



Miller Center
for Social Entrepreneurship



Unique Garden Planning Manual Replication Guide



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EXECUTIVE SUMMARY

DIG's mission is to improve the health, wealth, and sense of belonging of individuals in ultra-vulnerable communities through their adaptive training programs, which focus on the needs of the community and provide them with the tools to create nutritiously dense home gardens. DIG's emphasis on nutrition allows them to create sustainable social impact in a way that differs from many other organizations. Currently, DIG doesn't have a way to help program managers assist gardeners in choosing crops that provide solutions for their individual needs.

To assist field managers in recommending specific crop selections based on the unique needs of gardeners, we have created a nutritional tool. Based on research and interviews, the nutritional tool effectively categorizes gardeners based on their needs and limitations and identifies multiple sets of crop recommendations, each with unique benefits. This tool provides DIG with a great opportunity to create sustainable nutritional impact and enhance the livelihoods of the communities they serve. The creation of the tool followed a three step process, outlined below:

Part 1: Data Collection

We began by determining which program was the best match for this initiative. Our research focused on the Uganda program so that we could deep dive and create a well thought-out process that could be replicated in their other two locations. We collaborated closely with Gloria, the project manager to gather our data. We worked through the multiple databases DIG already had to record information, such as the nutritional traits of crops and understanding of the ultra-vulnerable communities being served. Next, we gathered information from both Gloria and Pacras, a field manager, via meetings, interviews, and surveys. This data related to the cultural and socio-economic implications of growing different crops.

Part 2 Development: Creation of Archetypes & Crop Profiles

Using the data described above, we created archetypes and crop profiles, which are described below:

- ❖ The crop profiles define the 20 different crops DIG facilitators teach gardeners to farm in Uganda's demonstration gardens. Each crop profile details the crop's nutritional qualities, its cultural associations, resource requirements, and potential profits, based on their unique benefits (social, nutritional, financial value).
- ❖ The archetypes highlight the most pressing needs and limitations that groups of gardeners share. These categories of needs and limitations, in conjunction with the crop profiles, are the foundation of our tool.

Part 3 Distribution: Nutritional Tool

Lastly, combining the archetype and crop profile data, we created a visually comprehensive, field-friendly tool that the program managers can use to assist gardeners as they make individualized home gardens.

We believe that this nutritional tool will allow DIG to take this unique focus even further, by providing a way for program managers to help beneficiaries create gardens that will enhance their health and livelihoods on an individual level.

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Overview

Development in Gardening (DIG) improves the health and financial well-being of ultra-vulnerable communities in Uganda, Senegal, and Kenya. To individualize beneficiaries' gardens, we first collected data on the 20 vegetables DIG offers, highlighting their nutritional benefits, cultural value, and social stigmas. Then we recorded the stories of 16 individual gardeners to identify key variables such as financial and nutritional needs, family size, and land ownership. We supported these individual stories with overarching community narratives collected in collaboration with local experts. Upon evaluation of this data, we created a tool that identifies crop recommendations based on the most pressing needs and limitations of each individual garden.

Due to DIG's emphasis on enhancing nutrition, their training programs offer gardeners a variety of crops to grow. Given this variety, DIG needs a tool that all local facilitators can use when advising gardeners on crop selections for their home gardens.

Since individuals, and their families, prioritize their gardens differently, facilitators need a way to quickly recommend crops that reflect the families' priorities and needs. For example, the needs of a gardener living with HIV are different from those of a pregnant gardener, and their home gardens should differ accordingly. Currently, there is no such system for making these recommendations. This absence prompted the development of the nutritional tool.

Key findings in our research:

- 1. Field friendly program materials.** Local facilitators respond best to tools that are visually comprehensive, quick to use, and independent of technology.
- 2. Not all crops are suitable for every gardener.** Each crop requires specific startup costs, types of land use, and farming expertise that not all farmers have. Though DIG demonstrates 20 crops in each country, not all crops can thrive in every location, so gardeners will benefit most if their options are tailored to their unique needs and limitations.
- 3. Gardeners will create their own home gardens.** Gardeners often choose crops based on their likes, dislikes, and community influence. An effective tool will respect this fact and work to provide gardeners with informed options and promote agency.

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Element 1: Research Process

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1. Collect Program Specific Materials and Data

- a. We collected Uganda's quarterly and annual reports, the preexisting plant library and nutrition manual, and a list of crops grown.
- b. We met with Gloria (Uganda's program manager) to ask clarifying questions and update the provided information.
- c. Program-specific material shaped our understanding of what has been effective or ineffective in their materials and manuals in the past.
- d. We then identified which areas would require supplemental research in the development of the nutritional tool.

2. Crop Data Collection

- a. After recording the nutritional attributes of each crop we recognized the need for social, financial, and cultural considerations of each crop. We created interview questions to fill these gaps based on the following categories: product costs, market prices, difficulty in farming, cultural value, social stigmas, general like or dislike of the crop, and environmental considerations.
- b. We created an interview process that we replicated with each of the 15 crops demonstrated in the Uganda program. Example questions included:
 - i. How expensive is the seed for this crop?
 - ii. How much profit would the gardener make if they sold this crop?
 - iii. Are there any social stigmas surrounding the crop in the

The complete list of interview questions are in Appendix A

3. Crop Profile Creation

- a. We combined the nutritional crop data with the most important data from the interviews on social, financial, and cultural considerations of each crop. We split the database into three categories: environmental, social, and nutritional, which were then split into subsections:
 - i. Environmental: input costs and limitations.
 - ii. Social: profitability in the local market and general like or dislikes
 - iii. Nutritional: most important nutrients, vitamins, and minerals for pregnant or nursing women, people living with HIV, or malnourished children.
- b. The crop profile database can be found [here](#) and in Appendix B.

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Element 1: Research Process Continued

4. Archetype Data Collection

- a. We collected individual narratives about DIG gardeners' needs, resources, and limitations. In these interviews we shared images of gardeners and asked questions about their background, family structure, nutritional status, and financial resources.
- b. This process confirmed that DIG gardeners each have needs that should be prioritized uniquely to their situation -- a fact the tool has to reflect. Example questions included:
 - i. What are the gardener's medical considerations?
 - ii. How much does the gardener earn? What is their monthly income?
 - iii. How much land does the gardener have available for their garden?**The complete list of interview questions are in Appendix C.

5. Archetype Creation

- c. After collecting individual narratives, we placed them within the following categories: Age, Family Size, Available Land, Specific Need (PLHIV, PLWD, Pregnant/nursing, child), Sex, and Income level.
- d. By using this form of categorization we made sure we had a diverse sample of individuals. These categories then helped us determine which key characteristics would be most important in the development of the nutritional tool.
- e. The archetype database can be found [here](#) and in Appendix D.



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Element 1: Research Process Continued

6. Crop Recommendation Identification: Part A

A. With our crop profiles and archetypes completed, we further identified which crops would best match the most prominent characteristics that repeatedly appeared in the archetypes.

- First was nutritional needs. We identified which nutrients, vitamins, and minerals were most beneficial to key groups: PLHIV, pregnant and nursing women, and malnourished children. We then cross referenced those nutrients, vitamins, and minerals with our crop profiles to identify which crops had the greatest nutritional benefits for those key groups. See Appendix E for results.
- Second was resource availability. Using our archetypes, we determined that the most limiting resources were land and cash: some farmers had more disposable income and/or land to use for their gardens than others. We cross referenced our crop profiles and identified which crops would be accessible to farmers with limited income and farmers with limited land. See Appendix F for results.
- We then took into consideration more situational limiting factors. The first was soil type; some of DIG's farmers in Uganda live in areas with rocky soil that is not suitable for many crops. See Appendix G for suitable crops.
- The second situational limiting factor we considered was level of experience; some DIG farmers may require more time to reach a high level of comfort with gardening. In this case, certain crops may not be suitable choices for an inexperienced farmer. See Appendix G for these crops.

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Element 1: Research Process Continued

6. Crop Recommendation Identification: Part B

B. We cross referenced all of the selections of crops listed above and identified groupings of the three crops that would best suit the needs of a given farmer while taking into account the resources they have available to them. This was our final tool.

- The tool is separated into four color coordinated sections. The tan section provides recommended crop selections for farmers with less than 1/4 acre of land and very low income. The light green section provides recommended crop selections for farmers with more than 1/4 acre of land, but low income. The orange section provides recommended crop selections for farmers with an acre or more land and fair income. And, the dark green section provides recommended crop selections for farmers living in a region with rocky soil. See Appendix H for the colors key.
- The icons that accompany each crop grouping signal the key population that selection has particular benefits for. See Appendix I for the icon key.
- The profitability of each crop selection, as found in our crop profiles, is also denoted, with a dollar sign, on the tool. If a farmer has multiple suitable options, or is not part of a key population, they may choose to use their home garden as a means to increasing their wealth.
- See Appendix J for tool. This tool, and supplementary pages, have been formatted into a user manual, explaining in detail how to use the tool and the purpose of each page.



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Element 2: Recommendations for Replication

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Recommendation 1: Perfect Uganda's Manual

1. We believe it would be wise to completely perfect the manual in Uganda before replicating the process in Kenya or Senegal. Below are listed some considerations we anticipate being helpful as you further perfect the tool:
 - a. Does the tool work for most local facilitators? Or would they like more customizable sections? If so, which sections would they like to customize?
 - b. Do the colors feel easy to remember with their respective categories? Or, does a different color to category pairing make more sense to the facilitators?
 - c. Are any of the icons not intuitive to local facilitators and/or farmers? Is there a more intuitive option?
 - d. Are the land and categories in their simplest forms? Or, would it be easier to categorize a farmer's land and cash availability differently?
 - e. How do farmers themselves react to the categories?

Recommendation 2: Be intentional about the idealistic nature of these recommendations

1. This manual is a bit idealistic in nature; the recommended crop groupings are not simply the most socially liked crops, but the most beneficial crops for that specific farmer. The manual is only useful as an educational tool if this is the case. However, be intentional about how and where you choose to recommend the ideal crops. For example, though spinach and kale are largely the most nutritionally dense vegetables, they are also not widely accepted at first. So, it is wise to have options without these crops but to denote the superior benefits of them with additional icons.



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Element 2: Recommendations for Replication

Recommendation 3: Tackle one need or limitation at a time

1. Create separate lists that tackle only one need or limitation at a time, i.e. make separate lists for PLHIV, People with less than ¼ acre of land, minimal income, etc, and then see how everything compares to make the appropriate larger categories:
2. In a new location we recommend you begin by identifying the key populations being served: Do those populations have any specific needs to be met in their home gardens?
 - a. Do those populations have any specific needs to be met in their home gardens?
 - b. Or, do those populations have any specific challenges or limitations when it comes to creating a home garden?
 - c. Are there any geographical, in terms of landscape or terrain, limitations to the crops certain farmers could grow?
3. We then recommend you survey a sample of farmers in that location, using the questions found in Appendix C as a base.
 - a. Are there any recurring needs or limitations in the farmer's responses?
 - b. Can those needs or limitations be attached to an identity, characteristic, or possession
4. You should then make a list of all the possible and recommended crops for each category you have found
5. Lastly, cross reference each of your categories to see which ones can be combined.



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Conclusion

Element 3: Conclusion

Conclusion

This nutritional manual will allow DIG to further enhance their farmer training program. It will provide farmers and local facilitators with information on how to individualize farmers' gardens. This form of training and making recommendations will allow DIG farmers to maximize the potential of their home gardens; with intentional selection, a farmer's garden can improve their health, improve their family's health, accumulate wealth, and improve their sense of belonging – all while respecting their unique limitations.

We hope that, over time, the tool will also encourage farmers to select the crops that are best suited to their needs. While some crops may be more socially typical, going beyond social norms can dramatically improve a farmer's diet. This nutritional manual depicts this very fact by denoting the specific benefits of each crop. This manual, thus, will frame the selection of garden crops as not only a selection of fruits or vegetables, but as a selection of benefits and possibilities.

Additionally, we hope that the replication of this manual will allow DIG to apply our development process to the Senegal and Kenya programs in the future. This visually comprehensive tool has the ability to make a positive impact for DIG's programming, local facilitators instruction, and farmer's gardens. Moreover, it has the potential to grow as DIG grows; we look forward to seeing how it is implemented and improved upon in the years to come.



Appendix

Appendix A: Cop Data Interview Questions

Production Costs

1. How expensive is the seed for this crop?
2. Does seed have to be bought each year? Or can you seed-save?
3. Does this crop require any special (expensive) tools/equipment or materials to farm?

Market Prices

1. How expensive are these crops in the local market (maybe like a circle \$, \$\$, \$\$\$, or \$\$\$\$?)
2. How much could they sell this crop for?
3. Is there a large demand?
4. How much profit would they make if they sold these?

Level of Difficulty

1. How difficult is this crop to farm?
2. Could a brand new gardener harvest it?

Cultural Value/ Social Stigma

1. Are there any cultural dishes that feature this crop?
2. Are there any Social Stigmas surrounding the crop in the community?

Generally liked/disliked? Why?

1. Are there any reasons people dislike this crop or especially like the crop?
2. Why do community members/gardeners have these likes or dislikes?

Environmental Considerations?

1. Is this crop environmentally resilient?
2. What would happen if there wasn't as much rain one year?
3. What kind of soils does this crop grow and/or not grow in?

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Appendix B: Cop Profiles

Crop	Input Cost			Limiting Factors			Profitability			Like and Dislike (*encapsulates social stigmas)		
	Low (one time cheap)	Medium (multiple times but cheap)	High (multiple times, costly)	A lot of land	A lot of movement	New farmer	not profitable	somewhat profitable	very profitable	like	neutral (like it, but aren't growing)	dislike
Peas			X			X		X			X	
Beetroot		X				X		X			X	
Amaranth	X					X	X				X	
Pumpkin/Leaf		X				X		X		X		
Sweet potato (Fruit and Vine)			X			X			X			X
Tree tomato		X		X		X			X	X		
Eggplant**look into white eggplants**		X				X			X	X		
African Black Nightshade	X					X			X	X		
Cabbage		X				X		X		X		
Carrots			X		X		X			X		
Passion Fruit	X			X	X		X				X	
Onion		X				X			X		X	
Spinach		X				X	X					X
Kale		X					X					X
Green Pepper				X				X				

Crop	Nursing and Pregnant Women				People Living w HIV/AIDS				Malnourished Children			
	Folic Acid	Calcium	Iron	Vitamin A	Potassium	Vitamin A	Vitamin C	Iron	Folate	Zinc	Iron	Vitamin A
Peas		X	X				X			X		
Beetroot			X				X	X			X	
Amaranth		X		X		X			X			X
Pumpkin/Leaf				X		X				X		X
Sweet potato (Fruit and Vine)				X		X	X					X
Tree tomato				X	X	X	X					X
Eggplant**look into white eggplants**												
African Black Nightshade			X					X			X	
Cabbage							X					
Carrots				X		X						X
Passion Fruit				X		X	X					X
Onion						X	X					
Spinach	X	X		X	X	X		X			X	X
Kale	X	X		X	X	X						X
Green Pepper				X		X	X					

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Appendix C: Community Narrative Interview Questions

1. What is the name of the gardener?
2. What is the age of the gardener?
3. What gender is the gardener?
4. Does the gardener have any medical considerations?
5. How many children does the gardener have? Does the gardener have a spouse?
6. How much does the gardener earn? What is their monthly income?
7. How much land does the gardener have available in their garden?
8. What do you think the gardener most benefits from DIG's program?
9. Currently, what would you recommend the gardener grow in their home garden and why?

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Appendix D: Archetypes

Name	Age				Family Size				Available Land		
	under 25	25-40	40+		under 4	4-6	6+		< 1/4	1/4 - 1/2	> 1/2
Generoza			X				X		X		
Emily	X					X		X			
Norah Bashabe			X			X				X-cc	
Roy Bayenda			X			X		X		cc	
Tusime Alice			X	X						X-cc	
Anansio			X				X		X		
Masaka Yegurasiamutwa			X			X		X			
Iret Manirho						X		X			
Sunday Benard / **married to Iret, same info as above**											
Iret Nyirasenga			X				X	X			
Jenipher	X						X		X-R		
Wilson			X				X		X		
Rosemary			X				X	X		cc	
Nyarurambi			X				X		X		

Roy Bayenda	X					X				X
Tusime Alice	X					X			X	
Anansio			X	X	X					
Masaka Yegurasiamutwa			X			X				
Iret Manirho			X			X				X
Sunday Benard ^					X					X **same as above
Iret Nyirasenga						X		X		
Jenipher			X			X		X		
Wilson					X			X		
Rosemary			X			X		X		
Nyarurambi			X	X		X			X	

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Appendix E: Crops for Key Populations

High Nutrient Value 					
Children 					
Pregnant Mothers 					
PLWHA 					

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Appendix F: Crops for Farmers with Limited Access

Vegetables for Farmers with Limited Land Availability



Ebihaza
Pumpkin



Bitruti
Beetroot



Kabegi
Cabbage



Sukuma Wiki
Kale



Sipinaki
Spinach



Obutunguru
Onion



Amashaza
Peas

Tip or Added Info:

Vegetables for Farmers with limited access to garden investments



Ebihaza
Pumpkin



Eschwiga
Nightshade



Obutunda
Passion Fruit



Kabegi
Cabbage



Sipinaki
Spinach



Eryanya
Tomato



Ebishenda
Green Pepper



Dodo
Amaranth

Tip or Added Info:

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Appendix G: Crops for Special Considerations

Vegetables for Rocky Soils



Bitruti
Beetroot



Karoti
Carrot



Dodo
Amaranth



Sipinaki
Spinach



Obutunguru
Onion

Vegetables for Experienced Gardeners



Obutunda
Passion Fruit



Sukuma Wiki
Kale



Ebishenda
Green Pepper



Karoti
Carrot

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Appendix H: Category Key

Category Key

The Category Guide explains what each color of the Vegetable Guide describes in regards to a farmer's available resources in land and income.

For farmers with less than 1/4 acre of land and very low income

For farmers with more than 1/4 acre of land, but low income

For farmers with an acre or more land and fair income

For farmers living in a region with rocky soil

For example, if a farmer has very limited income and land, you know that the recommendations in the tan category will be suitable for them. From here, look at the symbol key to decide which of the sets in the tan category is the best fit for that farmer.

If the farmer has more land, the light green and orange categories are possible. Determine how much income they have already; if it is low use the light green, and if it is higher, use the orange. Next, move on to the symbol key.

If a farmer lives in a region with rocky soil, use the darker green category.

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Appendix I: Symbol Key

Symbol Key

The Symbol Key provides an explanation of each of the icons by the crop recommendation sets.



Nutritional Benefits



Profitability



Children



Pregnant Woman



PLHIV

For example, consider a gardener who has a large family and is a person living with HIV. For this individual, prioritize selections that have the nutritional benefits and children, and PLHIV symbols.

On the other hand, if a gardener is simply looking for an overall nutritious garden, they may be able to focus on profitable crop selection, signaled by the dollar symbol.

Start by looking for crop recommendation with the symbols that best match the needs of the farmer.

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Appendix J: Crop Selection Tool

Vegetable Recommendations

The image displays a grid of 12 vegetable recommendation cards, organized into three rows and four columns. Each card features a set of icons at the top representing different criteria: a red plus sign (+) for health benefits, a dollar sign (\$) for cost, a red ribbon for social impact, and a person icon for social benefits. The cards are arranged as follows:

- Row 1 (Light Green background):**
 - Card 1: 3 health (+), 1 social impact (red ribbon), 1 person icon. Vegetables: purple eggplant, green leafy vegetable, yellow squash, green bell pepper.
 - Card 2: 2 health (+), 1 cost (\$), 1 social impact (red ribbon). Vegetables: red tomato, green leafy vegetable, green bell pepper.
 - Card 3: 3 health (+), 1 social impact (red ribbon), 1 person icon. Vegetables: green leafy vegetable, purple eggplant, yellow squash, green bell pepper.
- Row 2 (Light Green background):**
 - Card 4: 1 health (+), 1 cost (\$). Vegetables: green leafy vegetable, purple eggplant, yellow squash, green bell pepper.
 - Card 5: 3 health (+), 1 person icon. Vegetables: purple eggplant, purple eggplant, green leafy vegetable, purple eggplant.
 - Card 6: 2 health (+), 1 person icon. Vegetables: yellow squash, green bell pepper, purple eggplant, purple eggplant.
 - Card 7: 2 health (+), 1 cost (\$). Vegetables: green leafy vegetable, red onion, purple eggplant, purple eggplant.
- Row 3 (Orange background):**
 - Card 8: 2 health (+), 2 cost (\$), 1 social impact (red ribbon). Vegetables: purple eggplant, yellow squash, red tomato, green leafy vegetable.
 - Card 9: 3 health (+), 1 person icon. Vegetables: purple eggplant, green pea, green leafy vegetable, green leafy vegetable.
 - Card 10: 1 health (+), 3 cost (\$). Vegetables: green leafy vegetable, green leafy vegetable, purple eggplant, yellow squash, red tomato.
 - Card 11: 2 health (+), 1 cost (\$), 1 person icon. Vegetables: green leafy vegetable, yellow squash, purple eggplant, yellow squash.

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