than 43% of children aged 5-15 years and more than 22% of children aged 15-19 years were present. Furthermore, 51% of children aged between 0-4 years and more than 26.03 children aged 5-10 years were being protein-energy deficient, thus were suffering from acute malnutrition. Another study conducted in the same region in 1988 with 1879 children, saw that 235 of them i.e. 13%, were underweight (Sawadogo 1995). More than 20 years later after Sawadogo's study, the nutritional situation in the southwestern region still remains critical. The last census of 2006 recorded the south-west region as one with the highest infant and child mortality rate exceeding the average rate of 141.9 ‰ and more than 159 ‰ in 2006. In fact, there were 13 regions including the south-west with that rate (GOBF/INSD 2009). The same trend was observed by maternal maternity as well. With 285.4‰, the south-west region recorded one of the highest compared with the country's average of 307.3 ‰.

By 2010, the situation has not changed a lot according to the national survey. In fact, nearly 84% (88% as the national average) of children aged between 6-59 months and 40% (49% as the national average) of women were recorded anaemic in the southwest region. The prevalence of global acute malnutrition varies from 5.5% for Central- East to 9.8% for the southwest. 10 of twenty-three surveyed provinces have global acute malnutrition higher than 10%. While provinces of Zandoma in the North, the Bougouriba, and Ioba in the southwest have a global acute malnutrition rate of more than 13%. This rate exceeds the WHO alert threshold. Furthermore, the Sahel (235 ‰) and Southwest (195 ‰) regions have the highest child and young mortality rates while in contrast, the Central-East (80 ‰) and the Centre (93 ‰) regions have the lowest of rates (GOBF/INSD 2012). Between 2010-2012, the prevalence of moderate acute malnutrition experienced a decreasing trend both at the national level from 35.1% in 2009 to 32.9% in 2012, and at the regional level of the southwest 39% to 34.3%. But while the severe acute malnutrition also declined at the national level from 11.3 in 2009 to 10.9% in 2012, it increased in the southwest region from 10.1 in 2009 to 10.3% in 2012. Finally underweight also decreased from 26% in 2009 to

24.4% in 2012 for the whole country and from 23.1% to 22.1% for the south-west region (GOBF/INSD 2012).

Dietary patterns in the study area of the Ioba province in southwest BF were characterised by a poor quantity and quality of diet. Quantitatively the largest number of households (62%) consumed less than the recommended three daily meals. Qualitatively dietary patterns were static and monotonous with rarely any diversification. Diets consisted predominately of cereals (mostly cereal paste) and cooked green vegetables, vegetable oil and the local beer Dolo – due to its immense socio-cultural and religious significance during funerals and social events. In contrast, other food groups, such as dairy products, meat and poultry, eggs, fruits, roots and tubers and leguminous vegetables were rarely consumed. These dietary patterns invariably lead to low dietary diversity and high malnutrition rates, especially among the most vulnerable population groups that were women in their reproductive age, and children under five years.

The dietary patterns were determined by economic, local food availability, sociocultural and health-nutritional factors. Economic and local food availability factors were revealed as having the strongest influence on diet. The sources of food were mainly own-production of food, purchase of food and food aid in form of intersocial and institutional food transfer as main sources of food.

5- DIETARY PATTERNS

5.1 CEREALS AS STAPLE FOOD

The staple food is the one, which is eaten regularly and constitutes both the main part of the diet and energy and nutrient supply (FAO 2016). The followings methods have been used to assess the staple food in this study: semi-structured interviews and FGD with persons in charge of choosing and cooking food in the household. Furthermore, semi-structured discussions have been done with professionals from GO and NGO working in the area of food and nutrition in *Dano*. Additionally, participant and non-participant observation have been carried out on food consumption behaviour to profound and extend the data obtained through interviews. The question on *consumed foodstuffs* repeatedly aroused either an amusing or an embarrassed smile by participants. Most of the time it has been an amusing smile, which could/could mean *What a question, of course, it is and has been and still is tô (a thick paste made from cereal and/or root flour), we eat every day*. And when I asked why they were smiling as a reaction to the question. Those who proceed their answer with an embarrassing smile told: “ah, it is *tô* we know and eat, it has always been *tô*, we would like to eat something else, but because of lack of money we have to eat *tô* every day”. No matter the professional background, gender, geographical setting, ethnic group or age, almost every participant mentioned *tô* as part of his/her staple food.

Table 5 presents the summary of regularly consumed foodstuffs, grouped into food groups after the food groups of the FAO: Cereals; Roots and tubers; Vegetables; Fruits; Meat/poultry/offal; Eggs; Fish and seafood; Pulses/legumes/nuts; Milk and milk products; Oils/fats; Sugar/ honey; Miscellaneous, (FAO 2011).

Table 5 Foodstuffs/dishes consumed as staple food
(n=108, field data)

| | |
|--|-----|
| Cereals | 181 |
| Maize paste (tô de maïs) | 81 |
| Rice | 34 |
| Red sorghum paste (tô de sorgho rouge) | 31 |
| Millet paste (tô de petit mil) | 16 |
| Pasta/Macaroni | 13 |
| White sorghum paste (tô de sorgho blanc) | 2 |
| Wheat bread | 2 |
| Couscous/Semolina | 2 |
| Vegetables and fruits | 105 |
| Leafy/green vegetables | 54 |
| Vegetable fruit | 50 |
| Wild fruits | 2 |
| Pulses and leguminous | 18 |
| Beans | 14 |
| Groundnuts | 4 |
| Roots or tuber | 7 |
| Yam | 2 |
| Sweet potatoes | 4 |
| Potato | 1 |
| Cassava | 1 |
| Spices | 8 |
| Fish and seafood | 6 |
| Fats and oil | 4 |
| No fixed staple food | 2 |
| Beverages including tea and coffee | 1 |
| Milk and milk products | 0 |

In term of food groups, cereals and vegetables were the most consumed foodstuffs, which were mentioned on almost every occasion. The least consumed foodstuffs were milk and milk products, according to foodstuffs, the greatest percentage of households consumed maize as a staple food (81 %). The second most consumed cereal was rice with 34 % of the households having it as a staple food. The third cereal

* Does not sum up to 100. Multiples answers.

type for the staple food was red sorghum (31%), followed by millet on the fourth place (16 %), the fifth type of most consumed cereal types for the daily diet was pasta/macaroni for 13% of the households. Participants cited finally white sorghum, wheat bread and wheat couscous as their staple food with the same percentage of 2%.

Roots and tuber represented 7% of the participant's household's staple food share. Yam (6 %) and sweet potatoes (4% of the households) were the most frequently consumed roots. Only one participant (1%) cited potato as a staple food as well as cassava, which make up staple food of only one participant (1%).

Vegetables were used either as fruits (50 %) or as leaves (54%). Only one participant mentioned wild fruits as a staple for his household. Okra, onion, aubergine, cabbage and sorrel are the most consumed vegetables both as fruit and leaves. Tomato is used fresh and/or as a paste, but mostly fresh. Baobab leaves, generally used in form of dried powder represent also a significant part of the vegetables used by the households. Other vegetables making up a small share of a few participant households were carrot, French beans, cucumber and salad.

Pulses and leguminous were used in form of beans (14%) and groundnuts (4%) and made up 18 % of the participant staple food.

Nine participants mentioned spices, mostly in form of *soumbala* and/or Maggi (8%) as part of their staple food. *Soumbala* is a traditional west African seasoning used commonly, but mostly in Burkina Faso, Ivory Coast, Mali, Guinea, Nigeria and Ghana. It is made from the seeds of the *néré* (*Parkia biglobosa*) tree. *Soumbala* has high nutritional qualities. It contains proteins and dietary minerals. In *Dano*, like in the whole country, the access to the *soumbala* seasoning is getting more difficult. This is due to the negative consequences of the 1970s and 1980s droughts on the *néré* trees, whose amount is rapidly decreasing. That makes the physical and thus the economic access to the seeds challenging. The long preparation process of *soumbala* is time-consuming and this does not motivate the women to engage in this activity. For these reasons, the consumption of the industrial seasoning Maggi is getting more and more. With massive publicity of stock cubes, introduced to Africa through colonisation and the continuous advertisements from firms, stock cubes have integrated and influenced the African cuisine, both in rural and urban areas but, especially in the latter. The use of stock cubes is a controversy discussed in terms of their health effects. They do not have any nutritional value and could lead to cancer as well.

Six participants making up 6% of the total households mentioned fish and seafood products as their staple food.

Fats and oil products mostly *shea butter* and vegetable oil made staple food of 4% of the households. Shea butter is a traditional African foodstuff as well. This is made from the nuts of the shea tree's fruits. In *Dano* shea butter is used for different purposes: as a source of fat oil in food preparation, as a cosmetic product for hair and skin, as a medical product as an anti-inflammatory, for medicinal ointments, for skin and infection protection to the dry cold wind *Harmattan*. Shea butter is also used in the cosmetic industry for its hydrating, emollient and protective properties for hair and skin.

Two participants (2 %) reported, that they did not have any fixed staple food, their daily diet choice was dependant on the availability of food on the market. It is apparent from the table above that the consumption of fruits, raw vegetables, milk and milk products does not play a significant role in food composition.

5.2 COMPOSITION OF MEALS

A typical daily meal is composed of a single dish. The dish, in turn, is generally composed of cooked cereal grains or flour accompanied by a sauce. Diversity comes from the types of sauces. Sauces are with but not always meat or fish. For seasonings, *shea butter* and *soumbala* are the most used in the sauces in the rural area, whereas Maggi and other vegetables oil (mostly groundnut, palm oil) appear in urban sauces. However, rice with different sauces such as tomato soup with meat or fish, buttered wheat bread, attiéké (fermented cassava pulp that has been grated or crushed and steamed), tubers and roots, milk and raw vegetables are getting more into the urban diet. Depending on their seasonal affordability, fruits (baobab, mango, orange, bananas, and watermelon) and raw vegetables (local aubergine) are consumed between meals as a snack or replacing whole meals in rural *Dano*. Dried groundnuts play also a significant role as a snack in rural *Dano*, due to their good availability.

Festive meals are characterised by some diversity and abundance of dishes. However, it is to notice here that the abundance and the diversity of the festive meals depend on the financial affordability of the household. The common dish on festive days is rice with tomato sauce with meat or poultry, accompanied by tuber stew in some cases. Pasta with tomato sauce is getting more a festive dish in rural *Dano* as mentioned by a significant number of the participants. Main festive days depend on

religious affiliation, thus Ramadan and Tabaski (Islamic feast days) are celebrated by Muslims while Christmas, Easter and the New Year for Catholics. However, independent of the religious affiliation, ethnic group and socioeconomic background, participants share common festivities such as weddings, baptisms, funerals and the New Year's Eve, which are celebrated by all.

Picture 3 Meal composed of maize tô, served with a cabbage leaves sauce and ground dried chilli in rural Dano (field data)



5.3 MEAL COOKING, SEASONING AND INTAKE

The division of labour in households in the study area was gender-based. Men are usually in charge of fieldwork and other activities, which need physical strength such as building and /restoring houses, clearing of difficult accessible fields sites, cutting up of cereals. While women are generally in charge of household work (cooking, caring for children, collecting water and firewood, laundry, dishwashing, cleaning the household etc.). But despite this division of labour, women are good at multi-tasking and therefore can be flexible, clever and skilful to demonstrate their contributions to male-dominated activities while it is rather shameful and embarrassing for a man to engage in women activities. Women besides their own part of labour are an integral part of men labour also. Women are responsible for activities of the production such as weeding and clearing fields, sowing, transplanting new plants, picking and transporting crops homes, transforming and commercialising crops. Furthermore, they produce on their plots their crops of groundnut, cowpea and vegetables. They

are getting more and more into poultry, especially porcine production. Moreover, processing and trade of traditional local products (shea butter, *soumbala* and *Dolo*) and the production of traditional artisanal products (weaving), are dominated fields by women.

Picture 4 A rural women restoring her room with animal excrement
(field data)



A further important responsibility of women is crop management. Once crops are harvested and transported home, they are habitually stored in traditional granaries or sometimes in sacks. From that time on, men are not in charge of cereals anymore, thus women are those, who take over the management of cereals. Women serve themselves with cereals by need, or if they do not have time for that, they send their daughters to collect cereals. Emilie declared some thoughts on that issue:

...¹⁰Well, we are in charge of food preparation, thus we know better which quantity of cereals is needed to be cooked. But it is also a sign of confidence and trust for our good sign of management. We know that cereals are the only source of food for

¹⁰ French quote : ...Eh bien, nous sommes en charge de la préparation des aliments, nous savons donc mieux quelle quantité de céréales il faut cuire. Mais c'est aussi un signe de confiance pour notre bon sens de gestion. Nous savons que les céréales sont la seule source de nourriture pour nous. Nous devons donc nous en occuper en évitant tout gaspillage éventuel de chaque grain afin de prévenir la faim jusqu'à la prochaine récolte ...

us, so we have to deal very well with them by avoiding all possible waste of every single grain to prevent starvation until to the next harvest...

Amelie, who was nearby making shea butter, but was hearing our conversation added: ...¹¹It is in our interest to use rationally and judiciously cereals given by men. Then, as soon as the men's cereals reserves run down, we have to utilise our cereals for family meal cooking. That means that we will have less Dolo to sell, therefore more financial losses...

Picture 5 A rural woman standing on the traditional granary and sorting millet seed out (field data)



One of the central duty of women in *Dano* is providing the whole family with food. Generally, kitchen, cooking and childcare as well as household work are and remain exclusively the activities underlying women's area in African cultures. Also in *Dano* this behaviour remains. In fact, so far that some men rather starve, than cooking himself, as Ferdinand, 35-year-old participant confessed this: ¹²"Yesterday I did not have any warm food, because my wife was going to her village for funerals and nobody

¹¹ French quote : ...Il est dans notre intérêt d'utiliser rationnellement et judicieusement les céréales données par les hommes. Ensuite, dès que les réserves de céréales des hommes seront épuisées, nous devons utiliser nos propres céréales pour la cuisine familiale. Cela signifie que nous aurons moins de Dolo à vendre, donc plus de pertes financières...

¹² French quote : "...Hier, je n'avais pas de nourriture chaude, car ma femme se rendait dans son village pour assister à des funérailles. Donc personne n'était là pour cuisiner. Je viens donc de manger le reste du tô d'hier, des arachides séchées et de boire beaucoup de Dolo".

was here to cook, so I just ate the rest of the old tô, some dried groundnuts and drunk a lot of Dolo”. And when I asked him why he did not cook himself, she just responded with a smile ¹³“Cooking is not the business of men, this is for women”, I always received a similar answer whenever I paused this question, preceded with a smile, as with Evelyn, a 40-year-old participant from *Dano* rural ¹⁴“Well, kitchen, cooking and household work are habitually women area; men have nothing to do there. That is taboo for men. It is and has been so for ages, it is our culture...”. The tabooing of the cooking, kitchen, and household work for men in African societies been transmitting from generation to generation for both genders. This behaviour remains present; and at a very resilient and high level. As it is not only about cooking, kitchen and household work, it is also about ‘masculinity and honour of men’. As Evelyn continued to describe this in detail: ¹⁵“If a man tries to break this taboo, he risks losing his ‘masculinity and honour’. He risks becoming a laughingstock not only of his relatives, but also of the whole community, and probably of his wife and children”.

Even so, despite the risk of losing their ‘masculinity and honour’, there are men, who go to the kitchen and cook for their family and support their wife in household work, as this is the case of Mr Fofana, a 47-year-old school director from urban *Dano*, who explained to me his participation in household work in this way:

¹⁶...for one year I have been alone home with the kids, as my wife is doing her teacher training, she is only home at weekends. Besides my work as a school

¹³ French quote : “Cuisiner n’est pas une affaire des hommes, mais plutôt celle des femmes”.

¹⁴ French quote : “Eh bien, cuisiner, la cuisine et les travaux ménagers sont généralement réservés aux femmes; les hommes n'ont rien à faire là dedans. C'est tabou pour les hommes. Il en est ainsi depuis des siècles, c'est notre culture...”

¹⁵ French quote : “Si un homme tente de briser ce tabou, il risque de perdre `sa masculinité et son honneur`. Il risque de devenir la risée non seulement de ses proches, mais aussi de toute la communauté, et probablement de sa propre femme et de ses enfants”.

¹⁶ French quote : “...Depuis un an, je suis seul à la maison avec les enfants, mon épouse étant en train de faire sa formation d'enseignante, elle n'est à la maison que le week-end. En plus de mon travail de directeur d'école, je m'occupe de mes 3 enfants âgés de 2 à 8 ans: préparer le petit-déjeuner, les amener à la maternelle ou à l'école, en passant par l'achat d'aliments au marché, la cuisine, la lessive, les aider à faire leurs devoirs, etc... Cela peut être parfois stressant et épuisant, surtout à cause de mon travail à l'école. Cependant, c'était mon idée de

director, I take care of my 3 children aged between 2-8 years, from making breakfast to bringing them to kindergarten or school, passing through purchasing food in the market, cooking, washing, assisting them with homework, etc... Well, it can be sometimes stressful and exhausting, especially because of my work at school. However, it was my idea to send my wife back to school. I did not want her to stay at home and only attend to house chores, market, the kitchen and so forth. I wanted to support my wife with this undertaking....

Mr Fofana was the only male participant who made the above statements. However, his words revealed the beginning of de-tabooisation of men taking on housework, cooking...albeit in very small steps.

In Dano, the social organisation of society is both patrilineal and matrilineal. However, the patrilineal system exercises absolute power over the matrilineal one. Thus, society is ruled by patrilineality, meaning that normally, men never leave their paternal residence.

renvoyer ma femme à l'école. Je ne voulais pas qu'elle reste à la maison et ne s'occupe que des tâches ménagères, du marché, de la cuisine, etc. Je voulais soutenir ma femme dans cette entreprise..."

Picture 6 typical traditional patrilineal residence in Dano rural
(field data)

A typical patrilineal residence, built on a circular form with one main entrance. The Orientation of the main entrance is chosen based on rules, which are only known by the head of the clan. The residence has rooms with different scopes of function ranging from sleeping, animal keeping, etc. Here in this residence the grave of the patriclan in the middle of the residence, as remembering to him.



A patriclan head with his grand children



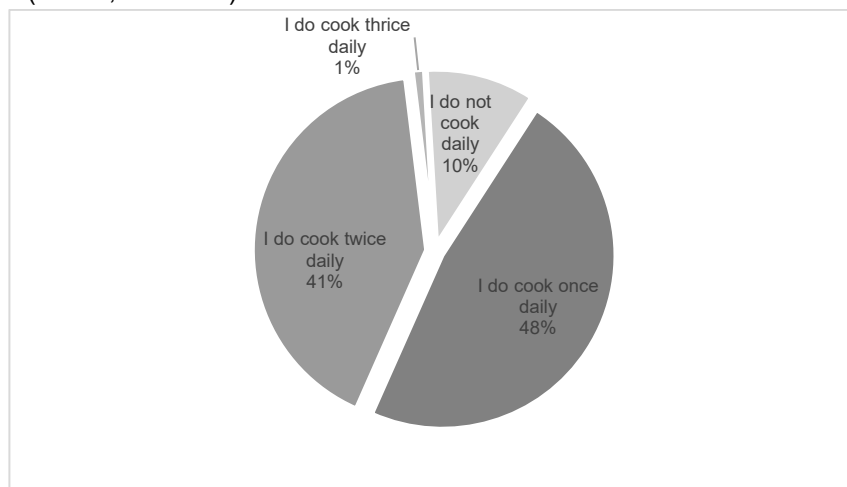
The patrilineal residence, in perpetual extension and long-lasting, is composed of sons and brothers and their wives and children and can host family members from 2 to several generations accounting up to 100 members or more. Rural *Dano* usually has more patrilineal families than *Dano* town. In rural *Dano*, until the death of the head of the patriclan, all the members produce crops together and share the same cooking plot under the authority of the family head. Wives cook alternately to avoid conflicts between the family members and in order to assure a fair distribution of cooking activities. Cooking includes wives, girls, grandmothers. Grandmothers/mothers of the husbands must not cook anymore, but in order to contribute to the household's activities and to keep themselves busy, they are implicated in this daily activity. In fact, they are the ones, who manage the cooking calendar between the wives of their sons. Cooking is not just an activity in rural *Dano* as well in another part of rural Africa, it is furthermore an opportunity and/or a ceremonial process for mothers and grandmothers to transmit their culinary knowledge to the young girls of the family, who will also leave their own patriclan through marriage one day.

5.3.1 Cooking patterns

Generally, women cook every day in *Dano* as can be seen in Figure 13 that illustrates daily cooking patterns and frequency of participants. It is clear from the figure that daily cooking by far represented the most popular cooking pattern by participants at nearly 90%. By contrast, not daily cooking formed the smallest group at 10%, lying far away behind the first group. In terms of daily cooking frequency, the vast majority of participants, about 46% stated, that they cook once every day. The next major daily cooking frequency was 2 times a day, at nearly 41% of all participants, while just the smallest part of them (1%) cook 3 times a day.

Alternatives to everyday cooking were: keeping the cooked *tô* from the day before in tamarind juice in *Dano* rural or fridge in *Dano* town to retain it fresh for the next day (3%), eating out of home (2%) and starvation due to lack of food for the remaining (5%) of them, who did not cook every day.

Figure 13 Cooking frequency of daily meals
(n=115, field data)

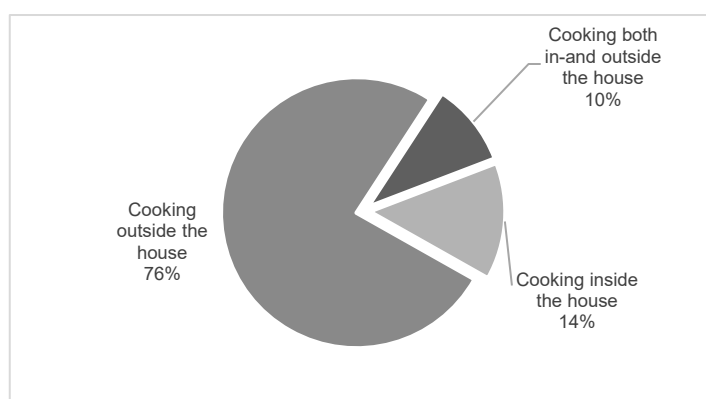


5.3.2 Place of cooking

More than half of participants cooked outside of the house (76%), while a small part of them cooked alternatively between in and outside the house (10%). A significant part cook inside the house (around 14%). In rural *Dano*, houses generally possess both cooking areas in and outside the house. Women cook on cooking stones or clay stove. However, they mostly cook outside than inside. Veronique, a 65-year-old grandmother in rural *Dano* explained why this is so:

¹⁷...Because of the smoke, which is assembled in the house during cooking, we feel pain in the eyes and respiring this smoke, is surely not healthy for us. Furthermore, you can see that it is very warm here, due to this high temperature plus the fire inside, it gets warmer during cooking, so we sweat more. Additionally, during cooking outside, one can chat and exchange news with others and get helped also, which makes cooking more fun...

Figure 14 Where do you usually cook your food?
(n=115, field data)



Utensils used around cooking and food are rudimentary and almost used every day:

- 1 Mortar and pestles: big ones are used to crushed and ground cereals and shea and néré nuts, the smaller ones are used to crush and ground for vegetables and condiments for sauces
- 2 Water canaries (water jugs): to maintain water fresh
- 3 Bowls, cups, trays, or pots made from dried calabash: to wash crops, serve food, drink *Dolo* and water
- 4 Sieves and strainer: to sieve and sort out cereals
- 5 Cooking pots: to cook staple and sauce
- 6 Wooden spatula: to make/beat *tô*
- 7 Wooden ladle: to serve *tô* in bowls

¹⁷ French quote : "La fumée produite dans la maison pendant la cuisson nous fait mal aux yeux. En plus respirer cette fumée n'est sûrement pas sain pour nous. D'autre part à cause de la chaleur et du feu à l'intérieur, il fait très chaud pendant la cuisine. Ceci qui fait que nous fait transpirer davantage. En plus, lors de la cuisine à l'extérieur, on peut discuter et échanger des nouvelles avec d'autres et se faire aider, ce qui rend la cuisine plus amusante ".

- 8 Steel or ceramic utensils, spoons, glasses and cups: For ceremonial meals or guests
- 9 Big utensils to transport, process crops and/or shea and néré nuts.

In *Dano* town, a typical kitchen possesses a combination of different cooking possibilities such as cooking stones, charcoal and gas stoves and electric cooker. Furthermore, besides the above-cited utensils mentioned for rural *Dano*, urban institutional professional possesses more modern kitchen utensils such food processor, fridge, rice cooker etc.

Picture 7 Traditional internal kitchen and its main components in rural Dano
(field data)

Kitchen containing stone cooker, cooking iron pots, measuring/serving bowls and calabashes, wooden spatula



Traditional way of keeping *tô* fresh in water and tamarind juice for conservation



5.3.3 Ways of cooking and seasoning

The usual ways of cooking were boiling, frying and grilling. Boiling/cooking was by far the most common method of food preparation used for cereals whether as flour or as grains. Roots and tuber, Meat, poultry and offal, fish and seafood products are prepared commonly fried, cooked and grilled depending on the end aim of their use. The regularly used type of fat for frying was self-made shea butter in rural *Dano* while

bought manufactured palm or vegetable oil was more used in urban *Dano*. Soumbala as a seasoning is used in almost every sauce. I had only one exception to this rule, namely from Helen the American missionary, who due to taste reasons does not use *soumbala* in her dishes. Besides this unique exception is the incontestable seasoning type both in rural and urban *Dano*, with the difference that in urban *Dano*, additionally to the *soumbala*, women use another seasoning such as pepper, mustard and Maggi. Overview of methods of cooking and seasoning food is represented in Table 6.

Table 6 Common cooking and seasoning patterns of food in the study area (field data)

| Type of food | Form of food | Cooking method | Approximative Time of cooking (minutes) | Types of seasonings used |
|---|----------------|----------------|---|---|
| Cereals maize, millet, sorghum, pasta, rice | Flour | Boil, steam | 10-20 | - |
| | Grains | Boil, steam | 30-60 | Salt, vegetable oil |
| | Couscous | Steam | 30-40 | Salt, vegetable oil |
| | Lumps | Boil, steam | 10-15 | Sugar, honey, tamarind juice, lemon |
| Pulses/legumes/nuts Beans | Flour/batter | Fry | 3-5 | Salt |
| | Grains | Boil, steam | 30-40 | Salt |
| Pulses/legumes/nuts Groundnuts | Grains | Boil, grill | 20-30 | Salt, vegetable oil |
| | Paste | Boil, steam | | Salt, vegetable oil |
| Roots and tuber Yam, potatoes, banana plantains, cocoyam, sweet potatoes | Flour | Boil, steam | 10-20 | Salt, vegetable oil |
| | Fruits | Boil, stew | 10-15 | Salt, vegetable oil |
| | | Fry | 5-10 | Salt |
| | | Grill | 10-20 | Salt |
| Vegetables Cabbage, okra, sorrel, tomatoes, onion, French beans, carrot, aubergine | Leaves /fruits | Boil, steam | 5-30 | Salt, soumbala, Maggi, |
| | Fruits | Raw | - | |
| | Fruits | Fry | 5-15 | Salt, vegetable oil |
| Meat, poultry, offal Beef, pork, goat, mutton | | Boil/steam | 30-40 | Salt, soumbala, Maggi |
| | | Fry | 20-40 | Salt, soumbala, Maggi, mustard, pepper, vinegar |

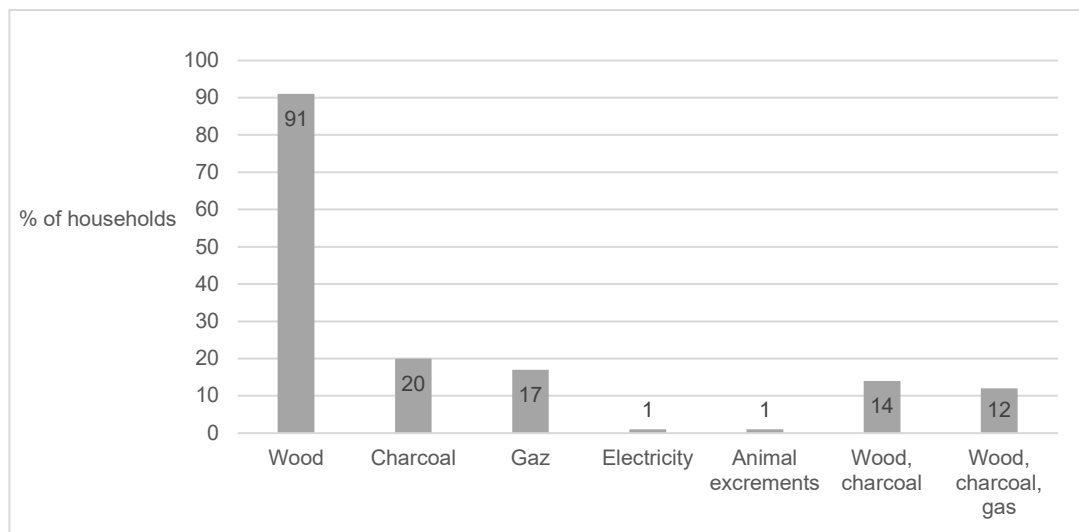
| | | | | |
|---------------------------|--------------|--|-------|---|
| | | Grill | 10-15 | Salt, soumbala, Maggi, mustard, pepper, vinegar |
| Fish and seafood products | Dried/smoked | Boil, steam in sauces Uncooked as snack | 10-30 | Salt |
| | Fresh | Grill | 15-30 | Salt, pepper, Maggi, mustard |
| | | Boil, steam in sauces | 10-30 | Salt, pepper, Maggi, mustard |
| | | Fry either for sauces or combined with boiled, grilled or fried tubers and roots | 5-30 | Salt, pepper, Maggi, mustard |

5.3.4 Sources of energy used for food cooking

Figure 15 illustrates the sources of energy used for cooking. The majority of participants stated wood as the most used source of energy for cooking, more than 90% of them. The second most used source of energy was charcoal, which was for 20% of the participants. Gas with a share of nearly 17% was the third most mentioned source of energy. The sustainable and cheap way of food cooking by using, for example, animal excrements as a source of energy is being more and more used, but very slowly, namely, only 2 participants (1%) were using this kind of material as a source of energy to cook food. Also, 2 participants from *Dano* town were using electricity as an alternative source of energy for food cooking.

It was not only the above-mentioned sources of energy that were used; it was rather a combination of all them, depending on the season (dry or wet), price, access and/or availability. Thus 14% of participants alternated between firewood and charcoal, while 12% between firewood, charcoal and gas to cook their food. Sources of energy used for cooking depending on the household economic situation, in fact on the financial asset that households owned. The less financial assets they owned, the more they were using wood as a source of energy for cooking. Thus, wood was the most used source of energy in rural *Dano*, as they had less access to financial assets. Salaried women in *Dano* town used alternatively charcoal, electricity or gas depending on the price and availability and on their daily schedule.

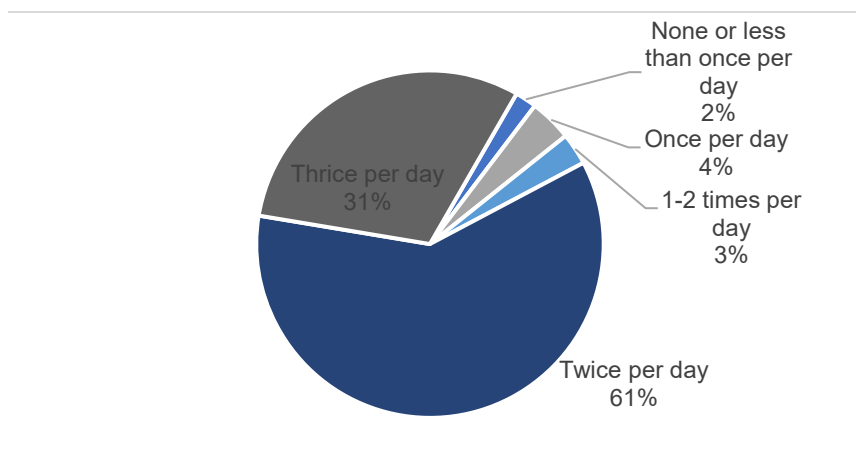
Figure 15 Types of sources of energy used for food cooking
(n=115, field data)



5.3.5 Frequency of meal intake

Meal intakes were between mornings with breakfast, noon with lunch and dinner in the evening. Depending on the professional activities and spatial settings of households, the meal intakes and the consumed foodstuffs differed. To get a deep insight on what food participant consume during their mealtimes, a one-day recall (a day before the survey) on consumed food and a seven-day recall (the last 7 days before the survey) on consumed food from different food groups have been done. Figure 16 illustrates the habitual meal intake frequency of participant's households. The greatest percentage of households (61 %) had stated having a meal twice a day. The next most habitual meal intake was 3 times a day, in which 31% of the households were having a meal. A third most food intake frequency was once a day for 4% of households. Another minority of households (3%) indicated they had meals between once to twice times a day. Lastly, the lowest number (2%) of the participants said that they had meals occasionally, meaning that they had no meal or less than once a meal a day, but with the tendency of not having a meal.

Figure 16 Daily meals intake frequency of households
(n=109, field data)



Breakfast

Table 7 illustrates the dishes consumed at breakfast the day before the survey. The most consumed dish at breakfast was *tô de maïs* (43% of the participants) with vegetable sauces making nearly half of the dishes recorded at breakfast. *Tô* consumed at breakfast comes usually from the leftover of the dinner of the previous day. It is either warm-up or watered-down. The most used vegetable sauce was dried okra sauce (*sauce de gombo sec*)¹⁸ with 20 % of the cases. The other sauces were sorrel sauce¹⁹ (*sauce oseille*) with 5% of the participants; fresh okra sauce (*sauce de gombo frais*) for 4% of the participants. Sesame sauce (*sauce de grains de sesame*)²⁰ was consumed by 3% of the participants. *Dolo* (local beer made through fermentation and cooking of red sorghum) in combination with other foodstuffs, mainly maize paste composed the breakfast of 12% of the participants while 8% of the participants had only *Dolo* at breakfast. Another significant foodstuff consumed at breakfast was millet

¹⁸ Dried okra, soumbala spice, fish powder, salt, shea butter)

¹⁹ Sorrel, crushed groundnut, fish powder, soumbala spice, salt, shea butter)

²⁰ Crushed sesame seeds, soumbala, shea butter, salt

porridge²¹, enriched with tamarind²² juice, sugar or honey which was consumed by 8% of the participants. Five participants (5%) had rice at breakfast with groundnut sauce²³ (*sauce pâte d'arachide*) in 3 cases and tomato soup (*sauce tomate*)²⁴ in 2 cases. Two participants had boiled yam at breakfast. Western types breakfast as coffee, cacao drink, buttered wheat bread and cornflakes were consumed by a few households: milk coffee was consumed by 10% of the participant, while 1% had his coffee black. Two teachers stated that they gave cacao drink, buttered bread to their children at breakfast. One household, an American missionary family stated having cornflakes with milk at breakfast. Coffee, although a western finished product, was drunk in both rural and urban *Dano* almost only by men.

Table 7 Food/dishes consumed at breakfast the day before the survey, one-day recall
(n=92, field data)

| Consumed food/dish | %* |
|-------------------------------------|----|
| Maize tô with dried okra sauce | 20 |
| <i>Dolo</i> , with other foodstuffs | 12 |
| Milk Coffee | 10 |
| <i>Dolo</i> , Only | 8 |
| Millet porridge | 8 |
| Maize tô with dried sorrel sauce | 5 |
| Maize tô with fresh okra sauce | 4 |
| Maize tô with sesame sauce | 3 |
| Rice with groundnut sauce | 3 |
| No breakfast was taken | 2 |
| Boiled yam | 2 |
| Rice with tomato sauce | 2 |
| Black coffee | 1 |

²¹ Porridge made with either millet flour or millet lumps.

²² Tamarind is a leguminous tree in tropical Africa. Tamarind fruits give a sweeter sour taste to dishes. It is used in desserts, as a jam, blended into juices, or sweetened drinks, sorbets, ice creams and other snacks. <https://en.wikipedia.org/wiki/Legume>.

²³ Groundnut butter, fresh tomatoes, onion, soumbala, Maggi, vegetable oil, beef meat or fish

²⁴ Fresh tomatoes, dried or fresh fish or meat, soumbala and/or Maggi, onion, shea butter or other vegetable oil, cabbage

* Multiple answers. Does not sum up to 100.

| | |
|--|---|
| Millet tô with dried okra sauce | 1 |
| Maize tô with squash leaves sauce | 1 |
| Maize porridge | 1 |
| Cigarette | 1 |
| African doughnuts (beignets) | 1 |
| Cacao milk drink, bread, Lipton tea with sugar | 1 |
| Cornflakes with milk | 1 |
| Bread and sardine | 1 |
| Black tea, meat sandwich | 1 |
| Fried bean doughnut | 1 |
| Milk, orange, fish | 1 |
| Dried groundnuts | 1 |
| Maize tô with groundnut sauce | 1 |
| Maize tô squash leaves | 1 |
| Maize tô with aubergine leaves | 1 |
| Rice with groundnut sauce | 1 |
| Rice with squash leaves sauce | 1 |

Lunch

A typical lunch consists of a single main dish, frequently accompanied by the local beer *Dolo*. The dish, in turn, consists habitually of a staple cereal accompanied by a sauce. It is apparent from Table 8 that maize paste represented by far the most dominant dish at lunch for participants (78%). The dish maize tô /paste with dried okra sauce represented the most preferred dish at lunch (33%). *Dolo* was a dominant part of the lunch menu with 18% of the participant drinking it at lunchtime. Thus, *Dolo* was the second most consumed foodstuff at lunch. Rice was consumed by 21%, making it to the second most preferred cereal type at lunch. The most preferred rice dishes were rice with tomato soup as a sauce, rice in sauce/fat rice (*riz gras*)²⁵ and rice with

²⁵ Ris gras (fat rice) also known as Jollof rice or Benachin (Wolof: "one pot"), is a one-pot rice dish popular in many West African countries, eaten whenever desired. It is a West African version of pilaf or paella. Jollof rice is one of the most common dishes in Western Africa with several regional variations in name and ingredients. The name Jollof rice derives from Wolof

beans. Millet in form of paste or couscous was consumed by 6 % of the participant's households, thus representing the third cereal type on the lunch menu.

The most consumed types of vegetables used for the sauce at lunch were okra (32 % of the households); cabbage leaves (17 % of the households); aubergine (28%); groundnut (25%). Due to their nutritional value, the following leaves of these local plant such as moringa, baobab, corchorus (bulvanka) and kapok are getting more into local dishes. Participants mentioned each of these plants once for having them in their lunch sauce.

Only *Dolo* has been consumed by 18% of participants at lunch and 8% of them had *Dolo* in combination with other 7% of the participant selected meat for having it at lunch the day before being interviewed, whereas only one household consumed chicken. Other foodstuffs from other food groups such as roots (cassava, plantain, yam, potatoes) came rarely on the menu and were mentioned only once as part of the lunch menu, the day before. Salad, fresh fish and raw vegetables (cucumber, carrots) made up only a very small part of a foodstuff consumed at lunch, namely only once. Milk and milk products were hardly ever mentioned, only one participant mentioned having once yoghurt on the lunch menu. On no occasion, participants have mentioned fruits and bread as part of the lunch menu.

Of the 72 participants, who responded to the question of *what kind of food did your household have yesterday at lunch?* 64 of them (89 %) recorded *soumbala* and 59 (82%) recorded shea butter in the composition of lunch. Despite their small amount in the lunch dishes, *soumbala* and shea play a significant role, since they are used in almost every sauce of the lunch menu. Other foodstuffs, which are used in small amount, but play a significant role by dishes, are dried fish (61 %), onion (36) and Maggi (32%).

people of Senegal and Gambia, where it is considered a "national dish", though now called theibou dienn or benachin. In French-speaking areas, it is called riz au gras. Despite the variations, the dish is "mutually intelligible" across the region, and has spread along with the diaspora to become the best-known African dish outside the continent (https://en.wikipedia.org/wiki/Jollof_rice).

Table 8 Food /dish consumed at lunch the day before the survey, one-day recall
(n=72, field data)

| Consumed food/dish | % |
|---|----|
| Maize <i>tô</i> with dried okra sauce | 37 |
| <i>Dolo</i> , only | 18 |
| Rice with groundnut sauce | 13 |
| <i>Dolo</i> with others foodstuffs ¹⁸ | 8 |
| Maize <i>tô</i> with sorrel | 5 |
| Riz au Gras | 6 |
| Millet <i>tô</i> with moringa leaves sauce | 4 |
| Maize <i>tô</i> with fresh okra sauce | 4 |
| Maize <i>tô</i> with dried baobab leaves sauce | 4 |
| Maize <i>tô</i> with red kapok tree | 3 |
| Maize <i>tô</i> with oil palm seeds sauce | 3 |
| White beans paste with dried okra sauce | 1 |
| Rice with tomato sauce | 1 |
| Millet couscous | 1 |
| Cooked white beans with palm oil | 1 |
| Salad with vegetables | 1 |
| Chicken soup, with attiéké, yoghurt | 1 |
| Fried plantains and French fries with tomato sauce and fish | 1 |
| Maize <i>tô</i> with cabbage leaves sauce | 1 |
| Rice with cabbage leaves sauce | 1 |
| Yam stew | 1 |
| Boiled manioc | 1 |
| Maize <i>tô</i> with dried corchorus olitorius ("bulvanka") sauce | 1 |
| Maize <i>tô</i> with sesame | 1 |

Dinner

The most consumed food/dish at dinner were cereals in form of grains or paste. Maize paste was by far the most consumed cereal type at dinner (67%) with dried okra sauce as the most dominant combination (30%) and sorrel sauce as the second most preferred sauce (8%). Rice with groundnut sauce played with 6% a significant role by food consumed at dinner. Three participants mentioned having only *Dolo* for dinner. *Dolo* with 18% presented a significant frequency by the dinner menu. It was consumed either alone by 3 participants or in combination with other foodstuffs (15%).

Tuber and roots were more present on the dinner menu than other meals of the day (11%). Boiled and fried yams, French fries, boiled manioc, attiéké and fried plantains were the mentioned types of tuber and roots, which have been consumed at dinner. Raw vegetables (cucumber, carrots, salad, fresh tomatoes) were mentioned by 5 participants. Meat in form of grilled meat was rarely consumed and consumed by only 2 participants. Beans (cowpea) in form of cooked alone with vegetable oil or in combination with rice or processed in flour and fried as beignet are getting more into consumed dishes (5%). In term of fruits consumption, only one participant said having one orange during dinner.

Table 9 *Food /dish consumed at dinner the day before the survey, one-day recall*
(n=96, field data)

| Foodstuff/dish consumed at dinner | %* |
|---|----|
| Maize <i>tô</i> with dried okra sauce | 30 |
| <i>Dolo</i> with maize <i>tô</i> with dried okra sauce | 15 |
| Maize <i>tô</i> with sorrel sauce | 8 |
| Rice with groundnut sauce | 6 |
| <i>Dolo</i> , only | 3 |
| Maize <i>tô</i> with dried baobab leaves sauce | 3 |
| Maize <i>tô</i> with cabbage leaves sauce | 3 |
| Salad with vegetables | 3 |
| Yam stew | 3 |
| Maize <i>tô</i> with red kapok leaves sauce | 2 |
| Maize <i>tô</i> with corchorus olitorius ("bulvanka") sauce | 2 |
| French fries | 2 |
| Maize <i>tô</i> with tomato soup sauce | 2 |
| Maize <i>tô</i> with bean seeds sauce | 2 |
| Maize <i>tô</i> with dried baobab leaves sauce | 2 |
| Riz au Gras with meat in a tomato | 2 |
| Grilled pork | 1 |
| <i>Dolo</i> , millet <i>tô</i> with dried okra sauce | 1 |
| Boiled manioc | 1 |
| Yoghurt | 1 |
| Chicken soup | 1 |
| Attiéké with fried fish | 1 |
| Fried plantains with tomato sauce and fish | 1 |
| Maize <i>tô</i> with cabbage leaves sauce | 1 |
| Maize <i>tô</i> with sesame sauce | 1 |
| Maize <i>tô</i> with aubergine leaves sauce | 1 |

| | |
|--|---|
| Maize <i>tô</i> with fresh okra sauce | 1 |
| Millet couscous | 1 |
| Millet <i>tô</i> with moringa leaves sauce | 1 |
| Maize <i>tô</i> with groundnut sauce | 1 |
| Sorghum <i>tô</i> with groundnut sauce | 1 |
| Sorghum <i>tô</i> with fresh okra sauce | 1 |
| Beans beignet (beignet haricot) | 1 |
| Fried yams | 1 |
| Rice with beans | 1 |
| Fish stew | 1 |
| Orange | 1 |
| Raw vegetables | 1 |
| Cooked bean | 1 |

Snacks between meals

As the Table 10 reveals the majority of participants (nearly 80-96%) did not have any snack between meals. The most consumed foodstuffs between meals was ready to eat and easily accessible food and drinks such as *Dolo* (only or with other foodstuffs), fried doughnuts and grilled meat.

Table 10 Snacks between meals the day before the survey, one day recall (n=72, field data)

| Snacks between breakfast and lunch | %* |
|---|-----------|
| No snack consumed | 71 |
| <i>Dolo</i> , only | 14 |
| <i>Dolo</i> fried bean doughnuts | 5 |
| <i>Dolo</i> grilled meat | 4 |
| <i>Dolo</i> , fried groundnuts | 3 |
| <i>Dolo</i> , whisky | 2 |
| Bread | 2 |
| <i>Dolo</i> , black coffee | 1 |
| <i>Dolo</i> , local aubergine | 1 |
| <i>Dolo</i> , rice | 1 |
| Attiéké | 1 |
| Beans | 1 |
| Honey | 1 |
| Snacks between lunch and dinner | |
| No snack between lunch and dinner taken | 96 |
| <i>Dolo</i> , only | 46 |
| <i>Dolo</i> with other food items with meat, groundnut and fried beans beignets | 10 |

| | |
|--|----|
| Banana, orange | 3 |
| Snacks after dinner | |
| No snack consumed between dinner and bedtime | 79 |
| <i>Dolo</i> , only | 16 |
| <i>Dolo</i> with other foodstuffs with grilled pork meat, fried beans beignets | 2 |
| Grilled pork meat | 1 |
| Fried beans beignets | 2 |
| Sweetened drink | 1 |
| Rice with | 1 |
| Liquor (mostly locally-made high-proof alcoholic beverages) | 1 |

5.4 EATING OUT PATTERNS

Dano offers an appreciable number of bistros, bars, cabarets, small restaurants, and street foods along the main street traversing the town.

Eating out habitually included visiting local traditional cabarets either in the villages or in *Dano* town, bars in *Dano* town, on markets days in *Dano* town and the 2 restaurants in *Dano* town. Food eaten out of home is mostly composed of beans beignets, grilled salted groundnuts, attiék, grilled chicken and meat, rice served typically with tomato sauce either alone or with beans and/or pasta. Two small restaurants affiliated to the hotels in town offer a simple limited menu composed mainly of spaghetti with tomato sauce, potato chips, fried or grilled chicken, yam or potato stew. The beverages served are composed of different types mostly locally produced beer and from neighbouring land imported (Benin, Ghana) beer and soft drinks. The price of the menu lies between 500-2000FCFA²⁶ making these restaurants too expensive for the majority of the local population. Therefore, the typical customers of these restaurants were either from the hotels or local salaried from GO and NGOs.

Simple local dishes such as rice, *tô*, beans, pasta with different sauces, beer, soft drinks and locally produced liquors are offered by a great number of bistros/bars. Depending on the dish and its composition, pricing starts from 200FCFA forward and therefore making these bistros/bars accessible to a mixed clientele of salaried and people from another professional background.

²⁶ National currency in Burkina Faso. 1Euro=665 FCFA

Street food, this type of catering offers rice with tomato and groundnut sauce, rice with beans, rice with pasta, attiéké with onion, fresh tomato, and fried fresh fish. The only kind of beverages here is tape water. Furthermore, grilled groundnuts with salt, seasonal fruits (mango, oranges, watermelon etc.) expand the menu of this food catering system. Likewise, as by the bistros, the clientele of the street food is a mixture of different people from different the professional background. Prices start from 50FCFA and more depending on the dish and its composition.

Picture 8 Typically offered street food in Dano town
(field data)



Cabaret, this type of catering is the most present either in *Dano* town or rural *Dano*. Women offer the traditional beer *Dolo* and locally produced liquor here to the consumers. For 25 FCFA, everyone can afford a calabash (drinking pot) of *Dolo*. Therefore, farmers and other people with low-income sources typically frequent this type of catering.

Another regularly prepared and most consumed street food is the fried bean beignets, made and sold by women. They are made from strongly whipped peeled beans flour. Habitually served with a tomato sauce or cooked cabbage leaves. Usually, the vendors begin making the beignets from late the afternoon until late in the night. The beignets are made per order because the preparation takes just only a few minutes and they are more enjoyable when they are warm. Three beignets cost 5FCFA, so this street food is affordable for everyone. They can be consumed directly on the spot by using one of the banks around the vendors by chatting with other consumers or take them away. Another type of preferred street food is grilled meat from mostly pork, and sometimes goat and beef. The setting here is almost the same as with the bean beignets, the only difference is the vendor's gender and the price of the food. Men are here the vendors and the minimum price lies by 500FCFA.

Picture 9 Foodstuffs offered in the market at the market day in Dano town
(field data)

Frying bean beignet

Finished fried bean beignets

Grilled pork meat



It is important to mention that bean beignets and grilled pork meat are food types that market visitors (vendors and buyers) most consumed at market days in *Dano*.

Cabarets, beans beignets stands and market food stands are not just for eating. They are the places to see and be seen. As stated by Sylvie 24 years old, mother of 3 children who was nicely dressed on that market day of the 03/04/2013 around 11 am:

²⁷ ...I am going today to the market; I do not have anything to sell. However, I am going to meet my mother and my sister, who I have not seen for a long time, they are selling dried groundnuts today in the market. We can chat and exchange some news by drinking some Dolo and eating some grilled meat and/or fried bean beignets...

²⁷ French quote : ...Je vais au marché aujourd'hui; Je n'ai rien à vendre. Cependant, je vais rencontrer ma mère et ma sœur, que je n'ai pas vues depuis longtemps. Elles vendent aujourd'hui des arachides séchées au marché. Nous pouvons discuter et échanger des nouvelles en buvant du Dolo et en mangeant de la viande grillée et / ou des beignets de haricots frites...

Picture 10 market cabaret scenery on a Sunday market day in Dano town (field data)



Cabarets, beans beignets stands and market food stands play therefore a significant role for and in socio-cultural life and lifestyle of people in Dano. People go there to meet, chat and exchange private, cultural, political and social news.

5.5 CHANGES IN DIETARY PATTERNS

Table 11 summarise results from the data to the question, *Are there any food your household are consuming in-or decreasingly and why?* The majority responded with a yes 86 (83%) and only the remaining 18 (17%) said that they were not eating any food items increasingly. This result was somewhat interesting and contradictory. And I was quite impatient to discern, what kind of food these participants were meaning to eat increasingly. My impatience may have been caused by the fact, that the data from previous discussions and interviews revealed a relative monotonous of diet. Table 11 shows particularly a dominant frequency of cereals and maize. Beans and pasta followed the cereals as being consumed more and more. Factors influencing the increased consumption of the food in Table 11 were mostly preferences, taste, health and nutritive reasons, financial, physical and seasonal access and availability of these foodstuffs.

Table 11 Are there any food your household is consuming in-or decreasingly and why?
(n=104, field data)

| Foodstuffs consumed increasingly | Factors influencing the increased consumption | % | Foodstuffs consumed decreasingly | Factors influencing the decreased consumption | % |
|--|--|----------|--|---|----------|
| Maize tô | Own production, availability at any time, easy access, more nutritive, pleasure, preference, taste, dependency on food aid | 46 | Rice | No production, stop of production, financial unavailability/lack of financial means | 16 |
| Rice | Implementation of lowlands for rice farming, start with rice production, availability, access | 32 | Pasta | Financial unavailability/lack of financial means does not like/taste | 16 |
| Red sorghum | Own production, availability at any time, easy access, pleasure, preference, taste, dependency on food aid | 15 | Beans | Rarity, expensive, we don't like/taste | 13 |
| Millet | Own production, availability at any time, easy access, pleasure, preference, taste, dependency on food aid | 11 | Meat | Financial unavailability/lack of financial means lack the quality of the meat | 5 |
| Beans | Easy to cook, loved by children, for pleasure/preference/taste, diet diversity, preference, taste | 8 | Salad | Financial unavailability/lack of financial means | 5 |
| Edible leaves And plants, legumes vegetable sauce (baobab, moringa, okra, sorrel etc.) | Nutritive, healthy, cheaper and easier access, better quality | 8 | couscous | Financial unavailability/lack of financial means | 4 |
| Cereals | Own production, availability at any time, easy access, pleasure, preference, taste, dependency on food aid | 6 | Manufactured/chemically treated products | Unhealthy, more preferences for natural products/ taste, ageing | 3 |
| Pasta | More income | 5 | Maize | Decrease in physical availability, do not like/taste | 2 |
| Couscous | More income, taste | 3 | Fresh fish | Bad quality | 2 |
| Tuber (Yam, potato) | healthy, cheaper and easier access, better quality | 3 | Chicken | Expensive, no availability | 2 |
| Yam | Preferences, seasonality | 2 | Attiéké (cassava couscous) | Expensive, no availability | 2 |
| Salad | healthy, cheaper and easier access, better quality | 2 | Sorghum paste | No production anymore | 1 |
| Bread | Easy access | 2 | Yam | Health issues | 1 |

Some statements came from the following participants, why they were consuming increasingly certain kind of food.

Mr Somé, 60-year-old organic farmer: ²⁸“I eat more edible plants and leaves and legumes, because they are nutritive and thus healthy, as I'm getting older.”

Suzanne, an American missionary and development worker:

...Since we have been living here in Dano, we have been losing our unhealthy American lifestyle of eating. No more or only very seldom manufactured food. We cooked our food from fresh and healthy and chemical-free ingredients from the market. We eat more fruits, vegetables, tuber and roots. Even when we are on holiday in the United States, my daughter cannot eat anymore supermarket finished foods, so she goes to the farmer market to buy all her ingredients in order to cook her own food from fresh ingredients. That is amazing. Of course, these foods may be expensive for the people here, but for American, it is like a gift if you think about expensive are these quality foods in America. That is why we have to use this wonderful opportunity...

And Dr Arnold, a French development worker was amazed by the local healthy food resource as well as Suzanne. In a quite exciting situation, he told me about what he was consuming increasingly since he is working and living in *Dano*:

²⁹...Before beginning to talk, he asked me in a rather enthusiastic ton do you know “Moringa”, in German they call it “tree of the life”, and in Burkina, they call it “tree of the paradise” these names tell everything about the health and nutritive qualities of this tree. If you consume it no matter as grains or leaves, you do not need any other medicine anymore. That is the healthiest food you can ever consume. Since I am

²⁸ French quote “ Avec l'âge je mange plus de plantes, de feuilles et de légumineuses, car elles sont nutritives et donc bonnes pour ma santé. ”

²⁹ French quote : ...Moringa , ils l'appellent en allemand “ arbre de la vie ”, et au Burkina ils l'appellent“ arbre du paradis ”, ces noms décrivent les qualités nutritives et thérapeutiques de cet arbre. Si vous le consommez sous forme de graines ou de feuilles, vous n'avez plus besoin d'aucun autre médicament. C'est la nourriture la plus saine que vous puissiez consommer. Depuis que je suis ici, je consomme du moringa tous les jours. J'essaie de le consommer sous toutes les formes imaginables qu'il peut y avoir. Par exemple, directement à partir de l'arbre sous forme de feuilles ou de graines, comme assaisonnement pour mes aliments. Pour mon shampoing et mes savons, donc pour mon corps et mes cheveux, j'utilise l'huile de graines de moringa. Cet arbre est juste incroyable. De plus, quand je pars en vacances, je prends beaucoup pour mes parents et mes amis car on n'obtient pas cette qualité en Europe, de plus, ils sont très chers là-bas. Mon objectif est d'informer les gens des avantages du moringa pour la santé à Dano et dans tout le Burkina, et ainsi améliorer la situation alimentaire et nutritionnelle... Ce que je consomme davantage, c'est bien sûr des fruits et légumes, compte tenu de leur disponibilité, facilité d'accès et qualité...

here, I consume moringa every day. I try to consume it in every imaginable form that can be. For example, directly from the tree as leaves or grains or as seasonings for my foods. For my body and hair, I used the moringa oil from the grains in my shampoo and soaps. This tree is just amazing. Moreover, when I go on holiday I take a lot for my relatives and friends home because you do not get this good quality in Europe. Furthermore, they are very expensive there. I aim to let people know about the health advantages of moringa in Dano and all Burkina, thus to improve food and nutrition situation...What I consumed more are also, of course, more fruits and vegetables given their availability, easy access and quality...

As an ecologist, Dr Arnold knew what he was talking about and why he was amazed and passionate for this remarkable local plant.

In fact, conversations and observations during the fieldwork revealed the increased use of local foodstuffs and/or plants such as moringa and baobab (grains, leaves and oil). The governmental and non-governmental institutions aim to make their nutritive and healthy advantages known by the population.

Table 11 represents also the list of lesser consumed food and the factors causing this decreasing consumption. Rice, pasta, beans and meat dominated the composition of the list here. Factors related to the decrease in their consumption were mostly the financial and physical aspects. However, some participants do not consume foodstuffs such as meat or manufactured products because of the unhealthy aspects of these such as Mr Somé, the organic farmer stated:

³⁰...Before consuming beef meat here in *Dano*, I have to be sure of its origin, especially if I 'am getting it from the market. Because quality is not always sure. It is frequently meat from sick or accidentally dead beef. Furthermore, I avoid eating manufactured food, which I know are not good for my health. Additionally, salt sea fish is not on my menu, because it is a very long journey for these fish to get to *Dano*. Thus once here, there are certainly not fresh anymore and could be contaminated. As I am getting older, I have to take care of my diet...

³⁰ French quote : ... Avant de consommer de la viande de bœuf ici à Dano, je dois être totalement sûr de sa provenance. Car la qualité n'est pas sûre. Il s'agit principalement de viande de bœuf déjà gravement malade ou mort accidentellement. De plus, j'évite de manger des aliments manufacturés. Car je sais que ceux-ci ne sont pas bons pour la santé. De plus, j'évite le poisson de mer, vu que leur transport jusqu'à Dano est très long et il n'arrive certainement frais à Dano. Je suis entrain de vieillir, je dois prendre soin de mon alimentation ...

Maize has been mentioned by 2 participants in the list of decreased consumed foodstuffs. Reasons were surprising for one person who admitted to disliking maize. The second person was eating maize paste lesser, as he reduced the production of maize.

Since food (such as rice, beans and pasta) are consumed lesser because of financial constraints, it can be argued that, if people had access to more finances, they would probably like to eat more of these foods.

6- DETERMINANTS OF DIETARY PATTERNS

This chapter will outline the determinants of participants' dietary patterns, thus what are the influential factors determining their dietary patterns. Doing so this chapter will reveal findings, which emerged from the analysis of information obtained from discussions observations and questionnaires in relation to the determinants of participants' food habits.

Could you please explain to me the reasons that determine your food choice? was a question asked to discern the influential factors of participants' food habits. Depending on their life experiences, socioeconomic situation, cultural and religious beliefs, participants revealed a broad range of factors that influence their food habits. After the analysis, I could group the enunciated factors into five main influential factors: economic, local availability /supply, taste, health-nutritional and sociocultural. As chapter 1- INTRODUCTION shows, the most influential factor affecting food habits was economic-related.

Table 12 Determinants of food habits (n=107)
(field data, 2013)

| Determinants of dietary patterns | %* |
|---|-----------|
| Physical determinant | 54 |
| Gustatory determinant | 13 |
| Health-nutritional determinant | 12 |
| Sociocultural determinant | 5 |

6.1 ECONOMIC DETERMINANT

Economic determinant here referred to economic poverty. Poverty was mentioned by the majority (66%) of participants as the main reason for their dietary patterns. Most of them meant that if they had more money, they would consume other types of foods than the ones they were usually consuming. Marie Claude, a 62 years old farmer in

Dano 7, described the economic determinant of her diet as follows: ³¹“Because of lack of money, I’m obliged to eat maize paste with green vegetable sauce every day. I would like to diversify my diet to get more physical energy.”

6.2 PHYSICAL AVAILABILITY

Generally, local food availability is determined by the total community food production. In the study area, local food availability was also determined by both local production and imported food. Furthermore, food aid service of the state represented a useful source of available food. Local food availability was mentioned as the second leading influential factor for food habits by almost half of the participants (54%), which in turn was characterised by 3 factors. Firstly, *food accessibility and/or availability from subsistence farming*- formed by far the biggest part of physical influential factors. Nearly half of participants (49%) indicated this factor as one the most influential factor in choosing their food. The statement ³²“This is, what we have” was cited by the majority of participants to underline their easy access to their production. Secondly, *food supply on markets* was cited as the second biggest influential factor in the category of food availability and influenced food habits of a small percentage of participants (4%)”. Finally, a minimal percentage of 1% characterised food aid as the third influential factor on their dietary patterns.

6.3 GUSTATORY DETERMINANT

The gustatory influential factor was the third most mentioned factor for food choice. In this category, individual food preferences and/or taste was the most significant influential factor with more than 11% of participants stating it. Two participants mentioned diet diversification as an essential influential factor in their food habits in

³¹ French quote “À cause du manque d’argent, je suis obligée de manger de la pâte de maïs avec une sauce aux légumes verts tous les jours. J’aimerais diversifier mon alimentation pour avoir plus d’énergie physique”.

³² French quote : “c’est cequ’on a.”

this category. Statements such as: ³³“I eat this food because I like it” and ³⁴“I eat these foods because they are my favourite ones” were the most noticeable here. However, the most cited food was *maize tô*.

6.4 HEALTH-NUTRITIONAL DETERMINANT

The next influential factor for food habits was health-nutritional related. Almost 10% of participants stated the healthy-nutritious aspects of their food habits. For instance, a participant from Lofing village, Rigobert stated that ³⁵“I eat these foods because they are healthy, why changing this if I always feel well with them.”

Furthermore, 3% cited the energetic value of food as an influential factor for eating them. And Rita, a salaried teacher from Dano town described the health-related issue of her food choice as follows: ³⁶“...well I have 2 children, I want to grow well, that is the reason, why I try to diversify as often as possible our dish. Furthermore, I try to not overheat frying fat for example, as I heard that this can give you cancer if the oil is too hot.” Health issue is gaining attention among the participants, as they referred to the health-benefit aspects of their food, e.g. ³⁷“I eat this because I feel well with it, and it does not make me sick.”

³³ French quote : “Je mange cette nourriture parce que j'aime ça.”

³⁴ French quote : “Je mange ces aliments parce qu'ils sont mes préférés.”

³⁵ French quote : “Je mange ces aliments parce qu'ils sont sains. Pourquoi changer cela si je me sens et me suis toujours bien senti avec eux?”

³⁶ French quote : “... Et bien j'ai 2 enfants que j'aimerais bien faire grandir en bonne santé. c'est la raison pour laquelle j'essaie de diversifier le plus souvent que possible nos aliments. De plus, j'essaie de ne pas surchauffer la graisse de friture par exemple, car j'ai entendu dire que cela peut vous donner le cancer si l'huile est trop chaude...”

³⁷ French quote : “Je mange tel ou tel aliment car je me sens bien avec ça, et ça ne me rend pas malade.”

6.5 CULTURAL-TRADITIONAL DETERMINANT AND THE SPECIFIC ROLE OF THE LOCAL BEER DOLO IN FUNERALS

Lastly, cultural-traditional aspects have been indicated as an influential factor for food habits. Nearly 5% of the participants were of this opinion and some of them underlined this with the following declarations such as that of Celestin Somé from Lofing village ³⁸“Food we consume is the same food our parents and grandparents used to know and to eat. This is the same food, we have been always eating. It is just like that” Marie from Dano 7 village expressed her point of view as follows: “The choice of our daily food depends on the fact that since our birth that is what we know.”

Another important socio-cultural aspect of food habits is the intense consumption of the local beer Dolo during the celebration of funerals. Consuming Dolo in the Dagara society is not only linked to the entertaining aspects in the local bars, but also the religious and traditional aspects of this beverage in social events, especially in funerals. Mr Somé describes a Dagara funeral as follows:

³⁹...Funerals are a powerful traditional institution in Dagara society. A person who died is just leaving this lowly world to join that of the ancestors. Hence dying is like travel from this world to that of the ancestors. Therefore, this travel has to be

³⁸ French quote : “La nourriture que nous consommons est la même nourriture que nos parents et nos grands-parents connaissaient et mangeaient. C'est la même nourriture, nous avons toujours mangé. C'est juste comme ça.”

³⁹ French quote : ... Les funérailles sont une puissante institution traditionnelle de la société Dagara. Une personne décédée quitte ce monde humble pour rejoindre celui de ses ancêtres. Donc, mourir est comme un voyage de ce monde à celui des ancêtres. Par conséquent, ce voyage doit être organisé avec précision. Cependant, le niveau de mise en œuvre des funérailles dépend des lieux, des causes et des circonstances du défunt, de son âge, de son sexe et de son statut social. Par exemple, un étranger non-dagara vivant dans notre société sans parents, un transgresseur de tradition qui a été excommunié, des criminels tels que des sorciers pervers, etc. seront simplement enterrés, ils n'auront pas des obsèques traditionnelles. Cependant, la punition dans la culture Dagara n'est pas seulement réservée aux défunts défavorisés, mais également aux personnes vivantes. En fait, les funérailles sont fortement caractérisées par la réciprocité, la présence de tout membre de la famille est donc presque obligatoire. Le non-respect de cette obligation peut entraîner des sanctions de la part des parents et / ou de la communauté. Un enterrement attire un grand nombre de personnes autour du défunt et de sa famille. Cela peut prendre parfois un aspect festif et un décor de rencontres, d'échanges et de diffusions d'informations. Et dans tout ce paysage, le Dolo joue un rôle crucial. D'où le nom particulier Dolo de funérailles...

precisely organised. However, the implementation level of the funeral depends on locations, causes and circumstances of deceased, age, gender and social status. For example, a non-Dagara foreigner living in our society without relatives, an excommunicated tradition's transgressor, criminals such as evil sorcerers etc. will just be buried, they will not get a traditional normal funeral. However, punishment in the Dagara funeral is not only reserved to unfavourable deceased, but also the living persons. Funerals are strongly characterised by reciprocity, thus their attendance is almost obligatory. Failure to comply with this obligation could lead to punishment from the relatives and/or community. A funeral brings a large number of people around the deceased and his/her family. It can take a festive aspect sometimes and scenery of meetings, exchanges and diffusions of news. And in all this scenery, the Dolo plays a crucial role. Hence, the special name Dolo de funérailles /Dolo of funerals...

Depending on the duration of the funeral (one up to 7 days), the Dolo is prepared every day and consumed by the funeral's participants. Principal participants during a funeral are relatives, a clan of the deceased (whether biologically, physically and socially close and distant one), funeral facilitators (balafonist singer, drummer), the gravediggers (initiated persons, responsible for digging graves and burying the body after certain preparations). Also, the public can play a passive role by the Dagara funeral by just observing and/or imitating the active actors. Besides this beverage function of the Dolo by funeral, there are also very important symbolic functions attributed to it, namely:

⁴⁰...the ritual of the deceased's soul accompaniment to the ancestors. The mourning period ends with the first ritual of the deceased's soul accompaniment. This ritual of

⁴⁰ French quote : ...le rituel de l'accompagnement de l'âme du défunt aux ancêtres. La période de deuil se termine avec le premier rituel de l'accompagnement de l'âme du défunt. Ce rituel d'accompagnement de l'âme du défunt a pour objectif de purifier les proches du défunt et de les aider à accepter la séparation provoquée par la mort. Dans la mentalité Dagara, les morts ne sont pas morts. Ils sont présents et circuleront parmi les siens pendant toute la période de deuil. En fait, si l'âme quitte le corps immédiatement après sa mort, elle ne fait pas encore partie du monde invisible des ancêtres. Ainsi, le rituel de l'accompagnement de l'âme du défunt a pour but de permettre à celui-ci de partir définitivement pour rejoindre les ancêtres. Ce rituel se déroule en 2 phases caractérisées par une utilisation symbolique du Dolo. D'où le nom des phases : Dolo des funérailles amères et Dolo des funérailles fraîches. Le Dolo des funérailles amères a pour but de cuisiner le Dolo pour le défunt afin de délivrer son âme. En effet, lors du voyage vers les ancêtres, le défunt subit un test de purification : il est d'abord

the deceased's soul accompaniment aims to purify the relatives of the deceased and help them to accept the separation caused by death. As in the Dagara mentality, the dead are not dead. They are present and will be circulating in among his/her own during the whole period of mourning. If the soul leaves the body immediately after death, it is not yet part of the invisible world of the ancestors. This ritual of the deceased's soul accompaniment aimed to allow the deceased to leave permanently for joining the ancestors. This ritual occurs in 2 phases that are characterised by the symbolic use of the Dolo. Hence the names of the phases: Dolo of bitter funerals and Dolo of the fresh funerals. The Dolo of bitter funerals aims to cook the Dolo for the deceased to deliver his/her soul. In fact, during the journey to the ancestors, the deceased undergoes a purification test: It is first installed uncomfortably by the deceased ancestors on a thorny tree and as soon as the Dolo of bitter funerals is prepared, they deliver him/her and install it at the foot of the tree in a more comfortable setting. A second preparation of the Dolo is characterised by washing the deceased by the ancestors, drinking the Dolo and taking him/her to the ancestral land...

So During funerals, which are almost daily ceremonies in the study area, participant's food habits are in that way symbolically influenced through the strong social and traditional aspect of the consumption of the Dolo.

6.6 THERE IS NO SINGLE DETERMINANT OF DIETARY PATTERNS BUT RATHER A COMBINATION OF SEVERAL ONES

To better discern the reasons for food preferences of participants, I have used different approaches. These included direct questions about the why for the food choice, a comparison between food choice of different professional groups, asking some hypothetical questions and lastly participant and non-participant observations. It was found that urbanity level, educational level, knowledge on health nutritional aspects of food, profession, access to the audio-visual media and personal curiosity and openness to try other types of food are further factors that influence food habits. In fact, the more the combination of these factors was by participants, the more diverse were their food habits. An example is Rita, a 35-year teacher who is

installé inconfortablement par les ancêtres décédés sur un arbre épineux et dès que le Dolo de funérailles amères est préparé, ils le livrent et l'installent au pied de l'arbre dans un cadre plus confortable. Une deuxième préparation du Dolo consiste à laver le défunt par les ancêtres, à boire le Dolo et à l'emmener vers la terre ancestrale...

passionate about food. Rita came from Bobo Dioulasso, the country's second-biggest city. She owns a TV from which she regularly watches food-related programs or gets curious about the food she sees on movies. She also buys feminine magazines where she reads sections on food. She describes her character according to food as follows:

⁴¹...I'm open and curious according to new food and thus news recipes. I guess, I just love food! That I'm interested in food, my favourite television programs are those about cooking and food. If I see something that looks tasty, I have to try it. Unfortunately, depending on what I want to cook, I cannot get all the ingredients here in Dano, but if I go to Bobo at weekends, I use this occasion to get food items I do not get in Dano. As I have 2 children, I want them to grow healthy and normally, thus I want them to eat diversified and good food. Further, I want them to be open and curious, just interested in food, especially healthy nutritious food as I do...

These statements show that Rita's receptiveness to trying various food items, her urbanity and educational level, her financial and information access to food and nutrition-related issues are leading aspects that influenced the food habits of her family. Likewise, other participants in the similar socio-professional group as Rita confirmed these influential factors of their food habits. Suzanne, a 46 years old American missionary and development worker elucidated the food habits of her family as follows: "we consume rice, potatoes, meat, vegetables as our staple food. Because they are nutritive, healthy and not processed."

A comparison between farmers' food habits and those of salaried is illustrated in Figure 17 and Figure 18. The figures show that the food habits of salaried differ from those of farmers. It can be seen, that salaried diet is diversified with more presence of different food groups such as fruits, roots and tuber, legumes and nuts, and milk on their weekly food menu. The reason for this difference is a combination of different factors, including physical and economic access to food, sociocultural, professional,

⁴¹ French quote : ...Je suis ouverte et curieuse par rapport aux nouveaux aliments et donc de nouvelles recettes. Je suppose que j'adore la nourriture - La nourriture m'intéresse, mes émissions de télévision préférées sont celles sur la cuisine et la nourriture. Si je vois quelque chose qui a l'air délicieux, je dois l'essayer. Malheureusement, selon ce que je veux cuisiner, je ne peux pas obtenir tous les ingrédients ici à Dano, mais si je vais à Bobo le week-end, j'utilise cette occasion pour obtenir des produits alimentaires que je n'obtiens pas à Dano. Comme j'ai 2 enfants, je veux qu'ils grandissent en bonne santé et normalement, donc je veux qu'ils mangent bien et diversifiés. De plus, je veux qu'ils soient comme moi intéressés, ouverts et curieux aux nouveaux aliments en particulier ceux nutritifs et sains ...

and gustatory factors. Rigobert Dabiré, a farmer from Lofing village, summarised these different factors by explaining his household's food habits as follows: ⁴²"we consume food we know by using our own produced food. At the same time, we save money in the view of the high food prices on markets."

However, as mentioned above the most influential factors cited by farmers for not diversifying their diet were the economic and cultural/gustatory ones, while salaried were more concentrated on the health-nutritious aspect as the reason they diversify their diet. For example, most of the farmers told me that they do not consume fruits because fruits are sweet and thus after eating them, they influence negatively the taste of the Dolo, meaning that they do not taste the sweetness of the Dolo anymore. This statement has cultural and gustatory reasons with a consequence of the health-nutritious aspects of food habits. The question is then, is the health-nutritious aspect of diet diversity clear to them? Most of the farmers did not give a clear answer to this question. However, the importance of Dolo consumption was clearly stated. The consumption of Dolo whether in local bars, markets or during funerals, remains its central symbolic character of the daily life in the study area. Thus, people will avoid everything that could influence the fulfilment of this obligation. In fact, under certain circumstances, failure to comply with this obligation could lead to punishment or reprisals from both society and ancestors.

⁴² French quote : "Nous consommons des aliments que nous connaissons en utilisant nos propres productions. En même temps, compte tenu des prix élevés des denrées alimentaires sur les marchés, nous épragnons de l'argent."

Figure 17 Weekly dietary patterns per different food groups of salaried households (hh) (n=20, one-week-recall, field data)

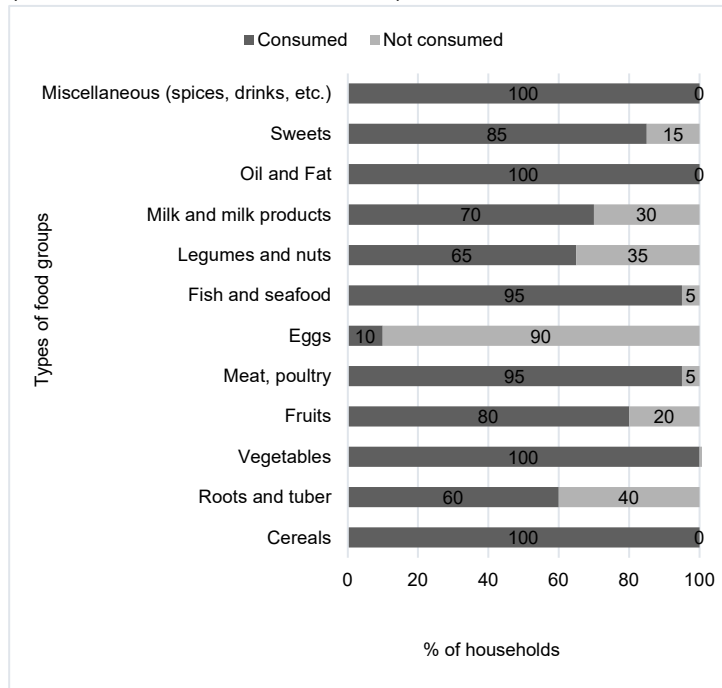
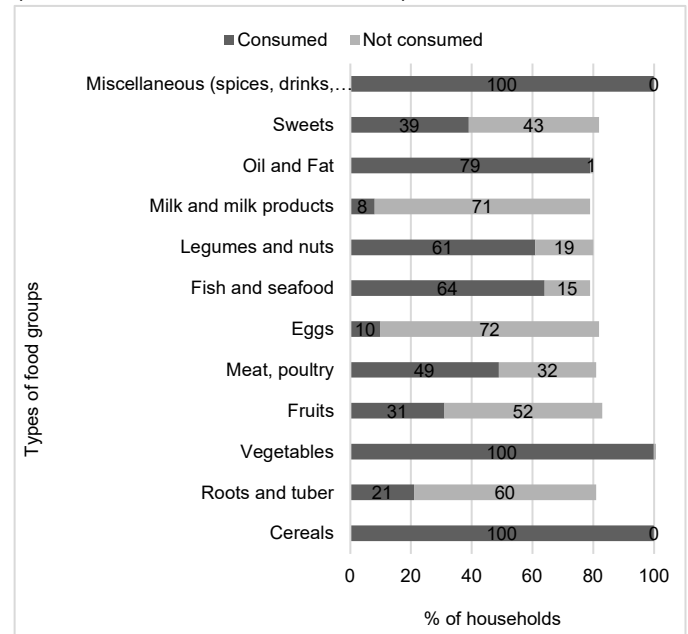


Figure 18 Weekly dietary patterns per different food groups of farmers' households (n=90, one-week-recall, field data)



6.7 AN IDEAL FOOD

6.7.1 What would be an ideal food you would choose/cook for the three daily meals for a visiting friend?

The majority of participants have stated economic unavailability as the most influential factor for food choice. Consequently, I undertook a triangulation of question on the economic influential factor for food choice to get more insight into the influential factors for food choice and their multidimensionality. I was interested in understanding to what extent the cited influential factors are consistent (especially the economic one) by asking for example if participants had sufficient financial means to buy food, would their food choice be different, as the actual one? Thus I have formulated the followings hypothetical questions under different settings:

If you should cook tomorrow for an inviting friend, what kind of food would you choose/cook for him/her if you do not have any financial constraint? The summary of ideal foods stated for the 3 daily meals is compiled in Table 13.

Table 13 What would be an ideal food you would cook for the 3 daily meals for a visiting friend?

(n=102, field data)

| Food I would choose/cook | % of participants who would have this food for breakfast | % of participants who would have this food for lunch | % of participants who would have this food for dinner |
|---------------------------------|---|---|--|
| Alcoholic drinks | 1 | 2 | 2 |
| Attiéké/Cassava | – | 2 | – |
| Aubergine | – | 4 | – |
| Aubergine leaves | – | 22 | 1 |
| Banana plantain | – | – | 1 |
| Baobab leaves | – | 1 | 1 |
| Beans | 4 | 4 | 3 |
| Bread | 39 | 1 | – |
| Butter | 8.82 | – | – |
| Cabbage | – | 4 | 1 |
| Cabbage leaves | – | 1 | 1 |
| Chicken | 1 | 10 | 3 |
| Coffee | 43 | | |
| Couscous/Semolina | – | 4 | 1 |
| Eggs/omelett | 6 | | 1 |
| Fish fresh | 4 | 17 | 3 |
| Fish dried | – | 20 | 17 |
| French beans | – | 2 | 1 |
| Maize | – | 36 | 38 |
| Meat | – | 28 | 22 |
| Milk | 38 | – | – |
| Millet | 11 | 6 | |
| Okra | – | 25 | 12 |
| Onion | – | 4 | – |
| Pasta/Macaroni | – | 10 | 9 |
| Groundnut | – | 26 | 10 |
| Rice | 2 | 48 | 23 |
| Salad | – | 1 | 2 |
| Salt | – | 5 | 6 |
| Shea butter | – | – | 2 |
| soft drinks | – | 1 | – |
| Sorrel | – | 7 | 11 |
| Soumbala | – | 6 | 2 |
| Squash | – | 6 | 3 |
| Sugar | 44 | – | – |

Ideal breakfast for a visiting friend without any financial constraint

Food that would be consumed at breakfast without any financial constraint was indeed different from the staple breakfast of participants. Breakfast without any financial constraint was dominated by the consumption of a typical western breakfast menu, namely buttered bread with sweetened milk/black coffee, and this was stated by around 40% of the participants as their breakfast menu if they would not have any financial constraint. Interestingly, maize paste, which dominated the real staple breakfast of participants, was not mentioned at all.

Ideal lunch for a visiting friend without any financial constraint

The hypothetical lunch menu would be dominated by rice with different sauces such as tomato soup, groundnut sauce (with meat 30%; with dried fish 36%; and with fresh fish 17%). The next most stated hypothetical foodstuff for lunch was maize paste with vegetable sauces (okra leaves; aubergine leaves etc.).

Ideal dinner for a visiting friend without any financial constraint

Lastly, dinner would be dominated mostly by maize (38% of the participants). The second most important food, that would be cooked for a visiting friend would be rice (23% of the participants). Rice was followed by meat as the third most stated food choice for 22% of the participants. The pasta took fourth place by being stated by 9% of the participants for their food choice for a visiting friend's dinner.

6.7.2 Influential factors for the choice of the ideal food for a visiting friend

Table 14 shows the reasons given by participants for their food choice for a visiting friend, assuming that they do not have any financial constraint. Gustatory factors represented the most influential factor that was stated by 41% of the participants as a reason for their food choice if they do not have any financial constraint. About 27% and 14% respectively stated food preferences and diet diversification as specific gustatory reasons for their food choice. About 29% of the participants stated the health-nutritive aspect of the chosen food as an influential factor. Thus the second most reason cited was the health-nutritive one with more than 21% taking the view that these foods are healthy-nutritive, while nearly 8% consider the chosen food as energetic. Nearly 18% of participants stated the economic access to the chosen foods as an influential factor for their choice. Thus economic access was the third most influential factor revealed. Lastly, nearly 3% and 2% of participants considered

respectively sociocultural and physical aspects as the influential factors for their food choice.

Table 14 Influential factors for the choice of the ideal food for a visiting friend
(n=102, field data)

| Stated influential factors for hypothetical food choice | n (%) |
|--|--------------|
| Health-nutritional influential factors | 30 |
| Economic influential factors | 18 |
| Cultural-traditional influential factors | 3 |
| Physical influential factors | 2 |

The second triangulation question on the influential factor on food choice was the following: if you were invited to a restaurant where you can get almost every kind of food, what would be your food choice?

As can be seen in Table imported beer, grilled fresh fish, grilled chicken, rice beef, beef meat were the most mentioned hypothetical foodstuffs that the respondents desired from restaurants which are different from the habitually consumed maize paste. Other unusual foodstuffs cited were pasta, salad, French beans, French fries and roasted potatoes, which rarely came on menus of real dinner.

Alcoholic drinks, especially, beer would be the most common food/beverage choice in the restaurant for 38% of participants. Fresh fish in form of grilled one would be the second most consumed food by 28% of participants. The next stated food was grilled chicken (24%), following by rice, which would be consumed by 22% of the participants. 21% of participants stated beef meat as their preferred food choice at the restaurant, making beef meat to be the fifth most frequent food choice here. The next most frequent quoted food choice at the restaurant in order of importance were pasta, salad, bread, local soft drinks and maize. Respectively 3 participants stated that they would choose French beans, roasted potatoes and potatoes chips as their food choice at the restaurant.

Table 15 What would be your food choice in the restaurant, where you have been invited and you can get almost every kind of food?

(n=102, field data)

| Food choice at the restaurant | % of participants who would choose this food |
|--------------------------------------|---|
| Drinks /alcoholic/Beer | 38 |
| Fish fresh | 28 |
| Poultry chicken | 24 |
| Rice | 22 |
| Meat beef | 21 |
| Drinks/soft imported | 19 |
| Pasta/Macaroni | 15 |
| Salad | 12 |
| Bread | 9 |
| Drinks/soft /local fruits | 7 |
| Maize | 7 |
| Couscous/Semolina | 4 |
| Poultry guinea fowl | 4 |
| Beans | 1 |
| Drinks /alcoholic/Dolo | 1 |
| Eggs/omelette | 1 |
| French beans | 1 |
| Groundnut | 1 |
| Potatoes | 1 |
| Potatoes/french fries | 1 |
| Meat pork | 2 |
| Butter | 1 |
| Cassava/manioc/attiéké | 1 |
| Pastenuts, biscuits | 1 |
| Drinks/soft /other | 1 |
| Meat, beef tongue | 1 |
| Meat, other | 1 |
| Milk/Milk products | 1 |
| Tomato | 1 |
| Vegetables green /sauce | 1 |

6.7.3 Influential factors for food choice at a restaurant

Stated influential factors for food choice in the restaurant that are summarised in Table 16 were similar to those cited for a visiting friend. Food choice at the restaurant was dominated by gustatory factors, which were stated by 40% of participants. Food preferences/taste were the largest under this category here as 30% of the participants stated this as the reason for their food choice. Diversifying owns' diet was the second most cited reason in the group of gustatory influential factors for food choice (5%). Lastly, 3% of participants expressed their desire to discover new foodstuffs as the reason for their food choice.

Physical influential factor made up the second major reason for food choice at the restaurant for slightly more than 20% of the participants.

The third-largest influential factor for food choice at the restaurant was related to the health-nutritional aspects of food. To be precise nearly 20% of participants thought that the food they would have chosen at the restaurant was healthier and more nutritive. Nearly 11% found their food choice healthier and more nutritive than the food home, while nearly 9% believed that the food they have chosen provides energy. Finally, sociocultural influential factors in term of food habits were the least cited reason for food choice by 8% of the participants.

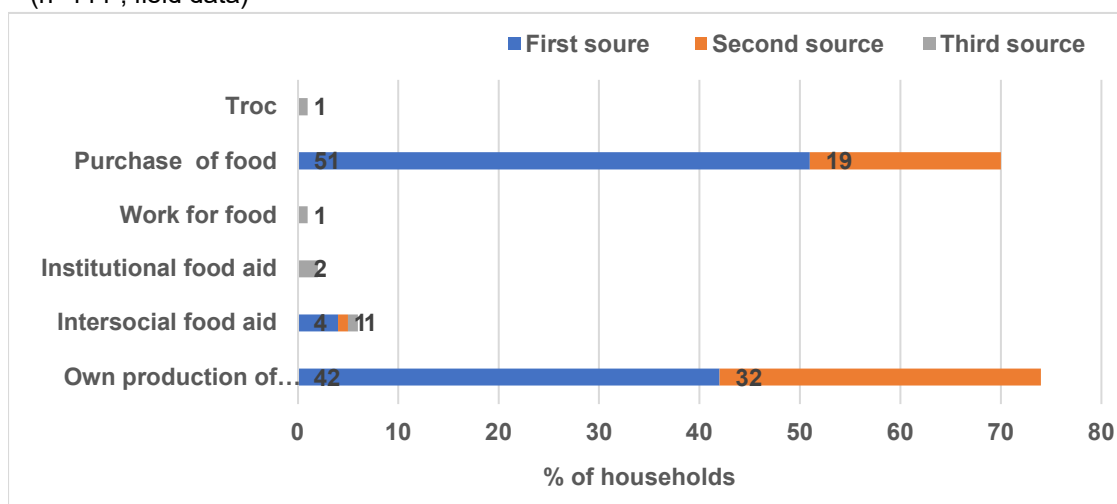
Table 16 Influential factors for hypothetical food choice at the restaurant
(n=102, field data, 2013)

| Stated influential factors for hypothetical food choice | n (%)* |
|--|---------------|
| Gustatory influential factors | 40 |
| Physical influential factors | 22 |
| Health-nutritional influential factors | 20 |
| Sociocultural influential factors | 8 |

7- SOURCES OF CONSUMED FOOD

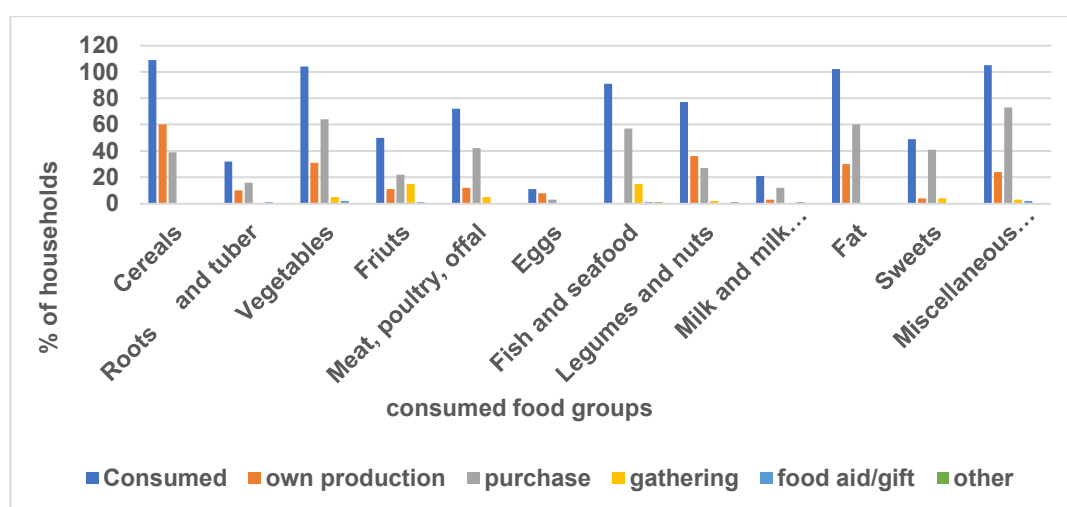
The chapters 5- and 6- above have dealt with the what and the why of participant's food habits. Chapter 7- will aim to determine the different sources of the participant's food.

Figure 19 Main sources of consumed foods by households
(n=111*, field data)



*Does not sum up to 100. Multiple Answers.

Figure 20 Example of weekly consumed food groups and their sources (%)
(n=111*, field data)



7.1 OWN PRODUCTION AS SOURCE OF FOOD

If we remember, the statement “*This is, what we have, c’est ce dont nous disposons*” chapter in 6.2 above, so the physical availability/accessibility of/to food, was cited as most influential factor for food habits. Accordingly, self-produced food as the main source of food for participant’s households does not come unexpectedly. 80% of participants—mostly farmers, who were the majority of the participants— used their self-produced food for their daily meals. As follows, I will go further to the main produced food by participants and the circumstances of their production.

7.1.1 Land access and the supernatural aspects or influence of ancestors through “the chef de terre/chief of the earth” on land use and exploitation

In Burkina Faso, land rights are administrated by institutional laws. However, in many rural areas, the traditional land tenure system remains the only formal way to access land. My research area is, in fact, one of these areas, which also underlies the traditional land tenure system. Mr. Somé, during a discussion on land access in Dano, summarised the land access rights as follows:

*Does not sum up to 100. Multiple Answers.

⁴³ ...In Dagara land, the land is governed by the autochthones, so the first occupants of a particular land. Autochthones, in turn, are managed by the chef de terre-Tégan-sob (owner of land). The Tégan-sob -the lead of the patriclan- is the politico-religious and social leader of the community. Furthermore, he is responsible for preserving the Dagara customs and traditions, especially problems related to farming lands. In fact, the chef de terre has the following specific functions. First, the chef de terre has a religious-ceremonial function. For example, he is in charge of making sacrifices to the spirit of land (the Tégan), thus to the ancestors in to ensure peace and principally to implore for abundant yields. Secondly, he plays a politico-administrative role by guarantying the fair distribution and utilisation of land between community's sons or between community's sons and immigrants. In the tradition Dagara, land does not belong to anyone, rather to God, thus the Tégan-sob himself does not proclaim himself to appropriate the land. He is rather the priest of land. And lastly, he plays a punitive and vigilant function by ensuring that peace and decent moral remain in the community. Thus, he has the right to impose penalties and uttering curses in the name of Tégan. The Dagara society is religious and traditional and relies on good and closed relations to the ancestors. Thus, the authority of the chef de terre is tangible and esteemed considering his mediatory religious function between the ancestors -through the Tégan and the community. However, the Tégan-sob is assisted by his functions by the council of elders of the village patrician's. In some cases, to avoid any kind of dictatorial behaviour of the Tégan-sob, there exist in some regions the Sùo-sob (possessor of the knife, priest) or the Kû ber sob (the one, who does not leave any impunity gaps). Both characters,

⁴³ French quote and Summary from the narration of the chef de terre Colonel Somé on the traditional land tenure system in Dano: ...Dans le pays Dagara, les terres sont gérées par les autochtones (premiers occupants d'un territoire donné). Les autochtones à leur tour sont gérés par le chef de terre-Tégan-sob (propriétaire de la terre). Le Tégan-sanglot - le chef du patriclan - est le chef politico-religieux et social de la communauté. En outre, il est responsable de la préservation des coutumes et des traditions Dagara, en particulier des problèmes liés aux terres agricoles. En fait, le chef de terre a les fonctions spécifiques suivantes: Premièrement, le chef de terre a une fonction religieuse et cérémonielle. Par exemple, il est chargé de faire des sacrifices à l'esprit de la terre (le Tégan), donc aux ancêtres pour assurer la paix et implorer principalement pour des rendements abondants. Deuxièmement, le chef de terre joue un rôle politico-administratif en garantissant une répartition et une utilisation équitables des terres entre les fils de la communauté ou entre les fils de la communauté et les immigrants. Dans la tradition dagara, la terre n'appartenant à personne, mais à Dieu, le Tégan-sob lui-même ne se proclame pas pour s'approprier la terre. Il est plutôt le prêtre de la terre. Et enfin, le chef de terre joue un rôle punitif et vigilant en veillant à ce que la paix et une morale décentes demeurent dans la communauté. Ainsi, il a le droit d'imposer des pénalités et des malédictions au nom de Tégan. La société de Dagara est religieuse et traditionnelle et repose sur de bonnes relations étroites avec les ancêtres. Ainsi, l'autorité du chef de terre est tangible et estimée, compte tenu de sa fonction religieuse médiatrice entre les ancêtres - à travers le Tégan et la communauté. Cependant, le Tégan-sob est assisté dans ses fonctions par le conseil des anciens du village. Dans certains cas, pour éviter tout type de comportement dictatorial du Tégan-sob, il existe dans certaines régions le Sùo-sob (possesseur du couteau, prêtre) ou le Kouber sob (celui qui ne laisse pas de faille d'impunité). Les deux personnages choisis parmi d'autres patriciens, ont pour fonction de s'opposer à tout comportement ou à toute décision injustes du Tégan-sob...

chosen from other patricians, have the function to oppose any unjust behaviour or decision of the Tégan-sob...”

As concluded in Mr. Somé’s narrative about the Dagara land tenure system.

The land which belongs to a patriclan is exploited collectively (all of the sons and brothers of a clan together). The collective working context ends with the death of the head of the patriclan and the division of the lands between the sons of the patriclan- only sons inherited land-. Due to the patrilineage custom, women, don’t have rights/access to lands, unless their husbands agree to this.

Almost 14% households of the 93 participants questioned on the topic about land and farming in my research still work in a collective-patriclan- working context against the majority of approximately 80 %, who work in a familial working context meaning, that they work with their household members. Merely 1%, who were working by themselves. As said above, after the death of the patriclan’s head, the land is divided into sons and brothers of the patriclan. Therefore, the preponderance (closely 75%) of the participants has access to their farming land through inheritance. For this reason, the larger part (nearly 95%) of the participants are also landowners against a minority of 5%, who do not own their farming lands. Population growth through marriage, birth etc. and the resulting continuous lineage in the division of land, farm size becomes less by increasing the size of household members. Thus, inherited land has to be increased through donation, purchase or loan, as it is the case of 5% of the participants, who had increased their farm size through donation and loan. A further strategy to compensate lack of farming land is emigrating in search of available farming lands in neighbouring localities, even lands. As the case of Mr. Dabiré, who is head of a large patrilineal residence with nearly 30 members and who lacks enough lands to cultivate enough food for all the family: “I have farming land on the border to Ghana, 40 km away from my home. There are no available farming lands anymore around here. My older son emigrates temporarily there every year through the farming season.”

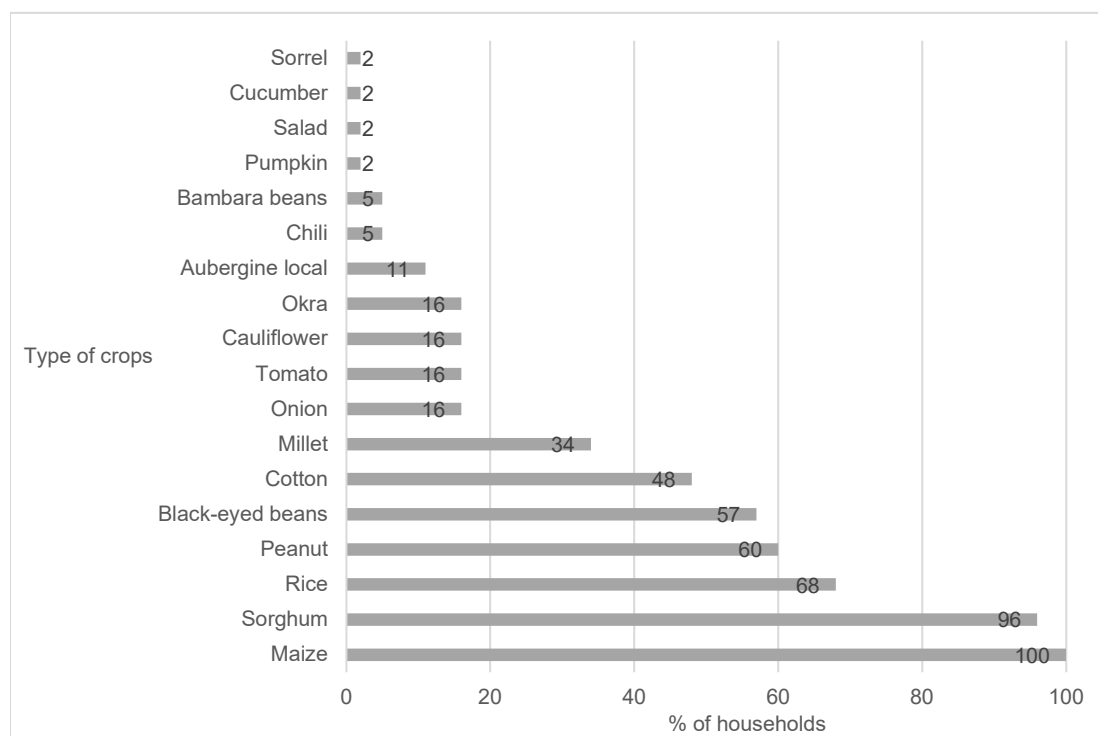
Table 17 Participant's land ownership status and ways of access to land
(n=89, field data)

| Land ownership status | % | Land ownership status | % |
|--------------------------|----|-----------------------|----|
| Owner | 87 | Not owner | 13 |
| Accessed to land through | % | Land ownership status | % |
| Inheritance | 80 | Loan from a relative | 10 |
| Inheritance and donation | 3 | Loan from a friend | 4 |
| Donation | 2 | | |
| Purchase | 1 | | |

7.1.2 Crops grown in the production year 2012-2013

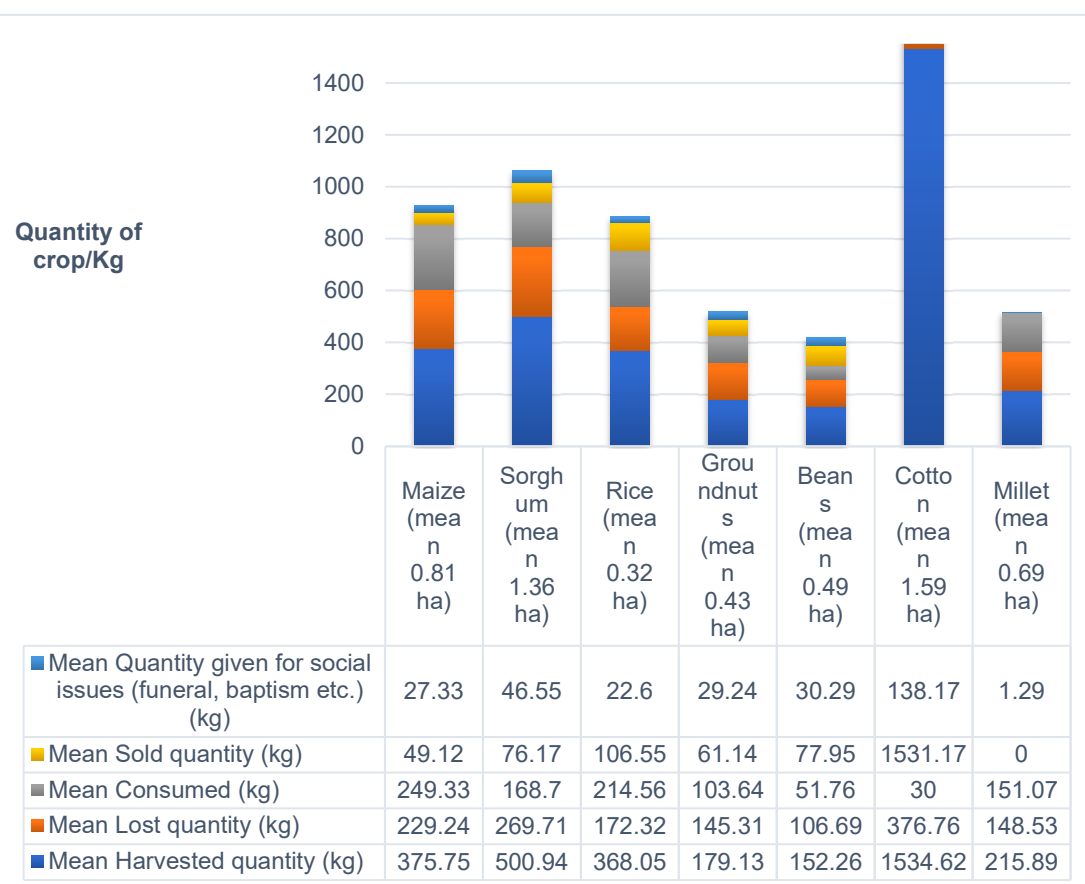
Figure 21 indicates types of crops grown by participants during the farming year 2012-2013. Figure 21 reflects the environmental influential aspect of participants' habits by reproducing the preponderance of staple food. It is clear from Figure 21, that dominated grown crops were mostly cereals and vegetables. The main food crops were maize, sorghum, rice and millet. Maize was without exception (100%) the highest produced crop type, which has been produced by each farmer. Maize was followed by sorghum, rice and millet which were produced respectively by nearly 96%, 68% and 34% of farmers. Cash crops were dominated by groundnut (60%), black-eyed beans (57%), and cotton (48%). Chili, salad, Bambara bean and cucumber represented other important cash crops in the area. The principal types of vegetables produced were onion, tomato, cabbage and okra, which have been produced in each case by 16% of farmers. The fourth most produced vegetable was local aubergine with an occurrence of 11% of cases. Soumbala and shea butter are both self-produced and represent crucial ingredients for food preparation. As can be seen, the production of roots and tubers does not appear in the Figure, explaining the almost inexistence of these crops in the participants' meals menu.

Figure 21 Main grown crops in the production year 2012-2013
(n=56, field data)



Besides self-supply with food, crops are also intended to other types of utilisation such as selling and donations for social ceremonies such as rituals, funerals, baptism etc. As stated above maize and rice are most used for household's consumption, while sorghum in form of Dolo is most sold and given for ceremonial purposes (Figure 22). As expected cotton - which is the classic cash crop- is produced solely for sale, mainly to the national cotton company the SOFITEX.

Figure 22 Approximating use of main grown crops in the production year 2012-2013 (n=93, field data)



7.2 FOOD FROM PURCHASE

7.2.1 Purchase of food from the market

Purchasing food from the market is the second source of food for farmers, but it is the first source for participants from other socioeconomic groups such as salaried throughout the year. Farmers used markets as a source of food in the lean season in order to overcome this⁴⁴.

Availability and access to markets

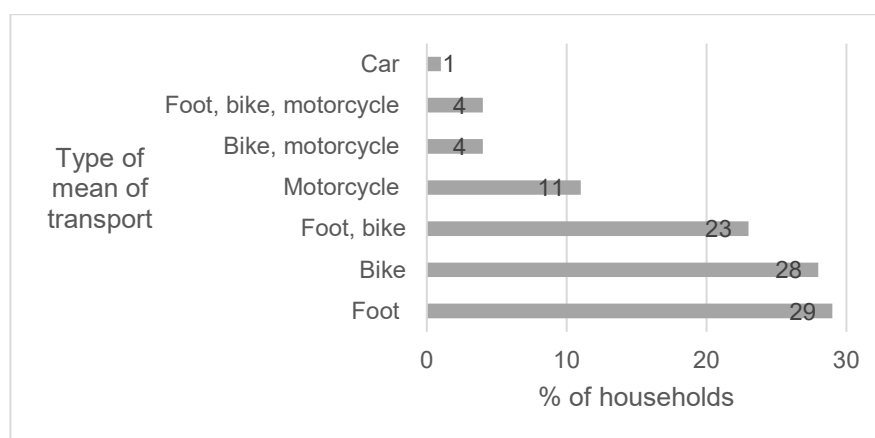
Markets are available around Dano and its localities. Every village disposes of its market, where the basic foodstuffs for everyday food staple are supplied. Markets availability differs from the locality. For a better qualitative and quantitative supply of foodstuffs on markets and a fair competition of them a rotation system is established through the different markets, meaning that markets do not open all on the same weekdays. However, markets are accessible daily for everyday foodstuffs such as soubala, tomato, onion, Maggi, vegetables etc. The distances separating households from their usually frequented market lie between 0.045 kilometres as a minimum, 25000 kilometres as maximum and 3.2 kilometres as average distance to the markets.

Means of transport to markets

How participants get to markets is illustrated in Figure 23. Participants get to market by using different types of transport means ranging from feet to cars.

⁴⁴ The lean season is the period between the last harvest and the next one. In that time the majority of the farmer's food stock is empty and the food gets scarce for the ones who cannot afford food from market or get food institutional or intersocial food donation. In my research area the lean season lies between May (begin of the new cropping season and September (begin of the new harvest).

Figure 23 Usually used means of transport to get to markets
(n =107*, field data)



Foot and bike being the most used means of transport, used by more than 60% of participants. Foot and bike are the key transport mean in rural Dano. However, generally, men are entitled to use bikes, women on their part mainly used their feet as a means of transport. Motorcycles represented transport means for slightly more than 10% of participants. They are most common in urban Dano and principally used by salaried as means of transport. Car is a rare local mean of transport in Dano. Generally, only rich traders (gold, food, cotton), employees - generally the highest ranks - of governmental and non-governmental organisations possess cars. Consequently, only one of the participants (an American missionary) used a car to get to the market.

* Does not sum up to 100%, multiple answers.

Picture 11 People on their ways to the Sunday market of Dano
(field data)



Food supply on markets

The list of usually supplied foodstuffs on the market of Dano is illustrated in Table 18. A look at the data reveals a concordance with the participant's food patterns (see Table 5). Whereby one can see, that the least consumed foodstuffs are supplied on the markets. This brings us back and/or confirms to the mentioned influential factors in chapter 6- above. Not all foodstuffs stated in Table 18 are available all the year-round, their availability depends however on seasonal production. Hence their price in turns is determined by their quantity and quality. Grown foodstuffs are more available and cheaper around the harvest time and/or seasonality. The further the harvest period and/or seasonality dates back, the more they get scarce and expensive. The non-grown foodstuffs remain in their part with a more or less constant price around the year.

The weekly market in Dano town which is on Sundays for example has a better qualitative and quantitative offer, than other weekdays. The offer varies from food and livestock to clothing and shoes, bags, gardening stuff, health and personal care, electronic stuff, local artisanal products etc. Furthermore, as mentioned in 5.4 above, markets represent social meeting places for community members, where the Dolo and food are also sold. Moreover, open restaurants represent one of the main offers of this market day, where people besides shopping meet each other to eat, drink and exchange news. The cited products imply that the market actors are not just from Dano, but also surroundings villages (Gniza, Fouzan, Pâ etc.) and communes Oronkua, Diedougou etc.), other urban areas (Koudougou, Gaoua, Diébougou, Houndé and Bobo Dioulasso) even neighbour's lands, especially Ghana (from where customers come to buy livestock and vegetables).

Table 18 Price and origin of foodstuffs on the market of Dano town during the period of January 2013-March 2013
(field data)

| Foodstuffs | Price (FCFA)/Sales unit | Origin |
|------------------------------|-----------------------------|---|
| Cereals | | |
| Maize | 350-450/Yoruba (2,6Kg)* | Ioba --Dano's and its surrounding villages (Fouzan, Pâ etc.) |
| Sorghum | 475/Yoruba | Ioba -- Dano's surrounding villages (Fouzan, Gniza) |
| Millet | 450/Yoruba | Dano's surrounding villages (Fouzan, Gniza) |
| Rice | 350-450 /Yoruba | Bobo, Ouaga, Ioba --Dano's surrounding villages (Fouzan, Gniza). Indirectly: Asia (China, Pakistan, Thailand, Vietnam, India) —(75% of imported rice), Côte d'Ivoire, |
| Pasta/Macaroni | 150-250/Package | Ghana, Côte d'Ivoire, Togo |
| Bread local | 50/Unit | |
| Grains and leguminous | | |
| Beans | 1100/Yoruba | Dano's surrounding villages (Fouzan, Gniza) |
| Roots and tubers | | |
| Groundnuts | 500/Yoruba | Dano |
| Yam | 500-2000/1-3Units | Gaoua |
| Sweet potatoes | 100 FCFA/3-5units | Ioba —Dano's surrounding villages (Fouzan, Gniza) |
| Cassava | 100FCFA/2-3units | Ioba— Dano's surrounding villages (Fouzan, Gniza) |
| Bananas plantain | 500FCFA/4-6units | Côte d'Ivoire |
| Vegetables | | |
| Citrus fruit | 25F/3-4units | Ioba— Dano's surrounding villages (Fouzan, Gniza) |
| Tomato | 50-100/4-8units | Ioba— Dano's surrounding villages (Fouzan, Gniza), Bobo Dioulasso |
| Onion | 100-200/4-10units | Ioba, Bobo, Ouaga, Koudougou Holland |
| Onion leaves | 25-50/Bunch | Dano's surrounding villages (Fouzan, Gniza) |
| Fresh okra | 50-100/ some fifty-20twenty | Ioba— Dano's surrounding villages (Fouzan, Gniza) |
| Dried okra | 500FCFA/Yoruba | |
| Aubergine | 50-100F/2-3units | Ioba— Dano's surrounding villages (Fouzan, Gniza), surrounding provinces |

*Yoruba is a measuring bowl for mostly dried crops (cereals grains or flour, dried vegetables). For example, 1yoruba= 2,6kg of maize grains and 1,7kg maize flour.

7- SOURCES OF CONSUMED FOOD

| | | |
|--|-------------------------------------|--|
| Salad | 25-100F/Bunch | loba— Dano's surrounding villages (Fouzan, Gniza) |
| Cabbage | 150-200/Unit | loba— Dano's surrounding villages (Fouzan, Gniza) |
| Dried chili | 750-1100/Yoruba | loba— Dano's surrounding villages (Fouzan, Gniza) |
| Fresh chili | 25-50 /1handfull | loba— Dano's surrounding villages (Fouzan, Gniza) |
| Cucumber | 100-200/Unit | loba— Dano's surrounding villages (Fouzan, Gniza) |
| Sweet pepper | 50-100/Pile | loba— Dano's surrounding villages (Fouzan, Gniza) |
| Spinach | 25/Bunch | loba— Dano's surrounding villages (Fouzan, Gniza) |
| Squash | 25-50F/Unit | loba— Dano's surrounding villages (Fouzan, Gniza) |
| Sorrel | 25 /bunch (some fifty-twenty units) | loba— Dano's surrounding villages (Fouzan, Gniza) |
| Fruits | | |
| Papaya | 100-200/Unit | loba— Dano's surrounding villages (Fouzan, Gniza) |
| Orange | 25-50 /Unit | loba and other provinces |
| Banana | 100-200/2-3units | loba and other provinces |
| Meat and poultry | | |
| Beef meat | 1400/Kg | loba province (Fouzan, Dano,) Hounti, Koti, Boromo, Bobo |
| Coat meat | 2000/Kg | loba province (Fouzan, Dano,) Hounti, Koti, Boromo, |
| Sheep meat | 2500/Kg | loba province (Fouzan, Dano,) Hounti, Koti, Boromo, |
| Chicken | 1000-3000F/Unit | loba province (Fouzan, Dano,) Hounti, Koti, Boromo, |
| Fats and oil | | |
| Shea butter | 25/Loose ball | loba province |
| Red palm oil | 1000F/Liter | Côte d'ivoire, Ghana |
| Rafined plam oil | 900F/Liter | Bobo, Banfora |
| Vegetable oil (Groundnut) | | |
| Fish (local sweetwater and imported seawater fish) | | |
| Dried fish | 1200/kg | Bobo, Ouaga, Mali, Côte d'ivoire, Senegal |
| Fresh /Smoked fish | 1200/kg | Bobo, Ouaga, Côte d'ivoire, Senegal |
| Spices | | |
| Soumbala | 25/Loose ball | loba— Dano's surrounding villages (Fouzan, Gniza) |
| Maggi | 25/Unit | Bobo, Ouaga, (Côte d'ivoire, Senegal) |
| Salt | 50-100/Pile | Bobo (BF, Europe-France) |
| Sweets | | |
| Sugar | 600-800/Kg | Bobo, Ouaga, (BF, Côte d'ivoire, Europe-France) |

*Picture 12 Market scenarios in Dano
(field data)*

A Weekday market-here a stand with vegetable



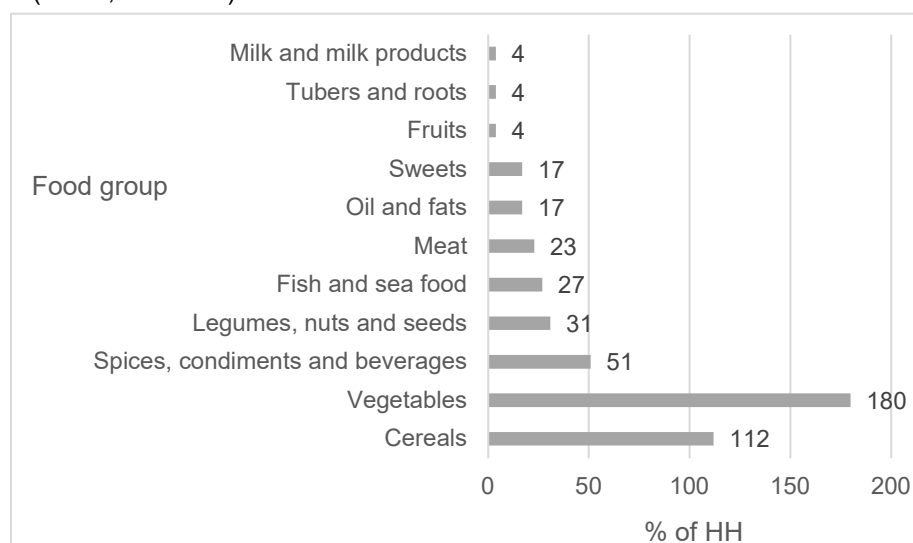
A Sunday market



Food demand and purchase from markets

Foodstuffs, which dominated the housewife's shopping/food basket is illustrated in Figure 24. I have summarised the stated foodstuffs into a total of 13 food groups. Having a look back at consumed foodstuffs in Figure 20, it can be seen, that both Figure 20 and Figure 24 share some similarities. Data from both figures revealed the dominance of cereals and vegetables in the household's food patterns. However, this statement does not come surprisingly, since food which fills housewife's shopping/food basket is generally intended to be cooked and consumed at home. The similarity continued by stating the same least foodstuffs purchased and/or consumed namely fruits and milk products.

Figure 24 Usually purchased foodstuffs in the market
(n=70*, field data)



7.2.2 Supply and purchase of food from the shops

Besides markets, stores represented an important place for purchasing food. Dano possesses several stores distributed along the national road, which crosses the city. Stores offer mostly diverse manufactured food such as milk (concentrated, no concentrated, fresh, powder form); white wheat bread, sugar, cacao, corned beef, sardines, wines, beer, liquor, biscuits, juices etc. Rice, maize, couscous, pasta are the common staple food supplied by stores. Furthermore, local finger food such as local bread, sweetened tamarind, ginger and hibiscus juices, fritted doughnuts, local yoghurt, local honey etc. are stock products offered by stores traders. Stores are accessible physically every day; however, their financial access is generally reserved to both local institutional professional and expatriate ones, making those to their regular customers. A list of typically supplied foodstuffs in a store in Dano is shown in Table 19.

* Does not sum up to 100. Multiple Answers.

Table 19 Habitually foodstuffs offered from a store in Dano
(field data)

| Foodstuffs | Origin |
|---|--|
| Milk (powder, concentrated, no concentrated, fresh) | Mali, France, Niederland, Senegal (Nestle) |
| Tomato paste | Italy, China, Ghana |
| Pasta | Côte d'ivoire, Togo, Ghana, Italy |
| Maize | Burkina Faso |
| Rice | Burkina Faso, Côte d'ivoire, China, Pakistan, Vietnam, Thailand |
| Ioded salt | France |
| Tinned fish | Maroc, France |
| Peas | France, Italy |
| Mushrooms | China (bottled in Liberia) |
| Vinegar | Burkina Faso, France |
| Tea | Sri Lanka |
| Chips | China |
| Chocolate | Côte d'ivoire, Turkey, China, |
| Biscuits | Côte d'ivoire, United Arab Emirates, India, Malaysia, France, Turkey |
| Yaourt | Burkina Faso, France |
| Soft drink/Fruit juice | Burkina Faso, USA, Côte d'ivoire, Benin, France |
| Sugar | Burkina Faso, France |
| Couscous | Tunisia |
| Fruit jam | Burkina Faso, France |
| Vegetable oil | Burkina Faso, Côte d'ivoire, France, Spain |
| Tinned fish | Marocco |
| Wines, beer, liquor | Burkina Faso, French Caribbean, India, France, India, Germany, Belgium |
| Fritted doughnuts | (Dano) Burkina Faso |
| Bread | (Dano) Burkina Faso |

7.3 FOOD AID AS SOURCE OF FOOD

Food aid was stated as sources of food by 8% of participants, whereby 6% were from intersocial and 2% from institutional one.

Intersocial food aid is mostly from family's members and friends while institutional food aid includes school aid from both governmental and non-governmental organisations. While the state provides a safety net program as a source of food for the most vulnerable and poor and the Dreyer foundation in the frame of its school meal frame and adequate nutrition education. However, intersocial and institutional source of food is mostly used as coping and adaptive strategies to food stresses (chapter 9.1).

8- VULNERABILITY OF FOOD AND NUTRITION SECURITY

As said in 0 the vulnerability context of food and nutrition security in the sustainable livelihood framework (SLF) framework refers “to the external environment in which people exist. People’s livelihoods and the wider availability of assets are fundamentally affected by critical trends as well as by shocks and seasonality – over which they have limited or no control” (DFID 1999b). Thus, the vulnerability is the furthest part of the framework outside people's control and is composed of the 3 main parts shocks, trends, and seasonality. These parts could have a direct impact on people’s assets status and strategies by the pursuit of their desirable livelihoods outcomes.

This chapter 8- of the thesis aims to describe factors, which expose participant's food production, food access and consumption to vulnerable circumstances such as risks, shocks, and stresses.

8.1 VULNERABILITIES OF FOOD PRODUCTION

Food production in the research area underlies different challenges; which farmers have to face. The challenges range from geo-environmental, social, cultural, demographic and politico-administrative and economic.

8.1.1 Vulnerability of food production to population growth, lack of land and social instability

Changes have been brought about land access in the last two decades by immigration and modernization of agriculture. Privatisation of the land was catalysed by the development of agro-forestry. Consequently, the modalities of land use are changing, with the allocation of compound fields and permanent fields among indigenous social units and the opening of bushland to all. Local farmers themselves perceive a land shortage and no longer easily grant fields to Mossi migrants. To prevent immigrants from taking over much of the land, only temporary rights of land use are allocated to them. This situation spurs frequent conflicts among indigenous and immigrant groups (Somé et al. 2006). Therefore, some villages are experiencing now population reductions as Mossi migrants continue to move southwards in search of fertile lands in other parts of the country (Gray and Kevane 2001). Land disputes do not exist only between immigrants and autochthones, but also between autochthones themselves.

Lack of land is getting palpable and is demonstrated by the occurrence of the several land disputes between some villages around *Dano* as described by the commune⁴⁵:

- The land dispute between the villages of Sarba and Dakoula, in which the population of Sarba reproach the people of Dakoula for infringing on their land.
- The problem of the boundary between Mèbar (*Dano* urban) and the village of Lofing. This conflict appeared when it came to erect Mèbar into an urban area.
- The land dispute between the village of Lofing (commune of *Dano*) and the village of Benkadi (commune of Oronkua). The latter which received support from the Italian NGO CISV⁴⁶ for the implementation of a small-scale irrigation field in "sooboué" whose ownership is claimed by the village Lofing. As a prerequisite for the implementation, minutes shall be signed by the concerned parties to indicate the end of the conflict.
- Land disputes exist frequently between the villages pougouli and those Dagara (Commune de Dano 2007:20–21).

These statements show that population growth and the resulting lack of land is a huge challenge for both food production and social stability in *Dano*.

A further resulting problem from population grown is lack of fallow, Mr Somé explained to me as follows:

⁴⁵Summarised from a discussion with the general secretary of the commune of Dano on Land access (Mai 2013) and (Commune de Dano 2007:20–21)

French original :

-Le litige foncier qui oppose Sarba et le village de Dakoula qui relève de la commune de Guéguéré. Dans ce litige, les populations de Sarba reprochent aux habitants de Dakoula d'empiéter sur leur terroir ;

-Le problème de délimitation entre Mèbar, secteur de la commune de Dano et le village de Lofing. Ce conflit est apparu lorsqu'il fallut ériger Mèbar en secteur urbain ;

-Le litige foncier entre le village de Lofing de la commune de Dano et celui de Benkadi dans la commune de Oronkua qui a reçu un appui de l'ONG italienne CISV pour l'aménagement du bas-fond « sooboué » dont la propriété est revendiquée par le village de Lofing. Comme préalable à l'aménagement, un procès-verbal de palabres aurait été signé par les différentes parties pour signifier la fin du conflit ;

-Des litiges fonciers existeraient de façon intermittente entre les villages pougouli et les villages dagara.

⁴⁶ CISV (Comunità Impegno Servizio Volontariato) an Italian NGO promoting irrigation systems, domestic water supply, sanitation, hygiene, harvest management.

⁴⁷...before 1972 there were fewer people in *Dano* and surroundings and thus more lands and more fallow. Thus, there were lands more fertile with very satisfying yields. But population increase whether by birth or immigration had led to a lack of fallow and land overproduction and to decrease of yield as consequence. The begin of cotton production represents a further source of yield decrease. Since the year 1961, we have begun to produce cotton and to use chemical fertiliser; our soils are getting more and poorer. And that's, in turn, led to yield decrease...

Lack of land was expressed by the majority of participants as alarming. That could explain why of the 71 farmers, who gave their view on changes on access to farming lands, the majority, namely 66% responded negatively, thinking that land is getting less, thus its access is more difficult. In contradiction, 4% of participants responded positively to that question saying that land access was getting more, while nearly 30% of the participants considered that the access condition to the land remained unchanged.

Population growth and food production exert increased pressure on the ecological system and thus leads to environmental degradation (Pare, S. et al. 2007), which in turn is aggravated by climate variability.

8.1.2 Vulnerability of food production to climate change and/or variability and other environmental-related constraints

In terms of climatic variations, participants have been asked to describe changes they have been experiencing especially according to the climate. The aim here was to find out, whether local population are experiencing changes according to climate and if yes, whether these changes correspond to those found in scientific data.

Without exception, every participant described rainfall patterns as the most changing climatic component they are being experienced. Rainfall is getting unpredictable

⁴⁷ French quote : ...avant 1972, il y avait moins de monde à Dano et ses environs, donc plus de terres et plus de jachères. Ainsi, les terres étaient plus fertiles avec des rendements très satisfaisants. Mais l'augmentation de la population, que ce soit par les naissances ou par l'immigration, a entraîné un manque de jachère, donc à une surproduction des terres et une diminution du rendement comme conséquence. Le début de la production de coton représente aussi une autre source de baisse des rendements. Depuis 1961, nous avons commencé à produire du coton et à utiliser des engrais chimiques. Nos sols deviennent de plus en plus pauvres. Et cela a conduit à une diminution des rendements également...

according to time and repartition. Main experienced changes according to rainfall are the delay and the bad repartition of rainfall.

- *The delay of the rainy season*: participants reported for example, that before 2005, they used to sow sorghum in March and other cereals in April, but since 2005 they are sowing in June / May, hence rainy rain mostly starts in these months. The delay of the rainy season was characterized by the early start, late start, early end and late end of the rainy season.
- *Bad repartition of rain*: characterized by an irregular and unreliable quantity of rainfall. For example, whether there is too much or too little rain. E.g. since the 1973s the amount of rainfall is getting less. For example, 2012 was a typical year with both characteristics (too much and lilted rain at the same time). Too very intense and short rains, which provoked massive inundation in February 2012, which was then followed by a drought in August 2012.

The summary of the most stated constraints related to food production can be seen in Table 20.

| <i>Table 20 Summary of experienced changes according to farming</i> (n=93, field data) | | | |
|---|--------------|----------|--------------|
| Experienced changes | Trends | | |
| | Decreasing % | Stable % | Increasing % |
| Access to farming land | 74 | 23 | 3 |
| Access to agricultural inputs | 57 | 16 | 27 |
| HHs labour force availability | 57 | 7 | 33 |
| Soil fertility | 88 | 7 | 5 |
| Crop yield | 74 | 9 | 17 |

8.1.3 Vulnerability of food production to not environmental constraints

Not environmental challenges by farming were related to economic and socio-cultural reasons.

Participants stressed poverty as one important aspect. The increasing non-profit aspect of farming results in a growing disinterest of the youth for it. As Daniel, a young farmer in Lofing explained to me this:

⁴⁸...In consideration of the rising constraints by farming through environmental changes and increasing prices for inputs goods, for example, I am not sure if I will continue to practice farming. The working conditions are just getting harder for me and my family, while yields on their part are decreasing. We do not know how under these conditions, how farming will continue to feed us sufficiently, so we have to find other sources of subsistence...

The old uncle of Daniel, who was near, complained about Daniel's statement with the following

⁴⁹...Of course, rain, institutional and community support to land access are decreasing while temperature, livestock and plant diseases are increasing, that all make farming difficult. But on the other hand, I just think that today's youth is just not courageous and rigorous enough. They would like to have everything easier without hard-working, especially they want to make money easily and rapidly, but life is not like that. As consequence, criminality is getting more and more in our community. Furthermore, an increasing disrespect towards culture, tradition and religion which results in punishment through God and/the ancestors. This in turn results in a decrease of yield...

These both statements from 2 different farmers from 2 different generations show, that the gravity of the constraints depends on the age of farmers. The senior perceive the changes but think that with courage and rigour and especially the respect of the traditions, one could manage these. The youth on the other side believes that the increasing constraints of farming will result in a slowly but surely abandon farming activities. However, older participants stressed sociodemographic factors such as schooling of children, lack of courage and rigour of the youth, the rural exodus of the

⁴⁸ French quote : ... Compte tenu des contraintes croissantes liées à l'agriculture par les changements environnementaux et la hausse des prix des intrants, par exemple, je ne sais pas si je continuerai à pratiquer l'agriculture. Les conditions de travail deviennent de plus en plus difficiles pour moi et ma famille, tandis les rendements diminuent. Nous ne savons pas dans ces conditions comment l'agriculture continuera à nous nourrir suffisamment, nous devons donc trouver une autre source de subsistance...

⁴⁹ French transcript :... Bien entendu, les pluies, le soutien foncier des institutions et communautés diminuent tandis que la température, les maladies du bétail et des maladies des plantes augmentent, tout ceci rend l'agriculture difficile. Mais d'un autre côté, je pense que la jeunesse d'aujourd'hui n'est pas assez courageuse et rigoureuse. Ils aimeraient que tout soit plus facile sans travailler dur. En particulier ils veulent gagner de l'argent facilement et rapidement, mais la vie n'est pas comme ça. En conséquence, la criminalité se répand de plus en plus dans notre communauté. De plus, un manque de respect croissant envers la culture, la tradition et la religion entraîne une punition de la part de Dieu et / ou des ancêtres. Ceci en retour entraîne une diminution du rendement agricole...

youth to the country's urban areas (Ouagadougou and Bobo Dioulasso) or the mining sites, the emigration of the youth to the neighbour countries, -where they work in large plantations and earn more money than by farming home-, old age and disease, the marriage of daughters, decrease in community collective farm working as further no environmental constraints for the increasing failure of farming activity.

8.1.4 Vulnerability of food production to politico-administrative constraints

The Sahel zone in the northern part is characterised as the country's classic vulnerable region. Thus, most of the politico-administrative and financial both from governmental and especially from nongovernmental assistance is focused on that region. Therefore, the southern part (soudanian zone) due to its generous climatic situation is short of need assistance according to the improvement of agricultural production. As a consequence, Agricultural production undergoes lesser and/or slower innovation in the southern part, where my study region is located, keeping agricultural activities and production static. Mr Moussa Koné, Chef de zone⁵⁰ de *Dano* has described this situation as follows:

⁵¹ ...Food production in Dano faces numerous constraints. For years we have been in constant lack of technical, material and financial support from the sides of the

⁵⁰ Le chef de zone (area chief/leader) for extension services in Dano -Direction provinciale de l'agriculture et de la sécurité alimentaire du loba/Provincial office of agriculture and food security of loba -ministry of agriculture and food security). He is responsible for the coordination, implementation and management of coordinator of agricultural extensions services for farmers and farms.

⁵¹ French quote : ... La production alimentaire à Dano est confrontée à de nombreuses contraintes. Pendant des années, nous avons constamment manqué de soutien technique, matériel et financier de la part de l'État (par exemple, aucun budget pour les frais de transport pour les tournées dans villages pour un suivi adéquat avant et après les campagnes agricoles). De plus, nous avons moins d'employés, c'est pourquoi un seul chef de zone doit se charger d'un plus grand nombre de villages et d'agriculteurs. Vous pouvez imaginer la conséquence de cette situation, à savoir une assistance technique et un suivi moins efficace et insuffisant pour les agriculteurs. Ainsi, les agriculteurs ont moins confiance aux chefs de zone, qu'ils jugent incompétents. De plus, nous manquons d'informations / de formations efficaces. Par exemple comment produire efficacement, comment mieux utiliser les sols pour

state (e.g. no budget for the transport costs to the villages for the suitable assistance before and after farming seasons). Furthermore, we are fewer employees, thus one single chef de zone has to regulate activities of more villages and farmers you can imagine the consequence of this circumstance, namely, less and inadequate efficient assistances for farmers. Thus, farmers have fewer trust on the chefs de zone, they deem as incompetents. Additionally, we lack effective information/training -e.g. how to efficiently produce crops, how to better use soils for efficient cropping, how to stock crops- all these induce to less innovative results of farming activities. Politics should take into account reality. We need a more intensive rapprochement to the farmers, a minimum financial, technical and human assistance; e.g. we don't even have any tape measure, GPS, no fuel supply for agents. For 2 years, I have been using my motorcycle to go to the fields. As my means are restraint, I cannot afford this for a long time ...It is a very frustrating situation...

However, despite the constraints cited above, participants mentioned different offered extension services in the localities even if there are not enough and efficient as expected and required, but they help them to cope with the food production-related constraints in some extent. Most of the farmers know the existence of extension services and take part accordingly to the training sessions. Nevertheless, still, a few of them lack information about the dates of the training sessions, which are disseminated through villages visits of extensions services workers themselves as well as word-of-mouth advertising of farmers. The frequency of the training sessions depending on the providing institution ranges from once to 6 times a year. For a better and efficient outcome of extension services on farming activities, farmers use a combination of different services, the range lies between one and 6 extension services, where 3 was the most combination choice. Farmers get their extension service from 6 locally extension services provider in Dano. Of them are 3 from

une culture efficace, comment stocker les cultures - tout ceci induit aux résultats moins innovants des activités agricoles. La politique devrait prendre en compte la réalité. Nous avons besoin d'un rapprochement plus intensif avec les agriculteurs, d'un minimum d'assistance financière, technique et humaine. Par exemple, nous n'avons même pas de ruban à mesurer, de GPS, de carburant pour les agents. Depuis 2 ans, j'utilise ma propre moto pour faire mes tournées techniques, comme mes moyens personnels sont limités aussi, je ne peux pas me le permettre cela pendant longtemps... C'est une situation très frustrante...

governmental, while the remaining 3 are from the nongovernmental institutions⁵². A list of provided extension services and their level of use is illustrated in

Figure 25. As it can be seen in

Figure 25, the 3 most used agricultural services in decreasing order are: Training on adequate use of fertiliser (93%); seeding in lines (88%) and thirdly the supply of farm inputs (60%). Further exposed constraints were the financial access to farming inputs. Most of the farmers cannot afford to buy farming inputs in cash, thus they purchase them on credit from the SOFITEX. A situation leading them into a vicious circle of vulnerability and poverty on one hand and on another hand in a dependency situation on that company.

Table 21 Further characteristics of accessing farming inputs
(n=93, field data)

| Purchasing power of inputs | % of participants |
|--|--------------------------|
| I can not afford farming inputs | 70 |
| I can afford farming inputs | 30 |
| Influential factors of the purchasing power | % of participants |
| Expensive fertilizer | 61 |
| Fertilizer not available | 5 |
| Bought for vegetable gardening | 9 |
| I made some saving for buying fertilizer | 25 |
| Ways of access to farming inputs | % of participants |

⁵² Extension services provider :

SOFITEX: Société Burkinabé des Fibres (Textiles Company Burkinabe of Fibers Textile (SOFITEX)); a state controlled state agro-industrial and commercial entity. SOFITEX is involved in the entire cotton production cycle, including planting, ginning of seed cotton and export of cotton fiber.

Direction provinciale de l'agriculture et de la sécurité alimentaire du loba/Provincial office of agriculture and food security of loba-ministry of agriculture and food security)

The German NGO Foundation Dreyer

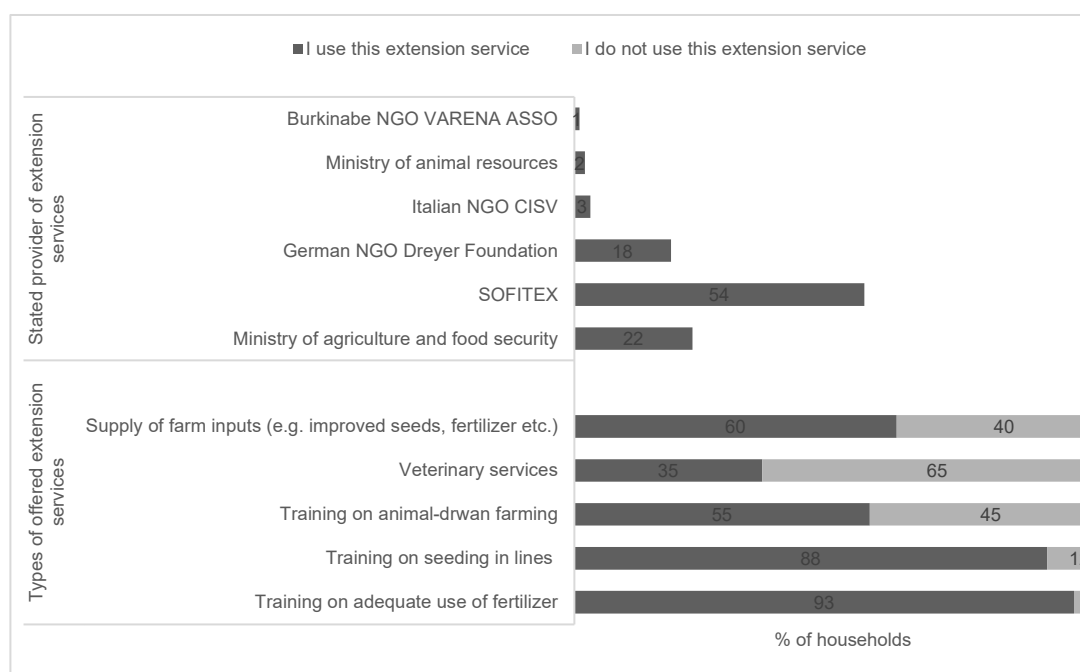
The Italian NGO-CISV (Comunità Impegno Servizio Volontariato, an Italian NGO)

La direction provinciale des ressources animales de l'loba/the provincial Department of Natural Resources (DPRA/Dano)"

Local NGO VARENA ASSO (Valorisation des Ressources Naturelles par l'Auto promotion). Its work focusses on general management of natural resources. Especially it aims to improve agricultural productivity, access to water and sanitation, adequate food practices, microfinance.

| | |
|---|---------------------------|
| Purchase on credit from the SOFITEX | 46 |
| Purchase on cash from the communal direction of ministry of agriculture and food security | 8 |
| Purchase on credit from a local NGO | 8 |
| Purchase on credit from the communal direction of ministry of agriculture and food security | 4 |
| Purchase on cash from the SOFITEX | 2 |
| Purchase on cash from a local NGO | 1 |
| Others | 31 |
| Types of farming inputs purchased | % of participants* |
| Chemical fertiliser | 67 |
| Organic compost | 61 |
| Herbicide/weed killer | 41 |
| Insecticide | 31 |

Figure 25 Provider, types and use of provided agricultural extension services (n=67, field data)



8.2 VULNERABILITIES OF FOOD ACCESS

8.2.1 Satisfaction level with food supply and price on markets

Figure 26 illustrates the participant's level of satisfaction with food supply and price on the market of *Dano* since this is the biggest and well-visited market of the commune.

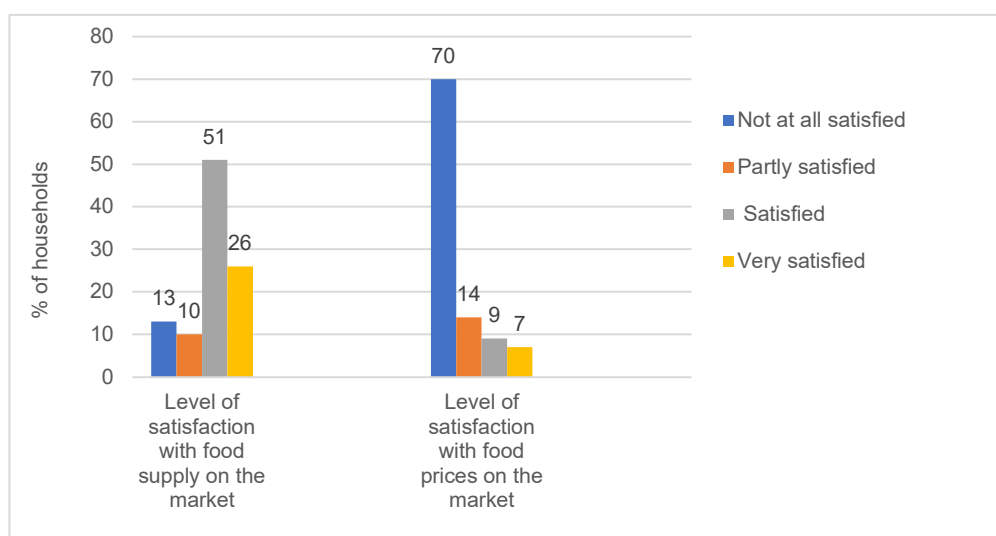
To access the level of satisfaction participants were asked to describe their view of quantitative and qualitative food supply and food price on the market of *Dano*. As can be seen in Figure 26, quantitative and qualitative food supply made a very satisfied and satisfied customer. More than half of them (51%) were satisfied with the food supply against nearly 26%, who were very satisfied. 13% of participants were unsatisfied with the food they have been offered on the market, while a small part of 10% was partly satisfied.

Picture 13 Market stands in Dano's market
(field data)



In contrast to the level of satisfaction with the food supply, the majority of participants, namely 70% of were totally unsatisfied against only 7%, who were totally satisfied with food price on the market. Between these both categories, 17% were partly satisfied against 12%, who were just satisfied with prices; they were paying for their food on the market.

Figure 26 Level of satisfaction with food supply and price on the market in Dano (n=111, field data)



Reasons for the above description of the market according to food supply and price are multiple and complex depending on participant's purchasing power, the expectation on food supply on the market, food patterns and experiences with other markets (Table 22).

Table 22 Summary of stated reasons for the level of satisfaction with the market (field data)

| Positive stated reasons for the level of satisfaction with the food supply | Negative stated reasons for the level of satisfaction with the food supply | Positive stated reasons for the level of satisfaction with food price | Negative stated reasons for the level of satisfaction with food price |
|---|--|---|---|
| <ul style="list-style-type: none"> Supply of all foodstuffs needed Market access and availability are easier Fresher and more qualitative vegetables and crops | Irregularity and/or lack of certain foodstuffs especially roots and tubers, fresh fish, qualitative meat, fresh milk or if there are too expensive | Crops and vegetables are cheaper | <ul style="list-style-type: none"> Global food price crisis in 2007-2008 leads to a price increase of staple food Less quantity of food for the same or more money Manufactured /imported food is more expensive |

The high number of participants being totally unsatisfied with food price, have to be referred to the increasing food price since the global food price crisis in 2007-2008⁵³. This crisis with a special name **avènement de la vie chère or vie chère/Onset of expensive life or expensive life in Burkina Faso**- one of the most affected countries in Africa by the crisis. Thus, Burkina Faso experienced during that time frequent severe food riots throughout the whole country as can be seen in Picture 14. Rita gave some examples of prices increase of some staple between 2008 and 2013 (see Table 23).

Table 23 Examples of price increase of some foodstuffs in Dano since the global food crisis 2007-2008 by Rita, a teacher in Dano (field data)

| Foodstuff | Price before the food crisis | Price by and/or after the food crisis |
|--------------------------------|-------------------------------------|--|
| Rice | 25000 F/50kg | 27500F/50 kg |
| Maize | 9000-11000F/50Kg | 17500-19000F/50Kg |
| Manufactured palm oil | 3500F/5liters | 5250F/5liters |
| Milk powder (Nido from Nestle) | 1000F/400g | 2000F/400g |
| Sugar | 500F/1Kg | 800F/1Kg |

⁵³ The global food crisis of 2007-2008 lead to a huge increase of food prices, especially staple foods such as rice, wheat, and Maize. This increase in price had affected mostly people in the developing world. Thus crisis provoked so called food riots by the population all over the world, but especially in African, middle and South American and Asian countries, hence engendered political and economic instability in these countries.

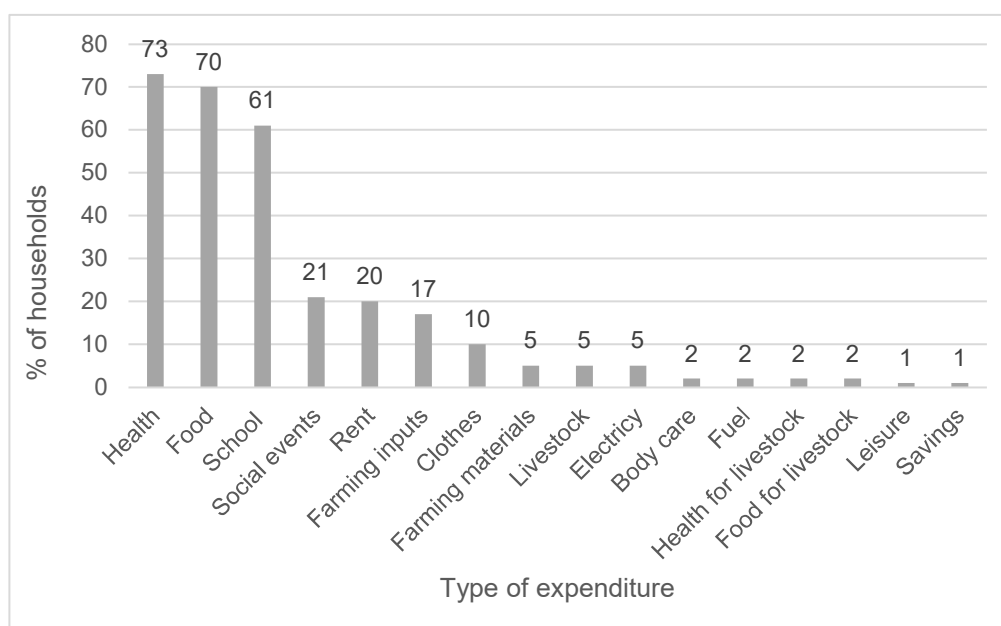
Picture 14 A so-called food riot during the food crisis on the 15.03.2008 in Ouagadougou
(http://archives.evenement-Burkina Faso.net/pages/dossier_1_136.htm)



8.2.2 Household expenditures patterns

Household expenditures patterns were defined by asking participants to describe the main good and services, for which they usually spend the most of their income. The answer to that question is summarized in Figure 27. It can be seen that the majority of expenditures was made on healthcare, food and school, comprising more than 70% of households for the first 2 and more than 60% of the households for the latter one, who spent most of their income on these goods and services. Social events, rent and farming inputs were the following expenditures for respectively 21%, 20% and 17% of households. It is clear from the graph, that food constituted one of the main expenses in the household. In detail, we can see that on average households monthly most spent on education, transport, gas and electricity, ceremonials and food. according to food, cereals, miscellaneous (alcohol, spices, etc.), meat and poultry made the main expenditures for households. For more details, see Figure 27, Figure 28 and Figure 29.

Figure 27 Patterns of household's expenditure
(n=111* field data)



* Does not sum up to 100, multiple answers.

Figure 28 An example of an average monthly expenditure of some households on goods and services
(n=29; field data)

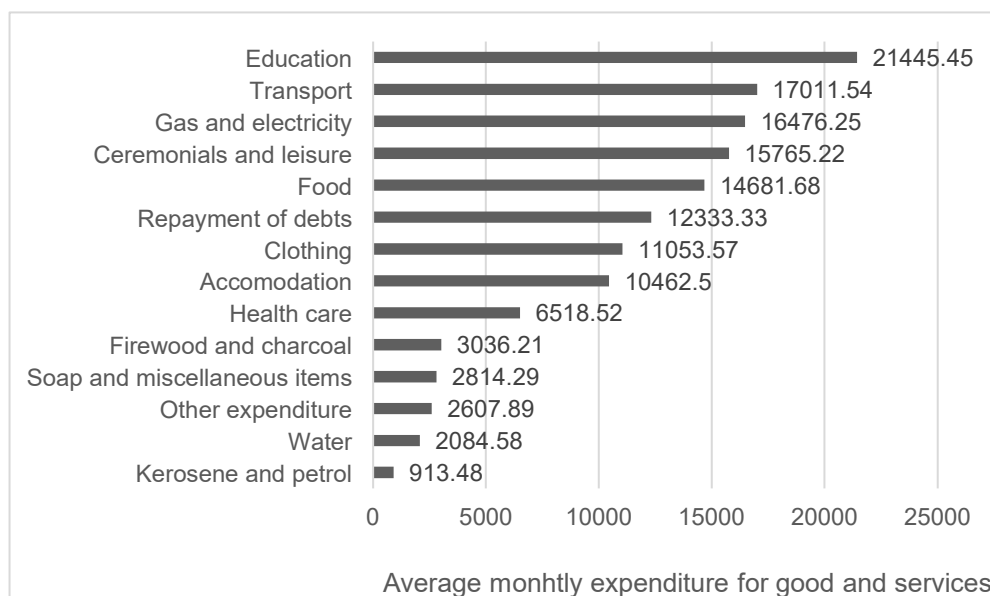
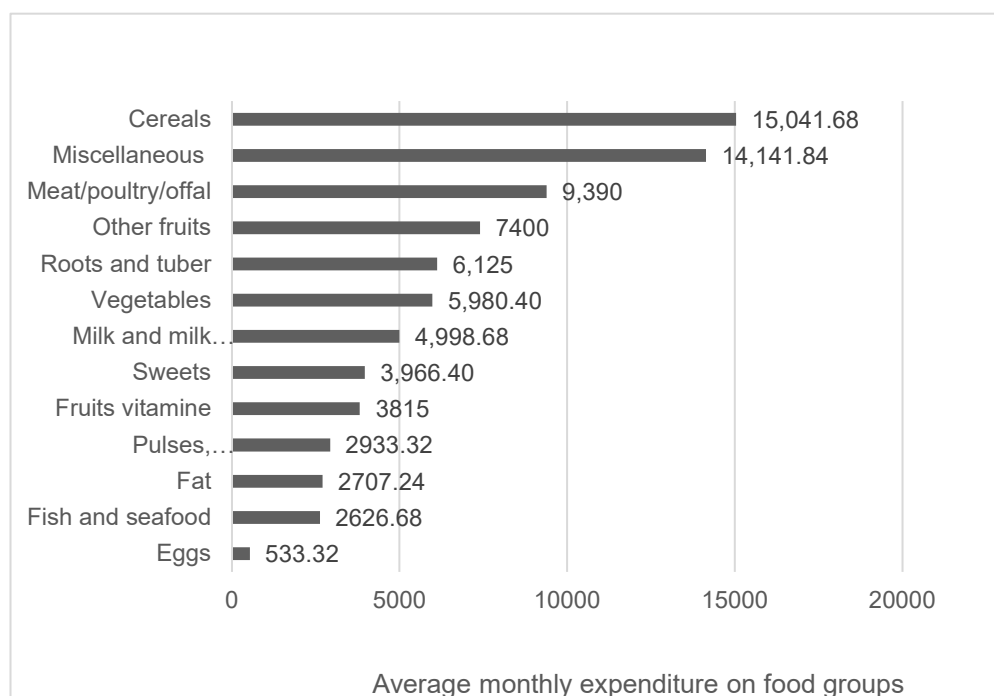


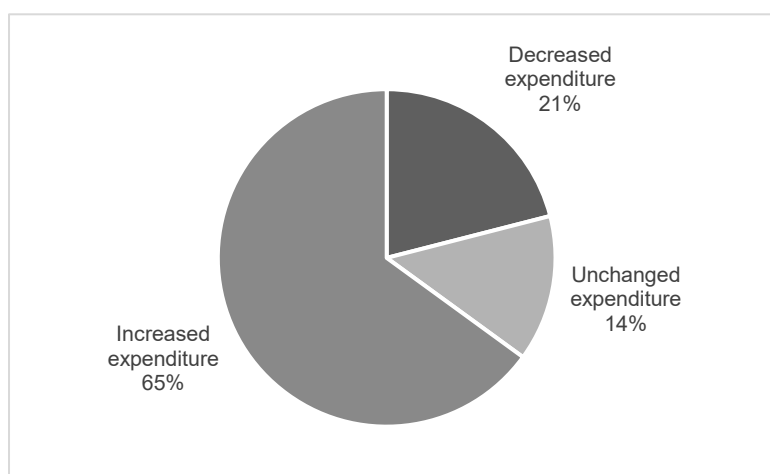
Figure 29 An example of a monthly average expenditure of some households for different food groups and their value
(n=29; field data)



8.2.3 Trends in household expenditure

The pie in Figure 30 illustrates how households experienced changes according to their expenditures. At first glance, it is clear that for the majority namely two-thirds (65%) of them have experienced an increase against around a fifth (21%) who had experienced a decrease in their expenditures. Lastly, a minority of 14% indicated that their expenditure had not changed. As the time frame for the changes experienced, the majority of participants were referring to the begin of the global food crisis in 2008 with an increase in expenditures from 5% up to 200%. However, if food price increase has been stated as the most cause for the increase in expenditure, participants have mentioned household size increase (birth, coming back of emigrated relatives from Côte d'Ivoire, assistance to relatives), household size decrease (emigration, other activities, old age, sickness), soil infertility/yield decrease and decrease in income level as further causes for the increase in expenditure as well.

Figure 30 Experienced changes in the household's expenditure
(n=111, field data)



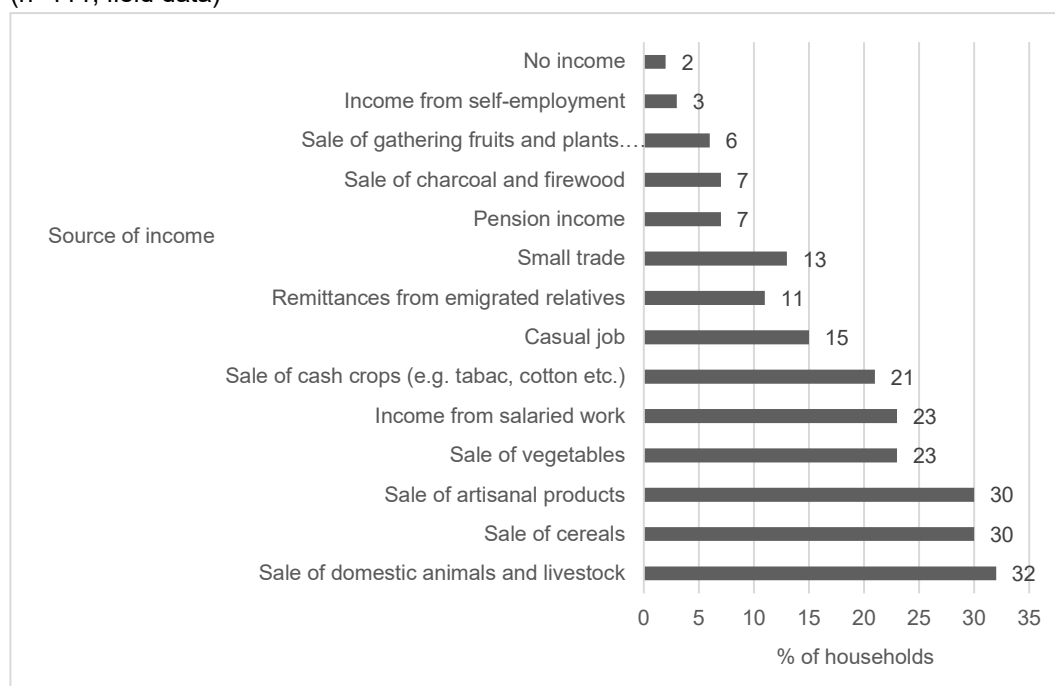
8.2.4 Sources of households' income

Main sources of household's income

Figure 31 summarises ways households acquire their income. The sale is by far the most source of income. It would be seen that sale represents half of the 14 indicated sources of income (Figure 31). Thereby sale of livestock, artisanal products and cereals make up each a third of the whole. A large number of households, approximatively a quarter were getting their income from salaried work, the sale of vegetables and cash crops at 23%, 23% and 21% respectively. Another important source of income was remittances. More than one household in 10 (11%) was getting

money from emigrated relatives from the main cities Ouagadougou and Bobo Dioulasso and the neighbour's countries Côte d'Ivoire and Ghana. In contrast to a large number of households having at least one source of income, we had also a very small minority, namely less than a fifth (2%) of households, which were at the time of the research without any source of income.

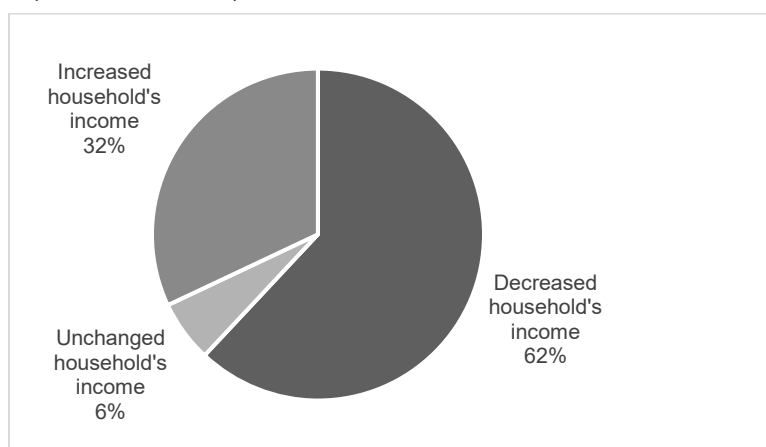
Figure 31 Main sources of household's income
(n=111, field data)



Trends in household's income situation

Accordingly, to increasing expenditures trends, a decreasing income situation can be expected as consequence. Indeed, a very large majority of households, nearly two-thirds (62%) of them expressed a decrease in their income while half of this number, nearly a third (32%) experienced an increase of their income. In contrast to these 2 groups, 6% stated having no change in their income situation. Most stated reasons for the trends in income were employment, savings, cheaper live costs for European in Africa, income from selling farm crops for an increase situation. While a decrease in income level, food price increase and soil infertility/yield decrease have been declared as the cause of income decrease.

Figure 32 Trends in household's income
(n=111, field data)



Assets ownership

Asset ownership generally reflects the wealth or social status of the households. Therefore, type, quantity and quality of assets a household owns plus some aspects of housing characteristics provide good awareness of a household's wealth. Depending on the livelihood strategies of households, assets consist of productive, non-productive and financial ones. Generally, the higher the number of assets owned, the wealthier the households, thus the more food secure it is.

Household's asset ownership is one of the most central indicators for food security as it is a dominant contributor to food security, resilience, and nutritional outcomes. Furthermore, Household's asset ownership can be a long-term indicator of successful livelihood strategies, as a wealthy household is expected to guarantee to all of its members access to a quantitative and qualitative diet, a hygienic and safe environment and education (WFP 2009).

Productive assets, livestock and some basic home assets (bike, mobile phone, radio and motorbike) dominated the asset ownership of households. This can be explained that the high number of participating households were engaged in farming. Note that most of the modernized home-based assets furnished living room, TV, stove/Cooker, ventilator, parabola, fridge, PC, car, landline, internet, freeze, truck, air conditioner as well some modernized housing aspects such electrify, water tap, metal roof and ceiling, cemented and cemented floor, flush toilet with water, inside bathroom with hand shower were usually owned by salaried professional living in households in *Dano* town.

Concretely assets owned by the large majority of households were a bicycle, owned by each household (100%) and farming lands, possessed by almost every household

(93%). Further vastly owned assets, namely by more than a three-quarter of households were chicken (79%) and goats (73%). A significant number of households, namely 7 in 10 of them (69%) were owning hoes, following by mobile phone and radio possessed respectively by almost two-thirds (66%) and three-fifths (61%) of them. More than half of households possessed pigs (57%) and machete 54%).

The least assets owned by a small minority of the households were a car, freezer, landline and internet owned each 5% of households, followed by PC, pumps and ducks for each 7% of households. The smallest types of assets owned households were mill (1%), air conditioner (2%) and generator (2%).

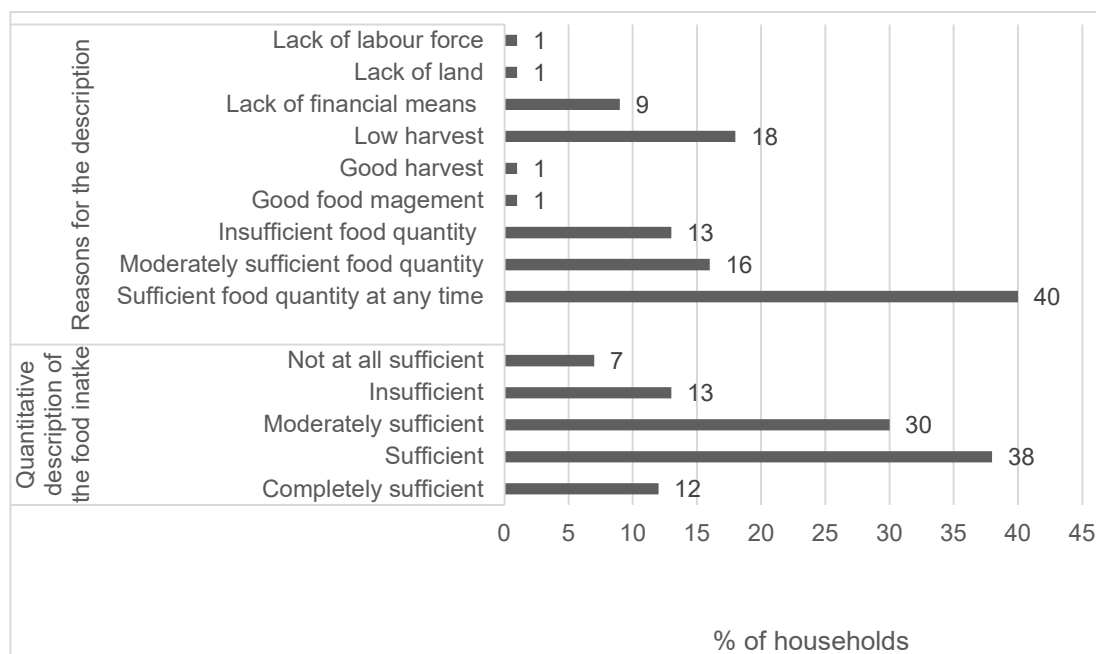
8.3 VULNERABILITY OF FOOD CONSUMPTION

8.3.1 Insufficiency of diet quantity

Figure 33 summarizes the self-perception of dietary quantity through households according to the quantitative intake of their diet. As can be seen half of the households (50%) found that they were eating sufficient food, while another half was not that meaning saying that they were not satisfied with the quantity of food they have been eating. Less than a third (30%) of households found that they ate only moderately sufficient food, while a minority of them viewed this quantity insufficiently and a very small number of them (7%) described their consumed food quantity not sufficient at all.

Diet quantity was further investigated through the number of meals eaten per day in the households as described in 0 above. According to the FAO guide, the number of meals consumed per day in households was recorded and used as an indicator of food security. A household that had less than 3 meals a day was considered food insecure while this having 3 or more meals a day was considered food secure (Swindale and Bilinsky 2006). Results as can be seen in 5.3.5 above, show that the largest number, nearly two-thirds of households (62%) had less than the recommended 3 meals against only one-third (31%) who ate the recommended 3 meals. A small number of households ate only meals occasionally, meaning that they had whether no meal or less than once a meal a day, but with the tendency of not having a meal.

Figure 33 Self-description of quantitative food intake and according to reasons
(n=104, field data)



8.3.2 Insufficiency of diet quality

If dietary quantity only describes the quantitative intake of food, the dietary quality is interested in the qualitative aspect of food intake. As described in 0 above “Dietary diversity is a qualitative measure of food consumption that reflects the household access to a variety of foods, and is also a proxy for nutrient adequacy of the diet of individuals” (Kennedy et al. 2010). Doing so the household dietary diversity (HDD) records all foods and beverages consumed for a specified period (generally one to 7 days) in a household. Based on the FAO dietary diversity score (DDS) classification:

- households consuming ≤ 3 food groups were considered as having low dietary diversity
- households consuming 4-5 food groups were considered as having medium dietary diversity
- and households consuming ≥ 6 food groups were considered as having high dietary diversity.

According to diet quality, households were classified as follows:

- households consuming ≤ 6 groups are considered as having low diet quality
- households consuming >6 groups are considered as having high diet quality.

The evaluation of the diet diversity of this study shows that the whole sample had a high diet diversity with an average score of 7.41. In details, a very minority (3%) of households had a low dietary against a large majority (85%) of households who had more than 6 food groups while 11% of households were consuming 4-5 food groups weekly making them to medium food-secure households.

Figure 34 Weekly food groups consumption per different professional groups
(n=117, field data)

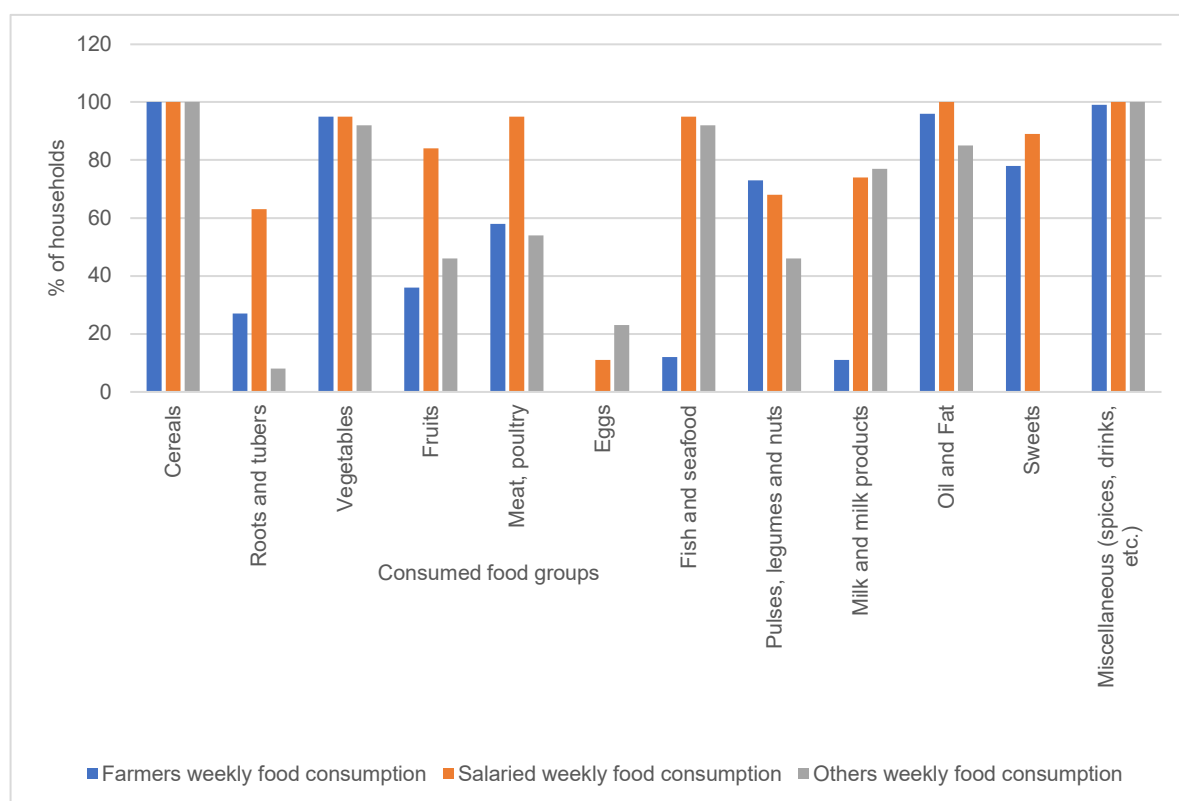
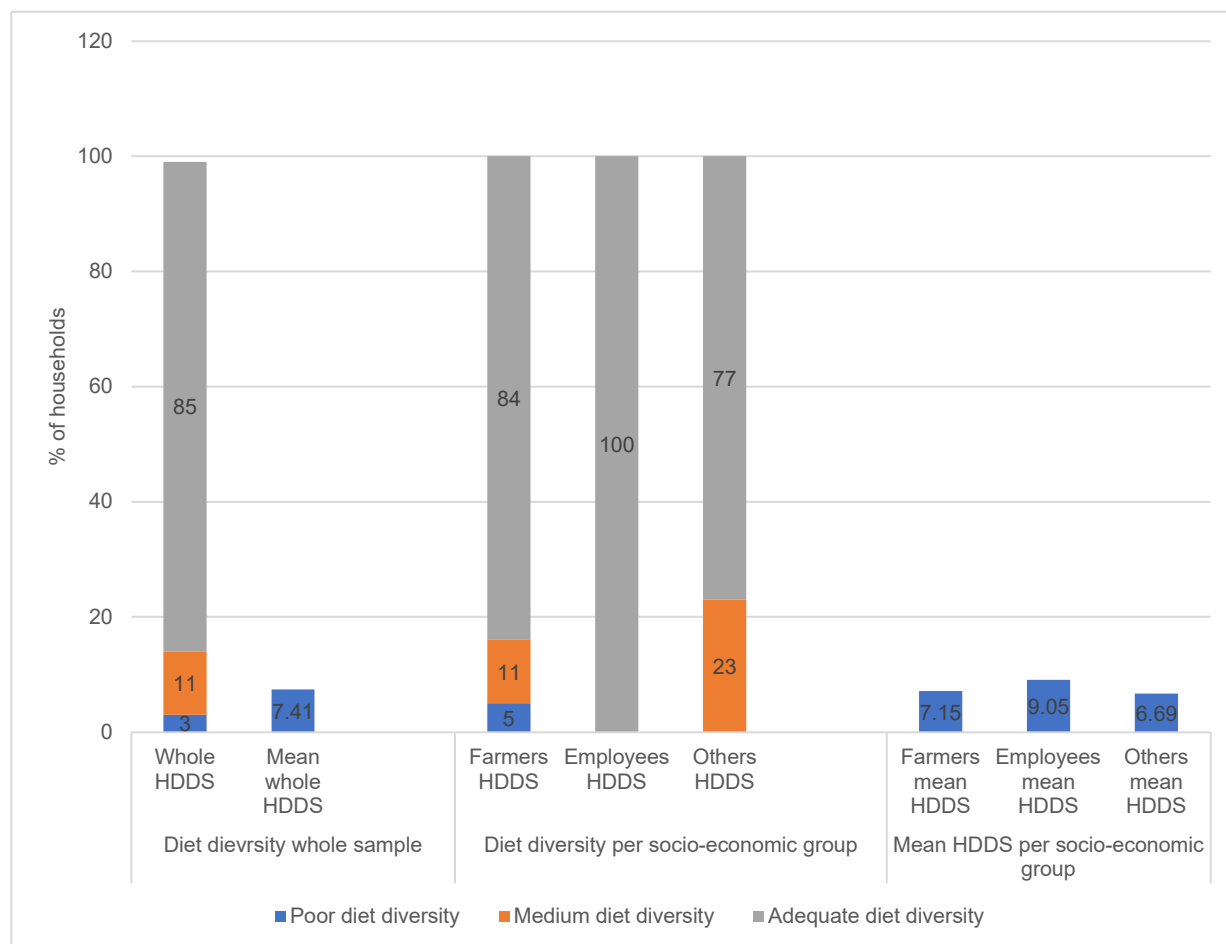


Figure 35 Comparative weekly households diet diversity scale (HDDS) of different professional groups
(n=117, field data)



8.3.3 Dietary patterns of vulnerable groups (pregnant and lactating women and children)

Dietary patterns of pregnant and lactating women

Within food and nutrition security of households, nutrition of women in reproductive age (15–49 years) and children is one of the most important focus. This is not surprising considering the yearly number of diseases and deaths cases mother and children are victims due to inappropriate nutrition. Undernutrition, for example, leads considerably at the global level to child mortality, stemming from foetal growth restriction, stunting, wasting, micronutrient deficiencies, and suboptimal breastfeeding. In 2011, 3.1 million children died as a result of undernutrition. In 2013, at least 161.5 million children experienced stunted growth, and 50.8 million suffered from acute malnutrition. Worldwide, around 13 per cent of women were estimated to be undernourished, and 38 per cent of all pregnant women suffered from anaemia.

Additionally, 2 billion people around the world are estimated to be affected by micronutrient deficiencies, whereby vitamin A, zinc, iodine, and iron deficiencies make up the highest occurrences, leading to premature death, poor health, blindness, stunting, reduced cognitive development, and low productive capacity as adverse effects for these people (USAID 2014). In this constellation women and children in the developing world are most affected, where yearly more than 3.5 million women and children under the age of 5 years die due to the underlying cause of undernutrition (Ronsmans et al. 1987). Burkina Faso in turn within this developing world pattern is one of the countries with the highest of micronutrients deficiencies affected mother and children. As already mentioned in chapter 1.3, 10,9% of the population (of which 417.000 children under 5 years) suffer from acute malnutrition, 9% from chronic malnutrition and 24,4% from underweight (OCHA-UN Office for the Coordination of Humanitarian Affairs, 2013). This high malnutrition rate, supported by the occurrence of malaria, respiratory infections, diarrhoea diseases lead to a high morbidity rate in Burkina Faso, especially for women in reproductive age and children under 5 years. According to the demographic and health survey in 2010, the maternal death birth was estimated to 341 deaths per 100,000 live births, while the infant and child mortality rate was estimated to 129 per 1.000 live births in 2010 against 184‰ in 2003 (OCHA-UN 2013). And the south-western area in Burkina Faso, despite its favourable climatic situation, suffers from food and nutrition insecurity. Nutritional field research conducted by the ministry of health in that region shows nutritional anaemia of more than 59% of children between 0-5 years, 43% of those between 5-15 years and 22% of those between 15-19 years. Also, proteins deficiency was detected in more than 51.5% of the children between 0-4 years and in 26.03% of the children between 5-10 years. A study conducted in the same region in 1988 with 1879 children, saw that 235 of them i.e. 13%, were underweight (Sawadogo 1995). These results are not surprising in the view that

...In resource-poor environments across the globe, low-quality monotonous diets are the norm. When grain- or tuber-based staple foods dominate and diets lack vegetables, fruits, and animal-source foods, the risk for a variety of micronutrient deficiencies is high. Those most likely to suffer from deficiencies include infants and young children, and adolescent girls and women in reproductive age. Unfortunately, outside of developed countries, very little information is available on women 's micronutrient status, but even with limited data, it is clear that poor micronutrient status among women is a global problem, and is most severe for poor women... (Becquey et al. 2009).

That women in developing countries belong to one of the most vulnerable population groups in terms of access to assets is well admitted today. This vulnerability generally originated from different socioeconomic and cultural factors such as limited access to assets (land, education, employment etc.), lack of empowerment, oppression etc. resulting into unfavourable outcomes of women's food and nutrition security with severe health and nutritional consequences both for women and children. This makes these both groups to one of the most vulnerable in terms of nutrition-related diseases such as malnutrition. Generally, children, nutritional status are influenced by this of their mother, as women are mostly responsible for child feeding and care from pregnancy till to childhood time, thus

...the quality of the diet of women in reproductive age is a key nutrition issue, which has important implications for the health and well-being of women in reproductive age; and, which, among pregnant and lactating women has important consequences for the health, nutrition and development of infants and young children. The quality of women's diet is thus an important feature of global efforts to address optimal health and nutrition during the first 1000 days (Vaitla et al. 2015).

Thus, as women in reproductive age are often nutritionally vulnerable because of the physiological demands of pregnancy and lactation. Requirements for most nutrients are higher for pregnant and lactating women than for adult men (FAO and FANTA 2016). The Minimum Dietary Diversity for *women in reproductive age* (MDDW) an important dichotomous indicator to assess women diet quality in order of preventing inadequate diet-related diseases for mother and child. Furthermore, it is used as a proxy indicator for higher micronutrient adequacy to evaluate the proportion of women 15–49 years of age who reach this minimum in a population. MDDW is an indicator revealing the consumption level of at least 5 out of 10 defined food groups by women in reproductive age the previous day or night. The 10 used food groups are ((FAO and FANTA 2016):

- | | |
|--|---|
| 1. Grains, white roots and tubers, and plantains | 6. Eggs |
| 2. Pulses (beans, peas and lentils) | 7. Dark green leafy vegetables |
| 3. Nuts and seeds | 8. Other vitamin A-rich fruits and vegetables |
| 4. Dairy | 9. Other vegetables |
| 5. Meat, poultry and fish | 10. Other fruits |

Studies in different age groups have shown that an increase in diet diversity scored is related to increased nutrient adequacy of the diet. The diet diversity score has been validated for several age/sex groups as proxy measures for macro and/or micronutrient adequacy of the diet. Scores have been positively correlated with adequate micronutrient density of complementary foods for infants and young children (Swindale and Bilinsky 2006), and macronutrient and micronutrient adequacy of the diet for non-breast-fed children (Hatloy et al., 1998; Ruel et al., 2004; Steyn et al., 2006; Kennedy et al., 2007 in Food and Nutrition Technical Assistance/FANTA 2007), adolescents (Mirmiran et al., 2004 in Food and Nutrition Technical Assistance/FANTA 2007) and adults (Ogle et al., 2001; Foote et al., 2004; Arimond et al., 2010 in Food and Nutrition Technical Assistance/FANTA 2007).

With the same aim to assess diet patterns of women of reproductive and to detect the general awareness, knowledge, and attitude according to diet during different specific situations such as pregnancy and lactation, the following question: *Are there any differences between the diet of pregnant and lactating women and this of the rest of the household? If yes, why?*⁵⁴ should be a first step to getting to this aim. More than half of all households (54%) responded having different diet during pregnancy against slightly under half of them (46%), who did not change their diet during pregnancy. While nearly three-fifths (58%) of lactating women stated that they change their diet in contrary to the slightly over two-fifths (42%), who did not vary their diet while lactating a child.

A further investigation on pregnant women diet patterns was undertaken during prenatal consultation combined with a sensibilization session in the health centre in *Dano*.

As the topics were relatively intimate and sensitive, I first met Mr. Somé (a long time experienced state nurse working at the health centre, I met several times). Through a meeting organised by Mr. Somé, I met the director of the health centre Mr. Traoré and the chief of the section 'Santé et Reproduction/Health and reproduction' and Mr Barry the facilitator of the prenatal sensibilization session as well to inform and discuss with

⁵⁴Note that the questions were not about the exact types of food respondents consume, it was rather an attempt to get a general overview of the tendency of their prenatal, natal and postnatal behaviour.

them about my research and its objectives and my intention to meet the women of the prenatal sensibilization session. During the meeting, I have got the first information about the procedure and content of the prenatal sensibilization session and its participants. Furthermore, I have got the official permission from the responsible for the centre and the prenatal section to participate in the session and to talk to the women.

However, on the day of the prenatal sensibilization session, after the presentation of myself and my research to the women, it has been made clear to them that they are free to participate or not to the conversation and FGD. Although no woman did not say no to the interviews, the level of contribution of some was very different from others, meaning, that while some participated actively in the conversations, others just sat uninterested. Finally, A FGD and an informal interview held with the most active 8 women of the 22 participants on that day of the 12th March 2012. 22 women for a prenatal consultation—compared to the whole population of *Dano* and the pregnancy occurrence rate- was a palpable example for the low attendance rate of women to prenatal consultation and sensibilization sessions. Topics of the FGD were on maternity and diet patterns. The summary of the conversations is presented in Table 24.

The 24-hour dietary recall of all women saw a diet made of starchy staples from cereals (100%) and a sauce of dark green vegetables (75%), therefore diet was made from the traditional staple food maize paste and vegetable sauce. No woman both from the urban and rural area has achieved minimum dietary diversity of 5 food groups. The consumed food groups included in the minimum dietary diversity (MDDS) settings were grains, white roots and tubers, and plantains and dark green leafy vegetables, while other consumed in form of fat and oil (75%), condiments and seasoning (100%) and other beverages a (100%) are not included in the minimum dietary diversity because they are considered as low nutrient capacity.

Table 24 Pregnancy and lactation-related diet behaviour and influential factors
(n=104, field data)

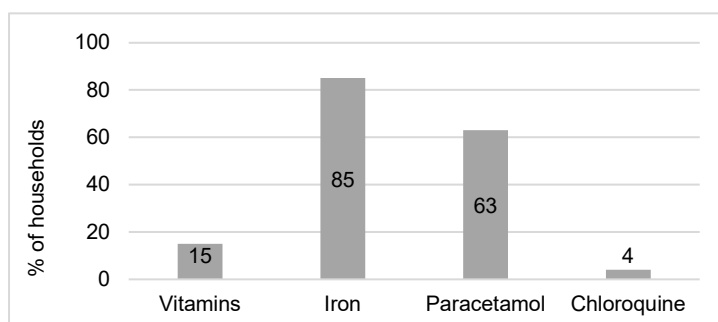
| Diet of pregnant women | % of households | Diet of lactating women | % of households |
|--|------------------------|---|------------------------|
| A pregnant woman has a different diet as the other household members | 54 | A lactating woman has a different diet as the other household members | 42 |
| A pregnant woman does not have a different diet as the other household members | 46 | A lactating woman does not have a different diet as the other household members | 58 |
| Factors influencing pregnant women's diet | % of households | Factors influencing lactating women's diet | % of households |
| Biological-hormonal factors | 27 | Health-medical/nutritional factors | 30 |
| Health-medical/nutritional factors | 15 | Economic factors influencing | 20 |
| Economic factors | 19 | Lack of knowledge on nutrition-related lactation | 2 |
| Socio-cultural factors | 15 | | |
| Lack of knowledge adequate nutrition-related pregnancy | 1 | | |

Not only an adequate diet is important for the healthy functioning of mother and child, but also intake of supplements, especially of micronutrient and iron during pregnancy and lactation is highly recommended. That was why respondents have been asked the following question as well: *Are there any specific medication women take during pregnancy, if yes which ones and why?*⁵⁵

Of the 33 women, who responded to that question, the large majority (88%) stated that they took medication during pregnancy against the minority of 18%, who was not taking any pregnancy-related medication. Taken medication during pregnancy were vitamins (4 of 33 women), iron (23 of 33 women), paracetamol (17 of 33 women) and nivaquine (1 of 33 women).

⁵⁵Note that the questions were not about the exact types of medication respondents took and how long, it was rather an attempt to get a general overview of the tendency of their prenatal, natal and postnatal behaviour.

Figure 36 Pregnancy related medication intake
(n=33, field data)



Feeding practices of children

...infant and young child feeding practices directly affect the nutritional status of children under 2 years of age and, ultimately, impact child survival. Improving infant and young child feeding practices in children 0–23 months of age is, therefore, critical to improved nutrition, health and development of children... (WHO 2008).

Breastfeeding is the most favourable feeding practice recommended for children in the first hour of birth up to the first 6 months in an exclusive way and from 6 months in a combined way with further adequate food items. The reason for this endorsement is palpable as

...Breast milk provides all of the nutrients, vitamins, and minerals an infant needs for growth for the first 6 months, and no other liquids or food are needed. Also, breast milk carries antibodies from the mother that help combat disease. The act of breastfeeding itself stimulates the proper growth of the mouth and jaw, and secretion of hormones for digestion and satiety... (http://www.unicef.org/nutrition/index_24824.html).

Results on young infant diet patterns revealed that mothers apply both adequate and inadequate child feeding practices according to international recommendations, which are defined as

...the initiation of breastfeeding within the first hour after the birth; exclusive breastfeeding⁵⁶ for the first 6 months; and continued breastfeeding for 2 years or more, together with safe, nutritionally adequate, age-appropriate, responsive

⁵⁶ Breastfeeding should include only mother's breast milk and oral rehydration salts (ORS), drops, syrups, vitamins, minerals, medicines and anything else breastfeeding.

complementary feeding⁵⁷ starting in the sixth month...(http://www.unicef.org/nutrition/index_24824.html).

As it can be seen in **Error! Reference source not found.**, breastfeeding is a common practice at every age section of the child, meaning from birth till to the age section 12-60 months (23,8 months for the national average). However, the recommended exclusive breastfeeding for the first 6 months was held only by 30% of mothers against 70% of them, who were doing mixed feeding⁵⁸ during that time. Further feeding methods were complementary and breastfeeding substitute feeding ones. Whereby complementary feeding was most used for children aged 6-12 months and 12-60 months for 96% and 52% of mothers respectively. Finally, 48% of mothers of children aged 12-60% used breastfeeding substitutes as well to feed their children. According to solid food used by children feeding, cereal porridge -whereby millet porridge- was almost the main ingredient and rice which was mentioned by a few women. Other ingredients included tamarind juice, baobab powder, moringa, powder, fish powder, groundnut powder, sugar, powder milk, honey, nut etc. Water-thinning maize paste, vegetable, juice, were mentioned as well in child diet.

⁵⁷ Complementary feeding: refers to feeding the child is through a combination of breastfeeding and solid (semi-solid or soft) foods. It is not recommended to provide any solid, semi-solid or soft foods to children less than six months of age.

⁵⁸ Mixed feeding refers to children who receive both breastmilk and any other food or liquid including water, non-human milk and formula before 6 months of age.

Figure 37 Feeding practices of under 5-years children
(n=51, field data)

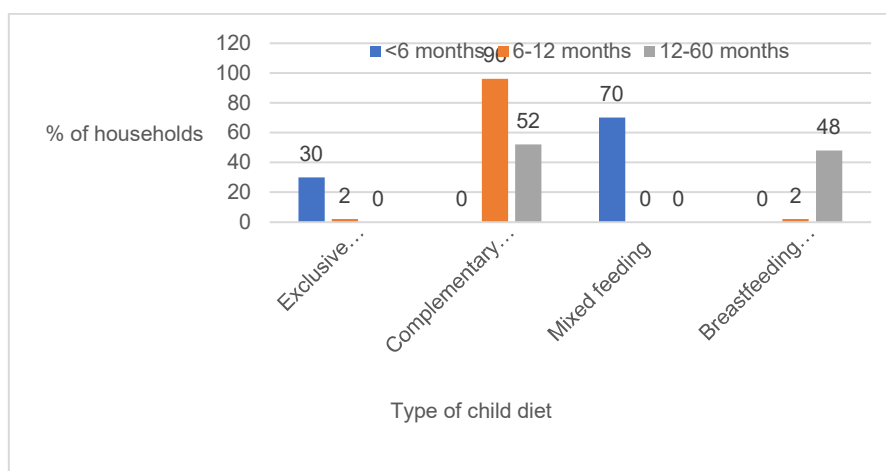


Table 25 Determinants of under 5-years children feeding practices
(n=51*, field data)

| Children under 6 months | Children between 6-12 months | Children above 12 months |
|---|---|--|
| <ul style="list-style-type: none"> • Culture and educational • awareness by health workers • Best for the child health • Prevent to malnutrition • Culture/habits • Breast milk is more nutritive • This is what is appropriate • Unable to eat what is heavy • good due to the fragile intestine • Avoid diseases • Strength provider | <ul style="list-style-type: none"> • Awareness by health workers • Needed for good growth, nutritive, keep him healthy • Breast milk is no longer enough • Solid and maintaining • Good growth • His stomach cannot digest heavy foods • Strength provider, good growth • Our mother used to do so • The porridge often compensates breast milk • The intestines begin to adapt to other food • Appropriate age to learn to eat solid food • Depending on the child's needs | <ul style="list-style-type: none"> • Awareness by health workers • Complete food for children • Food preferences • Lack of financial means • He is big enough • To not starve • Good growth |

8.3.4 Food cooking-related constraints

Decreasing availability of and access to cooking wood for women

If a salaried woman in *Dano* town can afford to buy their source of energy to cook, women farmers in rural *Dano* have to collect their cooking wood themselves from farms and/or bushes. Due to the high population migration in *Dano*, the huge occurrence of land degradation and deforestation, wood is getting more and more scarce, so that women have to walk for several kilometres to collect heavy wood bundles reaching up to 20kg. Collecting wood is an additional challenge in the daily

busy schedule of a rural woman. When asking women about the constraints related to getting sources of energy for cooking, more than half (57%) of them stated the increasing distance for collecting wood. 25% of them mentioned decreasing physical availability, thus the scarcity of the wood. Finally, the increasing price of all sources of energy for food cooking was seen as a big constraint for 18% of the participants. However, it was not only a single constraint of the 3 cited above that made women worried about how they will cook in the future, but it is also rather a combination of all 3 constraints. The 3 constraints are in a kind of vicious circle to each other; thus they can influence each other positively or negatively. For example, the lack of wood is accompanied by the decrease in access and availability of wood for the rural population and by a decrease in the supply of charcoal and wood for the urban population. A direct consequence of wood scarcity is a price increase of charcoal and wood, which in turn causes a price increase of other sources of energy used for food cooking and or domestic use.

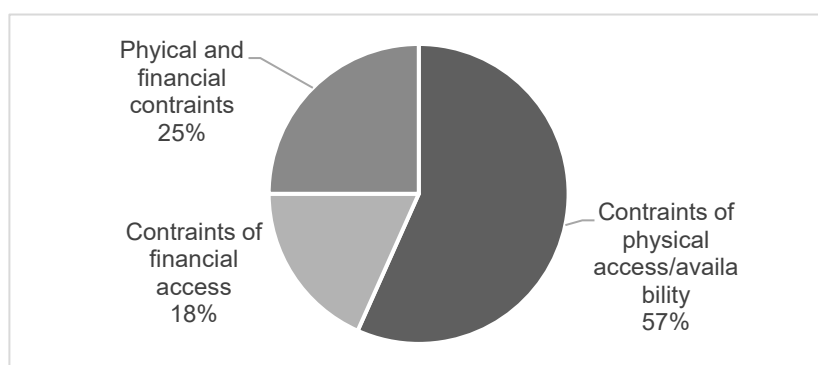
Picture 15 Rural women coming from gathering firewood outside of their village (field data)



Evelyn, a 65-year old- women farmer commented on this issue:

⁵⁹...Fifty years ago, you cannot imagine how this area looked like. From where we are now sitting you could not see the mountain over there, it was a deep forest until here and green and you did not need to walk that long to get wood. But today you have to walk even hours to get some miserable wood. Therefore, I do not know, how it will be in the future, but it is not looking good, especially for us woman, because men do not care about getting wood, we have to do the long ways to get wood...

Figure 38 Constraints related to availability and/or access to sources of energy for food cooking
(n=60, field data)



Access to water: another daily constraint for food cooking and general daily life in Dano

ONEA *Office national de l'eau et de l'assainissement* (National water supplier company) was not existing in *Dano* yet, therefore supply and access to domestic water were representing a heavy burden for both civil and institutional population. Especially for *La the* municipality of *Dano*, which is responsible for supplying water to its population.

⁵⁹ French quote : ... Il y a cinquante ans, vous ne pouvez pas imaginer à quoi ressemblait cette région. De là où nous sommes assis, vous ne pouviez pas voir la montagne là-bas, c'était une forêt dense et verte jusqu'ici, et vous n'aviez pas besoin d'aller aussi loin pour trouver du bois. Mais aujourd'hui, il faut marcher des heures pour trouver du bois, en plus misérable. Donc, je ne sais pas à quoi cela ressemblera dans le futur, mais cela n'a pas l'air bon, surtout pour nous femmes, car les hommes ne s'intéressent pas à la collecte du bois de chauffe, c'est nous les femmes qui devons parcourir de longues distances pour obtenir du bois ...

Mr. Nikiéma, the secretary-general of the mairie of *Dano*, explained the water issue in *Dano* with the following words:

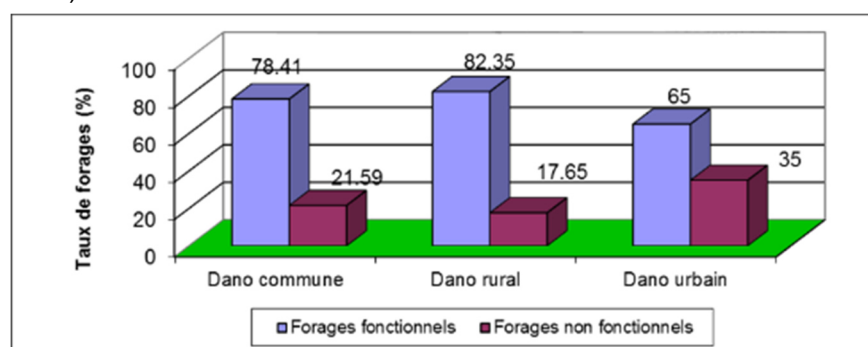
⁶⁰...Building and developing a sufficient and efficient drinking water network with the aim of an area-wide supply of the commune with potable water is one of the first political and development agenda of the commune. The population and we are already facing enormous challenges according to access and availability of water. The national standard recommends 1 borehole for 300 people. Our commune with approximately 508 persons per borehole exceeds by far this standard. The situation is not alarming yet, but having regard to the population dynamics in *Dano* -e.g the high rate of migration and birth- water is going to be one of the problem-based assets and issues in *Dano* in the future. Thus, we (the administrative institution of the commune of *Dano*) have to take appropriate measures to deal with the water issue in near future...

Apart from one village, all villages and quarters of *Dano* possess at least 1 borehole. Water is supplied in whole *Dano* through 88 boreholes (manually-operated pumps) in total. 68 or 77.27% of which are situated in *Dano* rural against 20 (22.73%) in urban *Dano*. Of the 88 boreholes, 59 (67.05%) are well functional against 19 (32.95%) defective. Of the well functional boreholes, 56 are located in rural compared to 13 in urban *Dano*. According to the defective boreholes, *Dano* Rural possesses 12 of them against the 7 remainings in urban *Dano*.

⁶⁰ French original : ... Construire et développer un réseau d'eau potable suffisant et efficace dans le but de fournir de l'eau potable à l'ensemble de la commune est l'un des premiers objectifs politiques et de développement de la commune de Dano. La population et nous sommes déjà confrontés à des défis énormes en termes d'accès et de disponibilité de l'eau. La norme nationale recommande 1 forage pour 300 personnes. Notre commune avec environ 508 personnes par forage dépasse de loin cette norme. La situation n'est pas encore alarmante, mais compte tenu de la dynamique de la population à Dano comme le taux élevé de migration, l'accès à l'eau va constituer l'un des atouts et problèmes de Dano à l'avenir. Ainsi, nous (l'institution administrative de la commune de Dano) devons prendre les mesures appropriées pour résoudre le problème d'eau dans un proche avenir...

Figure 39 Situation of boreholes in Dano

(Plan communal de développement de Dano/Communal development plan of Dano, October 2007)



If the population in rural *Dano* is only provided water by boreholes, in urban *Dano* the population has besides the boreholes more quantitative and qualitative access to water, whether through the further 12 public fountains/taps dispersed through the urban quarters or directly 4 connected private water taps. Both the public fountains and the private taps are provided with water by a borehole situated in sector 4 of *Dano* urban. However, the high pricing of water (400FCFA/m³) represents a financial barrier for accessing the available water in *Dano* urban. Thus, most of the population looks after other alternatives to water sources. Furthermore, institutional mismanagement of the boreholes and the old age and inadequacy of the piping system on the water distribution network represents further constraints to the well-functioning of the boreholes (Commune de Dano 2007:42–43).⁶¹

These institutional statements on the water-based problem in *Dano* have been confirmed by the long queue on the public fountains, by the huge number of people transporting water containers on carts or through a lot of informal water vendors

⁶¹ Original French quote : ... De plus, au niveau de Dano ville, on dénombre douze (12) bornes fontaines (deux (2) au secteur 1 ; trois (3) au secteur 2, deux (2) au secteur 3, trois (3) au secteur 4, un (1) au CSPS urbain et un (1) au marché) et quatre (4) branchements privés. Ces bornes fontaines sont reliées à une adduction d'eau potable mise en fonctionnement depuis 1998 et alimentée par un forage situé dans le secteur n°4. Cette adduction d'eau potable est gérée par un comité de gestion sous l'autorité technique de la direction de l'hydraulique plusieurs problèmes liés à la gestion de ce système sont signalés. Ce sont, entre autres : l'opacité de la gestion des ressources par le comité (absence de comptes rendus) ; la cherté de l'eau (400FCFA/m³) qui conduit la population à s'approvisionner ailleurs ; l'inadaptation de la tuyauterie utilisée sur le réseau de distribution d'eau ; etc...

making the round of households. In rural *Dano*, although every village has at least one borehole, the geographical situation of the households determines in this case, whether the household has easier access or not to water and the geographical dispersion of rural households influences the physical access to the water points in the villages. From the interviews and discussions during the research, like institutional participants, participants at households were not satisfied with the water situation either. Physical access remains difficult at the village and household level characterised by long walks and times to fetch water. Of the 94 participants asked, if they have access to potable water, 53% stated having access against 47%, who considered themselves as not having access to potable water. Sources of household's water are different according to their geographical situation and financial availability. Households use a combination of different sources of water to ensure the availability of water as *Figure 40*. The use of different sources of water is a necessity due to the irregular water availability, thus it is uncertain supply through the year, depending on climatic seasons. However, as *Figure 40* shows, for the 106 asked the question *what are the sources of water for your household?* Results revealed that participants used generally 2 sources of water. The main source of water was public taps, used by nearly 40% of the participants as first and 9% as the second source of water. The second most used source of water was open wells, which represented the first source of water for 24% of the participants and a second source for nearly 9%. With the percentage of 23%, closed wells represented the third first source of water by participants against 5%, who use it as the second source of water. Water from the river represented the only source of water for nearly 6% of the participants. The sixth source of water was a common tap from the common year, which was used by nearly 7% as the first source and 3% as the second source. Two participants (approximately 2%) in *Dano* had access to water through their private taps, which they used also as the only source of water. Rainwater was used lastly respectively by one participant as a first and second source of water.

It has to be noticed here, that the most users of public fountains were located in *Dano* urban, while participants of *Dano* rural usually get their water from river, backwater, rainwater, wells and boreholes.

Picture 16 Some water supply settings in Dano town
(field data)

One of the main and old boreholes supplying Dano town with water



Girls fetching water from a public manual water pump in Dano town



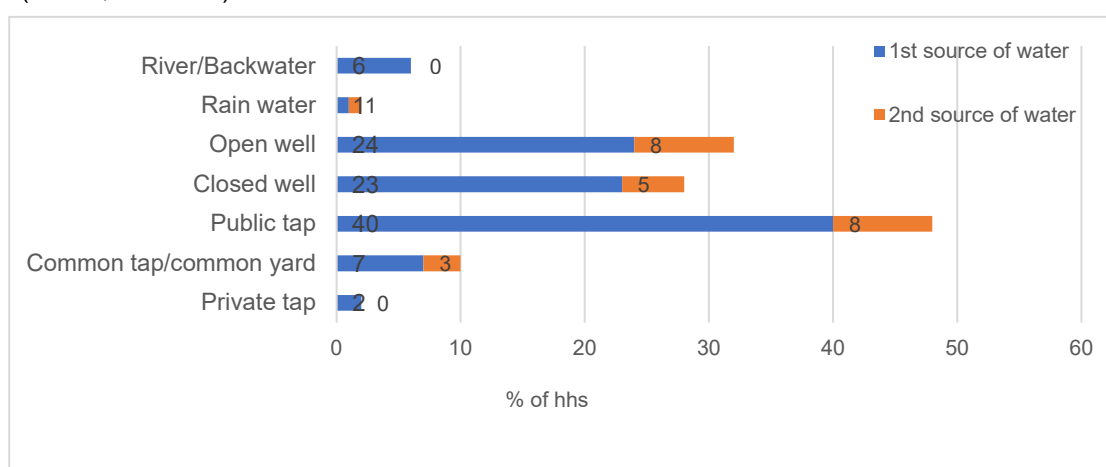
Public tap providing water to water containers for sale or private use



A boy fetching water from the DREYER's electric water pump



Figure 40 Sources of household domestic water
(n=106, field data)



The majority of participants, who consider themselves for not having access to potable water, was from rural *Dano*. This was explained by the fact, that although water pumps and/or wells exist in every village, however depending on the geographical position of a household in relation to the water points, a household may feel to not have direct access to it. Due to the difficult physical access, characterised by long distances and walk times to access to water points. Table 26 shows the distributions of distances and walking times to the water points of households. For the nearest water point to the 94 surveyed households, the shortest distance was 10m against 900m for the longest one. On average, households are located 207m away from their nearest water point. According to time needed to access water, households need a minimum time of 1mn against a maximum one of 45mn by an average of 15 min.

For the farthest distance to the water points, data revealed 5mm as the shortest distance compared to 5000mm as the longest distance by an average of 780mm. Concerning time to the farthest water points, 5mn came out as the minimum time against 70mn as a maximum time to access water. For the farthest distance to the

water points, households need averagely 19mn. It is to notice aspects such as the socioeconomic and geographical situation of households determine the easiness of them to access water. The more urban households are located and the more financial availability they have, the easier is their access to water.

Table 26 Nearest and farthest distances to the water points
(n=94, Field data)

| | Nearest distance to water points | | Fairest distance to water points | |
|---------|----------------------------------|-----------|----------------------------------|-----------|
| | In Meter | In Minute | In Meter | In Minute |
| Minimum | 10 | 1 | 20 | 5 |
| Maximum | 900 | 45 | 5000 | 50 |
| Average | 207 | 15 | 781 | 19 |

9- STRATEGIES TO IMPROVE FOOD AND NUTRITION SECURITY

The previous chapter has shown how vulnerable food and nutrition security is perceived locally both by institutions and households. In order to face this vulnerability, several coping strategies have been established locally.

In Dano commune to overcome food insecurity the strategies used at both households and institutional level are discussed below.

9.1 COPING TO FOOD INSECURITY AT HOUSEHOLD LEVEL

Households mentioned several strategies they applied in case of lacking food. The most applied coping strategies to face lack of food were being petty commodity production and trading (43%), the sale of livestock (31%), consumption of wild plants and fruits (21%) and sale of vegetables (16%). Further strategies used by a small number of households (10%) were intersocial food aid (relatives and friends), the sale of cash crops (cotton, nuts, chilli etc.) and occasional job (mining, construction etc.).

9.1.1 Petty trade

Petty trade mostly includes the sale of the local beer Dolo, firewood and artisanal handicraft items. In this category selling of Dolo was by far the most stated coping strategy. This results from the frequent consumption of Dolo in the region, resulting in an unquestionable source of income for women. Vegetables, which are counter farming season crops, are cultivated through irrigation systems including raw vegetables such tomato, onion, chilli, cabbage, African white aubergine and purple aubergine etc. represent another important less reversible food insecurity reducing strategy.

⁶²...After the farming season, my husband cultivates vegetables with the pump-driven well and I sell small things such as traditional Dagara handbag, dolo, soumbala and shea butter. That's quite a sure complementary source of income and security for us, in case the harvest was not good and we run out of food... Of course, if that all does not work as planned, we can demand support from the family, relatives and friends, but the Dagara are a very proud people, in fact begging for food would be really the last alternative... (rural housewife).

9.1.2 Consuming wild fruits and plants

Consuming wild fruits and plants (baobab and moringa fruits and leaves, néré fruits, mangos, etc.) represented the third important coping strategy. However, as a patrician leader mentioned this:

⁶³...today's knowledge on edible wild plants are getting lost, as young people are not interested in this anymore. Consequently, they are getting more and more vulnerable to hunger, especially in the fact that crop production is not that reliable anymore. But I must say also that on the other hand, the reserves of such wild plants are getting less and less, as they are being increasingly cut for farming and/or habitation purposes and not replaced...

9.1.3 Sale of livestock

Sale of livestock is also taken as another coping strategy during a lack of food but this is used as the last alternative if there are no other possible alternatives. This is because livestock represents the most valued assets of the households. Hervé explains the situation as follows:

⁶² French quote: ... Après la saison agricole, mon mari cultive les légumes avec la pompe à main et je vends de petites choses telles que le sac à main traditionnel Dagara, le Dolo, le soumbala et le beurre de karité. C'est une source complémentaire de revenus et de sécurité pour nous, si la récolte n'est pas bonne et que nous manquons de nourriture ... Bien sûr, si tout ceci ne fonctionnait pas comme prévu, nous pouvons demander de l'aide à la famille, des parents et des amis, mais les Dagara sont un peuple très fier. Mendier de la nourriture serait vraiment la dernière solution...

⁶³ French quote : ...les connaissances actuelles sur les plantes sauvages comestibles se perdent, les jeunes ne s'y intéressant plus. En conséquence, ils deviennent de plus en plus vulnérables à la faim, d'autant plus que la production agricole n'est plus aussi fiable. Mais je dois aussi admettre que, par contre, les réserves de ces plantes sauvages deviennent de moins en moins, car elles sont de plus en plus coupées à des fins agricoles et / ou d'habitation et ne sont pas remplacées...

⁶⁴...Before I sell one of my animals, the situation has to be worst and I have grabbed all other alternatives such as demanding my brothers, friends, borrowing food and/or money, using relief programs etc....because I need my animals, they are good sources of cash for my household and good labour forces for farming...

9.1.4 Remittances

Remittances were mentioned as a coping strategy. However, quite by a small percentage of households in the view, that in the literature remittances represent one of the most coping strategies used by people in vulnerable situations (Bals et al. 2008; Boko et al. 2007; de Haan and Zoomers 2006; Maxwell et al. 2000; Pieters et al. 2012; Piya et al. 2016; Shepherd et al. 2013). The main reason for the decrease in remittances has been explained by the political crisis in Cote d'Ivoire, the first destination for the emigration of Burkinabé. Consequently, this caused the homecoming of emigrated Burkinabé. This situation induced to a decrease of remittances coming from Cote d'Ivoire and to an increase in households members, thus to an increase in expenditure for food.

A returning household member from Côte d'Ivoire explained the situation of his household as follows:

⁶⁵...I was in Côte d'Ivoire and working in the plantations. It was hard but well paid so that I could help my family here in Dano, by sending them money every month. Now we are all here and trying to survive together. It is tough, I hope the situation will be better in Côte d'Ivoire very soon, maybe I could go back again...

9.1.5 Intersocial food aid

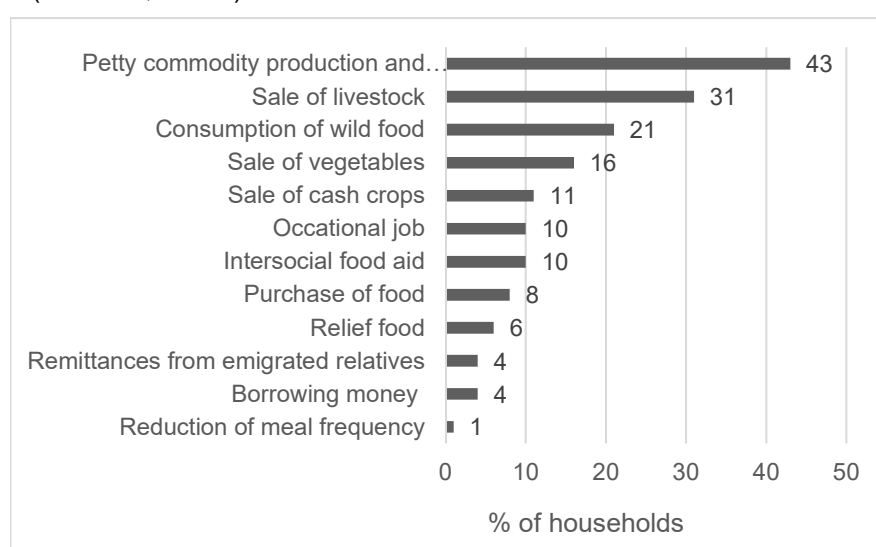
Intersocial food aid (aid from family members and friends) represented another important coping strategy cited in the literature (Maxwell et al. 2000). However, in my study, only 10% of the interviewed households mentioned Intersocial food aid as one

⁶⁴ French quote : ... Avant de vendre un de mes animaux, la situation doit être vraiment pire et j'ai parcouru toutes les autres solutions possibles, telles que demander à mes frères et amis, emprunter de la nourriture et / ou de l'argent, utiliser des programmes de secours, etc. les animaux, ce sont de bonnes sources d'argent pour mon ménage et de bonnes forces de travail pour l'agriculture ...

⁶⁵ French quote... J'étais en Côte d'Ivoire et j'ai travaillé dans les plantations. C'était dur, mais bien payé, pour pouvoir aider ma famille ici à Dano. Maintenant, nous sommes tous ici et essayons de survivre ensemble. C'est vraiment difficile, j'espère que la situation sera meilleure en Côte d'Ivoire, je pourrais peut-être y retourner...

of their coping strategies. This could be related to the socio-cultural behaviour of the Dagara people, who are generally considered as proud people. Rigobert, a farmer from rural Dano describes this as follows: ⁶⁶“...We the Dagara are usually proud people. That means, we often prefer to starve rather than going and begging for food. It costs a lot of courage to do that. I’m not saying that this not happens at all, but only in very extreme cases...”

Figure 41 households coping strategies to lack of food
(field data, n=111)



⁶⁶French quote : “Nous, les Dagara, sommes généralement un peuple très fier. Cela signifie que nous préférons souvent mourir de faim plutôt que d’aller quémander de la nourriture. Cela coûte beaucoup de courage pour le faire. Je ne dis pas que cela ne se produit pas du tout, mais seulement dans des cas très extrêmes.”

9.2 COPING TO FOOD INSECURITY AT INSTITUTIONAL LEVEL

9.2.1 Coping strategies at the governmental level

School meals as sources of motivation for more enrolment and school performance

School meal programmes represent a huge contributor to food and nutrition security as well as to education in Dano commune. School meal programmes have a long story not only in Dano commune but also in the whole Burkina Faso. The main aim of school meals is to increase the attendance of schoolchildren and to maintain them in school. School Canteens exist since the colonial era. During that time food came from own production and was collected in the form of taxes by communities. Every school had their farms for cereals production (maize, rice, millet) and legumes crops (beans, pea cow). Part of the produced crops was sold and the remaining was consumed. The school canteens were managed by schoolchildren and their parents. After the independence, the Burkinabé government (former Upper Volta), with the aim to develop education, still wanted to continue providing schools with food. However, this was becoming complicated, with the growing number of schoolchildren's enrolment due to the reduction of schooling age from 8 to 7 years old and the interruption of community food gathering. This forced the government to find another source of food. Thus, on the 16 of August 1960, the government and the Catholic Relief Services (CRS/CATHWEL in Burkina Faso) signed an agreement to import and distribute food as an assistance programme to BF, under the name of assisted canteens.

From 1962, the CRS/CATHWEL has been in charge of school canteens with the ministry of the elementary degree as the national partner, which however was not implicated in the implementation of the programme, meaning that the CRS/CATHWEL was the only executor of the school canteens programme. Food was directly imported from the United States of America (USA) and consisted of lentils, beans, maize semolina, wheat, refined vegetable oil.

In 1989, the CRS/CATHWEL transferred the programme to the ministry of the elementary degree with the goal to involve the ministry in the practical part of the food canteen programme. This has resulted in the conception of the project called school canteens/Cantines scolaires. Consequently, the responsibility was shared between the ministry and CRS/CATHWEL in such a way that the CRS/CATHWEL was in charge of importing the foodstuff from the USA and the ministry took over the responsibility of the distribution and management.

From 1988 to the present, school canteens programmes have been constantly evolving. Since 1998 while the CRS/CATHWEL has been progressively withdrawing from the programme, the intensive involving of the state and local communities are increasingly getting strengthened. Additionally, new types of school canteens have been implemented through new partners such as the European Union, the World Food Program (WFP), The Nederland and Canada. This new partnership was the beginning of the so-called semi-assisted canteens/cantines semi assistées, which was necessary to achieve the overall goal of the programme, namely the successful implementation of indigenous canteens.

As a coping strategy to the economic crisis in 2009, the government with the financial support from its partners (particularly the World Bank) has implemented the social safety nets programme that started from 2009 with the aim to support the most vulnerable households to the crisis. The school canteens programme was also a beneficiary of the social safety nets programme and received financial support of 24 644 156 738 FCFA/ 37,654,250.34 Euro (GOBF/MENA 2013) for the purchase of foodstuff in 2009 and 2010.

Currently, two main partners support the government's school canteens activities, the WFP and the CRS/CATHWEL. The schools in the country are, therefore, distributed among these 3 institutions. The WFP is in charge of four provinces in the Sahel (le Yagha, le Seno, le Oudalan and le Soum). The CRS/CATHWEL took the responsibility for three provinces (la Gnagna, la Komondjari, la Namentega).

Since the school year 2011-2012, the responsibility of the CRS/CATHWEL increased by 2 provinces (le Bam, le Sanmatenga) in addition to the already existing 3 provinces. The other 36 provinces of the country have been profiting from the foodstuff of the social safety nets programme. In addition to the budget for foodstuff from the social safety nets, the state has expended 4 billion FCFA/6111671,95 Eur for its part of the school canteens in the 2011-2012 school year (Mr. Etienne Kaboré, deputy director of the national school meal project).

Rice flour, cowpea and oil made up the foodstuff. The CRS/CATHWEL with a budget of 574 448 0000 FCFA/8777094,32 Eur (GOBF/MENA 2013) has offered lens, bulgur and oil to the schools under its responsibility. The WFP has allocated local cereals, oil and sugar and for the social safety nets, the state and its partners have budgeted 8 166 216 577 FCFA/ 124 773 09,19EUR (GOBF/MENA 2013) for the purchase of rice, oil and cowpea. Public or private elementary schools, satellite schools and franco-arabic schools are the main target groups of the school's canteens.

The main reasons for the establishment of school meal programmes in BF as explained by Mr. Etienne Kaboré, (deputy director of the national school meal project), are related to the huge drought in the 1970s-1980s, the far distances between schools and homes and the increase of education and/or enrolment of children through a more motivation of schoolchildren and parents.

He continued with a quite disappointed expression

⁶⁷...However, we would like to provide every single school with school meal in the country. To get to that goal a budget of 48 billion FCFA/ 73340063,35 will be needed. This budget is not available. That is the main constraint at the moment for the efficient functioning of school meal programmes. That is the reason, why we are planning to restructure the school meal programmes. Currently, the school food programmes are planned and managed in the capital Ouagadougou, from where they are redistributed to the schools throughout the country. One of the consequences of this centralized management of school meals programmes is high financial costs- for example those of transport. For this reason, for the school year 2013-2014, we are planning a new strategy concerning the delivery of food stock through a new management committee called Comité de Gestion d'École (COGES). With this new management programme. We aim to decentralise school meal programmes from the capital city Ouagadougou into the regions themselves. Concretely schools will get their own budget and organise a local supply of school meal. This will, in turn, affect positively both local production and economy...

Dano commune is, fortunately, one of the regions in Burkina Faso that benefits from school meal programmes from both state institutions and the Dreyer foundation, but

⁶⁷French quote : ... Cependant, nous aimerions fournir à chaque école un repas scolaire dans le pays. Pour atteindre cet objectif, un budget de 48 milliards de FCFA sera nécessaire. Ce budget n'est pas disponible. En fait, c'est là la principale contrainte pour le bon fonctionnement des programmes de cantines scolaires. C'est pourquoi nous prévoyons de restructurer les programmes de cantines scolaires. Actuellement, les programmes de cantines scolaires sont planifiés et gérés dans la capitale Ouagadougou, où ils sont réaffectés aux écoles de l'ensemble du pays. L'une des conséquences de cette gestion centralisée des de cantines scolaires sont les coûts financiers élevés, par exemple ceux des transports. C'est pourquoi, pour l'année scolaire 2013-2014, nous prévoyons une nouvelle stratégie concernant la livraison des stocks des cantines scolaires par le biais d'un nouveau comité de gestion appelé Comité de gestion d'école (COGES). Avec ce nouveau programme de gestion, nous visons à décentraliser les programmes de cantines scolaires de la capitale Ouagadougou vers les régions elles-mêmes. Concrètement, les écoles disposeront de leur propre budget et organiseront un approvisionnement local en repas scolaires. Cela aura également un effet positif sur la production et l'économie locales...

with huge restrictions. Mr Justin Somé from the inspection of education explained the functioning of school meal in Dano as follows:

⁶⁸...the state covers 202 schools with food in the loba province. I know that is a big challenge, in terms of the financial, infrastructural and administrative constraints. And due to these issues and mainly the financial one, the supply of schools with food is only partial for the whole school year, meaning that schools get food only a few months during each school year. For this reason and/or in this context, I would propose that school meal programme should cover the hunger season from May to October, when families run out and/or risk to run out of food, and should stop after the harvest time from September to April. During that time, most of the families have enough available food. I think doing so, we could avoid that children became vulnerable to hunger at any time during the school year, as we are experiencing it now...

Indeed, the yearly partial supply with school meal is a big issue in Dano, as Mr. Fofana, director of a primary school in Dano, one of the school meal beneficiaries, confirmed this:

⁶⁹...My school gets school food from both the Dreyer and the state. Until 2012 the Dreyer has supplied most of the food. It has engaged 4 cookers (3 women and one

⁶⁸ French quote : ...L'état couvre 202 écoles de repas scolaires dans la province d'loba. Je sais que c'est un grand défi en termes de contraintes financières, infrastructurelles et administratives. Et, à cause de ces problèmes, principalement financiers, l'approvisionnement en repas scolaires n'est que partiel pendant toute l'année scolaire, ce qui signifie que les écoles ne reçoivent des repas scolaires que quelques mois par an. Pour cette raison et / ou dans ce contexte, je proposerais que le programme de cantines scolaires couvre la période de soudure de mai à octobre, lorsque les familles ne disposent pas et / ou sont à risque de manquer de nourriture et s'arrêter après la récolte de septembre à avril. Après la récolte la plupart des familles disposent suffisamment de nourriture. Je pense que cette stratégie permettrait d'éviter que les enfants deviennent vulnérables à la faim à tout moment de l'année scolaire, comme nous le vivons actuellement...

⁶⁹ French quote : ...Mon école reçoit les repas scolaires de la fondation Dreyer et de l'État. Jusqu'en 2012 la fondation Dreyer fournissait la grande partie des repas. Elle a mobilisé 4 cuisiniers (3 femmes et un homme). Les cuisinières étaient rénumérés mensuellement par la fondation Dreyer avec 25 000 FCFA, tandis que le cuisinier était rénuméré mensuellement par l'école elle-même avec 20 000 FCFA. Cependant, depuis 2012, la fondation Dreyer ne payait plus les cuisinières à cause des contraintes financières, l'école pris alors le paiement des cuisinières en charge à travers l'association de parents. Le stock des repas scolaires est organisé et géré par les donateurs, en l'occurrence l'État et la fondation Dreyer. Ce qui signifie

man). The women got 25000/month each paid by the Dreyer and the man 20000/month paid by the school itself. However, since 2012 the Dreyer did not pay the women due to financial constraints and the school overtook it through the parent's associations. School food stock is organised and managed by the donors,

que nous n'avons aucun pouvoir de décision ni sur la quantité ni sur la qualité de la nourriture fournie. Nous recevons, prenons et consommons tout ce que l'État ou la fondation Dreyer nous livre. Les nourritures typiquement livrées sont le riz, les pâtes alimentaires, la sardine et huile de palme. Cependant la plupart du temps, nous ne recevons que du riz et devons voir quoi en faire, en particulier de l'État. Concrètement, l'école reçoit un approvisionnement trimestriel de riz, de haricots, de poisson séché ou de sardines et de la pâte de tomates fondation Dreyer, du riz et du sel pendant environ trois ou quatre mois par année scolaire de l'État. Ainsi, un menu typique ici dans l'école est du riz ou des spaghettis à la sardine ou du poisson séché à l'huile de palme et au sel. Je dois mentionner que c'est effectivement notre meilleur menu grâce à fondation Dreyer. Car si l'approvisionnement de Dreyer est parfois retardé, nous n'avons que du riz avec du sel. Mais toujours mieux que rien, non ? Cependant, malgré cette pénurie, le repas scolaire a un effet très positif sur la performance globale des élèves. Je vais donner quelques exemples évidents : pour l'année scolaire 2011-2012, 54 élèves sur 58 ayant réussi le certificat de fin d'études primaires ont obtenu un taux de réussite de 93%. Et pour cette année 2012-2013, nous avons eu un examen blanc au cours du premier trimestre. Seulement 26 élèves sur 50 sans repas scolaire contre 37 avec repas scolaires ont réussi le test au cours du dernier trimestre. Je pense que ces chiffres parlent et révèlent les relations profondes qui existent entre le repas scolaire et les résultats scolaires des élèves. Comme le dit un proverbe bien connu, « un estomac vide n'a pas d'oreille », sans repas scolaire, les élèves n'étaient pas très concentrés et ne présentaient donc pas de bonnes conditions de travail, en particulier pendant la période de soudure. De plus, ils manquaient de motivation pour aller à l'école, d'où un taux d'absentéisme plus élevé. Maintenant, avec le repas scolaire, les élèves et leurs parents sont motivés pour l'école. Pour les parents, parce qu'ils ont moins de bouche à nourrir avec moins de dépenses (2 000 F / contre un coût réel de 3 300 F de repas scolaire). Pour les élèves qui ont une source de nourriture assurée et qui n'ont pas besoin de rester chez eux l'estomac vide. La présence aux cours est un choix incontestable et le taux d'absentéisme a considérablement diminué, ce qui a entraîné un taux de fréquentation et d'inscription élevé. J'ai même constaté que des élèves malades préféraient aller à l'école plutôt que de rester chez eux. Et je pense que le repas scolaire en est presque la raison principale. Malheureusement, en raison principalement de contraintes financières, les repas scolaires ne couvrent pas toute l'année scolaire. Nous avons constamment connu des ruptures d'approvisionnement. Nous sommes donc sur le point de lancer une autre stratégie pour rendre le programme de repas scolaire constant, sûr et indépendant. Grâce à une sensibilisation intensive des parents à travers l'école, nous prévoyons de mettre en place une cantine dite endogène. Une cantine endogène signifie un soutien accru des repas scolaires par les parents d'élèves comme fournisseurs d'aliments (céréales) et de main-d'œuvre. Par exemple, depuis 2012, chaque parent fournit à l'école 3 kg de maïs par trimestre (ce montant a été décidé par les parents eux-mêmes) et du beurre de karité. C'est en fait une très belle situation. J'espère seulement que la cantine endogène prospérera, car c'est une source de capital économique et humain garanti pour toute la communauté...

in this case, the state and the Dreyer. That means we don't have any decision-making power on the quantity and quality of supplied food. We receive, take and consume whatever the state or the Dreyer send to us. Typically sent food consist of rice, spaghetti, sardine and palm oil in good years. But most of the times we only get rice -especially from the state- and we have to see what to do with it. Concretely the school gets a quarterly supply of rice, beans, dried fish or sardines and tomato paste from the Dreyer and rice and salt for about 3-4 months a school year from the state. Thus, a typical menu here in the school is rice or spaghetti with sardine or dried fish and palm oil and salt. I should mention that this is indeed our best menu thanks to Dreyer because if sometimes Dreyer's supply delayed, we just have rice with salt. But still better than nothing, right? However, despite this shortage, school meal has an enormously positive effect on the student's overall performance. I will give some palpable examples: for the school year 2011-2012 we had 54 out of 58 students who passed the primary school leaving certificate, this is namely a 93% success rate. And for this year, 2012-2013, we had a mock exam during the first trimester where only 26 of 50 students without school meal against 37 students with school meal passed the test during the last trimester. I think these numbers speak for themselves and reveal the deep relationship between school meal and student's performance in school. As a well-known proverb goes, 'an empty stomach has no ears', without school meals, students lack concentration especially during the hunger season. Furthermore, they do not have the motivation to come to school, consequently, the rate of absenteeism was higher. Now with the school food, both students and parents are motivated for school attendance. For parents, because they have less mouth to feed with fewer expenditures (2000 F/against real cost 30000F of school meal). For students because they have assured a source of food and do not need to stay home with an empty stomach. So, the attendance to classes is higher and the rate of absenteeism has drastically decreased leading to high frequentation and enrolment rate. I have even experienced that sick students prefer to come to school instead of staying home. and I think that the school meal is almost the main reason for that. Unfortunately, due mainly to financial constraints school meal do no cover the whole school year. We constantly experienced a discontinuity in supply. Thus, we are about starting another strategy to get the school meal scheme constant, sure and independent. Through an intensive sensibilization of parents through the school, we are planning to get in place a so-called endogenous canteen. Endogenous canteen means more support of school meal through the student's parents by food (cereals) and labour force supply. For example, since 2012 every parent provides the school 3kg of maize every trimester (this amount has been decided by parents themselves) and shea butter. That is, in fact, a nice situation. I only hope that the endogenous canteen will grow, because it is a source of guaranteed economic and human capital for the whole community

Local high nutritious food/plants as sources of affordable and accessible coping strategies to combat infant malnutrition

As already mentioned in the introduction, malnutrition represents a huge problem in Dano commune. The state nurse Mr. Somé, from the health centre/CSPS (Centre de Santé et de Promotion Sociale/health centre and social promotion) described that situation as follows:

⁷⁰...According to the data of the MUAC⁷¹, 8 out of ten children have MUAC < 115 mm indicating to severe malnutrition. 2 out of ten children have a MUAC < 125 mm indicating to moderate malnutrition. You see that malnutrition represents a severe health problem for our centre and Dano. Furthermore, the frequent occurrence of diseases such as malaria, bronchitis, diarrhoea and meningitis aggravated the malnutrition problem. Malaria represents by far the most detected disease on children with approximatively 4 in 5 or 80% of cases and this despite the provision of free mosquito nets. Meningitis is a seasonal disease, which occurs mostly during the dry season from February to April. However, there are sensibilization sessions and health programmes to decrease the occurrence of such health problems. The centre offers health awareness sessions, including nutritional education, family planning, hygiene, mother to child transmission of diseases, especially HIV/AIDS, disease prevention and treatment and coverage of medical and hospitalisation costs (for example for malaria), vaccinations programmes, prenatal and postnatal care, nutritional and hygienic behaviour of women in reproductive age and small children,

⁷⁰ French quote : ...Selon les données du périmètre brachial, 8 enfants sur 10 ont un périmètre brachial <115 mm, indiquant une malnutrition sévère. Deux enfants sur dix ont un périmètre brachial <125 mm indiquant une malnutrition modérée. Vous voyez que la malnutrition représente un grave problème de santé pour la commune de Dano. En outre, la fréquence des maladies telles que le paludisme, la bronchite, la diarrhée et la méningite a aggravé le problème de la malnutrition. Le paludisme est de loin la maladie la plus dépistée chez les enfants avec environ 4 cas sur 5, soit 80% des cas, et ce malgré la fourniture de moustiquaires gratuits. La méningite est une maladie saisonnière, qui survient principalement pendant la saison sèche, de février à avril. Cependant, il existe des séances de sensibilisation et des programmes de santé pour réduire la survenue de tels problèmes de santé. Le centre propose des séances de sensibilisation sur la santé, notamment sur l'alimentation, la planification familiale, l'hygiène, la transmission de maladies mère-enfant- en particulier le VIH / sida-, la prévention et le traitement de la maladie et la couverture des frais médicaux et d'hospitalisation (par exemple pour le paludisme), des programmes de vaccination, des soins prénataux et postnataux, le comportement nutritionnel et hygiénique des femmes en âge de procréer et des enfants en bas âge etc. Cependant, la demande et la fréquentation des services médicaux se heurtent à des contraintes comme manque de personnel pour la consultation, de matériel médical et des salles d'hospitalisation. Toutefois, l'un des principaux problèmes est la non-acceptation et l'application adéquate des conseils médicaux par les patients. Par exemple, nous avons toujours encouragé l'envoi des enfants au centre de santé dès qu'ils se sentent malades, mais jusqu'à aujourd'hui, certaines femmes ne viennent que lorsque les enfants sont sur le point de mourir. C'est très frustrant. nous pouvons prévenir une quantité énorme de décès d'enfants si les parents coopèrent avec nos méthodes et avec nous. La malnutrition reste toujours un énorme problème à Dano. Pour cette raison, le centre de santé a une section spécifique appelée CREN qui est chargée de récupérer les enfants malnutris âgés de 0 à 5 ans. Il leur fournit des soins médicaux et une récupération nutritionnelle - grâce à des aliments à haute valeur nutritive, principalement à base locale. Mais Cécile, une sage-femme senior du CREN, donnerait des informations plus détaillées à ce sujet...

⁷¹ MUAC or mid-upper arm circumference is used to assess malnutrition.

etc. However, the application of the health services faces some constraints such as lack of consultation personal, medical materials and hospitalisation rooms. But one of the biggest constraints is the non-acceptance and adequate application of medical advice from patients. For example, we have always promoted to send children to the health centre as soon as they feel sick, but until today, some women repeatedly come only when the children are about to die. That is very frustrating; we can prevent a huge amount of child death if parents are cooperative with our methods and us. Malnutrition remains a huge problem in Dano. For this reason, the health centre has a specific section called The CREN which is in charge of recuperating malnourished children aged 0 to 5 years. It provides them with medical care, and nutritional recovery -through high nutritional, mostly locally based food. But Cécile a senior midwife of the CREN would give deeper information on this...

Picture 17 A sensibilization session on malaria, family planning and mother-child health care at the health centre of Dano town
(field data)



From this conversation, it was clear that malnutrition represented the biggest health concern for children under 5 years in Dano commune. For this reason, there exists a special section Le CREN (Centre de Récupération et d'Education Nutritionnelle/ Centre for Recovery and Nutritional Education) in the health centre of Dano commune to better face malnutrition. To know well what the CREN does to achieve its aim, I met Cécile, a woman who has been working for many years at the CREN. Cécile first describes CREN as follows:

⁷²...Well, I suppose you have been observing a huge number of children at the CREN since you came here this morning. You have certainly noticed that the kids do not look normal in the sense that they look apathetic and lethargic, too thin, have swollen stomach and oedema. All of these symptoms refer to the presence of malnutrition and the children you see around suffer all from malnutrition. That's why the CREN exists because we have a high rate of malnutrition here in Dano and with the CREN, we aim to take off malnourished children in order to restore their normal nutritional status. Doing so, we used simple affordable and accessible local high nutritious plants and food. These include nutritious menus from baobab, moringa, soumbala, groundnut, dried fish. Furthermore, we used the UNICEF fortified milk⁷³ F-100 and F-75 as well in some cases as complements. Thus, the CREN's goal is to improve the nutritional status of children in Dano in general and treatment of malnourished children in particular. Further services of the CREN are the sensibilization and education of mothers about the importance of adequate food for

⁷² French quote : ... Eh bien, je suppose que vous avez observé un grand nombre d'enfants ici au CREN depuis votre arrivée ce matin. Vous avez certainement remarqué que les enfants ne paraissaient pas normaux en ce sens qu'ils semblaient apathiques et léthargiques, trop maigres, qu'ils avaient l'estomac enflé et leurs œdèmes. Tous ces symptômes font référence à la malnutrition et les enfants que vous voyez autour de vous souffrent tous de malnutrition. C'est la raison pour laquelle le CREN existe, car notre taux de malnutrition est élevé ici à Dano et avec le CREN, nous avons pour objectif d'accueillir les enfants souffrant de malnutrition afin de rétablir leur état nutritionnel normal. Ce faisant, nous utilisons des plantes et des aliments locaux à haute valeur nutritive, abordables et accessibles. Ceux-ci comprennent des menus nutritifs à base de baobab, moringa, soumbala, arachide, poisson séché. De plus, nous utilisons les laits enrichis F-100 et F-75 de l'UNICEF également dans certains cas. Ainsi, l'objectif du CREN est d'améliorer l'état nutritionnel des enfants à Dano en général et le traitement des enfants malnutris en particulier. Les autres services du CREN sont la sensibilisation et l'éducation des mères sur l'importance d'une alimentation adéquate pour la croissance et la santé de l'enfant. Et surtout pour leur faire comprendre qu'ils n'ont pas besoin de beaucoup d'argent et, dans la plupart des cas, de l'argent pour y parvenir en utilisant les plantes et les aliments locaux mentionnés ci-haut. C'est un défi, car pour la plupart des femmes, ce n'est pas leur première fois de venir ici à cause du même problème, ce sont des mères qui reviennent, qui sont déjà venues ici et qui ont appris tout cela, mais elles reviennent encore, que ce soit avec le même enfant ou un autre. L'application adéquate des recommandations nutritionnelles reste donc un défi majeur pour le combat contre la malnutrition. Je peux comprendre que les femmes ont beaucoup d'enfants et qu'elles ont beaucoup à faire toute la journée. C'est pourquoi parfois, elles retardent la consultation au centre dès les premiers symptômes de maladie chez l'enfant ou dès que celui-ci se rétablit, elles cessent avec le menu de réhabilitation recommandé, car elles ne comprennent toujours pas l'importance d'une alimentation adéquate. C'est pourquoi nous sommes ici pour rendre cette importance plus évidente et indéniable pour eux...

⁷³ F-100 and F-75 (also known as Formula 100 and Formula 75) are therapeutic milks – Milk-based products supplemented by fats, sugar, micronutrients and other nutrients used in the treatment of acute malnutrition. The formula is/should be exclusively used in therapeutic feeding centres where children are hospitalized for treatment. (UNICEF 2012).

child growth and health. And specially to make them clear that they do not need a lot of money and in most of the case any money to achieve this by using the above-mentioned local plants and foods. This is challenging because for most of the women it is not their first time to come here because of the same problem, they are returning mothers, who already have been here and learnt about all of this, however they still come back again, whether with the same child or another one. Thus, the adequate application of the nutritional recommendations remains a big challenge the fight for malnutrition is facing. I can understand that women have many children and have a lot to do through the day, so sometimes they just keep postponing coming to the centre as soon as the child gets sick, or once the child gets wells, they generally do not continue to feed him with the recommended menu, because they still misunderstand the importance. And that's why we are here, to make that importance more obvious and undeniable for them...

Picture 18 Child suffering from acute malnutrition (bi-lateral pitting oedema/Kwashiorkor) at the CREN (field data)



After this detailed presentation of the CREN, Cécile took me to the hospitalisation rooms, where hospitalised children and their mothers stay during the treatment. She also continues her presentation:

⁷⁴...The CREN has 5 rooms with 4 beds each, meaning that we only have 20 beds available for our small patients and their mothers, where they stay until they get

⁷⁴ French quote : ...Le CREN dispose de 5 chambres de 4 lits chacune, ce qui signifie que nous n'avons que 20 lits disponibles pour nos petits patients et leurs mères, où ils restent jusqu'à ce qu'ils soient stables sur le plan nutritionnel. Ce chiffre est assez faible, vu le taux élevé de malnutrition, c'est pourquoi seuls les enfants souffrant de malnutrition modérée et grave sont hospitalisés...

nutritionally stable. This number is quite small, seeing the fact, that we have a high rate of malnutrition, that's why only moderately and severely malnourished children are taken over...

And the visit continues to the plants and food items direction.

⁷⁵...The treatment itself includes a mixture of different local, affordable and accessible plants as already mentioned. However, depending on the severity of the malnutrition, children get different products. For example, severely malnourished children get the F-75 first while moderately malnourished get the F-100 and fortified porridge...

During the discussion, she was mixing a formula, called bouillie enrichie (fortified porridge). It consists mainly of local cereals (maize, millet or sorghum), which is enriched at least with two other ingredients. The ingredients include roasted bean flour, roasted soybean flour, roasted and grounded groundnut, dried and powdered fish, dried and powdered moringa leaves, dried and powdered baobab leaves, dried and powdered soumbala sugar leading to the creation of 7 porridges formula or recipes.

⁷⁶...This is a typical formula, we mixed here for our fortified porridge. For this morning I will be taking 9 tablespoons millet flour, 3 tablespoons of roasted bean flour, 1 tablespoon of roasted and powdered soumbala powder, 1 tablespoon dried

⁷⁵ French quote : ...Le traitement lui-même comprend un mélange de différentes plantes locales, abordables et accessibles, comme déjà mentionné. Toutefois, en fonction de la gravité de la malnutrition, les enfants reçoivent des produits différents. Par exemple, les enfants souffrant de malnutrition sévère obtiennent le F-75 en premier, alors que ceux souffrant de malnutrition modérée reçoivent le f-100 et le porridge enrichi...

⁷⁶ French quote : ...Ceci est une formule que nous mélangeons spécialement ici pour notre bouillie enrichie. Pour ce matin, je vais prendre 9 cuillères à soupe de farine de mil, 3 cuillères à soupe de farine d'aricots grillés, 1 cuillère à soupe de poudre de soumbala grillé et en poudre, 1 cuillère à soupe de feuilles de moringa séchées et en poudre et 1 cuillère à café de sucre. Je vais d'abord faire cuire le mil, la farine de haricot et le soumbala pendant 15 minutes. Ensuite, j'ajoute le sucre et je laisse le tout refroidir à l'état tiède avant d'ajouter la poudre de feuilles de moringa. Ceci est très important, car le moringa est une plante nutritionnelle fantastique, et il convient de l'utiliser idéalement pour conserver les nutriments. Mais si nous ajoutons cela à la bouillie, nous devons faire attention à la température, car la température chaude peut détruire tous les nutriments. Les autres formules sont similaires, nous changeons simplement d'ingrédients, par exemple pour la soirée, nous utiliserons la même formule, mais au lieu de soumbala, nous aurons de la poudre de poisson séchée, de sorte que notre CREN dispose jusqu'à 7 formules...

and powdered moringa leaves and 1 teaspoon of sugar. First, I will cook the millet, the bean flour and the soumbala for 15 minutes. Then I will put on the sugar and will let it cool down to the lukewarm status to add the moringa leaves powder. This is very important, because the moringa is a fantastic nutritional plant, and it should ideally be used row to keep the nutrients. But if we add it to the porridge, we have to be careful about the temperature, because the hot temperature can destroy all of the nutrients. The other formulas are similar, we just switch between the ingredients, for example for the evening, we will use the same formula, but instead of soumbala, we will have dried fish powder, and hence up to 7 formulas are available to our CREN...

*Picture 19 The CREN station at the health centre in Dano town
(field data)*

The CREN consultation room



External cooking place of the CREN



A hospitalization room at the CREN



Cécile mixing products for a fortified porridge



*Picture 20 Products used for the nutritional recovery of malnourished children at CREN
(field data)*

Industrial imported formula to treat malnutrition



Locally initiated formula to treat malnutrition

Millet



Roasted bean flour



Soumbala powder (local spice)



Moringa leaves powder



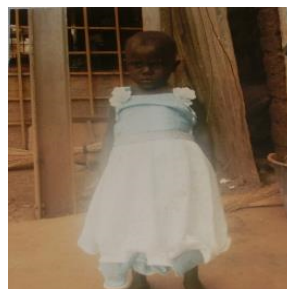
The success of the CREN has been confirmed by healthy-looking children after a few weeks of stay at the CREN. Cécile with an exciting feeling showed me 2 pictures with a small girl on both pictures and asked me to describe these both pictures. For me there were 2 different girls on both pictures until Cécile with a satisfied smile explained to me:

⁷⁷...That is the same and one girl.” As a reaction to my surprising expression on my face, she continues “ah oui, that’s one of our let’s say the challenging and miraculous story here at the CREN and we are very proud of it. This girl came here severely malnourished and we haven’t any hope if we could make it. I must admit, that her case was so severe. But after a few weeks of endurance and treatment and before leaving us she looked like this wonderful girl you are seeing on this picture. So that is one of the thousands of success stories of the CREN. Hence, we are kind of achieving our aim... she concludes with a very satisfied smile again...

Picture 21 A successfully recovered malnourished girl at the CREN
(field data)



A young girl suffering from SAM at delivery time at the CREN



Nutritionally recovered same young girl after her treatment at the CREN a few weeks later

Coping strategies at the non-governmental level

Not only the CREN offer such nutritional sensibilization sessions and support in Dano, but also the NGOs; the Dreyer and the VARENA ASSO are active in that field.

The Dreyer especially does the CEEP⁷⁸ in the frame of its preschool system as Mr. Somé, director of the CEEP explains:

⁷⁷ French quote : ...ah oui, c’est l’une de nos histoires difficiles et miraculeuses ici au CREN et nous en sommes très fiers. Cette fille est arrivée ici avec une grave malnutrition et nous n’avions aucun espoir de réussir. Je dois admettre que son cas était très grave. Mais après quelques semaines d’endurance et de traitement, avant de nous quitter, elle ressemblait à cette fille merveilleuse que vous voyez sur cette photo. C’est donc l’une des milliers de succès du CREN. Par conséquent, nous sommes en quelque sorte en train d’atteindre notre objectif...

⁷⁸Centre for Early Childhood and Preschool Education (CEEP) was founded in close cooperation with the Ministry of Social Affairs and National Solidarity and the community of Dano. Since October 2010, 300 local preschool children have got access to preschool education in ideal conditions. Classrooms, a sports field and a health centre are available to the children. The Foundation also runs school cafeterias providing 2,700 students with a balanced meal on all school days
<http://www.dreyerstiftung.de/index.php/en/projekte/bildung.html>.

79...in the educational programme of the CEEP, the Dreyer works on three main components with regard to nutrition. First, we aim at the nutritional care of children by offering them adequate food. Doing so we established monthly menus for the CEEP canteen with locally available products on the market and directly from farmers by trying to diversify the menu as often as possible.⁸⁰ The cost of food at the canteen depends on the income of parents. For example, parents with regular monthly income such as institutional employees pay 3000F/child/ year while parents without a regular monthly income such as self-employed paid 500F/child/year and finally parents with any regular monthly income are free of payment, meaning that their children get a free meal at the CEEP. Our 2nd component consists of sensibilization session on adequate nutrition and hygiene including topics such as hygiene of food, water, adequate management and conservation of food stock etc.

⁷⁹ French quote : « ... dans le programme éducatif du CEEP, la fondation Dreyer travaille sur trois composantes principales en matière de nutrition. Premièrement, nous visons à protéger les enfants en leur offrant une nourriture adéquate. Ce faisant, la cantine CEF propose des produits disponibles localement sur le marché et directement de la ferme aussi souvent que possible. Le coût de la nourriture à la cantine dépend du revenu des parents. Par exemple, les parents ayant un revenu mensuel régulier, tels que les employés paient 3 000 F / enfant / an, tandis que les parents sans revenu mensuel régulier, tels que les travailleurs indépendants paient 500 F / enfant / année et enfin les leurs enfants des parents ne disposant pas d'un revenu mensuel régulier reçoivent le repas gratuitement au CEEP. Notre deuxième composante consiste aux sessions de sensibilisation sur une nutrition et une hygiène adéquate incluant des sujets tels que l'hygiène des aliments, l'eau, la gestion adéquate et la conservation des stocks d'aliments, etc. Les parents sont invités à exposer leurs propres opinions sur les sujets mentionnés. Les sessions sont plutôt des réunions de discussion entre le CEEP et les parents. Enfin, le troisième volet de notre programme vise à sensibiliser les enfants eux-mêmes à la nutrition et à l'hygiène dans le but de leur assurer une nutrition et une hygiène diversifiées et adéquates à l'avenir. Nous constatons des succès dans le dernier cas, car de nombreux parents rapportent que leurs enfants répètent les leçons apprises au CEEP, telles que se laver les mains avant de manger ou après une visite aux toilettes, ne pas porter de vêtements sales, utiliser des poubelles, etc. Certains parents ont même signalé le refus de la nourriture familiale par leurs enfants qui réclamaient la même nourriture que dans le CEEP. Quand ils me demandent ce qu'ils devraient faire ? Je réponds toujours à cette question par cette contre question : « Pourquoi pensez-vous que votre enfant préfère manger des aliments de la cantine du CEEP ? C'est le même aliment que vous avez produit et vendu au CEEP et le même aliment que vous cuisinez à la maison ? C'est l'une des contraintes auxquelles nous sommes confrontés pour mener à bien les programmes de nutrition. Pour des raisons telles que le manque d'effort et de bonne volonté, l'ignorance, le je-m'en-foutisme / laissez-faire, le fatalisme surtout, il existe encore un grand nombre de parents qui n'accomplissent pas la recommandation issue des sessions. Cependant, étant donné que et les parents et les enfants assistent aux discussions et séances de sensibilisation sur les bons comportements en matière de nutrition et d'hygiène, nous pouvons espérer à un comportement de plus en plus adéquat et durable en matière de nutrition et d'hygiène... »

⁸⁰ A full description of such a typical menu at the and discussions topics at the CEEP are summarized in Table 38.

Whereby parents are invited to expose their own opinions on the mentioned topics, I would say the sensitisation sessions are rather discussions meetings between the CEEP and the parents. Finally, the 3rd component of our programme aims at the sensibilisation of children themselves on nutrition and hygiene with the aim that they practice adequate diversified nutrition and hygiene in the future. We are experiencing successes in that case, as a lot of parents' report that their children keep repeating the learnt lessons at the CEEP such as washing hand before eating or after toilet visit, not wearing dirty clothes, using the bin for waste etc. Some parents even reported the rejection of the family food by their children claiming the same food as in the CEEP. When do they ask me what they should do? I always respond to that question with this question 'why do you think that your child prefers to eat food from the CEEP canteen? It is the same food you have produced and sold to the CEEP and the same food you cook home as well? That is one of the constraints we face, to successfully implement the nutritional programmes. Due to reasons such as lack of effort and goodwill, ignorance, 'je-m'en-foutisme/laissez-faire, I do not care attitude...as well and especially fatalism there still exist a large number of parents who do not apply the recommendation issued from the sessions. However, as both parents and children are attending the discussions and sensitisation sessions on good nutrition and hygiene behaviour, this gives us hope to believe to a more and more adequate and sustainable nutrition and hygiene behaviour in the future...

Table 27 Dreyer's typical food menus and educational meeting topics at the preschool
(field data, Dreyer's CEEP)

| A weekly food menu for the Dreyer's preschool menu in Dano, (field data, CEEP/Dreyer Dano) | | | |
|--|---|--|---------------------|
| | 10H/10 AM | 12H30/12:30 PM | 16H/4 M |
| Lundi/Monday | Sandwich aux œufs (Sandwich with omelett) | Riz gras au poisson + jus de tamarin (Rise gras with fresh fish and tamrind juice) | Banan (Banar juice) |
| Mardi/Tuesday | Bouillie de petit mil au tamarin (Millet porridge with tamarin juice) | -Free | -Free |
| Mercredi/Wednesday | Crêpe simple (english version) | Spaghetti à la viande (Spaghetti with meat) | yaourt (Joghu) |
| Jeudi/Thursday | Bouillie de riz au lait Porridge with milk | -Free | -Free |
| Vendredi/Friday | Bouillie de petit mil au tamarin (english version) | Ragout d'igname (english version) | Fruit (banar) |
| Discussed topics during the educational meetings at CEEP/Dreyer (alternatively chosen every 2 weeks) | | | |
| Hygiène corporelle/B hygiene | | | |
| Hygiène alimentaire/Food hygiene Hygiène vestimentaire/ clothing hygiene | | | |
| Hygiène alimentaire : qualité des aliments/ Food hygiene and quality | | | |
| L'importance du petit déjeuner pour le jeune enfant./Importance of breakfast for a young child La socialisation (acceptation l'autre)/The socialisation | | | |
| L'hygiène alimentaire/Food hygiene Hygiène bucco-dentaire/Oral-dental care | | | |
| L'importance de l'éducation préscolaire/Importance of preschooling Hygiène vestimentaire/Clothing hygiene | | | |
| Hygiène alimentaire/Food hygiene La socialisation/The socialisation | | | |
| Hygiène bucco-dentaire/Oral-dental hygiene | | | |
| Le jeu chez le jeune enfant: le bon jouet/Playing for the young child and the right toy | | | |
| La scolarisation précoce : causes et conséquences./Early scolarisation : reasons and consequences L'hygiène alimentaire/Food hygiene | | | |
| L'hygiène environnementale/environnemental hygiene L'hygiène de l'eau/Water hygiene | | | |
| Le rôle des parents dans la réussite scolaire du jeune enfant/Role of parents in the kid's school success | | | |
| Hygiène et assainissement dans le milieu de vie du jeune enfant/Hygiene and sanitation in the young child surrounding Le rôle des parents dans la réussite scolaire du jeune enfant/ Role of parents in the kid's school success | | | |
| La sécurité des enfants : les dangers de la route et de la maison pour le jeune enfant/children security, dangers of the road and home | | | |

Picture 22 Daily scenes at the CEEP
(field data)

The yard of the CEEP



A class room



Washing hands with soap before lunch



Cleansing hands after washing



A canteen woman while distributing food to the kids



Children taking lunch at the CEEP c



10- DISCUSSIONS

This section presents the discussion of the results of the study. The discussion is structured according to the research questions focusing on household dietary patterns, determinants of dietary patterns, sources of consumed food, the underlying vulnerabilities of food and nutrition security and established strategies, both at household and at the institutional level to improve food and nutrition security.

10.1 DIETARY PATTERNS

Chapter 5- above sought to assess the dietary patterns of the households, which was the first question of this study. Dietary patterns referred to the qualitative description in terms of percentage and frequency of consumption of different foods. Thus, it gives the kind of food and not the quantity of food consumed (den Hartog et al. 2006).

The results of this study show that diet was dominated by the consumption of cereals and cooked vegetable leaves and/or fruits with the traditional spice *soumbala* and plant fat (*shea butter*). On the other hand, most of the food groups such as roots and tubers, vegetables, fruits, pulses and legumes, together with milk and milk products, meat, eggs and poultry were rarely consumed. Maize, red sorghum and rice were the most consumed cereals types, habitually in form of thick paste accompanied by a sauce. Maize *tô* was the incontestable consumed staple food, as maize *tô* was the most consumed dish at all meal times, which was twice daily for most of the households (61%) as confirmed by the majority of respondents when asking them to describe their staple with the following sentence: "...c'est le tô que nous connaissons et mangeons, ça toujours été le tô/...It is *tô* we know and eat, it has always been *tô*...". No matter the socioeconomic background, geographical setting, ethnic group, almost every household mentioned *tô* as part of his/her staple food. Furthermore, this study found out that the regular consumption of the local beer *Dolo* was an influential part of the diet as well (see chapter 5.1 above, Chapter 6.5 above).

The results of this study revealed a monotonous diet with the consumption of two food groups of cereals and vegetables. The question is, therefore if such a diet supplied the body with the required macronutrients and micronutrients for a good functioning? Probably not, due to the limited intake and/or no consumption of qualitatively varied food groups such as raw vegetables and fruits and animal sources proteins, which only consumed together can supply such nutritional adequacy to the body. As a

consequence of such a diet, macro-and micronutrients deficiency could be one example, which has been already approached by earlier studies on diet patterns in northern rural areas BF (Raoult 1948, Serre 1953-1954 and Bougnounou 1978 in Sawadogo 1995). These studies confirmed the poverty of a rural area's diet in qualitative animal proteins and fat, in green vegetables and fruits. They concluded that such a poor diet leads to vitamin A and C deficiency.

Some decades later, Sawadogo (1995) in his study in rural southwest BF, came to the similar conclusions: the south-west BF (which is considered as the food basket of the country) represents the same quantitative and qualitative nutritional deficiencies as the northern part of the country. This leads to the assumption, that the aim of the Burkinabé farmer is mainly focused on the satisfaction of the need for food (in terms of calories and proteins) and to the access to a certain level of consumption. Furthermore, diet is influenced by both agro-climatic and cultural settings as well by the diversity of local foodstuffs and their accessibility (Sawadogo 1995). Therefore, the agro-climatic, sociocultural influential factors on farming and eating and the goal of people is to first fulfil the biological aspect of satisfying hunger in terms of calories and proteins, thus to first fill the stomach with quantitative food and not with qualitative nutritive one could explain the consistency of the diet in the study area. As most of the participants said in this study: “⁸¹ah, it is *tô* we know and eat, it has always been *tô*, we would like to eat something else, but because of lack of money we have to eat *tô* every day”. Thus, poverty was mentioned in my study as a further reason for the diet patterns. This could explain why respondents from another professional background (salaried) in *Dano* town (with regular income source) had a more, slightly but more diversified diet including consumption of more food groups such as fruits and raw vegetables, roots and tubers, dairy and meat products than farmers. But, this salaried group, classified as middle class, are the most at risk of non-communicable diseases in African urban areas. The African middle class tends to have a more and more unhealthy diet through the increasing consumption of the so-called modern

⁸¹ French quote: “...c'est le *tô* que nous connaissons et mangeons, ça toujours été le *tô*. On aimerait bien manger autre chose, mais á cause du manque d'argent, nous sommes obligés de manger du *tô* tous les jours.”

foods including unsaturated fat (butter, margarine), fatty meat, Maggi seasoning, salt, sweets and sugar, wheat products (pasta, bread) etc. Consequences are increasing cases of hypertension, overweight, heart attack, diabetes, obesity and other non-communicable diseases in these urban areas (Becquey, Savy et al. 2010).

My findings also corroborate with those of further studies. One of the earliest classic studies on diet in SSA was by a British anthropologist Audrey Richards (1939) in her book *Land, Labour and Diet in Northern Rhodesia, an Economic Study the Bemba Tribe* from 1939. In this pioneering work, Richards analysed the processes of production, distribution and consumption of food in the South African Bemba society. Already in this early book, cereal paste with a vegetable sauce was stated as a staple food

...The Bemba diet is in a sense a simple one since it is composed largely of one cereal food-the finger millet...The bulk of each meal consists of a porridge made of this flour, and the subsidiary foods, meat or vegetable, are eaten with it in small quantities of the former...(Richards 1940:37).

Another earlier description of African diet was this of the geographer Livet Roger, who in his book *Geographie de l'alimentation* from 1969 described the tropical and equatorial African meal as a voluminous crumpled ball paste accompanied with a sapid gluey sauce which ingredients depends on the seasons and gathering possibilities (translation from Roger 1969:142). Roger even goes further by describing the consumption of fermented drinks and their social background: Fermented drinks are consumed regularly. Palm wine in equatorial while maize or millet beer in tropical areas are most appreciated. Generally, these drinks are consumed outside of meal times and give incentive for joy. A group of men get together, where there is drinking, talking, laughing, and singing leading to the consumption of 3 to 4 litres of an alcoholic beverage between 4° and 5° (translation from Roger 1969:143).

Similar recent studies on diet in BF have comparable results as well. They revealed cereals as a predominant staple food in both rural and urban BF (Becquey, Savy et al. 2010; Cheyns 1996; Konkobo et al. 2002; Lykke et al. 2002; Mathieu-Daudé et al. 2001). For example, in the concluding statement of their study Food consumption in rural BF in 3 villages in rural BF Lykke et al. found out

...that rural people on average consumed between 1.8 and 2.9 meals per day typically consisting of a thick porridge, made from pearl millet or red sorghum, and a sauce of leaves mainly *corchorus spp.* and *Adansonia digitata*, calyces from *Bombax costatum*, or groundnuts. Spices, such as chilli, *Parkia biglobosa*

(*soumbala*) and dried fish were frequently added. Vegetables and pulses were occasionally eaten, but meat and milk rarely so (Lykke et al. 2002:119).

But, there exist slight differences according to the local availability of the ingredients. For example, my results revealed dried okra, sorrel and fresh okra as the main three vegetables used for sauces while the study of (Lykke et al. 2002) had corchorus spp (Mallow/Bulvaka); and *Adansonia digitata* (Baobab), calyces from *Bombax costatum* (Red-flowered silk-cotton as main vegetables.

My results are similar to those of Becquey et al. (2010) who state in their study on dietary patterns of adults living in Ouagadougou and their association with being overweight was a result that “the diet was mainly made of cereals, vegetables and fats from vegetable sources” (Becquey, Savy et al. 2010:1).

Furthermore, in contrast to earlier findings, however, one interesting finding was the regular and intensive consumption of the local beer in my study area, which was not that most described in the previous studies mentioned above. This inconsistency may be due to the socio-cultural and religious background of my study area, in which the traditional beer *Dolo* plays a crucial role (see 6.5).

Moreover, none of these studies investigates the diet of for example European foreigners in the midst of this diet scenario. My study did investigate the diet of some Europeans living in the research area with the aim of some comparison between people from different socioeconomic and especially the cultural background. The results were surprising. The interviewed European living in *Dano* were increasingly consuming locally produced food than imported because they found that these were healthier than their industrial food back home. They found that living in *Dano* has led to a healthier lifestyle according to their food and nutrition habits. This claim illustrated an atypical situation as normally the opposite case was usual. Namely, that African local population often considered European imported processed products to be of higher nutritive quality and its consumption more prestigious than local African food, mostly considered unrefined and of low quality. This thinking and behaviour could be a further explanation for the unhealthy dietary patterns of the African middle class in urban areas, who can afford physically and economically the so-called modern foods as described above.

However, a note of caution is in order here, since it is possible that this result will not be reproducible on a wide scale across Burkina Faso (or West Africa), due to the very small sample of interviewed Europeans of two persons.

10.2 DETERMINANTS OF DIETARY PATTERNS

The influential factors that determined the dietary patterns were elucidated in 6-above. The study found out that the economic, environmental, sociocultural aspect and health-nutritive were the main influential factors of dietary patterns.

Thus, it is important to ask what factors lead an individual or a society to consume certain kinds of food and not others? This question has been of interest in interdisciplinary research for a long period. A vast corpus of scholarly work outline environmental, the economic and the socio-cultural domains of everyday life as the main factors influencing the human diet. In this context, age, population structure, occupation, nutritional knowledge, educational level, whether women work or not, the need for physical labour, household size, the need for warmth, rural or urban residence, race, religion, contact with immigrants, transport cost and availability, the availability of convenience foods and the cost of eating out etc. are among the most cited influential factors patterning food choice (Atkins and Bowler 2001; Grigg 1995b).

Economic determinants of dietary patterns: the statement “ah, it is tôle we know and eat, it has always been tôle, we would like to eat something else, but because of the lack of money we have to eat tôle every day” made by the majority of the sample in my study, stressed out the huge influencing role of the economic aspect on dietary patterns. Thus, it was not surprising that the economic factor took the leading rank (66%) by influential factors of the diet (Table 12). Other studies classified indeed economic factors as the leading reason for worldwide differences in the composition of the diet and the level of economic development, which influence many factors of diet (Grigg 1995b). The most influential factor of economic development on diet is income. In developed countries through the rising income of the poor since the 1930s, the difference in nutritional intake between the upper and lower-income groups have greatly diminished (Grigg 1995b). Thus, the higher the economic development is, the lesser is the difference in diet within the population. To offer an example, meat consumption offers a classic case in point, characterized by little differences between the rich and poor in most developed countries (Grigg 1995b). However, for the majority of the world’s population, income remains the most important and persistent

determinant governing food habits, along with the differing cost of calories and proteins, which in turn goes a long way in explaining spatial variations in diet and share of food expenditure against total expenditure. Because low-income families spend a larger proportion of their income on food than higher-income families. Higher-income groups can also be observed to purchase higher quality items rather than to increase their intake of basic staples (Atkins and Bowler 2001; Grigg 1995b).

Local food availability and/or supply determinants of dietary patterns: Local food availability and/or supply which is determined by the community own production and import of food plus food aid was mentioned as the second main factor by dietary patterns (54%). Whereby the majority (49%) stated the subsistence production as the major point here: “Cest ce que nous avons/This is, what we have” was cited by the majority of participants to underline their easy access to their own production. It has to be noticed that rural/farming participants primarily mentioned the production aspect of the physical influential factor in food habits. Because depending on the season, those get mainly their food on from their own production. Local and/national food availability remains one of the strongest influential factors of dietary patterns, as already investigated by many studies. Food consumption in the nineteenth and early twentieth century was influenced by the geographers’ view of environmental determinism. The environmental determinism saw food production as a product of physio-geographical factors as topography, hydrology, local soils and climate. As a consequence, diets of farmers in a traditional society exercising subsistent farming were limited to one form of production, and to some local trade reducing ingredients for food consumption to the range of farming systems practices within a particular physio-geographical setting (Atkins and Bowler 2001; Grigg 1995b). “Consequently, foods reflect the types of crop and livestock that can be kept on local soils and with local climates. Food consumption closely reflects local food production” (Grigg 1995b). But the increase of regional and international trade characterized by decreasing transport cost and increasing regional and international food imports led to the disconnection of food production from local ecology and thus local food production on one hand and to a gradual convergence of diets on the other (Grigg 1995b). This phenomenon led to what some writers call internationalisation and/or globalisation of food consumption (Grigg 1995b) and strong influence local and national food market’s food supply.

However, *Dano* as a typical African small urban town does not access all of the opportunities of such of the globalisation of food or diet, in terms of imported food, as

lots of foodstuffs are often missing in *Dano*'s markets. This is more or less limited to Ouagadougou, as in other main capitals in Africa. For this reason, food supply on market has been stated as the second most cited influential factor of local food availability (4%). As local food availability and supply on markets can indeed influence the diet of people (at least of the ones who buy food), since it determines the possibility on what kind of food to purchase or not. Fatoumata, an urban housewife stated: ⁸²"we consume maize paste and rice as a staple food. But also vegetables, beans, pasta and tubers according to their availability/supply on the market."

This statement was confirmed by Rita, a teacher in *Dano* town:

⁸³...Food supply is one of the challenges of living in *Dano* if you love cooking and eating like me. According to fresh vegetables and cereals, it is great, but other types of food such as roots and tubers, meat, fresh fish are missing or only sporadically available. Furthermore, products such as butter, milk, cacao, in short, imported products etc. are very expensive in *Dano*. That is why whenever I go to Bobo or Ouaga, I always come with food reserves back to *Dano*...

Suzanne, an American missionary who articulated similar perspectives as well:

...Well I love Dano for its supply in cereals and vegetables, fruits etc. But I miss qualitative meat, fish and potatoes, which are rarely or only infrequently supplied on markets. That is the reason, whenever I'm in Ouaga, I always come back with the car full of foodstuffs, I do not get in Dano...

Indeed, these statements could be confirmed by field observations, during which a constant change in food supply on different markets of *Dano* was noticed. This is logical, in the view, that food production is limited through its dependence on the rainy period. However, through the intensification of small dam and irrigation systems, the

⁸² French quote: "Nous consommons de la pâte de maïs et du riz comme aliment de base. Mais aussi des légumes, des haricots, des pâtes et des tubercules en fonction de leur disponibilité / fourniture sur le marché."

⁸³ ... L'approvisionnement en nourriture est l'un des défis de la vie à Dano, si vous aimez cuisiner et manger comme moi. L'offre des légumes et céréales fraîches est excellente. Par contre les produits tels que les racines et tubercules, la viande, le poisson frais sont rares ou disponibles seulement que sporadiquement. En outre, les produits comme le beurre, le lait, le cacao, bref les produits importés, etc., sont très chers à Dano. C'est pourquoi chaque fois que je vais à Bobo ou à Ouaga, je viens toujours avec des réserves de nourriture à Dano...

counter-season production is getting more and more in *Dano*, which positively influences food supply.

Nevertheless, dietary patterns of the majority of the world's population still reflect local food production and the inertia of traditional diets (Atkins and Bowler 2001). For example, Annegers (1973) in his investigation on the ecological background to certain nutritional imbalances in West Africa concluded that although salient historical factors influenced the spread of particular crops and farming systems, it was indeed the agro-climatic environment that has had the most implications on the evolution of regional dietary patterns (Annegers in Atkins and Bowler 2001). The results of my study indeed confirmed this statement.

Finally, a very small part of the sample stated food aid in terms of food availability as one of the most influential factors on their dietary patterns, particularly food aid supplied by both the governmental institutions and the foundation Dreyer. Food supplied here in form of social allocation and school meal are quite a strong institution in *Dano*, consequently, it is one of the most influential factors of dietary patterns of its beneficiary in *Dano*, as one participant described this as followed: ⁸⁴"I do not have any choice. Due to the lack of other alternatives sources of food, I have to consume that food that I get as a donation from the social services."

Sociocultural and gustatory determinants of dietary patterns: A further influential factor mentioned in this study were sociocultural and gustatory determinants given by 18% of participants as influential factors of their dietary patterns. The individual food preferences/taste played here a huge role with a statement such: ⁸⁵"I eat this food because I like it" and "I eat these foods because they are my favourite ones" were the most noticeable here. In terms of socio-cultural determinants of dietary patterns, participants stressed this through the following statement, like this of C. Somé:

⁸⁴ French quote : "Je n'ai pas le choix. Par manque d'autres sources de nourriture, je dois consommer cette nourriture que je reçois comme don des services sociaux. "

⁸⁵ French quote : "Je mange cette nourriture, parce que j'aime ça »et« je mange ces aliments, parce qu'ils sont mes préférés."

⁸⁶“Food, we consume is the same food our parents and grandparents used to know and to eat. This is the same food we used to know and to eat. It is just like that.” Marie from *Dano 7* village expressed her point of view as follows: ⁸⁷“The choice of our daily food depends on the fact that since our birth that is what we know.” Another important socio-cultural aspect of food habits is the intense consumption of the local beer *Dolo* and its symbolic and religious meaning during socio-cultural events, especially at funerals.

The interlinkages between sociocultural and gustatory aspects of food consumption has been in earlier studies investigated. In the first place, Humans consume food to fulfil a primary biological need. As omnivorous beings, they can satisfy their nutritional need by using a wide range of food. However, if the biological fulfilment of food need represents at first the main objective of food intake, it is not the only one (de Garine 2004:13). Besides the biological aspect, one of the most influential factors on human food consumption, there are sociocultural aspects to consider. Food is not just something to eat and /or only to eat, but also good to think with. Food transgresses many boundaries in the sense that it is both substance and symbol; it is life-sustaining in both biochemical and cognitive modes. It is both a physical and social part of a human. Food is both nutrition and ways of thought as anthropologist Lévi-Strauss once stated “Food is not only good to eat but also to think with” (Macbeth and MacClancy 2004:6). By definition, nothing else in human life fits that double bill. That being said, food is an elemental part of the culture of community, a region, or nation. However, it is a relative concept. Because what is considered edible in one culture, may not be the case in another culture (den Hartog et al. 2006; Macbeth and MacClancy 2004). The ways a specific food gets an integral part of the human and their culture are influenced by the fact that,

...Human are social animals, endowed with symbolic thinking, who in their society elaborate a culture, a dynamic corpus of knowledge and material artefacts, which is transmitted from generation to generation. Their artefacts and behaviour in relation

⁸⁶ French quote : “La nourriture que nous consommons est la même nourriture que nos parents et nos grands-parents connaissaient et mangeaient. C'est la même nourriture que nous connaissons et mangions. C'est juste comme ça.”

⁸⁷ French quote : “Le choix de notre nourriture quotidienne dépend du fait que depuis notre naissance c'est ce que nous connaissons.”

to food are largely a product of a learning process in the framework of their own society and culture (Macbeth and MacClancy 2004:7).

(Mead and Guthe 1945:13) referred to these aspects of food consumption when they defined food habits as “the ways in which individuals or groups individuals in response to social and cultural processes, select, consume and utilise portions of the food supply.” (de Garine 2004) stressing that it should be clear that the last part of this definition suggests in contrary to what many might think, the ultimate aim of human diets is not the automatic achievement of the best possible inclusive biological fitness by consuming of all of the food resources available. It is rather a process of selection, during which human opt for the potential food items according to a broad range of historic and situated factors. And within these processes of selection, each proceeds to an option according to personal criteria. Hereby play the psychological aspects of feeding behaviour a significant role. Psychological aspects influence the early and specific life experience of each individual. These lead to other immaterial aspects of food consumption such as taste, food preferences, health issues of nutrition etc.

Sociocultural aspects of food consumption are one of the main factors that capture deeper attention. At least by sociologist and anthropologists, who believe that rather sociocultural aspects exercise more influence on food choice than environmental or economic aspects, whereby some of them take a more materialistic view of food choices (Grigg 1995b). Mennell concretised this view by stating that “worldwide, the three most powerful influences on what and how people eat are religion, class and nationality” (Grigg 1995b:34). Grigg supports Mennells’ thesis further by stressing out the following statement: “National differences in the type of foods eaten and the way they are cooked often reflect local ecology and the level of economic development, but with migration, ethnic differences become influential” (Grigg 1995b:349).

As already mentioned the sociocultural aspects of food choice has been influenced by sociologists and anthropologists. A key influence has been outlined by the English Anthropologist Audrey Richards. In the first sentence of the preface of her book *Hunger and Work in a Savage Tribe: A Functional Study of Nutrition Among the Southern*, first published in 1932, Richards writes: “Nutrition as a biological process is more fundamental than sex” (Richards 2004:1). Richards with this statement wanted to reflect the vast interest of study of sex, by showing that Nutrition was not dictated by biologic alone, but satisfied a whole system of needs through institutional and social processes (Richards 2004). However, Richards’ theses were themselves

influenced by ideas of her Mentor Malinowski who outlined in his works: *Sex and repression in savage tribes* in 1972 and the *sexual life of savage* in 1929, the importance of reproduction for variation in family forms and social institutions. Nevertheless, Richards instead of focussing on sex and reproduction as basic needs for sentiment, institutions and values, oriented her view towards hunger and food. Whereby Malinowski himself recognised that theoretical work on instincts and needs in human society has suffered from a surfeit of sex. Thus he praised Richards for laying the grounds for further studies by turning the attention to another drive, namely food (Malinowski 1932 in Richards 2004).

Another mentioned influential factor of the dietary patterns is the **health-nutritional determinant**, elucidated by 10% of participants. Statements such as: “I eat these foods, because they are healthy, why change this, if I always feel well with them” (Rigobert, farmer, *Dano* village). “Well I have two children, I want to grow well, that is the reason, why I try to diversify as often as possible our dish” (Rita, teacher *Dano* town). Furthermore, Health issue is increasing in people’s minds, as they referred to the health-functional aspects of the food, e.g. “I eat this because it is healthy”, was the most common expression related to this.

The results of chapter 6- above, revealed that the economic, local food availability, sociocultural, gustatory and health-nutritional determinants as the influential factors of the dietary patterns. Whereby the economic and local food availability was revealed as having the strongest influence on diet. However, it is not only a single factor influencing diet patterns. There rather exists a combination of several elements including the receptiveness to trying various food items, levels of urbanisation, educational, informational and financial access to food and nutrition, knowledge on health-nutritional aspects of food.

Hypothetical assumptions were an adequate way to find out how far the participants' food choice horizon could be if they do not have any influential factor such as financial and/or physical (availability/accessibility) constraints. According to results the difference between the real food choice and the hypothetical one without any financial constraint is noticeable. Economic and/or physical factors have indeed an influential characteristic of their food choice. However, both real and hypothetical food choice made revealed deficient consumption of fruits, raw vegetables, tubers and roots, milk and milk products. One interesting finding was that sociocultural factors, which are among the most important reported in the literature (at least in social analyses), was

the last reported influential factor in my results for only 5% of the cases. This result may be explained by the fact that the statement was related to food items and not to beverages. As the socio-cultural and religious aspects of the local beer *Dolo* remains strong and has an important influence on people's food habits. Another explanation could be that participants omitted to explicitly state sociocultural aspects of their diet, as they were probably thinking that this was obvious and need not be mentioned. Additionally, factors related to the taste of the traditional food intake were stated as important for food choices. Another surprising finding was the health-nutritive factor articulated by participants. The influence of health-nutritive factors might be explained by the fact that both GO and NGO were increasing their focus on the importance of healthy-nutritive food in the study area. However as mentioned, in the previous chapter urban and rural areas in developing countries today experienced different types of diet. Rural diet remains mostly traditional, characterized by a higher total calorie consumption per capita, but due to the greater nutritional requirements of manual labour, there is at the same time a greater incidence of undernutrition (Grigg 1995b). Regarding the urban diet, in term of food access, it is characterized by less seasonal variations, a larger range and better availability of foods than their rural counterparts. Urban diet is often associated with changes in food habits, westernization of dietary patterns, lower levels of physical activity and overall changes in lifestyle. Increase in consumption of meat, dairy products, fatty and sweetened products, processed foods, street foods/snack, salt, sugar, sweetened and/or alcoholic beverages as well eating outside the home are the characteristics of this lifestyle known also as a dietary transition. Nutrition transition which is accompanied by increased rates of overweight and obesity and growing risks of chronic diseases is today one of the increasing issues affecting urban areas and rapidly developing countries (Becquey, Savy et al. 2010).

10.3 SOURCES OF CONSUMED FOOD

The chapters 5- above have dealt respectively with the what and the why of participant's food habits. Chapter 7- above aimed to determine the different sources of the participant's food. Results revealed three main sources of food: own production of food, purchase of food and food aid in form of intersocial and institutional food transfer.

The way people access food can be diversified and indeed are most diversified. But generally, people usually obtain their food from three main sources, namely from the market, their own production, and food transfers from institutions and/or other households (Ruel et al. 1998). The household heads (HHH) of my study indeed used these ways to access their food, rather through a combination of these sources.

However, self-production and purchase of food were the most cited sources. Consumption of self-produced food and purchase of food were used by seven in ten households as a source of food, at 74% for self-production and 70% for purchase. This amount for the purchase of food correlated with the national standard, where 70% of the households get their food from purchase as well in 2012. According to own production, the level of self-consumption is largely higher in the research area compared to the southwest region (39%) and the national standard (27%) (WFP 2014).

In terms of food aid, only 8% of households referred to that kind of way as sources of their food. Here emerged the intersocial source of food (food transfer from relatives, friends and ceremonies) as being the most used form with 6% of households against 2%, which referred to institutional food aid as a source of food. Institutional food aid in form of school meals represents an important source of food in *Dano*, at least for pupils in the schools and thus for parents indirectly. However, food aid although important was cited at the lowest level of sources of food. This could be because the school food was not directly linked to the whole household itself, but only to a part of it. However, depending on the number of children attending schools, this part could be large and thus influence the overall food access/availability of the whole household. It could be, that during the interviews participants were not aware of the importance and influence of a daily school meal, as this occurs indirectly outside of the households.

Food access is one of the dimensions of the term food and nutrition security, where it is referred to people's ability to access adequate resources (entitlements) which allow them to produce, buy, exchange or to be given food aid. How people have access to food depend on the economic, political, social and cultural conditions, in which there are situated. Further main influential factors of food access are people livelihoods assets /resources which allow them to purchase and/or produce sufficient food for their needs. Since the 1980s, the term food access is broadly influenced by the food entitlement approach of the economist A. Sen (1986), who refers to people's food insecurity as the loose of the access to their entitlements. Entitlements include the possibility of producing, buying, exchanging food or getting institutional, intra-social or intersocial food aid. The interest in whether and how people acquire food is closely associated with the concept of vulnerability as connected with the relative distribution and control over resources or access to employment and /or income (FAO 1997). Therefore "...the risk of entitlement failure determines the level of vulnerability and hence the level of food insecurity, with the risk being greater, the higher the share of resources devoted to food acquisition" (Maxwell 1995:3). Thus, lack of entitlements or access represents one of the main contributors to malnutrition occurrence in households.

Furthermore, it should be noticed that depending on the main occupation of households head, the first and second source of food can differ. For example, Farmers have as the first source of food their own production and purchase as the second option of getting food, while non-farmer purchase as the first source and sometimes own production as the second source of food. However, in BF - due to the low modernised farming system, the relatively small production area, the high climatic variability and the related low yield from subsistence production- only 30-35% of farmers use of their own food production as the main source and around 60% of them purchase the rest of food (WFP 2014). But the results of my study show that the number of the household using their own production as the main source of food slightly exceed the national standard. In my study, 42% of farmers were using their own production against 51% who were using the purchase as the first source of food.

10.4 VULNERABILITY OF FOOD AND NUTRITION SECURITY

Chapter 8- above has investigated the vulnerability of food and nutrition security in the research area. The chapter revealed that determinants of food and nutrition security namely food production, access and consumption were facing vulnerable situations.

The vulnerability of food production was characterized by population growth, lack of land, social instability, climate change and/or variability and other environmental-related constraints and not environmental constraints e.g. economic and sociocultural ones.

Population growth and the resulting lack of land and social instability is increasing in Dano. Although the existence of legal land rights, land issues in Dano- mostly in rural Dano- generally underlie the customary land tenure system and are therefore managed by the so-called *chefs de terre*, who are in charge of managing the society including land access and distribution for both local population and immigrants. However, despite the efforts of the *chefs de terre*, the problem of land in *Dano* is getting challenging and critical. Consequences of the lack of land are increasing disputes between both autochthones and immigrants leading to increasing social instability in the region (Commune De Dano 2007; Gray 2005).

Climate change and/or variability characterised by unpredictable patterns of rain and further environmental constraints including increasing plant/crops and livestock diseases and decreasing yield. Studies and climatic scenarios showed that Africa due to its already high vulnerability to climate vulnerability and fewer adaptation capacities will be one of the most vulnerable continents to the effects of climate change. Here are agriculture, ecosystem services and livelihoods the most vulnerable sectors, which are most at risk (Adger 2006; Boko et al. 2007; Codjoe and Owusu 2011; GOBF/MECV 2007; Mertz et al. 2009). In the case of Burkina Faso, rainfall and temperature represent climatic parameters with the most impact on resources, especially on main livelihood activities, due to their changing trends and both their inter-annual and intra-seasonal variability. This interplay between wet and dry seasons make Burkina Faso as the whole Sahel region the most dramatic example worldwide of climatic variability that has been directly and quantitatively measured (Nielsen and Reenberg 2010). An increase of the average temperature by 0,8°C in

2025 and 1,7°C in 2050 are projected, while rainfall will have a decrease of 3, 4% in 2025 and 7, 3% in 2050 (GOBF/MECV 2007).

Further constraints in food production were the lack of institutional support in terms of agricultural extension services, which although offered, were not sufficient and adequate for both farmers and extensions worker themselves. Intensive assistance in terms of agricultural extension services should be implemented by taking more and more farmers' and local realities into account. More climate services should be a solution for better and controllable predictability of the increasing unpredictability of rainfall patterns. However, a more efficient approach would be independence of farming from rainfall through the intensification of water keeping methods as the former president of Burkina Faso Thomas Sankara once described that:

⁸⁸...Regarding food self-sufficiency, we are retaining the maximum amount of water in this country. Everything that falls like a drop of water in Burkina is collected for use. Water is precious, more precious here than elsewhere, that's why we started the construction of 250 small dams. These reservoirs are modest compared to what is done elsewhere as dams...

Further, as traditional land access remains strong in Dano, it should be a better and intensive co-operation between the traditional leader and the government officials in terms of land access in order to avoid the land-related growing social collapse in Dano.

But not only food production was underlying stresses in Dano, but also food access and consumption.

As mentioned in chapter 7-, more than 70% of households purchase their food from market/shops. Vegetables, cereals, spices, condiments and beverages were the most purchased, while fruits, tubers and roots, and milk and milk products were the least purchased food groups. This reflects indeed the mentioned dietary patterns. If the

⁸⁸Original French quote : ...Concernant l'autosuffisance alimentaire, nous sommes en train de retenir le maximum d'eau de ce pays. Tout ce qui tombe comme goutte d'eau au Burkina est recueilli pour être utilisé. L'eau est précieuse, plus précieuse ici qu'ailleurs, c'est pourquoi nous avons lancé la construction de 250 petits barrages. Ces retenues d'eau sont sans prétention en comparaison de ce qui se fait ailleurs comme barrages...<http://thomassankara.net/le-president-sankara-au-journal-el-moudjahid-compter-sur-nous-memes-12-mars-1985/>, last accessed 01/01/2019

majority (51%) of households were satisfied with quantitative and qualitative food supply on the markets, a greater majority was unsatisfied with food price (70%).

Reasons for the above description of the market according to food supply and price are multiple and complex depending on participant's purchasing power, the expectation on food supply on the market, food patterns and experiences with other markets. The high number of participants being totally unsatisfied with food price, have to be referred to the increasing food price since the global food price crisis in 2007-2008. The global food crisis of 2007-2008 led to a huge increase in food prices, especially of staple foods such as rice, wheat, and maize. This price increase had affected most people in the developing world. Thus, the food crisis provoked so-called food riots by the population all over the world, but especially in African, middle and South American and Asian countries, hence engendered political and economic instability in these countries. The food crisis with a special name *avènement de la vie chère* or *vie chère* (*Onset of expensive life or expensive life in Burkina Faso*) -one of the most affected countries in Africa by the crisis-. Thus, Burkina Faso experienced during the time of food crisis frequent severe food riots throughout the whole country (Picture 14). With reasons, because as Prevel et al. (2012) found out, that the food crisis in Burkina Faso led to massive food prices increase on local markets, especially those of fish (113%), cereals (53%), and vegetable oil (44%), leading to an increase of the mean food basket price by 32%. The consequences were remarkable, both economically as well as nutritionally. The monthly food expenditure increased by 18%. Thirty-three per cent of households were food secure in 2007 and 22% in 2008. Individuals consumed fewer fruits and vegetables, dairy products, and meat/poultry in 2008 than in 2007 (Martin-Prevel et al. 2012). Consequently, households' expenditure also increased during the time of the food crisis between 2007-2008, as stated by the households in my study. The majority of households of my study, namely two-thirds (65%) experienced an increase from 5% up to 200%, whereby more than half of participants stated an increase of slightly more than 50% of their expenditures. However further causes of the increase of households' expenditure were related to the increase of the households' size mainly due to the massive come back of emigrated relatives from the politically unstable Côte d'Ivoire, which is one of the main target countries of Burkina Faso's emigrants.

That the increase of expenditure led to a decrease in income could be expected, as this was confirmed by the majority of households (62%) (Figure 32). However, this

statement was not surprising as several studies have shown that food expenditure represents a large part up to 80% of households' expenditures in developing countries (Chagomoka 2016; Leroy et al. 2015; Martin-Prevel et al. 2012; Maxwell 2000; Melgar-Quinonez et al. 2006; Ruel 2003). In Burkina Faso, such as developing countries, food expenditures include the largest part of households expenditures, taking (65%) of the monthly households' budget, indicating an economic vulnerability. However, urban households, due to their high dependency on food purchase have a higher food expenditure (31%) than the rural households that produce one part of their food (WFP 2014). In terms of income, in accordance to other studies (Commune de Dano 2007; Maxwell 2000; WFP 2014) households' sources of income included the sale of livestock, artisanal products and cereals, salaried work and remittances. Whereby households from rural Dano mainly generate their income from the sale of livestock and crops, while households from urban *Dano* get their income from salaried work, self-employment and petty trade. Petty trade, mostly done by women is well exercised in Dano, especially trade of local beer *Dolo* and artisanal products. However, in rural *Dano*, farming remains the main economic activity, where 90% of rural households get their income from, here are the sale of cash crops and vegetables the main sources of cash for farmers. Livestock while representing an important source of cash, play further important functions such as sociocultural (social status, funeral, wedding etc.) and production functions (draught animal, animal manure etc.) (Chagomoka 2016; Commune de Dano 2007). However, households do not get their income from one source, they were rather involved in multiple income-generating activities by combining diverse activities and this for both farmers and salaried professionals. Thereby sale (via petty trade) and self-employment were stated by households as the most second relevant sources of income. Studies emphasise the importance of diversifying income sources at both the individual and household level in order to meet various needs at different times and to reduce the vulnerability risk to the economic crisis and especially food insecurity (DFID 1999a). In this study, the term income refers to Chambers's and Conway's definition of income, which states that rural poor performs livelihood diversification by exercising multiple and varied strategies to obtain their living (Chambers and Conway 1992). Thus, in this study, the term income included both earned income (e.g. from salaried profession) and unearned income (e.g. from the sale of crops, artisanal products, street vending, pensions or other government transfers, net income from gifts and remittances, lottery winnings, and savings and net borrowing or lending etc.) (Maxwell

2000). Although income-oriented approaches of poverty have been much criticised (2.2.3 above), an increase in net income or cash stills remains one of most pursued goal by people (wage from employment, farm work, small trade, etc.). Consequently, augmented income also relates to the economic sustainability of livelihood and food security, as (Mathys and Gardner 2009) stated this:

...A household's risk of food insecurity in Burkina Faso is associated with the level of household income and with the percent of expenditures on food. Lower household income is also associated with poor maternal dietary diversity. Burkinabe households earn income from the following sources: selling agricultural production, selling livestock and providing labour (formal or informal) for payment ... four-fifths of rural households' annual income (81 per cent) is generated from the agricultural sector (including livestock). The other fifth is provided by trade, salaried and other paid work and other activities. In sharp contrast, ...urban households earn 42 per cent of their annual income from salaried and other paid work, 23 per cent from trade and the balance from other sources. Production of traditional sorghum beer, dolo, is a widespread and likely underestimated source of income for women nationwide...

But if the first two determinants of food and nutrition security underlie the vulnerability context in Dano, food consumption, the third determinant of food and nutrition security also underlies the vulnerability context.

According to diet, dietary patterns were characterised by a poor quantity and quality of diet.

Quantitatively, half of the households (50%) described their diet as insufficient. Low yield, moderate availability of food and economic inaccessibility to food were the main reasons given by households, why they were unsatisfied with their dietary quantity (Figure 33). According to the FAO guide, the largest number of households (69%) consumed less than the recommended daily three meals as recommended by the FAO. Qualitatively dietary patterns were monotonous with rarely any diversification. Diet consisted predominated of cooked cereal grains or flour-in form of a paste (tô)-accompanied by a green vegetable by a sauce. A minority of households (3%) had a low dietary against a large majority (85%) who had eaten more than 6 food groups, thus having high diet diversity score compared to 68% of the national average and 81% of the southwestern region average in 2012. This group consume more pulse and nuts, animal proteins, milk and milk products. Diet here is more diversified than by the first two groups (WFP 2014). Just over one in 10 households (11%) was consuming between 4-5 food groups, thus had a medium diet diversity households compared to the 27% of the national average and the 16% of the southwestern region

in 2012. This category of households has the same diet as the first group of low diet diversity. But they consume more animal proteins and pulse on average once a week. Yet, these households did not consume any fruit during the week preceding the survey, thus they could be suffering from micronutrient deficiency as well (WFP 2014). This brings us to the diet composition of the different socioeconomic groups of the study. It can be seen that salaried participants had the most diversified diet compared to the other two groups of farmers and others. For example, fruits, eggs, milk and milk products, animal proteins are more consumed by the group of salaried and other than this of the farmer. Thus salaried had the highest household diet diversity score. In fact, of the 19 households in the research with households head as salaried, no of them was belong to the first 2 categories of diet diversity, but the third category of an adequate diet. Reasons for this difference in diet diversity can be revised in chapter 6- above. Diet diversity seems to be adequate in participants households according to the high household diet diversity score. However, it should be reminded that the household diet diversity score more captures the quantity and lesser the quality of household food consumption. Thus household diet diversity score correlates with caloric intake and other measures of food consumption quantity but are also at least somewhat indicative of diet quality (Vaitla et al. 2015). But a diverse diet does not necessarily lead to an adequate and/or balanced diet quality. Thus a diverse diet can still lack macronutrient balance and/or moderation, which are other dimensions of diet quality. Diets lack balance when they are too high or too low in fat, protein or carbohydrate. Diets lack moderation when they include excessive consumption of energy (calories), salt or free sugars. Food group diversity does not ensure balance or moderation. Food group diversity also does not in itself ensure that the carbohydrates, proteins and fats consumed are of high quality. Dietary diversity is, however, associated with better micronutrient density (micronutrients per 100 calories) and micronutrient adequacy of diets (FAO and FANTA 2016). Furthermore, given its insufficient predictive power and inability to account for day-to-day variability, the household diet diversity score should be used only at the population level. Particular attention should be paid to the sample size, which must be large enough to ensure a stable estimation at the population level (Becquey et al. 2010).

My study further investigated diet quality through the diet adequacy of women in productive age and children under five years. Socioeconomic and cultural factors such as limited access to assets make women in developing countries to one of the most vulnerable population groups in terms of access to assets. This vulnerability results in

unfavourable outcomes of women food and nutrition security with severe health and nutritional consequences both for women and children. This makes these both groups to one of the most vulnerable in terms of nutrition-related diseases such as malnutrition. Generally, children, nutritional status are influenced by this of their mother, as women are mostly responsible for child feeding and care from pregnancy till to childhood time, thus, the quality of the diet of women in reproductive age is a crucial nutrition issue, which has important implications for the health and well-being of women in reproductive age; and, which, among pregnant and lactating women has important consequences for the health, nutrition and development of infants and young children. The quality of women's diet is thus an important feature of global efforts to address optimal health and nutrition during the first 1000 days. However, due to the physiological demands of pregnancy and lactation, women in reproductive age are often nutritionally vulnerable during this time, For example, during pregnancy and lactation, women in reproductive age have higher requirements for most nutrients than adult men. While in absence of pregnancy and lactation, other than for iron, nutrients requirements for women in reproductive age may be similar to or lower than those of adult men, but because women may be smaller and eat less (fewer calories), they require a more nutrient-dense diet ((WFP/FAO 2004, National Research Council, 2006, Torheim and Arimond 2013 in FAO and FANTA 2016).

Diet patterns of interviewed women in my study revealed that more than 40% of them do not have any related pregnancy and /or lactating special diet. Factors influencing the stated behaviours are a bundle of different ones ranging from socio-cultural factors, through economic, health-medical/nutritional till to lack of knowledge on the importance of such prenatal and postnatal care. Health, nutritional, economic and sociocultural factors were the most stated by women why they change their diet during pregnancy and lactation. In detail, we can see that the majority of women (27%) stated biological-hormonal change of taste during pregnancy as the main reason for the diet change, by saying that⁸⁹ "a pregnant woman's diet is not influenced by herself, but rather by the needs of the foetus, thus she will eat whatever the foetus requires."

⁸⁹ French quote "Le régime alimentaire de la femme enceinte n'est pas influencé par elle-même, mais par les besoins du fœtus. Elle mange donc tout ce dont le fœtus a besoin."

However, the question is if that diet would fulfil the nutritional requirements for pregnancy and lactation? Economic factors with the consequence of not being able to access other types of food were stated by almost a fifth of women. Less than a fifth was influenced each by sociocultural factors saying that "it has always been like that (*ça a toujours été comme cela*)" and health-medical/nutritional factors by following medical advice of the health centre staff for "a healthy mother and healthy growing child." One interesting finding was that a statistic of 1% of women meant that ⁹⁰"they did not know, that pregnant women should have a different diet", as revealed by a respondent."

Why nearly half of women do not practise pregnancy and lactation-related diet can be explained by inaccessibility to prenatal and natal related behaviour training sessions and/or information. As the population in rural Dano is very dispersed, prenatal and natal sensibilisation sessions are either not accessible to all households at all or only to an irregular extent. As a consequence women miss important prenatal and postnatal sensibilisation sessions, thus the lack of information leads to pregnancy and lactation inadequate behaviour from their site. However, due to the strong socio-cultural influence and/or low education level of women in the area, even if they get the needed prenatal and natal information, it happens most of the times, that women do not estimate the importance of such prenatal and natal behaviour as often stated by the medical staff of the health centre.

Why women in SSA use practices of prenatal, natal and postnatal care/behaviour have been the point of interest of many studies. Main factors resulting from these studies range from structural one, through economic constraints, socio-cultural and traditional beliefs, to cultural beliefs and perceptions about pregnancy (Dako-Gyeke et al. 2013)). Having a look on factors stated by this study participants, a similarity according to the influential factors can be detected, in the view that socio-cultural, economic and health- nutritional/medical factors were the main factors, which determined the prenatal behaviour of this study women. However, not that it was not

⁹⁰ French quote "Elles ne savent pas que les femmes enceintes devraient avoir un régime différent."

only a single factor to mainly influenced that prenatal, but rather a combination of several. Therefore, the implementation of more and intensive sensibilisation sessions on the primordial significance of adequate prenatal, natal and postnatal behaviour and its impact on health and well-being of both mother and children is needed in the study area for better awareness and understanding of adequate health and nutrition behaviour adequate behaviour during pregnancy and lactation

A further investigation of pregnant women diet patterns was undertaken during a prenatal consultation combined with a sensitisation session in the health centre in *Dano*. Topics of the FGD were on maternity and diet patterns. The summary of the conversations is presented in Table 24. The 24-hour dietary recall (the day before the interview) of all women was made from starchy staples from cereals (100%) and a sauce of dark green vegetables (75%), therefore diet was made from the traditional staple food maize paste and vegetable sauce. Any single woman both from the urban and rural area has achieved minimum dietary diversity of 5 food groups. The consumed food groups included in the minimum dietary diversity setting were grains, white roots and tubers, and plantains and dark green leafy vegetables, while other consumed in form of fat and oil (75%), condiments and seasoning (100%) and other beverages (100%) were not included in the minimum dietary diversity because they are considered as low nutrient capacity. In contrast, none of the 8 women has consumed any of the following high nutritive food group:

Pulses (beans, peas, and lentils): rich in proteins and B vitamins, highly recommended for people who can't access animal protein because of both physical and financial reasons.

Nuts and seeds: well known for their high content of unsaturated fatty acids, vegetable protein, fibre, minerals, tocopherols, phytosterols and phenolic compounds. They have been identified as having potential health benefits (Alasalvar and Bolling 2015; Del Gobbo et al. 2015). Nuts and seeds may not be explicitly mentioned by the women or may not be consumed the day before the interview, but nuts and seeds represent both basic ingredients for several sauces and snack. Thus represent one important source of protein and unsaturated fatty acids for people.

Dairy: high-quality protein, potassium, and calcium, as well as vitamin B12 (available only from animal-source foods) and other micronutrients. Dairy products represent one of the least consumed food items in Dano with different according to the socio-economic situation. Farmers households, for example, consume never or only very seldom consumed dairy products than a professional worker in Dano town, who consume on

regular basis tinned, powdered or ultra-high temperature milk, yoghurt and *Dèguè* (a sweetened yoghurt drink made from gruel millet). However, the limited consumption of milk and milk products is not only a problem in Dano but rather a national food deficiency according to other studies, whom sample either did not consume milk or only on the very little portion as well (Becquey al. 2010; Becquey and Martin-Prevel 2010; Chagomoka 2016). Conversely, an exception to this limited dairy products consumption represents the Sahel region in the northern part of BF. The Sahel due although their economic vulnerability but their high level of livestock farming consumes by far the most milk products. In fact in the Sahel region, milk products are consumed 5 times higher than that in another part in the countries, on five days a week compared to one day of the national standard. As a consequence, diet in their part of the country is slightly more diversified compared to the rest of the country (WFP 2014).

Meat, poultry, and fish and eggs: are important sources of high-quality protein and bioavailable micronutrients, notably iron, zinc and vitamin B12 (the last is available only from animal-source foods), thus are well recommended to pregnant women, especially who with iron deficiency. Meat is considered to be a luxurious food item in Dano, as is perceived to be expensive. That could be one of the causes of why these pregnant women did not consume it. However, it could be a good health issue of eating limited consumption of red meat in the view that there is an increasing controversy related to excessive consumption of red meat. Red meat is increasingly being identified as having colorectal and stomach cancer-causing properties⁹¹. Furthermore, women who regularly attend prenatal sessions and who get identified as iron deficient get iron complements drugs from the health centre.

Vitamin A-rich fruits and vegetables: another essential high in micronutrient missed food groups consumed by the women was this one. Also, to being vitamin-rich, this food group represents the best source of vitamin C and/or folate and/or other micronutrients (FAO and FANTA 2016). Thus probably these suffer from micronutrient deficiencies vitamin A, zinc, iodine, and iron deficiencies make up the highest occurrences, leading to premature death, poor health, blindness, stunting, reduced cognitive development, and low productive capacity as adverse effects for these people (USAID 2014).

⁹¹ <http://www.who.int/features/qa/cancer-red-meat/en/>, last accessed 30/06/2017.

One interesting point related to the consumption of nutritive rich vitamin fruits was the omission of mango often eaten by women. Why any of the women reported having eaten any fruit at that time was markedly abnormal, in the view that in the time of the interview, the mango season was in full swing, and when ripe mangos were suspended almost everywhere and could be freely plucked. Why women did not consume for example mangos, which are classified as very high micronutrient dense, especially in vitamin A and normally a very enjoyed snack in the country and West Africa. However, when asking why they did not consume mango as they did not need money to access them, one woman responded: ⁹²“mangos during pregnancy are not good because through them you get a lot of weights and problems during giving birth”. This sentence brings us to the lack of knowledge on adequate nutrition during pregnancy and lactation, which should be more intensified in that region.

After this description of the 24-hour dietary recall of pregnant women (the day before the interview), a resulting very nutrient-poor diet is the consequence. Although diet here provides energy, varying amounts of micronutrients (like some kind of certain vitamins B) and variable quantities of anti-nutrients, such as phytates from the cereals and the vitamin A, folate and several other micronutrients intake from the dark green leafy vegetable sauce, the highest source of micronutrients through fruits and vegetables and iron through meat consumption were missing. However, it is well known, that the vitamin retention of vegetables depends on several conditions such as how they are cut, washed, stored and cooked. How women in the study area know about this and make use of them depend also on personal experiences, socioeconomic situation and educational settings to practice such a proper preparation of fruits and vegetables to making the most of their nutrients. Although in Africa there are certain traditional ways of processing fruit and vegetable products, proved by the wide range of dried chips, dried and powdered leaves, fruit beers and other fermented⁹³.

⁹² French quote: “Les mangues pendant la grossesse ne sont pas bonnes, car elles font grossir et creeent des difficultés pendant l’accouchement.”

⁹³ fruit and vegetable product⁹³
<http://www.fao.org/english/newsroom/focus/2003/fruitveg4.htm>, last accessed 30/06/2017.

As already mentioned above, the nutritional status of children depends on the state of their mothers, thus the micronutrient deficient of women in the study area reflected this of their children. And in this regard, maybe the high rate of child death. Because when asking women if they have already lost a child, 4 of the 8 women stated having lost at least 1 child aged 1 month and 2 years. 1 woman lost 2 children while 2 others lost each 1 child. This question although very sensitive revealed and cannot be generalised, however, it provides a sufficient ground for having to assume that there could exist a high child death rate in Dano. The reasons for this could not be directly related to malnutrition as the study lacks medical proof of that. However, there could be a high assumption that malnutrition and other child-related diseases could be related to this high death rate of children. However, the mother here stated fever and malaria as the main reasons for the death of their children. Could such situations be avoided with the fact that the state through the health centre offers gratis educational sessions on prevention of malaria and treatment of malaria? During the sessions and/or consultation patients get informed on the availability of free mosquito nets and treatment of malaria.

Not only diet is important for the healthy functioning of a mother, but also intake of supplements, especially of micronutrient and iron during pregnancy and lactation is highly recommended. Of the 33 women, who responded to the question of intake of supplements, the large majority (88%) stated that they took medication during pregnancy against the minority of 18%, who was not taking pregnancy-related medication. However, having a look at the list of medication taken, we can see that only 63% and 4% of them were taking paracetamol and chloroquine respectively (Figure 36). These medications are though not recommended during pregnancy as paracetamol, for example, is supposed to originate asthma by children (Birgitte et al. 2012) while chloroquine is suspected to generate low child weight by birth (Cot et al. 1992). But, taking this medication is common in Africa, making them easily accessible both princely and physically. Their intake during pregnancy could be related to lack of knowledge on their disastrous sides effects for both themselves and their unborn child. Nevertheless, paracetamol and chloroquine are mostly taken during malaria disease, in most of the cases there is not another alternative than taking them, if one has got malaria, even in pregnancy time. In contrary iron intake is highly recommended during pregnancy as "...iron deficiency anaemia in pregnancy is a risk factor for preterm delivery and subsequent low birth weight, and possibly for inferior neonatal health" (Allen 2000:1). Furthermore "...anaemia in pregnancy and

pregnancy-induced hypertension are common and thought to contribute significantly to maternal mortality and morbidity in developing countries" (Ladipo 2000:1). Especially in Burkina Faso, where the percentage of women taking an iron supplement during pregnancy stills remains low with a national average of 7% in 2012. According to vitamins supplement which was taken by 15% of women during pregnancy, it is not a satisfactory number according to existing low diet quality and the fact that,

...requirements for many, but not all, micronutrients increase during pregnancy. Deficiencies can exist because of losses or malabsorption associated with a disease or inadequate intakes, lack of knowledge about adequate prenatal nutrition, or dietary taboos associated with pregnancy, with potentially adverse consequences for both mothers and new-born infants... (Ladipo 2000:1)

Results according to child feeding practices that mothers apply both adequate and inadequate child feeding practices according to international recommendations, which are defined as

...the initiation of breastfeeding within the first hour after the birth; exclusive breastfeeding⁹⁴ for the first 6 months; and continued breastfeeding for two years or more, together with safe, nutritionally adequate, age-appropriate, responsive complementary feeding⁹⁵ starting in the sixth month⁹⁶.

As it can be seen in **Error! Reference source not found.** that breastfeeding is a common practice at every age section of the child, meaning from birth till to the age section 12-60 months (23,8 months for the national average). However, the recommended exclusive breastfeeding for the first 6 months was held only by 30% of mothers against 70% of them, who were doing mixed feeding⁹⁷ during that time. Further, most feeding methods were complementary and breastfeeding substitute feeding ones. Whereby complementary feeding was most used for children aged 6-

⁹⁴ Breastfeeding should include only mother's breast milk and oral rehydration salts (ORS), drops, syrups, vitamins, minerals, medicines and anything else breastfeeding

⁹⁵ Complementary feeding refers to feeding the child is through a combination of breastfeeding and solid (semi-solid or soft) foods. It is not recommended to provide any solid, semi-solid or soft foods to children less than six months of age.

⁹⁶ http://www.unicef.org/nutrition/index_24824.html., last accessed 26/01/2017.

⁹⁷ Mixed feeding refers to children who receive both breast milk and any other food or liquid including water, non-human milk and formula before 6 months of age.

12 months and 12-60 months for 96% and 52% of mothers respectively. Finally, 48% of mothers of children aged 12-60% used breastfeeding substitutes as well to feed their children.

The results show, that as in other African communities, breastfeeding is one of the most feeding practices of mothers in Burkina Faso –even if inadequately practised-. The inadequacy of breastfeeding and/or infant feeding results from a combination of several factors such as cultural beliefs, lack of information, poverty and physical inaccessibility to certain types of food. The consequences of these factors are not only based in my study area, but it is also rather a national problem, where for example the percentage of exclusively breastfed children before the age of 6 months did not exceed 25% in 2012, only 52% of children aged 6-9 months and 78% aged 9-11 months received complementary feeding (WFP 2014).

As already mentioned these inadequate feeding practices originate and support malnutrition by children due to lack of needed nutrients from both breast milk and complementary liquid food and drinks used were usually composed of water, tisanes, cereal porridge, family meal (maize paste). For example, due to cultural beliefs, the colostrum⁹⁸ is in most of the cases not given to babies, because of the yellow colour it is seen as dirty by most of the women and in cultures. So the baby is mostly fed after birth with tisanes and /or hot water. Water, hot water and herbal teas are used for different but very similar purposes by babies as this rural grandmother explains:

⁹⁹...we always used warm water, tisanes and /or herbal teas to cleanse, purge and relax babies. A nice bath and a full stomach with hot water allow a baby to sleep very well. Furthermore, depending on the behaviour and/or body expressions of babies, we recognise certain diseases and use especial tisanes to heal that disease.

⁹⁸ Colostrum is the first breast milk after birth. It is highly medically and nutritionally recommended for babies as it acts a first natural vaccine for new-borns.

⁹⁹ French quote : ...nous avons toujours utilisé de l'eau tiède, des tisanes médicinales pour nettoyer, purger et détendre les bébés. Un bon bain et un estomac plein d'eau chaude permettent à un bébé de très bien dormir. De plus, en fonction du comportement et / ou des expressions corporelles des bébés, nous reconnaissons certaines maladies et utilisons des tisanes spéciaux pour guérir cette maladie. Nous avons appris cela de nos mères, qui l'ont appris de leurs mères et nous l'enseignerons également à nos filles...

We have learnt this from our mothers, who have learnt it from their mothers and we will teach this to our daughters as well...

According to solid food used by children feeding, cereal porridge -whereby millet porridge- was almost the main ingredient and rice which was mentioned by a few women. Other ingredients included tamarind juice, baobab powder, moringa, powder, fish powder, groundnut powder, sugar, powder milk, honey, nut etc. Water-thinning maize paste, vegetable, juice, were mentioned as well in child diet. The determinants for child diet choice are summarised in Table 25. The reasons “healthy food, good for grown, fragile interesting, appropriate, nutrition” for the first 6 months and “breast milk not enough more, now strong enough” for children aged 6-12 months and “solid food needs for grown, can eat now family meal” for children aged above 12 months. It is detectable that these stated reasons are quite similar to those from the medical institutions.

10.5 ESTABLISHED COPING AND/OR ADAPTIVE STRATEGIES TO IMPROVE FOOD AND NUTRITION SECURITY

Chapter 9- above has investigated the established strategies to improve food and nutrition security in the research area. Thus, the chapter dealt with the fourth research question of the study: *What are coping and/or adaptive strategies, both at household and institutional scale to improve food and nutrition security?* The chapter indicated the existence of coping strategies at both household and institutional level. Households mentioned many strategies they applied in case of food stresses. The most applied coping strategies to face lack of food were being petty commodity production and trading (43%), the sale of livestock (31%), the sale of vegetables (16%), consumption of wild plants and fruits (21%). Further strategies used by a small minority of households (10%) were intersocial food aid (relatives and friends), the sale of cash crops (cotton, nuts, chilli etc.) and occasional job (mining, construction etc.). At the institutional level, the main coping strategies were focused on school meals and food aid programmes for the most vulnerable.

As Chambers (1989) describes, the vulnerability has two sides: an external side, which is constituted of risks, shocks and stress events that affect people and an internal side that represents the coping and adaptive strategies of individuals to vulnerable events. The degree of the vulnerability results from the interaction of both sides. For example, there is a high vulnerability if a huge potential hazard is combined

with limited coping and adaptive capacity (Bohle and Glade 2007). Whereby coping strategies refer to fall back mechanisms to deal with a short-term and/or actual vulnerable situations such as the lack of food while adaptive strategies refer to long-term or permanent changes in the way in which households and individuals acquire and/maintain sustainable livelihoods such as sufficient food or income (Maxwell 1995). Whereby proven efficient coping strategies might turn into permanent adaptive strategies. Coping and adaptive strategies originate from well-conceived and mature processes. Because as referred to Sen's capability's approach, people, especially vulnerable people are reactive and proactive coping strategies developers. Therefore, people are capable and experimental beings, able to achieve certain basic functioning, to what a person is capable of doing and being including being able to cope with stress and shocks and being able to find and make use of livelihoods opportunities. This should be achieved through gaining access to and using services and information, exercising foresight, experimenting and innovating, competing and collaborating with others, and exploiting new conditions and resources as some examples of such livelihood capabilities. Hereby the word capability embodies different meanings among diverse groups of people in vastly different settings according to people's complex livelihoods. Thus, the quality of life depends on the value people give to activities, they can choose and perform to achieve that desired quality of life (Chambers and Conway 1992). Coping with food insecurity situation in developing countries have been in the focus of research for a long time and the most used strategies have thus been characterized by researchers. For example (Corbett 1988) in her paper on Famine and Household Coping Strategies listed common applied coping strategies in the Sahelian and eastern African countries. These coping strategies included dispersed grazing, change in cropping and planting practices migration to towns in search of urban employment, collection of wild foods, use of interhousehold transfers and loans, use of credit from merchants and moneylenders, migration to other rural areas in search of employment, rationing of current food consumption, sale of productive household assets (e.g., livestock, land), consumption of food distributed in relief programs, sale of possessions (e.g. jewellery), the breakup of the household increased petty commodity production and trading distress migration. These strategies remain in most African settings as the results of my study and other studies confirmed this (Chagomoka 2016; Ezeama et al. 2016; Grobler 2014; Hendriks 2014; Maxwell 2000; Maxwell and Caldwell 2008; Ouédraogo 2006; Ruel 2002; Stella Wabwoba et al. 2015).

However, in the frame of their capability setting, many of African HH frequently anticipated risks to food security, resulting in carefully planned strategies are to cope with them. This means that the responses noted above are adopted in a far from haphazard or random manner (Corbett 1988). One of these carefully planned strategies including for example that, people do not empty their source of food or do not wait until their sources of food are run out, in most cases, they anticipated the coping strategies which can be less reversible or more. Less reversible coping strategies such as eating less preferred food, for example, lead to fewer assets deterioration than more reversible strategies such as the sale of productive assets, which lead to assets deterioration, thus more poverty and finally could worsen the next vulnerable starting point to food insecurity. Meaning, that households by their coping strategies usually are the first to utilise less reversible options -less negative repercussion on the overall household asset situation -. For this reason, the coping strategies of households in this study first involved generally petty trade and sale of vegetables (59% of households), which are intentionally implemented to be used mostly for these situations. However, as (Chagomoka 2016) mentioned this, “food coping strategies vary from one spatial entity to another in terms of frequency, severity and coping strategy indices along the urban-rural continuum”. In other words, HH in my studies having access to different sources of entitlements and capabilities/livelihoods opportunities used different coping strategies. For example, small trading was used by more or less of households depending on the geographical setting and profession to prevent and/or cope with food shortage. But some salaried participants in *Dano* town were mostly borrowing money and buying food on credit as further coping strategies while farmers mostly consumed less preferred food, wild fruits and/or food, reducing meal frequency and or quantity.

According to institutional coping strategies, to overall established coping strategies to face malnutrition and to improve the general food and nutrition security make clear that institutions are aware of the insistence and occurrence of malnutrition in *Dano*. These current coping strategies face certainly some constraints such as financial, administrative, sociocultural one, but they certainly have their positive side as mentioned by some participants in this study.

The narrative of Mr. Fofana, for example, reveals the impact and relevance of school meal in *Dano*. It has been clear that school meal has positive effects on all parties involved including the school, students, student's parent, in short on the whole

community. Mr. Fonana story has shown that there is a positive effect between school meals and the overall school performance of students through its positive effects on their physical equilibrium and better concentration thus better school performance. Indeed, this has been confirmed by (Kazianga et al. 2009) in their study: *Educational and Health Impact of Two School Feeding Schemes: Evidence from a Randomized Trial in Rural Burkina Faso*, stated three main benefits of school meals on children: first, school meals positively influence the nutritional and health status of children. This, in turn, has powerful influences on a child's learning, performance and cognitive functions in schools. Second, malnourished or unhealthy children are likely to have a high absenteeism rate in school, thus have fewer academic performances. Third, children getting school meals can better concentrate and perform in schools than hungry children, who have difficulties concentrating and performing complex tasks, even if otherwise well-nourished. Thus, a part from getting parents to enrol their children, school meals have a long-term positive impact on children nutritional and health status and how their performance in school.

The positive economic aspects of the classic school meal have been well acknowledged. Through the consistent provision of school meals, stable demand for local products is guaranteed, thus guaranteeing a further source of income and consequently an overall increase in livelihood productivity and more available disposable income. Tellingly, those who profit economically from a school meal are these employed directly in the school for preparing meals. For these, the school meal generates a good and secure source of income. sources of income for a minimum number but at least four persons in Dano who are employed to cook for the school. And finally, if the quantity and quality of school meal supplied are compared to the yearly 2000 FCFA paid by the parents for that service, school meal can be seen as financial relief for parents in the view that the supplied food could normally have a real cost of 30000F/year. Therefore, there exists a more motivation for the system school from the side of parents. Which is one of the main goals of school meal programmes, namely to induce a change in household behaviour, to improve educational and nutritional outcomes. The driving rationale is that by subsidizing schooling costs, school meal can induce parents to invest more in their children education than they would have absent from the programme. Although school meal can be seen as conditional in-kind transfers, in the sense that a child must be enrolled and attend school regularly to be a beneficiary of his/her school meal programme (Kazianga et al. 2009). However, the overall decrease rate of absenteeism and increase rate of

school enrolment and frequentation is experienced as the institutions aimed this with a school meal. As a report of the World Bank showed that school meals increased enrolment in Burkina Faso by around 25 per cent, offering in school meals and take-home rations boosted enrolment; the same effect was experienced in Uganda, where enrolment rates rose above 80% when the feeding program started. According to school performance, in Burkina Faso, girls enrolled in schools with a feeding program showed small increases in scores on math tests, but there was no significant impact for boys; in Uganda, boys were less likely to have to repeat a grade, but there was no noticeable effect on girls. And in terms of nutritional benefits, in BF school meals did not affect beneficiary children, but based on weight-for-age and height-for-age measurements, the younger siblings of students who qualified for take-home rations did show gains. In Uganda, anaemia rates among girls who had hit puberty did decline (Kazianga et al. 2009; The World Bank 2012). But, it has to be stressed out that school performances do not depend only on school meal, other factors are ranging from the performance of the teacher to a number of students in the classroom till to learning materials access and availability in the school.

Furthermore, constraints such as financial and administrative ones leading to the discontinuity of yearly school meal supply are ever-present and remain a lurking threat to future successful implementation and maintenance of the school meal programme. However, this threat should be reduced with the initiation of the endogenous school meal programme, which should decentralize the school meal system through local relocation of both the management and supply of school food programme by the schools and student's parents themselves. "But one thing is for sure, in countries where underweight children are the norm and stunting is common, helping a household feed all its members is itself a valuable activity, regardless of whether or not they are in school" (The World Bank 2012:4).

In terms of fortified food at the CREN despite the mentioned constraints, successes have been registered by the nutritional treating and recovery of malnourished children. That is due to the fact, that one of the main goals of the social safety nets in Burkina Faso is focused on food and nutrition security of vulnerable people as well as food and nutrition security is one of the main target goals of international institutions in Burkina Faso. The used products are highly nutritional products containing proteins, minerals and micronutrients, which are needed for energy, grown, short overall

healthy functioning of the body. These products have been confirmed as efficient against malnutrition as a WFP report stated :

...WFP delivered Plumpy'Doz to children in Ouagadougou and Bobo Dioulasso through an innovative voucher system. In 2009, 360 metric tons of the ready-to-use, nutritious food supplement were distributed to more than 40,000 children under 2 — 20,237 girls and 20,089 boys. Health centres in these locations report better nutrition among children who have received the specialised product, a paste supplement made from vegetable fat, peanut butter, sugar and milk. Burkinabé children, who have grown fond of the supplement, have nicknamed it "chocolate...(WFP 2010:30).

However,

...these vouchers might be a way of distributing free samples, in anticipation of marketing these products as a new kind of threat. Some companies, such as Nutriset (the producer of both Plumpy'Nut and Plumpy'Doz), have promoted local production of these special foods, but outsiders generally control these operations as franchises. They do little to build local nutritional self-reliance. Indeed, they may do the opposite by creating doubts about whether ordinary family foods could meet the family's needs as well as the more exotic processed products that come in from the outside (Kent 2014).

This statement makes clear, that the already vulnerable beneficiaries of these vouchers *are at risk of being more vulnerable* to the more and more dependency of their diet, health and nutritional status from profit-oriented multinational concerns, who produce these products. That's why as good and efficient the ready to eat imported recovery foods are, focus should be given to local food, known by people and accessible for people to avoid that dependency of the already economic and nutritional vulnerable people these international profit-oriented concerns. (Kent 2014:271) points this further:

...while special medicines might be needed to treat nutritional problems as therapy, in most cases, the prevention of such problems should rely on familiar local foods. Studies that demonstrate the efficacy of medical treatments as a means of prevention frequently fail to ask whether the same preventive effect might have been achieved with better use of ordinary foods. Some studies do consider the locally available options. For example, a study in a rural and poor district of Burkina Faso showed that improving gruel for children through better use of familiar local foods was just as effective as using micronutrient fortification...

Another example is the study on the positive impact of red palm oil in school meals on vitamin A status in Burkina Faso, which found that red palm oil given regularly in small amounts appears highly effective in the reduction of vitamin A Deficiency (Zeba et al. 2006).

In Dano, the use of local food as coping strategies to food and nutrition security is, in fact, a current behaviour from both GOs (the health centre through the CREN) and NGOs (VARENA ASSO and the Dreyer Foundation) to improve food and nutrition security. Due to their large range of edible foods, such as seeds, fruits, leaves, roots, mushrooms and gums, local foods could contribute essentially to improve diets and nutritional quality, by adding variety to diets, improving taste and palatability of staples and providing essential vitamins, protein and calories (FAO 2014a). The used local foods in Dano to improve food and nutrition security have been confirmed as excellent sources of qualitative health-supporting components including vitamins A and C, protein and micronutrients such as calcium and iron, and this not matter if they are used as leaves, fruits, nuts or seeds. For example, the baobab (*Adansonia digitata*) and *Moringa oleifera* used as fruits, nuts and leaves are rich in minerals and vitamins A and C. Other used fruits such as guava (*Psidium guajava*), sugar apple (*Annona squamosa*), pawpaw (*Papaya sp.*) and mango (*Mangifera indica*) are important sources of vitamin C. Further seeds and nuts including groundnut, shea butter and shea seasoning (*soumbala*) are important providers of calories, oil and protein. In addition to the energy they provide, fats and oils from seeds and nuts are also important for the absorption of vitamins A, D, E and K (FAO 2014a). These products are available and accessible to local people, only an intensive use of them is needed through intensive and rigorous nutrition education and policy and social marketing which -although on small steps- take place in Dano as well, especially through the Dreyer approach. A more successful and sustainable acceptance and application of adequate nutritional behaviour should be indeed expected as the Dreyer's sensibilisation and nutrition education directly to the children themselves, by whom there exist easier and better learning, openness and flexibility for adopting new things. From this case it is should even be probable that children could re-educate their parents according to nutrition and hygiene. This is happening already if we remember the narrative of Mr. Somé, the CEEP director. Children keep practising the learnt nutritional and hygienic lessons at home and even go as far as to refuse the family meal (usually traditional dish *tô*) in favour of the CEEP's diversified menu. This is feasible for most of the parents, as all of the ingredients used at CEEP are of local origin and most of them are bought from the students' parents themselves. So, the main reason for lack of financial means/poverty here would sustain as a reason for the non-variation of dishes as children wish this like from the CEEP. Rather a goodwill and flexibility and certainly knowledge of nutrition would help parents to accomplish

the nutritional and hygienic recommendations. Further reasons could be related to the large family's number, especially in rural ones. Cooking the traditional dish *tô* is probably a simple and rapid option of family meal for those families than experimenting with new menus, where women are not sure if the rest of the household would like the new dish or not. However, it is not alone about the CEEP dishes, further it about the possibility of letting know that there is a possibility of varying and cooking good nutritional family dishes with affordable and accessible local products from one owns the garden and/or field and environment. The knowledge on it maybe even exist, only the importance of the application of this knowledge is lacking and this should be deepening through the sensibilisation sessions offered by all the institutions in Dano.

11- CONCLUSION

This study aimed to investigate local practices and experiences of food and nutrition as experienced by the food insecure themselves for a better understanding and therefore to a better policy to reduce vulnerability to food and nutrition insecurity in the study area. Because food and nutritional planning in Africa cannot be improved unless the approach moves from “blueprint” to “process planning”, projects and programmes should move from rigid planning from top-down through more participation from the bottom-up. Individuals and /or households who experience and/or fear of experiencing food insecurity, for example through lack of access and/or availability to/of adequate quantitative and qualitative food for a healthy and active life should be the focus of “food security planning”. In doing so, this planning could better capture the diversity and complexity of food insecurity to implement a successful programme (Pottier 1995).

To better get to this complexity of food insecurity, especially malnutrition, this study employed a combination of different approaches.

The approaches included the Food Availability Decline approach (Malthus 1798), the Food Entitlement Decline approach (Sen 1981) and The sustainable livelihoods approach (SLA) (Chambers and Conway 1992). The food availability decline approach focuses on the bearing capacity of the earth in the context of human-environment relationships (Malthus 1798). The approach of food entitlement decline explains food insecurity as a lack of demand opportunities due to loss of a set of entitlements that enable (or protect) economic and social access to food by producing, buying, exchanging food or getting institutional or intersocial food aid (Sen 1981). Finally, the sustainable livelihood approach includes the capabilities, assets and activities required for a means of living and which can cope with and recover from vulnerable situations, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the short and long-term (Chambers and Conway 1992).

The aforementioned development approaches have been enriched by the anthropological approach of food (FROMENT et al. 1996; Garine 1979; de Garine 2004; De Garine 1996; Macbeth and MacClancy 2004; Mead and Guthe 1945; Richards 1939, 2003). The anthropological approach of food consumption in contrary to environmental, political and economic influences of food habits, stress that sociocultural aspects rather

exercise more influence on food choice than environmental or economic aspects (Grigg 1995a). Thus the anthropological approaches investigate the interlinkages between sociocultural and gustatory aspects of dietary patterns as “the ways in which individuals or groups individuals in response to social and cultural processes, select, consume and utilise portions of the food supply” (Mead and Guthe 1945). In doing so, the study aimed at conceptualising the relationships between the environmental, human, economic, socio-political context and the resulting constraints, vulnerabilities and adaptive possibilities of food and nutrition security in the light the socio-cultural aspects. Against this constellation, the study intended to better capture the complexity of food and nutrition practices of households for an improved understanding and therefore to a better policy to reduce vulnerability to food and nutrition insecurity in Dano -one of the watersheds of the WASCAL-project- in southwestern Burkina Faso.

The results show that all the determinants of food and nutrition security-from food production through access until food consumption are embedded in a context of severe environmental and socio-economic vulnerability. Food production is vulnerable due to the existing and increasing climatic variability, lack of land and the related social crises, animal diseases and increasing disinterest of the youth to continue livelihoods of farming. Food access is vulnerable to increasing food prices and a limited supply of some food groups (especially roots and tubers), fresh fish and qualitative meat. Food consumption is vulnerable to a monotonous diet dominated by the consumption of the local beer *Dolo* and cereals and cooked green vegetables as a sauce. This leads to low dietary diversity and the related high malnutrition rate in the area, especially by the most vulnerable population groups e.g. women in reproductive age and children under 5 years.

Although this study, as the result of intensive fieldwork which combined different theoretical and methodical approaches and enlightens the complexity and vulnerability of food and nutrition security in Dano, its encountered some limitations, that should be mentioned:

- A distortion of the original statements of participants could be expected as the service of an interpreter was needed for a translation from the Dagara (the local language in Dano) to French.
- The term of food and nutrition security as defined in the western academia was sometimes not fully clear to some - especially rural participants -, which could conduct to biased statements.

- It was clear from the results, that there could be a high rate of child death in the study area, however, the study was not able to establish a direct link between the high child mortality rate and the dietary patterns, as there has not been enough clinical proof for that.
- An additional uncontrolled factor was, that some official participants - especially from the GO - were circumspect on some issues such institutional adaptive strategies and vulnerabilities, with the consequence that some responses or affirmations here could be biased.
- The recalls of food consumption could be biased as it could be possible to not remember every kind of food eaten on the previous one, two or seven days. This could influence the responses of dietary diversity.
- As the study was not specifically designed to evaluate factors related to the ancestral worship and its influence on the everyday life including decision-making, especially on food production and consumption, some important aspects of this sociocultural occurrence could have been missed in this study.

From the elucidated limitations, this study has thrown up many questions in need of further investigation. It is recommended that further research should be undertaken in the following areas:

- Establish whether there is a relation between dietary patterns and the assumed high rate of child death.
- Examine more closely the links between ancestral worship and everyday decision making, especially concerning food and nutrition-related decisions making processes.
- Examine closely the factors influencing the use of mosquito nets in the view, that despite the gratis mosquito nets, there still exists a high rate of malaria in the study area.
- The southwest of Burkina Faso should be more on the agenda of research and policy according to food and nutrition issues, as more of research and aid policies are concentrated on the northern Sahelian part of the country.

Finally, the projects and programmes should move from rigid planning from the top through more participation from the bottom on. Individuals and /or households that experience and/or fear of experiencing food insecurity should be the focus of food security planning. Doing so this planning could better capture the diversity and

complexity of food insecurity to implement the successful programme (Pottier 1995). Also, Dano needs more improvement potential for a further enclosure of sociocultural aspects for a better investigation of food and nutrition security. Research and policies - see WASCAL here for example- should be adequately planned in this matter to not mostly focus on the environmental and/or economic aspects of food and nutrition security, but as well on the sociocultural aspects of this complex question for achievement of an improved and healthier food and nutrition security situation in Dano, West Africa and worldwide.

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APPENDICES

Appendix 1 Semi-structured questionnaire for household survey

| I-Identification | |
|---|---|
| No du ménage: No du répondant/du questionnaire: Nom du répondant (facultatif): Nom et prénoms du chef du ménage: Age du répondant: Sexe du répondant: 1= M 2= F Quartier du ménage: Village du ménage (Code du village): Département/commune du ménage: Religion du chef de ménage : Ethnie du chef de ménage: Date de l'enquête: ____/____/____ (j/m/a) Temps de l'enquête: De ____:____ à ____:____ (h:m) Nombre de passage dans le ménage: | Remarques/notes de de l'enquêteur à la fin de l'enquête |

| Situation actuelle | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels |
|---|---|
| 1 Quel est le lien du répondant principal avec le chef de ménage? 0=Chef de ménage 1= Conjoint 3=Parent 4=Enfant 5=Petit enfant 6=Frère/Sœur 7=Neveu/Nièce 7= Beau-frère/belle-fille 8= Oncle/Tante 9= Autre membre (spécifier) | Causes des changements Effets des changements Réactions aux changements |
| 2 Quel est le nombre total de personnes y compris vous du ménage? (qui vivent et partagent le même repas ici) M= F= T= | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements |

| | | |
|--|---|--|
| | | |
| 3 Combien de membres du ménage ont ce degré d'éducation? | | Changements au cours des dernières décennies ? 1=Oui 0=Non, |
| 0= Jamais été à l'école 1= Ecole primaire 2= Collège 3= Lycée/Baccalauréat | 4= Université 5= Formation professionnelle 6= Ecole coranique 7= Autres (spécifier) | Si oui lesquels Causes des changements Effets des changements Réactions aux changements |
| 4 Combien de membres du ménage ont ce statut matrimonial? | | Changements au cours des dernières décennies ? 1=Oui 0=Non, |
| 1= Célibataire 2= Marié monogame 3= Marié polygame 1F 4= Marié polygame 2F | 5= Marié polygame 3F 6= Marié polygame 4F 7= Marié polygame >4F 8= Divorcé/e 9= Veuf 10=Veuve 11=Séparé 12=Autre (spécifier) | Si oui lesquels Causes des changements Effets des changements Réactions aux changements |
| 5 Combien de membres du ménage ont ce statut résidentiel (depuis quand vivez-vous ici)? 1= Autochtone (Né dans le village) 2= Résident permanent 3= Migrant de retour 4= Immigré saisonnier 5=Autres (spécifier) | | Changements au cours des dernières décennies ? 1=Oui 0=Non, |
| | | Si oui lesquels Causes des changements Effets des changements Réactions aux changements |
| 6 Combien d'enfants du ménage partent à l'école ? M= F= T= | | Changements au cours des dernières décennies ? 1=Oui 0=Non, |
| | | Si oui lesquels Causes des changements Effets des changements Réactions aux changements |

| | | |
|---|---|--|
| | | |
| <p>7 Combien d'entre eux abandonnent l'école? M= F= T=</p> <p>Si abandon, pourquoi ?</p> | | <p>Changements au cours des dernières décennies ? 1=Oui 0=Non,</p> <p>Si oui lesquels</p> <p>Causes des changements</p> <p>Effets des changements</p> <p>Réactions aux changements</p> |
| <p>Combien des membres du ménage suivent des cours d'alphabétisation ? M= F= T=</p> | | <p>Changements au cours des dernières décennies ? 1=Oui 0=Non,</p> <p>Si oui lesquels</p> <p>Causes des changements</p> <p>Effets des changements</p> <p>Réactions aux changements</p> |
| <p>8 Combien de membres du ménage pratiquent cette ou ces professions?</p> | | <p>Changements au cours des dernières décennies ? 1=Oui 0=Non,</p> <p>Si oui lesquels</p> |
| <p>1=M 1=Agriculture 2=Ouvrier agricole 3=Elevage 4=Agropastoralisme 5=Artisanat 6=Commerce 7=Travailleur occasionnel 8=Salarié 9=Pensionné 10=Autres (spécifier)</p> | <p>2=F 1=Agriculture 2=Ouvrier agricole 3=Elevage 4=Agropastoralisme 5=Artisanat 6=Commerce 7=Travailleur occasionnel 8=Salarié 9=Pensionné 10=Autres (spécifier)</p> | <p>Causes des changements</p> <p>Effets des changements</p> <p>Réactions aux changements</p> |
| <p>III Dimensions de la sécurité alimentaire au sein du ménage 3.1 Disponibilité alimentaire du ménage</p> | | |

| 3.1.1 Production | |
|---|---|
| <i>a. Capital humain (santé, forces de travail, niveau éducationnel, expériences dans l'agriculture, connaissances des pratiques agricoles etc.)</i> | |
| 9 Depuis quand pratiquez-vous déjà l'agriculture dans ce village (nombre d'années)? 1=10-15 ans 2=16-20 ans 3=21-25 ans 4=25+ | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements |
| 10 Dans quel cadre pratiquez-vous l'agriculture? 1= Familial 2= Individuel 3=Collectif 4= Ouvrier agricole (travailler pour autrui) 5= Autres (spécifier) | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements |
| 11 Si cadre familial, quels membres de la famille participent activement aux travaux champêtres? 1=Hommes 2=Femmes 3=Fille (<15 ans) 4=Garçon (<15 ans) 5= Autres | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements |
| Existe-t-il des services de vulgarisation agricoles offerts au village ? 1=Oui 0=Non Si oui lesquels ? | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements |

| | <i>b. Système foncier (accès à la terre)</i> |
|--|---|
| 12 La terre cultivée vous appartient elle? 1=Oui 0=Non | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements |
| 13 Si oui comment l'avez-vous acquis ? 1=Héritage 2=Achetée 3=Don 4=Prise à crédit (d'où) 5=Empruntée 6=Louée 7=Autres (spécifier) | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements |
| 14 Quel est la superficie totale approximative de votre champ? (Hectare) 1=0,5-2 H 2=-2-3 H 3=3-5 H 4=5H+ | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements |
| 15 Avez-vous pratiqué l'agriculture cette année (2012)? 1=Oui 0=Non | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements |

| | |
|--|---|
| | |
| <i>c. Agriculture pluviale/Calendrier saisonnier (début, quantité et fin de la pluie)</i> | |
| 16 Si oui quel genre d'agriculture pratiquez-vous ? 1=Pluviale 2=Irriguée | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements |
| 17 Quels facteurs ont influencé votre rendement cette année ? 1= Début à temps 2=Début tardif 3=Quantité satisfaisante 4=Quantité insuffisante 5= Fin prématurée 6= Fin à temps 7=de maladies des plantes? 8=Les températures 9=vents violents 10=d'insectes ravageurs 11='inondations | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements |
| Comment décrivez-vous l'accès au système d'irrigation? | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements |
| <i>d. Culture irriguée</i> | |
| Quelle est la source d'irrigation? 1=Barrage 2= Puits | |

| | |
|---|---|
| 3= Fleuve 4= Forage | |
| Quel est le mode d'irrigation? 1=Pompe 2=Manuel 3=Autres | |
| <i>d. Equipement agricole et transport</i> | |
| 29 Quels sont les outils principaux dont vous disposez pour vos travaux champêtres ? 1=Houe 2=Charrue 3=Tracteur 4=Pompe | 5=Charrette 6=Bœuf de traction 7=Âne de traction 8= Semoir 8=Autres (spécifier) |
| Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements | |
| 30 Possédez-vous un ou des équipements de transport? 1=Vélo 2=Moto 3=Tricycle 4= Âne 5=Cheval 6= Autres | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements |
| 31 Si oui quelle a été le mode d'acquisition ? 1=Don 2=Heritage 3=Achat | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements |

| | | | | | | |
|---|--------------------------------------|---|--|---|--|--|
| 4=Credit de la banque 5= Emprunt d'argent de la famille 6= Emprunt d'argent des amis 7=Location | | Effets des changements Réactions aux changements | | | | |
| <i>e. Application des techniques et intrants agricoles</i> | | | | | | |
| 32 quelles techniques agricoles appliquez-vous sur vos champs ? 1=Zai 2=Diguettes 3=Semences améliorées 4=Culture attelée | | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements | | | | |
| 33 Quels sont les intrants que vous utilisez pour vos cultures? 1=Pesticides 2=Engrais chimique 3=Fumure (engrais organique) 4=Autres (spécifier) Comment vous procurez vous ces intrants ? | | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements | | | | |
| Produits agricoles | Quantité approximative récoltée (kg) | Quantité approximative perdue (kg) | Quantité approximative consommée en famille (kg) | Quantité approximative vendue en grains (kg) Prix/kg | | Quantité donnée pour fins sociales (pour funérailles, travail collectif sur le champ, baptêmes etc.)(kg) |
| Mil | | | | | | |
| Sorgho | | | | | | |
| Maïs | | | | | | |
| Haricot | | | | | | |
| Riz | | | | | | |
| Arachides | | | | | | |
| Manioc | | | | | | |
| Patate douce | | | | | | |
| Igname | | | | | | |
| | | | | | | |
| Cotton | | | | | | |

| | | | | | | | |
|--|---|-------------------------------|--|--|--|--|--|
| Fruits () | | | | | | | Transformez-vous une partie de la récolte en dolo? 1=Oui 0=Non Si oui, quelle quantité de quels produits utilisez-vous pour la production du dolo? et pour quelles fins? utilisez le tableau ci-dessous |
| Produits maraichers, légumes | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Bétail | Quantité approximative consommée | Quantité approximative vendue | Votre ménage pratique-t-il aussi de l'élevage ? 1=Oui 0=Non Changements au cours des dernières décennies ? 1=Oui 0=Non, | | | | |
| Ane | | | | | | | |
| Boeufs | | | | | | | |
| Moutons | | | | | | | |
| Chèvres | | | | | | | |
| Porcs | | | | | | | |
| Volaille | | | | | | | |
| Si oui lesquels Causes des changements Effets des changements Réactions aux changements | | | | | | | |
| Comment se fait ce stockage ? | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements | | | | | | |
| Pour combien de temps se fait ce | Changements au cours des dernières décennies ? 1=Oui 0=Non, | | | | | | |

| Produits transformés en Dolo | Quantité approximative transformée en dolo (litre) | Quantité approximative du dolo consommé en famille (litre) | Quantité approximative du dolo vendue (litre) Prix/l |
|------------------------------|--|--|---|
| Sorgho | | | |
| | | | |

| | |
|--|---|
| stockage ? | Si oui lesquels Causes des changements Effets des changements Réactions aux changements |
| Qui a accès au stock ? | |
| b. Disponibilité des marchés | |
| Où vendez-vous vos produits agricoles? | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements |
| À qui vendez-vous vos produits agricoles ? | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements |
| 44 Si SOFITEX et SONAGESS sont indiqués comme acheteurs, demander comment l'agriculteur est satisfait des conditions de marché avec ceux-ci (prix proposé, temps de paye, etc.) | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements |

| | |
|--|--|
| | Réactions aux changements |
| Comment est la disponibilité des marchés à côté de votre village? | <p>Changements au cours des dernières décennies ? 1=Oui 0=Non,</p> <p>Si oui lesquels</p> <p>Causes des changements</p> <p>Effets des changements</p> <p>Réactions aux changements</p> |
| Quelle est la distance du marché le plus proche de votre village ? (Km) | <p>Changements au cours des dernières décennies ? 1=Oui 0=Non,</p> <p>Si oui lesquels</p> <p>Causes des changements</p> <p>Effets des changements</p> <p>Réactions aux changements</p> |
| Comment vous vous rendez au marché? | <p>Changements au cours des dernières décennies ? 1=Oui 0=Non,</p> <p>Si oui lesquels</p> <p>Causes des changements</p> <p>Effets des changements</p> <p>Réactions aux changements</p> |
| <i>d. Disponibilité et accessibilité des routes qui mènent aux marchés</i> | |
| Existent-ils des routes qui mènent aux marchés ? | <p>Changements au cours des dernières décennies ? 1=Oui 0=Non,</p> <p>Si oui lesquels</p> <p>Causes des changements</p> |

| | |
|---|---|
| | Effets des changements |
| | Réactions aux changements |
| <i>d. Disponibilité et accessibilité des routes qui mènent aux marchés</i> | |
| Existent-ils des moyens de transport à prix abordable qui vous transportent aux marchés ? 1=Oui 0=Non Si oui lesquels ? | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements |
| <i>f. Filets de protection publique</i> | |
| Ya-t-il des filets de protection publique ici dans le village (comme subventions alimentaires, cantines scolaires, travail contre vivres, distribution alimentaire gratuite etc.) ? 1=Oui 0=Non Si oui, lesquels ? | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements |
| 3.1 Disponibilité alimentaire 3.1.3 Echange | |
| Est-ce que votre niveau de revenu vous permet-il d'acheter la nourriture au besoin ? 1=Oui 0=Non Si non, pourquoi ? | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements |
| III Les dimensions de la sécurité alimentaires 3.2 L'accès alimentaire (Entitlements ou droits) | |

| a. Entitlements à la production | | |
|--|--|--|
| Quelles sont les activités par lesquels vous vous procurez de la nourriture ? 1=Agriculture de subsistance 2= Elevage 3=Pêche 4=Commere 5=Autres | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements | |
| b. Entilements de la force de travail | | |
| Existe il des opportunités d'emplois énumérés qui vous permettent aussi de vous procurez de la nourriture ? 1=Oui 0=Non Si oui, lesquelles ? 1=Le travail occasionnel 2=La main-d'œuvre qualifiée 3= L'emploi rémunéré 4=Autres | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements | |
| c. Entilements d'échanges | | |
| 54 Quelles sont vos principales sources de revenus ? Produits agricoles 1=Vente des céréales (ex.) 2=Vente des produits maraichers 3=Vente de vos produits de rente 4=Vente de vos fruits 5=La vente du bétail ou des produits de l'élevage 6=vente de dolo | 10=vente du bois de chauffe 11=vente du charbon de bois 12=produits artisanaux le commerce 13=Le travail occasionnel 14=La main-d'œuvre qualifiée 15= L'emploi rémunéré Les emprunts 16=Transferts d'argent des amis, des parents, etc. | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements |

| | | |
|---|---|---------------------------|
| Activités non agricoles 7=vente des produits de pêche 8=vente des produits de chasse 9=vente des produits sauvages | 17=Crédit de la banque 18=Crédit des caisses populaires 19=Les dons et l'aide des proches, des amis etc. 20=Les dons et l'aide de l'état, des organisations Autres= | Réactions aux changements |
| Quelles sont les principales raisons d'utilisations de ces revenus ? 1=Achat d'aliments 2=Elevage 3=Achat d'outils agricoles 4=Achat de semences 4= Achat d'engrais 5= Achat de pesticides 6= Santé 7 = Frais scolaires 8=Problèmes sociaux 8= Habillement 11= Autres | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements | |
| <i>d. Droits d'héritage et de transferts</i> | | |
| Recevez-vous des vivres comme dons des proches, amis? 1=Oui 0=Non Si oui, de qui? Si non pourquoi ? | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements | |
| Recevez des dons de vivres de l'État ? 1=Oui 0=Non Si oui, de qui? Si non comment? | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements | |
| VII Votre activité agricole et le système d'information sur la sécurité alimentaire | | |

| | |
|---|---|
| Recevez-vous pour vos activités agricoles du système d'information sur la sécurité alimentaire ? 1= Oui 0=Non | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements |
| Cette fréquence de réception du système d'information sur la sécurité alimentaire a-t-elle changé au cours du temps? 1= Oui 0=Non Si oui comment? et Pourquoi? | Changements au cours des dernières décennies ? 1=Oui 0=Non, Si oui lesquels Causes des changements Effets des changements Réactions aux changements |
| Pourquoi ne recevez-vous pas le système d'information sur la sécurité alimentaire? | |
| Votre degré de dépendance du système d'information sur la sécurité alimentaire pour vos activités a-t-elle changée au cours du temps? 1= Oui 0=Non Si oui comment ? et pourquoi ? | |
| Ya-t-il des signes prévisionnels et indicateurs qui vous indiquent qu'une insécurité alimentaire est imminente? 1= Oui 0=Non Si oui lesquels ? | |

| |
|---|
| Ces signes et indicateurs ont-ils changé au cours du temps? 1= Oui 0=Non Si oui comment? |
| Comment définiriez-vous la sécurité alimentaire ? |
| comment décrivez-vous la situation future de la sécurité alimentaire de votre ménage? |
| Quelles recommandations donneriez-vous pour une amélioration de la situation alimentaire de votre ménage? |

Appendix 2 Interview guide to key informants interview



Perceptions of Food Security in West-Africa: Livelihoods of Farmers in the Ioba Province of South-Western Burkina Faso.

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PHD Questionnaire (Key Informant)

| General Informations | | |
|---|------|------|
| Number of the interviewee | | |
| Date of interview | | |
| Name of the organization | | |
| Place of the organization | | |
| Name of the representative (Optional) | 1= M | 2= F |
| Function/position of the representative | | |

| I Your Organization and its activities (Votre Organisation et ses activités) | |
|---|---|
| 1A- Your activities in Burkina Faso (BF) (<i>Vos activités au BF</i>) | 1 What are the main objectives of your organization (<i>Quels sont les objectifs principaux de votre organisation?</i>) |
| 2 Where do you have your geographical focus in BF? (<i>Où avez-vous vos concentrations géographiques au BF ?</i>) / _ / _ / _ / _ / _ / _ / _ / _ / _ / | 3 Why? (<i>Pourquoi?</i>) |
| 1 Boucle du Mouhoun 9 Centre-Sud 2 Cascades 10 Est 3 Centre 11 Nord 4 Centre-Est 12 Hauts-Bassins 5 Centre-Nord 13 Plateau Central 6 Centre-Ouest 7 Sahel 8 Sud-Ouest | |
| 4 Which provinces are the targeted beneficiaries of your activities? (<i>Quelles provinces sont des bénéficiaires cibles de vos activités?</i>) - - - - - | |

5 If the region of sud-ouest cited in 2) please specify your activities there in the table below (*Si la région du sud ouest cite dans 2, veuillez spécifier vos activités là-bas dans le tableau ci-dessous*)

| 5.1 Why these regions | 5.2 Since when are you in this region (Year) (<i>Depuis quand operez vous dans cette region?</i>) | 5.3 Objectives of the activities (<i>Objectives des activités</i>) | 5.4 Which are the targeted beneficiaries' provinces of your activities? (<i>Quelles provinces sont des bénéficiaires cibles?</i>) | 5.5 Which are the targeted beneficiaries' livelihood groups of your activities? (<i>Quelles provinces sont des bénéficiaires cibles de vos activités?</i>) / _ / _ / _ / _ / _ / | 5.6 Which is the targeted beneficiary gender group? (<i>Quel group de genre est le bénéficiaire cible?</i>) / _ / _ / | 5.7 Which are the targeted beneficiaries ages groups? (<i>Quelles provinces sont des bénéficiaires cibles?</i>) / _ / _ / _ / |
|------------------------------|--|---|--|--|---|---|
| | | - - - - - - - - | - - - - - - - - | 1. Subsistence farmers 2. Pastoralists 3. Agropastoralists 4. Fishers 5. Other (please specify) | 1=Men 0= Women | 1= 0-5 years old 2= 5 -15 years old 3= 15-49 years old 4= > 49 years old Other (please specify) |

6 If the region of Sud-ouest has been not cited in 2) please explain why, this region does not benefit from your activities?? (*Si la région du sud-ouest n'a pas été citée dans 2, veuillez expliquer pourquoi cette région n'est pas bénéficiaire de vos activités ?*)

7 Please specify in the table below the targeted gender and age group of your activities? (*Veuillez spécifier le groupe de genre et d'âge cible de vos activités?*)

| | | | |
|---|--------------------------------------|--|--------------------------------------|
| 7.1 Targeted gender group of your activities <i>(Groupes d'âge cibles de vos activités)</i> / _/_/_/ 1= Men 2 =Women | 7.2 Why? (<i>Pourquoi?</i>) | 7.3 Targeted group age of your activities <i>(Groupes d'âge cibles de vos activités?)</i> /_/_/_/_/_/ 1= 0-5 years old 2= 5 -15 years old 3= 15-49 years old 4= > 49 years old Other (please specify) | 7.4 Why? (<i>Pourquoi?</i>) |
| 1 | | / _/_/_/_/_/ | |
| 2 | | / _/_/_/_/_/ | |
| 8 Are your targeted beneficiaries involved in the planning process of your food security –related activities? (Est-ce que vos <i>bénéficiaires cibles</i> sont inclus dans la planification de vos activités relatives à la sécurité alimentaire ?) /_/_/_/ 1= Yes 0=No | | 9 If yes, how? (<i>Si oui comment?</i>) | |
| 10 If not why? (<i>Si non, Pourquoi?</i>) | | 11 Are your targeted beneficiaries involved in the implementation process of your food security –related activities? (Est-ce que vos <i>bénéficiaires cibles</i> sont inclus dans la l'implémentation de vos activités relatives à la sécurité alimentaire ?) /_/_/_/ 1=Yes 0=No | |
| 12 If yes, how? (<i>Si oui comment?</i>) | | 13 If not why? (<i>Si non, Pourquoi?</i>) | |

| | |
|--|--|
| <p>14 Are your targeted beneficiaries involved in the evaluation process of your food security –related activities? (Est-ce que vos bénéficiaires cibles sont inclus dans la l'évaluation de vos activités relatives à la sécurité alimentaire ?) / _ / _ / 1= Yes 0=No</p> | <p>15 If yes, how? (Si oui comment?)</p> |
| <p>16 If not why? (Si non, Pourquoi?)</p> | <p>17 By which means do you mostly communicate with your target groups? (Par quels moyens communiquez-vous principalement avec vos groups cibles?) / _ / _ / _ / _ / _ / 1= Through field staffs, visiting engineers 2= Through seminars and workshops 3=Through published bulletins 4=Through radio and television 5= Other (please specify)</p> |
| <p>18 According to gender which group more often seeks information/expert advice on food security improvement? (Par rapport au genre, quelle catégorie est sensée vouloir des informations /conseils d'experts sur la sécurité alimentaire?) / _ / _ / 1= Men 2 =Women</p> | <p>19 If not why? (Si non, Pourquoi?)</p> |
| <p>20 According to age, which group more often seeks information/expert advice on food security improvement? (concernant l'age, quelle categorie attend souvent plus d'informations/conseil d'experts pour ameliorer la securité alimentaire) / _ / _ / _ / _ / _ / 1= 0-5 years old 2= 5 -15 years old 3= 15-49 years old 4= > 49 years old other(please specify)</p> | <p>21 If not why? (Si non, Pourquoi?)</p> |
| <p>Ib Your food security-related activities in Burkina Faso (BF) (Vos activités relatives à la sécurité alimentaire au BF)</p> | |
| <p>22 Which dimensions of food security your organization is concentrated on by its activities? (Sur quelles dimensions de la sécurité alimentaire votre organisation est-elle concentrée pour ses activités?) / _ / _ / _ / _ / 1. Food availability; 2. Food access; 3. Food utilization; 4. Food safety</p> | <p>23 What are the associated determinants (indicators) do you concentrate on by these dimensions of food security? Please specify in the table below. (Sur quelles dimensions de la sécurité alimentaire votre organisation est-elle concentrée pour ses activités ?veuillez spécifier dans le tableau ci-dessous)</p> |

| 26.1 Food availability –Production / / / / / / / / / / / / / / / | | 26.2 Food availability – Distribution/ / / / / / / / | 26.3 Food availability –Exchange/ / / / / / / / / |
|--|--------------------------------|---|---|
| 1. Land tenure law (land access) | 13. Severity of | 1. Transportation and infrastructure | 1. Income levels and purchasing power |
| 2. land-holding sizes | Evapotranspiration | Roads | 2. Informal social arrangements for barter |
| 3. Staple crops production | 14. Irrigation availability | Markets | 3. Local customs for giving and receiving gifts |
| 4. Cash crops production | 15. Cropping cycle: | Post-harvest storage facilities | 4. Migration |
| 5. Livestock production | 16. Begin of Rainfall | 2. Public safety nets | 5. Government policies affecting markets |
| 6. Human capital availability: | Sowing time | Food subsidies | 6. Gender and age structure subsidies |
| 7. Health | Quantity of rainfall | Food distribution | |
| Labor force availability | End of rainfall | School canteens | |
| Educational level etc. | Begin of harvest | Food for education | |
| 8. Availability and access to seed | 17. Severity of temperature | Food for work | |
| 9. Access and availability of fertilizers | 18. Occurrence and severity of | Exemptions from health costs | |
| 10. Quantity of fertilizers | plants diseases | | |
| 11. Soil productivity | 19. Occurrence of natural | | |
| 12. Soil degradation | disasters (floods, windstorms, | | |
| 13. Water availability | droughts) | | |
| | 18. Access and cost of credit | | |
| 26.4 Food access entitlements / / / / / / / / / / / / / / / | | 26.5 Food Utilization -Food consumption patterns / / / / / / / / / / / / / / / | |
| A-Production-based entitlements | | A-Food utilization –Nutritional value | B-Food utilization–Social and cultural aspects |
| 1. Subsistence farming | | 1. Diversity of food consumed | 1. Cultural dietary restrictions (e.g. religion) |
| 2. Pastoralism | | 2. Frequency of food intake | 2. Intra-household allocation of food (Who is responsible for meeting the food needs? Who prepares food and how? Who eats what? Are their differences in diet between children, women and men?) |
| 3. Agro-pastoralism | | the average family diet in a normal year | 3. Maternal care and feeding practices |
| 4. Fishing | | seasonal shortages of food in the household in a normal year | |
| 5. other (specify) | | 3. Type of primary protein (animal or vegetable) | |
| B-Own-labour entitlements | | 4. Disease incidence affecting food absorption | |
| 5. Waged labour opportunities | | 5. Access to clean water | |
| C-Trade-based entitlements | | 6. Hygiene, clean water and sanitation (adequate sanitation services latrines, washing facilities, individual hygiene practices etc.) | |
| 6. Trading of own produced food | | 8- Health services | |
| 7. Trading of own fish products | | | |
| 8. Trading of agro pastoral products | | | |
| 9. Trading of natural resources like forestry products | | | |
| D- Inheritance and transfer entitlements | | | |
| 10. Getting food through informal gifts and loans from individuals private gifts | | | |
| 11. Getting food through formal transfers | | | |
| 11.1 Governmental food transfers | | | |
| 11.2 Food aid through NGOs | | | |
| | | | Food utilization – Food safety Awareness of people of between healthy and nutritional food |

| II Your Perceptions of changes among dimensions of food security (<i>Votre perception des changements au niveau des dimensions de la sécurité alimentaire</i>) | |
|---|--|
| 27 Have you experienced changing food security over the last 10-20 years in your activities area? (<i>dans les 10-20 dernières années, êtes-vous entrain de percevoir des changements au niveau de la sécurité alimentaire qu'utilisent votre organisation ?</i>) / __/__/ 1= Yes 0=No | 28 If yes What kind of changes? (Quel genre de changement?) 1 = increased, 2 = stable, 3 = decreased, / __/__/ __/ |
| 29 By which dimensions are you perceiving changes? (<i>au niveau desquelles dimensions de la sécurité alimentaire observez-vous ces changements?</i>) / __/__/ __/ __/ 1. Food availability; 2. Food access; 3. Food utilization | 30 What kind of changes? (Quel genre de changement?) 1 = increased, 2 = stable, 3 = down 1. Food availability / __/; 2. Food access / __/; 3. Food utilization / __/; |
| 31 What are the causes of changes by food availability? (Quelles sont les causes des changements au niveau de la disponibilité alimentaire?) - - - - - - - | 32 What are the causes of changes by food access? (Quelles sont es causes des changements au niveau de l'accès alimentaire ?) - - - - - - |
| 33 What are the causes of changes by food utilization? (Quelles sont les causes des changements au niveau de l'utilisation alimentaire ?) - - - - - - | |
| 34 Are you aware of any agency or that bases its activities entirely or largely on food security (<i>êtes-vous conscient de l'existence de certaines organisations, qui concentrent entièrement ou largement leurs activités sur la sécurité alimentaire ?</i>) / __/__/ 1= Yes 0=No | 35 If yes, with which one? (<i>Si oui lesquelles?</i>) - - - - - |
| 36 have you collaborated with some of these organization on a food security related activity? / __/__/ 1= Yes 0=No | 37 If yes, which one? (<i>Si oui avec lesquelles?</i>) - - - - |

| III Effects of Changing food security on livelihood and food security (<i>Effets des changements des dimensions de la sécurité alimentaire sur les moyens d'existence et la sécurité alimentaire</i>) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|----------------------------------|-----------------------|--------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| IIIa Effects of changing dimensions of food security on livelihood <i>(Effets des changements des dimensions de la sécurité alimentaire sur les moyens d'existence)</i> | 38 Does changing dimensions of food security affect livelihood activities in your activity zones? (<i>les changements des dimensions de la sécurité alimentaire affectent ils les moyens d'existence dans votre zone d'activités?</i>) / _ / _ / 1= Yes 0=No | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 39 if yes, which livelihood activities? / _ / _ / _ / _ / _ / 1. Subsistence farmers 2. Pastoralists 3. Agro-pastoralists 4. Fishers 5. other (specify) | 40 In what way are they affected? (Comment sont-elles affectées?) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 41 Why? (<i>Pour quoi?</i>) - - - - - - - | 42 Where? | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IIIb Effects of changing dimensions of food security on food security <i>(Effets des changements des dimensions de la sécurité alimentaire sur les moyens d'existence)</i> | 43 Does changing dimensions of food security affect food availability in your activity zones? (<i>les changements des dimensions de la sécurité alimentaire affectent ils disponibilité alimentaire dans votre zone d'activités?</i>) / _ / _ / 1= Yes 0=No | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 If yes why? Si oui <i>pour quoi?</i> | 45 Which determinants/indicators and in what way are affected? (<i>Quels déterminants ou indicateurs sont à quel degré affectés?</i>) <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">Affected determinants/indicators</th> <th style="width: 33%;">In what way affected?</th> <th style="width: 33%;">Where?</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table> | Affected determinants/indicators | In what way affected? | Where? | | | | | | | | | | | | | | | | | | | | | | | | |
| Affected determinants/indicators | In what way affected? | Where? | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 46 Does changing dimensions of food security affect food Access in your activity zones? (<i>les changements des dimensions de la sécurité alimentaire affectent ils l'accès alimentaire dans votre zone d'activités?</i>) / _ / _ / 1= Yes 0=No | 47 If yes why? Si oui <i>pour quoi?</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| IV Your policy responses to changing dimensions of food security (Vos réactions stratégiques face aux changements des dimensions de la sécurité alimentaire) | |
| 58 Are there specific policy responses established by your organization to face the changes mentioned above? If yes, please list them (<i>Existent-elles des réactions stratégiques établies par votre organisation pour s'adapter aux changements cités ci haut? si oui veuillez svp les citer</i>). / _ / _ / 1= Yes 0=No | 59 If yes, please list them? (<i>Si lesquels?</i>) - - - - - - - - - - |
| V Your organization and food security information system (Votre organisation et le système d'information sur la sécurité alimentaire). | |
| 58 Are there any warning signs and indicators that suggest to you that a food insecurity situation is imminent? (<i>Ya t-ils des signes prévisionnels et indicateurs qui vous indiquent qu'une insécurité alimentaire est imminente?</i>) / _ / _ / 1= Yes 0=No | 59 If yes which ones? (<i>Si oui lesquelles?</i>) |
| 60 Are these warning signs and indicators changing over time? (<i>est ce que ces signes et indicateurs ont changé au cours du temps?</i>) / _ / _ / 1= Yes 0=No | 61 If yes how? (<i>Si oui comment?</i>) |
| 63 When you need informations in planning your activities (e.g. production, markets /roads accessibility, food prices trends food access and food consumption etc.) you normally (<i>Si vous avez besoin des informations pour planifier vos activités (telles que sur la production, les marchés, etc.), (Normalement vous...)</i>) / _ / _ / _ / _ / 1=Conduct a study by your in-house experts 2 = Contract the study to a consultancy group 3=Utilize published information in books, journal articles and reports 3= Historical experience 4= Others (please specify) | 64 Do you receive food security information? If yes please state the sources (<i>Recevez-vous l'information sur la sécurité alimentaire ?</i>) (si oui, svp veuillez citer les sources) / _ / _ / 1= Yes 0=No |
| 65 If no, why you don't receive food security information systems? (<i>Non pourquoi ne recevez-vous pas le système d'information sur la sécurité</i>) | 66 If yes, how often do you receive these food security information systems? (<i>Combien de fois recevez-vous informations des prévisions alimentaires</i>) |
| 67 Had the frequency of receiving food security information system changed over time? (<i>La fréquence de la réception du système d'information sur la sécurité alimentaire a-t-elle changé a dans le temps ?</i>) / _ / _ / 1= Yes 0=No | 68 If yes, how? (<i>Si oui comment ?</i>) |
| 69 Had your dependency on food security information system for the planning of your activities changed over time? (<i>Votre degré de dépendance du système d'information sur la sécurité alimentaire pour vos activités a-t-elle changée au cours du temps?</i>) | 70 If yes, how? (<i>Si oui comment ?</i>) |

Appendix 3 *Interview guide for an interview with a food shop trader*

Entretien avec un magasinier de Dano

Nom du magasinier

Date de l'entretien

1. Depuis quand ce magasin a été ouvert ?
2. Quelles étaient les denrées alimentaires offertes à l'ouverture?
3. Quelles sont les denrées alimentaires offertes aujourd'hui?
4. Pourquoi ce changement s'il y en a eu ?
5. Quelles denrées alimentaires demande-t-on de plus en plus ?
6. Quelles denrées alimentaires demande-t-on de moins en moins ?
7. Quel est le sexe de la plupart de votre clientèle ? M, f
8. Connaissez-vous la plupart de votre clientèle ? Oui ; non
9. Si oui d'où vient la plupart de votre clientèle ?
10. Si oui quelle sont les professions de la plupart de votre clientèle ?
 - Fonctionnaire de l'état
 - Travailleur indépendant (menuisier, tailleur, mécanicien etc.)
 - Travailleur salarié dans une entreprise privée ou une ong
 - Autre
11. Vendez-vous les denrées alimentaires à crédit aussi ? oui ; non
12. Si oui, quelles denrées alimentaires vendez-vous le plus fréquemment à crédit?
13. Si oui à qui vendez-vous les denrées à crédit le plus ? Femmes, hommes ?
14. Pourquoi ?
15. Si oui quelle est la fréquence de vente à crédit par jour ?
16. Si oui quel est le temps de remboursement des crédits ?
17. Si oui quelle sont les professions de ceux qui prennent les denrées à crédit ?
 - Fonctionnaire de l'état
 - Travailleur indépendant (menuisier, tailleur, mécanicien etc.)
 - Travailleur salarié dans une entreprise privée ou une ong
 - Autre
18. Si pas de crédit pourquoi ?
19. Quelle est la provenance de la plupart de vos denrées alimentaires ?
20. Quelle est la destination de la plupart de vos denrées alimentaires si vous en vendez en gros aux détaillants ?
21. Etes- vous satisfait de vos chiffres d'affaires journaliers ? oui, non
22. Si on pourquoi ?
23. Quelles sont les difficultés auxquelles un commerçant comme vous doit faire face à dano ?

Diversité alimentaire individuelle (de préférence la femme)
Demander au répondant (de préférence la femme) tout ce qu'il a mangé et bu hier (repas et grignotage), du matin jusqu'au coucher à son domicile ou à l'extérieur. Si c'est un plat préparé demandé s'il vous plait les ingrédients qui le composaient (par ex. tô de maïs avec sauce gombo, demander tout ce que la sauce contenait)

| Lieu/date | | Nom du répondant | | | |
|---|---|--------------------|------------------------------------|-------------------------------|------------------------|
| Profession du répondant | | Nom de l'enquêteur | | | |
| Petit déjeuner | Grignotage entre petit déjeuner et déjeuner | Dejeuner | Grignotage entre déjeuner et dîner | Dîner | Grignotage après dîner |
| le tot sauce gombo frais sel, piment feuille de gousse poisson. | mangue | | dolo | tôt de sorgho avec même sauce | |

Consommation des divers groupes d'aliments (diversité alimentaire pour le ménage des 7 jours passés)

Nous aimerions maintenant parler des différents types d'aliments qui ont été consommés dans le ménage (par tous les membres du ménages ou par une partie des membres du ménage au cours des 7 derniers jours. Citez les aliments qui appartiennent à chaque groupe et dès que l'enquêteur reconnaît que un seul de ces aliments a été consommé dans le ménage au cours de la dernière semaine (7 jours, ou deux marchés), inscrivez 1 dans la dernière colonne. Exemple: Si l'enquêteur dit que dans le ménage quelqu'un a consommé du sésame soit cru soit dans de la sauce, vous devez inscrire 1 pour le groupe des oléagineux même si elle ne mentionne pas de consommation d'arachide ou graines de coton.

| Groupes d'aliments | Exemples aliments | 1= Oui 0= Non | Principale source alimentaire 1= propre production 2= achat 3= cueillette 4= chasse 5= pêche 6= don (famille, amis) 7= aide alimentaire institution étatique (préciser) 8= aide alimentaire institution non étatique (préciser) 9= échange 10= travail contre nourriture 11= autre, précisez |
|-----------------------|---|------------------|---|
| Céréales | Si consommation souligner ou écrire le nom des aliments consommés Céréales locales: Petit mil, Sorgho blanc, Sorgho rouge, Maïs, Fonio Céréales étrangères: Riz, Blé ou produits de blé (pain, spaghetti, biscuits etc.) | 1 | 1 |
| Racines et tubercules | Si consommation souligner ou écrire le nom des aliments consommés Patates douces, Pomme de terre, Igname, Taro, Manioc (attiéké, gari), banane plantain | | |
| Légumes | Si consommation souligner ou écrire le nom des aliments consommés Légumes verts à feuilles vert foncées riches en vitamine A: salade, épinard, feuilles de manioc, de patate, d'oseille, haricot, de chou, d'oseille, de baobab, de chou, de | 1 | 2 |

| | | | |
|--|--|---|---|
| | cueillette, bulvaka, Autres légumes: citrouille, chou, tomate, carotte, oignon, poivron aubergine, | | |
| Fruits | Si consommation souligner ou écrire le nom des aliments consommés Fruits riches en vitamine A: mangue, papaye, pastèque, néré (fruit ou poudre) Autres fruits: orange, goyave, fruits sauvages et les jus purs obtenus à partir de ces autres fruits | 1 | 3 |
| Viande, volaille, abats | Si consommation souligner ou écrire le nom des aliments consommés foie, rognons, cœur et autres abats ou aliments élaborés à partir de sang boeuf, porc, agneau, chèvre, lapin, gibier, poulet, canard, autres volatiles ou oiseaux, insectes | | |
| OEufs | Si consommation souligner ou écrire le nom des aliments consommés œufs de poule, de canard, de pintade ou tout autre œuf | | |
| Poisson et fruits de mer | Si consommation souligner ou écrire le nom des aliments consommés poisson frais ou séché, conserves (sardines, thon, etc.), coquillages ou crustacés | | |
| Légumineuses/ légumineuses à gousse/ noix | Si consommation souligner ou écrire le nom des aliments consommés haricots secs, pois secs, lentilles, noix, graines de coton, graines d'arachides, sésame, et aliments élaborés à partir de ceux-ci | | |
| Lait et produits laitiers | Si consommation souligner ou écrire le nom des aliments consommés lait frais, lait en poudre (sucré ou non); fromage, yaourt ou autres produits laitiers | | |
| Huile / matière grasse | Si consommation souligner ou écrire le nom des aliments consommés huile (d'arachide, de coton, de sésame, de palme, etc.), Beurre de karité, Graisse d'animaux etc. ajoutés aux aliments ou utilisés pour la cuisson, mayonnaise; | | |
| Sucreries | Si consommation souligner ou écrire le nom des aliments consommés sucre, soda ou jus de fruit contenant du sucre ajouté, aliments sucrés tels que chocolat, bonbons, biscuits et gâteaux; boissons sucrées (sucreries, bissap, jus de gingembre, etc.), lait concentré sucré. | | |
| Divers (épices, condiments traditionnels, boissons etc.) | Si consommation souligner ou écrire le nom des aliments consommés épices (poivre noir, piment, sel, cube maggi, sel), condiments, (sombala sauce de soja, sauce piquante), café, thé, boissons alcoolisées (dolo, pastis, whisky, bière, vin, chiapalo etc.) | 1 | 2 |

Dépenses et dettes du ménage
Combien avez-vous dépensé en ALIMENTATION la SEMAINE DERNIÈRE? en FCFA pour...

| produits achetés | valleur |
|--|---------|
| Souligner ou écrire le nom des produits achetés Céréales: (Petit mil, Sorgho blanc, Sorgho rouge, Maïs, Fonio, Riz, Blé ou produits de blé (pain, spaghetti, biscuits etc.) | |
| Souligner ou écrire le nom des produits achetés Racines et tubercules: Patates douces, Pomme de terre, Igname, Taro, Manioc (attiéké, gari), banane plantain | |
| Souligner ou écrire le nom des produits achetés légumes verts à feuilles vert foncées riches en vitamine A: salade, épinard, feuilles de manioc, de patate, d'oseille, haricot, de chou, d'oseille, de baobab, de chou, de cueillette, bulvaka, | 50 |
| Autres légumes: citrouille, chou, tomate, carotte, oignon, poivron aubergine, | |
| Souligner ou écrire le nom des produits achetés Fruits riches en vitamine A: mangue, papaye, pastèque, néré (fruit ou poudre) Autres fruits: orange, goyave, fruits sauvages et les jus purs obtenus à partir de ces autres fruits | |
| Souligner ou écrire le nom des produits achetés Viande: foie, rognons, cœur et autres abats ou aliments élaborés à partir de sang boeuf, porc, agneau, chèvre, lapin, gibier, poulet, canard, autres volatiles ou oiseaux, insectes | |

Diversité alimentaire individuelle (de préférence la femme)
Demander au répondant (de préférence la femme) tout ce qu'il a mangé et bu hier (repas et grignotage), du matin jusqu'au coucher à son domicile ou à l'extérieur. Si c'est un plat préparé demandé s'il vous plaît les ingrédients qui le composaient (par ex. 10 de maïs avec sauce gombo, demander tout ce que la sauce contenait)

| Lieu/date | | Nom du répondant | | | |
|--------------------------------|---|---------------------|------------------------------------|-------|------------------------|
| Profession du répondant | | Nom de l'enquêteur | | | |
| Petit déjeuner | Grignotage entre petit déjeuner et déjeuner | Dejeuner | Grignotage entre déjeuner et dîner | Dîner | Grignotage après dîner |
| Cereales de + Milch Cornflakes | | Salade + vegetables | | Pizza | |

Consommation des divers groupes d'aliments (diversité alimentaire pour le ménage des 7 jours passés)

| Nous aimerions maintenant parler des différents types d'aliments qui ont été consommés dans le ménage (par tous les membres du ménage ou par une partie des membres du ménage au cours des 7 derniers jours. Citez les aliments qui appartiennent à chaque groupe et dès que l'enquêteur reconnaît que un seul de ces aliments a été consommé dans le ménage au cours de la dernière semaine (7 jours, ou deux marchés), inscrivez 1 dans la dernière colonne. Exemple: Si l'enquêteur dit que dans le ménage quelqu'un a consommé du sésame soit cru soit dans de la sauce, vous devez inscrire 1 pour le groupe des oléagineux même si elle ne mentionne pas de consommation d'arachide ou graines de coton. | | | |
|--|--|-------------------|--|
| Groupes d'aliments | Exemples aliments | 1= Oui 0 = Non | Principale source alimentaire 1 = propre production 2 = achat 3 = cueillette 4 = chasse 5 = pêche 6 = don (famille, amis) 7 = aide alimentaire institution étatique (préciser) 8 = aide alimentaire institution non étatique (préciser) 9 = échange 10 = travail contre nourriture 11 = autre, précisez |
| Céréales | <i>Si consommation souligner ou écrire le nom des aliments consommés.</i> Céréales locales: Petit mil, Sorgho blanc, Sorgho rouge, Maïs, Fonio Céréales étrangères: Riz, Blé ou produits de blé (pain, spaghetti, biscuits etc.) | 1 | 1 |
| Racines et tubercules | <i>Si consommation souligner ou écrire le nom des aliments consommés.</i> Patates douces, Pomme de terre, Igname, Taro, Manioc (attiéké, gari), banane plantain | 1 | 1 |
| Légumes | <i>Si consommation souligner ou écrire le nom des aliments consommés.</i> Légumes verts à feuilles vert foncées riches en vitamine A: salade, épinard, feuilles de manioc, de patate, d'oseille, haricot, de chou, de baobab, de chou, de | 1 | 1 |

Green beans

| | | | |
|--|---|---|---|
| | cueillette, bulvaka, Autres légumes : citrouille, choux, tomate, carotte, oignon, poivron aubergine, | | |
| Fruits | <i>Si consommation souligner ou écrire le nom des aliments consommés.</i> Fruits riches en vitamine A: mangue, papaye, pastèque, néré (fruit ou poudre) Autres fruits : orange, goyave, fruits sauvages et les jus purs obtenus à partir de ces autres fruits | 1 | 1 |
| Viande, volaille, abats | <i>Si consommation souligner ou écrire le nom des aliments consommés.</i> foie, rognons, coeur et autres abats ou aliments élaborés à partir de sang, poulet, porc, agneau, chèvre, lapin, gibier, canard, autres volatiles ou oiseaux, insectes | 1 | 1 |
| Oeufs | <i>Si consommation souligner ou écrire le nom des aliments consommés.</i> œufs de poule, de canard, de pintade ou tout autre œuf | 1 | 1 |
| Poisson et fruits de mer | <i>Si consommation souligner ou écrire le nom des aliments consommés.</i> poisson frais ou séché, conserves (sardines, thon, etc.), coquillages ou crustacés | 1 | 1 |
| Légumineuses | <i>Si consommation souligner ou écrire le nom des aliments consommés.</i> haricots secs, pois secs, lentilles, noix, graines de coton, graines d'arachides, sésame, et aliments élaborés à partir de ceux-ci | 1 | 1 |
| Lait et produits laitiers | <i>Si consommation souligner ou écrire le nom des aliments consommés.</i> lait frais, lait en poudre ; lait concentré (sucré ou non) ; fromage, yaourt ou autres produits laitiers | 1 | 1 |
| Huile / matière grasse | <i>Si consommation souligner ou écrire le nom des aliments consommés.</i> huile (d'arachide, de coton, de sésame, de palme, etc.), Beurre de karité, Graisse d'animaux etc. ajoutés aux aliments ou utilisés pour la cuisson, mayonnaise ; | 1 | 1 |
| Sucreries | <i>Si consommation souligner ou écrire le nom des aliments consommés.</i> sucre, miel, soda ou jus de fruit contenant du sucre ajouté, aliments sucrés tels que chocolat, bonbons, biscuits et gâteaux ; boissons sucrées (sucreries, bissap, jus de gingembre, etc.), lait concentré sucré, | 1 | 1 |
| Divers (épices, condiments traditionnels, boissons etc.) | <i>Si consommation souligner ou écrire le nom des aliments consommés.</i> épices (poivre noir, piment, sel, cube maggi, sel), condiments, (soubala sauce de soja, sauce piquante), café, thé, boissons alcoolisées (dolo, pastis, whisky, bière, vin, chiapalo etc.) | 1 | 1 |

| Dépenses et dettes du ménage | |
|---|--------|
| Combien avez-vous dépensé en ALIMENTATION la SEMAINE DERNIERE? en FCFA pour | |
| produits achetés | valeur |
| <i>Souligner ou écrire le nom des produits achetés</i> Céréales : (Petit mil, Sorgho blanc, Sorgho rouge, Maïs, Fonio, Riz, Blé ou produits de blé (pain, spaghetti, biscuits etc.) | 10000 |
| <i>Souligner ou écrire le nom des produits achetés</i> Racines et tubercules : Patates douces, Pomme de terre, Igname, Taro, Manioc (attiéké, gari), banane plantain | 10000 |
| <i>Souligner ou écrire le nom des produits achetés</i> Légumes verts à feuilles vert foncées riches en vitamine A: salade, épinard, feuilles de manioc, de patate, d'oseille, haricot, de chou, d'oseille, de baobab, de chou, de cueillette, bulvaka, Autres légumes : citrouille, choux, tomate, carotte, oignon, poivron aubergine, | 10000 |
| <i>Souligner ou écrire le nom des produits achetés</i> Fruits riches en vitamine A: mangue, papaye, pastèque, néré (fruit ou poudre) Autres fruits : orange, goyave, fruits sauvages et les jus purs obtenus à partir de ces autres fruits | 10000 |
| <i>Souligner ou écrire le nom des produits achetés</i> Viande : foie, rognons, coeur et autres abats ou aliments élaborés à partir de sang boeuf, porc, agneau, chèvre, lapin, gibier, poulet, canard, autres volatiles ou oiseaux, insectes | 25000 |

Questionnaire sur la diversité alimentaire individuelle

Demander au répondant (de préférence la femme) tout ce qu'il a mangé et bu hier (repas et grignotage), du matin jusqu'au coucher à son domicile ou à l'extérieur. Si c'est un plat préparé demandé s'il vous plaît les ingrédients qui le composaient (par ex. 10 de maïs avec sauce gombo, demander tout ce que la sauce contenait)

Lieu/date: Dano/ 090213
 Nom du répondant: enseignante
 Profession du répondant: enseignante
 Nom de l'enquêteur:

| Petit déjeuner | Grignotage entre petit déjeuner et déjeuner | Déjeuner | Grignotage entre déjeuner et dîner | Dîner | Grignotage après dîner |
|---|---|--|------------------------------------|--|------------------------|
| <u>Nescafé</u> <u>gallette</u> <u>sucrées</u> | | <u>10 de</u> <u>maïs</u> <u>sau ce</u> <u>gombo</u> <u>haché</u> <u>tomate</u> <u>oignon</u> <u>saumbara</u> <u>beurre</u> <u>de karité</u> | | <u>leignet</u> <u>d'haricot</u> <u>igname</u> <u>frites</u> | |

Consommation des divers groupes d'aliments (diversité alimentaire pour le ménage des 7 jours passés)

Nous aimerions maintenant parler des différents types d'aliments qui ont été consommés dans le ménage (par tous les membres du ménage ou par une partie des membres du ménage au cours des 7 derniers jours. Citez les aliments qui appartiennent à chaque groupe et dès que l'enquêtée reconnaît que un seul de ces aliments a été consommé dans le ménage au cours de la dernière semaine (7 jours, ou deux marchés), inscrivez 1 dans la dernière colonne. Exemple: Si l'enquêtée dit que dans le ménage quelqu'un a consommé du sésame soit au soit dans de la sauce, vous devez inscrire 1 pour le groupe des oléagineux même si elle ne mentionne pas de consommation d'arachide ou graines de coton.

| Groupes d'aliments | Exemples aliments | 1= Oui 0 = Non | Nombre de jours de consommation de l'aliment au cours des 7 DERNIERS JOURS? 0 = Non consommé 1 = 1 jour 2 = 2 jours 3 = 3 jours 4 = 4 jours 5 = 5 jours 6 = 6 jours | score | Principale source alimentaire 1 = propre production 2 = achat 3 = cueillette 4 = chasse 5 = pêche 6 = don (famille, amis) 7 = aide alimentaire institution étatique (préciser) 8 = aide alimentaire institution non étatique (préciser) | 7 = 7 jours | 9 = échange 10 = travail contre nourriture 11 = autre, précisez |
|--------------------------------------|---|-------------------|--|-------|---|-------------|---|
| Céréales | Céréales locales: Petit mil, Sorgho blanc, Sorgho rouge, Maïs, Fonio Céréales étrangères: Riz, Blé ou produits de blé (pain, spaghetti, biscuits etc.) | 1 | 7 | | | | 2 |
| Racines et tubercules | Patates douces, Pomme de terre, igname, Taro, Manioc (attiké, gar), banane plantain | 1 | 1 | | | | 2 |
| Légumes | légumes verts à feuilles vert foncés riches en vitamine A: salade, épinard, feuilles de manioc, de patate, d'oseille, haricot, de chou, d'oseille, de baobab, de chou, de cueillette, bulvaka, Autres légumes: citrouille, chou, tomate, carotte, oignon, poivron aubergine, | 1 | 7 | | | | 2 |
| Fruits | Fruits riches en vitamine A: mangue, papaye, pastèque, néré (fruit ou poudre) Autres fruits: orange, goyave, fruits sauvages et les jus purs obtenus à partir de ces autres fruits | 1 | 2 | | | | 2 |
| Viande, volaille, abats | foie, rognons, coeur et autres abats ou aliments élaborés à partir de sang boeuf, porc, agneau, chèvre, lapin, gibier, poulet, canard, autres volatiles ou oiseaux, insectes | 1 | 7 | | | | 2 |
| OEufs | œufs de poule, de canard, de pintade ou tout autre œuf | 1 | 1 | | | | 2 |
| Poisson et fruits de mer | poisson frais ou séché, conserves (sardines, thon, etc.), coquillages ou crustacés | | | | | | |
| Légumineuses/ légumes à gousse/ noix | haricots secs, pois secs, lentilles, noix, graines de coton, graines d'arachides, sésame, et aliments élaborés à partir de ceux-ci | 1 | 7 | | | | 2 |
| Lait et produits laitiers | Lait frais, lait en poudre, lait concentré (sucré ou non), | 1 | 7 | | | | 2 |

