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Yemen, Factor 11: Malnutrition

## **Yemen: Agricultural Education in Rural Areas**

### Introduction

Malnutrition is a huge problem worldwide; imagine being ranked 34 out of 100 for food security. (“CultureGrams”) Yemen knows what that is like: they do not have much land for growing crops and lack clean water. Most of the population is illiterate and struggles to receive education. The plan is to concentrate on helping the regions in Yemen (Rayma, Mareb, Al Bayda) by focusing more on the rural areas and making a positive difference as much as possible.

### Background

The country of Yemen is located in Western Asia. It is the second largest country in the Arabian Peninsula. Yemen is between Saudi Arabia and Oman. The country has five agro-ecological zones: the Coastal Plain, Western Mountains, Highland Plain, Eastern Mountains and Eastern Desert Plain. The majority of the land, however, is desert. The mountains and highlands are typically where Yemen gets the most rainfall. The highlands receive about 39 inches a year. Typically it rains the most between June and September. The highest point in Yemen is Jabal an Nabi Shu'ayb (12,000ft). Yemen has access to 1,906 miles of coastline along the Arabian Sea, the Gulf of Aden, and the Red Sea (“Yemen”).

Yemen uses a Republic form of government with a president and a prime minister located in Aden City (provisional) and also in Sana'a (capital). Within the country, there are 21 governorates which are similar to states in the United States. The government of Yemen is quite strict and has been responsible for torture, inhumane treatment, and uncontrolled corruption. At the present time the government would not be much help dealing with humanitarian issues within their country. In Yemen there is no freedom of speech, press, or religion. The main religion in Yemen is Islam, including both Sunni and Shia sects. These groups are closely related but differ when it comes to political power. The population of Yemen as of 2013 was 25,408,000 and the capital is Sana'a with a population of 1.708 million. (“Yemen”) The transportation between governorates is limited. There are no railroad systems and the roads in Yemen are minimal and of poor quality. There are only around 44,000 miles of road in the whole country. The roads are considered unsafe because of underage drivers and lack of traffic law enforcement. Unlike the United States, electricity and technology isn't as common or used daily. In urban areas, 99% of households have electricity, whereas in rural areas only 65% have access to electricity. Half of households use natural gases for cooking. (“CultureGrams”)

The main crop traditionally produced by Yemen was coffee. Now, the main cash crop is qat (also known as khat). Qat is a stimulant chewed by Yemenis daily. It is not exported due to the fact it is quick to perish. Qat, much like tobacco in the United States, is a very large part of Yemen's culture. At 2:00 pm every day, the country stops what they are doing and begins chewing qat the rest of the day. Qat is grown on more than half of the land that is suitable for any crop; rather than growing food in that land area, a drug stimulant with no nutritional value is grown instead. As of 2001, Yemen imported agricultural products worth \$857.2 million. Over 64% of the population works in agriculture, yet only 3% of their land is suitable for crops. Based on these facts, Yemen probably will not be agriculturally self-sufficient any time soon. (“Yemen-Agriculture”)

The typical Yemeni family has approximately seven total members. The gender roles in Yemen are

typical of the region with women being at a lower rank than men. (“Yemen”) The minimum age of marriage for women is fifteen. Women perform the household tasks, and men are responsible for financial needs and everything outside of the living space. Over time, the women and older children have become more responsible for hard labor, especially involving agriculture. Two out of five Yemeni women do not receive any education; a little over half of the women are literate. The main problems with education are weak school systems and social issues. Typical problems include availability of only single sex schools, long travel distances from home, low community participation, and lack of teacher training. The basic level of education in Yemen is nine years. If completed, there is the option of secondary education (three years), and then college level education. In Yemen there are a total of 29 public and private universities. (“Countries and Their Cultures”) Less than 10% of men and women pursue a college level education. In addition to the lack of educational opportunities, human trafficking is currently a problem. Human Rights Watch has been monitoring violence against women; although human trafficking in Yemen has been brought to the government's attention, no efforts to change it are happening. Along with human trafficking, slavery still occurs in Yemen. Slavery was put to an end in 1962, but is still practiced in Al-Zuhra and Hajji. (“Yemen Times”)

### Malnutrition Problems and Solutions

At the current time, fishing is the most secure source of food in the coastal governorates of Yemen. Unfortunately, this food source is limited to people who live near the coastlines. Since the transportation system in the country is minimal, people in the interior governorates have little access to fish. The diet most interior governorate Yemenis consume on a daily basis generally consists of bread, wheat, porridge, some vegetables, and lots of grains. (“National Health and Demographic Key Findings”) Malnutrition in Yemen includes not only too little of food to eat, but also an inadequate diet, lacking all proper nutrients like protein, vitamin A, iron, and zinc. In addition to malnutrition, there are a lot of food-borne illnesses that can cause lifelong problems for people, especially children. Yemen has one of the highest child malnutrition rates in the world. Leading causes of death among children are influenza, upper-respiratory infection, heart disease, and malaria. All of these conditions are exacerbated by malnutrition.

About 44% of Yemen's people are food insecure. (“Fighting Hunger Worldwide”) Providing alternative solutions to food insecurity can turn this around. The solution suggested focuses on three rural regions (Rayma, Mareb, Al Bayda) and their malnutrition problems. These regions are located in the middle-south-west of Yemen. The main issues they have are all related to three problems - low dietary access to protein/vitamins, high child malnutrition rates, and lack of water. The solution proposed is to incorporate three ideas to address these problems into the concept of educational “model farms”.

The first problem is the lack of proteins in the diet of rural Yemenis. Grains are produced easily in Yemen compared to other crops. Since rural Yemenis mostly eat cereals and grains, they do not receive the proper nutrition needed. The livestock that Yemen does have currently are sheep, cows, and camels. Farm animals are used for meat, milk, and wool/skin. (“The Global Food Security Index.”) Large livestock is harder to take care of and eats more food. The idea suggested to address this problem is the introduction of small livestock such as rabbits, guinea pigs, and chickens. By introducing small livestock, rural populations can have better access to meat in order to increase their protein intake. These small livestock options reproduce quickly and don't need a lot of food, space or water. The chickens also produce eggs that can be used for eating. These animals are easy to care for, especially if women and children are providing the labor. Since these animals are herbivores, their waste products can be used as fertilizer for vegetables and grains.

The second problem is lack of water. Yemen is said to be the first country that might actually run out of water. Drier rural regions get around 39 inches of rain annually, and they need to make the most of this moisture. (“Climate-Yemen”) The idea suggested to address this problem is to use cheap, easy technology

to collect and store rainwater. Once stored, the rainwater can be used for many things. The rain can be consumed and used for bathing. In addition, the collected water can be used during dry spells for watering crops and livestock. Collecting and building up an amount of rainwater is relatively simple and can be demonstrated easily.

The third problem to combat is the lower nutritional rates for mothers and children. ("The Global Food Security Index.") It is believed this can be solved using the two previously suggested solutions along with education. Teaching mothers how to get proper proteins, nutrition, and vitamins can help drastically.

With any humanitarian effort, an important part of the entire process is working with cultural barriers. When someone wants to provide aid in a different country, there are lines that can and cannot be crossed. People cannot be forced to change their lives completely; they have to see and accept the change to improve their situation on their own. This leads to my final overall suggestion – Model Education Farms.

Through these Model Education Farms, we can demonstrate how to raise small livestock, collect rainwater, and improve overall health. As mentioned earlier, the plan is to focus on the regions Rayma, Mareb, and Al Bayda; they are said to be the most food insecure. Model Education Farms in these regions will demonstrate and explain my three main solutions. To begin with, small livestock set-ups can be introduced to show the living situation of the animal, whether it be the rabbits, guinea pigs, or chickens. The rabbits/guinea pigs are capable of living in a smaller quarters and having something to catch the feces for the fertilizer. The chickens are free range, as long as a feeding area is available, a small coop for eggs is provided, and the area is predator-free. Along with demonstrating small livestock care, there will be educational sessions on how to prepare and use products such as meat and eggs gained from the livestock. Using just small livestock, demonstration and education can go hand-in-hand. For example, the mothers of households can learn how to care for the livestock. At the same time, however, she can learn how much protein she and her family should be receiving and different techniques on how to prepare meats from the livestock. Everything the family would need to know about the livestock would be demonstrated at the Model Education Farms. If a family chooses to adopt these new food sources, then the model education farm staff could help them get started. Changes would be demonstrated and encouraged, but the Yemenis would have to adopt the change.

In addition to livestock, the Model Education Farms would demonstrate and provide education on the set-up and use of rain collectors and rain storage systems. The rain collectors would provide a simple, effective method of collecting minimal amounts of rain over a large area and moving it to a collection system. Although rain in a region may be limited, with rain collectors, people will have more water than they had before. The rain collection system will include a gutter along any model farm structure with a wide surface area exposed to the rain. These structures are usually roofs, but could also include any large area rain falls upon. The gutters will be attached to piping directed to a large containment reservoir – probably an underground container in dry regions. Some rain collectors have a filtration system set up in the piping before it reaches the reservoir. Usually the systems that have the filtration are near manufacturing which can cause the rain to be more acidic and harmful. In rural Yemen where there's not much manufacturing going on, a filter would not be needed for acidic purposes but possibly for sanitary reasonings. For small scale operations, a couple of filter options are possible. One option is a filter is known as the "Water Purifying Bicycle". This filtration system is powered by pedaling a bicycle which draws up water from a large source and filters it out into a new container. Although this process can be costly, it is a portable way of filtering water. Filters will need replacement after time but the system can process up to five liters in a minute. A second option is "Solar Purification". In this process, water is disinfected in glass or plastic bottles which are exposed to the sun for 6 hours to 2 days depending on how much sun is available. The bottles can be reused and it is a simple process. The volume of water purified, however, is limited by the volume of the bottles available. ("Five Water Purification Designs.") In conjunction with the Model Education Farms, the uses of purified water that will be encouraged and

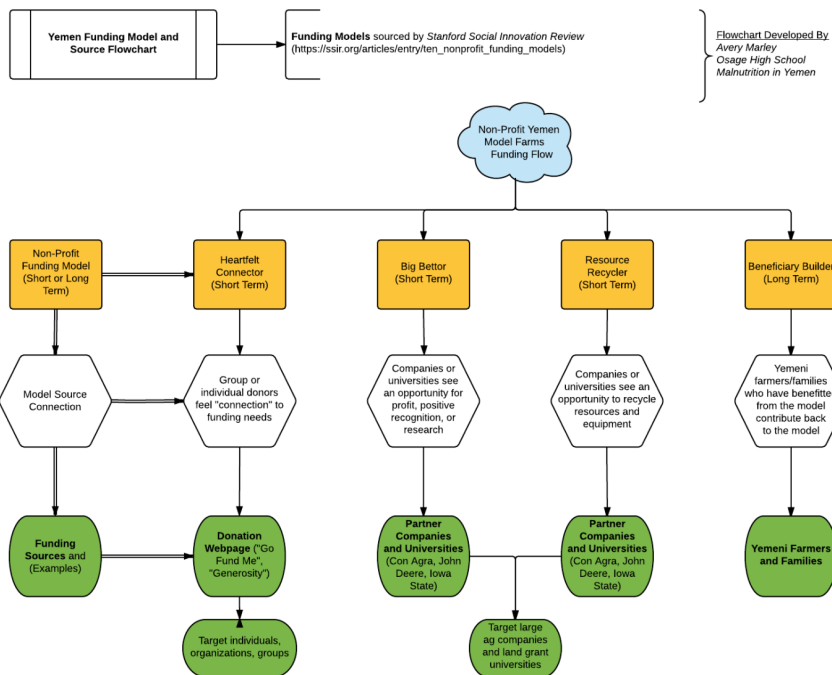
demonstrated include drinking, bathing, watering livestock, watering vegetables, and storage for droughts. Once again, along with encouragement and demonstrations, education and assistance with set-up will be available from the Model Education Farm staff.

### Funding Solutions for Model Education Farms

As with any non-profit humanitarian project, funding is always a concern. In the case of malnutrition in Yemen, the funding process can be described through “Funding Models”. There are four different funding models that would fit the model farm idea. These models, as described in an article by the Stanford Social Innovation Review, include the “Heartfelt Connector”, “Big Better”, “Resource Recycler” and “Beneficiary Builder”. (“Ten Nonprofit Funding Models (SSIR)”)

1. Heartfelt Connector - With the “Heartfelt Connector”, groups or individuals feel a connection with the project and want to help through a donation page such as “Go Fund Me” or “Generosity”. People can learn about this funding channel through commercials, and social media. With this funding, the money can be more focused to the families that have an interest in the Model Farms idea. Funding can go directly to specific families to purchase the supplies they need for their own farm. Individuals or groups can be targeted through the Heartfelt Connector model.
2. Big Better - The “Bigger Better” model focuses on donations or input from large companies and universities. These organizations view this model as a positive way to gain recognition. Involvement in the Bigger Better model may include monetary donations or research partnering. Numerous large companies and universities have philanthropic or humanitarian research interests. In the Midwest U.S. for example, possible sources may include agricultural companies such as John Deere or Con-Agra, or land-grant universities such as Iowa State.
3. Resource Recycler - In addition to monetary donations and research interests, large companies or universities may use the “Resource Recycler” model as a positive opportunity to recycle resources and equipment. As with the Bigger Better model, Midwest U.S. agricultural companies such as John Deere and Con-Agra, and land-grant universities such as Iowa State could donate used resources and equipment to be implemented in the model farm system. These donations would go directly to model farm use with no exchange of money .
4. Beneficiary Builder - The “Beneficiary Builder” model is a long range model which would allow Yemeni farmers and families who have benefitted from the Model Education Farm system to contribute back. These contributions may include providing education, farm supplies, money, or help with farm task such as harvest. Reaching the Beneficiary Builder model would be a true indicator of the success of the Model Education Farm as a non-profit humanitarian solution in Yemen.

The implementation of the four funding models is shown in the following chart. A larger version of this chart is attached at the end of this paper.



When considering timelines, the first three models are considered short range solutions, and may result in funding within a period of weeks or months. This funding may be one-time or may last for a longer time period. The fourth model is a long range model and would not result in funding until Yemeni families are stable and able to donate from their own resources. This last model would most likely not be used for at least five years. Overall, there is confidence that one or more of these Funding Models can be truly successful working with my Model Education Farms and the families of Yemen.

### Conclusion

Through having possibly two or three Model Education Farms in each of the regions (Rayma, Mareb, Al Bayda) the word will spread around the regions about the new ideas and improvements that can be made in local agriculture. Demonstrating the possibilities and including the Yemenis in the process of education and improvement should be the goal of the Model Education Farms. If the right minds and tools come together, cooperative agricultural education can improve the rural regions of Yemen.

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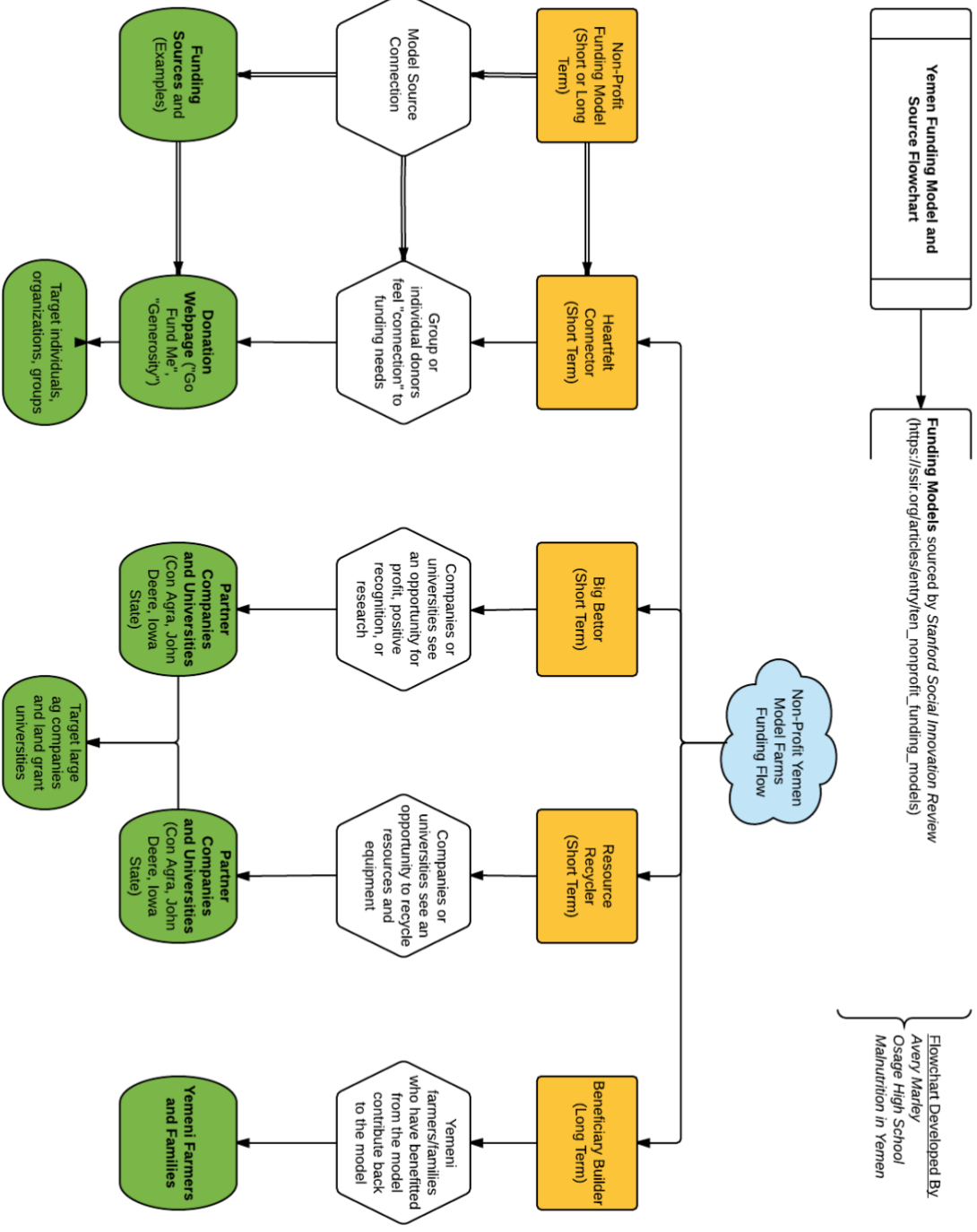
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