

Nutrition and Food Security in the Resettlement Farms of Skoonheid and Drimiopsis, Namibia



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Nutrition and Food Security in the Resettlement Farms of Skoonheid and Drimiopsis, Namibia

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Abstract

The purpose of this project was to assess community Food Security and Nutrition in relation to health and development on the resettlement farms of Skoonheid and Drimiopsis in Namibia. In living with the communities and conducting group based activities, we have developed a comprehensive understanding of issues including agriculture, animal husbandry, and marketing practices. From these findings we created recommendations on how to sustainably improve the livelihoods of farm residents in addition to a pictorial manual about proper nutrition.

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This proposal was written with equal input by all team members in every section. Editing and revisions were done on each section by the entire team in order to ensure common ideas, knowledge, and input. For each section, we have listed the original writer(s):

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Table of Contents

<i>Abstract</i>	<i>ii</i>
<i>Acknowledgements</i>	<i>iii</i>
<i>Authorship</i>	<i>iv</i>
<i>Table of Contents</i>	<i>v</i>
<i>List of Figures</i>	<i>ix</i>
<i>List of Tables</i>	<i>x</i>
<i>List of Acronyms and Abbreviations</i>	<i>xi</i>
<i>Executive Summary</i>	<i>xii</i>
1. Introduction	1
2. Background	3
2.1. Food Security and Nutrition	3
2.1.1. Food Security	3
2.1.2. Proper Nutrition	4
2.1.3. Monitoring	6
2.2. Problems with Global Resettlement	7
2.2.1. Government Policy	7
2.2.2. Problems Resulting from Resettlement	9
2.3. Resettlement in Namibia	13
2.3.1. Namibia	13
2.3.2. Resettlement in Skoonheid and Drimiopsis	16
2.3.3. Livelihood Support Programme	18
3. Methodology	20
3.1. Food Consumption	20
3.1.1. Diet	20
3.1.2. Nutritional Consequences	25
3.2. Factors that Influence Food Security	27
3.2.1. Agriculture	27
3.2.2. Animal Husbandry	30
3.2.3. Water Infrastructure	32
3.2.4. Marketing	32
3.3. Improving Community Awareness	33
3.3.1. Education	33
3.3.2. Monitoring	33
4. Results and Analysis	35
4.1. Food Security	35
4.1.1. Diet	35
4.1.2. Nutritional Consequences	48
4.2. Factors that Influence Food Security	53
4.2.1. Cultural barriers	53
4.2.2. Income Generating Activities	54
4.2.3. Agriculture	58
4.2.4. Livestock	67

4.2.5.	Water Infrastructure	70
4.3.	Marketing	76
4.3.1.	Intra-communal trade.....	76
4.3.2.	Travel to Outside Markets.....	77
4.3.3.	Trade with Outside Communities.....	77
4.4.	Perceptions of Nutrition	79
4.4.1.	Current Awareness	79
4.4.2.	Monitoring	80
4.4.3.	Education	80
5.	Conclusions and Recommendations	82
5.1.	Agriculture/Animal Husbandry	82
5.1.1.	Water Infrastructure	82
5.1.2.	Crop Planting.....	84
5.1.3.	Crop Variation	86
5.1.4.	Storage.....	87
5.1.5.	Sustainable Animal Husbandry.....	87
5.2.	Marketing	89
5.2.1.	Access to Markets	89
5.2.2.	General Sales Practices.....	89
5.2.3.	Purchasing Practices.....	90
5.2.4.	Government Loans and Grants.....	90
5.2.5.	Micro-Entrepreneurial Ventures	91
5.3.	Education	91
5.3.1.	Existing Community Resources.....	92
5.3.2.	Expert Training.....	92
5.3.3.	Nutritional Manual	92
5.4.	Community Based Monitoring	92
5.4.1.	Mid Upper Arm Measurements.....	92
5.4.2.	Weight Based Monitoring	93
5.5.	Conclusion	93
	References and Works Cited	94
	Appendix A: Sponsor Description	101
	Appendix B: Key Informant Interviews	103
	Tim Downs – Community Based Development.....	103
	Barbara Thomas-Slayter – PRA Expert	110
	Albert Fosso – Agricultural Expert	113
	Ida Erasmus – Nutritional Expert	114
	Marjorie Van Wyk – Ministry of Health	116
	Kathryn – Omaheke San Trust	118
	James – Ministry of Lands, Office in Gobabis	120
	Professor Andrew Mwonge	122
	Silke Felton – Regional Director of WIMSA	124
	Dr. Helen De Kok – Clinic Doctor for	126
	Omaheke Regional Council.....	129

Interview with Chief Langmann	131
Interview with Mr. Potgieter – Omaheke Maize	132
<i>Appendix C: Village Resource Maps</i>	134
Skoonheid	134
Drimiopsis	140
<i>Appendix D: Seasonal Calendars</i>	144
Skoonheid	144
Drimiopsis	146
<i>Appendix E: Daily Activity Clocks</i>	149
Skoonheid	149
Skoonheid	150
Drimiopsis	158
Drimiopsis	159
<i>Appendix F: Ownership, Control and Access Matrices</i>	167
Skoonheid - Gender	167
Skoonheid - Poverty	169
Drimiopsis – Gender	171
Drimiopsis – Poverty	174
<i>Appendix G: Food Security Pathway</i>	176
Skoonheid	176
Drimiopsis	178
<i>Appendix H: Marketing Discussion</i>	180
Skoonheid	180
Drimiopsis	183
<i>Appendix I: Nutrition Discussion</i>	185
Skoonheid	185
Drimiopsis	187
<i>Appendix J: Feedback Session</i>	189
Skoonheid	189
Drimiopsis	191
<i>Appendix K: Roles of Vitamins in Health</i>	194
<i>Appendix L: Roles of Minerals in Health</i>	197
<i>Appendix M: Nutrients in Common Foods</i>	198
<i>Appendix N: Agricultural Specifications</i>	199
MAIZE (ZEA MAYS)	199

<i>Appendix O: Child Growth Chart</i>	203
<i>Appendix P: Prices of Common Vegetables</i>	237
<i>Appendix Q: Pictorial Nutrition Manual</i>	239

List of Figures

Figure 1- Food Guide for Namibia	4
Figure 2: Geographic Area of Indigenous Amazonians Prior to European Colonization.....	12
Figure 3- Average Annual Rainfall in Namibia	14
Figure 4- A map indicating the different regions of Namibia. Source: Namibiansafari.com	17
Figure 5- Daily Activity Clock in Skoonheid	22
Figure 6- Seasonal Calendar activity in Drimiopsis	23
Figure 7- Ownership, Access and Control Matrix	24
Figure 8- Nutrition Discussion in Skoonheid	26
Figure 9- Food Security Pathway in Skoonheid	28
Figure 10- A couple planting beetroot in their plot in Drimiopsis	30
Figure 11- Village Resource Mapping in Skoonheid.....	31
Figure 12- Close up of Drimiopsis village map showing water infrastructure	32
Figure 13- Community discussion in Skoonheid	34
Figure 14- Staple foods in Skoonheid and Drimiopsis	36
Figure 15- Cow being milked in Drimiopsis	38
Figure 16- Different veldt foods that are collected by residents of Skoonheid and Drimiopsis	39
Figure 17- Drought relief aid distribution in Drimiopsis	43
Figure 18- Children displaying signs of illness	49
Figure 19- Example of an eye infection in a young girl.....	51
Figure 20- Price chart at the shebeen in Skoonheid	52
Figure 21- Sample crafts in Skoonheid	54
Figure 22- Experienced crafter showing off her works in Drimiopsis.....	56
Figure 23- Old pensioners from Drimiopsis	58
Figure 24- Example of poor soil in Drimiopsis	60
Figure 25- Calcium deposit on an irrigation pipe in Drimiopsis	61
Figure 26- Food Security Pathway showing threats to the staple foods in Skoonheid	62
Figure 27 - Food Security Pathway showing threats to the staple foods in Drimiopsis.....	63
Figure 28-Black Aphids on beans in Skoonheid.....	64
Figure 29- Weeds encroaching on sorghum in a plot in Drimiopsis.....	65
Figure 30- Dried beans being stored in a room in Skoonheid.....	67
Figure 31- Undernourished cow on grazing land in Skoonheid	69
Figure 32- Dam in Skoonheid used for watering cattle	70
Figure 33- Crudely repaired main pump in Skoonheid	71
Figure 34- Leaking dam in Skoonheid.....	73
Figure 35- Leaking water pump in Drimiopsis	75
Figure 36- Examples of crafts in Skoonheid	76
Figure 37- Poster used in Stepping Stones class in Skoonheid	81

List of Tables

Table 1- Demographic Breakdown for the Daily Activity Clock activities -----	21
Table 2- Demographic breakdown of groups attending the Seasonal Calendar Activity-----	24
Table 3- Demographic breakdown of Ownership Control and Access matrix -----	25
Table 4- Demographic breakdown of residents attending the Nutritional Discussions -----	26
Table 5- Demographic breakdown of those attending the Food Security Pathway activity-----	29
Table 6- Demographic breakdown for the Village Resource Mapping activity. -----	31
Table 7- Fruits and vegetables cultivated in Skoonheid and Drimiopsis -----	37
Table 8- Seasonal Calendar in Skoonheid-----	40
Table 9- Seasonal Calendar in Drimiopsis. -----	41
Table 10- Approximate garden size given to residents of Skoonheid and Drimiopsis-----	42
Table 11- Skoonheid male Ownership, Control, and Access Matrix -----	44
Table 12- Drimiopsis male Ownership, Control, and Access Matrix -----	45
Table 13- Skoonheid female Ownership, Control, and Access Matrix -----	46
Table 14- Drimiopsis female Ownership, Control, and Access Matrix. -----	46
Table 15- Skoonheid Affluence Ownership, Control, and Access Matrix. -----	47
Table 16- Drimiopsis affluence Ownership, Control, and Access Matrix.-----	47
Table 17- Evaluation of different power techniques for pumping water in the communities -----	83

List of Acronyms and Abbreviations

AIDS	Acquired Immunodeficiency Syndrome
CBRP	Community Based Resource Persons
DRFN	Desert Research Foundation of Namibia
FCEAR	Fundación CEAR
HIV	Human Immunodeficiency Virus
IGA	Income Generating Activity
LISUP	Livelihood Support Program
MHSS	Ministry of Health and Social Services
MLR	Ministry of Lands and Resettlement
MUAC	Mid-Upper Arm Circumference
NFSNC	National Food Security and Nutrition Council
NGO	Non-Governmental Organization
NPC	National Planning Commission
PEM	Protein Energy Malnutrition
PPA	Participatory Poverty Assessment
TB	Tuberculosis
USA	United States of America
VPC	Volunteer
WIMSA	Working Group of Indigenous Minorities in Southern Africa
WPI	Worcester Polytechnic Institute

Executive Summary

For many people in the world today, it comes as second nature to accept that a healthy variety of food will be available throughout the year. In reality, there are many parts of the world in which food is not readily available and in which people struggle to obtain enough food to feed themselves and their families on a daily basis. This is especially the case in developing countries, such as Namibia, that do not have the extensive government policies or infrastructure that is necessary to ensure that the whole nation has sufficient food throughout the year.

The Desert Research Foundation of Namibia (DRFN) is a nongovernment organization that aims to enhance sustainable development in underprivileged sections of Namibia by fostering community involvement in projects that aim to directly improve the lives of community members. In this study, we have worked closely with one of the DRFN's projects, the Livelihood Support Programme (LISUP), to identify sustainable methods by which nutrition and food security can be enhanced for residents of the resettlement farms of Skoonheid and Drimiopsis in the Omaheke region of Namibia.

The overall objectives of our project are to:

- Identify factors that influence or inhibit food security within the communities with special focus on agricultural development
- Determine the perceptions of nutrition amongst the residents
- Identify nutritional and dietary problems manifested in the communities
- Devise sustainable means by which community nutrition can be monitored
- Determine current marketing practices and how they can be improved
- Develop a visually explicit manual to portray good nutrition to a predominantly illiterate community

Background

With the spread of the influence of Western nations and the goal of modernization across the world, many indigenous tribes and ethnic groups have been misplaced from their natural homelands. As these groups are pushed out of their native lands, the developing nations are faced with the prospect of integrating the native peoples into their societies. Such assimilations have occurred in nations across the world including the United States, Australia, South Africa, Botswana and Namibia. In an effort to expedite the process of incorporating indigenous tribes into their nations, these countries implement resettlement programs that attempt to settle the indigenous peoples into a more economically viable sector of society. These resettlement programs often fail to take into account the opinions or abilities of the ethnic groups being relocated and thus have failed to achieve their goals. Resettlement in Namibia was designed to specifically target the most vulnerable groups in the country. The main target groups were San, veterans, returnees, displaced persons, people with disabilities, and those from overcrowded communal areas. The two resettlement communities that we worked with were Skoonheid and Drimiopsis, resettled in 1993 and 1991, respectively. Skoonheid is a community of roughly 700 people living approximately 110 kilometers north of Gobabis. Drimiopsis is a larger community of about 1000 people located approximately 45 kilometers north of Gobabis. The diets in these communities are limited in both variety and quantity (DRFN, 2006a & DRFN, 2006b)

Methods

In order to achieve our stated objectives, we approached our project from two different angles. First, while working and researching in Windhoek, we interviewed several key informants from both government and nongovernmental organizations who have expertise in the fields of nutrition, health and agriculture. Additionally, we interviewed several experts while in the field, including physicians who work with the communities. From these interviews we gained their insight about nutrition and food security in the communities. Second, we spent eight days camping in each of the resettlement farms working directly with the community members. During our time in the field, we used Participatory Poverty Assessment (PPA) as described by the Namibian National Planning Commission in their PPA fieldwork manual (NPC, 2005). We also had several open discussions to gauge community opinions and views regarding the current status of nutrition and food security on the resettlement farms. In addition to our structured group sessions, we traveled throughout the communities and spoke informally to individuals about the status of nutrition and food security in the communities. Through these methods, we have obtained the opinions of the majority of community members and have acquired an understanding of the situation on the resettlement farms.

Results and Analysis

In order to analyze the results from our fieldwork and compile the opinions and views collected from our many interviews and group sessions, we divided our results by topic. The major topics are: food security, factors that influence food security, monitoring, and perceptions of nutrition. By dividing our results amongst these four topics, we are better able to understand how our results relate back to our objectives.

Currently, food security on the resettlement farms is not adequate. Community members consume a diet that consists almost exclusively of maize porridge, beans, and maize. Since the people in both communities eat a limited variety of foods, many people do not get enough vitamins and minerals to maintain a healthy life. This results in many community members suffering from malnutrition and nutritional deficiencies.

There are many factors that influence food security in the resettlement farms. These factors include income generating activities, agricultural production, animal husbandry, and water infrastructure. Overall, income generating activities (IGAs) will provide residents with the largest potential for increased dietary variety. Through IGAs they are able to purchase food from nearby stores where a wider variety of food is available. Some of the IGAs we explored with community members include crafting, sale of agricultural products, sale of animal products, and employment on nearby commercial farms. Agricultural production also greatly affects food security on the resettlement farms. Since many people can afford to eat only what they grow, it is important that people grow a variety of food that is nutritionally sound. Currently, the majority of people on the resettlement farms exclusively grow maize and beans; thus providing a diet that does not provide a healthy amount of many vitamins and minerals. Animal husbandry affects food security on the farms to a lesser extent. Due to the fact that many of the animals on the farms are government owned or privately owned with restrictions on use, most animals do not provide a significant amount of food to residents. Finally, water infrastructure affects the food security of residents, especially those in Skoonheid. Poor water infrastructure causes many people to have poor hygiene and sometimes go without enough water for sustaining sufficient agricultural production.

Another major objective of our project is to determine the feasibility of monitoring the nutrition of community members. After discussing this concept with the communities and several experts, we determined that there are two feasible methods; both of which are applicable only to children. One method, which can be used periodically, with some success, is to measure the mid upper-arm circumference of children ages 6 months to 5 years. The second method charts the weight of children from infant to teenager but must be recorded on a monthly basis to accurately assess nutrition.

Understanding community perceptions of nutrition was one of the most important aspects of our project. We determined that many community members had a surprisingly rich knowledge of what different foods do for the body and the value of a sufficiently varied diet. As a result, we have determined that it is not lack of knowledge about nutrition, but rather, lack of access to the proper food resources that prevents the communities from having better nutrition and food security.

Conclusions and Recommendations

Based on our time in Skoonheid and Drimiopsis we have created recommendations to help the communities progress towards the goals set forth by LISUP and the Ministry of Lands and Resettlement (MLR). We have specifically done this by addressing the issues of food security and nutrition. The recommendations aim to improve agriculture, animal husbandry, marketing, nutritional education, and monitoring on the resettlement farms.

Agriculture in the communities is directly related to the health and nutrition of the residents, thus the success of the harvests is vitally important. There are aspects of the communities' agricultural practices that can be altered to help improve production. Some areas we identified that need to be addressed are: water infrastructure, produce storage, soil management, pest control, and crop variation.

The consumption and sale of animals and animal products offers potential to improve protein intake as well as income. It is necessary to maintain herd size and grazing practices such that livestock do not use more resources than are available. Recommendations made about animal husbandry aim to maximize potential gain while limiting environmental impact.

Although some members of both communities have knowledge about healthy eating practices, many do not. Education about nutrition and healthy eating is necessary in order for community members to make advantageous decisions about crop planting, meal preparation, and food purchasing. One way in which we plan to inform the communities about nutrition is through a pictorial manual. The manual contains information about what specific foods do for the human body. Existing resources in the communities, such as the program, Stepping Stones, could be used as another method to teach residents about proper dietary practices.

Community monitoring should be implemented in order to assess the effectiveness of practices being used and to determine the overall nutritional status in the communities. We have assessed the feasibility of three different methods. These methods are mid-upper arm circumference measurement, growth weight charting, and weight comparisons to national averages. The easiest monitoring technique to implement would be mid-upper arm measurements, but this method can only be used for young children. The other strategies are more accurate and can be used with older children as well. Monitoring of the elderly, although

potential useful, is more difficult to do correctly. These recommendations offer potential ways to improve food security and nutrition on the resettlement farms.

1. Introduction

With the creation of modern international borders, the traditional lifestyles of indigenous groups of people all over the world have often been forced to change. Such compulsory changes have occurred in a large number of countries including, but not limited to, Australia, the United States, South Africa, and Botswana. In efforts to aid the uprooted indigenous populations of their countries, governments have implemented resettlement programs in order to provide people with land to begin a new life. Due to a lack of research, communication, and sometimes respect for the cultures of indigenous peoples, these government programs have faced many challenges. These challenges may stem from the provision of land not fit for prescribed uses, a lack of education for the resettled population, or insufficient resources to maintain a sustainable way of life. The end results of this process have typically been poverty, government aid dependence, and poor health.

Like other nations across the world, Namibia has faced resettlement challenges. One of its indigenous peoples, the San, has had to change their traditional means of livelihood after resettlement. In their previous hunter-gatherer way of life, the San were able to track herds of animals throughout the year and to gather a wider variety of plants than are traditionally cultivated on farms. Other marginalized populations were resettled along with the San, including those who were war veterans and those who were disabled. Two of these resettlement communities are Skoonheid and Drimiopsis located in the Omaheke region of Namibia. Compounding the effects of resettlement, Namibia receives very little annual rainfall, making agriculture and livestock farming difficult for even the most experienced farmers. Since the resettled populations have little education regarding farming techniques, they have trouble growing enough food to eat consistently throughout the year. In addition to low food security, the food they can provide for themselves does not usually meet all of their nutritional requirements for a healthy life. This causes the populations to be prone to malnutrition and its related diseases.

Other projects have worked with the resettlement areas around Namibia, but there is still limited knowledge on how to address the issues of hunger and nutrition. Organizations such as the Desert Research Foundation of Namibia (DRFN) have been working with resettlement communities to increase their quality of life by enhancing livelihoods. The DRFN has been working with FCEAR, a Spanish Corporation, through the Livelihood Support Programme (LISUP), to help improve the overall status of the resettled populations in Namibia. This program enabled our group to work alongside the communities and DRFN staff to form a strategy on how to improve nutrition through sustainable livestock farming and improved agricultural practices. The DRFN has conducted extensive research on the San and resettled populations in areas such as Skoonheid and Drimiopsis.

Despite the effort that has been made towards understanding resettlement communities' current situations and the malnourishment that exists, there is still a need for more information about how the people's lives can be improved. In order to come to conclusions about how this can be done, multiple topics require further investigation, and relevant information about the communities needs to be gathered. A few of the topics that

need to be investigated include agricultural practices, water infrastructure, and the current diet of the populations. The communities' sources of sustenance, the seasonal trends in their diet, and the land and resources available throughout the year also need to be assessed.

The goal of our project was to identify sustainable methods to enhance nutrition and food security for residents of the resettlement farms of Skoonheid and Drimiopsis. In order to accomplish this overall goal, several objectives were established. Our objectives included, assessing food production and consumption, community knowledge and interest in nutritional education, marketing practices, and nutritional monitoring techniques. We used Participatory Poverty Assessment (PPA) exercises as well as informal listening sessions to gather knowledge about the communities and gauge community perceptions. Interviews with people working closely with the community, such as clinic doctors, helped us arrive at a more comprehensive understanding of the situation on the resettlement farms. A literary review was conducted on sustainable development and poverty alleviation to gain insight on successful strategies and practices. The results of our work were compiled and examined to draw conclusions and thus make recommendations. Recommendations were made to address agriculture, animal husbandry, marketing, nutritional monitoring, and health education.

2. Background

The communities in which we lived and conducted research had cultural domains far outside our own. For us, it was imperative to be sensitive not only to their current situation, but also to cultural considerations and complex histories. In order to understand food security and nutrition in the communities, we must first explore the inherent issues that effect resettlement; specifically those in Namibia. We investigated nutritional deficiencies and methods of monitoring malnutrition prior to conducting research in the communities. This section of our report will discuss these topics in an effort to understand the context of the situation.

2.1. Food Security and Nutrition

In order to make recommendations on food security and nutrition, we first defined both of these terms. By understanding the definition of food security and what constitutes proper nutrition, we were able to focus our research using meaningful and straightforward questions.

Our research into the physical manifestations of nutritional deficiencies was also crucial. Without this knowledge, we would have missed important observations that confirmed or conflicted with statements from the community. These observations have helped us create a more in-depth picture of community life and nutritional deficiencies. Feasible methods of monitoring nutrition will also be discussed in this section.

2.1.1. Food Security

In order for a community to have proper nutrition, it must first attain complete food security. Food security is best defined as, “a situation when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life” (Khanya, 2006, p. 1). This means that in order for a community to have food security, all of the people must be able to both afford and access enough food for a nutritiously sound diet. The definition of food security can be divided into three sub-sections: availability, access and diversity (Khanya, 2006).

Availability refers to the physical existence of a quantity of food necessary to feed a community. This means that the community or nearby communities produce or import a sufficient amount of food to feed all individuals. This part of food security includes the efficiency of the production and distribution systems and their ability to provide food (Khanya, 2006).

Once food is available, it is necessary to have access to this food. This component of food security works to assess people’s ability to either produce or exchange for the food that is available. This means that availability cannot be assumed to imply access—if food is available but a family cannot afford it, they still do not have access to food (Khanya, 2006).

Also, if a family produces food, but must sell instead of consume to pay off expenses; they are also hampered in their ability to access food.

Finally, even if food is available and a family has access to it, food security cannot be achieved until there is a reasonably diverse diet available. If a household only has access to one specific food source, they cannot be considered to have food security or adequate nutrition (Khanya, 2006). It also puts them at risk for starvation if this food source becomes unavailable. As such, it is important for us to examine what constitutes good nutrition and what foods should be included in a healthy and diverse diet.

2.1.2. Proper Nutrition

Researching the concepts of proper nutrition as portrayed by the Namibian Ministry of Health was essential to our project because the recommendations that we make will be implemented in Namibia. Since the Ministry of Health defines the national nutrition standards for the country, we have used the guidelines set forth in the “Food & Nutrition Guidelines for Namibia” (National Food Security and Nutrition Council [NFSNC], 2000). Some of these guidelines can be seen in Figure 1. These guidelines cover the variety, frequency, and types of foods that constitute a healthy diet.



(FAO, 2009)

Figure 1- Food Guide for Namibia

Whole Grains

Whole grains such as millet, maize, sorghum and wheat typically represent the staple foods of a Namibian's diet (NFSNC, 2000). These foods are rich sources of B-vitamins, iron, and fiber along with a small amount of protein. These foods are necessary for good digestive health and healthy blood. The importance of these nutrients is described in Appendix K.

Fruits

Due to the high quantity of vitamins and minerals contained in fruits, they are particularly important to a nutritious diet (NFSNC, 2000). Specifically, they contain a high quantity of vitamin C, which enhances the body's ability to prevent disease. Vitamin C deficiency is a large problem in Namibia due to the high cost of fruit, therefore unavailability is an issue for much of the population (I. Erasmus, personal communication, March 26, 2009).

Vegetables

Vegetables, like fruits, are extremely important to a healthy diet. When boiled they can lose vitamin and mineral content (NFSNC, 2000). Vegetables will provide the most nutritional advantage when eaten raw or fried in oil because fat soluble vitamins, such as A and E, cannot be absorbed unless consumed with fat (C. Peet, personal communication, April 30, 2009). The nutrient composition of common foods can be found in Appendix M.

Meat, Beans, and Dairy Products

Meat, beans and dairy products are essential for a well rounded diet. All of these foods are significant sources of protein which is vital for healthy childhood development, muscle growth, and nervous system function. As such, it is imperative that these foods are eaten on a regular basis. In addition to protein, these foods also are an important source of iron. Iron is necessary for the body to create healthy and functional blood cells and its consumption can prevent illnesses such as anemia (NFSNC, 2000).

Seafood

Seafood is the best natural food source of iodine. This particular food group is not easily accessible in many parts of Namibia as it can only be produced in regions close to the seacoast or northern perennial rivers. A suitable alternative source of iodine for the remainder of the country is the use of iodized salt. Iodized salt, even when used sparingly, can provide adequate iodine to the diet and prevent health problems such as a goiter (NFSNC, 2000).

Daily Consumption Practices

In addition to consuming a wide variety of food on a daily basis, it is important to have a sufficient caloric intake. One of the major problems in underdeveloped communities is the inability to obtain food with enough caloric content to maintain a healthy body weight. A simple and effective measure of how much food a person consumes is to count the number and size of meals that one eats in a particular day. The Namibian government considers three

meals a day to be the optimal number of meals for proper health. One of the reasons behind this is that children can only consume a small amount of food at any one time (NFSNC, 2000).

Nutritional Deficiencies

In addition to contributing to the overall health and wellbeing of an individual, good nutrition also prevents many health conditions that result from nutritional deficiencies. The absence of vitamins and minerals may result in physical manifestations of disease. For example, a deficiency in vitamin A will result in lines across the irises of the eyes of a person suffering from a deficiency. These types of physical manifestations are helpful when assessing the nutritional status of a community because they are easily identifiable signs of nutritional deficiencies. These signs should not be considered an absolutely positive indicator of any deficiency as there are often several conditions that can result in similar symptoms. These deficiencies can be detrimental to health, growth and development (MHSS, 2007).

2.1.3. Monitoring

An important tool for increasing community awareness of nutritional deficiencies is to encourage the community to monitor their own nutritional status. There are several ways to monitor nutrition. These methods range from simply measuring a person's weight at regular intervals to performing blood tests for each individual vitamin or mineral. Due to the constraints on access to clinics in the communities we studied, our research focused on methods which are easier to self-administer. Additionally, we focused on monitoring the nutritional status of children as they are most prone to nutritional deficiencies. According to the Namibian Ministry of Health, there are currently two widely accepted methods for monitoring the nutritional status of children: mid-upper arm circumference measurements (MUAC), and growth-weight monitoring (M. Van Wyk, personal communication, March 27 2009).

The mid-upper arm circumference measurement is perhaps the simplest method of monitoring and is typically utilized every three months. This method uses a specially made band to measure the circumference of the child's middle upper arm. The bands used for this measurement are distributed to clinics by the Namibian Ministry of Health and Social Services. These bands come pre-marked with measurements corresponding with mild-acute malnutrition and severe-acute malnutrition. These markings allow someone with very little training and no medical expertise to determine the nutritional status of a child. However, there are challenges with using this method. It can only be used on children between the ages of six months and five years old, and can be misinterpreted if placed on the wrong part of the arm. Simple training is required to ensure proper measurement (M. Van Wyk, personal communication, March 27, 2009).

The weight monitoring method, which is used by many clinics across rural Namibia, requires that a child's weight be measured and recorded on a monthly basis. Interpretation of the results of this measurement takes more expertise than the MUAC method, but signs of malnutrition are apparent earlier on a weight chart than they are in using the MUAC. To

interpret the weight chart, the graph for a child is compared to a standard to determine if the child is growing at an approximately normal rate. A sudden drop in the child's weight is typically a clear sign of malnourishment. The advantage of this method is that it can sometimes identify the malnourishment before a child's muscles begin to deteriorate (Ministry of Health and Social Services, 1994). The Ministry of Health and Social Services distributes yellow Child Growth Cards to clinics and hospitals which are then used to keep records for up to five years. A pamphlet is also available from the government describing how to use the growth card and promote healthy living. See Appendix O for a copy of the Child Growth Chart and the accompanying instructional pamphlet.

2.2. Problems with Global Resettlement

Resettlement is a practice in which a group of indigenous peoples are moved off of their native land to what is usually government purchased territory elsewhere. Some other names for resettlement are land reform and relocation (Roger, Soren 2001). Reasons for resettling vary, but are often a direct or indirect consequence of colonization. Resettlement in the past has sometimes been forcibly implemented, and the land allocated for settlement has frequently been purchased without weighing the opinions of the peoples being moved (Plant, 2001; Kinsey, 2009; Philander and Rogerson, 2005; Wolfgang, 2001; Memmot, Morn, 2009; Oswalt, 1973). Large scale resettlements have been conducted by many governments including those of Canada, the United States, Ecuador, Brazil, Botswana and Namibia (Plant, 2001; Kinsey, 2009; Philander and Rogerson, 2005; Wolfgang, 2001; Memmot, Morn, 2009; Oswalt, 1973).

Governments have offered different explanations for why they have adopted resettlement policies. In a court case brought up by a relocated group of San, arguing they should not have been moved, the Botswanan government stated that they needed to move the San in order to better provide them with modern amenities (Taylor, 2007). In another case, US President Andrew Jackson attempted to justify the removal of all Native Americans from east of the Mississippi in his seventh annual message to the United States Congress given on December 7th 1835. "All preceding experiments for the improvement of the Native Americans have failed. It seems now to be an established fact they cannot live in contact with a civilized community and prosper" (Jackson, 1835). In this speech Jackson claimed removal was in the best interest of the Native Americans, but the discovery of gold in Georgia is thought to have influenced the government's actions. Despite the wide range of strategies used and the vast variety of land reallocated, almost all resettlement cases have resulted in similar outcomes for the people being moved (Wolfgang, 2001; Oswalt, 1973; Kinsey, 2009; Anderson et al., 2006). Resettlement often does not reach the goals set forth at its initiation, which is almost always to make participants self-sufficient (Mayo 2004; Plant 2001).

2.2.1. Government Policy

International law has granted native peoples a legal claim to their ancestral land. Despite this, some governments intentionally ignore these rules (Perreault, 2003; Moncher et al., 1990). No policing organization exists to enforce such international laws (Perreault, 2003;

Moncher et al., 1990). As a result, the indigenous peoples of colonized countries are typically marginalized.

Land Allocation

Several of the same mistakes have frequently been made by different governments and organizations in implementing resettlement programs. Land is often bought by the government with no input from the people for whom it is being bought (Plant, Hvalkof, 2001). Most relocation programs place native peoples on land they are not familiar with; they are forced to relearn how to survive in their new environment (Oswalt, 1973; Saugestad, 2005). This is a problem when hunter-gatherer societies are relocated, as they have little or no experience living on the type of land being allocated to them. The land given to beneficiaries is often not suitable for agricultural development (Kinsey, 2009; Plant, Hvalkof, 2001). This magnifies other problems making it very difficult for resettled communities to prosper. The locations chosen are often isolated from major towns, limiting the amount trade (Plant, Hvalkof, 2001). This severely limits the capability for economic growth by hindering the flow of cash and goods into and out of the community. Therefore resettled communities rarely achieve fiscal independence.

Top Down Policy

Land resettlement plans have often been developed and executed without input from the people being moved, which is referred to as “top down policy” (Perreault, 2003; Anderson et al., 2006; Memmot, Morn, 2009; Plant, Hvalkof, 2001; Saugestad, 2005; Kinsey, 2009). In this type of decision making, rural communities with valuable insight are frequently excluded from the process. Oftentimes officials who are making decisions do not have a full understanding of cultural barriers that could impede policy (Plant, Hvalkof, 2001; Kinsey, 2009; Oswalt, 1973; Memmot, Morn, 2009). Top down policy has been noted as being a cause for the failure of land redistribution (Plant, Hvalkof, 2001). Policies that are developed with the input of those intended to benefit from these actions are found to be more successful in achieving policy goals (Philander and Rogerson, 2005). By working with the beneficiaries of a program not only is the policy itself enhanced by knowledge the locals possess, but the plan is more likely to be embraced by the community and mobilize community action. This concept of project ownership empowers communities to solve their own problems.

Communication

Another issue that plagues resettlement policies is poor communication (Wolfgang, 2001; Plant, Hvalkof, 2001; Perreault, 2003; Hitchcock, 2002). In many cases, government organizations do not share their findings or discoveries with the people they intend to assist (Perreault, 2003; Hitchcock, 2002; Plant, Hvalkof, 2001). Additionally, the exchange of thoughts and ideas between government officials and local leaders is typically infrequent (Wolfgang, 2001; Saugestad, 2005; Perreault, 2003). These breakdowns in communication have been cited as a reason for the failure of land reallocation projects (Plant, Hvalkof, 2001). Communication is also important in the resettled communities themselves as project participants have first hand knowledge about the effectiveness of specific practices.

Training and Education

Training and education are important topics in socio-economic development. This has been frequently ignored when attempts have been made to integrate native peoples into national economies (Oswalt, 1973; Wolfgang, 2001). Though a lack of training is often cited as a reason for program failure, the specific type of training needed varies (Oswalt, 1973; Plant, Hvalkof, 2001; Saugestad, 2005). It is difficult to expect a group of people, who are by nature hunters, to raise cattle without a comprehensive education and training program. In addition, the need for training about the local environment is often cited as a recommendation in reports assessing land reform (Memmot, Morn, 2009, Oswalt, 1973, Plant, Hvalkof, 2001).

Traditional leadership and community organization have a tendency to break down during resettlement programs (Plant, Hvalkof, 2001). Training is needed in order to help beneficiaries deal with organizational issues and improve a potential difficult situation.

2.2.2. Problems Resulting from Resettlement

Historically, the resettling of nomadic tribes has not effectively raised the standards of living of these indigenous peoples (Plant, 1973). In almost every examined case of land resettlement the population being moved has experienced the same symptoms. These include poverty, poor education, malnourishment, insufficient housing, and a higher rate of disease (Anderson et al., 2006; Oswalt 1973). It is rare to find an instance of relocation in which both parties are completely satisfied. One such population in which these problems are prevalent is the Native Americans.

Case Study: Native American Resettlement

Prior to the arrival of European society the native populations of the Americas, called either Native Americans or American Indians, prospered from the use of natural resources. The first Native Americans arrived on the continent shortly after the first ice age, crossing over a temporary land bridge between North America and Asia (Thorton, 1990). At the time of the arrival of Europeans, the land mass of what is currently North and South America was inhabited by an estimated 16 million people (Meriam, 2003). During early European occupation, the Native Americans aided the newly arrived settlers in basic survival skills such as farming and gathering (Meriam, 2003). This good will was not long lasting. With the rise of permanent white settlements and population influx, European land claims began clashing with indigenous territory. The superior military technology of the Europeans allowed them to impose their will on the Native Americans. Large scale resettlement policies, such as the infamous Trail of Tears, were implemented by the U.S. Government (Thorton, 1990). As a solution to the now displaced populations, the U.S. government granted the Native Americans large plots of land and provided them with the minimal means of subsistence. By the 1920s almost all Native Americans lived on these settlements (Thorton, 1990). In 1926, the US Government recognized the need to assess the implementation of Native American resettlement and as a result conducted a two year study of the program.

*A report outlining the findings was published in 1928 called *The Problem of Indian Resettlement* (Perreault, 2003). This report thoroughly discussed all aspects of Native American life in the resettlement camps including education, wealth, quality of life, and health. In addition to investigating the state of the population, the report also examined the manner in which resettlement was implemented. Aspects of Native American life in the resettlement camps were analyzed and compared to those of the non-native population. The report found that “the health of the Indians as compared with that of the general population is bad” (Meriam, 1928, p.1). Communicable diseases such as Tuberculosis and Trachoma were found to be prevalent in the Native American population. Overcrowding and poor living conditions were credited with the rapid spread of such diseases, as “it is virtually impossible in any way even partially to isolate a person suffering from a communicable disease” (Meriam, 1928, p.1). In addition to poor health and overcrowding, the report found the diet of the Native Americans to be nutritionally inadequate. This arose predominantly from an insufficient supply of fruits, vegetables, and dairy products.*

The issues the Native Americans have faced are generally attributed to government implementation of resettlement. The report suggested that policy makers did not have adequate information about the Native American population or the land they were being moved to when relocation was enacted. A lack of input from the Native Americans was presented as a prime reason for policy failure. The land itself was also mentioned as part of the problem; agricultural development is almost impossible on Native American settlements due to poor soil quality. Some other areas mentioned as being issues in resettlement implementation were lack of agricultural or industrial training and poor communication between policy makers and the Native Americans. Resettlement did not improve Indian life but instead marginalized Native Americans.

Poor Health

One of the most alarming recurrent problems with resettlement is the poor health of the beneficiaries. Ion Anderson et al. (2006) studied indigenous people’s health in Australia, New Zealand, and the Pacific Islands. Specifically they studied the prevalence of diseases among native populations and compared findings to that of non-native settlers. It is important to note that these data were recorded after indigenous populations had been either relocated or westernized and not in their pre-settlement environment. In every case, it was found that diseases were much more prevalent in the native populations. Anderson et al. also found that the life expectancies of relocated peoples were much lower compared to the general population. Anderson is not the only researcher to come to this conclusion. Roger Plant found this to be true in the Amazon (2001). Similarly, the health of the San in Botswana was significantly reduced after relocation as determined by Richard Hitchcock in 2002. Based on our review of the literature, we have concluded that poor health tends to be correlated with most resettlement schemes.

Malnourishment and Hunger

Health related issues that arise from relocation projects are often the result of malnutrition and hunger. Problems with dietary variety and food security often arise when a people have to alter their sources of livelihood. Particularly hunter-gatherer societies suffer when they are forced to live on one permanent location and prevented from gathering wild

indigenous foods, often referred to as veldt foods. A lack of knowledge about agriculture or animal husbandry results in an inability to maintain a constant source of food or income. The end result is hunger and a lack of dietary variety. (Anderson, I., Crangie, S., & Kamaka, M. 2006)

One example of malnourishment and hunger issues affecting a community was seen in Kuala Betis, Malaysia. In this case, malnutrition manifested itself in the form of stunted growth and wasting. The nutritional status of children, one to ten years old, was assessed using weight based monitoring. The parameters of the children from Kuala Betis were compared to those of children in a nearby town, Malay. Malay is not a resettlement community and thus residents live there by their own choice. The findings showed that more children in Kuala Betis were stunted, wasted, and malnourished. It was concluded that the cause of the nutritional difference was the poor economic situation in the resettled community (Atiya, A.1999)

A similar study was conducted in a resettlement colony from Delhi with comparable results. Children from the resettled community were found to be more malnourished than those of the general population. Protein energy malnutrition (PEM) was identified as a major nutrition-related problem resulting in physical and mental impairment (Badhan, 2003).

Poor Education

Insufficient education is also a prevalent problem in resettlement communities. Often education infrastructure and resources are inadequate and inconveniently located. Education frequently is too expensive for impoverished residents to afford. Poor education results in resettled community members having a significant disadvantage when trying to assert their rights. This problem is often exacerbated by language barriers that are best overcome through an educational system. Additionally, poor quality education or lack thereof in resettled communities prevents social mobility (Meriam, 1928; McDonald, 2006).

Poor Housing

Houses and dwellings in resettlement communities tend to be overcrowded and have inadequate infrastructure. These conditions facilitate the spread of disease and poor hygiene, especially when a large number of people may be forced to live in a small house. This problem is mainly caused by a lack of flexibility in community design such as rules preventing expansion of housing. This situation worsens as families grow (Meriam, 1928).

Case Study: Amazonian Resettlement

Europe was not the first culture to bring civilization to the region currently known as South America. Prior to being discovered by Europeans, culturally rich communities thrived in South America (Plant, Hvalkof, 2001). Figure 2 shows where civilizations existed.



Figure 2: Geographic Area of Indigenous Amazonians Prior to European Colonization Source: Plant, Hvalkof 2001

The Spanish settled these areas during the 16th and 17th centuries. Though brutal at times, they issued land titlements to native communities (Plant, Hvalkof, 2001). These land claims were recognized globally for hundreds of years under the phrase “Comunidad indigena”. As South American countries began gaining independence in the 19th century, the land claims granted by the Spanish were repealed. As the legal systems of the newly formed countries were difficult to understand, the native peoples lost much of their land. European population began to encroach upon this now unprotected land, degrading the quality of the land and the ability of the indigenous people to sustainably live off of it. As a result, native Amazonians began working on farms as a means of subsistence. Wages were not regulated and were often changed without notification (Plant, Hvalkof, 2001). These marginalized, indigenous societies were often forced into cheap labor. An exception to this took place in Colombia. After native land claims were denounced in 1850, indigenous communities protested and were granted special land claims (Plant, Hvalkof, 2001). Native communities, such as the ones mentioned, were able to gain political leverage and fared better than those who did not have land claims. Even the simple act of voting in high percentages helped the cause of several indigenous tribes (Plant, Hvalkof, 2001; Perreault, 2004).

During the 1950s and 1970s, large scale land reform took place in South America, also leading to titling of native land (Plant, Hvalkof, 2001; Perreault, 2004). Land was distributed collectively to communities in an attempt to promote cooperative farming (Plant, Hvalkof, 2001; Perreault, 2004). This was in contrast to the traditional livelihoods of the indigenous peoples. Much of the land distribution policies developed by the South American governments were based on Marxist models and the philosophy of “cooperative venture” (Plant, Hvalkof, 2001). The aim of

increased productivity was not met as “communities found themselves involved in cooperative ventures, which turned into economic failures and caused much resentment.” (Plant, Hvalkof, 2001, p.15). The popular attitude towards the indigenous community also changed in a negative way during modern land reform (Perreault, 2004; Plant, Hvalkof, 2001). For example, in Peru, the phrase “indigenous communities” gave way to “peasant communities” in government documentation and general discussion (Plant, Hvalkof, 2001). These modern policies had grave effects on the native communities of the Amazon. Extreme poverty and its ramifications became prevalent among native populations. Consequences included poor education, hunger, and disease (Perreault, 2004; Plant, Hvalkof, 2001). These resettlement programs were investigated in order to determine why the program had not fully succeeded. It was found that the quality of the land given to the natives was very poor and that land resettlement had actually increased the problem of landlessness (Perreault, 2004; Plant, Hvalkof, 2001). The Marxist theories that had been implemented were also determined to have been impractical for the social system and beliefs of the native Amazonians (Plant, Hvalkof, 2001). Little input was taken from these beneficiaries in creating the resettlement program, and many of the policies were not viable for the community

2.3. Resettlement in Namibia

Soon after its independence in 1990, the nation of Namibia began to implement programs for sustainable development of marginalized groups across the country (McLean, 1988). The main goal of this resettlement program was to encourage sustainable development by enhancing the capabilities, equity, and livelihood security of previously disadvantaged peoples. In order to understand the resettlement programs being implemented in the communities that we worked with, we familiarized ourselves with the country of Namibia and the Government’s reasons for implementing resettlement. Next, we reviewed previous reports on the specific resettlement farms with which we worked. Finally, we researched the Livelihood Support Programme (LISUP), which is the driving force behind initiatives to improve life in the resettlement farms (DRFN 2006c).

2.3.1. Namibia

Namibia is a semi- arid country located in the south west part of Africa. It covers an area of 824,295 km² and is one of the most sparsely populated areas in the world with approximately two people per square kilometer. The land is quite dry, as Namibia is mostly situated between two deserts. Almost 92% of Namibia’s land is arid or semi-arid, and temperatures can range from freezing to above 40 degrees Celsius. It is so dry that almost 83% of rainfall evaporates very shortly after precipitation and only 1% reaches the ground water reservoirs. Figure 3 shows the average rainfall trends throughout the country of Namibia. The unavailability of clean water is exacerbated for many people because over half of all water must be collected from ground water resources which are often high in salts, resulting in poor water quality (Harring & Odendaal, 2002)

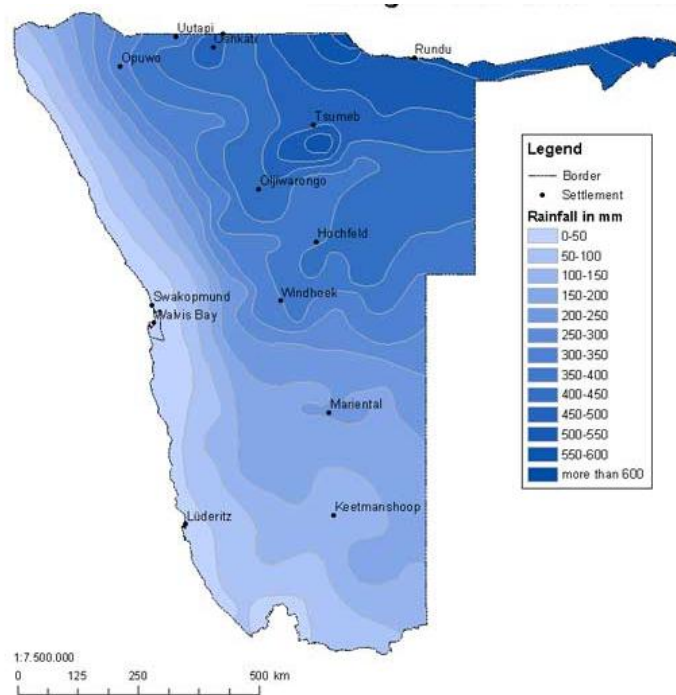


Figure 3- Average Annual Rainfall in Namibia

Source: uni-koeln.de

The culmination of these factors makes much of Namibia’s land poor for agricultural use. Only a third of the land that is available for commercial and communal use is suitable for agriculture. Yet in 2002, it was estimated that 70% of the population is somehow dependent on agriculture for livelihood. However, most of the land in Namibia is used for grazing livestock. Cattle farming is done in the north and center of the country due to higher rainfall, while sheep and goats are raised elsewhere. This large use of land for grazing has caused a problem with bush encroachment and therefore reduced the overall quality of the land (Harring & Odendaal, 2002).

History of Apartheid

The history of resettlement in Namibia is long and complex. It originated in 1884 when Germany began to colonize and seize the rich and profitable central lands of Namibia. Namibia was split into two zones called the Police Zone and the “homelands”. Movement in and out of these areas was restricted from both sides. Whites could not enter the north, and blacks could not enter the Police Zone except as contract labor (Harring & Odendaal, 2002).

Though German colonial rule ended in 1915 when Great Britain gained control over Namibia, land rights for native Namibians continued to worsen. With the end of martial law in 1920, white farmers from South Africa started to settle in Namibia. The South African government began giving large loans to white farmers in order to expand and fortify their already sizeable farms. This monopoly on land was expanded in 1925 when laws were passed

which gave the government the ability to relocate any tribe, appoint or remove chiefs, and over-rule any laws or customs made by indigenous peoples (Harring & Odendaal, 2002).

Almost thirty years later, a commission was appointed in 1962 to investigate how to provide for economic advancement, health services, education, and opportunities for employment for black Namibians. The main result was an increase in availability of land to black Namibians by nearly 50%. Much of this land, however, was barren desert. The recognized areas were Owamboland, Hereroland, Kaokoland, Okavangoland, Damaraland, and Eastern Caprivi, none of which were San inclusive. This first step in resettlement was still highly grounded in the South African apartheid approach (Harring & Odendaal, 2002).

Resettlement in Namibia

After Namibia's independence in 1991, the Ministry of Lands and Resettlement was responsible for investigating how to reallocate land to populations marginalized under apartheid. The goal was, "improvement of the quality of life through enhancing dignity, well-being and empowerment of the landless and destitute people in Namibia" (Ministry of Lands, Resettlement and Rehabilitation [MLLR], 2001, p.1). This was no easy task as 90% of the black population was cited as living in small, barren, "homeland" areas, while white farmers that made up 8% of the population, owned approximately half of the land (MLLR, 2001). At that point it was estimated that over 243,000 Namibians were in need of resettlement.

The Ministry was faced with many challenges as little land in the north was viable for farming and land in the south had been degraded by overgrazing (MLLR, 2001). The main target groups for resettlement were San, veterans, returnees, displaced persons, people with disabilities, and those from overcrowded communal areas. The San were especially targeted for resettlement as they had often been treated the most unjustly out of all ethnic groups in Namibia, by both white colonizers and native Namibians. German colonial troops used San as trackers in the bush then abandoned them at old military camps. The San were also workers on white-owned commercial farms, often living like indentured servants (MLLR, 2001).

The Cabinet Committee on Land Policy determined that because many communal farmers could not buy land themselves, farms would be purchased and allocated. The residents on these new farms would be responsible for recurrent expenditures and maintenance. One major decision made by the new government was that the restitution of ancestral land rights was impossible. This policy was adopted for two reasons. The first was that before colonial times, ownership of land was very subjective and not able to be determined at the time. The second reason was that the new government intended to prevent hostility between the various groups and to promote national unity (Harring & Odendaal, 2002). Resettled people were expected to give up their rights to land anywhere else in the country. The people on the farms were expected to become self sufficient in four years. This idea encompassed their ability to pay for resources such as water and diesel (MLLR, 2001). By the White Paper on Resettlement Policy, October 1997, land acquired for resettlement

purposes was to be given to resettled peoples for 99 years after which ownership will revert to the government (Harring & Odendaal, 2002).

Traditional San Life

Although the communities of Skoonheid and Drimiopsis contain people of many ethnic origins, the San comprise most of the populations. The San have been marginalized due to their cultural heritage and their inability to assimilate more closely with modern society. They represent the most ancient genetic line of humans that exist today. As a culture, the San have been living in southern Africa for about eleven thousand years. Traditionally, the San were a group of hunter-gatherers who traveled and lived nomadically throughout parts of Namibia, Angola, South Africa, and Botswana. The San followed animal herds during the year to obtain meat for food while collecting veldt foods as they traveled in the region. This gave them an immense knowledge of the land, plants, and animals in the region but due to the loss of land and encroachment of other cultures, it is necessary for the San to integrate into modern society (Suzman, 2001).

2.3.2. Resettlement in Skoonheid and Drimiopsis

The two resettlement communities that we worked with were Skoonheid and Drimiopsis. Both of these resettlement farms are in the Omaheke region of Namibia. The Omaheke region contains some of the most impoverished people in the country. This region is located on the far eastern edge of the country, adjacent to Botswana. This can be seen in Figure 4.

is on 2262 hectares of land, thus limiting the ability raise much livestock. Therefore, the land is mainly used for crop production (DRFN, 2006b).

2.3.3. Livelihood Support Programme

LISUP was jointly created by the DRFN and the Fundación CEAR with funding from the Spanish Agency for International Development and the Namibian Ministry of Land, Resettlement, and Rehabilitation. The program was designed to improve the livelihoods of the residents of five resettlement communities: Donkerbos/Sonneblum, Drimiopsis, Skoonheid, and Arovley. LISUP's goal is to lessen the overall poverty on the farms through improving the communities' livelihoods. Since April of 2007, LISUP has been working to improve the welfare on the resettlement farms through improving farming practices and conducting agricultural training (DRFN, 2006c).

The program was designed to improve the residence's livelihoods through enhanced agricultural productions on the land that was provided. Through this kind of progress the communities would be able to feed themselves and be involved in the modern economy (DRFN, 2006c).

Skoonheid

LISUP also provided agricultural training and seeds to ensure strong harvests to support the community. The program has also been working on creating more irrigation for the established gardens to further their productivity. Many residents have used the training they received and are beginning to have extensive home gardens. That being said, the majority of the population is underutilizing the training that they have received. LISUP has been working to retrain individuals and impart the importance of proper technique as it relates to yield (DRFN, 2006a).

There has also been a development of a crafting market for the community. With subsidized materials from LISUP, the community is able to create a range of crafts that are then sold on their behalf. Crafting is one method by which LISUP is attempting to increase income in the community (DRFN, 2006a).

Drimiopsis

The community of Drimiopsis faces somewhat different challenges than that of Skoonheid. With the limited land available to the community, the people are restricted with how they can use the land. The land that they do have is primarily used for crop production. Through LISUP, the community receives seeds and agricultural training to encourage them to use their land effectively. With this training, the residents are able to have more successful harvests (DRFN, 2006a). Similar to Skoonheid, a crafting system has also been created. Each person crafting thus has a somewhat steady flow of money that they are then able to allocate to their various needs (DRFN, 2006b).

Food security is a global issue that is being magnified as the world population increases. A reliable source of nutritious foods is imperative to good health and quality of life.

Malnutrition and hunger often correlate with impoverished communities. Efforts, such as resettlement, have been put forth to alleviate poverty in many countries, including Namibia. Although, resettlement is a commonly used strategy to lessen poverty without thorough planning, it does not fully address food security and nutrition. This was the case in Namibia when the resettlement farms of Drimiopsis and Skoonheid were established. Efforts have begun to improve the availability of food through various means, such as proper agricultural training. LISUP has been instrumental in improving their food security.

3. Methodology

The goal of our project is to develop recommendations that will enhance the nutrition of the residents of the resettlement farms in Skoonheid and Drimiopsis through improved food security and nutrition. Additionally, we have aimed to identify simple and sustainable methods by which the availability of food throughout the year can be increased in order to reduce the prevalence of periodic hunger within the communities. To obtain the level of knowledge about the communities that is necessary to achieve our project goals, we spent approximately eight days in each of the communities and worked directly with community members. Using both formal group-based activities as well as informal discussions with individuals, we have gained an understanding of the current state of food security and nutrition in both communities and what steps the community members believe should be taken to increase nutrition and food security for all community members. We made a conscious effort to obtain the opinions of residents from all parts of the communities and surrounding posts to make sure the recommendations we make could be applied to everyone in the communities. The major topics of focus for our research are: food consumption, factors that influence food security, and perceptions of nutrition. By actively engaging the community in our research, we hoped to develop sustainable recommendations that would be useful and applicable. Although each of the activities that were completed with the community had specific research objectives in mind, many of the activities provided results or insight that overlapped into other parts of our research.

3.1. Food Consumption

In order to understand nutrition and food security in Skoonheid and Drimiopsis, we first determined what the community members currently eat. This information was useful because it helped us to determine nutritional gaps in the diets along with what times of year the people consume less food. After we determined the foods that the residents consumed regularly, we explored community perceptions of nutrition and the consequences of having a poor diet. Through these methods, we have gained an understanding of the context of food consumption in these two communities and therefore have maximized potential for making successful recommendations.

3.1.1. Diet

In order to determine how the diets of community members in both Skoonheid and Drimiopsis vary among different households, and throughout the year, we conducted several group-based activities with some of the residents to gain the best understanding of the problems that they faced. Each of the activities we used, along with informal community walks and passive observation, helped to both determine and confirm the dietary patterns of the residents throughout the day and throughout the year.

Daily Activity Clock

One of the first activities that we completed with the community members was the daily activity clock. This activity was completed based on the method described in the

Namibia Participatory Poverty Assessment (PPA) Fieldwork Manual (National Planning Commission (NPC), 2005). For this activity, we split the participating community members into a male group and a female group. This allowed us to better understand the different tasks each gender typically completed during the course of the day along with how and what they ate and how this changed at different times of year. Each group was facilitated by a moderator, and had a note taker and a translator. Attendance for this activity is recorded in Table 1 below. The community members involved for both groups are represented solely by the people who came when we rang a town bell for our meeting.

Table 1- Demographic Breakdown for the Daily Activity Clock activities

	Skoonheid	Drimiopsis
Male	Seven men aged 35- 70	Twelve men in attendance One man aged 12-20 Ten men aged 30-50
Female	Fifteen total women Four aged 18-25 Eleven aged 35-50	Ten women aged 30-50 Two women aged 20-30 Several younger teenagers attended intermittently

In each of the gender groups, we first asked those attending to describe us their typical day in the current season (winter). This was accomplished by drawing a line in the sand and labeling sunrise, midday and sunset. The community members were then asked to explain what they did from the time they awoke until the time they returned to bed. This activity was typically started with the aid of one specific community volunteer. With questioning from the moderator, we determined the approximate time the volunteer spent on each activity throughout a typical day. When the original volunteer had completely described his or her typical day, the rest of the group was asked if it was also representative of their typical day. If anyone’s daily timeline varied significantly, we asked that volunteer with a different schedule to map out his or her day. We continued with this method until we had a timeline that resembled the typical day of everyone present in the group. Upon completion of the timeline, the moderator asked the group questions that helped reveal the dietary patterns in the particular season being discussed. Additionally, we determined the number of meals typically eaten per day. This task was then repeated for the other two seasons of the year; resulting in timelines for the dry, rainy and winter seasons. The daily time clocks developed during this session in both communities are shown visually in Appendix E.



Figure 5- Daily Activity Clock in Skoonheid

Seasonal Calendar

The second activity that we used to study the dietary patterns of residents was the seasonal calendar. The seasonal calendar, which is also a structured PPA activity, studies the availability of different resources throughout the different months of the year (NPC, 2005). Due to the focus of our project, we asked community members to rate the availability of agricultural products, water, livestock, and other food related resources throughout the year. This was accomplished by giving the participants sixty stones for each resource and asking them to distribute the stones between the months of the year. Based on the availability of the resource in question, the participants would place fewer or greater stones in each month of the year. The end result of this activity was a large matrix containing a wide range of resources that affected food security in the communities. This activity both verified some of the information found in the Daily Activity Clock and added information regarding what specific foods are being consumed at different times of year. Since this task used a larger group, we incorporated six people into our team. A moderator, a translator, a note taker, a person to make drawings for the matrix, and a separate note taker and translator who helped reduce marginalization within the group. This extra pair with a note taker and translator traveled around and asked questions directly of those community members in the group who were not as outspoken as the rest of the group. Using this method, we attempted to get the views of everyone present, not just those who were willing to speak to the whole group.



Figure 6- Seasonal Calendar activity in Drimiopsis

The seasonal calendar activity was conducted with a large group containing both genders. The composition of those attending this group is shown in Table 2; the group in attendance was composed only of those people who chose to come when the community bell was rung. To initiate the activity, we drew a matrix in the sand with column headings representing the twelve months of the year and asked the community members to tell us which months encompassed each of the three defined seasons. This allowed us to ensure that all community members present understood which part of the year each month represented. Next, we began to list different food and diet related resources along the vertical axis, such as food from harvested crops, and asked community members to show the changes in availability of the resource throughout the year. To aid the community in rating availability, we called for a volunteer to distribute 60 stones amongst the 12 months—more stones in any particular month represented an increased availability of that resource during that month. The moderator was then sure to validate the volunteer’s stone placement with the rest of the participants. After completing a matrix for all of our resources of interest, we began to ask questions that would give us a better understanding of the composition of people’s diets throughout the year. Additionally, we directed the discussion toward determining if and when people did not have enough food to eat. Appendix D displays the seasonal calendars developed in both communities.

Table 2- Demographic breakdown of groups attending the Seasonal Calendar Activity

Skoonheid	Drimiopsis
Seven women and three men in attendance Five women aged 30-50 Two women aged 18-25 Three men aged 30-50	Thirty-eight community members in attendance Seventeen men aged 30-50 Sixteen women aged 30-50 Five women aged 18-25

Ownership, Access and Control Matrix

Another PPA tool that we used during our research was the Ownership, Access and Control Matrix. Although, as described in the PPA manual, this matrix is typically used to examine differences in resource access between men and women in communities, for our purposes we also extended it to examine differences between the more wealthy and less wealthy people in the community (NPC, 2005). The objectives of this PPA tool were to determine the ability of different sections of the community to own, control or access important food-related resources.

To facilitate accurate results for this activity, we originally planned on splitting the people present into 3 separate groups: we first split the entire group evenly (each half had similar numbers of each gender) and then we split one of the remaining groups into two by gender. This method worked effectively while we were in Skoonheid, but the group in Drimiopsis that attended our meeting was not large enough to split effectively into 3 groups. As an alternative for Drimiopsis, we began the discussion by doing a poverty assessment with the entire group and then split the group into two gender groups. Other than this minor alteration, the same assessment was completed in both locations. The demographic breakdown of each group in each location is shown in Table 3. The participants in both communities were those residents who chose to come when the town bell was rung.



Figure 7- Ownership, Access and Control Matrix
Shown are the men, women and poverty groups, respectively, from left to right

We began by defining the terms ownership, control and access and ensuring that our definition of the terms matched those of the communities. We then drew a matrix that compared the three terms between two target groups (either men and women, or more wealthy and less wealthy). The participants were then asked to compare the ability of the

different groups to own, control or access food related resources. To help quantify the comparison between the poverty or gender groups, the participants were asked to allocate a proportion of ten stones in such a way that the group with greater ownership, control or access had a greater proportion of stones. For example, when asked whether the men or women had control of cattle in the communities, all groups overwhelmingly said that men were in control. As a result, the community placed a greater number of stones in the men’s side than in the women’s side. Appendix F shows the matrices developed during this activity in both communities.

Table 3- Demographic breakdown of Ownership Control and Access matrix

	Skoonheid	Drimiopsis
Male Gender	Five men present All aged 35-50	Seven men aged 35-50
Female Gender	Five women Present Four aged 35-50 One age 18-25	Four women aged 35-50
Poverty Group	Seven people attending Two men aged 35-50 Five women aged 35-50	Eleven people attending Seven men aged 35-50 Four women aged 35-50

3.1.2. Nutritional Consequences

In order to make recommendations regarding nutrition for the residents of Skoonheid and Drimiopsis, it was not sufficient to simply know what and when the community members eat. Additionally, we needed to determine the perceptions and knowledge about nutrition that people currently held. Understanding of what a healthy diet is will influence decisions about food consumption. In order to understand these perceptions we conducted a focus group discussion that specifically targeted obtaining this information. We were fortunate enough to interview the doctors who provide clinical services to both communities. These doctors gave us a separate point of view from which to assess the nutritional status of the populations in question.

Community Perception of Nutrition



Figure 8- Nutrition Discussion in Skoonheid

Due to the importance of community perceptions of nutrition to our project, we spent an entire meeting with several residents of the communities discussing their perceptions and knowledge of nutrition. This discussion was conducted in an informal manner in order to make participants feel at ease with sharing. To begin, the moderator of the exercise initiated a group discussion about what constitutes a healthy diet. The conversation that ensued was then directed by the moderator to focus on the communities perceptions of nutrition and health. Specifically, the discussion targeted vitamin deficiencies, medical issues, and the constituents of a healthy diet. Table 4 shows the demographic composition of the group present at the perceptions of nutrition discussions.

Table 4-Demographic breakdown of residents attending the Nutritional Discussions

Skoonheid	Drimiopsis
Eighteen people present	Twenty-one people present
Eight men aged 35-50	Twelve men aged 35-50
Eight women aged 35-50	Seven women aged 35-50
Two women aged 18-25	Two women aged 18-25

Discussions with Doctors

In an effort to gain an understanding of food related deficiencies in these two locations we spoke with doctors from the community clinics. We inquired about diseases prevalent in each community, dietary related health issues, medical care given, and health education. We were particularly interested in vitamin deficiencies and opportunistic disease.

3.2. Factors that Influence Food Security

In order to fully understand the problems affecting nutrition in these communities, we also wanted to understand those factors that can affect the ability of community members to obtain and access food at all times of year. These factors include direct sources of food such as agricultural and livestock production and indirect factors such as water infrastructure, marketing of goods for income, and other income generating activities.

3.2.1. Agriculture

The amount and variety of crops produced through agricultural activities directly affects diets. Therefore it was necessary to understand the threats and limitations to such activities to be able to make recommendations on improving nutrition and food security. In order to gain a comprehensive understanding of the cultivation process we discussed soil, seeds, pests, weeds, agricultural methods, and watering practices. Using a Food Security Pathway, a PPA activity, threats were identified and ranked according to their impact on yield (NPC, 2005). Visits to the plots and discussions with individuals about crop growing were also used as a method to examine agricultural practices. In order to assess the effectiveness of techniques implemented by residents an agricultural technician was interviewed. Through these activities and discussions we are able to make recommendations on how to improve crop production and storage.

Food Security Pathway



Figure 9- Food Security Pathway in Skoonheid

In order to identify threats to crop production and assess their prevalence we created a Food Security Pathway with the aid of the community. The approximate age and gender of participants for this activity are shown in Table 5. To complete the food security pathway we gathered willing community members and explained the objectives of the activity, which were to identify staple foods, identify threats to food security, and prioritize the stated threats. We then defined what a staple food was and asked the participants to state what their staple foods were. Visual images were agreed upon and drawn on cards; the cards were then placed in the sand. Each item was discussed and the threats to that item were listed. Visual images were drawn for each threat and then placed below the relevant staple food. Next the participants were asked to rank the threats to staple foods using a fixed number of stones. The process was repeated for the other staple foods. After the stones were laid, questions were asked to confirm that the stones were allocated correctly. For example, if maize was being discussed and there were five stones placed on crickets and ten on weeds the participants were asked if weeds were a much bigger problem than crickets in regards to the growth of maize. The stones would then be readjusted by a volunteer until questions did not raise any additional issue. A discussion followed that addressed coping mechanisms and consequences of a diminished harvest. This activity was used as an introduction for the nutritional discussion by relating hunger to health.

Table 5- Demographic breakdown of those attending the Food Security Pathway activity

Skoonheid	Drimiopsis
Nine women aged 35-50 Two women aged 18-25 Five men aged 35-50 One man aged 25-35	Five men aged 35-50 Two women aged 25-35 Three women aged 35-50

Garden and plot visits

In order to confirm conclusions drawn from PPA activities about agriculture and to further our understanding of the farming process we visited residents’ plots and gardens. Community members were asked to accompany us on these visits in order to inquire about the areas. Throughout our time in Skoonheid, we visited the plots of three men who were between the ages of 35 and 50. In Drimiopsis, we visited a woman who was 50 or older and talked to several individuals of varying age and both genders as we passed their plots in the field. By conducting these visits individually we aimed to assess the differences in the community as it relates to crop production. In regards to nutrition we evaluated the difference in the amount of crops being harvested and the types grown. This was accomplished by taking special note of individuals who have successfully grown crops that are not grown throughout the rest of the community. We visited home gardens, dryland plots, and irrigated plots. Tours would usually last about ten to twenty minutes in order to not interfere with other activities the individual needed to accomplish. Some were able to offer more time and answer more questions. Questions were posed to individuals about the plot or garden being examined. Generally we asked what is grown, when it is grown, and what happens to it after it gets harvested. We also inquired about things that people have tried growing or potentially would have liked to grow. When specific issues such as poor soil and the use of manure or fertilizer were raised, they were discussed further. Through the garden visits we achieved a more holistic understanding of the agricultural situation in the communities.



Figure 10- A couple planting beetroot in their plot in Drimiopsis

Interview with Agricultural Specialist

In order to evaluate the effectiveness of the agricultural practices used in Skoonheid and Drimiopsis and to identify feasible improvements that could be made we conducted an interview with Albert Fosso, an agricultural technician. He has worked with other resettlement communities and has visited Skoonheid giving him an understanding of the situation there. Fosso also has knowledge about the nutritional value of crops which proved to be useful in the context of our project. The interview protocol and notes can be found in Appendix B.

3.2.2. Animal Husbandry

The keeping of animals and the way in which they are used is an issue that both affect food security and nutrition. In particular, animal husbandry relates to protein intake or lack thereof. To assess the dietary implications of keeping animals and the factors that inhibit it we explicitly discussed livestock in the Community Mapping Activity, the Ownership, Control, and Access Matrix, the Seasonal Calendar, and we also discussed it on an individual basis with residents.

Additionally, we witnessed a wide variety of animals living in both Skoonheid and Drimiopsis. These animals included donkeys, cattle, goats, sheep and chickens. When asked during our Ownership Control and Access activity, the participants stated that they very rarely ate meat and that they do not currently use milk products extensively or even drink milk daily.

Village Resource Mapping

Village Resource Mapping is a PPA exercise that is done in order to visually depict where resources are within a community. All available members of the community were included in the mapping process and were encouraged to be actively involved. The demographic breakdown of participants for this activity is shown in Table 6. We began the

activity by explaining the objectives and purpose of the exercise and then drew a large square in the sand to indicate the total area of the resettlement farm. Items within viewing distance were then drawn on cards and placed in the sand to indicate the current location. A participant was then asked to place cards where all of a specific entity was located. After this, the community was asked if the placements were correct and adjustments were made accordingly. This process was repeated until the participants had agreed on the map. Some items that were mapped were: houses, water pumps, and soil types. After the map was completed, we discussed with the participants about the mapped resources where used and related concerns.



Figure 11- Village Resource Mapping in Skoonheid

The objective of the mapping exercise in regards to animal husbandry was to identify the resources that livestock use as well as problems with these resources. We asked community members to map the grazing land and which type of animal grazed on which sections of it. Follow up questions about the quality of the grazing land and the rates of land degradation were also posed to determine if the grazing area is adequate and sustainable.

Table 6- Demographic breakdown for the Village Resource Mapping activity.

Skoonheid	Drimiopsis
Twenty-three total participants	Three men aged 25-35
Four men aged 12-18	Fourteen men aged 35-50
Three men aged 18-25	Three men aged 50+
Four men aged 35-50	Five women aged 18-25
One men aged 50+	Two women aged 25-35
Six women aged 18-25	Thirteen women aged 35-50
Five women aged 35-50	Two women aged 50+

The Ownership, Control, and Access Matrix was used as a method to determine the community ownership, control and access to livestock as compared between genders and poverty groups. Through this activity we were able to resolve who owns, makes decisions about, and consumes particular livestock. Therefore we were able to identify what members and socioeconomic sections of the community are consuming animals and animal products. Personal conversations about livestock with community residents were also conducted. In these individual interactions personal uses of livestock were identified as well as specific threats to the livestock. Through these exchanges a better understanding of the role that livestock play in community diets was developed. These personal conversations included discussions with men working at cattle posts, women whom we met in the gardens, and men who showed us their fields.

3.2.3. Water Infrastructure

Water plays a vital role in the lives of resettlement community members. It is often the scarcest resources. Therefore water is a limiting factor for activities requiring large amounts of it such as agriculture. In order to understand the use of water in the communities, its sources had to first be identified as well as methods used to collect and distribute it. To accomplish this we used the Village Resource Map. Storage and use were assessed through the Ownership, Control and Access Matrix, as well as through informal conversations with community members throughout our fieldwork. Through these activities we have evaluated water use in the communities.



Figure 12- Close up of Drimiopsis village map showing water infrastructure

In the Village Resource Map, water infrastructure was identified. After the map was made, the conversation that followed inquired about the adequacy of the infrastructure in terms of availability, efficiency, and durability. After the mapping activity we walked through the community to verify the placement of various items and obtain comments about the water points from the participants of the activity.

3.2.4. Marketing

Another method by which food security can be enhanced in Skoonheid and Drimiopsis would be to increase marketing of their agricultural products and crafting goods. To assess the current marketing situation within each community, we conducted a marketing focus group in both Skoonheid and Drimiopsis. In this focus group discussion we asked the

participants about their current practices related to buying and selling produce and other products. Within this topic we focused on crafts, agriculture, credit, and jobs. We asked participants about their past experiences with these subjects and if practices have changed. In an effort to understand how the community members would respond to any recommendations we also asked if they had ideas about ways that marketing in the communities could be improved. By researching marketing we were able to identify those practices that have negatively impacted food security.

Marketing Focus Group

In both Skoonheid and Drimiopsis we looked into the residents' income generating activities through the Marketing Focus Group. These activities have the potential ability to supplement their annual income between harvests. We asked about the number of people in each community who participated in such activities and how it affected their income.

3.3. Improving Community Awareness

In Skoonheid and Drimiopsis, we discussed people's interest in monitoring the nutritional status of children in the communities. We also inquired about increasing community awareness of nutrition through education. Via community based monitoring and education the residents would be able to take responsibility and ownership of their own wellbeing. This relationship to the monitoring and education of the community is important to ensure the continuance of community improvement.

3.3.1. Education

We discussed with the community members what further education they would like to receive and in what form. We also asked the participants of our final feedback session if they would find a pictorial manual to be a helpful guide to improved health in the communities.

Community Feedback Sessions

The last activity we completed in each community was the community feedback discussion. During this session, we discussed the major problems we had identified in the communities with a group of residents who came when we rang the town bell. We then asked the participants what viable solutions they believed would solve each of the problems. In this way, we determined the participant perspective on what solutions would be best. Additionally, we discussed the feasibility of nutritional monitoring and education in the communities.

3.3.2. Monitoring

In order to assess the feasibility of monitoring nutrition, we discussed the potential methods with the doctors from each village. Additionally we spoke to Dr. Marjorie Van Wyk at the Namibian Ministry of Health about implementation of methods of nutritional monitoring. Finally, we spoke to the participants of our feedback sessions about what they thought of the different monitoring methods we explored and their comments on the ideas.



Figure 13- Community discussion in Skoonheid

4. Results and Analysis

The goal of our project was to determine methods by which Food Security can be improved in the communities of Skoonheid and Drimiopsis. In this chapter we will discuss and present the data and community responses that we collected during our time in the field and analyze the implications our results have on food security and nutrition. Since each of our research activities covered several independent objectives, we will examine our results by topic rather than by data collection activity. In this chapter we will discuss the information gathered while conducting Participatory Poverty Assessment (PPA) and our other activities with the communities of Skoonheid and Drimiopsis (NPC, 2005). The implications that the findings have on food security and nutrition will be explicated and examined. In addition to information gathered during PPA activities, interpretations based on personal conversations and observations will also be presented. We developed an accurate picture of the communities through a combination of the results derived from these research techniques. We will begin this section by explaining what we found to be dietary norms within the communities, and then discuss how the diet in the communities affects living standards and health of the residents. Next, we will examine how residents obtain their food, and the factors that affect their food security. Finally, we will discuss the communities' perceptions on nutrition.

4.1. Food Security

Throughout our time in the field, the major objective we focused on was determining the food security status of the residents of the communities. In order to better understand our results for this section, we have broken them into two subsections. We will first analyze the typical diets of community members and then discuss the consequences their diets have on their nutritional status and overall health.

4.1.1. Diet

The overall diet of the typical resident of either Skoonheid or Drimiopsis is limited at best. Although residents tend to have access to the necessary amount of staple foods for their diets, the lack of supplementary foods on a regular basis prevents them from having healthy eating habits. We will discuss the staple foods identified by participants of our Food Security Pathway activity and other foods that are available to community members. Afterward, we will examine the major sources of food available to the community and analyze the differences between age groups, genders and different locations within the communities.

Staple Foods

Staple foods are items that constitute the main proportion of person's diet in regards to frequency of consumption and fraction of total calories consumed. The Food Security Pathway shown in Figure 14 shows the major staple foods identified by members of each community. This information is supported by the findings of the Daily Activity Clock. Community members in both locations claimed that on average, two meals of maize porridge were consumed per day with little supplement. The community members were very emphatic in this fact, often becoming agitated when pressed to reveal other possible staple foods.

Community observations also confirmed maize porridge as the main staple food. It was frequently seen being prepared and eaten by families in both communities for both meals of the day. Maize porridge, also called “millie pap”, is prepared by boiling maize meal in either milk or water. As water is more readily available than milk for most residents, millie pap is primarily made with water.

When government funding is made available through drought relief, each qualifying family receives two 12.5 kilogram bags of maize meal, two cans of fish, and two 750 milliliter bottles of cooking oil. From our fieldwork experience in Drimiopsis, we found that this is not entirely the case. When drought relief arrived while we were there, residents did not receive fish. When we asked residents of Drimiopsis if this was normal, they stated that they very rarely received the fish that is supposed to come with drought relief.

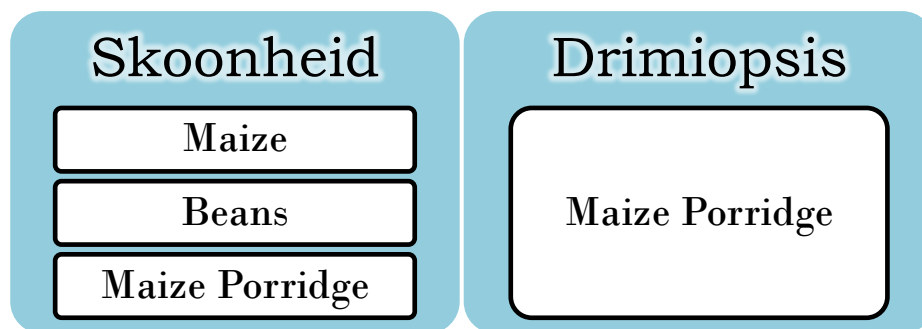


Figure 14- Staple foods in Skoonheid and Drimiopsis

In Skoonheid maize and beans were also identified as prominent foods. As shown in Figure 26, they were recognized as staple foods in Skoonheid during the Food Security Pathway. When walking through the community, people could often be seen eating ears of maize or preparing beans in pots. Maize was often brought as a snack to focus groups and was seen being carried around by little children. In informal conversations, maize and beans were frequently mentioned as what people ate along with their millie pap.

The people of Drimiopsis do not eat a significant amount of maize or beans and therefore these are not considered staple foods there. In contrast to Skoonheid, Drimiopsis residents were not often seen eating maize or beans at any point in the day even though their harvest time had recently passed. When asked if we should include maize and beans in their Food Security Pathway they spoke strongly against it. As such, the Food Security Pathway for Drimiopsis contained only Maize Porridge. To us, this indicated that maize porridge is the main staple food in both resettlement farms, with maize and beans as secondary staple foods in Skoonheid.

Supplementary Foods

In addition to staple foods, there are a number of supplementary foods that are used commonly in diets. Some of these items are consumed on a seasonal basis while others are eaten only occasionally. The proportion of the total diet that is made up of non staple items is relatively small. Many people stated that they were tired of eating just maize porridge or maize. Based on our discussions with each community in our Daily Activity Clock, we found

that residents of Skoonheid consume a variety of supplementary foods on occasion. In Drimiopsis, we found that people almost exclusively eat maize porridge. Supplemental food items constitute a larger portion of the diet in Skoonheid than in Drimiopsis.

Fruit and Vegetables

Along with staple foods, vegetables are the most frequently consumed food in the farms. They are often grown as “winter” crops in irrigated gardens or in home gardens. Listed in Table 7 are all of the cultivated fruits and vegetables that we observed being grown in either of the two farms. The foods in this table are divided to compare the diversity of fruits and vegetables grown in each farm. Based on our observations of many individual gardens, we believe that overall, residents of Skoonheid have tried to grow a wider variety of foods than residents of Drimiopsis. This should, however, not be taken to mean that growing new foods is normal for the entire population of either farm. Rather, growing a variety of vegetables is limited to a small group of residents in each farm. This being said, the foods listed in Table 7 can all be grown successfully in the region.

Table 7- Fruits and vegetables cultivated in Skoonheid and Drimiopsis

Skoonheid Only	Skoonheid and Drimiopsis	Drimiopsis Only
Prickly Pear	Butternut Squash	Hibiscus
Guava	Calabash Squash	
Lemons	Pumpkin	
Potatoes	Beetroot	
Red Chili Pepper	Cacti Fruit	
	Ground Nuts	
	Tomatoes	
	Green Pepper	
	Cabbage	
	Watermelons	
	Tsama Melons	
	Onions	
	Carrots	

The most commonly grown vegetables include squash, pumpkins, beetroot, spinach and carrots. Prickly pear, melons, and cacti are the most commonly and successfully grown fruits. Other attempts at growing fruits have not been successful. One man in Skoonheid has tried to grow two apple trees but after three years these have still not borne any fruit.

Animal Products

Small stock consisting of goats, sheep, and chickens are raised and eaten on the resettlement farms. This is a rare practice, however, as the majority of people do not own small-livestock on either farm. Goat’s do provide a limited amount of meat to their owners,

but goat's milk is largely not utilized in either location. Chickens, in addition to their eggs, are also eaten, but on a limited basis.

Cattle can also be found at both locations. According to one farmer with cattle in Drimiopsis, one of his mature cows is able to produce about 3.5 liters of milk per day. Milk can be consumed in many forms. Traditionally it is either soured or added to pap. Unfortunately, neither location benefits much from the local cattle. In Skoonheid, most of the cows are not of breeding age and thus do not produce milk. People cannot consume the meat because most of the cattle were provided by the government and cannot be slaughtered. In Skoonheid, residents had between 300 and 400 head of cattle. The majority of these cattle (approximately 244) were donated earlier this year. In Drimiopsis, few people own cows and so the majority do not get milk or meat. There are only a total of around 100 head of cattle in Drimiopsis. Some of the farmers who own cattle sell their milk, especially in the summer, but most of the time it is not readily available for purchase.



Figure 15- Cow being milked in Drimiopsis

Fish are also a small part of the farm diet. When communities are given drought relief, qualifying households are supposed to receive two tins of fish per month. Yet, this has not happened in either community for an extended period of time. Cans of fish are available in shops in both communities but only for a relatively expensive price. In Skoonheid, each 75 milliliter can was selling for N\$19.50. This limits the ability of most people to purchase fish.

Veldt Foods

Veldt foods are still an important part of the diet for many resettlement farmers. According to the results of the Daily Time Clock, women can go out into the veldt and find a number of nutritious foods to supplement their family's diet. The most widely collected veldt food is the marama bean (*Tylosema esculentum*). The marama bean is collected from a crawling vine that is almost exclusive to the veldt but can sometimes be found on the outskirts of cultivated fields. This plant produces pods which are collected, boiled, and split.

This labor intensive process yields one or two large beans roughly 20mm wide. The marama bean is very high in protein and oil. Due to its hard outer pod, it can also be stored for long periods of time. Not everyone is able to go out into the veldt, but there was evidence that marama beans were being consumed in large numbers in Skoonheid. Piles of pods could be seen drying in the sun and empty ones were found in most trash piles.

Other veldt foods mentioned by the community members are sweet berries (bessies), Kalahari truffles, wild potatoes, wild cucumbers, tsama melons, sweet melons, sour berries, hibiscus, huru, gubbrood-root, and wild coffee plant. The community also listed other leaves and roots that we could not identify due to problems with translation.



Figure 16- Different veldt foods that are collected by residents of Skoonheid and Drimiopsis
Shown top left are bessies, top right is a tsama melon, bottom left are marama beans and bottom right is a marama plant

During an interview with Chief Langmann, Skoonheid's leader, we discussed the problems that people are now having with the veldt. He believes that the nutritional standard at his farm is now a challenge because their diet has become restricted. Before the LISUP project began, he said, they lived off of veldt foods that were healthier than their current diet. This is true because the LISUP project introduced agriculture to the region. The increase in agricultural production has significantly reduced the time residents can spend in the veldt collecting foods. Now, he states, they are just living off of maize, beans, and melons, but before they lived off of veldt foods like marama, berries, and roots. In his view,

people would be healthier if they lived off of veldt foods during the rainy season and off of project foods during the dry season. Many community member have spent most of their lives on commercial farms, thus Chief Langmann was most likely referring to their traditional hunter-gather lifestyle. We learned from Dr. De Kok, however, that people are eating much more frequently compared to when she started working with the community. Their food security has increased to enable them to eat twice a day during most times of the year.

Seasonal Variety

The type and quantity of food being consumed varies over the course of the year in both Skoonheid and Drimiopsis. Using the Seasonal Calendar and the Daily Activity Clock, we were able to determine trends in food consumption for both communities.

Skoonheid

In Skoonheid, food is most scarce during the dry season which can last from June to November. We found that families during this time may have only one meal per day of thin maize porridge. Based on social pressures, families will save money to purchase coffee or tea while they have to beg for food. When neither is available, veldt coffee is used. In this, a little bit of milk may be added but usually this is not the case. At this time, small children are given a thin mixture of milk, sugar, and maize meal. Through the Seasonal Calendar, people also indicated that they may have some beans left over from the previous harvest. The Seasonal Calendar that was developed in Skoonheid is shown in Table 8. The table shows the stone placement as it related to prevalence during the year. As shown, food is most common from March to May due to harvesting time. This correlates to high rates of income from the sale of crops. Expenses are highest in December due to the holiday season. Field labor is high in January because it correlates to harvesting in the dryland plots.

Table 8- Seasonal Calendar in Skoonheid

Skoonheid Seasonal Calendar												
Resource	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec.
Seasonal Variations	Rain	Rain	Rain	Rain/ Cold	Cold	Cold	Cold	Cold /Hot	Hot	Hot	Hot	Rain
Food	3	5	9	11	7	5	3	2	1	2	0	12
Income	2	2	10	12	12	12	2	2	2	2	5	0
Expense	2	2	0	4	3	9	7	5	4	8	4	10
Field Labor	11	9	8	9	8	0	0	3	3	3	0	6

The rainy season can last from December to March with the most rain occurring in February. Harvest begins at the end of this time. March until May is the most abundant time for crops and harvesting foods from the veldt. The staple food is still maize porridge, but during this time diets are largely supplemented with food from the project gardens such as beans, carrots, and watermelon. From the veldt, people are able to collect a diversity of foods such as wild spinach (dtjamma), wild cucumber, and wild potatoes (tjarre). If there is a good amount of rain veldt foods are more readily available. People also indicated that those

with money can purchase rice, pasta, tomatoes, soup, and fat cakes. Some people at this time of year can eat up to three times a day due to this abundance.

The third season identified by the Skoonheid community was the cold season from April to August. We pointed out to the participants of this activity that the seasons they had identified overlapped each other. Participants insisted that these seasons were approximately correct due to seasonal variation. On average, people eat maize meal with water twice a day with a few supplementary foods. The irrigated garden is producing carrots, beets, onions and cabbage, while the dry garden produces maize, beans, melons, pumpkins, and ground nuts. According to residents, some do not have a plot in the irrigated garden; therefore not everyone is sharing in this diversity of food. Maramas, wild potatoes, and sour berries are also available from the veldt.

Drimiopsis

In Drimiopsis, the harvesting times and storage practices are unlike those in Skoonheid, leading to a difference in food security trends. The Seasonal Calendar developed by the residents of Drimiopsis is shown in Table 9.

Table 9- Seasonal Calendar in Drimiopsis.

Drimiopsis Seasonal Calendar												
Resources	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Seasonal Variation	Rain	Rain	Rain	Rain Dry Cold	Dry Cold	Dry Cold	Dry Cold	Windy	Rain Hot	Rain Hot	Rain+ Hot	Rain+
Food	4	2	3	4	1	1	1	6	7	9	10	12
Income	6	7	6	4	2	1	2	3	4	5	9	12
Expenses	5	1	2	1	7	7	5	6	3	3	2	8
Field Labor	6	6	6	4	1	1	1	6	6	7	8	8
Cattle Handling	2	3	2	4	7	8	9	6	4	6	5	4
Hunger	4	4	4	7	7	7	7	4	4	4	4	4

In Drimiopsis, residents also placed the start of the rainy season at December, but noted that rains this year began much earlier in October. They recounted how in the past the rains would start in August but they have been slowly taking longer to start. The heaviest rains happen from November to December and usually end in May. November and December are the months with the highest availability of food due to the summer harvest. Income is also high during these two months due to selling of crops. This can be seen in Table 9 with the high number of stones placed in both months. Veldt foods such as marama beans, tsama melons, wild potatoes, and tjamas are readily available at the end of the rainy season.

Drimiopsis residents determined that the dry season was from May to July. Like in Skoonheid, people beg from their relatives and neighbors in this season. They mainly obtain

maize meal, beans, maize by doing so. Due to poor storage, most food is not available in May even though harvesting of summer crops begins in April. The crops that are harvested in April are cabbage, beet root, onions, maize, beans, and spinach. According to some residents, the onions may be kept naturally until December or January, and the maize and beans until July. In place of stored foods, products such as rice, macaroni, sugar, and maize meal are bought from the local stores. Also, instead of being consumed, milk is sold for money. When asked about this period of hunger, residents said that it was a big problem which caused sickness, weakness, and death. A few older women in the community recounted that the last death due to hunger was in 2003.

Sources

There are four methods by which people obtain food in Skoonheid and Drimiopsis: growing, buying, begging, and government rations. The importance of each source is different between the two communities and is not the same for all members.

Crop production is carried out at both locations in a similar fashion. Large plots of land have been subdivided into individual partitions. What is grown on the plot and how the plot is cared for is the prerogative of the individual. In Skoonheid, there is a large dryland garden and a small irrigated garden. Each household can use one plot in each of these gardens. In Drimiopsis, there are three separate gardens. An adult can have a plot in each of the three gardens. Specific plots were identified as having better soil than others. The size of the plots in both farms is shown in Table 10.

Table 10- Approximate garden size given to residents of Skoonheid and Drimiopsis

	Skoonheid	Drimiopsis
Dryland Gardens	10000 square meters	NONE
Irrigated Gardens	250 square meters	540 square meters

In Skoonheid there is one harvest per year from each plot. The irrigated plot is used for winter crops and the dryland plot is used for summer crops. But, due to the small plot size and limited irrigation the winter harvest in Skoonheid does not provide as much food as the summer harvest. In comparison, land is harvested twice per year in Drimiopsis. After the summer harvest, plants are removed and winter crops are planted. The yields from each of these harvests are similar.

Buying is another important way in which community members obtain food. Maize meal is the most frequently purchased item, followed by cooking oil, tea, and sugar. Goods are purchased at local shops, surrounding posts, or in Gobabis. Some of the local shops allow pensioners and those with jobs to buy items on credit. Generally there is a credit limit of one month's salary, N\$200-300. When a person receives his or her pension or paycheck, they are expected to go to the shop and pay off their outstanding debt. The price of food in these local shops is higher than in Gobabis due to transportation costs and limited competition.

Drought relief is a less regular, but important source of food. When drought is declared by the Prime Minister, a regional assessment is conducted and affected areas are identified. Households can qualify for drought relief if a pregnant or lactating woman, child under five, elderly, or disabled person lives at the house. In order to get drought relief one must apply and receive an ID card. Drought relief is delivered once a month during the declared period and is allocated to card-holding individuals. People collect their rations by stamping next to their name with their right thumb. This aid program is typically enacted once every three to four years.



Figure 17- Drought relief aid distribution in Drimiopsis

Differences among Population Groups

The types and amounts of food being consumed in Drimiopsis and Skoonheid are not homogeneous throughout the populations. Divisive aspects are important to analyze because they determine the food security and nutritional content of each person's diet. In the resettlement farms, diet varies based on age, gender, wealth, and location.

Age

Most babies begin to eat semi-solid foods from three to six months. This mainly consists of maize porridge, but breastfeeding is continued for one to two years. After this, children eat similarly to their parents. Children attending school get an additional boost in their diet from school-provided food. In Skoonheid, we were able to interview a young woman who had dropped out of school. While attending school she received maize porridge on week days, milk, and sometimes meat on Sundays. In Drimiopsis, school children receive half a cup of maize porridge in the morning. Those that stay at the hostel also get bread.

Though staying in the hostels increases the ability to study effectively, few families can afford to pay the hostel fees.

People over the age of sixty are mostly dependent on pensions. They may have plots, but many are too weak to go out into the fields and work. Because of this, pensioners often rely on credit. This means that their main source of food is maize meal and other items sold in local stores such as sugar and oil. In Drimiopsis however, older members of the community stated that they were better off because they could still remember how to collect food and medicinal plants from the veldt.

Gender

Using the Ownership, Control, and Access Matrix we found that gender was one of the most decisive factors in determining the eating patterns of farm residents. Both genders felt that the amount of food consumed by each was equal, but the type was not. Most residents in Skoonheid agreed that chickens and goats were eaten predominantly by men as can be seen in Tables 11 through 14. This indicates that though women and men may be eating in equal amounts, women are not getting as much protein as their male counterparts. In the activity, most Drimiopsis residents indicated that the amount of meat consumed is not gender related. However, there were conflicting responses. One woman explained that her husband would take half the chicken leaving the other half for her and the children.

Table 11- Skoonheid male Ownership, Control, and Access Matrix

Skoonheid Male Ownership, Control, Access Matrix						
Resource	Men			Women		
	Ownership	Control	Access	Ownership	Control	Access
Water	5	6	3	5	4	7
Tractor	5	Committee	Klein Lucas	5	Committee	Klein Lucas
Chickens	0	2	6	10	8	4
Income	7	3	5	3	7	5
Dryland	5	5	5	5	5	5
Goats	6	6	10	4	4	0
Cattle-GRN	5	Committee	6	5	Committee	4
Clinic	Government	Government	4	Government	Government	6
Irrigated	5	5	5	5	5	5
Grazing Land	5	10	5	5	0	5
Education	Government	Teacher	3	Government	Teacher	7
Food	0	10	5	10	0	5
Trees	5	5	5	5	5	5
Diesel	Government	Committee	Immanuel	Government	Committee	Immanuel
House	5	5	7	5	5	7

Table 12- Drimiopsis male Ownership, Control, and Access Matrix

Drimiopsis Male Ownership, Control, Access Matrix						
Resource	Men			Women		
	Ownership	Control	Access	Ownership	Control	Access
Water	Government	Government	4	Government	Government	6
Chickens	2	3	4	8	7	6
Money	6	4	6	4	6	4
Veldt	None	6	5	None	4	5
Cows	4	4	10	6	6	0
Plots	5	5	6	5	5	4
Clinic	Government	Government	4	Government	Government	6
Food	0	0	6	10	10	4

Another difference between the two communities involves cattle. In Skoonheid, we found that people saw government provided cattle as no one's property, and not under their control. Men and women milk the few lactating cattle equally. In Drimiopsis, however, women were identified as the main owners and controllers of cattle, but had no access to them at all as seen in Table 12. This was interesting because in the discussion following the matrix activity men said that the owner of the cattle, regardless of gender, would decide on how to use the cattle. The community members could not explain this discrepancy, but maintained that women do not consume or milk the cattle though they own them.

Table 13- Skoonheid female Ownership, Control, and Access Matrix

Skoonheid Female Ownership, Control, Access Matrix						
Resource	Men			Women		
	Ownership	Control	Access	Ownership	Control	Access
Water	5	6	3	5	4	7
Tractor	5	5	7	5	5	3
Chickens	0	0	6	10	10	4
Income	6	5	3	4	5	7
Dryland	5	5	5	5	5	5
Sheep/Goats	5	2	8	5	8	2
Cattle-GRN	Government	Government	6	Government	Government	4
Clinic	Government	Government	5	Government	Government	5
Irrigated	5	5	5	5	5	5
Grazing Land	5	5	5	5	5	5
Firewood	5	5	4	5	5	6
Cattle-Private	10	10	5	0	0	5
Education	Government	Government	6	Government	Government	4
Food	5	1	5	5	9	5
Dog	10	10	10	0	0	0
Plow	5	10	10	5	0	0
Horses	7	10	7	3	0	3
Donkeys	5	8	7	5	2	3

Table 14- Drimiopsis female Ownership, Control, and Access Matrix.

Drimiopsis Female Ownership, Control, Access Matrix						
Resource	Men			Women		
	Ownership	Control	Access	Ownership	Control	Access
Water	5	6	3	5	4	7
Chickens	5	1	5	5	9	5
Money	5	6	5	5	6	5
Veldt	5	5	5	5	5	5
House	3	3	3	7	7	7
Crafts	0	0	0	10	10	10

On the issue of food in general, men and women were interestingly divided. The Skoonheid men stated that they did not own the food at all but controlled it 100%. The Skoonheid women, however, said that ownership was equal, but they also almost completely controlled it. These results do not support each other and may be a result of separating the groups using two different moderators.

In Drimiopsis some adult women work as domestic help for teachers. These women do not get the benefit of crops from the garden unless their husband works a plot. If there is no husband and the children are young, as we discussed with one woman, there is only meager income from work. Much of the money goes to school fees, so in her case there is little left over for food. Single mothers seemed to have less food on a consistent basis than most according to their Daily Activity Clock.

Poverty Groups

We found that the biggest determining factor in diet content and quantity was wealth. When asked what makes a person wealthy, the community members gave a number of responses. The most common responses were money and cattle. They also confirmed that there were divisions within the community along wealth boundaries. As neither community has wealthy members per se, the community was asked to differentiate between groups who “had more” and “had less”. Those who “had more” were always found to own more chickens, goats, cattle, and food which can be seen in Tables 15 and 16. As stated earlier, people who own animals have the sole right to make decisions about them. This means that they can eat more meat, or sell their animals for cash thereby improving their food security. The less wealthy do not have this option. However, all people regardless of wealth have equal access to plots in Drimiopsis. This helps ensure that the poorer residents are less marginalized in regards to their diet.

Table 15- Skoonheid Affluence Ownership, Control, and Access Matrix.

Skoonheid Affluence Ownership, Control, Access Matrix						
Resource	Rich			Poor		
	Ownership	Control	Access	Ownership	Control	Access
Water	Government	Community	5	Government	Community	5
Chickens	8	8	8	2	2	2
Tractor	Government	Ministry	5	Government	Ministry	5
Clinic	Government	Dr. de Kok	5	Government	Dr. de Kok	5
Education	Government	Government	6	Government	Government	4
Goats	8	8	8	2	2	2

Table 16- Drimiopsis affluence Ownership, Control, and Access Matrix.

Drimiopsis Affluence Ownership, Control, Access Matrix						
Resource	Rich			Poor		
	Ownership	Control	Access	Ownership	Control	Access
Water	Government	Committee	5	Government	Committee	5
Chickens	8	8	8	2	2	2
Food	8	8	8	2	2	2
Cattle	8	8	8	2	2	2
Plots	5	5	5	5	5	5

Location

Location can correlate to a family's level of food security. Within Skoonheid, there are a number of small cattle posts. Most of these posts are controlled by Herero farmers who employ local people to maintain their herds. Through interviews, we learned that these employees are paid only in maize meal and sugar, and do not grow any crops. People from Skoonheid rarely market at these posts so access to a varied diet is limited.

In Skoonheid, there are a number of houses in the location that are set up in rows. Walking through the community, it was apparent to us that most of the houses had approximately the same amount of wealth. However, there were small but noticeable differences such as houses with backyard gardens, greater amounts of furniture, and with donkey carts. Families at these houses, however, were usually seen eating the same maize porridge as those with less. The same situation was observed in Drimiopsis with the addition of informal housing. These informal houses, though created from corrugated metal and wood, appeared to contain roughly the same amount of material belongings as those of the formal housing. Living in informal housing does not seem to affect the food security of the residents.

4.1.2. Nutritional Consequences

The limited diets in both communities' stems from the lack of variety of foods consumed throughout the year. Since people do not consume enough essential nutrients, health is adversely affected. A diet of pure maize meal with few supplementary foods cannot provide all essential nutrients, thus making the populations more susceptible to diseases.

Deficiencies

There is a very small amount of meat consumed by the populations in both Skoonheid and Drimiopsis. Meat provides high amounts of protein and fat, both of which are extremely vital to the growth and strength of children. In Skoonheid, protein deficiency was not seen as a problem by Dr. de Kok. This is likely due to the high bean content in the diet of residents. As compared to Skoonheid, Drimiopsis was found to have a high rate of protein deficiencies. This could be due to the sole reliance on maize meal for food. The mobile clinic doctor in Drimiopsis stated that the community was "wasted" because of lack of protein in their diets. Wasting is a medical term used to describe the condition of having a very low body weight in comparison to height. This can be a sign of chronic malnutrition, and was mainly used to describe people living in Drimiopsis.

Protein-Energy Malnutrition (PEM) is very common in poor communities among children under five. It is often called kwashiorkor, and presents itself as edema of the abdomen. Edema is a swelling caused by internal fluid retention. These "potbellies" were observed in many of the children in both locations. When visiting the shebeen in Skoonheid, the team noticed one child with particularly severe abdominal distension. Two days later, we learned that the same child had fainted and was taken to the hospital. Although we cannot know if this issue was caused by a protein deficiency, it is a sign of poor nutrition and health in the communities. Protein deficiencies in children may be causing this problem as their diet is lacking in meat or a nutritionally equivalent substitute.

We also found that most people lack the ability to obtain fruit. Because of this, people may not be getting crucial vitamins, most specifically vitamin C. Without a regular supply of vitamin C, the immune system becomes weakened thus leaving the body more susceptible to disease, general sickness, and slow wound healing. For example, in Skoonheid a community member commented that a gash on her child's leg had taken three weeks to heal. Also, many of the children had sores on their skin. This implies that there may be a serious problem with vitamin C deficiency. Figure 22 shows a thin child with large, white head sores, and another child who was sneezing and coughing through a focus group discussion.



Figure 18- Children displaying signs of illness

Though the staple foods of both communities are based on maize, there are many vegetables missing from residents' diets. Green leafy vegetables such as spinach are the most important due to their high nutrient content. They are also the most difficult to obtain because of their short storage life and high cost. These vegetables provide crucial nutrients such as vitamin A, vitamin K, fiber, calcium, and folic acid. Folic acid is almost exclusively found in this type of vegetable. Folate deficiency has been linked to megaloblastic anemia, a wasting of the intestines which leads to malabsorption of nutrients. It has also been linked to neural tube defects in developing fetuses. Unfortunately, we learned that both communities have a strong aversion to spinach. They had been prompted to grow this highly nutritious food but did not like the taste.

Health

Poor nutrition can physically manifest in a number of forms. It may cause a health problem or make a pre-existing condition worse. There are many health concerns affecting the people of Skoonheid and Drimiopsis which can be linked to problems with poor nutrition.

Diarrhea was found to be a major problem in both communities, but particularly in Drimiopsis. The high prevalence in children can be attributed to many things including poor diet, spoiled foods, and a poor hygiene. As discussed previously, a lack of vitamins weakens the immune system and can prevent one's body from fighting bacteria. When diarrhea occurs, it further compounds the issue of malnutrition. Fluids and important nutrients are lost sometimes creating severe malnutrition and dehydration. This malnutrition further weakens the immune system which allows the problem with diarrhea to continue.

Eye problems can also relate to malnutrition. Most eyesight issues occurred in older generations, while eye infections were noted in small children. In the Nutritional Focus Group the older residents complained of not being able to see up close or far away for various reasons. Some explained that craftwork had caused them to have difficulty seeing up close, while those who worked in the fields blamed the sun. The adults described general eye infections in many of their children that were soon cured with medication from the clinic. Figure 23 shows the beginning of an eye infection in a child at Skoonheid. Though neither of these symptoms were particularly indicative of specific nutritional deficiencies, many of the children were away at school during the period of our research. It is impossible for us to assess the nutritional status of those children, but possible signs of vitamin A deficiency were seen in those too young to attend school. A deficiency in vitamin A can cause brown bands or speckling through a person's eyes. This was seen in a small number of the children in Skoonheid. As people's diets were found to lack meat and most vegetables, it is plausible that a deficiency of vitamin A could be present. The two parts of vitamin A can be found in different places. Animal products such as fish, eggs, and dairy provide retinol while vegetables such as carrots and green leafy vegetables provide beta carotene. None of these foods are commonly consumed in Skoonheid or Drimiopsis. Also, the high rate of eye infections could signal weak immune systems.



Figure 19- Example of an eye infection in a young girl

When discussing health issues with the community members, broken bones became a topic of interest. According to the people at both farms, young children and older residents break bones. As young children have weak growth plates and older generations have brittle bones, they require an elevated intake of calcium. Dairy is a very small part of the diet for most residents as are green leafy vegetables. Both of these would provide calcium if eaten in adequate amounts. Yet, because the cultivated crops are not rich in calcium, people may be suffering from weakened bones.

High alcohol consumption creates many problems, both socially and for one's health. Heavy drinking can cause difficulty or inability to maintain steady employment. When we asked a focus group in Drimiopsis if there were residents who were often too drunk or hung-over to work, they responded strongly that was a large problem for the community. This included both sexes and all age groups. This agreement was supported in a personal interview with a local janitor. In his spare time, this man had been helping residents find housework and gardening jobs for many years due to his connections with the local school. He relayed that he had a continuous problem with people showing up to work drunk or quitting after they had collected enough money for alcohol. This unpredictable behavior can put people and their families at great risk for food insecurity. As crops at either site are not available year round, most families must buy a portion of their food. With no cash income, the ability to pay for basic necessities such as food and water decreases dramatically. This may also affect the ability to pay for less critical but very important expenses such as medical bills and school fees.

Another food security problem that we have seen is the practice of buying alcohol in place of food. In Skoonheid, food can be bought on credit while alcohol must be paid for in cash. This creates a system in which people consume alcohol first and do not worry about how they will secure food. Many people also consume alcohol this way because of addiction.

Lastly, money is a deciding factor in whether people consume alcohol over food. A traditional alcoholic drink called “tombo” is very cheap. At the shebeen in Skoonheid, we found that a liter could be bought for N\$1. This price contrasts sharply to the price of food at the same establishment. A 1 kilogram bag of rice was marked as N\$18.00, 500kg of macaroni was N\$17.00, and a 750kg tin of fish was N\$19.50. As most people are poor, they can afford to spend N\$1 for a large amount of alcohol, but may not be able to afford something more nutritional. The pricing list for the shebeen in Skoonheid can be seen in Figure 24.

LEA FIVE PAGES	50 KG	16.50	18.50
LEA FIVE PAGES	50 KG	9.50	10.50
KOFFIE	60 KG	8.50	9.50
Rice	1KG	18.00	21.50
MACARONI	500KG	17.00	20.50
TAMATIE SOUP	750KG	14.50	16.50
SOUP		7.00	8.50
LUCKY STAR		9.00	10.50
oil	750KG	19.50	22.50
oil	500KG	14.50	16.50
oil	375KG	12.50	13.50
MAIZ MEAL	10KG	47.50	52.5
BISCUITS		10.50	11.50
BISCUITS		5.50	6.50
SWEETS		1.40	1.60
OMO Sulf	22.00	500KG	24.00
OMO Sulf	12.00	250KG	13.50
SUNLIGHT	7.50		8.50
BAO SUP	6.5		7.50
ROL MAM	9.00		10.50
DRAIN	11.00		15.00
VASELINE	11.00		12.00
CANDLES	2.50		2.700
LIAN	1.00		1.20
SWS	8.50		10.00

Figure 20- Price chart at the shebeen in Skoonheid

From a health perspective, alcohol has a number of ill effects on the human body. First, it can weaken the immune system so that previously mild infection can become virulent. This can cause a problem for people suffering from diseases common in the community such as tuberculosis and HIV. Their bodies may not be able to fight off the infection, or they may forget to take their medication on a consistent basis. Tuberculosis was cited as one of the biggest health issues for the communities by both residents and doctors. Nationally, tuberculosis is also a large problem. Namibia has the highest notification rate for tuberculosis in the world, and it is the leading cause of death for those infected with HIV or AIDS.

Finally, alcohol can also cause numerous developmental problems. In both settlements, an alarming number of pregnant and lactating women were seen at shebeens consuming excessive amounts of alcohol. The children were often with them at these locations. This practice has many negative consequences for the child. Fetal Alcohol Syndrome may occur, leading to deformities and growth deficiencies. Deformities were

noticed in the population, but may be due to other factors including poor maternal nutrition. By speaking to women in the communities, we found that there was an elevated rate of infant mortality. One woman had lost five children to disease or malnutrition. People in both communities stated that there were no programs to help with the problem of alcohol consumption. In Drimiopsis, a youth group dealing with drugs and alcohol had been recently established but was not implementing community-wide programming.

Long Term Consequences

In addition to the lack of nutrients, there is an overall lack of food in both of the communities at various points in the year. When hunger is constant for years, people may become stunted. Stunting is the medical term for a low height to age ratio, and is a sign of long-term undernourishment. Many of the children in both communities appeared much younger than their actual age. Food consumption, along with most other aspects of community life, circles around the harvest. In both Skoonheid and Drimiopsis, the harvest provides plenty of food for everyone in the community. As the harvest gets eaten and sold, the supply becomes so low that there is constant hunger for periods of time. This happens periodically in Skoonheid, but there appears to be a more constant hunger in Drimiopsis. When asked why this was the case, the residents responded that they are forced to sell most of their crops before they spoil, and have no storage methods for long periods of time.

4.2. Factors that Influence Food Security

Hunger and food insecurity result from a compilation of factors; in order to address the issue of food security these issues were comprehensively examined. A lack of money or credit is the first factor that can seriously affect the ability of community members to obtain adequate food. The limitations with income generating activities were investigated as a factor that affects food security. The cultivation of crops is another source of livelihood in the communities, thus we investigated issues that limit agricultural production. Finally, livestock, to a lesser extent, is consumed in the communities therefore we explored the consumption of livestock products in the communities.

4.2.1. Cultural barriers

The community's ability to support internal initiatives and willingness to adopt training affects food production. LISUP has provided instruction on proper agricultural techniques, such as crop rotation and pest control, yet we did not see these practices being implemented. If the benefit of using such training is not obvious, concepts will most likely not be practiced. Community based projects have difficulty coming to completion. In Drimiopsis an initiative to clear bush land stalled after one month. Food was purchased by the Ministry of Lands field coordinator to motivate individuals to continue working. In order for community members to participate in such an activity incentives must be transparent. This makes it difficult to put long term projects into practice.

4.2.2. Income Generating Activities

Income generation provides the ability for people to vary their diet as they can potentially buy goods not produced within the community. Money can also be saved for situations when food is not available, or for needs such as school fees and medical bills. For these reasons we have explored a broad range of income generating activities with the communities to help assess which activities may provide the most potential for economic growth.

Crafts

Crafting offers a straightforward way to generate income and was found to be a prevalent activity in the communities. In walking through the resettlement farms we often saw residents engaged in crafting. Its importance in relation to food security was discussed in the Seasonal Calendar while the acquisition of materials as well as the sale of final products was discussed in the Marketing Focus Group.



Figure 21- Sample crafts in Skoonheid

The majority of craft production in Skoonheid is coordinated by Dr. De Kok, the clinic doctor. In our interview with her we discussed the production and marketing of craft items. Currently there are 66 community members involved in production of crafts. Last year LISUP began working with Dr. De Kok by helping supply materials for crafting. Crafts being produced under this initiative include: bead bracelets, cloth placemats, and stick placemats. Items are market tested before being introduced to the community to ensure that all products have market potential. Next, individuals or families are given training on how to produce one particular item and then are given supplies. Though not mentioned by the communities, a

craft coordinator named Karen comes and trains interested women in how to create these items. A board detailing how to create specific bracelet patterns can be seen in Figure 25.

Once complete, these crafts are bought from the residents. In Skoonheid, women receive N\$10 for every bracelet they create. One family receives N\$40 to N\$50 for producing a string of beads one meter long, depending on quality. The crafts are collected twice a month by Dr. De Kok and then sold to shops and lodges across Namibia, including the Craft Centre in Windhoek. The Craft Center is a shop that sells locally produced wood carvings, clothing, jewelry, and souvenirs. Jewelry at the Craft Centre from Skoonheid is labeled as a product of Skoonheid. Community members realize roughly 60 to 70 percent of the net profit from these crafted goods. Last year crafts from Skoonheid generated N\$30,000 of profit. The market was identified as the limiting factor to income generation. Dr. De Kok felt confident that production could be up scaled if there were more buyers for the items. There are plans to expand the potential market of the crafts by selling them on the internet. The ultimate goal originally outlined by LISUP is for twenty community members to generate N\$450 each per month from craft production. Despite the fact that 66 people are currently involved in the project, none of them currently have reached this target income. However, involving more people in income generating activities is beneficial because once training is complete; each person can individually increase their production to this desired goal.

Another community venture sponsored by LISUP is leatherworking. A group of about half a dozen men was trained in how to produce belts and bridle equipment from leather. They have created a partnership to partition the production process. Leather goods have not proved to be easily marketable. The inability to bring the products to large markets such as Gobabis was cited as a major limitation. Making leather goods has not yet been proven as a reliable source of income.

Crafting is not as prevalent in Drimiopsis as it is in Skoonheid. When discussing income in the Seasonal Calendar, crafting was not mentioned as a major source of income. When we walked through Drimiopsis we rarely saw people producing crafts, yet, a wider variety of products are made in Drimiopsis. Craft items include bead bracelets, string bridles, clothes, coffins, whips, necklaces, and wall art. Despite the variety of crafts produced, residents of Drimiopsis do not believe that their crafting ventures provide them with enough income to justify the time spent crafting. Several had discontinued making crafts as they felt their time could be better spent working in the fields, cooking or tending to livestock. Other residents explained that although crafting may be time consuming it is an important source of income. From our observations, we believe that crafting is not done in Drimiopsis on as large as scale as the crafting initiatives in Skoonheid.



Figure 22- Experienced crafter showing off her works in Drimiopsis

We learned through discussions with project liaisons that crafts are sold through Omba, not directly marketed by Dr. de Kok as the communities believe. The Omba Arts Trust is a non-profit organization that markets rural crafts to larger markets such as Windhoek (E. Dirkx, personal communication, May 7th, 2009). Out of all income generating activities analyzed, we feel that crafting has the most potential to improve food security in the communities as it allows residents to avoid traveling and therefore participate in agricultural activities, and can be done without great amounts of training.

Work

Many young adults, mostly young men, leave the communities to find work. Jobs are often found at nearby commercial farms though in Drimiopsis some people work in the school system. Farming jobs are available on an irregular basis with an undetermined time frame. We spoke to some residents who had left to work on commercial farms, but had returned due to conflicts with the owners. Other individuals worked on a seasonal basis, leaving for several months and then returning when the work was completed. When individuals are away from the community working, it is difficult for them to send money back. It is only upon returning that they may bring money back to their family. In respect to nutrition and food security this is not advantageous as it does not provide a steady source of income. Often, workers come back with no money as they may have spent it on alcohol or were forced to pay for food consumed while they were working on the commercial farms. Also, working a separate job hinders people's ability to become self-sustainable. It creates a system of dependence that is amplified when they lack agricultural skills to fall back on if a job ceases to exist.

Pension

Pension is a monthly payout that the government provides individuals in the community who are over the age of sixty. In order to receive pension, a person cannot hold a job; despite this some pensioners participate in crafting. The application process to become a pensioner can be challenging for individuals who are illiterate and do not have regular access to Gobabis. First, a potential pensioner has to obtain the application form, fill it out, and submit it for approval. Once he or she has been granted approval, documentation of age (such as a nationally issued ID or birth certificate) has to be brought to Gobabis. After the pension card has been obtained, the pensioner will receive N\$450 a month with the exception of November when pension is doubled as no pension is given in December. Pensions are delivered directly to the communities. The complexity of the application process has marginalized potential pensioners as they may not be able to complete an application, get to Gobabis, or prove their age. We spoke to several residents who claimed they should be receiving pensions but were not. One man claimed that he was eligible for a pension but could not get to Gobabis to get his pension card. He complained that he had lost a year of potential pension because of this problem. Another woman explained that though she was sixty-four, her documentation was printed incorrectly forcing her to wait ten more years to get a pension. When an elderly community member is not able to get a pension, it has a negative effect on the individual and his or her family. Pensioners often use their pension to help buy food and pay for school fees. Pension is a reliable, but transient source of income. If a family relies heavily on the pension of its older members, there will be complications when these members pass away.



Figure 23- Old pensioners from Drimiopsis

Variation in diet and nutrition suffer when potential pensioners are not able to receive pensions. The gentleman who could not get to Gobabis to get his pension card said he eats what is grown in his plot, and when that runs out, he is forced to beg. In effect his diet was limited and restricted by his inability to obtain a pension. Pensioners who do not own plots must purchase the majority of their food. As maize porridge is inexpensive, it often becomes the staple food of a pensioner's diet. This creates nutritional deficiencies and potential health issues.

4.2.3. Agriculture

Crop production is the main source of both income and food for the resettlement communities. This was determined through the Seasonal Calendar and the Nutrition Focus Group. The size and quality of the harvest directly affects the diets of community residents. A good harvest can mean more money for school fees and more food for the family while a poor harvest makes the community more susceptible to hunger and hunger related health issues. Agriculture offers a proven method to improve nutrition as well as food security on the resettlement farms. Crop variation can help alleviate nutritional deficiencies in diets, while increased output can reduce hunger. We examined the timing of planting and harvesting in order to make recommendations on the feasibility of staggered planting and harvesting.

Increasing the time in which people can gather food from the fields helps address periodic hunger. In the context of agriculture, the factors that influence food security are the production of the crops, the method and timing of harvesting, and the storage of produce.

Production

The planting and growing of crops is the most vulnerable part of the agricultural process. If nothing grows, there will be no crops to harvest or store. For this reason we examined the production process by looking into soil quality, water use, and planting techniques. Through discussions with individual plot holders we gained an extensive knowledge of the agricultural growth practices in the community. Some of our PPA activities also explored aspects of crop cultivation and therefore aided in our understanding of current agricultural practices. The threats to agricultural production were discussed in the Food Security Pathway.

Soil Quality

Good soil is necessary in order to grow a variety of crops. We determined that soil quality varies between the communities by completing mapping exercises and visiting gardens. The soil in both communities was described by residents as being red and sandy. Residents claimed that this kind of soil is poor for crop growth. Over-cultivation can sap the soil of its nutrients, stunt crop growth, and limit the types of crops that can be grown. In Drimiopsis one plot was said to have better soil by multiple community members. In Skoonheid the plot behind the location was identified as having bad soil. The unequal distribution of good soil on the farms is one way in which people are marginalized. In Skoonheid people who had plots in the dryland garden with poor soil claimed that their crops were not doing as well as those crops in the better dryland areas. Through observation we found that both maize and bean plants on the “good” dryland plot were significantly larger than those on the “bad” plot. As we arrived in Drimiopsis after the harvest, we could not physically examine the plants in the different plots, but residents did report a lower yield in one garden that was attributed to poor soil quality.



Figure 24- Example of poor soil in Drimiopsis

Residents in both communities had taken action to improve soil quality through fertilization and crop rotation. In Skoonheid, the cattle are let on the land after the plants have been harvested to eat the remainder of the plants. This is done so that the cattle will fertilize the dryland plots. Animal manure is also used as a soil improvement strategy in Drimiopsis but not to the same extent as it is in Skoonheid. Farmers at both locations stated that manure was an effective fertilizer, and through its use they could prevent soil degradation. In Drimiopsis some wealthier residents claimed to purchase chemical fertilizer to increase the level of nutrients in the soil. Chemically fertilized crops cannot be marketed as organic, which may affect the price they can get in the market. Ash is also used a fertilizer, particularly in Skoonheid. Community members in Skoonheid stated that they burn the weeds in the field after collecting them and mix the ash with the soil. Residents claimed that this technique was an effective means of soil improvement.

Some residents practice crop rotation to prevent the earth from becoming infertile. People in Drimiopsis referred to Claus, the former LISUP agricultural technician, when mentioning who taught them about crop rotation. According to community members, the effectiveness of crop rotation was hard to determine as other factors could not be controlled. We found that not everyone rotates their crops, or are aware that this method is beneficial.

Bad soil can negatively impact the diets of farmers and their families as it influences crop growth. Residents who have plots on land with poor quality soil or those who do not actively treat the soil may have a more limited diet than other plot holders. This is why it is necessary to address soil as a factor that influences food security. Having good soil raises the potential for individuals to provide nourishment for themselves and their families.

Water Use

The dry climate of the Omaheke region makes water a scarce resource. The availability of water is a significant limiting factor in regard to harvest yields. In Drimiopsis all of the gardens are irrigated; therefore water is limited by how much can be pumped. In Skoonheid there is a small irrigated garden, but the majority of cultivated land is rain-fed. Because of the lack of irrigation the amount of rainfall limits the amount of water received by crops in Skoonheid.

The irrigation systems in the communities both use drip irrigation fed by water towers. While we were in Skoonheid, the irrigation system had yet to be connected. Therefore, we do not know how long and when the community intends to water their crops. In Drimiopsis water is run once a day for two hours during summer and once every other day for two hours during winter. Calcium deposits were mentioned as a major problem. Calcium collects in the holes of the drip irrigation tubes reducing the effectiveness of the irrigation system. Individuals have to clear calcium clogged holes prior to irrigation in order to ensure proper water flow. This is a labor intensive process that takes time away from other necessary tasks such as weeding, and limits the amount of water available to crops. Figure 29 shows an irrigation pipe with a large calcium buildup.

When examining the drip irrigation system we noticed that the ends of the drip pipes had smaller calcium deposits and the ground was drier at the end. From this we concluded that the amount of water reaching the ends of the pipes is less than that throughout the rest, suggesting that perhaps the structure of the irrigation system should be modified to water all of the crops more evenly.



Figure 25- Calcium deposit on an irrigation pipe in Drimiopsis

Planting

The timing and technique of planting of a crop is important as it dictates when crops will be ready to harvest and therefore when food is available. Currently in Skoonheid planting is done at the beginning of the rainy season. Some community members planted their crops

too early, and as a result their crops dried up. In looking at the gardens we noticed that some plants were clearly planted too close together. We observed visible stunting of plants that were close enough to touch each other. Finally, we found that some crops were planted in mounds instead of depressions. This creates a problem with drip irrigation as the water runs off the side of the mound instead of concentrating at the roots of the plant.

Limiting Factors

In the Food Security Pathway, we discussed with the participants the biggest threats to agricultural production. The issues addressed can be grouped into four categories: pests, weeds, labor, and land availability. Figure 26 and Figure 27 show the food security pathways for Skoonheid and Drimiopsis respectively. In Skoonheid, the community identified maize, beans and maize porridge as the staple foods. Additionally, they identified and ranked the major threats to these staple foods. Since maize porridge is purchased, the community did not identify any threats. In Drimiopsis, the community identified only maize meal as a staple food. They then discussed the means of purchasing and ranked the threats. In both figures, the threats were ranked in the order shown.

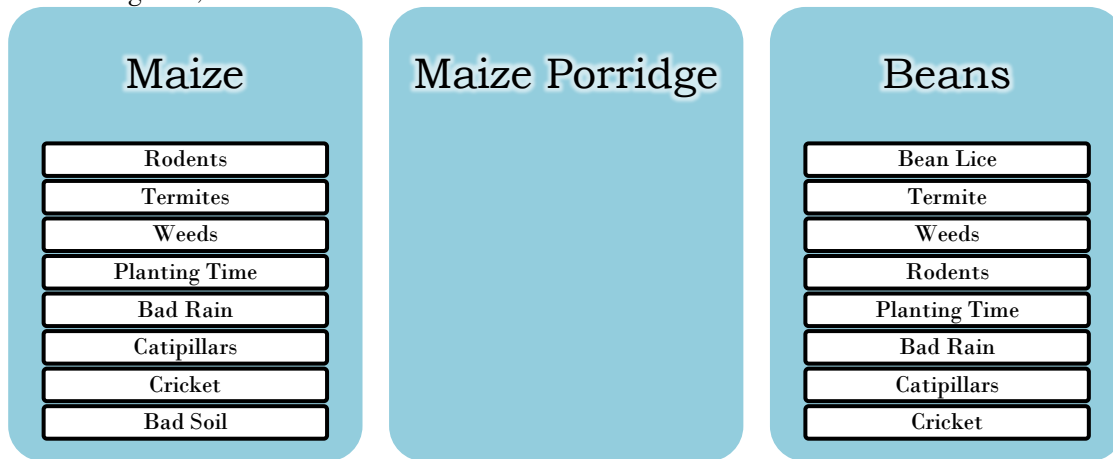


Figure 26- Food Security Pathway showing threats to the staple foods in Skoonheid

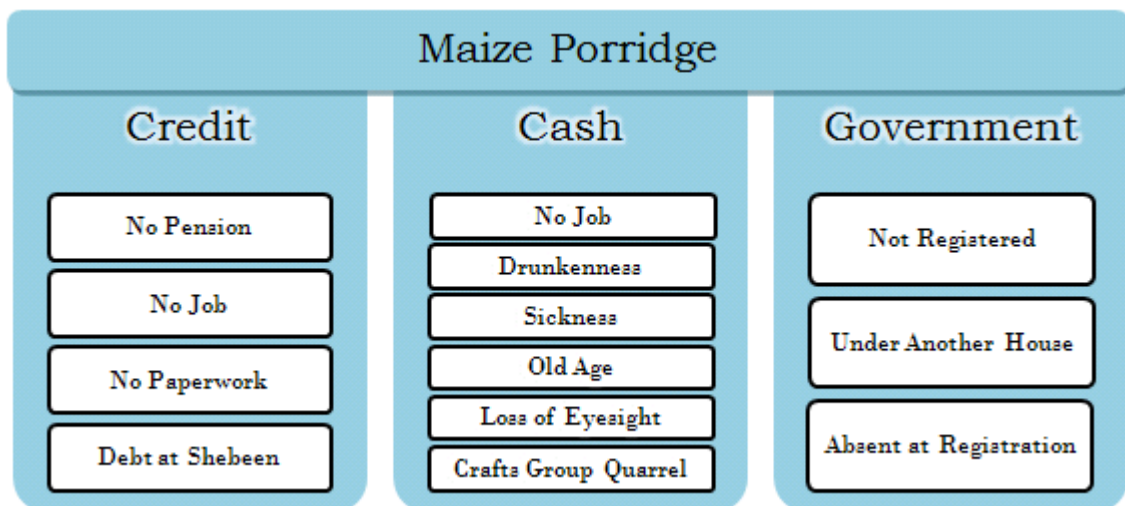


Figure 27 - Food Security Pathway showing threats to the staple foods in Drimiopsis

Pests

Pests present a threat to crop production as they eat the produce before it can be harvested or they damage the plant before it has matured. The most abundant pests are: crickets, caterpillars, “bean lice”, *spring hares*, crows, meerkats, and termites. With respect to community staple foods the pests that affect beans the most are “bean lice” or aphids, while springhares are the biggest threat to maize production. Some residents had built traps to capture the springhares, eating them after capture. There were no measures taken by individuals to curb the impact of “bean lice.”



Figure 28-Black Aphids on beans in Skoonheid

Weeds

Weeds negatively impact the productivity of crops by competing with them for nutrients and water. When left unchecked weeds can deprive crops of nutrients to the point of killing them. Even if weeds do not kill a plant, they can stunt its growth thus limiting the quantity of its produce. When asked how they manage weed growth, the community informed us that weeding is the only method currently in use. Weeding requires an extensive amount of labor, and if an individual does not have the time or strength to weed his or her garden on a regular basis, the output of his or her plot may suffer. This is one way in which people's diets may be impacted. If a harvest is limited by the prevalence of weeds, the plot holder may experience hunger. When walking through the gardens we saw some plots that had been overtaken by weeds. In Drimiopsis some irrigation pipes were feeding plots of land that were only growing weeds.



Figure 29- Weeds encroaching on sorghum in a plot in Drimiopsis

Labor

Growing crops is a labor intensive process. As mentioned before with weeding, individuals who cannot work in the fields may suffer from limited agricultural yields and therefore a limited diet. In order to have a successful harvest the soil must first be tilled, then the seeds need to be planted, the land must be weeded and watered and then the crops need to be harvested. In the daily activity clock the men explained that during the growing season they may spend all day in the fields weeding and maintaining the crops. When talking to individuals within the community, some older residents said they did not want a plot because they could not put in the work required to maintain the land. When asked what they ate if they didn't have a plot, many said they bought pap using money from their pension. This means that their nutritional status suffers because they cannot work in the plot. Some residents (both pensioners and those who do not have a plot) were able to beg for or trade for maize and beans but not on a regular basis. Labor put into agriculture also may take away from other income generating activities, though community members did not explicitly state so.

Land Availability

The amount of land available to each community limits the size of the harvest. In theory more cultivated land equates to more produce harvested. In Drimiopsis, when asked if the plots were large enough, residents said that if they did not sell their produce and were able to store everything that was harvested; they would be able to have enough food for the year.

As the majority of Drimiopsis residents the majority of their harvest and do not have effective storage methods, they do not eat their own produce year round. In Skoonheid we spoke to one man who claimed that he did not have a plot because the dryland garden was full. There were others who expressed a desire to have a plot but could not get one due to the allocation rules. In Skoonheid plots are distributed on a per household basis. A person living in a household that already has a plot cannot get another plot regardless of the size of the family. This practice does not take into account population growth. Although the number of houses is constant, the population has and will continue to increase. The need for more plots will continue to grow. In Drimiopsis the plot allocation system is simpler; in theory anyone who wants a plot can have a plot. With completion of the community-based initiative to clear 2 hectares of bush for cultivation this allocation policy would seem to be feasible. In talking to Drimiopsis community members we did find people who did not have plots. When asked why they did not have a plot most said they had not asked for one but would in the future.

Those individuals who do not have land in the irrigated and dryland gardens have a limited diet in that they cannot produce their own crops to consume or sell. When non-plot holders were asked what their diet consisted of, many responded maize porridge with no beans or maize. In Skoonheid one squatter who did not have a plot just ate beans that he begged for. The impact of not having a plot on one's nutritional status and food security are severe. If an individual has no plot, he/she has limited his or her income-generating potential as well as dietary variety. Those who cannot grow their own food must depend on other sources of livelihood that may not be as regular. This makes them the more vulnerable groups in the community, such as pregnant women and elderly people, more prone to periodic hunger.

Harvest

The timing of the harvest can affect the nutritional value as well as the quality of the produce harvested. Cultural perceptions can alter decisions about when to harvest. For example, beans are not harvested until they have dried on the stalk though they are more nutritious and marketable when fresh. A limit in agricultural as well as nutritional knowledge could be the cause of this harvesting decision.

Storage

The ability to store food over an extended period of time is imperative to food security. As harvesting occurs only once or twice per year, making sure produce does not spoil is a way to benefit from crop production year round.

Storing maize and beans is common in Skoonheid. The preferred method is to store the food with ash. According to community members, the addition of ash prevents food from growing mold and bugs from eating it. Some residents in Skoonheid stored their produce on the floor of their houses or in a closet. When food storage was discussed with participants of our Nutrition Focus Group, we learned that pests are the biggest problem with storage. When a lack of space was mentioned as a limiting factor to storage, the community members were strongly opposed to using a communal storage space. One man vowed he would never store his produce with anyone else's because they would steal from him. Other community

members agreed. The resources and knowledge needed to effectively store maize or beans are limited in both Skoonheid and Drimiopsis. Figure 32 shows dried beans being stored in the farm house in Skoonheid. The only other crop that is commonly/frequently stored is ground nuts. These require no special storage techniques.



Figure 30- Dried beans being stored in a room in Skoonheid

In Drimiopsis, residents sell more produce than they eat, partially due to limited use of storage techniques. Individuals did not generally mix ash with their food to help prevent insect infestation, though there were specific people who did. The burden of paying school fees may also contribute to the limited storage of agricultural produce. By selling their crops residents can earn a substantial amount of income. As the money earned is not always spent on food, food insecurity is the end result.

Poor storage or a lack of storage is manifested in the form of periodic hunger. When storage is ineffective, food is lost to mold or rot and therefore is not consumed. If moldy food is eaten, it can negatively affect health. Good storage methods could enable farmers to keep food longer, thus helping to prevent hunger.

4.2.4. Livestock

Another factor that affects food security is animal husbandry. Cattle in both communities are considered to be a status symbol and a sign of wealth regardless of the economic advantage or lack thereof that the cattle provide. This conception of cattle could be considered a problem in communities with already scarce food and water resources.

Ownership

In Skoonheid, the ownership status of many of the cattle is unclear, even to the members of the community. In early 2009, a German NGO donated 420 cattle to the community of Skoonheid through the Ministry of Lands. These cattle are technically owned by each individual household, 3 per household, but the terms of ownership are limited. In group and individual discussions with residents of Skoonheid, we learned that the community members could not slaughter, sell or even brand these “donated” cattle. Additionally, since most of the cows are not old enough to have calves, the owners of the cattle have not been obtaining any milk. At this point in time, these donated cattle are providing the community of Skoonheid with no physical advantage while draining residents of scarce water, food and time. Also, the rule against branding of the cattle prevents community members from having an absolute claim on their own cattle—encouraging theft of cattle in the area. The remaining, non-donated cattle in Skoonheid do provide some milk and are slaughtered for meat infrequently. Even so, very few residents of Skoonheid are economically advantaged as a result of owning cattle.

In Drimiopsis, very few residents have cattle and of these cattle, some are actually owned by an organization sponsored by the Catholic Church. The cattle owned by the Church were given in groups of five to different households. These cattle can be kept and used for milk or to produce calves for 5 years at which point the household must pass 5 cows back to the Church or on to another family. In this way, families are getting calves that can be kept after the 5 year period. These cattle are infrequently slaughtered for meat.

Grazing

In both communities, livestock are cared for on a communal basis and therefore herding and watering may not be handled evenly amongst those people who own livestock. Grazing of cattle in Skoonheid occurs in a large region just beyond the dryland gardens and in the lands surrounding the location. Due to the large number of cattle being raised on a relatively small piece of land, the amount of naturally available fodder for the cattle is quickly disappearing. According to community members, they do not expect the currently available grazing land to last for more than a year. This problem is made worse by the encroachment of non-edible plants into the grazing land. This issue should be considered a huge problem for the community, especially as the available grazing land becomes depleted due to excessive grazing. Figure 33 shows an undernourished cow on a plot of degraded land.



Figure 31- Undernourished cow on grazing land in Skoonheid

In Drimiopsis, cattle are kept and herded at a cattle post that is located several kilometers east of the center of the location. In a visit to the cattle post, we spoke to a group of young men who were tending the cattle. These men stated that some community members fail to care for their cattle and leave the burden of caring for the cattle on everyone else.

Water

Water is vital to the health and development of livestock. Insufficient water can result in disease and poor growth. Water is given to livestock from the same source used for human consumption, though it is pumped into a circular dam instead of a water tower. These dams are uncovered and contain a significant amount of algae. According to community members the algae in the water does not affect the health of the animals.

As there are a large number of cattle in Skoonheid, the demand for water is high. Each head of cattle consumes 30 to 40 liters of water per day. As the community is not provided with sufficient diesel to pump this amount of water, community members are forced to contribute to a common fund to buy more diesel. The total water usage in Skoonheid once the irrigated garden is running and the rest of the cattle are delivered is estimated to be 70,000 liters a day. In Drimiopsis, as water pumps are electric and paid for by the government, there is not the same problem with water shortages.



Figure 32- Dam in Skoonheid used for watering cattle

As water is a limited resource some individuals are forced to prioritize where the water goes. In Skoonheid many residents explained that water is first given to the cattle before their families. When asked why, they explained that the cattle were government property and had to be cared for. This problem obviously has negative affects on the overall health of the population.

4.2.5. Water Infrastructure

Due to its immense importance in the maintenance of all parts of daily life, water infrastructure is a key component of many aspects of our project. Without proper water infrastructure, the agricultural production, livestock production and hygiene within the communities would be greatly reduced. As such, we examined water infrastructure in several of our fieldwork activities. Due to the structural and layout differences between Skoonheid and Drimiopsis, we will examine the results for each community in separate sections.

Skoonheid

Upon completion of our mapping exercise with the community in Skoonheid, we realized the immense problem caused by poor water infrastructure within the community. When asked to rank the problems within the community at our feedback session, the community ranked broken water infrastructure as the second most important issue affecting the community. The highest ranked problem was poor supply of diesel, which was used to supply water from the borehole to the community. These rankings highlight the extent to which water infrastructure is a problem for the community of Skoonheid. In addition to the many community comments made regarding water infrastructure, in our walks in the community, we observed many problems with the water infrastructure.

Pumps

Among the first observations we made in Skoonheid was the amount of noise that the main diesel pump made throughout the day. The pump made noises that suggested a definite mechanical problem within the engine or its interface with the pump. Upon observation, the pump appeared to be extremely old and was fueled by diesel. Additionally, the engine and the pump were precariously connected using several stones and a large log. Upon inquiry during our mapping exercise, the community members claimed that the pump seemed to use fuel slowly but also pumped water very slowly. According to community members, the pump is typically run for around thirteen hours every few days, and during those 13 hours it uses about 12 gallons of diesel.



Figure 33- Crudely repaired main pump in Skoonheid

The second pump that is currently in use in the community is an electric pump powered by a diesel-electric generator. The community members said that the generator would consume approximately 25 gallons of diesel over the course of 3 hours but that it pumped water much faster than the previously mentioned pump. Since we were unable to determine the actual amount of water pumped by either pump, it is impossible to know which pump is actually more fuel efficient. Our impression from the community members, however, was that the slower pump was more fuel efficient than the faster pump.

In addition to the two pumps that are currently in use, the community members pointed out three other boreholes. Two of the boreholes are connected to pumps that are similar to the ones currently in use. The community members stated that the water was “weak” in one of these boreholes, suggesting that the underground water reservoir may no longer contain sufficient water or the pump is inefficient. As to the second of these boreholes, we were told that it simply did not work. Finally, we observed that a working windmill near the main farmhouse was not connected to a pump. When discussed with participants of our

mapping activity, we found out that this windmill had not been connected since 1993. This particular point was especially of interest to us because the windmill represents a free and sustainable source of energy that is not currently in use.

Diesel

Overall, diesel was considered to be the biggest problem in Skoonheid. Diesel ties directly into the water problems in the community because it is used solely for the purpose of pumping water from the boreholes. The community has been promised 210L of diesel per month by the Ministry of Lands. Despite this, the community says that at times they must go without water. This problem results from the fact that in most months the diesel arrives later than the promised date. This community assertion is in direct contradiction with the claims of a regional coordinator of the Namibian Ministry of Lands. During an interview with the Ministry of Lands, it was stated that if the residents of Skoonheid ever run out of diesel, all they need to do is call the Ministry and diesel will be sent within a few days.

Dams

In Skoonheid, there are two dams that store water for livestock use. Of these two dams, one has been disconnected because according to the community it is broken. The second dam, which is currently in use, leaks significantly onto the adjacent ground. In a community discussion community members revealed that they had ordered cement to repair the dam but had not received it. Additionally, community members expressed interest in replacing the dams with better zinc or zinc lined dams. These dams are more resistant to environmental pressures and less likely to crack or leak. The community seemed extremely concerned with the fact that water was being wasted from the one dam that is currently in use. Figure 36 shows the leak in the current dam. A final observation we made regarding the dams was the fact that they were completely open to the air. With the dry air in the region compounded by the high temperatures throughout the year, it is likely that a large amount of water is lost to evaporation. This problem could be easily addressed if the dams were covered.



Figure 34- Leaking dam in Skoonheid

Tanks

Water for consumption out of taps is stored in large above-ground tanks. These tanks appeared to have no major problems in Skoonheid, and they were not brought up as a problem in any of our discussions with the community. Upon visual inspection, this part of the water infrastructure did not appear to present any problems.

At the time when we visited Skoonheid, the irrigated garden was being switched to an individual plot system. Thus, the irrigation system was not in use, and we were unable to observe its functioning. When asked, the community stated that they had not received enough pipes from LISUP to irrigate the entire garden. When this problem was addressed with a LISUP project manager, it was clarified that pipe connectors, not pipes themselves were lacking.

Drimiopsis

Water infrastructure in Drimiopsis, when compared to that of Skoonheid is much better and more reliable. Since Drimiopsis is connected to a working electric grid, the issues with diesel that were evident in Skoonheid, are irrelevant. When asked to rank the problems in the community at our feedback session, the participants ranked water infrastructure as the fourth biggest problem effecting community nutrition and food security. The only real issue within the community with obtaining water seems to be the government sponsored payment of electric bills. According to community members, the government sometimes fails to pay for electricity for pumping water. At these times, the community must collect money for water in order to keep the water supply constant. In our Ownership, Access and Control Poverty Analysis, the participants stated that the less wealthy people in the community contributed more to this water fund than the more wealthy people. Additionally they stated that overall, the contributions for payment for water when the government fails to pay is uneven and unfair amongst community members.

Pumps

The two electric borehole pumps in Drimiopsis were said by the community to work effectively and efficiently. Upon observation of one of the two pumps, it was seen to leak slightly when running as seen in Figure 37. Community perception seemed to be that there was no major problem with either pump.



Figure 35- Leaking water pump in Drimiopsis

Dams

The dams that were observed in Drimiopsis were made of galvanized steel lined with zinc and were said to work effectively and without leaking. The only issue observed with the dams was that, like Skoonheid, the dams were uncovered and prone to water loss due to evaporation. The water tanks in Drimiopsis also seemed to function without problems. Additionally, while we were in the community, a large shipment of small household tanks arrived and was distributed to project households. These tanks were supplied so that each household could store its own water.

Irrigation

Since all of the gardens in Drimiopsis are irrigated, the irrigation infrastructure is much more important to general community functioning. The community in Drimiopsis did not report any problems with irrigation in the gardens. We did, however, observe some issues that could potentially cause problems. The foremost of these issues was calcification of holes in the drip pipes. To our knowledge there is no cost effective method of preventing this problem, meaning that it is necessary that community members periodically clear calcium deposits out of the drip holes in their pipes. We observed calcium deposits in the pipes throughout all three gardens. Another issue we observed was that some plots in the gardens clearly did not have crops planted in them. Despite this, these plots remained connected to the irrigation system and thus were wasting water on weeds. Overall, water infrastructure in Drimiopsis appeared to be working effectively and efficiently with no major issues.

4.3. Marketing

The ability of community members to buy and sell goods influences the availability and variety of dietary items. In this respect, marketing influences food security and nutrition. The ability to maximize profit for goods sold increases the purchasing power of an individual, therefore giving him or her more choices when buying food items. The value of the capital held by community members can be optimized by buying products with the most value; thus increasing food security. Specifically, in this section, we will explain the current marketing situation within the community, the situation outside of the community and the matters affecting transportation into and out of the community. We also explored potential markets that are not currently doing business with the resettlement farms to assess economic feasibility of forming more formal agreements and, finally, we have researched the general knowledge the community possesses about business and business practices.



Figure 36- Examples of crafts in Ssoonheid

4.3.1. Intra-communal trade

Bartering and selling takes place within the communities, particularly with maize and beans. It is common for someone to trade a few ears of maize for some beans. In Drimiopsis there are individuals who sell agricultural products within the community. The markets of Ssoonheid and Drimiopsis are the easiest for residents to access and therefore the easiest to trade in. The in-community markets are limited, especially in Ssoonheid, where the population is smaller. The markets cannot consume the large quantity of agricultural produce that is grown, and there is no interest in purchasing hand-crafted items. It is more profitable

for residents to do business outside of the communities.

4.3.2. Travel to Outside Markets

The ability to get produce to market in a timely fashion is important to the success of agricultural sales. The value of produce depreciates as it begins to over ripen or rot. Farmers who are not able to get to market are forced to store or eat their produce and therefore gain no monetary benefit from their agricultural activities. Individuals must leave the area to both increase the money they make on the goods they sell and decrease the price of the goods they buy.

Community residents use different methods to travel about the region. The most commonly employed methods are hitchhiking, paying for a ride, walking, or using a donkey cart. Hitchhiking is a prevalent practice in Omaheke as well as Namibia. In Drimiopsis it is easy to hitch a ride to Gobabis as Drimiopsis is off of a main road going into Gobabis. Gobabis is the nearest major town to both communities and serves as a trading post for agricultural and livestock products. Hitchhiking from Skoonheid to Gobabis is more difficult as the settlement is eight kilometers away from a main road and 110 kilometers from Gobabis. Residents are often asked for money in return for hitching a ride. There are residents in both communities who have cars and give rides to other community members, often for a fee. In Skoonheid, Chief Langmann, the shebeen owner, and a man who owns a nearby cattle post, have cars. Langmann charges N\$50 each way, the post owner charges N\$100 and the shebeen owner gives rides for free when he is going into town. In Drimiopsis several families own cars and give rides for smaller fees due to the much smaller distance to Gobabis. Residents in Skoonheid often walk to the surrounding posts or the small nearby village of Epukiro while some Drimiopsis residents walk the 45 kilometer distance to Gobabis to sell their goods.

4.3.3. Trade with Outside Communities

Epukiro was started as a Catholic missionary location and has grown into a town. People from Skoonheid go there to buy and sell goods. Goods are sold for less than in Gobabis. One cup of beans can be sold for three Namibian Dollars in Gobabis but only two in Epukiro. Epukiro is 20 kilometers from Skoonheid making it easier to get to than Gobabis. As we left Skoonheid, we saw community residents walking to Epukiro carrying goods on their backs to sell.

Gobabis is the largest market in the region and the place where most of the economic activity takes place. Gobabis is located 110 kilometers away from Skoonheid and about 45 kilometers from Drimiopsis. Many community members in both settlements said it was worth going to Gobabis to buy and sell goods, though there were some in Skoonheid who felt otherwise. There are several places in Gobabis where items can be sold. One such place is the open air market. We visited the open air market and spoke to several vendors. There are two places at the open air market where people can sell goods, one row of booths and a covered car port. Both are supposed to cost thirty Namibian Dollars per day to rent, but fees are sometimes not collected from people in the car port. The thirty Namibian Dollars is only

collected if an individual has sold enough goods to cover the cost. We visited the market on a Monday afternoon and found that the market was not very busy despite the presence of several vendors in stalls. The vendors who said that they were there daily, reported that business varies throughout the day and week. We also asked the vendors if they ever saw San people selling goods. They reported that people of San heritage did come and sell items around the periphery of the open air market in an effort to avoid the thirty dollar fee.

As some community residents told us they sell produce to Pop In, a grocery store in Gobabis. We visited the store and spoke to the manager who confirmed that people come from the surrounding towns and sell crops. She explained that donkey carts are usually brought full of either dried beans or maize. She examines the product for quality and then decides on a price for the goods. Other items such as pumpkins and squash are also brought in but to a lesser extent. The produce is normally purchased at a price a little lower than the market price. The only complaint the manager had was that beans were brought to her dried and not fresh. She expressed interest in setting up a more formal arrangement with the growers. She would prefer working with one person to coordinate the selling of goods in order to be informed in advance what items are going to be brought to town. Pop In would not be able to transport items from Skoonheid or Drimiopsis. She gave us her contact information for further discussion about establishing a grower-buyer connection.

Epako is located on the outskirts of Gobabis. Many people from Drimiopsis and Skoonheid have relatives living in Epako whom they stay with while in Gobabis. Some of the community members live with their relatives while they sell goods on the streets in Epako. Crafts are also brought to Gobabis, but buyers are harder to find. When in Gobabis individuals go to the Shoprite supermarket or other stores to buy goods. The most commonly purchased food items are maize porridge, sugar, and cooking oil.

Windhoek, though more than 200 kilometers from Gobabis, is a large and viable market for selling both agricultural products and crafts. We visited two locations in Windhoek that sell locally grown produce and one craft store where crafts produced in Skoonheid were being sold. One local store, Fruit and Veg City, is a large grocery store where fresh produce is sold. We priced crops that were being sold there that are produced on commercial farms throughout the northern portion of Namibia (a list of the prices of these fruits and vegetables at the market is shown in Appendix P). We also spoke to the manager and senior buyer about their buying practices as well as the feasibility of purchasing produce from Skoonheid and Drimiopsis. Fruits and vegetables are bought at either a local market or directly from the farmers (Leon Nel, Personal Communication, April 25, 2009). Much of the produce comes from farms near Tsumkwe, a town in the Northern part of the country. The farmers do not have an official contract with Fruit and Veg City; the relationship is informal. There is no official quality review, but the produce must be fresh and free of mold or bruises. We received the contact information of the senior buyer in order to follow up on our conversation. We also visited the Green Market in Klein Windhoek. The Green Market takes place on Saturdays and is a place where farmers can sell produce, homemade foodstuffs and crafts at booths. In order to get a booth the seller must register with the coordinator and contribute 15 percent of his or her profit to the Green Market organization. Ten percent goes

to the church where the market is held and five percent goes to maintenance fees. The Green Market is, according to vendors selling there, usually very busy and the vendors we spoke to seemed pleased with their sales.

4.4. Perceptions of Nutrition

An extremely important aspect of our project was to understand what the residents of the two communities we were studying know about nutrition and to determine methods of enriching their knowledge. Additionally, we assessed the possibility of monitoring the nutritional status of children in the communities on a regular basis. In this section we will examine the results of our studies regarding perceptions of nutrition and the implications our findings have on nutrition and food security in the communities.

4.4.1. Current Awareness

Overall we were surprised at the level of awareness the participants of our Nutrition Focus Group in both communities had regarding good nutrition and healthy eating. From our earlier community discussions, we determined that residents of both communities consumed maize meal porridge almost exclusively on a daily basis. In our Nutrition Focus Group, the participants explained that this diet was consumed out of necessity and that they would be much healthier if they could eat a wider variety of foods.

The community explained that they would be healthier if they ate more meat in addition to other foods such as fruits and vegetables. One interesting point mentioned by a resident of Skoonheid was that consuming meat causes people to drink greater quantities of water due to the high salt and fat content. The fact that community members had such extensive knowledge about the affects of different foods on the body was surprising to us.

Members of both communities stated the importance of consuming a variety of foods, especially fruits and vegetables. A member of the community of Skoonheid said that although fruits are delicious and healthy, they are far too expensive to buy regularly. Cost was once again brought up in our discussions with the community in Drimiopsis. Additionally, some of the more educated community members in both communities mentioned that fruits are important for fighting diseases and that vegetables contain the necessary vitamins to live healthily.

The participants in Drimiopsis also seemed to have an extensive understanding of how other foods contribute to overall health. The residents listed such foods as cabbage, potatoes, rice and beans as foods that could provide energy and strength in the place of meat. Other residents in Drimiopsis pointed out that drinking milk and eating dairy products will enhance the strength of one's bones.

Another important factor effecting health within the communities is the consumption of alcohol. During our fieldwork, we observed many people who were clearly abusing alcohol. Additionally, we found that alcoholism is a problem that mainly effects the younger generation, starting with teenagers. When asked about alcohol, both of the communities in our Nutrition Discussion expressed that it has many negative consequences to personal

health. Some of the consequences mentioned included disinterest in eating, poor decision making, and swelling of the feet.

Finally, several participants stated that their current diet contributes significantly to many of the health problems within the communities. Some specific health problems that were mentioned include tuberculosis, high blood pressure, fainting, and general fatigue.

4.4.2. Monitoring

We discussed monitoring malnutrition with several of our key informants while in Windhoek and the field including two of the medical doctors who directly service the farms. In a discussion with a member of the Ministry of Health and Social Services, we learned that a simple and effective method of monitoring the nutrition of children is to use a mid-upper arm circumference measurement, which can be used on children from the ages of 6 months to 5 years old. This method is strongly supported by the Ministry and is optimal for the periodic monitoring that would be used in Skoonheid and Drimiopsis.

Additionally, we spoke to a local pastor in Drimiopsis and the LISUP field facilitator for Skoonheid about the feasibility of them helping monitor the nutrition of children in the communities. In both communities it was determined that it is likely that a monitoring program, especially one utilizing mid-upper arm measurements, could be used effectively.

4.4.3. Education

We asked the participants of our Nutrition Focus Group in Skoonheid where they learned about nutrition and healthy living. Most of the education came from the younger children who learned about it in school. Nutrition education in schools begins in grade three and continues until grade twelve. Additionally, health education is received to some extent through several locally based organizations. The most prominent of these organizations, which we saw in both Skoonheid and Drimiopsis, was Community Based Resource Persons (CBRP). It is a local group of volunteers that helps facilitate community activities and provides support to people in need, such as helping a sick person get to the hospital. Another group in both communities is Stepping Stones. Stepping Stones (see Figure 37) is a catholic aids initiative to educate youth and teenagers on health issues such as tuberculosis, malaria, HIV/AIDS, and some basic healthy eating concepts. This program simply involves a volunteer-taught class that meets on a regular basis in the community.

In Skoonheid, there the Volunteer Peer Council (VPC) is a community organization that teaches young people about sickness prevention, suicide prevention and mental health. In Drimiopsis some of the sources of education that were mentioned by community residents included the hospitals, clinic doctors, and education in the local schools. In the local schools the children start learning about nutrition at about six years old and continue such education all the way through school. In the place of VPC, there is a program called Adventures Unlimited. This is a class for kids who are nine to fourteen years old and it teaches about the growing process. It also touches on what constitutes a healthy diet for their age group.



Figure 37- Poster used in Stepping Stones class in Skoonheid

Most of the nutritional education given in these programs is taught in conjunction with diseases such as TB and HIV/AIDS. Despite the limited education regarding overall nutrition, the participants of our Nutritional Discussion still had a substantial amount of knowledge about nutrition.

5. Conclusions and Recommendations

Based on our time in Skoonheid and Drimiopsis we have created recommendations to help the communities advance closer to the goals set by LISUP and the Ministry of Lands and Resettlement (MLR). Additionally, we have made conclusions as to the outcomes of our research and their implications for the communities. The conclusions and recommendations range from areas that are currently being focused on by both agencies, such as agricultural improvement, to those that have yet to receive much focus, such as community based nutritional monitoring.

5.1. Agriculture/Animal Husbandry

Agriculture is undoubtedly the most important means of livelihood for both Skoonheid and Drimiopsis. There are aspects of the communities' agricultural practices that can be altered to help improve production as well as ensure produce longevity. Crop production is directly related to the nutritional status of the residents, thus the success of the harvests is vitally important to community health. Animals and animal products offer a substantial source of protein as well as calories. Based on our fieldwork, we believe that livestock practices in the communities can be altered to increase protein consumption.

5.1.1. Water Infrastructure

The most basic aspect of an agrarian community is the use of water; since crop cultivation cannot take place without it. Thus the management and conservation of water is imperative to the sustainable functioning of the community. In Namibia, the importance of good water maintenance is magnified by the severe lack of rainfall in the country as a whole. Making changes to the water management systems will provide more water with less cost and waste.

Pumping

In Skoonheid there are several aspects of the current pumping set up that should be reexamined. One of the more pressing items to look at is the efficiency of the existing pumps. In both Skoonheid and Drimiopsis the pumps are not operating to their full potential, they either waste diesel or leak water. Getting new pumps would greatly improve the amount of water collected and lessen the amount of energy required, especially in Skoonheid. In Drimiopsis a new pump may not be necessary, but the leak in the central pump should be fixed. There is also a functioning windmill in Skoonheid that could be hooked up to a pump. Not utilizing the free wind energy is essentially wasting money that is being used to pump water with diesel. Solar energy is another resource that could potentially be used to pump water. Table 17 lists possible pumping strategies and the factors that should be examined with each.

Table 17- Evaluation of different power techniques for pumping water in the communities

Pumping technique	Benefit	Factors to examine
Electric pump	Efficient, readily available	Costs, maintenance,
Wind energy	Free, abundant	Initial investment, durability, seasonal availability
Solar pump	Free, abundant	Initial investment, durability
Bio-diesel	Producible fuel	ability to make bio-diesel, efficiency,

In Skoonheid the piping that transports water from the bore holes to the storage containers is outdated and prone to leaks. The current status of the piping system needs to be analyzed and appropriate action should be taken to ensure leaking is eliminated or at least minimized.

Irrigation

Using irrigation correctly represents the difference between having healthy crops and running out of water. We observed several unused plots in Drimiopsis that were being irrigated. This is an obvious waste of water which additionally creates more work for the farmers who then have to clean out the calcium deposits when they do plant. Being able to completely turn off sections of the irrigation pipes, or disconnecting unused sections of pipe are straightforward and simple solutions that reduce water waste.

We also noticed that there was not an even distribution of water through each line of pipes. The amount of water delivered to the plants slowly becomes less as they are further and further away from the end that the water is fed through. Although not the most critical issue associated with irrigation, it can be easily fixed. Instead of having the water fed down along the irrigation pipe from one side, it could be set up such that the water is fed through both ends. This would create a more even flow of water to all the plants along the line.

There is a calcium deposit issue in the irrigation pipes in both communities. In Drimiopsis we saw that there were filters being delivered, but there was no evidence of these in Skoonheid. Having a filter attached to the lines so that some of the calcium is removed before the water goes down the irrigation pipes and blocks the holes would be one way of preventing the clogging. This would enable the residents to spend their time more efficiently and only have to clean the filters every so often instead of manually unblocking each irrigation point after several uses.

One simple way to conserve water is to irrigate the gardens at either dusk or dawn. Irrigation done during the day results in water lost to evaporation. In order to minimize mold growth on the crops, irrigation should ideally be done at dawn. Another way to reduce water waste is to make sure the water application rate does not exceed soil absorption. If the amount of water being put on the fields is greater than the amount being absorbed by the soil

water will pool and evaporate off (Smith, 2006). To further reduce water waste, irrigation should be done to the depth of the plant roots, not to the depth of the penetrable soil. A table in Appendix N lists the depths of crop roots grown on the communities.

It is understood that management is a problem in the communities and that not all water problems can be fixed by technical means. The community must also work to avoid wasting water in any way possible and treat the given supplies with care in order to extend their use. The only way to enforce these ideas is to emphasize to the communities that by doing this they will improve their ability to eat and market their crops.

Storage

Proper storage is important to using water efficiently. The current dams in Skoonheid and Drimiopsis are not covered, thus exposing the water to evaporation. A simple way to fix this is to cover the dams with a tarp or other covering. This would prevent the water from evaporating and lessen the amount of contamination in the dams. We also observed leaks in the dams in Skoonheid, which prevents the storage capacity from being used to its fullest. All of the tanks and dams should be thoroughly checked for leaks. The leaks then need to be patched correctly or the storage container should be replaced. If a leak cannot be patched and the dam must be used it should not be filled to capacity as the added pressure will push more water out of the leaks faster. Filling a leaking dam wastes more water than if the dam was half filled and could potentially increase the severity of the leak.

5.1.2. Crop Planting

The primary source of both communities' livelihoods is based on crop production and sales. Thus improving the inefficient and inaccurate aspects of the currently utilized techniques would be greatly beneficial to the communities as a whole. Changes that can be made to crop planting methods range from ensuring soil health for planting to changing the specific types of crops grown.

Fertilization

There were many complaints from both communities about the soil in certain plots not being as good as in other areas. Some of the residents in Skoonheid let their cattle graze on the fields after harvest in an attempt to fertilize the land for the next planting. This concept could potentially be expanded upon. There needs to be more fertilizer used in the fields with poor soil. Additionally, the fertilizer would more effectively improve plant growth if it was mixed into the soil rather than just left on the surface. Some community members in both Skoonheid and Drimiopsis mentioned the use of ash as a kind of fertilizer. If this is, in fact, useful for crop production the communities need to ensure that they use the ash produced by all fires, including that from their cooking fires. The use of chicken and goat feces as fertilizer should also be taken advantage of as these droppings serve as a better fertilizer than cow manure (C. Peet, personal communication, May 7, 2009).

Technique and Timing

After the soil is fertilized, the ground needs to be shaped correctly to optimize productivity. Planting the crops in depressed beds helps to channel the water closer to the roots, thus minimizing water waste. Additionally, in Skoonheid, we observed a chart that describes when plants should be planted and harvested. This chart should be followed closely, as it describes the optimal timing for crop growth in the region.

By varying planting times, people can ensure that crops mature at different times. This will help food last longer as storage methods are currently not optimal. Also by varying planting times people will be able to bring their crops to market for a longer period of time, thereby strengthening their food security and avoiding market flooding.

We spoke to several residents of Drimiopsis who began to grow their plants from seeds in their home gardens before transplanting them to the plots in the fields. This technique would do well if expanded to all of the residents of both farms. This method is effective because it keeps the plants in a more protected garden while they are young, and places them in the less sheltered gardens only when they are strong enough to withstand greater environmental stress. One way to increase the efficiency of this method would be to use trays for transplanting. Trays are relatively cheap, can be reused, and make the process of transplanting much quicker. The spacing of plants is important to their success as well. Different plants have different optimal spacing; these specifications should be considered during each planting season. The feasibility of genetically selecting seeds should also be examined. By using seeds from plants that have given a high yield to plant the next crop, the overall success of the harvest can be improved.

The timing of harvesting should also be taken into consideration in an effort to improve cultivation productivity. Mature crops that are left in the field are prone to theft or damage from pests and therefore should be collected shortly after maturation.

Rotation

The concept of crop rotation should be taught to both communities. Although a few individuals did switch the placement of some crops each season, it was only a select few. Planting the same crop on the same section of land every year strips the soil of certain nutrients. Eventually that crop will not be able to grow on that land because the nutrients that it needs are no longer there. Conversely, different plants add nutrients to the soil while they are growing. Thus by altering the kinds of crops in each area, the soil will remain healthier and more able to sustain continual use. The current staple crops being grown complement each other; beans are nitrogen fixing, while maize consumes nitrogen. Therefore the rotation of these crops will reduce the rate of soil degradation. Other nitrogen fixing plants should be rotated with crops that use nitrogen.

Weeds and Pests

Without herbicides weeds will always be a problem in the fields. The amount of weeds can be lessened by removing them by the roots. This will make them less likely to grow back

and harm the crops. Fields that are not being used and become overrun with weeds promote the spread to nearby plots. As the unused field is not weeded the seeds are able to spread to the nearby fields and hinder crop production. A simple fix would be to make sure that all the plots, used and unused, are weeded or to ensure that the entire garden is being cultivated. There are several organic methods that could potentially be used to curb the prevalence of weeds. One such technique is mulching. This is when the ground is covered in an organic material that suppresses weed growth. If mulching is to be done, the feasibility of using locally available materials should be investigated. Importing mulch on a large scale would not be a sustainable practice. Landscape mesh could be used in the place of mulch, but do to high costs may not be practical.

Pests present another threat to crop production, therefore limiting the impact of pests on the harvest is important to attaining food security. One way to manage pests, such as insects, is to plant mint plants around the crops as a repellent. Soapy water solution offers another organic solution to the problem. Spraying plants with a dilute soapy water spray kills insects while leaving the plant unharmed. Honey and vinegar can also be combined to make an insect killing spray. Lady bugs offer a potential solution to bean aphid infestation as aphids are the mainstay of their diet. If lady bugs are to be used, they should be placed in the field at dusk to ensure they do not fly away. To curb the impact of rodents on crop harvests, fences should be built such that they extend underground to prevent burrowing rodents. Traps, already used by some farmers, should be implemented on a larger scale since trapped rodents can be used to supplement the diet.

5.1.3. Crop Variation

Especially in Skoonheid, there is a serious lack of variety in the large gardens. Growing only maize and beans adversely affects community health, soil quality, and marketability. Expanding the types of crops grown would be beneficial for the community as a whole.

Fruits

Very few residents of the communities grow fruits effectively. Fruit is an important part of a healthy diet, and as of right now, community residents do not eat enough of it. If the communities could start growing fruit on a sizeable scale it would greatly increase their nutritional intake. Income could also be generated from selling harvested fruit. Many fruits require large amounts of water or a humid climate in order to generate produce (Smith, 2006). When selecting fruit to grow, climate, rainfall, soil type, and plant vulnerability must be considered. Based on home garden visits and literature review there are several fruits that are able to grow in the climate of Omaheke. Guava is already produced in some backyard gardens, and its growth specifications, found in Appendix N, match those of the Omaheke climate. Other fruits that may be suitable for cultivation on the communities are lemons, sweet oranges and some deciduous fruit. Deciduous fruit might be hindered by the brevity of the cold season in which plants go dormant to “rest” (Smith, 2006). Fruiting cacti are already grown on the resettlement farms and could potentially be up scaled in order to make them a larger part of the diet. The production of melons already takes place in the irrigated gardens.

This practice should be continued with added encouragement to consume mature melons instead of selling them.

Vegetables

Vegetables are a necessary part of the human diet and must be consumed on a regular basis in order to remain healthy. A variety of vegetables are currently grown in the communities, predominantly in the irrigated gardens. As water is a limited resource the expansion of irrigated land in an effort to grow more vegetables may not be practical, especially in Skoonheid. The feasibility of producing dry land vegetables other than beans and maize should be explored. Crops that might be feasible are: Cassava, Cow Peas, Sorghum and Soybeans due to their low water requirement. In particular the growth requirements for soybeans are similar to that of maize.

5.1.4. Storage

There is a serious lack of effective storage in both Skoonheid and Drimiopsis. Families do store maize and dry beans successfully in Skoonheid, but they lack means to store other goods. In Drimiopsis they store crops by leaving them in the fields until they are either picked for consumption or sale. It would be advantageous for both of the communities to store enough food to sustain them throughout the year. The methods they have tried all involve mixing the crops with ash and putting them in traditional baskets or sacks. Having containers that keep pests out is one way that this method could be improved. Other methods of storage should also be explored. Some methods include pickling, jarring, drying, and salting. Through improved storage they would be able to eat more of their crops for longer and possibly be able to sell some of the crops when they are out of season for higher prices.

One storage method that was brought up by residents in the community brainstorming session was a cool box. A cool box was explained to us to be a wooden box surrounded by dry coals that, when wetted, cools the box down. This would then allow goods to be stored for longer. Jarring is another feasible storage technique. A wide variety of items can be jarred as long as they are suspended in a liquid. Proper training should be done if jarring is to be used as incorrect technique can cause food to spoil. The factors that need to be considered with any storage technique are, cost, effectiveness, risk, and the types of items being stored.

5.1.5. Sustainable Animal Husbandry

Livestock is a potentially lucrative undertaking, but there are restrictions to its success. If not monitored and controlled, livestock can cost more money to maintain than they can generate. Thus it is critically important that this form of income be sustainable from the beginning. Regardless of the risk, the consumption of animals can provide much needed protein and iron to residents.

Fodder

Both goats and cattle can eat the weeds and the leftover plants from the gardens. Making sure that this already existing resource does not go to waste is a simple way to ensure the health of the animals. Animals can also be put out to pasture to forage for food.

Land use degradation

Having many head of cattle use the same land for grazing can cause the forage to be consumed faster than it will grow back. To prevent this from happening, the herd size needs to be controlled and land management strategies should be implemented. Limiting herd size is difficult in Skoonheid due to the restrictions placed upon the government donated cows, as they cannot be sold or eaten. Current grazing practices in Drimiopsis incorporate rotating grazing land, hence making the practice more sustainable. Cattle graze for two weeks and then are moved to another location. A potential problem arises with this grazing system as plants are most nutritious to livestock before they have matured. During the wet season, grazing land should rest for 40 to 60 days and in the dry season two to three months of rest is ideal (Smith, 2006). In Skoonheid, animals are allowed to graze land until the land can no longer provide fodder. Grazing land management practices should be implemented in Skoonheid, especially due to the large number of cattle. By implementing a management strategy, the complete degradation of all grazing land may be avoided or delayed. The feasibility of cultivating pastures should be assessed, potentially tropical grasses, which do not require large amounts of water, could be grown in order to make the land more bountiful.

Breeding

All livestock should be bred towards their purpose. That is to say, if cattle are being used for mainly milk, then the cows that do not produce a lot of milk should not be bred. This will ensure that the herd will eventually produce a large amount of milk. This concept should be applied to the livestock in the communities in order to increase the benefits of keeping livestock.

Animal Products

Eggs are a great source of many important nutrients, including protein and fat. Both communities have chickens, but a large number of them are not contained in a coop. This means that there is a high possibility of eggs being laid where they cannot be collected. If the chickens were contained, the eggs would be more accessible.

The manure produced by goats and cattle could be used more effectively if it was collected from the kraals and used to fertilize the soil. Chicken droppings are also a nutrient fertilizer and should be collected from chicken coops. This is another reason the cooping of chickens may be beneficial for the communities.

In order to achieve the greatest benefit from practicing animal husbandry, the products of the livestock should be utilized to their greatest potential. Goat's milk is healthier than cow's milk in that it has been shown to prevent anemia and aid in the absorption of

calcium more effectively. Despite the health benefits, goats are milked on a limited basis. In order to realize the full potential of keeping goats, the milk from offspring bearing females should be collected and consumed while leaving enough for the kid to drink.

Once milk has been collected it can be cultivated in order to increase its market value as well as nutritional benefit and storage life. One product that can be made is cheese. Cheese is made by separating the curds of the milk from the whey and then aging the product. Other dairy products that could potentially be made are yogurt and butter. Butter is easily made and can be used to cook with, thus reducing the need to buy cooking oil.

Animal Disease and Health

Disease was mentioned as an issue that affects livestock in both communities. In order to fight the spread of disease, sickly livestock must be isolated from the herd. By doing this, the impact that a disease has on herd size and viability will be limited. Hygiene must also be addressed as an issue that affects animal health. Chicken coops, as well as kraals must be kept sanitary in order to prevent disease. This entails clearing droppings and providing clean drinking water and feed.

5.2. Marketing

The marketing of agricultural products and crafts should be improved in order to increase the flow of capital into the communities. Through developing trade routes and business relationships, this can be accomplished. Markets themselves are not static; the demand for a product varies over time. This fluctuation in demand means no single economic venture will always be a profitable one. The unstable nature of markets increases the importance of being able to produce one's own food. Basic living expenses create the need for revenue which can be generated through income generating activities (IGA's).

5.2.1. Access to Markets

The inability to get to viable markets is the biggest hindrance to economic growth in Skoonheid and a limiting factor in Drimiopsis. In order to alleviate the situation in Skoonheid, the government car that was taken away from them should be returned. As the car was taken away due to maintenance problems, a community member should be trained in vehicular repair or other arrangements should be made to maintain the car. Alternatively the transport system that is implemented in Drimiopsis, described in section 3.2.4, could be used in Skoonheid. Factors that would need to be investigated are, costs of transport, partition of truck space, finding a buyer, frequency of trips, and terms of use.

5.2.2. General Sales Practices

Once goods are brought to market they must be sold, a process that is not simple by nature. Prices must be negotiated and agreed upon. Ensuring residents have the skills to competently complete this process is important to the profitability of economic ventures.

Agricultural Products

More economically viable crops should be grown in order to increase profit from crop cultivation. Harvesting practices should also be altered to adjust for sales potential. The most obvious alteration that could be made is the timing of bean harvesting. Currently beans are dried while on the plant and then harvested, though they are worth more when still green. Beans should be harvested when they are fresh as this is when they are at their highest market value (Annie Steenkamp, personal communication, April 6, 2009).

Another measure that should be taken in order to improve agricultural sales is staggering the harvest. By staggering when crops are planted and harvested, produce does not all mature at once, which would flood the market. This would make it easier for individuals to sell cultivated products at a higher price. Storing crops through methods previously mentioned would also be beneficial to agricultural marketing as produce could be sold at a time of high demand, thus increasing profit.

Animal Products

The development of certain animal products, previously discussed, creates the opportunity for income generation. Certain barriers exist before products can be developed and sold including: quality control, storage, and marketability.

5.2.3. Purchasing Practices

The current purchasing practices on the resettlement farms do not realize the maximum value of the residents' money. Goods are bought after they have been marked up several times. In order to achieve the best value, items that are frequently bought such as soap, maize meal, oil, flour, macaroni, and rice, should be bought collectively in bulk. Although our impression in the community was that purchasing in groups would not be viable, it may be possible for close friends or neighbors to form buyer's groups. Money can be compiled and then goods purchased. By doing this, more food can be obtained for less money, therefore increasing food security.

5.2.4. Government Loans and Grants

In our interview with the Omaheke Regional Council, we discussed government aid available in the region. Specifically the council's food for work program, pay for work program, loans, and grants were discussed. As grants are given to operations that have already established, but need a boost, the leather making operation in Skoonheid would benefit from such a grant. The leather group is trained on how to produce belts and bridle and has made final products. A government grant could be implemented to aid in the marketing, up scaling, and transport of the product. A government grant could also be applied for to fix or replace the diesel pump in Skoonheid. The food for work program is a way that the clearing of bush could be sponsored. Despite the apparent attraction of these programs, these programs may contradict the goals of LISUP in that they give money for free rather than promote self-sufficiency.

5.2.5. Micro-Entrepreneurial Ventures

Entrepreneurship is a potential way to increase revenue generation for community residents. In order for a start-up business to be successful, it must offer a service or good that is superior and or cheaper to comparable services that are available elsewhere. Before an initial investment is made, the size of the potential market should be evaluated and a business plan put in place. These types of undertakings have proven to be successful even in impoverished communities. Examples of profitable projects are outlined in Heierli Poverty Alleviation as a Business (2000). One venture explained in this publication is the production of maize silos. Silos are produced from tin sheets and cost \$12 to \$63 US to make. Making silos is an intensive process that would require a large market to be profitable. Even if the silos could not be sold on a large scale, their production would benefit the communities. Smaller economic undertakings, however, may be more feasible.

One possible undertaking is maize grinding. Maize meal is eaten by almost all individuals in both communities. Though corn is grown in both locations, people do not have the ability to grind it themselves and so must sell their corn, then buy the processed product. If a person were able to develop a process to grind maize or obtain a hammer-mill, a sizeable market is already in place. The community would also not have to spend so much money on transportation to and from Gobabis.

Sugar is another commodity that is widely purchased on the resettlement farms. We observed sorghum being grown in some home gardens without irrigation. Sugar syrup can be extracted from sorghum and then potentially sold within the resettlement farms (Phillips, 1978). Cultural barriers may be a hindrance as the sweet syrup cannot be made into granular crystals.

Fat is currently an item that many residents buy outside of the communities. Transport increases the cost of oils and fats purchased outside of the farms. If an entrepreneur were able to cheaply produce fat he or she would gain an advantage over the market. Fats can be made from milk and oil can be extracted from corn with the use of enzymes. Both of these commodities are readily available on the farms (Larsen 1908). Soap production also offers potential for income generation as it is derived in part from fat. Proper training would be required as soap making can be a dangerous process (Browning 1999).

The launch of any business has inherent risk which must be understood before undertaking such a task. Despite this, the development of production systems or commodities already bought within the communities would be beneficial to both economies.

5.3. Education

In order to improve community knowledge about nutrition and other related ventures, residents must be educated. There are several means through which people could be taught.

5.3.1. Existing Community Resources

There are organizations and groups that are currently established in the communities that can be used as resources for education. These groups include: Community Based Resource Persons (CBRP), Stepping Stones, Schools, Volunteer peer Council (VPC), Adventures Unlimited, and health clinics. Information about nutrition could be incorporated into the curricula of these programs in an effort to improve dietary knowledge.

5.3.2. Expert Training

In the community brainstorm the participants explained that when trying to learn, they benefit from having personal interaction with an expert. The ability to ask questions about things that are not understood was mentioned as the biggest benefit. Having an expert on nutrition come into the communities and share their expertise with them would be an effective means of education. Some residents said they would prefer to have someone teach them about nutrition and then have a manual to refer to after the expert was gone.

In addition to nutritional training the community would benefit from financial training as well. Financial training should include information about tracking debt, selling goods, and buying goods.

5.3.3. Nutritional Manual

In order to educate the communities about nutrition, we have developed a nutritional manual. The manual is pictorially based as it is intended for the largely illiterate resettlement populations. The purpose of the manual is to help inform residents about nutrition in order to enable them to make more health conscious decisions about their diet. The manual first illustrates the importance of having a varied diet by explaining the uses of different foods by the body. The consequences of not having specific dietary items are then portrayed. Finally the negative impact of eating spoiled or rotten food is explained.

5.4. Community Based Monitoring

It is important for the communities to take ownership over their own nutrition and health. In order to help this come to fruition, each community needs to have its members become involved in the process. There are few very feasible forms of monitoring that the communities could perform.

5.4.1. Mid Upper Arm Measurements

Training some community representatives about how to test children for malnourishment with the use of a mid upper arm measurement is a simple method to empower the communities to assess the nutritional status of their young children. It is also a measurable and recordable way to monitor the overall health of the communities over time.

5.4.2. Weight Based Monitoring

Another, and perhaps more accurate, way to monitor the health and nutrition of the children and community as a whole is to use weight based monitoring. This type of monitoring can be graphed and thus the health of the children can be monitored visually over time. There are three forms of weight based monitoring that can be used: weight versus height, weight versus, age and weight growth charting. Each offers its own benefits and limitations. Growth charting is the most involved and most accurate technique. The other techniques are more easily implemented but not as accurate.

5.5. Conclusion

Through our research we have provided the DRFN and LISUP with tools and a fresh perspective on the food security and nutrition situation within Skoonheid and Drimiopsis. Our recommendations are geared towards sustainably enhancing the development of the communities such they will eventually become self-sufficient. Specifically, our recommendations aim to promote proper nutrition and thus improve the quality of life.

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Appendix A: Sponsor Description

The Desert Research Foundation of Namibia is a non-governmental organization that endeavors to “enhance decision-making for sustainable development through research, training and consultancy in the country’s land, water and energy sectors” (DRFN, 2008a). The DRFN plays a significant role in investigating, planning, and advising scientifically based projects on local and legislative levels in order to foster sustainable economic and social development in Namibia (DRFN, 2008a). Based in Windhoek, the capital city, DRFN employs roughly thirty-five full time workers and multiple part time workers including interns and students (DRFN, 2008a). Recently reorganized, the DRFN is split into six main groups, half dealing with projects, and half dealing with organizational duties. The three project groups are the Water Desk, Land Desk, and Energy Desk, headed respectively by Viviane Kinyaga, Erik Dirx, and Robert Schultz. The three remaining groups are Management, Administration, and Publications (DRFN, 2008b). The consulting division of the DRFN is known as the Environmental Evaluation Associates of Namibia. Run by John Pallett, this section works on engineering projects that put emphasis upon sustainability and mitigating environmental damage (DRFN, 2008c). The DRFN is supported by a group of Associates, and a Board of Trustees.

Currently, DRFN has over fifty programs in progress. Monetary support for these various programs comes almost entirely through the success of other completed programs. Research grants may also play a role in project funding (NamibWeb, 2009). Detlof von Oertzen, the former Executive Director of DRFN, has recently discussed the fact that donors are no longer being as generous as they once were, especially to non-governmental organizations such as DRFN who test “new and unproven approaches to community empowerment, often with few tangible outcomes”(Von Oertzen, 2007). In order to deal with this, the DRFN is implementing multiple strategies to guarantee tangible project deliverables, increase accountability, and rebuild donor trust.

The DRFN works with many other organizations, notably, the Gobabeb Research and Training Centre. As a joint venture between the DRFN and the Namibian Ministry of Environment and Tourism (MET), this organization is a model for “Government-NGO equal partnership” (Goabeb, 2009). In 1963, the Gobabeb Research and Training Centre became known as the Desert Ecological Research Unit (DERU). After Namibia gained independence, this organization had the opportunity to develop, and so created the DRFN in order to “apply arid-land expertise to environmental issues in Namibia and the southern African region” (Goabeb, 2009). This training center is internationally recognized for its desert research, and was honored in 1997 as a Southern African Development Community Centre of Excellence (Goabeb, 2009). This organization could be quite helpful to our project as it can provide expert information on arid-land and environmental issues and research. The Gobabeb Research and Training Centre gets funding through the DRFN and “Friends of Gobabeb” (NamibWeb, 2009).

The Livelihood Support Programme is one of the newer projects being undertaken by the Land Desk. In the resettlement areas of Drimiopsis, Skoonheid, Donkerbos-Sonneblom,

and Arovely, this project endeavors to empower people to increase their level of socio-economic development so as to decrease poverty and hunger and create sustainable living conditions. The DRFN must collaborate with both the governmental agencies and project beneficiaries for this goal to be successfully realized. The donor for this project is the Spanish Development Cooperation. The goal of this organization is to provide aid to the poor and support programs which foster equality and environmental responsibility (Spain, 2002).

Other project partners are Ida Erasmus, a consultant on nutrition, the Ministry of Health and Social Services, the Namibia Agricultural Union, the Namibia National Farmers Union, the Ministry of Agriculture Water and Forestry, and the Ministry of Lands and Resettlement. The Ministry of Health and Social Services will give our team access to over “1655 health and social welfare related books including reference books”, journals, and research reports (Republic of Namibia Ministry of Health and Social Services, 2002). The Namibia Agricultural Union, headed by Raimar von Hase, is a group which represents about 2000 non-subsistence farmers (Namibia Institute of Technology, 2007). This group could be useful in educating us as to appropriate farming practices for the region, and what has been tried before. The Ministry of Agriculture Water and Forestry will hopefully be able to answer any legal questions that we may have such as policies and laws. The Ministry of Lands and Resettlement may be very important to our team in that it can provide information on the San, why they were placed in the particular region, and current conditions and research. Overall, these project partners will be crucial to our understanding of the Namibian resettlement programs, agricultural techniques, and the nutritional situation of the San beneficiaries.

Appendix B: Key Informant Interviews

Tim Downs – Community Based Development

Interview Protocol:

Participatory Methods

What are some benefits of PRA?

In your opinion, what are some of the best methods of participatory analysis to obtain input from underprivileged people?

Is there a generic protocol you have developed in promoting sustainable communities/development or is it necessary to take on each case as an independent entity? If so what is the general procedure?

We are limited to two to three weeks in the field. In your opinion what would be the most effective use of our time in terms of gaining an understanding of the situation and consolidating public opinion?

As students at a very “technical” school, a big constraint on our abilities to conduct anthropological research is our very technical approach to problems. How should we approach the non technical side of our project to ensure things such as cross culture misunderstandings do not undermine the validity of our findings?

Application of Methods

Our project requires us to make recommendations to a group of people who have, due to social conditions, low self esteem and therefore could possibly take offense at even the most well-intentioned assistance. Do you have any suggestions of methods that we could use to interact with these people without insulting their pride?

As outsiders, we anticipate it will be difficult to develop trust with the San community. What have you found to be the best way to gain the trust of a population?

From our research, the best two methods for determining the opinions of the San people are through use of focus groups or personal interviews. From your experience, which of these methods would be most effective for our project?

What are some obstacles we can expect to face in conducting one on one interviews with indigenous people?

Sustainability

What have you found to be an effective way in communicating the philosophy of sustainable development to communities that are not familiar with it?

The community of Skoonheid is composed of around 400 people who don't have a formal governing agent or a common historical background to tie them together. How much of an issue can we expect this to be and should we address this issue in trying to aid the community with food production?

Can you tell me about your experience with water supply systems in impoverished arid regions?

Health issues

The San are currently living of a diet predominantly composed of corn porridge with meat on occasion (once per month). Based on this limited diet, how has your experience shown this to effect childhood development?

Based on your work what are the more effective strategies to empower a vulnerable community in order to address malnourishment and hunger?

Closing

The project we are dealing with is..... With your expertise and experience are there any other concerns you have or areas you think we need to explore.

Is there anybody else you know that you think we should talk to that would be helpful with our project?

Interview Notes:

What are the advantages and disadvantages of participatory research methods?

Helps researchers to better understand problems and gauge solutions

Major challenge: how to access local populations

We must initiate dialogue and then listen to responses

Know accepted ways of meeting and conversing with people in the target culture

Account for community stratification: pay attention to those people who are not talking to you and ensure to try to gain their opinions

These are likely the people whose voices are heard the least

Earn the respect of the people

Demonstrate good will: help with a small unrelated community problem

People like to see tangible benefits

How can we best use our limited fieldwork time for the greatest benefit

Talk to a wide range of people

First week: introduce and assimilate ourselves

Listen to what people have to say: perceptions of problems

Have open meeting that are guided toward our project objectives

Determine what kinds of environmental problems the people experience

Ask what causes food shortages

Ask what the people believe are the most important health issues in the community

SPEND MOST TIME LISTENING!

Explore the area

Take photographs

Assess local resources

Agricultural practices

Water Sources

Environmental Conditions

Gather as much relevant information as possible

Community Mapping-> know where everything is!

What can we do to help focus on the “non-technical” aspects of the problem

Build trust and have listening sessions (if appropriate for the region)

Don't be technical in the field!--> data analysis can be completed in Windhoek

What can we do to gain the trust and respect of the San people?

Since theater and skits are an important part of African culture—this might be a good ice breaker for the community

Lets the community see who you are

Potentially introduces humor

Help them understand where we come from and our culture

Bring pictures of where we come from and what we do

What are some obstacles that we may hit in a personal interview situation?

Biggest challenge is trust

Avoid excess or unwanted information → stay on topic

Translator should be able to sensitize us to the community

Manage expectations → Don't promise too much: undersell and pleasantly surprise

What are the disadvantages and advantages of using focus groups?

Group dynamics may mediate what people reveal

Mix individual and group sessions

More efficient in hearing more voices

What methods do you recommend to help empower the community to help solve their own problems?

Look at our goal as to “facilitate something that which wouldn’t happen otherwise”

We should creatively develop many solutions

We should not push a certain alternative

Have locals vocalize their opinions on each alternative

We should recommend the most feasible project that the San approve of

This will best yield a sustainable future for our project outcome

Interview Transcript:

BURFORD: Ok so our first question, our first series of questions are about the participatory research approach. In your experience what is the theory behind using this approach and what are the benefits of using the participatory research approach?

DOWNS: Umm. Well the I guess the theory is to understand a lot of the development in the environment that we worry about you need to have an active engagement and dialogue to people who are exposed to these problems directly so that’s a scientific justification for gathering info from people who know best or most about what the environmental condition is like. Did you ask about benefits?

BURFORD: yea benefits

DOWNS: Challenges

BURFORD: and challenges

DOWNS: so the benefits are that you get a more complete picture of the context in which these problems occur and what these people worry about which may not be what you perceive. And that’s particularly important for the action participatory research that you are doing. What are the needs of local people what the priorities and how do I respond to that. And the challenges are as basic as access how do you gain access to local people to begin that dialogue and then how does that dialogue actually happen. This is particularly important when your setting is different from your own culture. What are the accepted ways of meeting people and conversing with people and talking to people? sometimes people some certain people will be excluded from that process so you may have to approach local leaders first or you may be able to engage with certain people of the local community but others may not be represented something you should be aware of in any community there are people who are more or less powerful in those communities and those who are less powerful are often because of that situation they are the most vulnerable to issue of food security. Nutrition will not be necessarily be equally distributed amongst the community.

BURFORD: so gauging the perspective of everybody in a community seems to be a problem

DOWNS: rite yea how do you do that so often when you go there and have your first meeting what you’re interested in is who is not at the meeting who is not represented because they may sometimes be the more vulnerable groups. So that’s part of the challenge the community is not a homogenous entity it’s comprised of lots of different classes different levels of power. Um challenges, I guess at a very basic level is how do you gain the trust of the local people you may be living there for a few weeks two weeks.

BURFORD: three weeks.

DOWNS: Gives you more of an opportunity to do that. But building trust is not something to be taken for granted. And id say in a practical sense the best way to do that is try to demonstrate some kind of

benefit as early as you can if you go there and say were going to produce this report in six months and your basically asking them to take that on faith that in six months you're going to have something useful. You may want to try and do others things that um just helping in the community helping out around the community so people can see these guys are trust worthy and serious and their well intentioned. So that they can see some kind of benefit some tangible benefit.

BURFORD: trust is very important

DOWNNS: Otherwise they'll be not really sure whether they can trust you or not.

BURFORD: ok so trust is very important and being active in the community and engaging and interacting with people is important to build that trust. Our next question involves time management. We're only going to be in the field for three weeks. We wanted to know in your exp what would be the most effective use of our time in terms of gauging an understanding of the situation and consolidating public opinion and really gaining an understanding of the context of the problem?

DOWNNS: I would say talk to as many people as you can. Will you have a translator (YES)? Initially the first week your just touching down its time well spent just introducing yourself so they know who you are you're not these strange people walking around. I would say listening, having meetings that are structured in the sense that you have specific questions you're interested in. They shouldn't be very long drawn out questionnaires it should be more like a listening session less like an interview. In other works there are few questions in the issues of food security and nutrition that can open up a session. What you're trying to do is listen to people's perceptions of these problems. Maybe what they do or what kinds of things they do in terms of the kind of food they grow the kinds of environmental problems they experience droughts. If its food security and nutrition what your really trying to get a handle on, how do these, how is it that people perceive these shortages happen? What do they perceive as the cause of theses shortages? Is there not as much rain as their used to be or now there are two growing seasons instead of three or the land is not as producing as well for some reason. So you're trying to get peoples you're trying to understand the perception of these problems and that would be a very good use of your time. To basically try and understand the way people perceive these issues.

BURFORD: really do a lot of listening while we are there

DOWNNS: listening but you have an agenda you have goals for these listening sessions and you want to steer it in that session. I would say after you've had a few of these listening sessions, there're like interviews but there not sitting with someone and going through a list of questions. It's more informal and I think that would work better. And after you've have a few of these, maybe four five six, you may want to just keep looking at these results to see if there are any patterns In what people are saying or differences. You're also going there as researchers trying to find out what are the kinds of factors that people seem to perceive are causing these. And you know as researchers you are going to have some sense of whether they 're accurate perceptions or not because ultimately you want to provide some advice or recommendations and those can simply be predicated on people's perceptions because there may be other things at work. I would say divide your time most of your time I think should be in getting to know people gaining trust listening gathering this primary data. Also you want to I would say explore the area. Take a lot of photographs do some of your own assessment what are the local conditions.

BURFORD: survey the land.

DOWNNS: yea obviously one of the most important things is sources of water. Water scarcity, agricultural practices, soil erosion, desertification this is a desert region rite. This issue of scarcity of nutrition presumably it is something that has changed, maybe things are getting worse. Is this you're understanding or has it always been bad?

FAVREAU: it's more that they were, the people we are working with are the san. For thousands of years they were hunter gathers they were never good with agriculture and they're in a place where farming isn't easy to begin with.

DOWNS: because they've been resettled

FAVREAU: yea they've been resettled

BURFORD: they're lifestyle has been sedenterized when they used to be nomadic.

DOWNS: ok so part of what you want to find out is a lot about environmental conditions because you're going to want to be able to make suggestions about types of farming types of agriculture crops that might do better. That might involve literature reviews and things you do before you go and after you come back. But the more you can gather on the ground; this is the golden window of opportunity you're going to be there for three weeks four weeks gathering as much relevant primary information as you can. I would mix it up; like that do a lot of walking surveys. You can do some community mapping, which would be a good exercise. You can have rep. of the community actually map out where they're fields are where water is where water holes are where particular boundaries are. I have actually an example of something I'm going to do in class tomorrow that's a map of a livelihood strategy. The complexity of livelihood strategies you might want to try and put together some kind of model or map.

BURFORD: o wow this is great.

DOWNS: I can make a photo copy of that.

BURFORD: o yea that'd be really useful to us actually.

DOWNS: so there's sort of [a pictorial tool], particular because you were saying earlier john, literacy is an issues you want to do pictorials of course this gives some kind of special dimension to things. What we're also interested in is how things change over time. You'd like to be able to have some way of saying do things stay more or less the same over a year or do things change over the year or years.

BURFORD: There's a brief rainy season but most of the year things are dry.

DOWNS: what you get into here is back to water. There might be ways to manage water during the rainy season. Can they collect the water and store it and use it during the year to extend their growing season? Food security and agriculture is tied ultimately to water. What people can grow is based on water and location. I guess what I'm really saying is you guys really need to have a really good handle on how the way food is currently produced. With the issue of soil, water, soil erosion, and problems of water availability. Those are things you might be able to change or manage. There's not much you can do about climate. Those things are things you can make suggestions about. I know I'm taking a long time to answer your questions.

BURFORD: no no this is useful info a lot of what you're saying covers others questions. Our next question is we talked to our sponsor he had read our proposal, our description of our problem and he said our approach was very technical and we wanted to know how we could address the non technical side. How we can avoid cultural misunderstandings or things that would make our findings less valid.

DOWNS: yes that's a good question. What I was saying earlier about some of the challenges. It speaks to that same issue of building trust conducting listening sessions is very low tech way of doing research but it's appropriate. So you're not going to be able to do very much unless you invest in having meaningful conversations. If you can't, that's the number one thing, if you don't do that you've closed off any information that could have been provided to you. Plus there's not going to be receptiveness to your

results. In the field work the emphasis needs to be on building this trust and building communication. Any other technical things, accessing water availability soil erosion things like that are secondary. I think there both important things. I think the mapping is a way to bridge those two. This is not high tech it's basically building a model. And uh I think everything that we do, engineers or scientist Understanding the local context understanding how these factors interact the relationship between human beings and their environment you're showing different livelihood strategies. And what you'd be trying to do with such a picture is use it as a way to engage people in a dialogue. So I would agree with the liaison to emphasize on the engagement piece and use appropriate methods to do that.

BURFORD: : our next question you already kind of addressed is about developing trust in the community in addition to being involved in community activities and helping out in the community and trying to build relationships with individuals. What are other ways to build trust?

DOWNS: Well one thing that comes to mind, in many African cultures theater or some kind of play or performance, well you guys may not have experience. (Laughter) How many of you are going (four) I think some kind of skit that helps explain where you come from or what culture is like. I think that would really go down well in African societies in my opinion works pretty well and can be very amusing even when you don't mean it to be. I just think that kind of putting yourselves out there and letting the community see who you are is the most important thing that would go a long way. People just kind of thinking these guys are kind of interesting and at least appear to be trust worthy. That's the only thing I can think about on top of what we already talked about. Because you're building a relationship and your coming from a very diff culture that they have some understanding of but not very much. Doing in the same way that, your there to try and understand their culture anything you can do to help them understand your culture would help to build a bridge. I would take pictures. I remember being in Latin America in very remote areas taking pictures of my home town, people were just very interested.

BURFORD: sharing as much as we can about ourselves. Our next question: What do you think are going to be some obstacles or challenges we will face in conducting interviews or the listening sessions?

DOWNS: I think probably the biggest challenges probably; well it all comes back to the trust issue it all hinges on that. If they don't have the beginnings of a trustworthy or feel that your trust worthy it's a waste of time. But you can build that, I think sometimes the practical challenge can be if you're in a listening session that's deliberately not structured people can go off on tangents about information that's not really relevant. How do you bring it back to where it will be helpful? I'm assuming the translator and others will help sensitize you about the culture and things you should and shouldn't do in terms of greetings. Is that he case?

FAVREAU: I hope so, we don't really know who were going in the field with but there's going to be somebody

DOWNS: the other thing I guess is managing the expectations you don't want to promise too much this is a short amount of time. Be very mindful about not promising too much. Ones urge or instinct is to over sell you want to undersell and then people will be pleasantly surprised that you're able to produce more.

BURFORD: how do you feel focus groups or group discussions could be useful to us or what are the benefits or drawback of group interviews.

DOWNS: well whenever you interview in a group what they say is mediated by group dynamics. I may say something to you on my own but in a group I may not say the same thing. I think both things both types of things could be useful. You could do listening sessions with groups which may be more efficient. You may want to do some individual sessions as well. What was the other question?

BURFORD: just the advantages and disadvantages of using group interviews.

DOWNNS: well the advantages would be its more efficient in terms of capturing more voices .disadvantages is it's mediated by whatever that group dynamic might be. The info you'll hear may not be completely true.

BURFORD: One more question. Based on your work what have you found the most efficient strategies to empower a community to solve their own issues? Really give a community a sense of project ownership

DOWNNS: I think it goes back to basics. Basically your role is to facilitate something that would otherwise not happen. You're facilitating some kind of creative thinking about the nature of these problems. What are the alternative ways? You shouldn't like push one alt over another. You should collaborate with local people to explore alternative solutions. And that's actually something in your listening session you should begin to do people can tell you about things. The problems they worry about and what the solutions might be. And then when you do your report or compile something that will be very valuable is looking at alt solutions. What are the advantages disadvantages of each? So you're getting info from local people and you're putting your critical minds and information from your assessment of literature to expand possibilities of a more sustainable future basically opening up the range of options beyond what is currently there. I think people once you give people options that are actually viable practical that's a big contribution. Leave it up to them to decide

BURFORD: thank you so much for your time. Can you recommend any other people to talk to?

Professor Barbara Thomas-Slayter senior research professor done a lot of work in Africa email her. You might try and contact her and see if she's available to meet with her she's got more exp than anyone else here.

Barbara Thomas-Slayter – PRA Expert

Interview Protocol :

We were told to use PRA methods in our research, but we're still hazy on how to apply it to our situation. Do you have any suggestions?

What ways do you suggest that we make the community feel comfortable around us?

*Mapping exercise – It was suggested that we do a mapping exercise to get the San involved, and to help us understand how they see their community?

Because of their reportedly very low level of self esteem, we want to show the San that we respect them and their way of life. Do you have any suggestions on how to conduct ourselves to show this?

Are there any barriers that would prevent us from interacting with women, and how can we make sure their voices are heard in a society where they do most of the food work yet receive very little respect?

What would be the best way to gain women's trust?

How can we make sure that women's nutritional needs are taken into consideration?

Using the documents that we were supplied with, it seems that there is no definite hierarchy in the community. How would we go about determining who makes what decisions, especially those about food and nutrition?

How do we overcome the fact that there is a lot of petty social interaction such as bullying after town meetings that cause people to not speak out in groups, or to later rescind their statements?

Example: They don't share knowledge but hoard it for money, they don't share resources, they expect other people to do the work, etc.

Interview notes:

- Impossible task
 - o Send 4 juniors to convert pastoralists into farmers
 - o Food security is something we should focus on
- Lots of detective work
 - o Likely that a few households have taken up farming
 - Interview those people
 - How do they grow food
 - Are they willing to help the other people in the community
 - o Divide study into 2 pieces: Nutrition and Food Security
 - o Use PRA methods!
 - o Good film to copy and watch
- Conducting focus groups
 - o Age/gender groups
 - Women
 - Men
 - Youth groups
 - o Using stones
 - Types of foods
 - What is useful
 - o Interview pre-existing groups
 - Interview people from each section of the area
 - Try to randomly interview parts of each area
- Food
 - o Food from outside may have been brought in
 - Don't know what to do with them
 - o Use of veldt foods
 - Indigenous knowledge can be extremely useful
- Resettlement project in Kenya
 - o Discusses resettlement problems
 - o Not taking traditional knowledge with you
 - o Agricultural to agricultural
- How to make the community feel comfortable
 - o Don't work without talking to who's in charge of the area
 - Letter of authority
 - Get permission
 - Validate your preference
 - o Be clear on why we are there
 - What we hope to do
 - What we are trying to accomplish
 - o Try to see if there is a meeting that we can be introduced at
 - o Talk to governing committee first
 - First thing we should do!
 - Ask that DRFN to tell the San that we are coming
 - Establish credentials

- Tim Downs idea: play
 - o They would love dance
 - o Music or sing
 - o Show interest in their culture as well
 - o Provide entertainment of some sort
- Other ideas
 - o Bring soccer ball or baseball caps
 - o Plan something at the end of our stay
 - o Sponsor a goat roast
 - o Effigy of Gompei?
- Start with informal acquaintances
 - o Important people
 - Church minister
 - School Master
 - Local health person
 - Leaders of local groups
 - o This will help to get a better understanding of the situation
- Problems with us eating near them
 - o Have a meal in the morning and late in the evening
 - o People may share food
 - o Be careful of water
 - If in doubt—boil it
 - This is the most important thing
- Talk to different groups
 - o Express interest in speaking with women
 - Girls talk to girls
 - o Will often lead to children and children's health
 - Often connected with poor sanitation
 - o Ask what other people eat (indirect questions)
 - This avoids embarrassment of the interviewees
 - o Interview people indirectly
- Compare to similar communities
 - o Visit better developed communities nearby
 - o See how they have solved similar problems
- More interview information
 - o Interview guy to guy and girl to girl
 - o Larger group interviews can be performed by all 4 of us
 - o If there is a religious center nearby we should visit
 - o A lot of things will not be determined until we get to the field
- Advise for field work
 - o **WRITE DOWN EVERYTHING**
 - o Do this every day
 - o Keep an extremely well written field notebook
- Data analysis
 - o Keeping track of interviewees
 - Approximate age
 - Relationships in family
- Community mapping
 - o Find translator in community
 - Pay?
 - Give gifts?

- Travel in pairs
 - Different pairings: male-male or male-female or female-female
- Other methods
 - Timelines
 - Work with local people
 - We will have to be creative
 - Use sticks and stones on the floor
 - Responsibility lists
 - Food availability
- Have an interview format before we travel
 - Work out basic questions ahead of time
 - Example in paperwork
 - Change interviews once in Namibia
 - Narrow down to the most important (15-20) questions
 - Make sure we write EVERYTHING down each evening
- Words of advice from other student
 - Shoot San an email
 - Call their cell phones
 - Contact San organizations in Windhoek
 - See if poly or university of Namibia are doing research on the San

Albert Fosso – Agricultural Expert

March 25, 2009

Interview Protocol:

What do the San eat?

What is their nutritional status?

What are the nutritional values of plants grown there?

What are the nutritional values of the veldt foods?

What other plants could be grown there?

What problems do you see in the community in regards to food?

What nutritional health issues does the community face?

What plants could be of use to treat these health issues?

What is the San perception of nutrition?

How do we educate people on nutrition and horticulture?

What plants store well and how are they currently stored?

Crop rotation and its benefits and feasibility?

Interview Notes:

- What are some methods you've seen used in communities to enhance nutrition and food security?
 - Soup potatoes which are rich in Vitamin A help to reduce Vitamin A deficiencies

- Solar energy powered water pumps for an irrigated garden
- 80% of vegetables in Namibia come from South Africa
- About 35% of Namibians live on a Namibian dollar per day
- Composting → accelerating with worms
- Diversification to maize and beans—meat isn't enough
- Production is required in addition to nutritional education in order to promote a balanced diet
- Many of the people in the communities are willing to try new crops, but people need additional training
- Electricity is also a limiting factor to agricultural production
- It is better to ask people “What do you want to eat?” as opposed to saying “you should eat this” → there are some things people don't like to eat
- What kind of workshop could be helpful in the communities?
 - Nutritional education programming
 - Spinach should be promoted as it contains Vitamin A, folic acid, Vitamin C, Magnesium, Iron, Calcium
 - San people get enough protein but not enough vitamins and minerals
 - Lines in eyes, especially in children, are representative of a vitamin A deficiency
 - Indigenous vegetables are very high in nutrition
 - Basic eating guidelines
 - Eat 3 times a day
 - Eat fruits and veggies
 - Eat a little meat daily
 - Give examples of spacing and fertilizer use (showing is better than telling)
 - Give examples of growing something and show success—successful achievements will catch on in the communities
 - Training should also be completed with communities as a whole
 - A good demonstration would grow seedlings before we leave the field
- Discussing marketing
 - Find the market before food is produced and make arrangements for sale on the market
 - Preserving skins for drying and leather making
- General practices
 - How to effectively store seeds
 - Frost protection and prevention
 - Cattle drink a lot of water
 - Too many cattle will lead to a water shortage
 - People also eat healthy veldt foods such as mahango beans, sorghum, also grown via dry land farming
 - Money is there but the knowledge of needs and implementation is lacking in communities

Ida Erasmus – Nutritional Expert

March 26, 2009

Interview Protocol:

What problems have you seen in rural communities in regards to food?

What things are they missing in their diet?

What nutritional health issues does the community face?

What is perception of nutrition in rural communities?

Are there plants could be of use to treat these health issues?

Can you tell a person's nutritional status by simple observation?

What kinds of things can we look for that would indicate specific kinds of deficiencies?

Have you ever tried to communicate ideas about nutrition to an indigenous population?

What methods did you use?

Interview Notes:

- Maramba Beans
 - o High in protein
 - o Doesn't need much H₂O
 - o Indigenous to the area
- Has been to Drimiopsis, Skoonheid and Donkerbos
 - o Poorly nutritious foods
 - o Lots of alcohol
 - o Social problems cause poor nutrition
- Social problems
 - o "group pressures" affect people—Those who don't work pressure those who do for money
 - o Many San are hesitant about accepting help due to past history with resettlement
- Food Issues
 - o Most people eat starchy foods exclusively → no protein, vitamins or minerals
 - o The body can adapt to the foods that it is given
 - o There are some cultural issues that reduce the possibility of introducing fruits and other foods
 - o Vitamin A can be obtained by orange fleshed sweet potatoes but these potatoes cant grow in the local climate
 - o Most fruits and vegetables in Namibia are from South Africa and are therefore quite expensive
 - o Food markets are manipulated by the government to make Namibian products cheaper
 - o In Mariental- melons, dates, oranges and grapes are grown Only place in Namibia
 - o Need to overcome the cultural issues related to meat
 - o Butternut squash may grow more efficiently in Namibian sandy soil
- Manifestations of nutritional deficiencies
 - o Vitamin A- Brown spots in the eyes (especially in children)
 - o Vitamin B- Skin becomes rough and peels
 - o Vitamin C- Can present as sores in the mouth
 - o Vitamin D- Issues with bones and rickets
 - o Iron- Can be a problem if people don't eat enough meat
- Appropriate fieldwork techniques
 - o Be aware of who and what you teach things to
 - o Be aware of what makes people feel uncomfortable
 - o Forget your own views and focus on the views of the local people
 - o Focus on building trust and confidence
 - o Projects tend to work while they are being facilitated but fall apart soon after the facilitators leave
- Cooking and nutritional perceptions
 - o People lack basic ideas of nutrition

- People simply eat when hungry → no thought as to what is healthy
- Many residents refuse to eat spinach
- Hibiscus grown in Skoonheid, very nutritious, eaten in a soup
- Carbs → energy
- Protein → building
- Vitamins and minerals → protection for body
- They eat root mash made from a tree
- Many indigenous foods don't have known nutrition
- Community
 - Flatter them about their knowledge and culture
 - Ask for a tour, show us what they have and know
 - Have the ladies show us around their houses
 - They go to Gobabis whenever there is a life, buy maize, oil, alcohol
- Orange fleshed sweet potatoes for vitamin A
 - Sweet potato mash in maize porridge
 - 52 days of ½ cup in maize per day in Lesotho
 - Vision, concentration, and vitamin A levels improved wonderfully
 - Test for concentration: say something to a kid and ask for him to repeat it back
- Advise:
 - Sustainability is key
 - Training is key
 - Train people well that are going to stay in the communities (residents)
 - They can help keep the project going
 - Passion for the success of the project
 - Think simple for the ideas for the project

Marjorie Van Wyk – Ministry of Health

March 27, 2009

Interview Notes:

- Omaheke is different than all regions in Namibia
 - Cattle farming, not produce
 - Botswana link
 - Meat and sour milk
- We need to have them define nutrition
 - Food security does not equal nutrition
- Poor communities, mainly work on someone else's farm
- Projects tend to die after the project initiators leave
- Very little nutritional info exists in Namibia
- The only nutritional works in about kids
- What types of programs do they want and need
- DRFN has existing data about veldt foods
- Naturally occurring fruit trees can be a good step towards food security
- Preservation – current forms?
- Only the cash value is recognized
- Difficult to monitor nutrition
 - Children are vulnerable, thus there can be quick changes that can be recognized
 - Adults are difficult to monitor for changes
 - Children can only be monitored if weighted regularly
- HIV – community volunteers based at facilities

- Home-based care givers – 5+ patients monitored at home
- Community leaders need to be used to monitor the community health
- Ministry of Health (MoH) is mainly concerned with only severe malnutrition
- Mothers are trained in the basic needs, do's and don'ts of well being (hand washing, activity, feeding children, etc)
- MoH trains NGOs that then work with the communities
- Faith based organizations in Omaheke
- Mother training
 - o Breast feeding
 - o Solid food at 6 months
 - o Variety of foods, food density
 - o Issues between 3-6 months that don't have training of mothers due to lack clinic visits
- Nurses aren't being trained fast enough and not being taken up into the field. Many leave for other countries
- 5 major diseases in children:
 - o Diarrhea
 - o Pneumonia
 - o Malaria
 - o HIV (sometimes)
 - o Malnutrition – effects all above
- San are worst off due to isolation, slave-like conditions in a lot of areas
- Very limited access to medical facilities due to long travel and limited facilities. Only one state hospital and about 13 clinics in the region
- Clinic provide basic health service
 - o Diarrhea
 - o Growth monitoring
 - o Pre-natal care
 - o Family planning
 - o Not supposed to do deliveries, but will in an emergency
 - o Not supposed to set up outreach
- Health facility committee
 - o Head of community
 - o Teachers
 - o Nurse
 - o It finds out how the community and the MoH can help
- For about 3,000 people → 65 children in the area
- Drimiopsis has a clinic, do talk to them to get nurse involved
- Skoonheid, not sure about the clinic
- Diet variety in the area is very limited
- Alcohol abuse is a national issue. Cheapest drink available is alcohol, thus more affordable than needed goods
- Flora is different allover country, due in part to rainfall
- Vitamin A and iron issues in Namibia
- More rain has more plant and those communities are more likely to eat variety of foods
- Guideline to take, nutrition and HIV never got too far with guideline promotion, no education materials yet produced/used
- Mid-upper arm circumference
 - o Fast and simple
 - o Arm band with color coded sections
 - o Can be difficult if not trained
 - o Give arm bands

- Vitamin A supplementation:
 - o 1 capsule/6 months
 - o Supposed to be given to all children on the clinic level
- Difficult to see/know deficiencies such as vitamin A and eye effects
- 24 record, gives a good sample
 - o Identify which of the 4 food groups
 - o Sense of how diverse diet is → explore perception of nutrition and food security
- Leave preconceived ideas behind
- Find a way to ask about alcohol, do they perceive it as an issue?

Kathryn – Omaheke San Trust

March 30, 2009

Interview Protocol:

What do the San people in the community typically eat?

How many meals do the San typically eat per day?

Where do the San people get the majority of their food?

Do the San commonly consume any fruits or vegetables?

If so, which ones?

How often do the San eat meat?

What are the storage methods they use?

Do you know of any San perceptions regarding nutrition?

What knowledge of nutrition do they have?

What nutritional deficiencies do the San have?

Are there any clinics that visit the resettlement camps frequently?

Do the San in the Omaheke region have any existing connections to market?

How do San crafts or other goods get transported to market?

Have the San people had any training or experience with bartering in a market?

What knowledge of finance do the San people possess? (counting money, Simple math)

Interview Notes:

- doesn't know much about Skoonheid and Drimiopsis
- of the communities that she does know:
 - o they don't eat much meat, poor
 - o drought relief - ~10-12 kg maize meal, oil, and canned fish
 - o bush food

- Storage methods – unknown, dry foods mainly
- Idea of nutrition:
 - o Not really, if they have money they just buy sugar
 - o Basic knowledge of what can make you well if sick, but not what should be eaten to sustain
- Education
 - o Short sessions with food
 - o Education about HIV & AIDS, just touching on nutrition
 - o Make sure its fun
 - o Diabetes
 - o Only have knowledge and acknowledge of TB
 - o AIDS and HIV isn't talked about
- Day to day concerns of just eating not eating specific things
- Food security before nutrition
- Clinics
 - o Mobile clinics are quite limited
 - o Supposed to be once a month, but not the case
 - o Random checks
 - o HIV out reach programs
- A lot of good ideas and policies, but ut never makes it down to the people
- Community
 - Chief is supposed to be quite powerful
 - San chiefs get out “played” by other chiefs. Supposed to be policing
 - Omaheke chiefs are not recognized by the Namibian government
 - 2 chiefs – one male, one female
 - o Male: quite, but respected, in the north
 - o Female: apparently kind of corrupted, in the south
 - San council exists, doesn't seem to be any other group
 - All communities seem to be on the same poverty level
- In Donkerbos
 - o Goods (produce) bought for the community thus sold at a lesser cost for the San Trust pays for the initial shelving, then its pays for itself
- On a whole: don't like working together, worried about the others success and group failure
- Excess goods to be sold was facilitated by LiSUP
- Kathryn used to bring the goods in and sell for the communities
- Bad at bartering, will take whatever price offered to just get the cash home.
- Education of money would be very useful
- Education is the number one thing that the people need
- But they can't due to the need for transport, schools won't take them because they don't have to pay as the government says they would for them
- The children get picked on for not dressing (uniforms) the same
- Parents/families can't do anything to speak out
- There is a serious racism issue in the communities and schools
- “capital punishment” → hitting etc is supposed to be illegal, but it happens in the schools, thus causing kids to drop out of school
- Obviously and guaranteed source of healthy food would help so much in every regard
- Monitoring
 - o Journals etc would work only if there is a positive outcome due to the process
 - o Persistence of hand-out system
 - o Questions about telling the truth when asked what they ate
- Hattie Wells :

- Down in the south
- Has done some work in nutrition in the populations
- Stella knows her contact information
- Are they happy with their way of life and/or what needs to be changed
- “we are having a hard time”
- Change over time
 - 5 years
 - More optimistic now
 - Lessen sense of self involvement
 - Issues with project follow through, issues with motivation
 - Training with the project not just little good ideas for them
 - Chief in Namibia
 - Not too forceful
 - Thus can’t have him push a project along
- Where would you like see them:
 - More kids in school
 - Better for interactions
 - Maintain culture, instead of losing it for modern life
- Enthusiastic about dancing, bring people together (healing, game, etc)
- Old verse Young
 - Info about veldt foods isn’t being lost just being dropped in favor of other communities (English, SA, etc)
- They like being asked and be interested in their culture
- Issues with self worth
- People can be quite, shy. We need to make it clear we aren’t trying to exploit them
- Being completely honest → trust

James – Ministry of Lands, Office in Gobabis

March 30, 2009

Interview Protocol:

What are some of the biggest problems in resettlement communities regarding land use?

What policies regarding land use have been implemented?

Agriculture

Grazing

What has worked?

What hasn’t worked?

What are the cultural perceptions of the land?

What aid has been given to the populations?

How much aid?

How has the aid enhanced the livelihoods of the communities?

How is water pumping paid for?

How much water does livestock consume?

Interview Notes:

- Perception of/with nutrition/marketing
 - o San – those left behind, they need to be brought up with everyone else
 - o Need to be taught etc, not that its hard, it just requires work
 - o Ministry – project to bring people on board with food production, supplies, and support
 - o Mainly maize and beans, need more vegetable production/consumption
 - o Supply seeds (maize, beans) and water infrastructure, transport of 800 kg of excess in and out of local for sale etc
 - o 50% home consumption, 50% for sale
 - o Sold goods are group goods, benefits the whole community (trust/savings). Some of the money goes directly to them but not too much
 - o Given: 244 cattle from prime minister. ~ 5/household
 - o Government owns land, given as tenure for 99 years. They are given a letter to show “ownership” for the period of time
 - o San are not required to have production from the land, compared to everyone else that is with the threat of repossession
- Commercial land policy, old government, but amended 1995
- Cattle:
 - o Only use products from them, not allowed to kill or sell
 - o 70-80% young cattle (1-1.5 years), thus still have to wait for goods to be produced.
 - o Owned by the office of the prime minister, but “owned” with conditions by the San
 - o No other livestock given, only native cattle
 - o Grazing land – special allocated land, but conflict with the “given purpose” of the land for goods production. Gazing land is supposed to be shared
- Those that grow food still get aid from the project/government
- Cattle post. There are other non-San people with posts as well, but not under the project. Some theft does exist
- Still some cattle to come (485 – 244 = 241)
- Use cattle as collateral? → no, if allowed then government can lose the cattle
- Land use policies and barriers
 - o Policies – land reform process
 - Commercial land – live and do whatever with
 - Communal land – divided into units
 - Skoonheid and Drimiopsis: project like communal land
- 2002 land act, March 2003 implementation
 - o Prevents more fences, thus illegal farms
 - o Not allowed to sublease in resettlement
 - o → San issue, poverty needed giving more money. Money for grazing space. Issues of taking other people’s land, take advantage of
 - o Policies don’t cover removal of people from the land
- Application forms for the land have a spot for beneficiaries, in case of death → just away to take more land over from other people
 - o Government can take the land over with the presentation of death certificate from home affairs

- Skoonheid isn't allocated to people. Its just communal. Same with Drimiopsis. The only thing that gets past along is the house itself
- Water
 - Government is supposed to help set up infrastructure
 - That didn't really happen, issues with timing, people already lived on the land
 - A lot of money given to the Ministry of Agriculture t help infrastructure
 - If not water, call Ministry for approval to purchase more goods
 - Converting all fields to drip irrigation
 - "Spring line" – sprinkler – irrigation effected by wind, thus ineffective
 - Skoonheid field is still dryland, as it is too big to transform
 - Monthly basis diesel is bought and stored in Gobabis. Call James and more diesel gets driven out. Can use as much as needed. Issues with storage and security
 - As time goes by, irrigation pipes need to be replaced. Can be effected by Calcium build up (especially in the south)
- Training:
 - DFRN staff is mainly training them
 - "wild thing" to farmers
 - Can arrange any kind of training needed/wanted
 - Trying to have them learn about
 - 1) food production
 - 2) leadership (ownership of things)
 - important when DRFN and Spanish leave → independence
 - Long term goal 2030, whole of Namibia needs to be at the South Africa level, especially for industrialization
 - NDPs
 - Want more divers crop production for better health
 - Trials of vegetables on dryland
 - Chemical production
 - Manure production
 - Combination of chemical and manure
 - Hydroponics
 - Trials want to happen this year, ASAP

Professor Andrew Mwonge

March 24, 2009

Interview Notes:

- Experience with San – prep work for National Report by a college
- Communicate ideas of nutrition
 - Nothing to eat due to poor soil and water, geographic placement (not conducive to farming), sanitation
 - Not a good idea had by San of what is nutrition
 - Only really eat sour milk. Telling them to eat things they don't have
- Backyard gardening
 - Waste water used to water garden
 - Teaching hw to pour water on plant in conjunction with proper wit soil placement

- How to get the water stay in the ground verses evaporation in the atmosphere (80-90% evaporates)
- Rain collection is really important
- Marketing
 - Improper cattle marketing → less money then needed
 - ~ N\$200/month, with no shop to buy food, money spent on travel to get food.
 - No travel lines
 - Walk 10-20 km to sell cow, then not a good offer. Hassle of transport, thus just sell for cheap
- Nutrition
 - Children need more food, means cooking more. Cooking requires wood etc, but there is none. → solar ovens? Lack of investment, many ideas, but little success and follow through
 - No food verse no way to cook it
 - Stunting and retardation
 - Anger and frustration rooted in malnutrition
- Storage:
 - Traditional methods baskets on wood
 - Maize is hard to store – bugs
 - Relevance on food aid
- There is enough money to feed everyone, but there is such a huge imbalance of wealth
- Many minerals found here, but not utilized (gold, uranium, diamonds, etc)
- If people moved to the city there would be more jobs and access to basic needs
- The rural communities are about 600,000 people
- Production:
 - Need to participate in the modern economy (needs for sugar, clothes, medicine etc)
 - Storage can effect the need to sell
 - Keep a cow and feed it verses buy meat when wanted
- Rural producers and business
 - People will produce what they will and buy what they want (beer usually)
 - Food distributions ignore the rural areas because there is no income there
 - People don't have experience, they need culture and practical production in addition to general education
 - Involvement in ideas → ownership
 - There is no saving. Eat all food when it appears
 - Life surrounding mainly meat, verses the inclusion of vegetables etc
- Cultural challenges – issues with being “overly landed”
- Education:
 - Use the school system.
 - Teach how to eat well and cook , grow, etc
 - “marketing of a new culture”
 - Market nutrition
- Small population prevents a small land area to become an industrialized people
- Loans etc
 - Exist but money “doesn't flow”
 - Lots of ideas and red tape
 - No collateral
 - More creation and development needs
 - Combine with monitoring
 - Money doesn't move
- Monitoring:

- Not enough access to medical people
- Many nurses go out of the country or at the least the city if Windhoek
- Dr. De Kok.
- Ministry of Health
- Nutrition is linked to everything
- Advise:
 - Improve the market, global economy
 - Ownership of the project will enable people to embrace ideas
 - Use the schools
 - Use all of the groups existing to push agenda
 - Empower to create the answers verses being given the answers

Silke Felton – Regional Director of WIMSA

March 24, 2009

Interview Protocol:

What is the political structure in the San community?

How do the San perceive nutrition?

Do they relate what they eat to health issues?

What challenges will we face in the field when trying to determine nutritional status?

What do you see as the biggest factors affecting San food security?

What cultural obstacles are there for trying to implement recommendations?

“gather data?”

“gain trust?”

“change community perceptions?”

What do you think is the feasibility of marketing training and education?

Do you think that improved market access would be helpful?

What are challenges we could face with crop diversification?

What are the challenges that we will face in the creation of our manual?

Have you had any experience in monitoring nutrition?

Interview Notes:

- Politics and Structure
 - 6 main groups via languages
 - Omaheke – 2 main groups (north and south)
 - Elected chiefs, but not recognized but the Namibian government

- 6 applied to be recognized, 2 pending
 - North – male chief, Langmann, (Skoonheid and Drimiopsis)
 - South – female chief
 - Langmann works with the council and the National San leaders.
 - National leaders are not chiefs
 - Kathryn – volunteer with the Omaheke San Trust
 - People of communities don't really respect leaders. In the past there was local leaders, but not as a whole of bushman land. Leaders respect is backed by actions
 - Resettlement camps are easier to work with in that they are all there
 - Permission from “leaders” and council (and maybe Ministry of Lands) will make work easier
 - Balance between helping and doing their work. Make sure there is an entry point. Maybe have someone was us around and introduce us to people.
- Nutrition and Health
 - Mothers and babies and the effects of sugar (considered a luxury)
 - Women get fat once there is money coming in due to buying food that just tastes good
 - Alcohol is a huge issue that many don't really understand the issue's scope
 - Veldt foods provided a well balanced diet due to necessary
- Food Security
 - Ministry of Lands → communal gardens and then personal gardens
 - Kalihary garden project – komalo
 - Wants verses planning for wants and needs
 - Water is always an issue. More pumps might eliminate all the water
 - → make sure we know what has been done before so we don't bother them asking the same questions over and over
- Marketing
 - Market flooding issues. Arranging communication etc between Gobabis and Windhoek. Shouldn't be too hard
 - Prediction of harvest time
 - Prediction of amount
 - Organic food market in Windhoek
- Manual
 - Touchy issues with telling them to eat better if they are lucky to eat at all
 - Mothers would be the best target group → children
 - Men love money
 - Women love family and money
 - → incentives
 - Lessons to parents are harder
 - School programs for education enriched corn porridge
 - There salt should be iodized
- Monitor
 - Key → sustainable
 - Incentive is key to get them to do anything
 - Integrate monitoring into general and everyday activities (school program)
 - If food is available they would be more willing to change
 - Need someone to negotiate on their behalf. Faulty understanding of how much they should be getting
 - Monitoring nutrition etc
 - Has been a project in the Omitara region lead by a NGO
 - Families given N\$100 monthly to spend however, done over two years, study of how the people spent it etc

- Organized through: basic income grant generation, council of churches, and the Labor Research Institute
- General thought of our research will be rather indifferent or positive if they have had direct involvement
- We are doing a project for ourselves in 3 weeks, but what do they get from it all?
- Yes and No games have worked well in other areas
- “we are part of a team... baby steps towards the ultimate goal”

Dr. Helen De Kok – Clinic Doctor for Skoonheid

April 6, 2009

Interview Protocol:

Do you have existing method for monitoring nutrition over time?

Do you have recommendations for new monitoring methods?

Do you have experience with visual communication techniques?

Based on your experiences with the communities, how interested and involved would you say they are in taking control of their own monitoring?

Are there any good venues that you think would be good for monitoring nutrition and general health?
(Church, school)

What education methods about nutrition that have been used with the communities?

Do you know of cultural barriers that can hurt nutritional education?

What are the commonly observed deficiencies in the Resettlement areas?

Which of the deficiencies are most concerning for the whole population?

Which of the deficiencies are most concerning for child development?

Are there certain health concerns in the elderly populations?

Are there specific ways that you have tried to address deficiencies?

Interview Notes:

- situation has changed James Susman 1999 → all aspects, thesis for oxford
 - used to be that they ate one meal a day
 - children had poor weight gain
 - adults were quite thin too
 - this all happened without things such as scurvy
- Craft project
 - Ensures some continual income
 - Helps ensure some more food security
- Doctor in 1968 from South Africa to clinic in Skoonheid
 - Involved in other communities

- Chirs Hanning Hospital, largest in the southern hemisphere, services mainly black people (apartheid)
- Married and became a general practitioner about 35 years ago, mainly San and Herero patients
- People came via donkey cart or on foot, good amount from Skoonheid
- The Roman Catholic nurse is really good, she is just has too much to do
- Transport is really difficult for the ill
- 2001, went to the Ministry of Health and asked if she could open a clinic for better access. It took two years to open, 2003, fulfilled need for accessible health
- Became aware of health issues, survive off of pension (1 supporting 10)
- Saw idle hands, thus crafts
- DRFN/LISUP doing crafts since last year
- She goes to Skoonheid twice a month
- 2004, 3 craft people, now 66 craft people
- ~75 % of the houses have regular income in the 73 location homes
- ~ N\$30,000 made last year from crafts
- Idea to expand crafting, aim to have 20 people with N\$420/month, her idea is to improve and increase food security for as many people as possible
- Market is the limiting factor, the market needs to expand
- Veldt foods gave them a more balanced diet, thus they now need to farm more in home gardens (waste water recycling) and other areas. Home gardens could be kept throughout the year
- N\$70-80/month is enough for pap consumption and purchase
- Chicken project: hens tend to get eaten before they have chicks
- All crafts, minus leather, go through her. Placemats – 40 just sent to a lodge near the fish river
- She tried to limit the number of people per type of craft (stick mats etc)
- Transport is an issue. She brings the materials there and the products back. She fronts the money for the people in Skoonheid, N\$3,000
- She doesn't "phase people out" due to productivity and product quality
- She is the only one as of yet that works with Skoonheid in this way
- She does advertising to find markets and brings the goods with her to show off
- She is thinking of putting the goods on the internet
- Works with lodges (good way to reach a wide variety of people)
- She also works on making place mats with their traditional head adornments on them (helps preserve culture a little)
- Main issues
 - They just don't have enough food
 - They used to be able to hunt and collect from the veldt
 - Now if you hunt you are stealing/trespassing
 - There is now too many people to make veldt food sustainable
 - Main food sources are government drought relief and purchasing
 - Number of daily meals has increased from one to two
 - Variation in diet
 - Home gardens and viable livestock production
 - Need to start making the communities independent
 - She brings maize meal when she goes and they buy it at cost from her with the money they make from crafts. This helps to offset the high prices of others (shebeens)
- Teaching accountability through proper use of money, food, and health care.
- She asks them to pay a small fee for her services
- Can't just keep giving aid without them "paying for it" → dependence
- Can't rely on handouts
- Health concerns:

- She mainly sees TB
- She doesn't see protein deficiencies and complete lack of food intake
- She hasn't seen too much vitamin A issues
- State clinic does vaccines, BCG for TB at birth, WHO prescribed vaccines, TB follow up medications
- All find issues with transport and movement of people → drug resistance
- The san use to "have a very high moral standard", monogamous, but with alcohol this is become less so → HIV
- She provides multivitamin supplements for the children (cost included in the N\$2 fee for children and N\$5 for adults → trains ownership and accountability) has helped with alcohol issues
- Crafts workers used to be "weekend alcoholics" and fulltime alcoholics. Having something to do has helped lessen this issue. Prime Minister Libertina is very interested and impressed with the improvements
- Try and improve as many skills as possible, hand skills and life skills. She provides them with factory off cuts and they make clothes for themselves and the children
- Malaria is high during the rainy season. Gastroenteritis, measles (when not vaccinated), and pneumonia are all problems for the communities
- Pot bellies = malnutrition, diarrhea (chronic and acute), no clothes to confine them (usually goes away at about 3 or 4 years old)
- "Malnutrition in a rural area" she wrote it. Important weight gain. When it goes down it is usually indicative of TB or malnutrition
- She seems slightly overwhelmed by all that needs to be done. She wants to train the people then to monitor etc themselves. CBRP.
- Weigh each child once a month when she come to Skoonheid
- She hasn't tried arm band measurements, but is rather interested. Some concerns with African weight charts verses European ones
- Self monitoring has been made such that the kids were really involved. Many people were/are illiterate though, thus they can't do it by themselves. The younger ones that were more educated are sure to be trained to monitor the kids health
- Average first child is at about 13-15. Issues with family growth and mother/child health. Massive scale training on how to do family planning. Some issues with cultural beliefs and male influence. Their families are not sustainable → world wide food shortages
- "In Africa, rainfall is a gift not a certainty"
- She wishes there culture could be preserved (gentle, non-materialistic, etc) but the world is competitive, thus this can't be
- Individual health training
 - She tells the women to wait between children
 - Male influences are problematic (alcohol makes it worse)
 - Education is *really* important, issues with cost and big families
- Child Development Center. Kindergarten, wants to expand
- Schools are over full as it is, it is a government issues
- In the past there were deaths due to hunger and transport issues (1999), but recently this has improved immensely
- Most children get vitamins from her. As they com to her for runny noses. A few families don't come to see her for whatever reason, thus those kids don't get vitamins.
- Traditional healers have basically died out and the knowledge was not passed on, but many men still believe in the old way of life and healing
- Adults mainly come to see her for arthritis, the children come for runny noses, cough, etc
- Children are our wealth in Africa, family planning is the simple way to fix so many issues
- 6 months of treatment for TB. Sputum test is not 100%, and the skin test is on children (false positive issues with the vaccine)

- Water and electricity is a huge problem. Other models of toilets, but stigma attached to non-flush toilets. Alternatives: VIP, Ochie (sp)
- Years ago would have ranked food-related things immediately higher, but the fact that they put toilets first speaks to how the food situation has improved.
- No known cause of diabetes (maybe overweight) and only a small number of cases of high blood pressure. These issues really only develop with the movement towards a more western diet.

Omaheke Regional Council

April 6, 2009

Interview Protocol:

How often do you meet?

What is your greatest concern for/about the community?

What do you try and do for the community?

What has been the most helpful contribution to the community by anyone?

Do you think that the home gardens or the community gardens are more beneficial? Why?

What happens to any excess food collected during the harvest?

Is alcohol a problem in the community? Why?

Which months of the year are hardest for the community? Why?

Have you seen any improvements in the community in the past few years?

Where do you see the community in a year from now?

What foods does the community need most and why?

Interview Notes:

- LISUP will be working with communities for the next year
- Regional had no direct connection with the projects done in the region
- Helps to coordinate drought relief
- Best interest to provide rations?
- Gardens create sense of independence, concerns with killing that through too much help
- "food/cash for work", concerns with sustainability
- Transitions/evolution to family/personal from community based land etc
- Can't say too much about our project, but is thankful for our work and effort for seeking them out
- Mission of council: create environment for communities. Helps to foster IGAs and provides grants/loans for projects. Food security and nutrition: food for work and drought relief. People can come request materials (ex. Fencing) that get given → increase equality and employment
- Go to office, register project, council evaluates and goes out and appraises location. Then the committee can approve/deny. Currently support leather, sewing, guinea hen farming, cattle, aquaculture, goat, sheep, and other projects

- Loans: 2 kinds
 - o Goats – return half of the same kind to allow for further giving within a year
 - o 10% per year payback
- Grant/loan application the same. N\$280,000 divided nationally 5,000-10,000 projects. If it is machinery that is wanted, quotes are brought to the council and the one is picked and paid for directly
- Want to support existing initiatives, support those that want/need a boost after being self started (ownership and accountability)
- Drought relief allocation
 - o Office of the Prime Minister (OPM) declares a drought after examining the country (food shortage, grazing, rainfall, etc)
 - o Registration across the country
 - o 5 points of application: pregnant, lactating, children under 5, older than 60, disabled, then they get food for the house
 - o National → regional → household
 - o They are supposed to get 2 – 12.5 kg bags of maize meal, 2 – 750 ml bottles of cooking oil, and 4 tins of fish, sometimes beans
 - o The food is given out on a monthly basis during the declared drought
 - o October – April distribution
 - o Drought is declared every 3-4 years, including the past year
 - o OPM decided what gets sent out to the people
 - o Aware of different family sizes thus needs, on average “it should be enough”
 - o OPM begins to look at the regions after complaints make it up to the office from the people in the regions
- Food/Cash for Work:
 - o People can either get paid in food or cash
 - o Garden projects, graveyard projects, road clearing and creation, hostel building, etc.
 - o Apply with the regional council
 - o Amount of food provided based on application and number of those supported
 - o Same distribution lines as drought relief
 - o First round of food given out ~1-2 months after the project starts, then the council assesses if it is been done well enough
 - o Second food round given out based on if the project has been done well
 - o Cash style works the same basic way (N\$57-83/day/individual)
 - o 2 hostels created so far
 - o Council is pleased with work done so far
 - o Not supposed to be IGA
 - o Tools for activities are provided from 2-3 months then given to someone else, not including training
 - o Training only in IGA (bookkeeping)
 - o Community has to have skill for activity (construction)
 - o Inspectors are sent “on a timely basis” to check on skills etc
 - o Application indicates the length of the project, payment is based on proposed time, doesn't extend if needed.
 - o Council supplies materials, not money for materials
- Funding is limited for all projects. The council approved 1 project per constituency.
- In the next five years they hope to increase the budget. Was N\$100,000/year in the past 2 years
- Keep reports helpful so future policies etc can be based off of finding, helpful to have many different points of view information form the ground.

Interview with Chief Langmann

March 30, 2009

Interview Notes

- Gave permission for us to be there and work with the community.
- Was promised a maize mill, but can't remember who said that; yet to get one.
- Living standard is difficult because everyone is living off of LISUP.
 - Before the project they lived off of veldt foods, but now they just live off of maize, beans, and melon.
 - Some veldt foods included: maramas, spur berries, haru (root with bitter taste), gubbrood (root that quenches thirst). Marama are available from Donkerbos for money.
 - He thinks that people would be healthiest if they lived off of veldt foods during the rainy season, and off of project foods during the dry.
 - Haven't tried growing veldt foods, but he thinks that they would grow.
- People before the project were healthy, but now people are sick. Maybe they didn't know what TB was before, thus they didn't know they were sick.
 - Eye sight issues with old ladies and kids. One of the kid's eye issues is due to allergies.
- LISUP provides seeds for the project, used to have to buy then from shops, some seeds left over from the year before, most from LISUP.
- Food storage: can get insects, but mainly eat it anyway. Ash mixed with beans keeps ants away.
 - Mold is not an issue because it is so dry.
 - Food can be stored for a whole year if stored correctly.
- Extra food sold in Gobabis, but transport is difficult.
 - Missing goats, thus he can't drive people to sell, thus extra is just stuck in Skoonheid.
 - Main drivers of people are Chief and Johnny from the Ministry of Lands.
- Modern food doesn't make them fat, due to the lack of meat.
 - Can't hunt due to red tape, and being surrounded by commercial farms.
- If LISUP left they would be fine with seeds, but have issues with water due to diesel.
- Want more training on how to plant properly.
 - Believes that the external encouragement has helped them in the past.
- When they sell in the market they don't get a good price, but people don't keep it to eat it.
 - Not sure if they market intelligently.
 - People basically get the same price for goods year to year.
 - Tend to sell more beans over maize.
 - Things are sold individually v. communally.
 - Gobabis they buy sugar, maize, tea.

- Community doesn't have a good perception of health, but they try and eat "clean food" (fresh foods). People aren't away of eating specific foods, just want to stop being hungry and eat what available.
- Fruit is expensive.
- Doesn't know of anyone that has died due to hunger.
- People only eat veggies and grains because they are available.
 - Sweet potatoes and spinach have yet to be tried, and squash doesn't really grow well.
- Tambo drinking is a problem in young people, 18-19 years old.
 - Young people eat well, but they drink a lot
- He stopped drinking
- All food is good and healthy, but alcohol is a problem

Interview with Mr. Potgieter – Omaheke Maize

April 16, 2009

Interview Notes:

- Uses only electricity.
- Everyone can come here.
- San only buy processed maize meal.
- Buys corn from South Africa, but sometimes the border closes. Namibians plant later so the corn is ready later.
- Does not want Omaheke corm. Most people have permit contracts.
- One bag is too expensive to grind soley. It is usually done in truckloads.
- Haven't had random people come to grind, but could possibly take them.
- Maize board sets a corm price for the year.
- Doesn't know the permit price, but it may take up to 2 months. The Maize Board has independent standards.
- Only white maize is ground.
- 27 tons is the smallest truckload that they get.
 - 20 tons would be the least amount accepted because you don't know the quality of the maize. It must be maize-board approved.
- For an import permit, you must have the producers name and your name. The permit is only valid for one month. Permission is given for 30 tons though the road only allows 27 tons.
- Selling permit is for a year. You can buy Namibian all year round. They issue the permit for about 60 tons.
- Sells to local shops, sells out of his own shop, and sells to government and schools per order.

- His shop sells 5kg for N\$22, 10kg for \$44, 20kg for N\$88 and so on. Stores get a discount because they may buy up to 5 tons. This is an informal agreement.
- The price usually does not fluctuate.
- San people do buy here, mostly local and coming form the farms. He sells only maize meal with no additives.
- There are no deliveries. Stores place an order then come collect only in the Gobabis region. There is no tax on corn.
- Texas Trading sells 5kg for N\$24.50, 10kg for N\$41.35, 20kg for N\$80.50, and 50kg for N\$213.35.

Appendix C: Village Resource Maps

Skoonheid

Participant Dynamics

Total Participants: 23
Four men aged 12-18
Three men aged 18-25
Four men aged 35-50
One male aged 50+
Six women aged 18-25
Five women aged 35-50



Objective: Identify key physical resources, use patterns, and issues with each resource.

Relation to Project Goals: Relays land use, soil quality, infrastructure, and water supply information.

Notes:

Cattle

- Gift of 244 cattle were given totaling 360 animals, most of which are grazed at Post Skoonheid. This land is degrading. People think that the grass will last until November, some only a month.
- Herero people live on the posts and some community members feel like they should be kicked out even though they have been there for 15 years and the grass is poor because there are too many animals.
- When harvest is complete, cows are allowed to eat the remainder in the dryland fields in order to naturally fertilize.
- Little grass is left where donkeys and horses are grazed.
- Cows drink 40-50 liters of water a day. People give water to cattle first because livestock are more important than people. "Leaders tell us that we should water the livestock first". People wish they had money to buy salt licks so the animals will drink more water and be healthier.
- More fencing is needed.
- Cannot do anything with the cows from the government.

Diesel

- 200 liters are supplied per month by the Ministry of Land. It is usually late and is not enough to supply for both livestock and people.
- “We chase the cows off the land of those that don’t pay for diesel.”
- Diesel isn’t enough for the irrigated gardens.

Agriculture

- Onion, cabbage, carrots, beetroot, potatoes, tomatoes, maize, and watermelons are grown in the irrigated garden.
- Maize, beans, tsama, groundnuts, watermelon, pumpkin grown in the dryland garden.
- Land issues in the community are decided by committee. Women work in the garden, not the young people.
- There are fruit trees behind the location.
- Problems with termites and soil quality. Some people are marginalized because of their soil. Crops do well where there is clay, but three of the plots are mostly sand. Ants eat a lot of the crops. “No way to beat them away, they have little houses.” The pests that eat the maize are white with yellow heads. Termites do not eat the beans. Some men have been growing in the same area since 1994 used to grow beans and maize but they do not grow well anymore.
- There are people that live in the location and have home gardens instead of plots in the big fields, but the soil is not as good and they have a hard time growing enough food. One plot house owner was told that he was not allowed to have a dryland plot; that he had to grow next to his house.
- Beans were harvested in April last year and Maize in May. There were a lot of beans so they ate until September, some were sold, then they starved. This year there are more crops in the dryland area. After harvest is done people tend to rely on pensioners. Maize meal is bought after September.

Water

- One dam is not working. One borehole does not pump and the other is weak. There are broken taps that water won’t run from. Because of a lack of diesel the towers can only be pumped half full. The power generator uses a lot of diesel: 25 liters used every 3 hours, but it pumps quickly. The other pump uses 12 liters of diesel in 13 hours but pumps slowly.
- There is not enough water to cook and wash with. “We are expected to start paying but how is that possible if we are dependent on the government?”
- Lack of water because of lack of diesel, inefficiency, and an increased number of cattle.

Other

- Firewood is collected from the veldt after garden chores. It is very far away, and takes 2-3 hours. Everyone collects, even young men and women. If you are busy in the garden, firewood can be postponed for the following day.

Community Notes

- Majority of the participants speak. Arguing happened when landmarks are out of view of the discussion area.

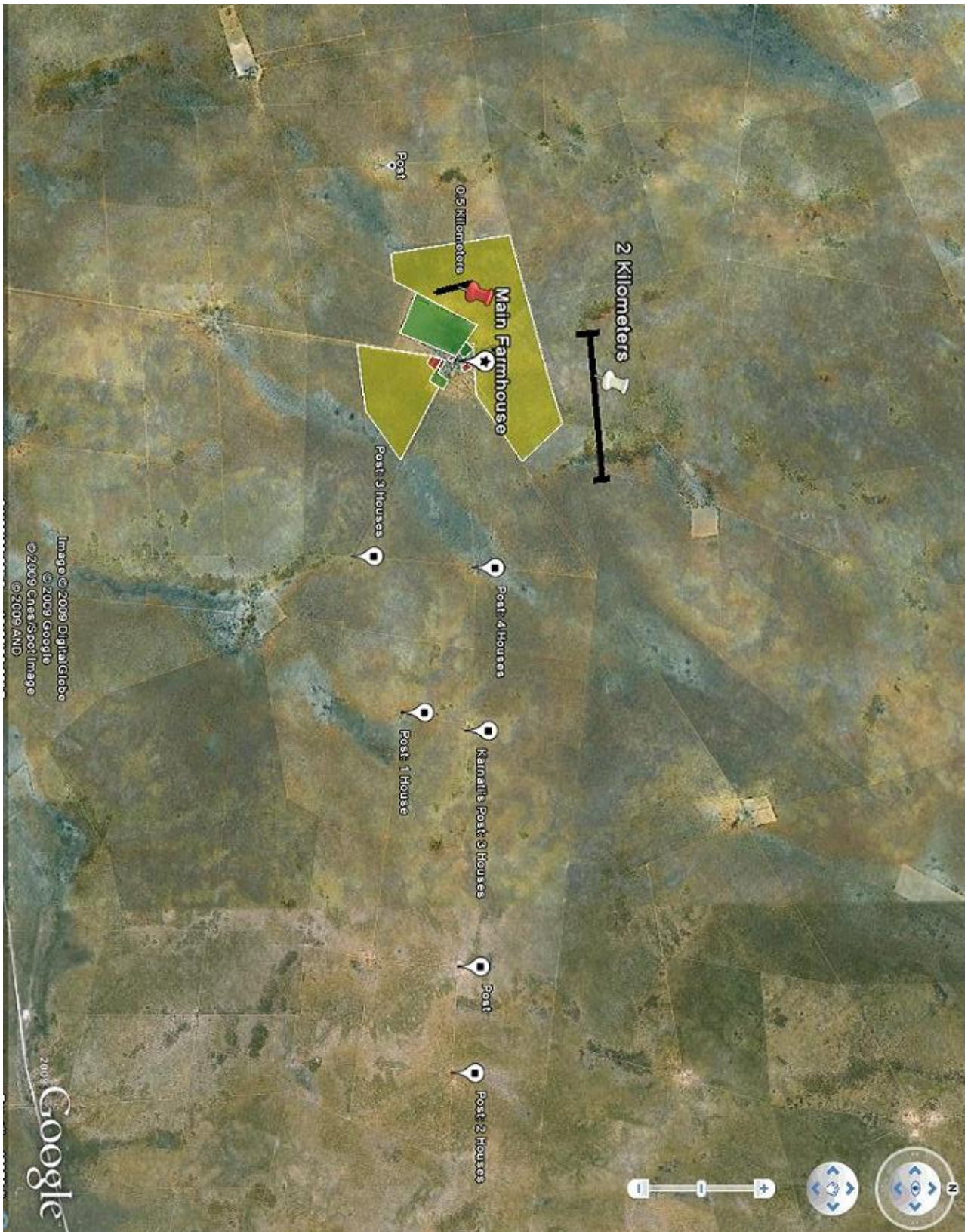
Skoonheid Location Map



Skoonheid Plot-House Map



Skoonheid Post Map



Drimiopsis

Participant Dynamics

Total Participants: 42
Three men aged 25-35
Fourteen men aged 35-50
Three men aged 50+
Five women aged 18-25
Two women aged 25-35
Thirteen women aged 35-50
Two women aged 50+



Objective: Identify key physical resources, use patterns, and issues with each resource.

Relation to Project Goals: Relays land use, soil quality, infrastructure, and water supply information.

Notes:

Agriculture

- Soil type differs by garden. The oldest garden and part of the middle is the best because it has clay. The remainders are mostly sandy.

Water

- Houses have private taps but many are leaking. This wastes water.
- The north and east most dams do not have water. They are broken and leaking. The primary school has a dam.
- Boreholes are electrically powered.
- No tanks are leaking. Tank in field has no tap, just drip connection.

Cattle

- All grazing land is good; it depends on the animal handling.

Structure

- Many schools: two kindergartens, one high school, one primary school.
- No permanent clinic for this large community.
- Six shops, five churches (three at houses), six shebeens. Most people get food from the shop in the northeast. Schools are close enough.

Community

- Mostly men aid in mapping.

Drimiopsis General Map



Drimiopsis Location Map



Appendix D: Seasonal Calendars

Skoonheid

Participant Dynamics

Total Participants: 10
 Five females aged 30-50
 Two females aged 18-25
 Three males aged 30-50



Objective: Determine yearly fluctuations in resources, time expenditure, hunger, and cash flow.

Relation to Project Goals: Provides information on seasonal food insecurity in relation to resources.

Outcome:

Skoonheid Seasonal Calendar												
Resource	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec.
Seasonal Variations	Rain	Rain	Rain	Rain/ Cold	Cold	Cold	Cold	Cold/ Hot	Hot	Hot	Hot	Rain
Food	3	5	9	11	7	5	3	2	1	2	0	12
Income	2	2	10	12	12	12	2	2	2	2	5	0
Expense	2	2	0	4	3	9	7	5	4	8	4	10
Field Labor	11	9	8	9	8	0	0	3	3	3	0	6

Notes:

Seasons

- Seasons vary from year to year. Rain from December to March with the most in February, and sometimes in April.
- Cold is from mid-May to August.
- Heat is from mid-August to November.

- Sun is from September to November.
- No field work from July to September.
- Increased time with cows from August to November.
- Burn poisonous plants from August to September.

Diesel

- When diesel was received, crop production increased. Government diesel is for irrigated garden and domestic use. Other diesel (livestock) is paid for by people.
- Most diesel is bought from August to December.

Agriculture

- Maize gets attacked in the field by termites, beans get attacked by “flying ants”.
- Maize cobs last a whole year for some people.
- January is weeding, February is plowing and weeding, March is harvesting, April is selling maize, May is selling beans, June and July has no activity, August is clearing land, September and October are livestock into the fields and burning weeds, November has no activity, and December is weeding.

Income

- “Enough” money is made from the harvest; much more than pension.
- December requires more money as it is the Festive season.
- Dr. de Kok buys crafts irregularly throughout the year. Leather is also irregular.
- Pension is N\$450 per month, N\$900 in November, and N\$0 in December.

Food

- January is rice, pasta, maize porridge, tomato, soup, and fatcakes, February is maize porridge, March is vegetables, maize, maize porridge, carrots, watermelon, and veldt foods, April is marama, wild potatoes, and sour berries, June is maize porridge, beans, and milk, July and August are maize porridge and beans, and October and November are begging.

Community

- Led mainly by pregnant woman (aged 20-30).

Drimiopsis

Participant Dynamics

Total Participants: 38
 Seventeen male aged 30-50
 Sixteen female aged 30-50
 Five female aged 18-25



Objective: Determine yearly fluctuations in resources, time expenditure, hunger, and cash flow.

Relation to Project Goals: Provides information on seasonal food insecurity in relation to resources.

Outcome:

Drimiopsis Seasonal Calendar												
Resources	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Seasonal Variation	Rain	Rain	Rain	Rain Dry Cold	Dry Cold	Dry Cold	Dry Cold	Windy	Rain Hot	Rain Hot	Rain+ Hot	Rain+
Food	4	2	3	4	1	1	1	6	7	9	10	12
Income	6	7	6	4	2	1	2	3	4	5	9	12
Expenses	5	1	2	1	7	7	5	6	3	3	2	8
Field Labor	6	6	6	4	1	1	1	6	6	7	8	8
Cattle Handling	2	3	2	4	7	8	9	6	4	6	5	4
Hunger	4	4	4	7	7	7	7	4	4	4	4	4

Notes:

Seasons

- Rain begins usually around December but this year it was in October. A long time ago the rain used to start in August. The heaviest rains are from November to December. Rains end in May.
- Hot weather is from October to December.

- Dry weather is from May to June.
- Windy weather is in August which makes it hard for maize to grow. Pieces of the informal houses blow away.

Food

- Greatest quantity of food is in December.
- May to June is a time of hunger and begging. Maize porridge, meat, and fat can be obtained from begging. Foods bought from the store by people who have money during this time are rice, maize meal, macaroni, sugar, apples, raisins, bananas, lemons, flour, chili soup, and bread flour.
- August also has a good amount of food due to harvest from planting in April.
- The food from the winter harvest consists of cabbage, beet roots, onions, and spinach. The onions are the only ones that last until December/January.
- Summer crops (maize, beans, watermelons, sweet melons, tomatoes, cucumbers, green peppers) are planted in August and are ready in December. Some are ready in November.
- Harvesting and replanting can happen up until May, but not before August. If harvest lasts until May, the crops can last a little while, but the maize and beans last until July.
- Veldt collection in April including: maramas, tsama, wild potatoes, tjamas. Maramas are also collected in May.

Income

- January to March all have the same amount of money made.
- November to December people make the most amount of money.
- September to October make the same amount of money as January to March.
- June to May people make the least amount of money.
- November to December's money is bonuses, job payments, and small amount of pension. Maize, beans, pumpkins are also sold in Gobabis at this time.
- January to February the same things are sold as above. Begging happens at this time as well.
- Small business: welding, fat cakes, crafting, firewood, renting out donkeys.
- Money made from harvest is more than pension.
- Many people craft: frames, bracelets, wood carving. Crafts sold whenever there is an order for them.
- Milk is sold for money, especially in summer. Some sell crops by the road, some sell in front of the shop.

Spending

- School fees in September. School fees: some pay for whole year, others pay in parts (monthly).
- December is Christmas spending.
- May to August money is spent on food, school fees, clothes, and blankets.

- February to April not much is spent due to harvest.

Time

- April to July is spent harvesting. Cannot work on/in houses or collect much firewood.
- Time with cattle is highest in the dry season. Cattle are getting weak so they need to be watched, they can even die.

Hunger

- There are people that are hungry throughout the year, but it is the worst from April to July.
- People go begging August through February also.
- Hunger = sickness, death, and weakness for the community.
- People have died due to hunger, the last time was in 2003.

Appendix E: Daily Activity Clocks

Skoonheid

Participant Dynamics

Total Participants: 22
Seven men aged 35-50+
Four women aged 18-30
Eleven women aged 30-50



Objective: Determine the difference in diet and productive activities between men and women.

Relation to Project Goals: Examines seasonal diets and what contributions are made to food security.

Notes:

Diet

- People eat three times a day in the rainy season, twice in the cold season, and once in the dry season.
- Food is mostly maize porridge made with water, but can be supplemented at different times of the year.
- Children eat the same foods as adults.
- Breakfast is small, usually tea, as is dinner. Lunch is biggest meal.
- Drought relief is an important source of food.

Skoonheid



Summer Timeline - Female (50+)

6:00 AM Start Fire and Breakfast of Coffee

8:00 AM Arrive in Garden

10:00 AM Clean House

1:00 PM Lunch of Maize Porridge, Wash Dishes

2:00 PM Clean Yard

3:00 PM Look After Flower Garden, Craft Bracelet

7:00 PM Dinner of Coffee, Relax by the Fire

9:00 PM Bed





Winter Timeline - Female (50+)

-
- 8:00 AM Wait for Sun by Fire in Blanket, Breakfast of Tea
-
- 9:00 AM Garden
-
- 1 2:00 PM Lunch of Maize Meal
- (May have veldt foods if rain was good: bessies, sour berries, wild potatoes, Kalahari truffles, marama, caterpillars, and pumpkins and maize from the field. Tjammama is boiled and drank as bush medicine.)
-
- 1:00 PM Work in Irrigated Garden
-
- 3:00 PM Work in Home Garden
-
- 4:00 PM Collect Firewood
-
- 6:00 PM Collect Maize from Field and Cook
-
- 7:00 PM Clean House
-
- 8:00 PM Rest by Fire
-
- 9:00 pm Bed





Winter Timeline - Female (Pregnant, 20+)

8:00 AM Sit by Fire

9:00 AM Breakfast of Maize Meal, Clean House, Take a Walk

(Irrigated garden is giving carrots, beets, onions, and cabbage. Some do not have vegetables at this time because not everyone has a plot in the irrigated garden. Babies/Children eat vegetables if their parents have it. The dry garden is producing beans, maize, groundnuts, melons, and pumpkins. Some people do not have pipes for their irrigated garden and they do not have vegetables. The irrigated garden is too small, and the boreholes are not enough to pump water.)

12:00 PM Lunch of Maize Meal and Meat if Available

1:00 PM Sit Around House

During winter, people are busy harvesting beans and shucking them. They have to go far for firewood and spend two to three hours looking. Diesel from the ministry is only for people and the garden. Residents must pay for cattle, and it takes away from personal use. If there is little water people only drink the water and use a little to cook.

8:00 PM Bed





Rainy Timeline - Female (35+)

7:30 AM ~~Make Fire, Cook Tea and Maize Porridge if Available~~
(Some go early to the dry land field.)

8:30 AM ~~Work in Irrigated Garden or Look for Veldt Foods~~
(Wild cucumber, wild spinach, wild potatoes)

12:00 PM ~~Lunch of Maize Porridge~~
(When money is available, possibly rice and meat.)

1:00 PM ~~Work in Dryland Garden~~

2:00 PM ~~Work in Irrigated Garden, Collect Firewood, or Craft~~
(Ostrich egg beads, bracelets)

4:00 PM ~~Tea and Sugar if Available~~

6:00 PM ~~Dinner of Maize Porridge with Oil if Available~~





Rainy Timeline - Female (40+)

8:00 AM Breakfast of Tea and Thick Maize Porridge

9:00 AM Clean House

10:00 AM Clean Yard and Laundry

12:30 PM Weeding in Garden

1:00 PM Lunch of Maize Meal and Beans
(Beans are stored from harvest.)

2:00 PM Collect Firewood if Not Raining

Discussion

(Men bring livestock from field posts to water. Everyone checks to see if their cattle come back. Not everyone has livestock because the men and husbands mostly have it. Women have had to take over chores due to the men working with cattle. They now have to even chop wood. “We do all the work, the men just come home to eat then go back to the cattle.” Women believe that they are doing more than men. They have no concept of time because there is so much to do.)

Resident did not wish to complete timeline.





Summer Timeline - Female Community

6:00 AM **Make Fire and Boil Water**

(Must make fire even if there is no food. Tea and coffee are a must because you are not normal without them. They like store coffee but veldt coffee is used.)

7:00 AM **Check on Livestock at Camp**

(Small amount of milk from goats and cows goes to tea. Tend to milk more in the rainy season, but in dry cows are left in camp.)

9:00 AM **Visit Family to Beg or Wait for Drought Relief**

(Can get milk and sugar from family. Hitchhike and spend the night depending on distance. Drought relief brings two liters of oil, two 10kg bags of maize meal, and two cans of fish per household. This doesn't take into account number of people in a house.)

1:00 PM **Milk Cattle**

3:00 PM **Tell Stories or Collect Wood**

(Very little water so no veldt. Wrap cloth around stomachs to fight hunger. Give children milk, sugar, maize meal mixture (magou) as a food substitute when weak.)





Rainy Timeline - Male Community

6:30 AM Breakfast of Tea or Coffee and Sugar

7:30 AM Check on Animals and Search for Wood

8:00 AM Works in Dryland Garden on Beans

(Beans take a long time to weed if only one person is doing it. People at Pos 8 have a hammer mill and accept diesel as payment.)

10:00 AM Milk Cattle

11:00 AM Cleans Beans to Remove Sand and Stores

12:00 PM Lets Goats Graze, Builds Fire if Wife is Absent

1:00 PM Lunch of Maize Porridge, Beans, and Fat with Salt

(Beans are stored in bags with ash, and can be dried or eaten the same day as harvest. Cook beans in water then add oil when soft.)

2:00 PM Harvest Beans

3:30 PM Leather Crafting

6:00 PM Dinner of Maize Porridge, Beans, and Coffee

7:00 PM Rest

9:00 PM Bed





Summer Timeline - Male Community

4:00 AM Water and Work in Garden

6:00 AM Breakfast of Coffee or Tea

(Coffee makes you full and awake, when you drink coffee you can work longer. When tea is strong you get high blood pressure.)

7:00 AM Cattle Return to Corrals, Count and Search for Lost Cows

(Not everyone is taking care of cattle. Not everyone who has cattle knows how to take care of cattle. There is no coordination as to who is taking care of cattle when. Cannot brand, eat, or sell cattle. A Cattle Committee was formed and trained in Skoonheid apart from LISUP. They count cows, check fences, check animals.)

8:00 AM Crafting Leather or Work in Irrigated Garden

10:00 AM Work in Dryland Garden

1:00 PM Lunch of Maize Porridge and Beans if Big Harvest

(Many buy food on pension such as sugar and maize meal and send children to school which also costs money. Children often live off of parents or grandparents pension.)

2:00 PM Work in Dryland Garden

(Use weeds as compost. Youth do not help, only fight.)

6:00 PM Dinner of Maize Porridge if Available (Rarely)

7:00 PM Rest

8:00 PM Sleep



Drimiopsis

Participant Dynamics

Total Participants: 21
One man aged 15-20
Ten men aged 30-50
Two women aged 20-30
Ten women aged 30-50
Intermittent attendance by several teenagers



Objective: Determine the difference in diet and productive activities between men and women.

Relation to Project Goals: Examines seasonal diets and what contributions are made to food security.

Notes:

Diet

- Breakfast is small, usually tea.
- Maize porridge is the most common food.
- Not every person participates in farming and so do not have maize or beans.
- Milk is available to a few people year round.

Other

- More children go to school here. Many adults attend literacy classes.
- Most vegetables from the gardens are sold.
- People must pay for electricity to pump water.
- People have more opportunities to work for pay, but that limits the amount of vegetables that they are eating as they have little time for the garden.

Drimiopsis



Winter Timeline - Male (60+)

7:00 AM

Radio News and Tea

8:00 AM

Garden until 12:30 PM

12:30 PM

Lunch of Maize Porridge

3:00 PM

Plant in Garden

6:30 PM

Dinner of Maize Porridge

7:00 PM

Radio, Bed





Winter Timeline - Male (16-21)

Arts and Writing

5:00 AM Tea, Sometimes Bread, Make fire and Boil Water for Aunt

7:00 AM School

7:30 AM Exams

9:00 AM Lessons

11:00 AM Break

11:30 AM Lessons

1:00 PM Lunch of Maize Porridge and Milk then Relax at Friend's

3:00 PM Study

4:00 PM Soccer

6:00 PM Dinner with Aunt, Sit by Fire, Radio

8:00 PM Bed





Rainy Timeline - Male (60+)

Arts and Images.com

7:00 AM Breakfast of Tea and Homemade bread or Fat cake if Available

8:00 AM Milk Cattle, Drop Milk at Home, Look for Lost Cattle

11:00 PM Work in Field

12:00 PM Rest

1:00 PM Lunch

2:00 PM Hunting with Dogs (Sometimes)

3:00 PM Hunt or Look for Lost Cattle

4:00 PM Bring Cows to Homestead or Look for Lost Cattle

6:30 PM Dinner of Maize Porridge (Top Score)

7:00 PM Shower, Relax by Fire, Bed





Summer Timeline - Male (60+)

6:00 AM Coffee or Tea (Coffee is Filling, Tea Makes You Hungry)

6:30 AM – 9:00 AM Arrive in Garden

11:00 AM Finish in Garden

1:00 PM Lunch of Maize Meal

Back to Garden, Church, or Literacy Classes

6:00 PM Dinner of Maize Meal (Fatigue, Sickness from Same Food)

7:00 PM Radio, Bed





Cold Timeline - Female (50+)

6:00 AM Wash and Start Fire

6:30 AM Cook Maize Meal and Tea for Family

8:00 AM Clean House, Yard, and Do Laundry

10:00 AM Collect Firewood with Children

1:00 PM Lunch of Maize Meal (Vegetables if Money Allows)

(Sells most vegetables from personal garden. Needs money to pay for electricity to power the water pump - N\$50 per year.)

2:00 PM Clean Laundry, Dishes, Blankets, etc.

6:00 PM Light Fire, Dinner of Pap

7:00 PM Coffee

8:00 PM Wash Children, Kids





Cold Timeline - Female (35+)

6:00 AM Wash Children and Make Tea

6:30 AM Work at a Teacher's House
(Washing, ironing, and cooking.)

10:00 AM Work Ends

1:00 PM Children Come Home from School, Lunch of Maize Porridge
(Daughter cooks – dropped out)

3:00 PM Literacy Class
(Should have started in March – Started in April to allow for garden work. Intended for youth who dropped out.)

4:00 PM Church

6:00 PM Bed
(If there is food she will eat, if not, will just go to bed.)





Drought Timeline - Female (35+)

6:00 AM **Wash Face and Hair, Only Cook Maize Porridge for Adults**
(Children who live at home get a scoop of maize porridge at school during the dry and rainy season but none during the cold season. Reasoning is not explained by the teachers. Children who live in hostel also get bread.)

6:30 AM **House Work**

10:00 AM **Arrive in Garden**
(Weed and use animal or store bought fertilizers.)

12:00 PM **Lunch of Maize Porridge**
(People who work on commercial farms bring meat to sell but almost no one can afford it.)

1:00 PM **Children Return from School**
(Checks that children are studying.)

3:00 PM **Collect Firewood**

(Some women do crafts at this time. Bracelets and beaded cloth. Karen comes, teaches a design, gives materials, takes the product, and sells in Gobabis. N\$120 for one piece of cloth which takes one month to make.)

5:00 PM **Return from Collecting Firewood**

6:00 PM **Bed**
(No evening meal in summer, only tea and sugar from store on credit. May also beg from relatives on commercial farm. Mother stops eating first so children can eat.)





Rainy Timeline - Female Community

7:00 AM Breakfast of Tea, Maize Porridge

9:00 AM Clean House

10:00 AM Check on Garden

(During the rainy season, a person must really use their hands but there is not so much work because it is too rainy. A person can get a plot if they want. Women mostly go out in the field, and attend church. Women are busier than men because the men sometimes sit around.)

12:00 PM Lunch of Maize Porridge with Sometimes Maize, Beetroot, Cabbage, Potatoes, Spinach, or Soup

3:00 PM Needlework or Mend Clothes

4:00 PM Firewood

(It is difficult to find firewood in the rainy season.)

6:00 PM Dinner of Maize Meal, Beans, and Meat if Maize has Been Sold
(If there is no food people just make a fire but during the rainy season almost everyone has food)

7:00 PM Bed



Appendix F: Ownership, Control and Access Matrices

Skoonheid - Gender

Participant Dynamics
<p>Total Participants: 10 Five men aged 30-50 One woman aged 18-25 Four women aged 30-50</p>



Objective: Analyze who owns, controls, and accesses community resources.

Relation to Project Goals: Determines the ability of people to control their own food security.

Outcome:

Skoonheid Male Ownership, Control, Access Matrix						
Resource	Men			Women		
	Ownership	Control	Access	Ownership	Control	Access
Water	5	6	3	5	4	7
Tractor	5	Committee	Klein Lucas	5	Committee	Klein Lucas
Chickens	0	2	6	10	8	4
Income	7	3	5	3	7	5
Dryland	5	5	5	5	5	5
Goats	6	6	10	4	4	0
Cattle-GRN	5	Committee	6	5	Committee	4
Clinic	Government	Government	4	Government	Government	6
Irrigated	5	5	5	5	5	5
Grazing Land	5	10	5	5	0	5
Education	Government	Teacher	3	Government	Teacher	7
Food	0	10	5	10	0	5
Trees	5	5	5	5	5	5
Diesel	Government	Committee	Immanuel	Government	Committee	Immanuel
House	5	5	7	5	5	7

Notes:

- Men control water pumping, women control water use at home for cooking and cleaning.
- Some men do not use the clinic because they are too proud, so use traditional medicine.
- More girls go to school because boys do not care but boys stay longer.
- Some women and children are homeless because houses are too full.
- Equality in deciding when to harvest, tractor use, food consumption, and how to use income.

Outcome:

Skoonheid Female Ownership, Control, Access Matrix						
Resource	Men			Women		
	Ownership	Control	Access	Ownership	Control	Access
Water	5	6	3	5	4	7
Tractor	5	5	7	5	5	3
Chickens	0	0	6	10	10	4
Income	6	5	3	4	5	7
Dryland	5	5	5	5	5	5
Sheep/Goats	5	2	8	5	8	2
Cattle-GRN	Government	Government	6	Government	Government	4
Clinic	Government	Government	5	Government	Government	5
Irrigated	5	5	5	5	5	5
Grazing Land	5	5	5	5	5	5
Firewood	5	5	4	5	5	6
Cattle-Private	10	10	5	0	0	5
Education	Government	Government	6	Government	Government	4
Food	5	1	5	5	9	5
Dog	10	10	10	0	0	0
Plow	5	10	10	5	0	0
Horses	7	10	7	3	0	3
Donkeys	5	8	7	5	2	3

Notes:

- Women control the small stock but men access by eating the majority.
- Donkeys are used to fetch water and firewood, pull the cart, for meat when dead, and plow.
- Boys get more schooling because girls get pregnant.
- Women control food because they must buy and cook it.

Skoonheid - Poverty

Participant Dynamics

Total Participants: 7
Two men aged 30-50
Five women aged 30-50



Objective: Analyze who owns, controls, and accesses community resources.

Relation to Project Goals: Determines the ability of people to control their own food security.

Outcomes:

Skoonheid Affluence Ownership, Control, Access Matrix						
	Rich			Poor		
Resource	Ownership	Control	Access	Ownership	Control	Access
Water	Government	Community	5	Government	Community	5
Chickens	8	8	8	2	2	2
Tractor	Government	Ministry	5	Government	Ministry	5
Clinic	Government	Dr. de Kok	5	Government	Dr. de Kok	5
Education	Government	Government	6	Government	Government	4
Goats	8	8	8	2	2	2

Notes:

Water

- Water can be accessed only once a day but everyone has the same access.

Chickens

- Only the owners can use the chickens.
- They only lay in the nest, but some lay in the field. If you find an egg in the field you cannot just take it.

Tractor

- Only one man plows with the tractor but everyone gets equal use for field.

Clinic

- Dr. de Kok comes with the clinic. She calls to say that she is coming.
- The clinic is in a small room in the farmhouse.
- When Dr. de Kok is not available, people go to Epukiro where there are always nurses. The doctor is there every so often.
- People attend for TB, asthma, malaria, diarrhea, rashes, chicken pox, and eye infections.
- People can get help at the clinic even if they have no money. Aid is not better if you have more money.

Education

- Being educated means you can read, write, go to school, and have a good heart. You are respectful and get respect when you are educated.
- Kindergarten exists in the community. Children learn to write, sing, and pray. For secondary school they must go to Drimiopsis, Duplessi, Kunichas, Epako, or Vinito School.
- Children do not often attend high school. Many schools do not accept children without money.

Goats

- If you are poor, you only have one goat. Only the owners have access to and control over the goats completely.

Drimiopsis – Gender

Participant Dynamics

Total Participants: 11
 Seven men aged 30-50
 Four women aged 30-50



Objective: Analyze who owns, controls, and accesses community resources.

Relation to Project Goals: Determines the ability of people to control their own food security.

Outcome:

Drimiopsis Male Ownership, Control, Access Matrix						
Resource	Men			Women		
	Ownership	Control	Access	Ownership	Control	Access
Water	Government	Government	4	Government	Government	6
Chickens	2	3	4	8	7	6
Money	6	4	6	4	6	4
Veldt	None	6	5	None	4	5
Cows	4	4	10	6	6	0
Plots	5	5	6	5	5	4
Clinic	Government	Government	4	Government	Government	6
Food	0	0	6	10	10	4

Notes:

Water

- Government owned. Men and women both make decisions about water use.
- Women access water more for domestic use.

Cattle

- Women own more cattle than men in Drimiopsis. Owner, whether lady or man, decides on cattle usage. If widowed, some ladies care for their own cattle, but usually widows get help from other men to care for cattle.

Chickens

- Always owned by women and purchased by women.
- Women cook and decide who eats what.

Clinic

- Men and women use clinic equally, but some believe that women use the clinic more.
- Men spend money on other things such as tombo while women save for the clinic.

Veldt

- Women usually collect veldt foods, but everyone eats it evenly.
- Commercial farmers will shoot you if they see you hunting.

Food

- Women own the food and decide when and what to eat, but men eat more.
 - Two men say they eat equally with their wives.
 - 6 say 6-4 men
 - 1 says 7-3 men
- Men believe that women sometimes pretend to give men more food but “we know they are saving some in the pot and eating it later”.
- Different if pregnant: women eat more and selectively.

Money

- Men make more money but women spend more.

Outcome:

Drimiopsis Female Ownership, Control, Access Matrix						
	Men			Women		
Resource	Ownership	Control	Access	Ownership	Control	Access
Water	5	6	3	5	4	7
Chickens	5	1	5	5	9	5
Money	5	6	5	5	6	5
Veldt	5	5	5	5	5	5
House	3	3	3	7	7	7
Crafts	0	0	0	10	10	10

Notes:

Water

- Everyone owns it but women fetch the water. The men then complain that we spill it and don't get enough. They want more.
- Women use water more than the men to wash, cook, and water the house garden.

Chickens

- Men and women own the chickens but women make the decisions on when to feed, water, and where they are. Women need to bake with the eggs so need to make the decisions.
- Men get half of the chicken then women and children split the other half.

Money

- Men make money decisions and if women do not obey they get hit. This usually happens with men who abuse alcohol.
- Women earn more money than men. Men can earn money by chopping firewood and selling to teachers. Women can be domestic help. This work can be for the whole year or partial. Women also have crafts. Women also can get more pension if they are widows with children.

Veldt

- Men use the veldt to chop wood for houses and to hunt, but women use it for veldt food.
- Bessies, cucumbers, wild potatoes and Kalahari truffles can all be found in the veldt.
- Men do not really hunt anymore. Maybe those working on the farms get to hunt, but not those who live in Drimiopsis.
- Men go and collect firewood if they have a donkey cart but if you do not have one you go together.

House

- The houses were given to the women when they were first built. Women make decisions around the house because their names are on the lease.
- In the "old days" men used to kick people out when they felt like it but since the houses are under the names of the women it only happens once every three months or so.
- One woman's children sleep outside because there are too many people in the house.
- The houses are given by the state but there is confusion about if a person can build on their land or expand their house.

Crafts

- Crafts belong completely to women. Men never tell women to stop but tell them to make more. Men never make crafts because Karen never talks to them.
- Karen brings all supplies, but they only sell to Karen. She takes them and sells them.

Drimiopsis – Poverty

Participant Dynamics

Total Participants: 11
 Seven men aged 30-50
 Four women aged 30-50



Objective: Analyze who owns, controls, and accesses community resources.

Relation to Project Goals: Determines the ability of people to control their own food security.

Outcome:

Drimiopsis Affluence Ownership, Control, Access Matrix						
Resource	Rich			Poor		
	Ownership	Control	Access	Ownership	Control	Access
Water	Government	Committee	5	Government	Committee	5
Chickens	8	8	8	2	2	2
Food	8	8	8	2	2	2
Cattle	8	8	8	2	2	2
Plots	5	5	5	5	5	5

Notes:

Water

- There was a time when the government provided all water, but now residents sometimes have to pay. The government does not always pay back.
- The old, the poor, and the pensioners contribute the most to water because they get cash.
- The water pumper decides when the pump turns on (Benedict). Other decisions are made by committee by vote. Many do not agree with the committee.
- People with goats and cattle use more water than the poor who use water just for domestic use.

Cattle

- Rich have more cattle than the poor. Only those who have cattle make decisions about cattle.

Plots

- Plots are distributed equally between the rich and poor.
- The people who do not have plots, it is their own fault for not being forthcoming.
- There was a time when people worked as a community, but now the plots are individual and we control our own plots.

Chicken

- People who have money buy chickens, people who do not, don't.

Clinic

- When people do not have money they are turned away and cannot get treatment.
- CBRP people must help people get transport to hospitals but it is not paid and when there is no money they may not get treatment.

Community

- Cattle and goats make a person wealthy. Cats and dogs were also mentioned, and women added sheep.

Appendix G: Food Security Pathway

Skoonheid

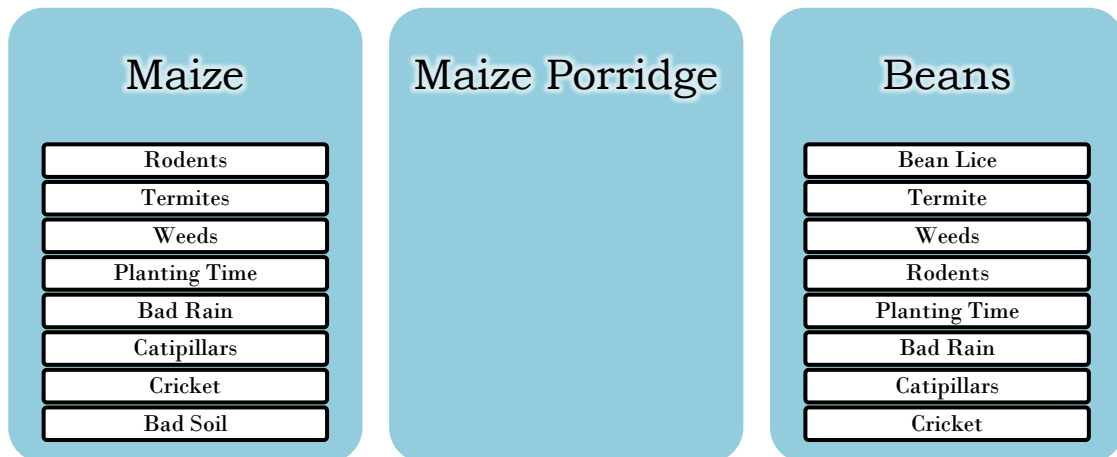
Participant Dynamics

Total Participants: 17
 One man aged 25-35
 Five men aged 35-50
 Two women aged 18-25
 Nine women aged 35-50



Objective: Determine the threats to and sources of staple foods, and participants' perceptions of food security.

Relation to Project Goals: Gives useful information for recommendations on how to mitigate



threats.

Outcome:

Notes:

Community

- Time did not permit analysis of the maize porridge pathway as concepts were difficult to explain and there was a great deal of discussion when ranking threats. We chose to focus on maize and beans because they are the most controllable aspects of the community's food security.

Maize

- Seeds are bought to grow, not to eat.
- Rain is a big problem because if after planting there is no rain, everything is a problem.
- Community understands that weeds prevent growing, and that if there is too much between the maize it will not grow.

Beans

- Not as affected by the weeds as the maize.
- Beans do not grow well in bad soil.
- It is very important to plant correctly, but some women believe that as long as you give them enough water, the beans will grow.
- Two men planted around the same time in the same area but had different yields.

Issues

- Never sell, always eat all of the food according to one.
- Some people can sell but they lack the transport to do so.
- Timing is important, plant earlier with good rain.
- Black colored bug attacks beans.
- Crickets eat flowers.
- Caterpillars eat seeds.
- Ants cut the plants.
- Jumping hare eats plants and beans.
- Forced to sell beans; when stored they attract flying ants. When cooked the ants can be seen leaving the beans.

Drimiopsis

Participant Dynamics

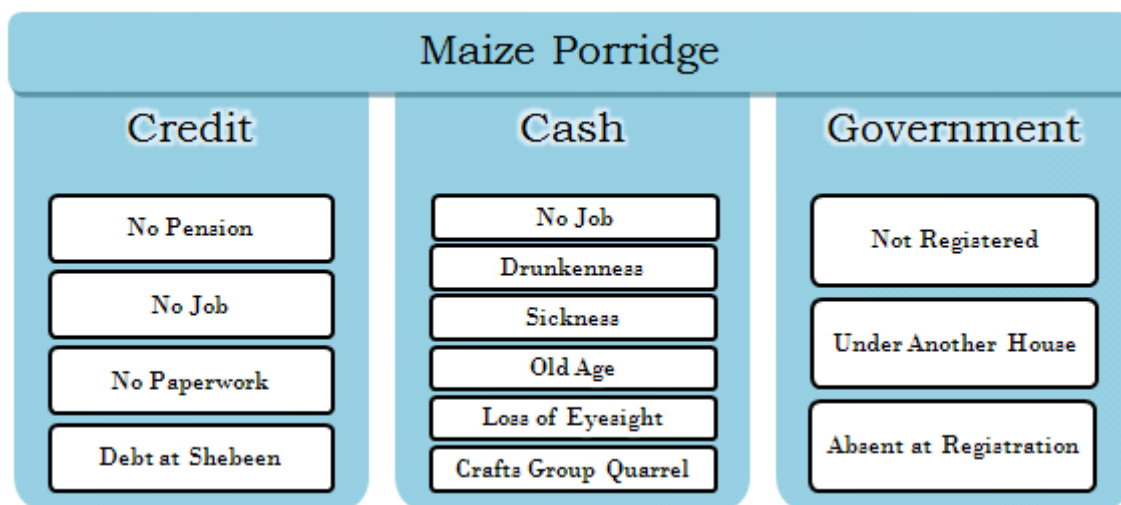
Total Participants: 10
 Five men aged 35-50
 Two women aged 25-35
 Three women aged 35-50



Objective: Determine the threats to and sources of staple foods, and participants' perceptions of food security.

Relation to Project Goals: Gives useful information for recommendations on how to mitigate threats.

Outcome:



Notes:

- Maize porridge is the only staple food that the community identified.

Credit

- If you work for someone or get pension, you can get food on credit. You need some kind of assurance that you can get work or pay it off. We go with our pension cards to prove that we can pay it.
- Pensioners cannot work anywhere else including the government. They send people out to check. The contract with another party can signal the government to arrest.
- If you do not pay credit, you will be stopped. The limit is \$300.00 for some people, but it depends on you. You try not to exceed your pension or all of it will go to the shops when it comes. Not all shops buy on credit and yes, they can refuse to give on credit.

Cash

- Women do domestic work for cash. Young men ask for pension money from older people. They may also work on commercial farms, and come back to give a little money but many come back and spend their money on alcohol.
- Some are too weak to work because of hunger, and others are too old. Being too drunk is a problem for everyone. Also squabbles in the craft groups can keep people from working.

Government

- Must make an application to the government in the office. The committee must put this together to get drought relief.
- Government assistance comes whenever they are struggling.
- Threats: you are not registered, you are already registered under another house, or you were absent during a registering period.

Appendix H: Marketing Discussion

Skoonheid

Participant Dynamics

Total Participants: 13
One man aged 25-35
Six men aged 35-50
Two women aged 18-25
Four women aged 35-50



Objective: Identify marketing practices that influence food security and community perceptions.

Notes:

Crafting

- Dr. de Kok buys crafts every two weeks and gives them money after an inspection. They are then sold in Gobabis. Four armbands are sold to Dr. de Kok for N\$40. They are only produced on request. Community was trained on how to make crafts. One man makes blinds for N\$20 a piece.
- Leather work is not done through Dr. de Kok. Leather is bought every three months from auction. People must walk or hitchhike to the auction on Duplacey's farm 20km away.
- People say they don't make enough for the time put into crafting. One man is not satisfied with crafting but at least he receives some money. With this money he can buy animal skins.
- Making crafts puts pressure on eyes and neck. It takes a lot of time, and some people have stopped making crafts. Two say even if its not enough money at least it's a job to buy sugar and tea.
- There are very few other sources of income.

Gobabis

- Gobabis can be reached with a car or by hitchhiking. Man named Johnny is available to drive. Langmann and Bryman can also drive. Bryman and Langmann ask for money (N\$100 for round trip). Grayman asks N\$50 to N\$100. It is N\$50 to the main road. Some people feel that if you don't have money you cannot get to Gobabis.

- If the animals are strong they can get you to Gobabis, but it takes all day. People must stay overnight. This is not a problem because most of the community has children or family in Gobabis, but those that cannot afford the trip stay in Skoonheid and sell in the location. Sometimes they are able to send things with others.
- Some say its worth going to Gobabis because they can sell crops for more and groceries are cheaper.
- Some sell maize in Gobabis, some at the surrounding posts, commercial farms, or in Skoonheid. Selling takes place in the open-air market.
- One woman is satisfied with prices in Gobabis. She said that if she is not satisfied with the offered price she does not sell. Some people keep trying if they cannot get a good price.

Epukiro

- Only one sells at Epukiro.
- N\$2 for a cup of beans at Epukiro, and N\$3 in Gobabis.

Sales Practices

- Beans, pumpkins, water melon, and maize are sold. Those who have permits can sell goats at auction.
- One older man went to Pos 3 didn't get a good price so he came back. People sometimes negotiate him down until he decides to take a lower price.
- People never go to Windhoek.
- Purchased goods are getting more expensive such as soap and clothes.
- Everyone sells individually or with husband. If they go in group they sit together and sell together.
- People spend some cash but must save some for ride home.
- If they had a community car to take them it would help.

Shebeen/Credit

- Shebeen is very expensive, more than Epukiro and Gobabis.
- If you have money or no money you go to the Shebeen because you can buy food on credit and drink. Some write down what they buy on credit to know how much they owe but there are those who are illiterate and have no way of checking. When it is pay time for pensioners they give them all their money and don't know if it's enough or too much. Each time they buy on credit they never get money back.
- Alcohol cannot be bought on credit, and is bought before food.
- People drink one day come back and ask for food the next. Some are addicted and recognize it.
- A lot of pensioners buy on credit, but spend more on credit than pension provides.
- Craftmakers also buy on credit because they are paid every two weeks.

- Sugar, tea, maize meal, tobacco, candles, and soap are bought on credit.
- One woman never buys at shebeen.
- Some just buy cheap things at shebeen.
- Recent increase of 50 cents.
- One man owes N\$264.
- People must pay first debt before next trip.
- One woman doesn't even know money.
- Limit is N\$400.

Jobs

- Farm work/ fencing/ building/ painting
- Some work on farm for food and get money deducted from check, and some get no cash.
- Most jobs won't say how much the pay before hand. Some go to work and get no pay.
- Before independence there was not such poverty.
- Christmas doesn't feel like Christmas.
- Not many can get jobs, but men get the most jobs.
- Sometimes people go out and work and have a good life and return with nothing.
- When they have a permanent job they send some cash back. A lot of men leave and go out to find jobs.
- People barter with animals. Can exchange goats for donkeys. There is no wool from sheep. Sheep are used for fat and meat.
- One man exchanged maize for beans.
- Most females go to school but get pregnant.
- There is a curriculum for CBRP but not really followed.
- VPC is something different.
- Community asked whether the government can put an official shop in Skoonheid. People said there was a shop but the shop keeper ran away with money. He still lives in Skoonheid.

Drimiopsis

Participant Dynamics

Total Participants: 10
Seven men aged 40-50+
Three women aged 35-50



Objective: Identify marketing practices that influence food security and community perceptions.

Notes:

Crafts

- Crafts in the community: bracelets, beads, whips, clothes, necklaces, wall art with beads, used to make coffins with special wood, but the wood is all gone.
- Sell beads in the Windhoek, then off to South Africa. Karen coordinates all with beads. She comes when the products are done, or supplies are needed. She also brings food for free.
- ~16 people are involved in making crafts
- Bead products are measured and paid by the size. Quality checks happen too.
- Non-Karen crafts: clothes sold just around on the streets, etc.
- They don't feel like they get enough money for the time spent on the crafts. Some have stopped crafting due to money/time.

Selling Crops

- After harvest they arrange transport to Gobabis where it is weighted and sold. Individual bags with names on them are weighted, thus the right percentage of proceeds go to each person.
- Some people sell by the roads.
- Gobabis is better for selling: more fair prices and it gets weighted. People don't go to Gobabis to sell due to the money needed for transport and other transport issues.
- Sell mainly maize, but some winter crops too (beets, onions, pumpkins, cabbage, carrots).
- They bring them to Gobabis. Price is okay, but "one & the same"

Buying in Gobabis:

- Clothes, shoes, porridge, and other goods are purchased.
- Gobabis has better prices than the winkel/shebeens, thus making transport more worth while.
- Get to Gobabis via hitch hiking sometimes.
- Most people go and shop every once and a while.

Credit

- It does happen, but its not easy.
- Through pension is how credit is given out. If pension time is far, then almost no credit is given out.
- There is a credit limit of N\$~300.
- The price of everything goes up when bought on credit. 10kg bag of maize meal in cash is N\$50 in cash, and N\$60 on credit.
- The basic needs (soap, cooking oil, maize meal) are sold on credit. Alcohol is also sold on credit in some winkel/shebeens. There isn't anything that hey have tried to buy on credit that they couldn't get.
- Those that are unemployed can't get credit. If you can't pay your debt, they just stop selling to you until you are all paid up. If it becomes a habit, they can stop extending credit at all

Jobs

- Gardens/plots, housework for teachers, people also go away and work on other people's farms. Some people even go to Windhoek to work in people's houses.
- Mainly men go away to work.
- They said that it isn't enough money.
- Just a few people go to work and don't get paid at all.
- Those that present issues are those that have been working on the white farms for a long time and then get released.

IGA

- Sell own clothes, sell pods from the Acacia tree, sell fat cakes.
- Within the community: They sell everything between each other: clothes, crops, maize, cabbage, beet roots, carrots, watermelon are the main things.
- Why selling: Sell because they need money and because they can't store everything properly.
- They don't store anything, leave stuff in the garden and pick when needed, the rest is sold.
- They have tried storing things in the office, but it got all rotten. Onions were the only things that kept.
- If they could store crops they would sell less and eat more. If they could store all food grown, they would have enough food all year for everyone.

Appendix I: Nutrition Discussion

Skoonheid

Participant Dynamics

Total Participants: 18
Eight men aged 35-50
Two women aged 18-25
Eight women aged 35-50



Notes:

Sickness

- People that are ill lose appetites and are then placed on IVs.
- Old people often need doctors.
- Sickness is also caused but HBP, arthritis, TB.
- High blood pressure is due to sugar, causes headaches, blackouts, and increased heart rate. Salty and fatty meat will cause HBP.
- Fainting is considered a different thing than a blackout.
- People often feel too weak to work due the lack of food especially during the dry season.
- No body breaks their bones, yes it happens. Mainly to kids break their arms. Caused by tripping and falling.
- Many kids have sores on their heads and are contagious and are caused by dirt and sand. Cream from the clinic and devil's claw to make go away. Prevent by staying clean.
- Many people get crusty yellow eyes, anyone can get it, but especially those that do crafts. No one knows if the kids have night vision issues because they are at school.
- Older women can't see very far and old men have hazy vision.
- Vitamin A pills are only received at the clinic, and all children get immunizations.

Diet

- Meat causes people to drink water because cows eat salt. Meat, fish, and milk prevent people from getting sick. If you just eat porridge, you don't build up. You can even become healthy when you eat meat because some people don't drink a lot of water, but when they have meat they drink water. Part of the meat has fat, and it makes you thirsty. The cow itself is salty when it eats a lot of salt.

- To be as healthy as possible you should eat: pumpkins, cabbage, fish, veggies, green beans, carrots, potatoes, rice.
- Fruits are very expensive, but healthy for the body. They can fight disease. Only really eaten when in town. If fruits could be grown, they would eat them: favorites: apples, oranges and pears.
- Tobacco is not healthy, kills people and makes TB worse. Men smoke and sniff, ladies just sniff. People are addicted to tobacco.
- Older people tend to quit drinking alcohol. The drinkers are mainly young men and old women. Drinks include: tombo, kalhut (goat lice killer). Aware that alcohol is bad. "If it was healthy, people around here would be fat." If you drink you loose appetite.
- Veldt foods are healthier than current foods. People were really healthy in old times.

Education

- Programs that teach people how to eat healthy include: CBRP, VPC, and Ministry of Health
- Only a small group of people attend those meetings. Teach mainly about TB, HIV, and a little bit of nutrition and healthy eating.

Drimiopsis

Participant Dynamics

Total Participants: 21
Twelve men aged 35-50
Two women aged 18-25
Seven women age 35-50



Notes:

Sickness

- Kids have vomiting, diarrhea, sores, and chicken pox.
- Diarrhea call for lots of water and liquids for everyone, especially kids. Cooked water with sugar and salt added helps.
- Broken Bones: Mainly from soccer, falling, falling out of trees. Happens to elders and kids. Call the ambulance to take them to Gobabis. Bone healthy foods: Milk only.
- Eyes: Old age, allergies, “see darkness” (glasses help). Kids get runny eyes. They put milk or urine in their eyes, they say it helps.
- Not many cases of malaria anymore after given mosquito nets from the clinic. Given to young children and pregnant women.
- TB happens often, mostly elderly and children. It is spread within families. Free treatment: Gobabis people come and check up on monthly to see if they are taking their treatment
- Large problem with sanitation. It causes diarrhea, polio (?), sores. They try to wash their hands and keep short nails to stay clean
- Alcohol causes people to “swell up”. This is a big problem in the community. Nothing has yet been done in the community to help stop the issue. There has been a committee created about alcohol and drugs, just waiting for training.

Diet

- Eating the wrong foods can make someone unhealthy (rotten or old food). Not eating the right foods at the right times can cause unhealthiness too. This unhealthiness can cause a lack of appetite and make someone weak.
- To stay healthy a person needs Fruits (vitamins) and veggies, potatoes, cabbage, oranges, apples, bananas, pears, carrots, beans, and sorghum.
- Eating just pap is not healthy at all.

- The fruit and veggies don't keep for more than a week between eating and selling them. No viable storage
- Same foods needed for both adults and kids to be healthy.
- Meat is wanted too, but cabbage, potatoes, rice, and beans all give the same strength.
- Babies 3-6 months start eating solid foods such as porridge. They stop breast feeding at about 1-2 years.
- They only know what is important to eat or not when the doctor says so. They basically eat what is available.
- Kids eat less when they are sick, but they try to feed them more to make up for the sickness loss.

Clinic/Hospital:

- Mobile clinic comes once a month. People don't always know when the clinic comes to town, thus miss it.
- Very difficult to get to the hospital in Gobabis. They hitch hike to hospital, but then they have to pay for the ride, sometimes they beg for it. Sometimes it takes 3 days to get to Gobabis.
- People do help them when they asked for money for the hospital, have to pay back most of the times. Once you get to the hospital you can always get seen.
- Traditional healers aren't interesting anymore, and they charge too. Very few left.
- If weak sometimes you can't get to the hospital.
- Many women take their kids to get weighted for growth charts.
- Some don't take their kids to get weighted because they don't want the kids to get shots.
- All mobile clinic costs are free.
- Most children get vitamins from the clinic, they come to get them.

Education

- Education on food comes from: hospital, clinic, schools, growing up with white people who tell us what we should eat.
- Kids start learning about health at 6 years old. Older people say no about group classes and teachings. Kids say Adventures Unlimited (9-14years old) and Stepping Stones (14 years and up). Adventures Unlimited teaches about the growing process. Stepping stones teaches about HIV, TB, and general health and disease issues.

Appendix J: Feedback Session

Skoonheid

Participant Dynamics

Total Participants
Five men aged 30-50
Three men aged 50+
Four women aged 20-30
Two women aged 30-50
Six women aged 50+



- Thank community for participation and remind that we are here writing a report for LISUP and making recommendations.

Past Efforts

Diesel

- Came together as a community to try to solve the issue but could not find the solution. It is an issue of fair cost and contribution for cattle.

Broken Water System

- Asked for cement to fix dam. LISUP is waiting for 50% contribution from GRN to supply cement.
- Desire zinc dam.

Transport

- Car was given to the community by Spanish Corporation but there was no driver so it was sent back to Windhoek. It didn't have GRN plates so it couldn't be serviced at a GRN location. Maintenance issues.

Food Variety

- The government only provides pap because the people only ask for pap. The government should know that we need more.
- One person has tried to grow guava, lemons, and apples. Grapes, peppers, spinach, and chilies have also been tried by select people.

Bad Soil

- Manure and ash have worked as fertilizer but manure works better.

Pests

- Some people trap the springhares and eat them.
- Little else has been done for the other pests.
- Ash is mentioned in conjunction with ridding ants with mixed reviews.

Storage

- Some store in large barn and some store at home.
- Issues with stealing.

Ideas Presented

Diesel

- Improve efficiency.

Water

- Cover the dam to lessen evaporation.
- They agree but feel that there are little resources in the community to do this themselves. Nets and using roofs from other structures were brought up.
- Some people throw waste water away instead of using in home gardens.
- Ministry of Land should come and fix pumps.

Transportation

- Use donkeycarts collectively to get to Gobabis.

Food Variety

- Try and get extra money to be able to buy more and different types of food.

Monitoring and Education

- Professional training and picture book mentioned. Large interest in monitoring shown by those present.

Agriculture

- Two crops are rotated but these are the only crops used for this.
- Bee keeping has been suggested but never tried.

Storage

- Only store in traditional ways: open air or in bags of ash.

Crafting

- Idea of making shoes, needlework, handbags, knitting.
- Community gives second reminder for shop that sells fruits and vegetables from the government at a cheaper price than the shebeen.

Drimiopsis

Participant Dynamics

Total Participants : 13
One man aged 20-30
Eight men aged 50+
Two women aged 20-30
One woman aged 30-50
One woman aged 50+



- Restatement of the purpose of our study and time here: LISUP, food security, and nutrition. We aren't here to promise anything, just obtain an understanding of life here.

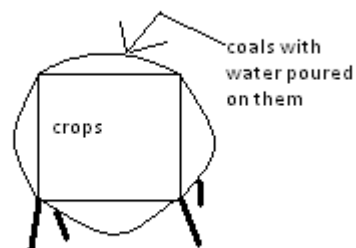
Issues

- Meat and milk – don't hunt anymore, too expensive to buy.
- Water for fields – pumps.
- Pests – every crop has its own pest, more issues during the rainy season. Tops of beet roots eaten off. Some pests include: springhare, aphids, and worms. Weeds are an issue too, "lawn" style grass chokes the crops from expanding.
- Lack of work – limits income, thus the ability to eat well.
- Storage – lacking. If store with out selling there would be enough food, but they need to sell some, they need to be able to pay for things too (like school fees).
- Selling – transport not reliable, especially to Gobabis.
- Food variety in diet – not everyone has an irrigated garden, and those that do only eat when the vegetables are ready. Thus many don't eat vegetables through the bulk of the year. Too much porridge.
- Sanitation – big issue in the community. Soap is lacking and expensive at local shops. Each formal government given house has a flush toilet.
- Hunger – happens periodically between harvests.
- Stealing – stealing from the fields pre-harvest. Reported to police, sometimes the person is caught. Many people suffer from it. Stolen stuff gets sold. Pumpkins cut in half to check for ripeness, if not ripe it is just left in the field and is wasted.
- Some people still have maize from summer's harvest.

- They are only able to keep maize and beans when mixed with ash. Can last for about 2 months.
- List of issues put up on the board: lack of transport, storage, meat, water, pests, grass/weeds, no work, stealing.
- Ranking of list presented:
 1. No work – leads to theft.
 2. Storage – they could wait to sell if they could store foods. They want a “cool place” to keep everything.
 3. Transport – N\$30 for the group truck. If they had their own transport everything would be easier to sell and do everything. Often have issues.
 4. Water – hinders farming, self, and animals. Sometime pick between them. Toilets don’t work without water too.
 5. Pests
 6. Lack of variety in diet
 7. Meat
 8. Stealing
 9. Weeds

Past attempts and future ideas:

- No work – bricks project (IGA), it didn’t work because some of the people involved stopped and there was a lack of market. Many people still know how to make bricks, weld, and paint. The bricks were made because they needed to build their own houses. Knitting, crafts, sewing (only crafts continuing), gardening (IGA and feeds them – when enough to harvest it works, gives people something to do)
- Storage – harvest and eat. Only a few mix with ash to keep maize and beans. Other veggies can’t be stored without a cool place, this they have to sell them. Watering cold coals to keep crops cold? They don’t use the “cooler” because they haven’t built it and are lacking some of the supplies



- Transport – hitch hiking, community rented truck, donkey carts, walking (~10 hours when carrying stuff). Go to buy needed goods, sick, visit family/friends. Have to go after harvest.
- Water – LISUP adds to what they contribute, thus they get enough water in the formal units.
- Pests – pesticides from LISUP, it works basically for all pests.
- Pap – settle for it due to storage and money constraints.
- Meat – issues with storage, money, and laws.
- Stealing – report to police. Most people are underage, thus they get taken in and then are released. Can't lock someone up about/over maize.
- Weeds – just weed it all out by hand, no other way.
- Interest in training – agriculture, health, diet.
- Game/speaker/picture book – all sound find, but it all goes through Lenin (Ministry of Lands). Definitely need to have agricultural training.
- Monitoring – can be possible, but they weren't really sure how. Michael later said that it would have to be from within the community.

Appendix K: Roles of Vitamins in Health

Adapted from the Vitamin Deficiencies Chart
 Eastern Cape Department of Health: Integrated Nutrition Programme
 Private Bag X0038, Bisho. 040 6094242/3/7/8
 And Table of the most important vitamins and minerals, MHSS, 2007

Vitamin	Sources	Role in Health	Daily Requirement	Symptoms of Deficiency
A (Retinol & Beta Carotene)	Retinol: Liver, oily fish, egg yolk, butter, cheese. Beta carotene: carrots, winter squash, apricots, spanspek, green leafy vegetables.	Essential for growth and cell development, vision and immune function. Maintains the health of the skin and mucous membranes such as the lining of the respiratory and urinary tracts. Carotenes may act as important antioxidants in the body.	Male: 1000 mcg Female: 800 mcg (1300 mcg in breastfeeding)	Poor night vision, increased risk of infection, respiratory disorders; eye damage which in extreme cases can lead to blindness.
B₁ (Thiamine)	Pork, liver, heart, kidneys, fortified bread, fortified breakfast cereals, potatoes, nuts, and pulses.	Needed to obtain energy from carbohydrates, fats and alcohol; prevents the build-up of toxic substances in the body which may damage the heart and nervous system.	Male: 1.5 mg Female: 1.1 mg	Appetite loss, mental confusion, swelling of the limbs, loss of sensation, nervous disorders, muscle weakness and an enlarged heart. Common among alcoholics.
B₂ (Riboflavin)	Milk, yoghurt, eggs, meat, poultry, fish and fortified breakfast cereals.	Needed to release energy from food and for the functioning of vitamin B ₆ and niacin.	Male: 1.7 mg Female: 1.3 mg	Dry, cracked lips, inflamed, bloodshot eyes, dermatitis, mild anaemia.
B₃ (Nicotinic Acid)	Lean meat, poultry, pulses, potatoes, fortified breakfast cereals and nuts.	Needed to produce energy in cells and to form neurotransmitters. Helps to maintain healthy skin and an efficient digestive system.	Male: 19 mg Female: 15 mg	Fatigue, depression, pigmented skin rash (more likely when exposed to sunlight), dermatitis, diarrhea, and in advanced cases, dementia.
B₅ (Pantothenic Acid)	Contained in all meat and vegetable foods,	Helps to release energy from food. Essential to the	Male: 4-7 mg Female: 4-7 mg	Deficiency is extremely rare and may lead to

	particularly liver, dried food and nuts.	synthesis of cholesterol, fat and red blood cells.		numbness and tingling in the toes.
B₆ (Pyridoxine)	Lean meat, poultry, fish, eggs, wholewheat bread, cereals, nuts, bananas, yeast extract and soya.	Helps to release energy from proteins; important for immune function, the nervous system and the formation of red blood cells.	Male: 2.0 mg Female: 1.6 mg	Deficiency in adults is rare but may be induced by antifungal and antitubercular drugs. Symptoms include anaemia, depression and confusion.
B₇ (Biotin)	Present in almost all foods, particularly liver, peanut butter, egg yolk and fortified foods such as yeast extracts.	Needed to release energy from food. Important in the synthesis of fat and cholesterol.	Male: 30-100 mcg Female: 30-100 mcg	Deficiency is unknown on a normal diet but can be induced if raw egg whites are eaten regularly. Symptoms include dermatitis and hair loss.
B₉ (Folic Acid)	Green leafy vegetables, liver, Brussels sprouts, broccoli, pulses, wheatgerm, fortified breakfast cereals and bread.	Required for cell division and the formation of DNA, RNA, and proteins in the body. Extra needed before conception and in pregnancy to protect against neural tube defects.	Male: 200 mcg Female: 180 mcg (400 mcg in pregnancy)	Megaloblastic anaemia, wasting of the gut leading to malabsorption of nutrients. Linked with neural tube defects in foetus.
B₁₂ (Cyanocobalamin)	Foods of animal origin such as meat, eggs, and dairy products.	Needed to form red blood cells and maintain nerve and gastro-intestinal tissue (MHSS, 2007).	Not available.	Anaemia, nerve problems, confusion (MHSS, 2007).
C (Ascorbic Acid)	Fruits and vegetables, particularly citrus fruit, guavas, strawberries, kiwi fruit, peppers, blackcurrants and potatoes.	Needed to make collagen (a protein essential for healthy gums, teeth, bones, cartilage and skin) and neurotransmitters such as noradrenaline and serotonin. Important as an antioxidant in the body; aids absorption of iron from plant food.	Male: 60 mg Female: 60 mg (smokers 80-120mg)	Fatigue, appetite loss, aching joints, sore gums, scaly skin. Slow healing of wounds and consequent increased susceptibility to infection. Severe deficiency can cause mental disorders and internal haemorrhages which may lead to anaemia.

D (Calciferol)	Fish liver oils, eggs, fortified margarines, tuna, salmon and sardines.	Needed to absorb calcium and phosphorus for normal formation of bones and teeth.	Enough vitamin D is made when the skin is exposed to sunlight. People who are confined indoors require about 10mcg from the diet.	Muscle weakness and tenseness, shortening of the bones causing bone pain and fractures (osteomalacia). In children, leads to deformation of the skeleton (rickets).
E (Tocopherol)	Vegetable oils, wheatgerm, nuts, seeds and margarine.	Helps to prevent oxidation by free radicals of polyunsaturated fatty acids in cell membranes and other tissues.	Male: 10 mg Female: 8 mg	Occurs only in people who cannot absorb fat and in premature babies. Symptoms include haemolytic anaemia and nerve damage.
K (Phylloquinone, Menaquinone)	Green leafy vegetables, especially green cabbage, broccoli and Brussels sprouts.	Essential in forming certain proteins and needed for normal blood clotting.	Male: 70-80 mcg Female: 60-65 mcg	In extreme cases a deficiency reduces prothrombin (a coagulation agent), so impairing clotting of the blood. In adults deficiency is usually the result of disease or drug therapy.

Appendix L: Roles of Minerals in Health

Mineral	Function in the Body	Food Sources	Deficiency Symptoms
Calcium	Building and maintaining bones and teeth, nerve transmission, muscle contraction, regulation of heartbeat.	Milk, cheese, other milk products, dried fruit, dark green leafy vegetables, sardines.	Stunted growth, poor development of bones and teeth, osteoporosis, leg cramps.
Copper	Skeletal development, formation of red blood cells by helping the body to adsorb and use iron, immunity.	Liver, kidney, nuts, legumes, cocoa, eggs.	Anaemia, nerve problems, osteoporosis.
Iodine	Component of thyroid hormones, normal body temperature, energy metabolism normal growth and reproduction, prevention of goiter.	Iodized salt, sardines, other seafood and salt water fish.	Development of goiter, poor mental and physical performance, slowed heart rate, weight gain, constipation.
Iron	Responsible for carrying oxygen to cells, involved in the function of the immune system and in cognitive performance.	Liver, organ meat, poultry, fish, dried beans, green vegetables, eggs.	Anaemia, headaches, shortness of breath, weakness, fatigue, heart palpitations, sore tongue.
Magnesium	A normal constituent of bone, involved in a wide variety of biochemical and physiological processes, including muscle contraction and nerve transmission.	Cocoa, chocolate, nuts, soybeans, dried beans, peas, dark green vegetables, whole grain cereals.	Loss of muscle control by causing muscles to remain contracted, nervousness, irritability and tremors.
Selenium	Prevents oxidation and breakdown of fat and other body cells, improves supply of protein to the heart muscle, antioxidant.	Brown rice, nuts, liver, eggs, seafood, grains, garlic.	Impaired antibody production, weakness, impaired growth, heart problems.
Zinc	Needed for digestive and immune system enzymes, important for wound healing, needed for formation of proteins and carbohydrates, antioxidant.	Seeds and nuts, whole grain, green leafy vegetables, eggs, liver, seafood.	Loss of appetite, sense of taste, skin problems, poor wound healing, slow growth.

(MHSS, 2007)

Appendix M: Nutrients in Common Foods

Food (Per 100g)	Description	Energy (Calories)	Protein (g)	Iron (mg)	Vitamin A (megRE)
Millet (Mahangu)	Pearl, flour	318	5.6	54	4
Maize Meal	Flour	335	8	1.1	0
Maize	Whole	364	8	3	0
Rice	Cooked	138	2.6	0.2	0
Potato	Cooked	75	1.5	0.3	0
Sweet Potato	Cooked	84	1.1	0.7	660
Groundnuts	Raw	564	25.6	2.5	0
Beef	Raw	123	20.3	2.1	0
Chicken	Raw	116	21.8	0.5	0
Fish	Steamed	98	22.8	0.2	0
Milk	Fresh, whole	66	3.2	0.1	55
Egg	Boiled	147	12.5	1.9	190
Carrot	Raw	35	0.6	0.3	1350
Carrot	Boiled	24	0.6	0.4	1260
Spinach	Raw	58	4.5	7.2	550
Spinach	Boiled	19	2.2	1.6	640
Pumpkin	Boiled	13	0.6	0.4	160
Tomato	Raw	17	0.7	0.5	107

(MHSS, 2007)

Appendix N: Agricultural Specifications

Crop	Moisture Extraction Depth (mm)
Ryegrass	250
Kikuyu	300
Vegetables	450
Potatoes	500
Dry beans	600
Maize	600-800
Wheat	600-900
Soyabeans	600-900
Groundnuts	600-900
Cotton	1000
Sugarcane	1200
Lucerne	1200
Orchards	1000
Peas	600
Sweet Potatoes	900
Tobacco	750
Tomatoes	600

(Smith, 2006, The Farming Handbook)

MAIZE (ZEA MAYS)

Site requirements

Maize prefers a warm to hot, frost-free growing season

Rainfall: 500-700mm

Temperature

germination: 18-20 Celsius

growth: 24-30 Celsius

Soil: well drained, deep red and yellow brown soils. Light- and heavy-textured soils reduce yields in low and medium rainfall areas. In drier areas, fine-grained sandy loam Avalon soils are very suitable. The rooting depth should be 750 mm or more.

Growth Cycles

Establishment: 15-25 days

Vegetative: 25-40 days

Flowering: Tassel in 10-15 days; silk in 10-15 days

Yield formation: 40-50 days

Ripening: 10-15 days

Moisture stress can reduce yield; maize is most vulnerable 105 to 120 days after planting. During this vulnerable period, the commencement of silking, one day of water stress can reduce yield by 11 percent. A stress day occurs when a plant wilts in the morning from previous water strain. Eight consecutive days of water stress during the vulnerable period of growth can result in an eighty percent reduction in yield.

Maize planting specifications based on average rainfall:

Rainfall (mm)	Row spacing (mm)	In-row spacing (mm)	Plants/ha
900	750	270	50,000
800	750	330	40,000
700	750	440	30,000

Fertilization: Sandy soils should be nitrogen treated twice.

Weed Control: Weeds compete with maize plants for moisture and fertilizer, therefore early weeding increases yield.

First weeding: two to three weeks after emergence

Second weeding: Two to three weeks later

Third weeding: two to three weeks later, if necessary

Or use herbicide pre-emergence and early post emergence

Labor and fuel requirements for maize plants

Operation	Labour (days/ha)	Tractor (litres/ha)
Ploughing	1.65	32.33
Other land preparation	2.42	20.78
Liming and fertilising	3.69	7.12
Planting (by hand)	6.34	-
Planting (machine)	1.1	6.15
Cultivation and herbicide	7.34	6.34
Cultivation only	12.75	8.34
pest control	1.99	0.56

Yields

Maize yield based on rainfall		
	Rainfall (mm)	Grain (tons/ha)
Dryland	700	3.75
	800	4.75
	900	6
Irrigated		8.0-10.0

(smith, 2006, The Farming Handbook)

DRY BEANS (PHASEOLUS VULGARIS)

Dry beans are a good source of protein and have an advantage over other legumes as their seeds can be stored for long periods of time.

Rainfall: 500 (mm) during growing season

Temperature: 18-24 C after emergence

15C <day temp < 30 C after flowering

Soil: deep well drained soils, clay content 15-25%

Planting dates: Planting too early results in seed ripening during the rains, causing tannin stain. Planting too late causes rust.

Planting depth: light texture soil (less than 25% clay) 50mm, heavy-texture soil (more than 35%) 30mm

Crop Rotation: one in three years alternate with maize or wheat to prevent disease.

Fertilizing: 70% at planting 30% within four weeks of planting. Dry beans are less susceptible to low potassium levels.


Weeds: weed pre-planting, pre-emergence, and post emergence.

Yield: Beans 1-2.5 tons/ha

(smith, 2006, The Farming Handbook)

Appendix O: Child Growth Chart

9-1/0034 B



Republic of Namibia

Ministry of Health and Social Services
CHILD'S GROWTH CARD

CHILD IDENTIFICATION

Health Facility Name:
Child's Name:
Sex:
Child Clinic No:
Date of Birth:
Date First Seen:
Birth Order:
Mother's Name:
Father's Name:
District:
Location:
Village/Street:

PARTICULARS OF BIRTH

BIRTH: Normal: _____ Instruments: _____
BIRTH: Hospital: _____ Clinic: _____ Home: _____
 Caesarian Section: _____
 Head Circumference: _____
 Birth Weight in kg: _____
 Length: _____

Neonatal problems: _____

IMMUNISATION

Age	Vaccine	Date due	Date given	Given by
New Born	Polio 0 BCG			
6 weeks	Polio, DPT, HepB + Hb 1 (Pentavalent)			
10 weeks	Polio, DPT, HepB + Hb 2 (Pentavalent)			
14 weeks	Polio, DPT, HepB + Hb 3 (Pentavalent)			
9 months	Mozelis + Vit A			
5 Years	DT + Polio			
10 Years	DT + Polio			

HEALTH EDUCATION

Breastmilk is best for your baby

- Breastfeed your baby exclusively for 6 months.
- At 6 months add mixed complementary foods and continue breastfeeding for at least 2 years.



Give plenty of **green leafy vegetables** and **fruits**.
They are good for your child's eyes.



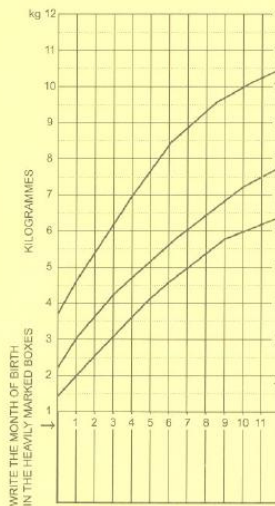
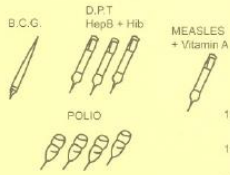
Vaccinate your baby against the **eight childhood diseases**.
They are dangerous diseases.

IF YOUR CHILD HAS DIARRHOEA

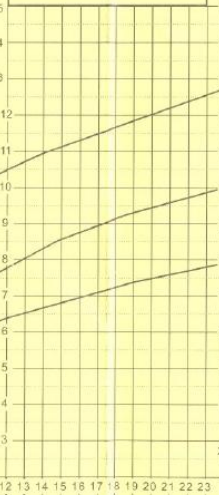
1. Continue Breastfeeding.
2. Give plenty of water, home made cooked thin porridge and "omaere".
3. Continue other foods.
4. Seek medical advice, if child is not improving.

GROWTH CHART

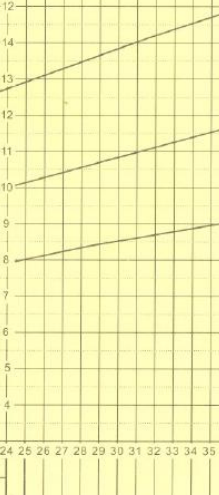
BIRTH TO 1 YEAR



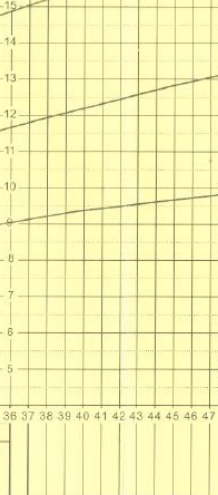
Birth - 1 year



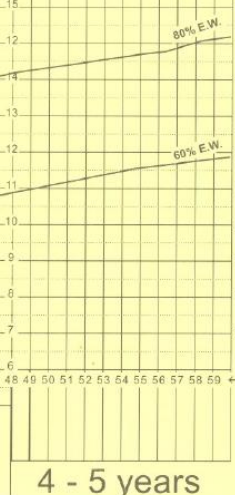
1 - 2 years



2 - 3 years



3 - 4 years



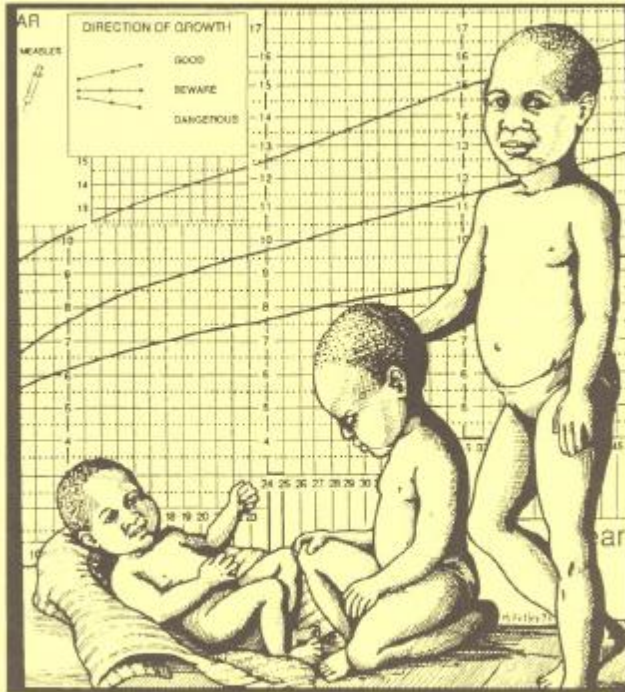
4 - 5 years

IMPORTANT MILESTONES

AGE IN MONTHS	MILESTONES
4 and a half to 9	Sits alone at least for one minute
9 to 18	Walks at least 10 steps
9 to 20	Talks 3 to 4 words
18 to 24	Talks sentences of 3 to 4 words

Note: Check the milestones on each visit and refer to the doctor in case of delayed milestones.

HOW TO USE THE CHILD GROWTH CARD TO PROMOTE GROWTH



A GUIDELINE FOR
OPERATIONAL LEVEL AND COMMUNITY HEALTH WORKERS

**HOW TO USE
THE CHILD GROWTH CARD
TO PROMOTE GROWTH**

**A GUIDELINE FOR
OPERATIONAL LEVEL AND COMMUNITY HEALTH WORKERS**

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Namibia
With support of UNICEF



FOREWORD

This small booklet is a guideline on how to use the child's Growth Card to promote the growth of children in Namibia.

The booklet is meant for all health workers dealing with growth of children by constant monitoring and promotion using the child growth card, and providing appropriate nutrition education in hospitals, clinics and in communities.

It is a simple book with illustrations and examples. It has resulted from the experiences of many health workers in Namibia.

The introductory part enlightens health workers on the relationships between growth monitoring and growth promotion. It then gives 10 steps which will guide health workers in the use of the growth card for monitoring and promotion of growth and concludes by suggesting relevant content for health and nutrition education.

The Ministry of Health and Social Services is indebted to all those who contributed to the production of this book, in particular UNICEF for financial and technical support and the national task force for the Growth Card.

All health workers are urged to make good use of this booklet and to actively involve our communities in the promotion of good growth for our children.

Amadhila

Sally Amadhila
Permanent Secretary
MINISTRY OF HEALTH AND SOCIAL SERVICES



TABLE OF CONTENTS

Foreword.....	(i)
The Concept of Growth Monitoring and Promotion.....	1
Section 1 of the Child's Growth card.....	2
Section 2 of the Child's Growth card.....	4
Section 3 of the Child's Growth card.....	6
Section 4 of the Child's Growth card.....	7
A small diary provided with the card.....	8
Weighing the Child.....	9
The growth Curve.....	12
Interprete the Growth Chart.....	13
Identify the Cause of the Problem.....	14
Assist mothers, families and communities to take actions based on investigation.....	16
Example of Possible actions to support Growth Monitoring and Promotion.....	18
Important Health and Nutrition Education to Promote Growth.....	21

THE CONCEPT OF GROWTH MONITORING AND PROMOTION

- Growth is the gradual increase in size of the body and other organs.
- A normal growing child will advance from lying and sitting to a walking stage.
- A growing child is a healthy child.
- Growth depends on good family care and love.
- Growth also depends on the absence of diseases and availability of the right food in adequate quantities.
- The right food includes breastfeeding and complementation at 4 - 6 months of age.
- Growth depends on good medical and environmental care.
- Good medical care includes prevention of infectious diseases, through immunization. It means early treatment of diarrhoea, Acute Respiratory Infections (ARI), malaria and other diseases.
- If growth is measured often poor nutrition can be noticed before it becomes serious. This is called growth monitoring.
- The easiest way to monitor growth is through weighing and plotting on the growth chart.
- The purpose of monitoring the child's growth is to promote growth, to maintain weight increase by preventing diseases and promoting good child care and proper eating in children. This means growth promotion.
- To maintain proper eating and care, families have to work very hard to produce enough food and enough income to purchase food.
- To maintain proper eating and care, families, communities, the government and Non Government Organizations need to work together.

**REMEMBER CHILD GROWTH, IS PROMOTED BY ACCURATE WEIGHING,
PROPER ANALYSIS OF PROBLEMS AND TAKING APPROPRIATE ACTIONS,
INCLUDING NUTRITION EDUCATION**

1



REPUBLIC OF NAMIBIA

Ministry of Health and Social Services

CHILD GROWTH CARD

CHILD IDENTIFICATION

Health Facility Name:	_____
Child's Name:	_____
Sex:	_____
Child Clinic No:	_____
Date of Birth:	_____
Date First Seen:	_____
Birth Order:	_____
Mother's Name:	_____
Father's Name:	_____
District:	_____
Location:	_____
Village/Street:	_____

PARTICULARS OF BIRTH

BIRTH	BORN AT
Normal: _____	Hospital: _____
Instruments: _____	Clinic: _____
	Home: _____
Cesarian Section: _____	
Head circumference: _____	
Birth weight in kg: _____	
Length: _____	
Neonatal problems: _____	

IMMUNISATION

Age	Vaccine	Date Due	Date Given	Given by
New Born	Polio 0			
	BCG			
6 weeks	Polio 1 + DTP1			
10 weeks	Polio 2 + DTP 2			
14 weeks	Polio 3 + DTP 3			
9 months	Measles			
5 years	DT + Polio			
	BCG			
10 years	DT + Polio			
	BCG			

FOR GOOD SUCCESS HERE IS HOW TO USE A GROWTH CARD TO PROMOTE GROWTH:

STEP 1: UNDERSTAND THE CHILD'S GROWTH CARD

Study the child's growth card on his/her first visit and see that all spaces are filled in as advised.

SECTION 1 OF THE GROWTH CARD SHOWN ON PAGE 2

The Child's Particulars

Fill in all the blanks as shown. **Health facility** refers to the clinic from which the child gets his/her immunisation.

Birth order - write down whether the child is first born, second or third by putting either 1, 2, or 3 or more depending on how many children come before the current child.

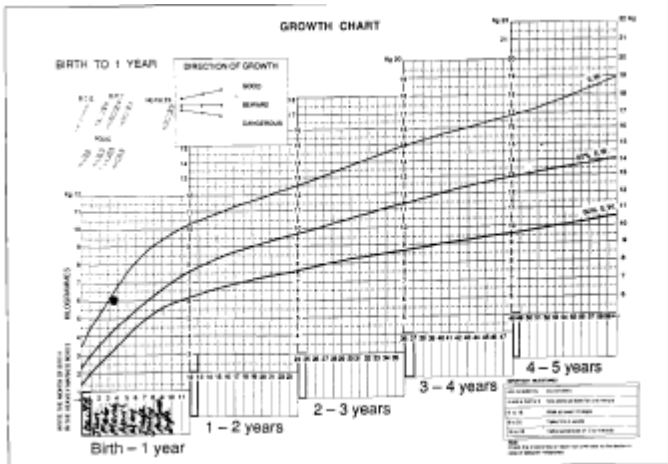
Particulars of Birth: This space is filled in by the midwife or doctor at delivery. Where the mother delivers at home put a tick (✓) as shown against the word "Home....."

Neonatal Problems:

This space is also filled in at birth.

Immunisation

- It is very important that the mother follows the schedule.
- BCG injections and Polio drops are given soon after birth.
- When the child comes to the health facility for the first time at 6 weeks and older check for the BCG scar. If it is present and the child is 6 weeks, he/she should get the Polio 1 and DPT 1.
- If the scar is not present repeat the BCG and also give the Polio 1 and DPT 1.
- Make sure the type of vaccine corresponds to the age of the child as shown on the table.
- Record the date you give a vaccine.
- Write your name.
- Write the Date of Next Visit for Immunisation and weighing and tell the mother about it.



SECTION 2 OF THE GROWTH CARD

- This is made up of vertical and horizontal lines forming boxes where they meet.
- The horizontal lines correspond to standard weights at particular age of a child. The thick lines show a kilogram margin. The dotted lines show a half kilogram margin.
- The vertical lines show the age of child in months.
- Across the page are standard growth curves shown in bold lines.
- The weight of the child is recorded by **placing a big dot where the weight line crosses the age line as shown on page 4.**
- By joining this dot with a weight dot to be recorded the following month, the direction and position of the child's weight can be seen.
- Look at the bottom of the chart. You will see the boxes.
- Now look at the numbers 1 - 12. Each number represents one complete month.
- Begin to count the age of the child from his/her birth month. If he/she is born in December and he/she visits the clinic in March, fill the names of months beginning with December, and then January, February which is left open, start plotting the weight in March.
- Notice the horizontal lines that show the weight categories in kilogrammes and half kilogrammes.
- If the birth date or month is not recorded at birth, try to estimate it from the calendar of events of your local area. **Example is shown Below:**

YEAR	MONTH	EVENT	CHILD'S AGE
1988	March October	Unhappy for free & fair Elections. Military moves out of country.	
1990	March	Independence in Namibia launching of ANC by President.	
1991	May	College Day. Population census.	
1992	May August	Closing of main Drakensberg tunnels. Freedom Street Market	
1993	November	Drought countrywide. Elections local & Regional Councils.	
1994	January February	Heavy floods in Durban. Re-integration of Swaziland.	

SECTION 4 OF THE GROWTH CARD

Health Messages

There are 4 good health messages as shown. Advise the mothers and communities using those messages.

HEALTH EDUCATION	
<p>Breastmilk is best for your baby</p> <ul style="list-style-type: none">* Breastfeed your baby exclusively for 4-6 months.* At 4 - 6 months add mixed complementary foods and continue breastfeeding for at least 2 years.	 
<p>Give plenty of green leafy vegetables and fruits. They are good for your child's eyes.</p>	
<p>Vaccinate your baby against the six childhood diseases. They are dangerous diseases.</p>	
<p>IF YOUR CHILD HAS DIARRHOEA</p> <ol style="list-style-type: none">1. Continue Breastfeeding.2. Give plenty of water, home made fluids like the porridge, "orokur", "mages" and "omere".3. Continue other foods.4. Seek medical advice, if child is not improving.	

1. BREASTFEEDING: emphasize exclusive breastfeeding for the first 4 - 6 months

2. TALK about the importance of green leafy vegetables and yellow fruits for eyes. These contain vitamin A.

3. TALK about the problems of measles and the importance of immunisation.

4. TALK about the problems of diarrhoea and the importance of breastfeeding and adequate feeding particularly during illness.

A Small Diary

Together with the growth card is provided a small notebook. In this notebook you can record on each visit a very small, neat summary of your observations. Fill one column first and when this is full, begin the second.

Baby Isak Jansen born 7/3/92 Weight: 345g

DATE		DATE	
24/3/92	Progress good, in length: 25	3/11/92	Low birth weight
	No problems in		Stomach
18/4/92	Weight gain		4-5 mm
	2 kg, 5 cm	9/12/92	Therapy
	Rolls out		
4/6/92	Slow but		
	fastest in the		
	high school		
17/7/92	Feeding began		
	in 1st		
	month		
	strongly		
	directly		
	to the		
	stomach		
	is		
	recommended		
	Butter		
	fruits		
	and		
	vegetables		

WEIGHING THE CHILD

STEP 2: CHECK THE WEIGHING SCALE IN ADVANCE FOR ACCURACY



- If it is a hanging safter scale, hang it on a strong support and see that it hangs freely. Place it at a height where it is at eye level when reading the scale.
 - Check the weighing scale before each weighing session, and see that it reads zero with the weighing pants fixed to it.
 - Weigh an object whose weight is known, such as a one kilo bag of sugar and record this weight in a notebook.
 - If the weight reads one kilo, then it is clear that the scale is accurate.
- Repeat weighing other objects of known weights and if they read accurate weights proceed to weigh the child.
 - If the readings are incorrect send the scale for repair.

STEP 3: PREPARE THE CHILD FOR WEIGHING



- Ask the mother to remove the child's clothing except a pair of pants or a thin vest.
- Place the child in the weighing pant allowing the child to face his/her mother so that he/she is not scared.
- Hang the weighing pant with the baby in it on the hook of the safter scale. The child should be off the ground but at a low height.
- Involve the mother in the preparation of the weighing of her child.

STEP 4: WEIGH THE CHILD

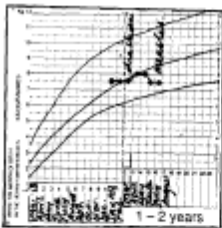


- Check the needle of the scale to see if it is steady. A baby may cry and disturb the correct reading of the scale. Keep the child on the scale with the mother talking to the child, until the scale is steady.
- When the needle is steady, take the reading to the nearest 0.1 kilogram.
- Involve the mother in weighing the baby.

STEP 5: PLOT THE WEIGHT OF THE CHILD ON THE WEIGHT CHART



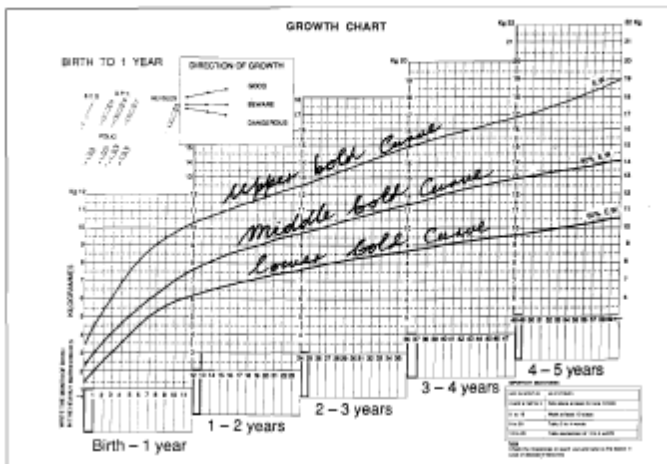
- The weight of the child must be recorded immediately after weighing.
- Record the weight by putting a dot (•) representing the weight at the point where the column of boxes corresponding to the current month meets the horizontal line corresponding to the weight. The dot should be at the centre of the month column.
- Record only one weight reading in one month.
- If the child is weighed more than once in one month record the weight in the notebook provided with the Card.



- Draw a line joining the dot for the current weight to the last dot.
- If there was a drop in weight write the reason opposite the dot across the growth card, eg. diarrhoea, fever, measles etc.

STEP 6: RECORD AND NOTICE IMPORTANT INFORMATION ON THE CARD

- Look in all the sections of the card.
- The **child's identification** tells you the child's name, parents and about how close or distant the child lives from a health service. This will determine the kind of follow up possible if the child has problems.
- The **particulars of birth** tell you whether the child suffered some problems at birth. This puts you on the alert.
- The **immunization** chart shows which immunizations are due and when they are due. Advise the mother accordingly. If your facility gives immunizations, give the correct one and advise the mother on future date of immunization. If your facility does not give any immunizations, advise the mother to go to a facility near her home where they give immunization.
- The **growth chart** gives you the position and the direction of the curve at a given age.
- The **problem page** needs to be filled. If there is no problem say so. If the child for example had diarrhoea write down a summary of your advice or treatment.
- Fill in any major observations including follow-up actions in the **notebook**.
- All these are noticed and recorded before final interpretation of the growth curve is done.



STEP 7: INTERPRETE THE GROWTH CHART

THERE ARE TWO FACTORS THAT MUST BE CONSIDERED WHEN INTERPRETING THE GROWTH CURVE

1. **The Direction of the Growth curve.** This is most important because it shows whether or not it follows direction of the reference curve. If the child is growing well the curve will climb upwards in the same direction as the reference curve.

Different curve directions give different messages as follows:-

- **The growth curve is climbing upwards in the same direction as the reference curve.** This is good if means the child is growing well.
- **The growth curve is horizontal.** This means the child is not putting on weight. This is dangerous. Find out why and advise.
- **The growth curve is moving downwards.** This means the child is losing weight. This is very dangerous. It means the child needs very urgent help.
- The curve moves up then down inconsistently. This is dangerous. Find out why.

2. **The position of the growth curve.** Most healthy children grow along the upper bold growth curve. Some children have a small build. These may grow along the middle bold growth curve. If these are healthy and active there is no reason for worry.

- Children born with low birth weight may tend to grow below the middle line. If their growth increases monthly and lies parallel to the middle bold line, encourage the mother to feed and care for her child very well. At some stage the child's growth curve will cross over to above the middle bold line.
- If a child born with a birth weight of above 3 kilogrammes, crosses the middle bold line, and moves down, then he is in the wrong position and needs help.
- Moderately malnourished children normally lie between the middle bold and the lower bold growth curve. These children need immediate help.
- Any child falling below the lower bold line growth curve is severely malnourished or may have a chronic condition. This child needs to be referred to a doctor.
- The goal is to keep all children as close to the upper bold line as possible.

3. Involve the mother in the interpretation of the child's Growth Curve.

STEP 6: IDENTIFY THE CAUSE OF THE PROBLEM

- A single weight measure is not enough. At least 2 weights taken within a period of 1 - 2 months will tell which direction the growth curve is moving.
- A single weight can only give you a position in relation to the standard growth curve. This alone is not helpful. With constant weighing it becomes easy to interpret the growth curves. When there is a problem **investigate** the cause.



INVESTIGATION PROCEDURE

- take diet history of the child.
- find out about illness.
- look at the general appearance of the child: is he/she irritated, unhappy, crying.
- observe any clinical signs of malnutrition on the child:
 - swelling of face and feet
 - shrinking skin
 - very thin hair
 - pale lips, tongue, inside of eyelids
- ask about or observe common risk factors in the family
 - what is the birth order of child?
 - what was the birth weight of child?
 - does the child have a mother?
 - is the baby one of twins?

- ask about the mother and the family
 - is the mother married or single?
 - how much food storage do they have in the home?
 - how many other children are there? Are the other children well?
 - is water and firewood easily available?
 - who takes care of baby daily?
- ask about or observe the community

FIND OUT ABOUT COMPLEMENTARY FEEDING AND BREASTFEEDING PRACTICES

- do community members have food?
 - do they have good income?
 - do they understand about health?
 - do they support each other?
 - do women do more work than other members of the household?
 - is there a CHW in the village ?
- The causes of the problem may be different for different children. Advise each according to the results of the investigation.
- **THE INDIVIDUAL CHILD**
 - the child may be a twin, or low birthweight
 - bottlefed, not given enough food, complemented too early or too late.
 - may be sick
 - may be an orphan
 - **THE MOTHER** - she may not know the harmful effects of bottle feeding, she may not know when to complement the breast, she may be alcoholic, too busy to take good care of the child, or she may be a single mother who needs support, she may not have taken adequate food during pregnancy or lactation.
 - **THE FAMILY** - maybe too poor, not literate, have poor living conditions, too many children. The father may not be supportive and one or both parents may be alcoholics.
 - **THE COMMUNITY** - the community may have unsuitable customs, be illiterate, or not been sensitized. The men work away from home, do not give enough family support, do not have any productive activities. The community may live far from basic facilities, have water, firewood and transport problems.

REMEMBER, A FACE TO FACE DIALOGUE WITH THE MOTHER WILL HELP YOU ADVISE HER SUITABLY.

STEP 9: ASSIST MOTHERS, FAMILIES AND COMMUNITIES TO TAKE ACTIONS BASED ON INVESTIGATION:

FOR A GROWING CHILD - praise the mother and encourage her to continue with the good care. Ask her to assist her neighbours.

FOR A CHILD WHO IS NOT GROWING

- If the baby is below 4 months and is not breastfeeding enough, advise the mother to breastfeed her baby on demand, even more than 10 times a day. She should breastfeed during the night as well.



- If the baby is 4 - 6 months, is not growing but is not sick and is breastfeeding well, and has a big build, ask the mother to increase the frequency of breastfeeding and start giving at least one semi solid food a day until he is 6 months. Advise the mother to eat her normal food and at least one snack and green leafy vegetables and yellow/orange fruits. She may also take some rest.



- If the baby is 4 - 6 months, is not sick but small built and the mother is well and not working far from home, ask the mother to continue exclusive breastfeeding until the baby is about 6 months, then provide adequate complementary feeding starting with semi solids. If the mother works far away from home show her how to prepare a suitable complementary food from food available in the home. A spoon and cup should be used for feeding. Advise mothers to avoid bottlefeeding.

- If the baby is 7 - 12 months:
 - explain to the mother how she should prepare complementary foods by adding to the local gruel energy rich foods such as oils, groundnuts, softly cooked meat and eggs, vegetables and fruits.



- show her how to prepare the foods.
- Discuss with her about the importance of cleanliness for herself and the baby.
- advise her to continue breastfeeding.
- Advise her to feed the baby four times per day.

- If the baby is 13 - 18 months discuss with the mother about the frequency of feeding and the importance of green leafy vegetables and yellow and orange fruits for Vitamin A and C. Advise the mother to continue breastfeeding as well until the baby is beyond two years.



- If the baby is older than 18 months, advise the mother about the child eating from its own plate at least 5 times a day. If she is too busy to cook for the child, she should leave him/her some cold food or snacks, covered in a cool place, so that the child can eat whenever it wishes. Show the mother how to prepare energy foods.

FOR A CHILD WHO IS LOSING WEIGHT

- Find out the reasons why
- Refer the child for examination and treatment
- Advise according to age as explained earlier.
- See the family and discuss with them how serious the child's condition is and suggest how the father and other family members can support the mother.
- If the family has special social problems, discuss the problem with them and listen to their plan of overcoming the problem.
- If the family's social problems are affecting the health of the mother and the children, with the permission of the family, discuss the situation with a social worker, community leader, a church leader or chairman of the village committee so that they can assist the family.
- Ensure the child is fully immunised
- If the child is losing weight, it may need extra food supplementation.
- Provide nutrition education to the mother.

STEP 10: EXAMPLES OF POSSIBLE ACTIONS TO SUPPORT GROWTH MONITORING AND PROMOTION

Actions to support mothers:

- Encourage mothers to weigh their children monthly from 0 - 3 years, and at least every 3 months from 3 - 5 years.
- Learn to listen to mothers.



- If her child is malnourished **DO NOT BLAME HER** but **HELP HER AND HER CHILD.**
- Learn from mothers
- Learn to place yourself in their position
- Be kind and understanding to their problems.
- Praise and encourage them whenever they make a good effort to care for children
- Suggest practical solutions based on their actual local situations.
- Give them health and nutrition education by face to face communication whenever possible.
- Give advise on the advantages of family planning.



Actions to support families:

- Involve the father through home visits
- Educate him on the causes of poor health and nutrition.
- Explain to the father the advantages of growth monitoring and promotion.
- Explain to the family members how they can assist the mother with good child care.
- Make practical suggestions about assisting pregnant and lactating mothers.

- Talk about the importance of breastfeeding for both the mother and the baby.
- Give advice on family diet and importance of baby eating from his/her own plate.



Actions to support communities:

- Inform communities about the advantages of growth monitoring and promotion.
- Involve communities in group discussions about the growth of children and the results of growth promotion activities.
- Involve communities through village development committees to discuss causes of poor growth and ways to improve it.
- Suggest viable development and income generation projects in the community.
- Advise communities on sources of information and assistance.
- Assist communities, in starting feeding centres, participate in weighing

IMPORTANT HEALTH AND NUTRITION EDUCATION

A growing child is a healthy child
Growth begins from pregnancy



- A pregnant mother should eat well.
- She needs extra food of the same food she eats every day.
- Green vegetables and fruit are good for pregnant mothers.
- Iron tablets increase mother's blood.
- Pregnant mothers need at least two injections to prevent tetanus for her and her baby.
- There is no harm if pregnant women breastfeed, provided they are eating enough.

THE PERIOD AFTER BIRTH IS VERY IMPORTANT FOR BABY'S GROWTH

- It is good for both mother and baby if the mother breastfeeds immediately after birth.
- The child should be put on the breast within 1/2 hour after delivery.
- The first breast milk is good for baby.
- The first milk protects the baby from infections, such as diarrhoea.
- The mother needs to eat more food when breastfeeding.
- Mother's milk alone is enough for baby, from birth up to 4 - 6 months.
- The baby should receive his/her first vaccines at birth.

21

OTHER FOOD IS IMPORTANT FOR GROWTH

- When the baby is 4 - 6 months he/she should begin with other foods.
- The most common children's food is porridge, "ontaku", "mageu" and "amaere". Add groundnuts, oil or sugar for energy.
- Increase the frequency of feeding as the baby grows.



- For other milk or fluids use a cup and spoon, not a bottle.
- A feeding bottle is difficult to clean. It is dangerous for your baby.
- Continue to breastfeed.



DO NOT FORGET IMMUNISATION

- Immunisation prevents Tetanus
- Immunisation prevents TB.
- Immunisation prevents disabilities caused by polomyelitis.
- Immunisation prevents whooping cough.
- Immunisation prevents measles.
- Immunisation prevents diphtheria.
- Children who are fully immunised are prevented from childhood infectious diseases.

22

DIARRHOEA IS BAD FOR A CHILD

• **Prevent diarrhoea by:**

- Cleanliness.
- Proper disposal of childrens' stools
- Proper disposal of refuse.
- Proper handwashing.
- Keeping utensils clean
- Keeping household water clean and safe for human consumption
- Protecting the child from fever and malaria, as these may cause diarrhoea.
- When the child is sick or has diarrhoea the mother needs to take extra care. She needs to give extra food.
- When the child has diarrhoea, breastfeeding should continue. ORS and other homemade fluids, should be given and the child continue to eat soft foods.
- A mother should get her child timely treatment in case of cough fever or difficulty in breathing (ARD)

GREEN VEGETABLES AND FRUITS ARE IMPORTANT FOR GROWTH

- A healthy child has a good eyesight.
- Bright lights are good for a growing child.



- A healthy child performs well all round
- A child who does not eat green vegetables may have problems with eyes.
- A child who does not eat green vegetables and fruit may have weak blood.
- A child should eat as much green vegetables and fruit as possible.

SOME SOILS DO NOT HAVE CERTAIN MINERALS

- In an area where you see several people with enlarged thyroid in their necks, there may be iodine deficiency. Investigate and find out.
- The children in such an area need to use - iodised salt.
- Iodised salt prevents enlarged thyroid glands.
- Iodised salt helps children to grow physically and mentally.



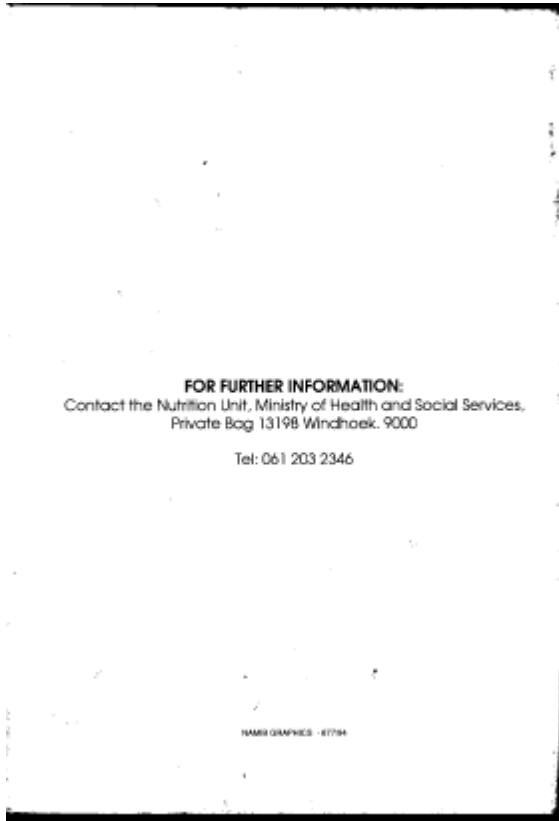
GOOD PARENTS TAKE GOOD CARE OF THEIR CHILDREN SO THAT THEY CAN GROW AND DEVELOP TO THEIR FULL POTENTIAL.

IMPORTANT MILESTONES IN A CHILD'S GROWTH

AGE IN MONTHS	MILE TONES
4 and half to 9	Sits alone at least for one minute
9 to 18	Walks at least 10 steps
9 to 20	talks - 3 to 4 words
18 to 28	talks sentence of 3 to 4 words

NOTE:

CHECK THE MILESTONES ON EACH VISIT AND REFER TO THE DOCTOR IN CASE OF DELAYED MILESTONES.



Appendix P: Prices of Common Vegetables

Obtained at Fruit and Veg city in Windhoek Namibia on April 25, 2009

Prices for loose fruits and vegetables:

Cabbage	N\$11.99 each
Carrots	N\$ 7.99/ bunch of 12
Beet Roots	N\$8.99/ bunch of 4-5
Turnips	N\$8.99/ bunch of 3-4
Cauliflower	N\$ 22.80/ head
Spinach	N\$9.99/ bag of about 250g
Yellow Onions	N\$8.99/ kg
White potatoes	N\$11.99/ kg
Red Sweet Potatoes	N\$5.99/ kg
Butternut Squash	N\$5.99/kg
Red Onions	N\$12.99/ kg
Gems	N\$6.99/ kg
Red and Yellow Peppers	N\$ 42.99/ kg
Green Peppers	N\$19.99
Garlic	N\$39.99/ kg
Green Beans	N\$16.99/ kg
“Jam” Tomatoes	N\$7.99/ kg
“Beef Stake” Tomatoes	N\$10.99/ kg
Lemons	N\$ 4.99/ kg
Grapefruits	N\$ 8.99/ kg
Packham Pears	N\$ 12.99/ kg
Crisp Pink Apples	N\$ 18.99/ kg
Golden Apples	N\$ 14.99/ kg
Star King Apples	N\$ 16.99/ kg
Granny Smith Apples	N\$ 16.99/ kg
Naartjies	N\$ 4.99/ kg
Black Grapes	N\$ 18.99/ kg
White Grapes	N\$ 16.99/ kg
Red Grapes	N\$ 26.99/ kg
Black Plums	N\$ 24.99/ kg
Prickly Pears	N\$ 3.00 for 10
Guava	N\$ 21.99/ kg
Red Crimson Grapes	N\$ 26.99/ kg
Persimmons	N\$ 2.00 for 10
Sweet Corn	N\$ 4.00 for 10
Crown Pumpkins	N\$ 5.99/ kg
White Pumpkins	N\$ 4.99/ kg
Green Hubbard Squash	N\$ 5.99/ kg

Green Pumpkins	N\$ 4.99/ kg
Bananas	N\$ 12.99/ kg
Queen Pineapples	N\$ 6.99/ kg
Sunflower Seeds	N\$ 4.99/ 100g
Pumpkin Seeds	N\$ 7.99/ 100g

Appendix Q: Pictorial Nutrition Manual

A healthy diet is when a person eats different foods from all four food groups, in a balance to maintain a strong & active life. ^①

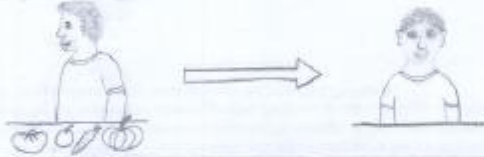
The diagram is a 2x2 grid of food groups. The top-left quadrant is labeled 'GRAINS & BREAD' and contains illustrations of corn, wheat stalks, a loaf of bread, a bowl of rice, and a carton of milk. The top-right quadrant is labeled 'FRUITS & VEGETABLES' and contains illustrations of a pumpkin, watermelon, grapes, an apple, a banana, and various leafy greens. The bottom-left quadrant is labeled 'MEAT & DAIRY/PROTEIN' and contains illustrations of a fish, a chicken drumstick, a carton of milk, and an egg. The bottom-right quadrant is labeled 'FATS & SUGARS' and contains illustrations of a stick of butter, a bowl of sugar, and a jar of jam. Below the grid, there is a small note: '(Adapted from Food & Nutrition Education for Young Adults)'. Below the grid, there is a paragraph of text.

It is important to eat foods from all of the food groups. No one food is all that is needed to be healthy. Eating a variety of foods ensures all of the needed nutrients are obtained.

Fruits and Vegetables

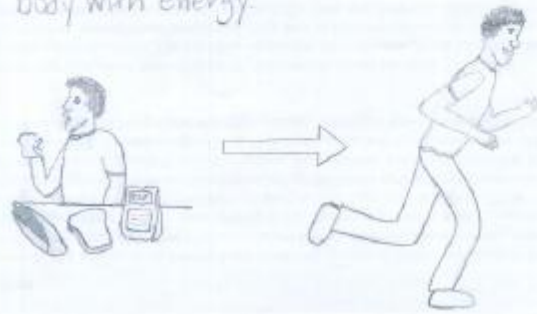
⑨

Eating fruits and vegetables helps to keep disease away and promotes healing.



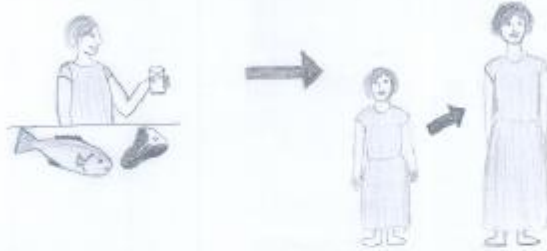
Grains and Breads

Eating grains and breads provides the body with energy.



Meat and Dairy

Eating meat and dairy provides the body with strength, strong bones, and growth.



Fats and Sugars

Eating fats and sugars help the body to trap nutrients for use. Be sure to eat some fat everyday.



Foods to stay away from:

Alcohol can damage your insides and make people weak.



Spoiled and rotten food can cause diarrhea and damage your insides.

Deficiencies

Wasting is a drop in body weight. This can be caused by not eating enough foods, especially meat and dairy. Eating more of these foods will help stop wasting.



Diarrhea and vomiting can last days to weeks.³
Eating spoiled food, drinking dirty water, and eating non-food items can cause both vomiting and diarrhea. Be sure to drink plenty of clean water, dehydration solution, eat grains and breads and cooked fruits and vegetables. Avoid coffee, tea, and alcohol as they can make it worse.



Runny nose and cough can be caused by many things. Most commonly it is caused by not staying clean through washing one's self and from not eating enough fruits and vegetables. By washing regularly and eating more fruits and vegetables you can avoid getting a runny nose and cough.



Birth defects is when a baby is born not normal. One way this can happen is when the mother does not eat enough meat, dairy, and dark green vegetables while pregnant. This can also happen if the mother drinks alcohol while pregnant. To help prevent birth defects be sure to eat meat, dairy, and dark green vegetables, while avoiding alcohol.



Broken bones mainly happen to young children and older people. To avoid broken bones try to eat milk, eggs, meat, and spinach. Of these foods milk is the most important.



Spinach is one of the most nutritious[Ⓢ] vegetables. It can provide many vital vitamins and minerals.

