

# Internship Report to the Namibian Horticulture Trust for Hope Village



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## Acknowledgements

I would like to thank a variety of individuals who helped make this experience educational and inspirational at Hope Village (HV). First I must thank the Namibian Horticulture Trust (NHT) for pairing me with the Hope Village and giving me the opportunity to work in urban horticulture. Thanks to Emmanuel for working with me on a daily basis, my advisor Albert Fosso for his guidance, support and advice in all aspects of horticulture and Albie Oelofse for his insight and planning for the success of all our projects.

Thank you to Hope Village for supplying the space and resources for the garden itself. I give all the best wishes for the staff and much appreciation for the loving children of HV; they made the work worthwhile.

Finally, thank you to the Center for Global Education for pairing me with the NHT and bringing me to Namibia. Their hand in my time here in Namibia has been invaluable and I thank the whole staff for their support.

## 1. Introduction



Panoramic view of the Hope Village veggie tunnels

My time at the NHT has been an insightful and holistic experience in urban horticulture. Taking on tasks from daily operations to designed experiments, I have been fully immersed as an intern within this Namibian non-governmental organization (NGO). The purpose of this report is to highlight the experience of an intern with the NHT, analyzing the holistic approach this organization takes and reviewing my work with specific projects within the confines of Hope Village, an orphanage in the heart of Katutura, Namibia.

Through the U.S. University Augsburg College's Center for Global Education, interns from America are paired with various organizations in Windhoek. These groups are a means to further the students' education in a particular field of their study to augment learning abroad. I was paired with the NHT to further my degree in Plant and Soil Science, particularly in the realm of agro ecology, urban horticulture and community food security.

## 2. Organization Mission Statement

*The Namibian Horticulture Trust is registered as a company that specializes in the training of self-sufficient, sustainable Urban and Peri-Urban Horticulture projects. The main focus is on poor and vulnerable communities, to help them with skills development for food security and nutrition and to be able to generate income through entrepreneurship.*

## 3. Personal Goals

The NHT takes a holistic approach to the daily operations of their gardens and projects throughout Namibia. My experience as an intern has exposed me to the entire workings of this organization, which has resulted in an ever-growing knowledge of horticultural systems, NGO operations and funding strategies. In the gardens of Hope Village, an intern can expect to be engaged in the daily needs of the garden.

My goals as an intern for the NHT were:

- To understand the concept of urban horticulture
- To reduce synthetic chemical usage by introducing good agricultural practices for pest and fertilizer usage
- To understand pest-plant relations in the veggie tunnels used by the NHT.
- To conduct a semi-formal experiment in the field
- To understand the structure, management, beginnings and activities of an NGO in Namibia
- To write grants and business plans for small scale endeavors
- To manage and implement infrastructure and education based projects

## 4. Daily Activities

As an intern for the NHT, I experienced a variety of projects as well as day to day activities that coincided with my goals.

### General Work



Performing general gardening needs

To understand both the requirements for the veggie tunnels at HV and the methods of the NHT, I participated in the general upkeep of the garden. A garden requires a certain amount of general labor to continue forward successfully. I helped to water the plants, weed, and clean the space, record data, harvest vegetables and plan.



## Informal Training

As a university student, I have a strong background in institutional knowledge of agricultural practices and a conceptual understanding of how science affects the garden. However, I did not have a working knowledge of gardening processes coming into the internship. The garden technician, Emmanuel, has a strong working knowledge of the garden but less experience in the formal understanding of the scientific processes that govern food production.

Together, we shared considerable information around our expertise. Often, I was able to give Emmanuel resources I have access to from my home university to help train him on subjects of soil fertility, nutrient management and crop rotations. We exchanged ideas about improving food security in the garden through diversifying crops and growing them throughout the year over one major harvest. Focus on improving the nutrition of the children at Hope Village is the primary goal of the garden and through our discussions we emphasized this point and brainstormed for continual improvement.

The most fruitful part of our exchange was the development of a detailed and succinct planting calendar. This calendar is based on seasonality of the crop, good rotations, biodiversity in the garden, harvest times and nutritional needs. Between the two of us, this information existed independently and was then put together into the planting calendar that can guide any individual working at the HV garden for three years into the future. Attached is the planting calendar.



Showing NHT trainees pests and diseases in the veggie tunnel

## Documentation

An aspect of my internship that was not intended but materialized with need was developing documentation systems with Emmanuel. Better forms of recording garden activities and progression were observed after I spent a few weeks working at HV. Together, we implemented a “Daily Observations Log,” which is simply a daily recording of all the activities and happenings in the garden. Though a simple concept, it has already proven useful to Emmanuel in writing reports and recalling information from earlier in the year. Building this skill is paramount to tracking progress in the garden. Forming the habit of good documenting skills has helped save time, frustration and loss of data in the garden.



Planting Calendar for Hope Village Veggie Tunnels

Timeline

1 cell = 1 month

	Tunnel 1		
December	Beets	Beets	Beets
January	Beets	Beets	Beets
February	Beets	Beets	Beets
March	Beets	Beets	Beets
April	Cabbage and Basil	Onion	Lettuce
May	Cabbage and Basil	Onion	Lettuce
June	Cabbage and Basil	Onion	Lettuce
July	Cabbage and Basil	Onion	Lettuce
August	Beans	Onion	Egg plant
September	Beans	Potatoes	Egg plant
October	Beans	Potatoes	Egg plant
November	Carrot	Potatoes	Egg plant
December	Carrot	Potatoes	Leek
January	Carrot	Beans	Leek
February	Carrot	Beans	Leek
March	Broccoli	Beans	Leek
April	Broccoli	Leek	Carrot

	Tunnel 2		
December	Tomato and cabbage	Cabbage	Cabbage
January	Tomato and cabbage	Cabbage	Cabbage
February	Tomato and cabbage	Cabbage	Cabbage
March	Tomato and cabbage	Spinach	
April	Carrot	Spinach	Leek
May	Carrot	Spinach	Leek
June	Carrot	Spinach	Leek
July	Carrot	Spinach	Leek
August	Broccoli	Spinach	Peas
September	Broccoli	Spinach	Peas
October	Broccoli	Spinach	Peas
November	Broccoli	Spinach	Potatoes
December	Onion	Spinach	Potatoes
January	Onion	Carrot	Potatoes
February	Onion	Carrot	Potatoes
March	Onion	Carrot	Onion
April	Onion	Carrot	Onion

	Tunnel 3		
December		Spinach	
January	Carrot	Spinach	Carrot
February	Carrot	Spinach	Carrot
March	Carrot	Spinach	Carrot
April	Carrot	Spinach	Carrot
May	Beets	Spinach	Lettuce
June	Beets	Spinach	Lettuce
July	Beets	Spinach	Onion
August	Beets	Spinach	Onion
September	Beans	Spinach	Onion
October	Beans	Spinach	Onion
November	Beans	Spinach	Onion
December	Butternut	Spinach	Tomatoes
January	Butternut	Spinach	Tomatoes
February	Butternut	Spinach	Tomatoes
March	Butternut	Onion	Tomatoes
April	Cabbage and Basil	Onion	Lettuce

	Tunnel 4		
December		Spinach	Spinach
January	Peppers	Spinach	Spinach
February	Peppers	Spinach	Spinach
March	Peppers	Spinach	Spinach
April	Peppers	Carrot	Onion
May	Broccoli	Carrot	Onion
June	Broccoli	Carrot	Onion
July	Broccoli	Carrot	Onion
August	Broccoli	Tomatoes	Onion
September	Squash	Tomatoes	Peas
October	Squash	Tomatoes	Peas
November	Squash	Tomatoes	Peas
December	Squash	Onion	Squash
January	Beans	Onion	Squash
February	Beans	Onion	Squash
March	Beans	Onion	Squash
April	Carrot	Onion	Leek

May	Broccoli	Leek	Carrot
June	Broccoli	Leek	Carrot
July	Onion	Leek	Carrot
August	Onion	Tomatoes	Kale
September	Onion	Tomatoes	Kale
October	Onion	Tomatoes	Kale
November	Onion	Tomatoes	Kale
December	Potatoes	Beets	Peas
January	Potatoes	Beets	Peas
February	Potatoes	Beets	Peas
March	Potatoes	Beets	Lettuce
April	Spinach	Carrots	Lettuce
May	Spinach	Carrots	Leeks
June	Spinach	Carrots	Leeks
July	Spinach	Carrots	Leeks
August	Spinach	Beans	Leeks
September	Spinach	Beans	Cabbage and Basil
October	Spinach	Beans	Cabbage and Basil
November	Spinach		Cabbage and Basil

Beets	Lettuce	Onion
Beets	Lettuce	Onion
Beets	Cauliflower	Onion
Beets	Cauliflower	Beets
Beans	Cauliflower	Beets
Beans	Cauliflower	Beets
Beans	Tomatoes	Beets
Carrot	Tomatoes	Squash
Carrot	Tomatoes	Squash
Carrot	Tomatoes	Squash
Carrot	Onion	Squash
Kale	Onion	Lettuce
Kale	Onion	Lettuce
Kale	Onion	Carrot
Kale	Onion	Carrot
Leeks	Broccoli	Carrot
Leeks	Broccoli	Carrot
Leeks	Broccoli	
Leeks	Broccoli	

Cabbage and Basil	Onion	Lettuce
Cabbage and Basil	Onion	Beets
Cabbage and Basil	Onion	Beets
Carrot	Butternut	Beets
Carrot	Butternut	Beets
Carrot	Butternut	Beans
Carrot	Butternut	Beans
Tomatoes	Peas	Beans
Tomatoes	Peas	Onion
Tomatoes	Peas	Onion
Tomatoes	Leek	Onion
Cauliflower	Leek	Onion
Cauliflower	Leek	Onion
Cauliflower	Leek	Lettuce
Cauliflower	Kale	Lettuce
Peas	Kale	Tomatoes
Peas	Kale	Tomatoes
Peas	Kale	Tomatoes
		Tomatoes

Carrot	Kale	Leek
Carrot	Kale	Leek
Carrot	Kale	Leek
Soya bean	Kale	Beets
Soya bean	Squash	Beets
Soya bean	Squash	Beets
Soya bean	Squash	Beets
Soya bean	Squash	Beets
Egg plant	Squash	Carrot
Egg plant	Beans	Carrot
Egg plant	Beans	Carrot
Egg plant	Beans	Carrot
Lettuce	Carrot	Cabbage and Basil
Lettuce	Carrot	Cabbage and Basil
Beets	Carrot	Cabbage and Basil
Beets	Carrot	Cabbage and Basil
Beets	Lettuce	Potatoes
Beets	Lettuce	Potatoes
Lettuce		Potatoes
Lettuce		Potatoes

<b>Species</b>	Lily	Legume	Lettuce	Nightshade	Carrot	Mustard	Beet	Cucurbit
<b>Crops</b>	Onion	Bean	Lettuce	Potato	Carrot	Broccoli	Spinach Swiss Chard	Pumpkin
	Leek	Peas Soya bean		Tomatoes		Cauliflower		Squash
	Garlic			Peppers		Cabbage	Beetroot	Butternut
				Eggplant		Kale		

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## 5. Project Management

### Compost and Vermicompost



Emmanuel checking worms



A handful of new worms

One of our many projects was the implementation of a vermicompost pit at the HV garden. Built out of the current thermophilic pile, our goal for the vermicompost pile was to quickly produce useful castings (this word is interchangeable for vermicompost) for worm tea (a fertile and antibiotic liquid applied to the soil) or incorporation into the soil.

We began by removing a majority of the current compost from the pile and building a cover for shade over the pit. We also laid bricks in a quadrant in the pit to have an informal trial of which feedstock the worms preferred. Next we shredded the feedstock, vegetable waste from the garden, and layered it thinly over the entire pit. We then shredded newspaper and soaked it in water for about 10 minutes, rung it out, and layered it over the pile. This arrangement is necessary for the specific vermicomposting worms, the *Eisenia fetida*, to live in the matrix between ground and feedstock, insulated by the moist newspaper to mimic their native ecosystem.

When the worms were introduced, they were prolific and quickly turned feed into castings. However, after three weeks, we experienced troubles with the worms.

They had burrowed deep inward and then disappeared without a trace. Recommendations are given in the section 7 as to how to ameliorate the issue.



Me in the Vermicompost 'Farm'

## Agri-Trap Trial



Cabbages under trial

The NHT was given an organic pesticide to trial for effectiveness against an aphid infestation on cabbage crops within our veggie tunnels. This trial was conducted over a month time in the veggie tunnels at HV using existing resources. A detailed report is given under the title, “Agri-Trap Trial Report.”

Please see [Report](#)



## Drip-line Irrigation

Drip-line irrigation is a simple engineering solution to saving water, utilizing time and reducing disease problems in your crop production. The basis of this technology is using a series of pipes to deliver small increments of water directly to the plant roots, avoiding wetting the leaves to prevent disease.

At the HV garden, we planned to trial drip-line irrigation for a veggie tunnel with in-ground planting. I began by modeling the design of the system under the guidance of Albie, who has had experience working in piping. Once we had a useful design, Albie and I visited a local supply stores to price out the component parts of the system. From there, we have obtained funding, the piping and have plans for a pump that will supply pressure for the system.

\*\* We will soon attempt to install the system in one tunnel based on the blueprints created by Albie.



Me busy with Albie's drip design

## 6. Conclusions

My experience with the Namibian Horticulture Trust at Hope Village has been a rewarding experience. I have gotten hands on experience in basic gardening, project management, writing skills and system design. By working with insightful, motivated people, I feel that I have been able to obtain the goals I have set forth for myself.

The internship experience allows the student to pursue a variety of topics pertinent to their own study. Necessary in this process is a level of motivation and initiative to initiate these projects. I think it was good that I had a level of guided responsibility but also freedom to pursue developments within the NHT. This balance has allowed me to grow as a student in skill and knowledge. I have grown in my understanding of Namibian organizations, which will help me to visualize future projects both home and abroad in my future.

Being able to see and experience a setting that is in dire need of improved food access is educational beyond any classroom setting. Working for the NHT allows the intern to observe but also contribute to improving community food security. Compounding the issue is the nutritional necessity generated by the ill effects of HIV/AIDs. I was unaware of the food-based needs of those fighting this virus, particularly children, before this internship. Through working for and with the children, I have grown in my awareness of the importance for proper nutrition for all disadvantaged communities.

My contribution the garden at HV has been felt and recognized. I feel successful not just because of the physical changes to the garden but through my relationships with the NHT as well. I have made lasting relationships both professionally and socially, making the work enjoyable day to day. Through the activities, relationships and education I have received with the NHT at the HV garden, I feel energized to go back to my home community able to contribute to a greater sustainable food system.

## 7. Recommendations

My recommendations for the NHT revolve around the projects I participated in at the HV garden. These recommendations are based on my best perceptions as a student of agriculture and intern at the Hope Village.

The vermicomposting system needs to be retried to create a sustainable opportunity to harvest castings indefinitely. The main problems we had in the system was overheating and over feeding of the worms. To begin with, the pit should be around 30 cm, not the 80 cm depth the current pit has. Shallower depths will ensure easier management of the system easier. We need to remove all currently composting material from the worm's inhabitation. The increases temperatures of the composting material likely drove the worms out of the pit or killed them. Also, the over feeding probably smothered the worms, causing a decrease in oxygen, moisture and most likely excess heating as well. I conclude that a new pit to be dug that is no more than 30 cm deep. This pit should have about 12 cm of finished compost on the bottom, followed by a thin (no more than 2 cm) layer of chopped feedstock and then 5 to 10 cm of moistened, shredded paper. No more than 2 cm of well-chopped feedstock should exist at any one time in the worm pit. With these recommendations, I believe the vermicomposting system will be a sustainable step towards soil fertility at Hope Village.

The Agri-Trap experiment is discussed in greater detail in the report, "Agri-Trap Trial Report," but a few recommendations can be broadly applied to my time as an intern. Good planning and recording of data is paramount to the success of any trial with the NHT. Given the currently low resource base, it was difficult to conduct this experiment with high levels of scientific accuracy. In the future, more quantitative indicators should have been set and followed before beginning the trial. The experiment should have begun immediately at the emergence of the cabbage, with more control over the placement of our experimental groups. More plants should be used in the future for better, more

verifiable results. Finally, proper equipment, specifically an industrial pesticide sprayer, should have been obtained for uniform application of the agent studied.

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