Internship Report

Evaluating High Diversity Gardening Project in Mazar-e Sharif

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Colophon:

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Table of Contents

List of Abbreviation

DDS	Dietary Diversity Score
DQQ	The Dietary Quality Questionnaire
GDR	The Global Dietary Recommendations
HDG	High Diversity Gardening
IFRC	International Federation of Red Cross and Red Crescent Societies
IPC	Integrated Food Security Phase Classification
HFIAP	The Household Food Insecurity Access Prevalence
HFIAS	The Household Food Insecurity Access Scale
MAHFP	Months of Adequate Food Provision
NCD	Non communicable diseases
NGO	Non-Governmental Organization
NRC	Norwegian Refugee Council
PVADO	Peace Village for Afghanistan Development Organization
UNDP	United Nations Development Programme
UNICEF	The United Nations International Children's Emergency Fund
VoP	Village of Peace
WFP	World Food Programme

Introduction and methods

Afghanistan has experienced decades of continuing crisis. After the return of the Taliban in 2021, household food insecurity has worsened from 70% to 98% (Saif-Nijat et al., 2023). Afghanistan is ranked 114 out of 125 countries in the 2023 Global Hunger Index, with nearly 9 million of Afghans on the verge of famine (Global Hunger Index, 2023, NRC, 2022). This contributes to a high level of malnutrition with an estimated 4 million children, pregnant, and lactating women being acutely malnourished (IPC, 2023). Moreover, the prevalence of anaemia among children and women of reproductive age exceeds 40% (WFP, 2023). In Mazar-e Sharif where high-diversity gardening has been implemented, the food insecurity was classified as critical (IPC, 2023).

The main driver of food insecure is poverty (Leppaniemi et al., 2023). The economic welfare of Afghans has been unstable for more than 30 years, with the proportion of the population living below the poverty line increasing from 62% in 2001 to 92% in 2022 (Watson Institute, 2022). Food prices surged, followed by a fall in domestic production due to limited supply of raw materials and restriction on external suppliers and trade (UNDP Afghanistan, 2023). Moreover, purchasing power parity declined, meaning that Afghans experienced economic hurdles in purchasing food, purchase foods by cash, particular for daily wage workers (Human Rights Watch, 2022).

Besides the economic crisis, environmental problems have exacerbated the food security and malnutrition situation. In 2021, over 80% of Afghans were impacted by severe drought, resulting in a reduced food supply and prolonged food shortage (IFRC, 2021). Moreover, flooding events have spread all over the country, contributing to reduced income and food intake (UNICEF, 2023).

Taliban rule has banned girls and women from working and pursuing higher education. Girls and women must adhere to a strict dress code and travel permit (>75 km with male chaperone and are prohibited from public spaces (i.e. gyms, public park, restaurants). Such restrictions have specifically affected widows' ability to generate income and access food (Amnesty International, 2023).

High-Diversity Gardening by Village of Peace

Village of Peace (VoP), an NGO headquartered in the Netherlands but working in Afghanistan, is dedicated to enhancing the well-being of Afghan citizens. In partnership with the local organization Peace Village for Afghanistan Development Organization (PVADO), VoP targets the most vulnerable groups in Afghanistan, namely widows and orphans. Over the past five years, they have led an initiative known as High Diversity Gardening (HDG) in Mazar-e Sharif City to address food security. HDG involves cultivating nutrient-rich crops to diversify diets and growing cash crops like saffron to generate income for purchasing other food items.

Nutrition education is an integral aspect of the High Diversity Home Garden project. Participants are provided with supplies and seeds to start their own home gardens, featuring a variety of crops to enrich their diets with essential nutrients and vitamins. VoP adopts a comprehensive approach, offering both materials and training in garden care to help participants maximize the nutritional benefits of their produce. They receive instruction in techniques such as direct seeding, transplanting, land cultivation, and the advantages of crop rotation.

Complementing the home garden training, participants learn about how nutrition is obtained from food. The training covers topics such as the importance of a healthy diet, what constitutes a healthy diet, meal preparation, and infant feeding practices. Teaching is conducted through diverse methods, including storytelling, games, action cards, and cooking demonstrations.

Theory of change

Home gardening is a promising approach to improving household food security and well-being by providing direct access to food that can be harvested, prepared, and fed to family members. Previous studies in Tanzania, Rwanda, and South Africa have shown that participation in home gardening enhances dietary diversity, nutritional outcomes, and food security (Blakstad et al., 2021; Blakstad et al., 2022; Issahaku et al., 2022; Gwacela et al., 2024). Additionally, involvement in agricultural activities has been shown to reduce the likelihood of severe household food insecurity (Lal et al., 2020).

However, home gardening faces challenges such as insufficient irrigation and inadequate fencing. To ensure sustained positive outcomes, it is essential to provide adequate irrigation, implement cropping methods that maintain soil quality, and use fencing materials to mitigate the risk of damage from domestic animals. Future strategies might also include designing programs that emphasize intervention fidelity, social support, motivation, community cohesion, and platforms for sharing experiences (Blakstad et al., 2022). More detailed discussion on benefits of home gardening can be found in the previous report (Auliani et al., 2023).

VoP has adopted a theory of change to formulate hypotheses for the high-diversity gardening intervention, as depicted in Figure 1 (Auliani et al., 2023; Blakstad et al., 2022). They hypothesize that the intervention program—including agricultural inputs and training, nutrition education, and financial education—will improve income and well-being, as well as increase fruit and vegetable consumption in the short term through three pathways: increased production of cash crops and nutrient-dense crops, improved financial management, and enhanced nutritional knowledge and hygiene practices. In

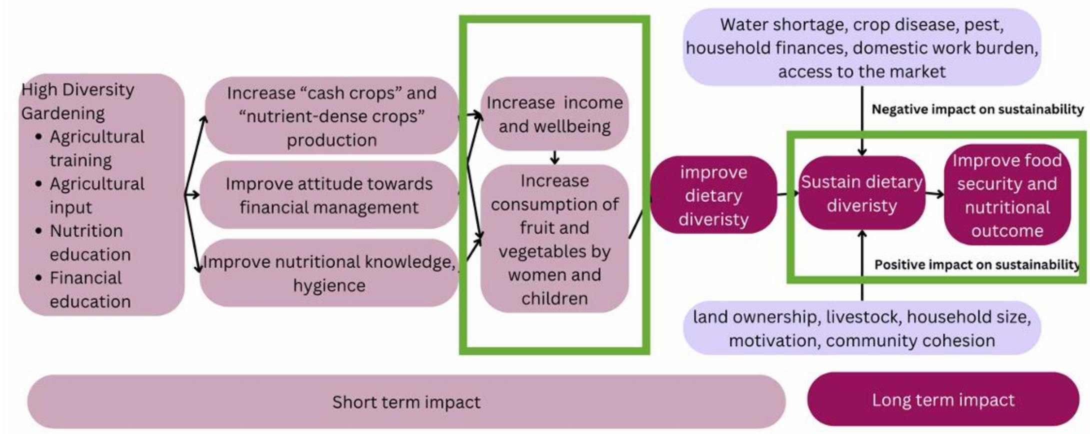


Figure 1: Theory of change (Auliani et al., 2023)

Objectives

This report has two objectives:

1. To describe the results of the pilot study evaluating the high diversity gardening intervention to improve the next round of high diversity gardening project.
2. To describe the capacity-building efforts in data analysis for Afghans volunteers.

Data Collection

Data were collected from 150 women who participated in home garden project between 2017 and 2022. The participants included in the pilot study were: (1) participated in the HDG program from 2017-2022, (2) still in contact with the facilitators.

Interviewer used the Dari language with the Kobo Collect mobile data collection platform. Enumerators collected data about basic household questions, home garden production, household grown crops in the past year, challenges with home garden, market access, hygiene, and food security and nutrition indicators. Data collection method has been described more elaborately in a previous report (Auliani et al., 2023).

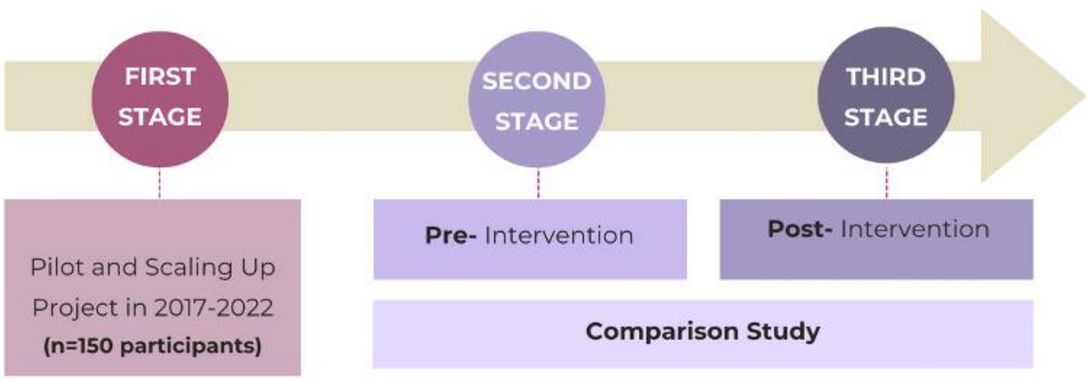


Figure 2: Study design (Auliani et al., 2023)

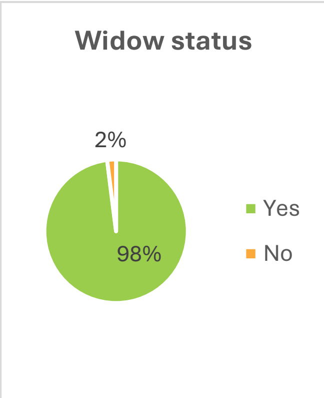
Data Analysis

Descriptive analysis was performed on the categorical variables and presented as frequencies and percentages. Correlation tests were performed for indicators of Household Food Insecurity Access Scale (HFIAS), Dietary Quality Questionnaire (DQQ), and Months of Adequate Food Provision (MAHFP). Microsoft Excel and R studio were used to conduct statistical analyses.

Results – The pilot study

Demographics

A total of 150 participants were included in the analysis. Figure 3 and 4 show that nearly all participants were widows, with more than half of them aged 55-64 years old (68%), while the rest were aged over 65 years old (18%) and 25-54 years old (14%).



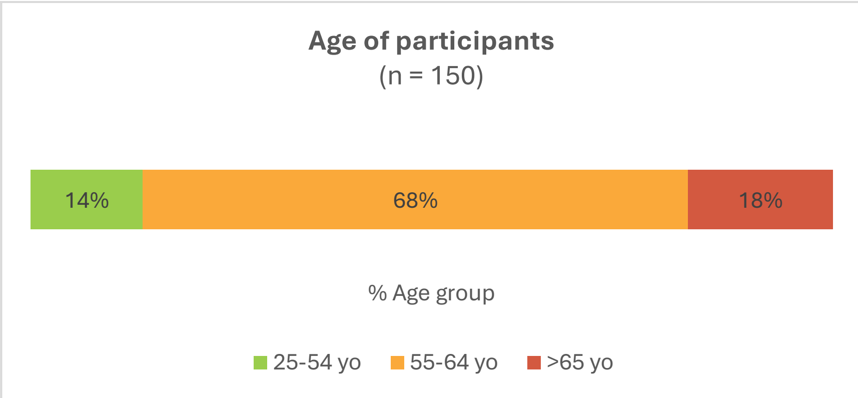


Figure 3: Widow status of the participants

Figure 4: Age of the participants

On average, participants have 3 children and 1 elderly who needs care (Appendix 1). Figure 5 shows a diverse range of child age groups across the households, with the largest groups being children aged 6-10 years (35%) and 10-14 years (34%). Half of the households had 4-7 household members, while 30% had more than 7, and the rest have less than or equal to 3 as depicted in Figure 6.

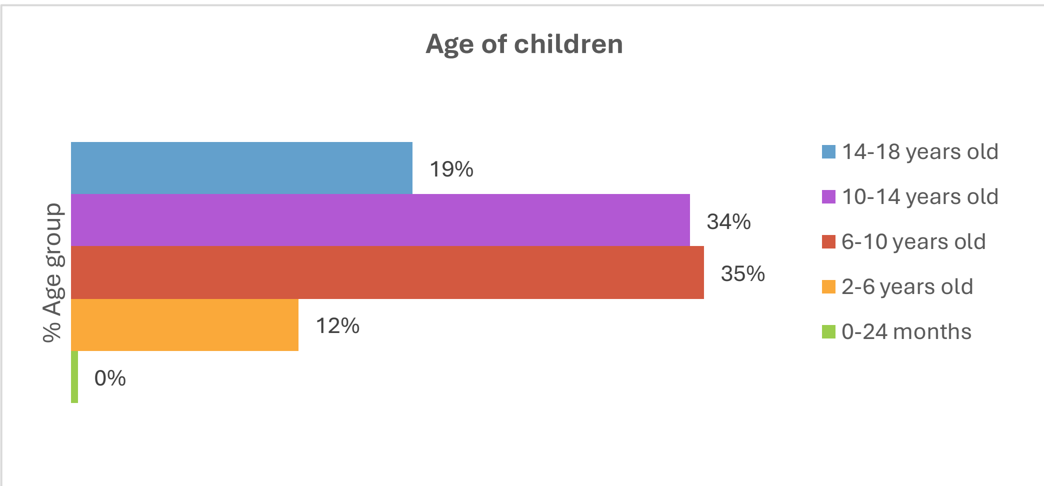


Figure 5: Age of children

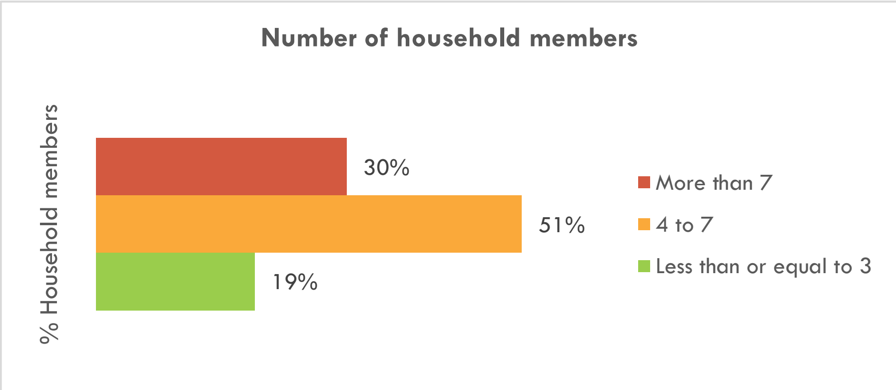


Figure 6: Number of household members

As illustrated in Figure 7, half of the participants had no formal education background, while 28% attended primary school and 14% attended religious school. Less than 10% attended various levels of education, such as middle school, secondary school, vocational school, technicums, and literacy courses.

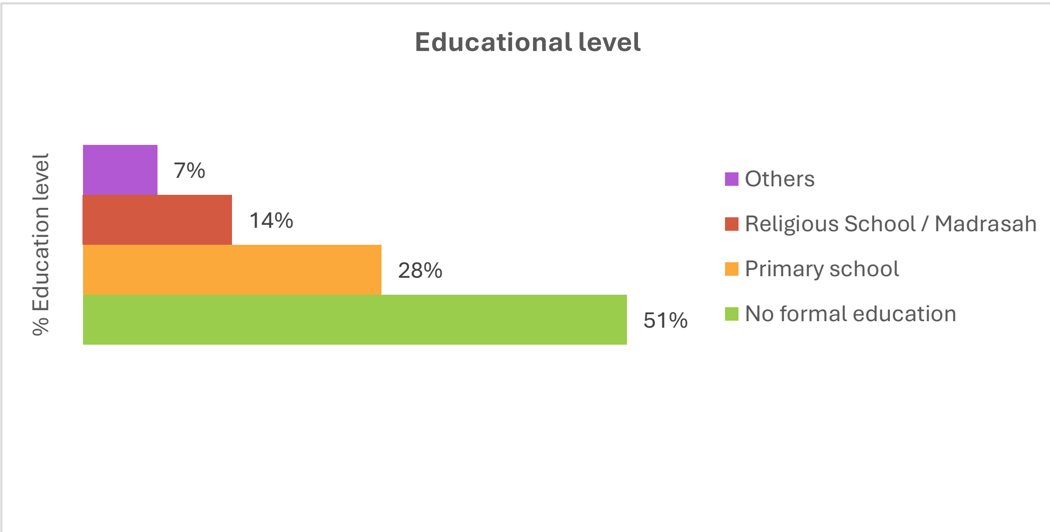


Figure 7: Education level of participants

Home garden situation

The majority of participants (95%) had a home garden (Appendix 1). Figure 8 shows that most participants (94%) received support in the form of training. In addition to training, half of the participants received livestock, seeds, and crop resources (e.g. fertilizer, garden tools), while less than 10% received trees.

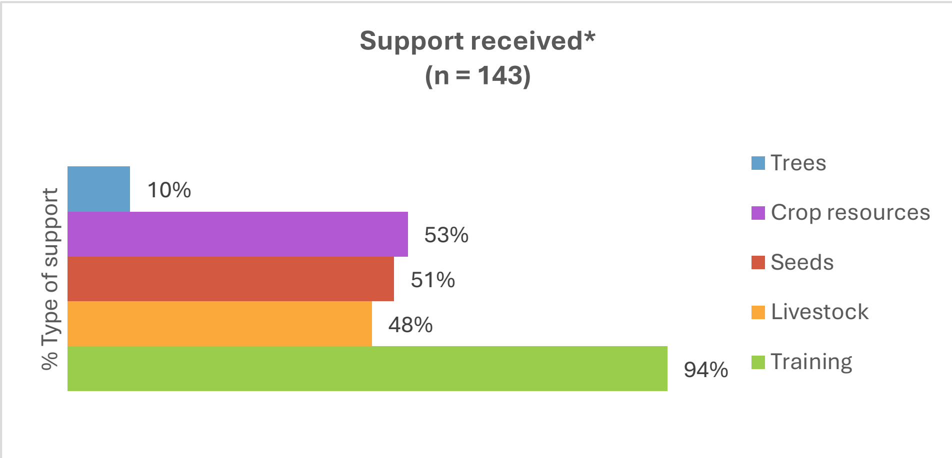


*Figure 8: Support received by participants (*participants could give multiple answers)*

More than half of the participants (n= 99) (69%) had livestock (Appendix 1) with poultry being the most owned (83%). Other livestock included cattle/cows (19%), sheep (10%), and goats (10%) as illustrated in figure 9.

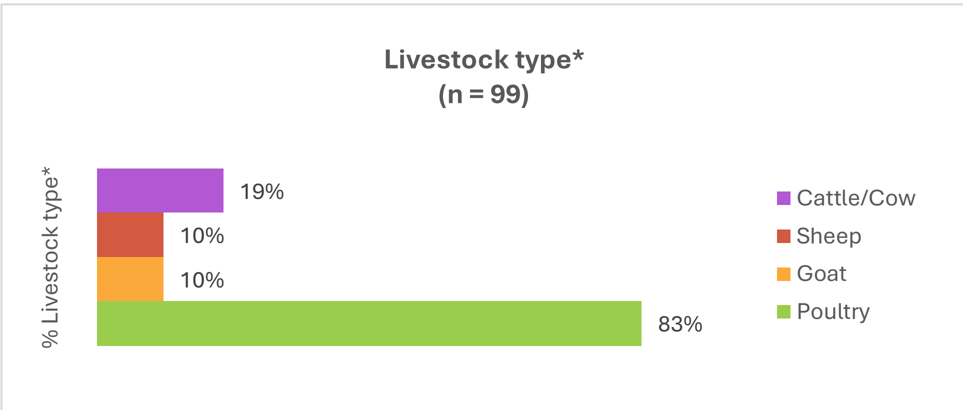


Figure 9: Livestock type
**Participants could give multiple answer*

As depicted in Figure 10, crops were planted either for consumption or trade, or a combination of the two. The highest utilization was for full consumption (32%), while the lowest was for full trade (7%). The second highest category was equal split between consumption and trade (29%), followed by 70% for consumption and the rest for trade (20%), and 30% for consumption and the rest for trade (13%).

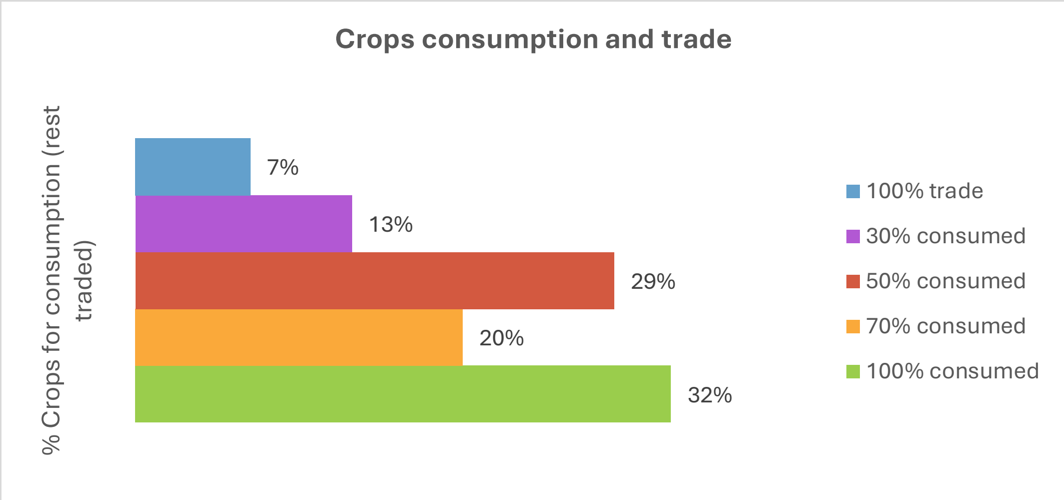


Figure 10: Crops for consumption and trade

Figure 11 illustrates the top 5 crops planted by participants were spinach as the highest at 17%, followed by onions and carrots (16%), strawberry bushes (15%), and soybeans (10%). On average, participants planted five different crops. See further data in the Appendix 1.

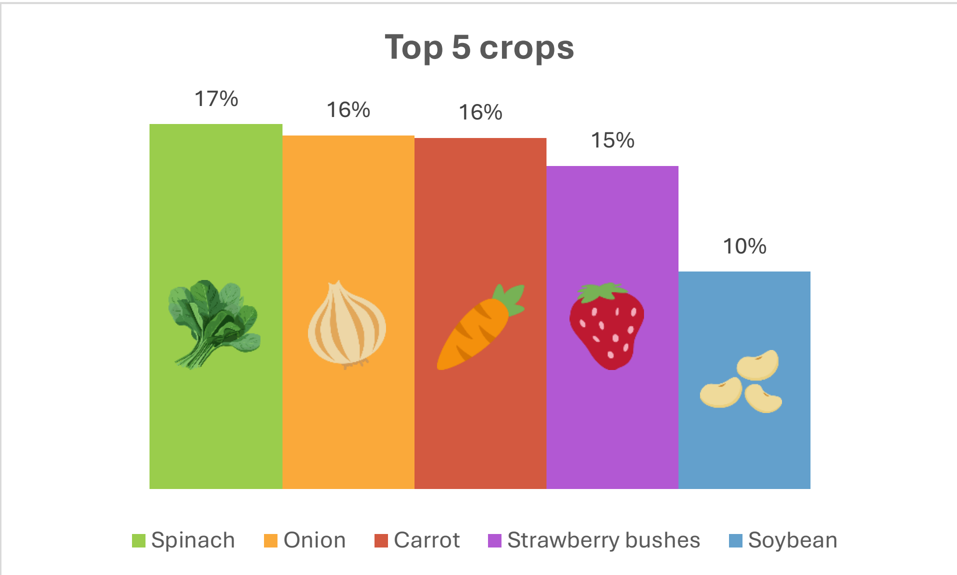


Figure 11: Top 5 planted crops

Among the planted crops, certain crops were identified as top crops that were fully consumed, fully traded, or used for both consumption and trading (Table 1). The top crops for full consumption were onions (31%), chickpeas (5%), and strawberries (1%). The top crops fully for trading were strawberries (36%), carrots (33%), and soybeans (27%). The top crops for both consumption and trading were spinach (66%), carrots (51%), and strawberries (40%).

Table 1: Top crops for different use

Top crops	Crops
Fully traded	Onions (31%), chickpeas (5%), and strawberry (1%)
Fully consumed	Strawberry (36%), Carrots (33%), and soybean (27%)
Consumed and traded	Spinach (66%), carrot (51%), strawberry (40%)

Although majority of participants use the seed provided by VoP (94%), some participants still used seed from other sources (35%). The reasons for planting other crops included that they were easier to plant, sold better at market, and required less water.

Challenges & benefits of home garden

Only 1.4% of participants perceived home garden as an additional burden (Appendix 1). However, several challenges related to home garden are depicted in the figure 12 below. The top five challenges reported were the high cost of fertilizers (39%), the high cost of pesticides (37%), the high cost of seeds (36%), poor access to pesticide (35%), and the effort required for fetching water (27%).

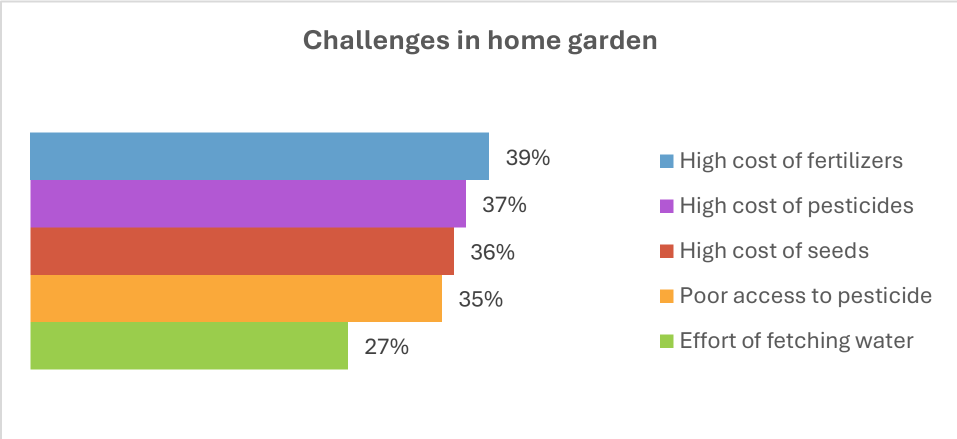


Figure 12: Challenge in home garden

Most participants (70%) perceived that the home garden intervention improved their livelihood situation, while only 3% felt their livelihood stayed the same, and 1% perceived their livelihood did not improve or slightly worsened (Appendix 1). The figure 13 below shows that the greatest perceived impact of home gardening is helping participants find a purpose of life, followed by improvements in health, help for children's necessity for school, pay for healthcare, support for household necessity, and alleviate financial stress.

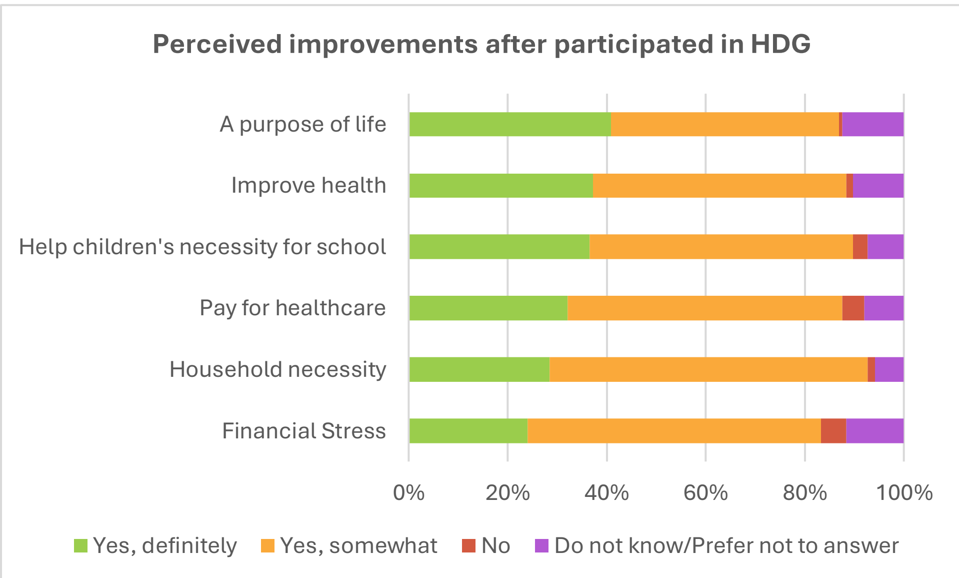


Figure 13: Improvement aspect

Market access

Figure 14 shows that most participants reported access to market (67%) without restriction, while 22% could only go to the market when accompanied, and only 11% had no access to the market. Half of the participants went to the market centre by car (taxi/own car), while 23% of them walked to the centre, and the rest used various transportation modes (e.g., bicycle, bus, motorbike). For further data, see the Appendix 1.

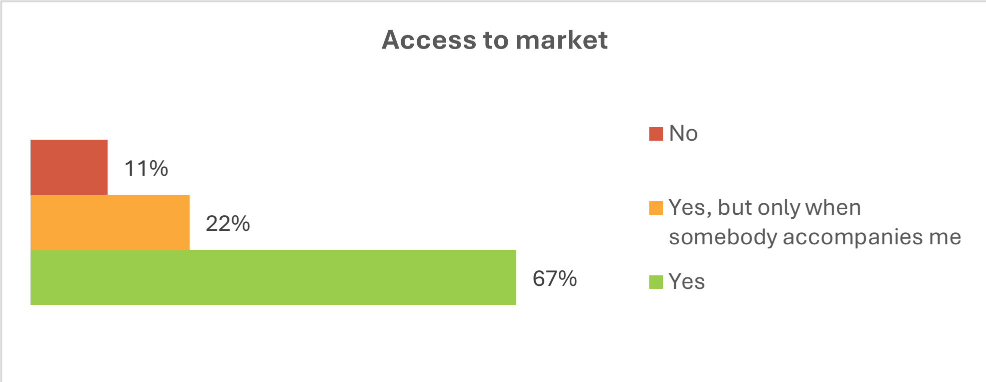


Figure 14: Market access

Among the women who reported having access to the market, they reported that a mahram (i.e. a travel companion for women, which is obliged in Afghanistan) not always available to accompany the participants as depicted in figure 15. The availability ranged from less than 2 times a month (30%) and 2-3 times a month (28%) as the most common, then 1 time per week (22%), 2-3 times per week (11%) and always (10%).

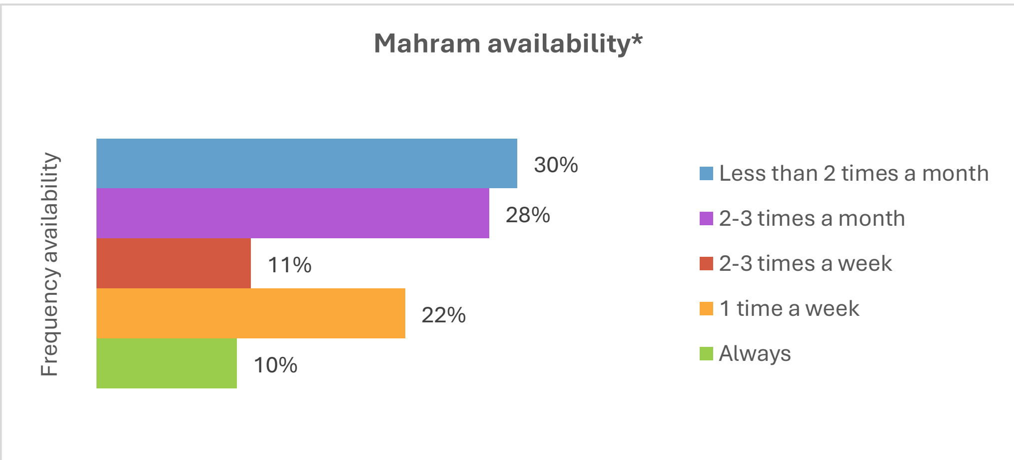


Figure 15: Mahram availability
** Responded by participants who answered 'yes' and 'yes, but only when accompanied by someone.' (n = 134)*

Food security and nutrition

Table 2. Diet quality indicators

Quality indicators	Mean
DDS	7.9
NCD-Protect	5.4
NCD-Risk	2.4
GDR Score	12

Table 2 shows the indicators calculated from Diet Quality Questionnaire (DQQ). On average, the interviewed women consumed 7.9 food groups a day according to the Dietary Diversity Score (DDS). Consuming ≥5 food groups a day is associated with sufficient micronutrient intake. Only 3% of the respondents consumed <5.

NCD-Protect, NCD-Risk, and GDR-Score are new indicators for evaluating diet quality. On average, participants consumed 5.4 out of 9 protective food groups. Moreover, participants only consumed 2.4 out of 9 food groups associated with NCDs. A higher NCD-Protect score indicates increased consumption of protective food groups against non-communicable diseases (NCDs). In contrast, a higher NCD-Risk score indicates a higher consumption of foods groups that are risk factors for NCDs.

On average, participants consumed 12 out of 18 food groups recommended. The Global Dietary Recommendation (GDR) score reflects the adherence to the WHO recommendation for healthy diets; the higher the score, the more likely more recommendations are met. For further details on these indicators, refer to the guidebook about the study design (Auliani et al., 2023).

Figure 16 illustrates the consumption of various food groups on the previous day. The consumption of grains, roots, and plantains was the highest at 100%, while nuts and seeds had the lowest consumption at 23%. Dark green leafy vegetables, vitamin A-rich fruits and vegetables, dairy, and eggs were consumed by 90% of participants. Pulses and other vegetables were each consumed by nearly 90% of participants. Meat, poultry, and fish were consumed by 73%, and other fruits by 51% of participants.

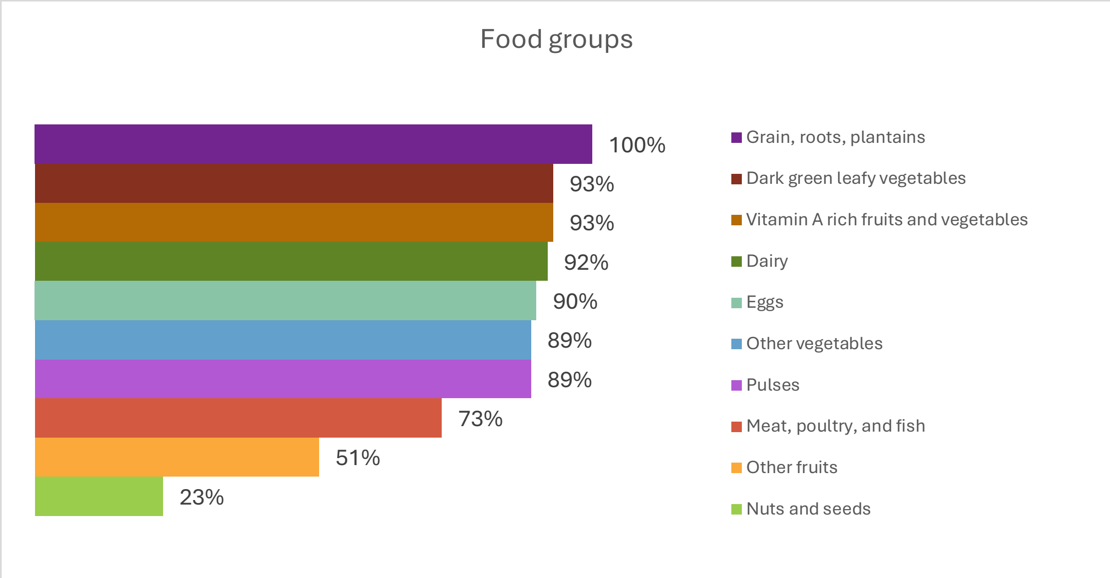


Figure 16: Food group consumption

The Household Food Insecurity Access Scale (HFIAS) assesses coping strategies used when faced with food scarcity. It asks about the participants' experiences of food security rather than actual consumption, with scores ranging from 0 to 27. A higher the score indicates greater food insecurity experienced by the households. The average HFIAS score for the surveyed households was 5 out of 27 (Appendix 1).

The households were further categorized based on the prevalence of household food insecurity as displayed in Table 3. The highest prevalence was food secure at 41%, whereas 35% of households were severely food insecure. Additionally, 19% of households were moderately food insecure, and 7% were mildly food insecure. Further definition of these categories can be found in the study guidelines (Auliani et al., 2023).

Table 3: Household food insecurity access prevalence

Category	**Prevalence**	**DDS**
Food secure	41%	8,1
Mildly Food Insecure Access	7%	8,6
Moderately Food Insecure Access	19%	7,9
Severely Food Insecure Access	35%	7,6

Households in the mildly food insecure category had the highest DDS at 8,6, followed by households in food secure category at 8,1. Households in the moderately food insecure had an DDS of 7,9, while the lowest DDS was at 7,6 was among households in severely food insecure category.

Figure 17 shows that the group of grains, white roots, and plantains was consumed at 100% across all food security levels. Conversely, the consumption of nuts and seeds was the lowest across all food security levels, under 50%.

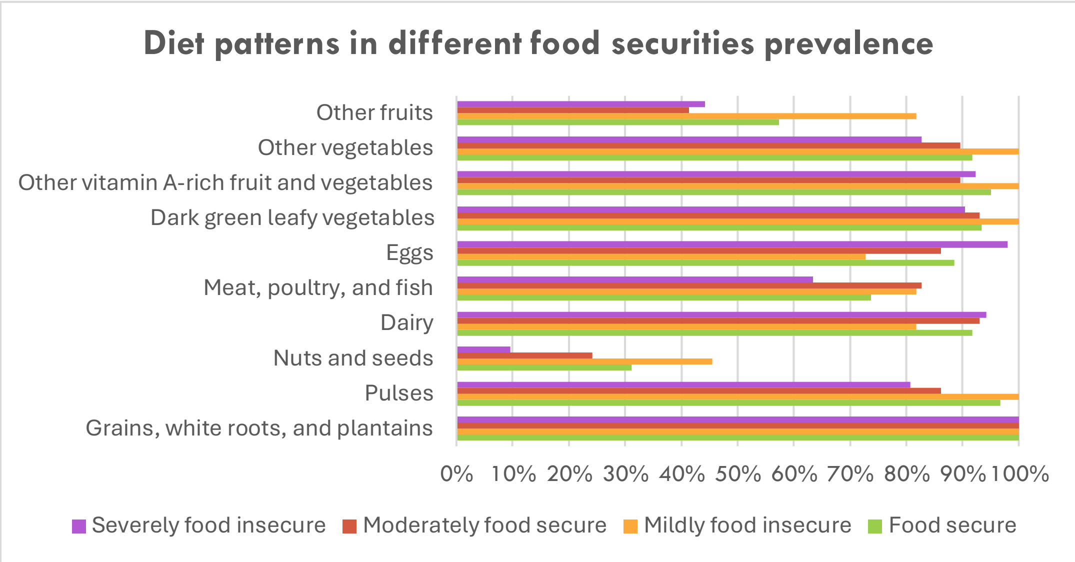


Figure 17: Diet patterns in different food securities prevalence

The Months of Adequate Household Food Provisioning (MAHFP) score was divided into two categories; households with MAHFP score of 12 and households with MAHFP score under 12. About 45% of households had a score of 12, indicating that these households had sufficient food for the entire year. Conversely, 55% of households had a score under 12, with a mean of 9. This means that these households experienced some level of inadequate food access during the remaining three months of the year.

Figure 18 shows that the participants perceived the most inadequate food provision in December (18%), followed by June (17%) and November (15%). March was the month with the least perceived inadequate food provision (6%).

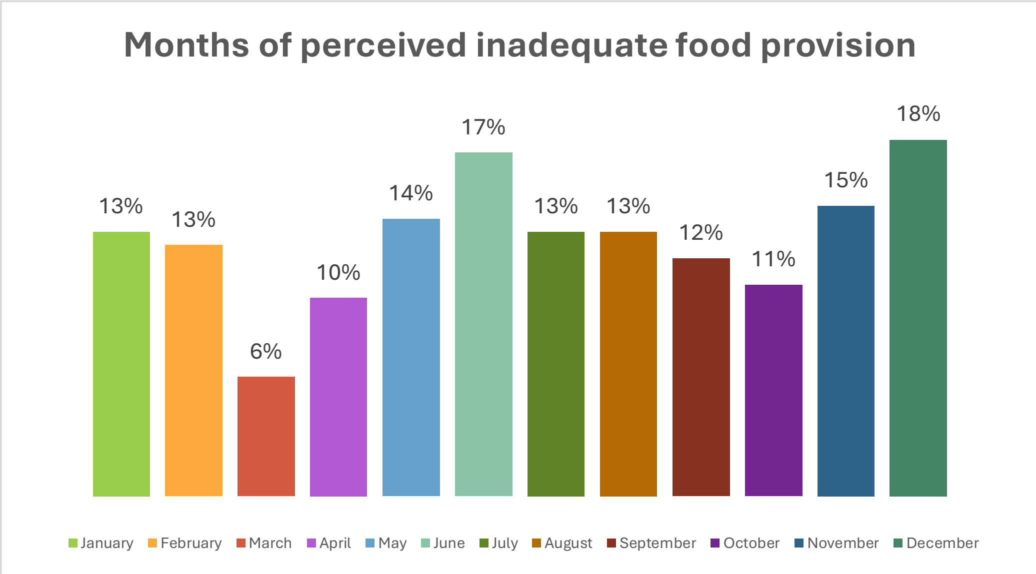


Figure 18: Months of perceived inadequate food provision

DDS, HFIAS, and MAHFP scores were further tested for correlation, as shown in Table 3. Both DDS vs. HFIAS and HFIAS vs. MAHFP have weak but statistically significant negative correlations, suggesting an inverse relationship. Specifically, as the DDS increases, the HFIAS score tends to decrease, although this relationship is not strong. Similarly, as the HFIAS score increases, the MAHFP score tends to decrease, but again, the relationship is weak. Regarding MAHFP vs. DDS scores, there is a very weak correlation that is not statistically significant. This indicates that there is no meaningful relationship between MAHFP and DDS scores.

Table 4: Correlation test

Variables*	Correlation coefficient	p-value*
DDS vs HFIAS	-0.19	0.01
HFIAS vs MAHFP	-0.19	0.01
MAHFP vs FGDS	0.05	0.51

*FGDS vs HFIAS and HFIAS vs MAHFP was tested using Spearman's rank correlation test, while MAHFP vs FGDS was tested using Pearson's correlation test.
*Two-sided hypothesis test was used at significance level of 0.05

Hygiene

Improved drinking water sources are designed and constructed to potentially provide safe water. These sources include piped water, boreholes or tubewells, protected dug wells, protected springs, rainwater, and packaged or delivered water. Main source of water for drinking and cooking among participants was from rivers, lakes, ponds or dams (50%) as shown in figure 19. While the rest of participants had diverse main source of water; 11% accessed water via protected wells and piped water, while under 5% accessed it via unprotected spring and by purchasing it. Before cooking and drinking, the majority of participants prepared water by boiling (65%), while the rest used various methods, such as using water filter, solar disinfection, adding disinfecting chemicals, and straining through a cloth. Three percent of participants didn't apply any preparation methods. For further data, see the Appendix.

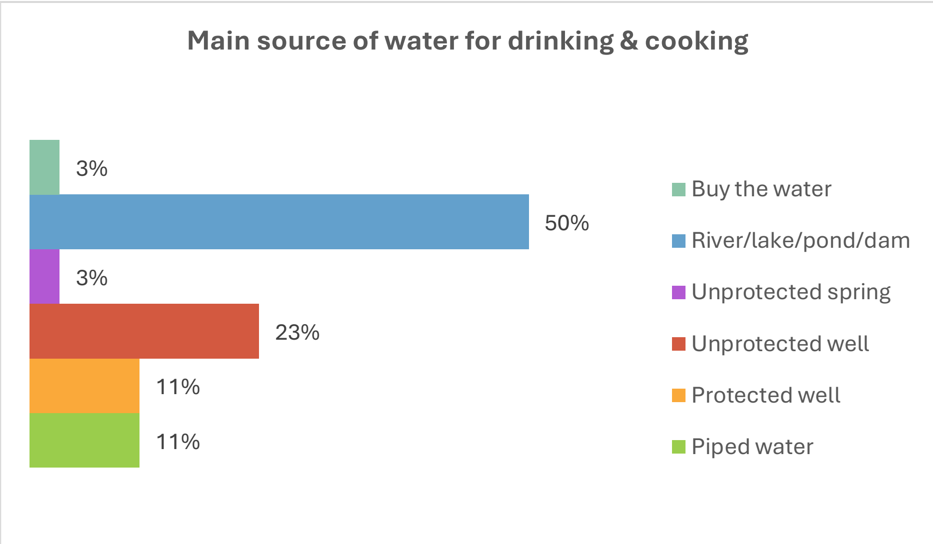


Figure 19: Main source of water for drinking and cooking

Improved sanitation facilities are designed to hygienically separate human excreta from contact. These facilities include flush or pour-flush toilets connected to piped sewer systems, septic tanks, or pit latrines; pit latrines with slabs (including ventilated pit latrines), and composting toilets. In figure 20 is shown that participants had different type of toilets, with pit latrines without slabs being the most common (37%), followed by bucket toilet and ventilated improved pits. Around 5% used pit latrines with slab and 13% of participants did not have toilet facilities.

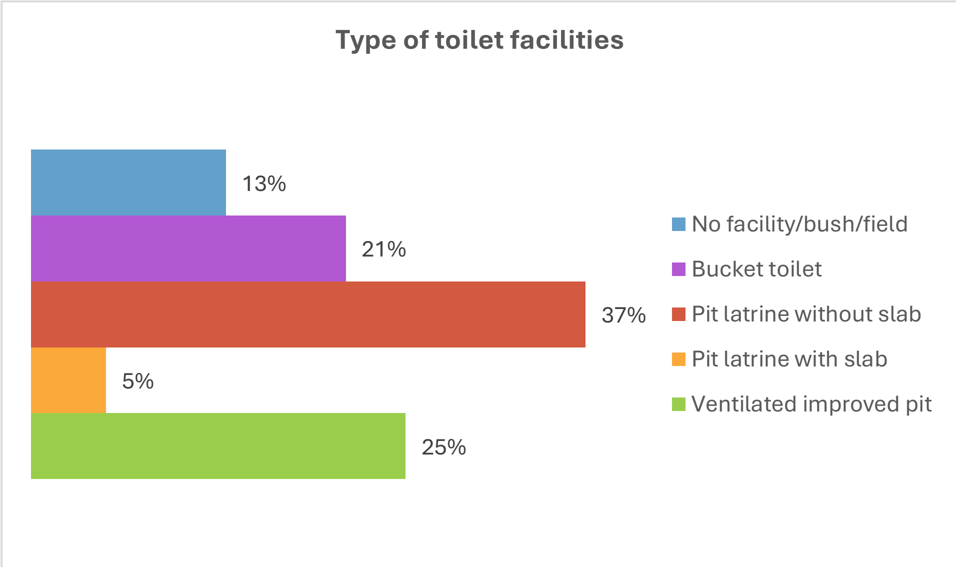


Figure 20: Type of toilet facilities

Over half of the participants washed their hands with water and soap (61%), while 32% only used water as depicted in figure 20. About 6% used water and ash/sand, and for 1% the method unknown. Nearly all participants washed their hands before eating (97%). More than the three-quarters of participants washed their hands on several occasions, such as after going to the toilet, before feeding an infant, and before preparing food. Around half of the participants washed their hands after attending to a child who has defecated. For further data, see the Appendix 1.

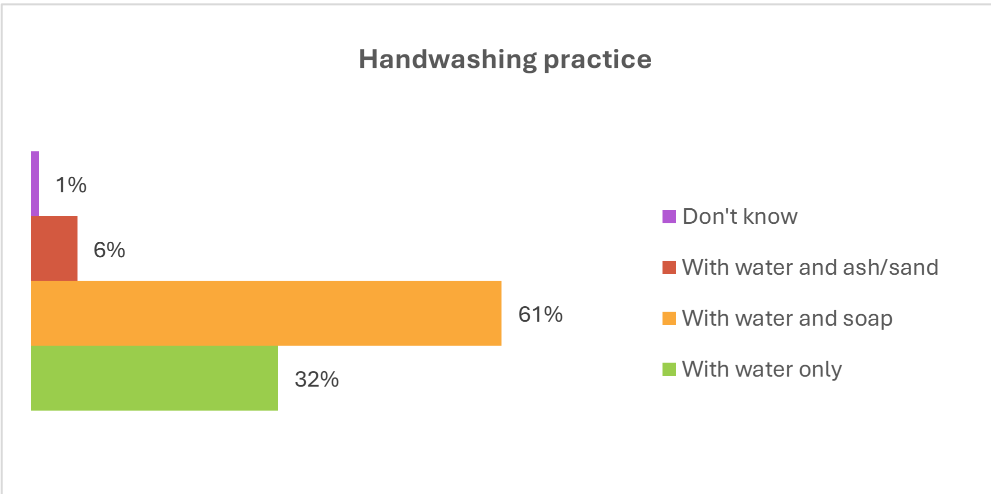


Figure 21: Handwashing practice

Discussion and Recommendation

This study looked at the current state of participants who joined the HDG projects between 2017 and 2020. There was no baseline conducted so a comparison between pre and post intervention could not be made. Also, due to the set up of the study, we cannot conclude that the results are due to the HDG or due to other external changes. Furthermore, due to safety concerns, the questionnaire was asked using phone interviews. This resulted in a study population that was probably somewhat biased since only participants who had a phone and that were still in contact with the intervention team were eligible for the interview. The bias probably resulted in a study population with better off and participants for who the intervention worked quite well. So, to interpret the findings, the results were compared with a theory of change (described in the introduction).

Our findings suggest that the HDG project aligns with the theory of change to some extent. First, we hypothesized that HDG could increase the consumption of fruits and vegetables through the increased production of cash crops and nutrient-dense crops. Our results show that participants were actively engaged in exchanging crops for both consumption and trade. Additionally, the Dietary Diversity Score (DDS) of 7.9 out of 9 indicates that participants had good food diversity and were meeting minimum micronutrient intake requirements. Second, we hypothesized that the HDG project could improve participants' income and well-being. Participants reported perceiving home gardening as beneficial to their livelihoods, with the greatest impact being a sense of purpose in life. However, while we cannot conclusively determine whether home gardening directly increased their income, participants did report that their involvement in HDG helped pay for their children's needs, including school, healthcare, and household expenses, and also alleviated financial stress.

Nevertheless, we also observed inconsistent findings that warrant further investigation and improvement. Only 3% of women consumed fewer than five food groups. However, this result contrasts with another study that found low dietary diversity in Afghanistan, where people rely heavily on wheat consumption (Poole et al., 2019). According to the theory of change in a home-gardening context, increasing the production of cash crops and nutrient-dense crops should lead to greater consumption of fruits and vegetables. This suggests that some of the observed dietary diversity might be due to participants trading cash crops and nutrient-dense crops, such as exchanging onions as cash crops for other sentinel foods considered nutrient-dense. Additionally, rather than promoting saffron as a cash crop, it may be worthwhile to explore the potential of promoting onions, as our results indicate that onions were one of the top crops fully traded.

Given that the surveyed women had the lowest consumption of nuts and seeds, we recommend that VoP promote the cultivation of these crops to increase their consumption. In the HDG project, VoP provided participants with a variety of seeds aimed at enhancing dietary diversity. The analysis shows that participants commonly grew five crops: spinach, onions, carrots, strawberry bushes, and soybeans. Since our data collection took place in winter, we assumed that spinach, carrots, onions, and strawberries were typical winter crops capable of withstanding cold weather. However, soybeans are not typically grown in winter, so we assumed that they were harvested earlier and then consumed or traded during the winter months. Additionally, among these top crops, only spinach and carrots were included in the sentinel foods surveyed in this study. Therefore, there may be other crops contributing to dietary diversity that we are unaware of, as they were not included in the sentinel foods.

Some participants grew seeds that were not provided by VoP because they perceived to be easier to grow, sold better at market, and required less water. Although it was not confirmed which crops fulfilled all three criteria, the analysis shows that only three crops fell into the 100% trade category: onions, strawberry bushes, and chickpeas. Meanwhile, carrots, strawberry bushes, and soybeans all fell into the 100% consumption category. These results suggest that these crops could be promoted for further intervention. However, we should also consider whether these crops would remain top crops in other seasons, as our data collection took place during winter.

Despite the relatively high dietary diversity, around 60% of households experienced varying levels of food insecurity: 35% were severely food insecure, 19% were moderately food insecure, and 7% were mildly food insecure. Moreover, the correlation test showed only a weak correlation between DDS and HFIAS scores, which could not confirm whether households with higher dietary diversity levels had better food security. The HFIAS score assesses anxiety about food access, insufficient quality, and insufficient quantity, while the DQQ focuses on food diversity. Although participants may have a diverse diet due to food trading, this does not guarantee consistent food availability or sufficient nutritional quantity.

There is also a weak correlation between HFIAS and MAHFP scores, which could not confirm whether households with better food security levels had more adequate food provisioning. Participants indicated that food availability was most inadequate in November and December. The HFIAS results may be influenced by the timing of data collection, as it coincided with these months when we inquired about food scarcity conditions over the past month.

While participants received training on nutrition and hygiene aimed at improving well-being, our results indicated that not all participants practiced proper handwashing habits. Some participants did not wash their hands after attending to a child who had defecated, after using the toilet, or before cooking. Additionally, the majority of participants did not have safe access to drinking water and sanitation facilities. Therefore, VoP should pay more attention to hygiene training, focusing on how participants absorb the knowledge and ensuring they can maintain these habits over time.

For future research, it is crucial to thoroughly assess the dietary diversity of the next baseline sample to determine whether the observed high dietary diversity is attributable to the project or if the targeted population already possessed a high level of dietary diversity. If the population's dietary diversity is already high, it may be necessary to revise the targeting strategy. Conversely, if the baseline sample reveals low dietary diversity, this would suggest that the intervention has the potential to make a positive impact.

Limitations

Although this study was a baseline study and was able to describe the initial state of the participants in the home garden intervention, it had some shortcomings that can be addressed in the second and third rounds of data collection.

Firstly, there were some errors in the questionnaire incorporated into the Kobo tool that prevented us from obtaining the desired results. For example, the question on the distance to the market asked whether closer proximity would lead to more diverse food consumption or better access to selling food. However, there was an issue where the travel times reported by participants were unrealistically long, indicating a need for further exploration of this issue with the enumerators.

Secondly, the sampling process for the HDG intervention involves two levels: selecting sample (vulnerable widows with young children) from the entire population for the HDG project and then selecting a sample from the HDG project participants for this study. It's likely that sampling bias occurred at the first level, as those involved in the intervention might not include those who live in isolation due to the difficulty of reaching them. While there might also be sampling bias at the second level where those who dropped out of the intervention might not have been surveyed. Therefore, we assume that if the study sample reflects the intervention sample, the results of our study are valid, though the initial sampling for the HDG intervention might have been flawed.

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Appendix 1.

Table 5: Demographics

Variables	Frequency (N)	Percentage (%)
Widow status		
Yes	147	98%
No	3	2%
Age of women		0%
25-54 yo	21	14%
55-64 yo	102	68%
>65 yo	27	18%
Age of children		
0-24 months	1	1%
2-6 years old	32	21%
6-10 years old	89	59%
10-14 years old	87	58%
14-18 years old	48	32%
Education level		
1. No formal education	76	51%
2. Primary school	42	28%
3. Middle School / Maktabeh Motevaseteh	4	3%
4. Secondary School / Doreyeh Aali	1	1%
5. Vocational / Vocational in Lower & Upper Middle School	1	1%
6. Vocational / Technicums	2	1%
10. Religious School / Madrasah	21	14%
11. Literacy course	3	2%
Number of household members		
<= 3 household members	28	19%
4-7 household members	77	51%
>7 household members	45	30%
	Mean	
Number of children	3	
Number of elderly and people who need care	1	

Table 6: High Diversity Gardening

Variables	Frequency (N)	Percentage (%)
Starting year of intervention		
2019	33	23%
2020	29	20%
2021	1	1%
2022	80	56%
Starting month of intervention		
January-March	70	49%
October-December	73	51%
Reasons for joining the program*		
Economic benefit, such as generating income	82	57%
Providing food and better nutrition	96	67%
Improving health	71	50%
Uplifting the status of women	103	72%
Helping the community	57	40%
Environmental benefit, such as conserving biodiversity, habitat for livestock, etc	35	24%
Other	2	1%
Support received*		
Training	134	94%
Livestock	68	48%
Seeds	73	51%
Crop resources (fertilizer, garden tools, etc)	76	53%
Other	14	10%
Livestock ownership		
Yes	99	69%
No	44	31%
Type*		
Poultry	82	83%
Goat	10	10%
Sheep	10	10%
Cattle/Cow	19	19%
Land ownership		
Solely	77	51%
Jointly	58	39%
Solely and Jointly	9	6%
No land	6	4%
Land status*		
Own land	83	55%
Rent in land for own use	11	7%
Rent out land to others	19	13%
Use common land	46	31%

No, don't use any land	1	1%
No answer	4	3%
Land owner in the family*		
Male adult	113	75%
Female adult	22	15%
Male youth (18-35yrs)	15	10%
Female youth (18-35yrs)	5	3%
Male child (<18 yrs)	1	1%
Area of all land use		
Farms with > 1.25 ha of land and > 5 TLU	71	47%
0.5 -1.25 ha and 1- 5 TLU	30	20%
< 0.5 ha 0-1 TLU	49	33%
Home garden ownership		
Yes	143	95%
No	7	5%
Distance to home garden		
< 500m	111	78%
500m – 1km	23	16%
>1km	9	6%

Note: *Participants provided multiple answers

Table 7: Challenges of home gardening

Variables	Frequency (N)	Percentage (%)
Working on garden activities		
Widow	111	77,6%
Children (<18 yo)	6	4,2%
Adult male family members (>18 yo)	12	8,4%
Adult female family members (>18 yo)	12	8,4%
Others	2	1,4%
Home garden as an additional burden		
Yes	2	0,0%
No	141	98,6%
How to minimize burden*		
Shared work (others helping)	2	
Labour and time saving technologies	1	
Effort of fetching water	2	
High costs of inputs (seed, fertilizers, pesticides)	2	
No time	1	
No water	2	
Too much time in terms of planting, weeding, harvesting	1	
Specific challenges in home garden management*		
High cost of fertilizers	58	40,6%
High cost of pesticides	56	39,2%
High cost of seeds	54	37,8%
Poor access to pesticide	53	37,1%
Effort of fetching water	40	28,0%
Poor access to seeds	37	25,9%
Poor access to fertilizer	36	25,2%
Poor extension support from DAEO	33	23,1%
No access to water	32	22,4%
Poor soil fertility	20	14,0%
Poor seed quality	15	10,5%
Poor extension service from CHW	14	9,8%
Limited technical skill to manage home garden	13	9,1%
Work load	12	8,4%
Unable to get small size packed seeds	10	7,0%
High post-harvest loss	9	6,3%
No land	8	5,6%
Time taking to manage	7	4,9%
No interest/desire	2	1,4%
Health effect (due to organic fertilizers)	2	1,4%
Poor knowledge on preparation and consumption of home garden products	2	1,4%

Pest, rodent, frost	1	0,7%
Method of Cropping		
Mono-cropping	43	30,1%
Mix-cropping	53	37,1%
Inter-cropping	19	13,3%
Respondent do not understand	28	19,6%
Use of Seed from PVADO		
Yes	135	94,4%
No	8	5,6%
Use of Seed from Other Sources		
Yes	50	35,0%
No	93	65,0%
Reasons for planting other crops*		
More tasty	12	24,0%
Easier to plant	30	60,0%
Sell better at the market	30	60,0%
High cost of the seed	15	30,0%
Less water used	22	44,0%
Less area used	13	26,0%
Harvest is a shorter duration	9	18,0%
Access to water for irrigation		
Yes	130	94,2%
No	8	5,8%
Distance of Water Source for Irrigation		
Piped water to house	25	17,5%
<5 min walk (round trip)	37	25,9%
Between 5 and 10 min walk (round trip)	31	21,7%
Between 10 and 15 min walk (round trip)	28	19,6%
Between 15 and 20 min walk (round trip)	16	11,2%
More than 20 min walk (round trip)	6	4,2%
Year-Round Availability of Water		
Yes	125	87,4%
No	18	12,6%
Water unavailability*		
January	3	16,7%
February	3	16,7%
March	5	27,8%
April	9	50,0%
May	14	77,8%
June	11	61,1%
July	9	50,0%
August	5	27,8%
September	2	11,1%
October	3	16,7%

November	3	16,7%
December	3	16,7%
Ask for financial support		
Often	24	16,8%
Sometimes	51	35,7%
Never	68	47,6%

Note: *Participants provided multiple answers

Table 8: Perceived benefits of home garden

Variables	Frequency (N)	Percentage (%)
Livelihood situation		
Not improved at all or slightly worsened	1	1%
Stayed the same	5	3%
Improved just a bit	30	21%
Improved a lot	107	75%

Table 9: Perceived improvement of participating in home garden

Improvement aspects*	Yes, definitely	Yes, somewhat	No	Do not know/Prefer not to answer
Improve health	51	70	2	14
Pay for healthcare	44	76	6	11
Household necessity	39	88	2	8
Help your children's necessity for school	50	73	4	10
Financial stress	33	81	7	16
A purpose of life	56	63	1	17
Frequency	**273**	**451**	**22**	**76**
Percentage	**33%**	**55%**	**3%**	**9%**

Note: *Participants provided multiple answers

Table 10: Source of seeds of planted crops

Crops*	Source of Seed			Frequency (N)	Percentage (%)
	PVADO	PVADO and on own	Do not get the seed from PVADO		
Saffron	55	3		58	7,5%
Onion	67	60		127	16,5%
Potato			3	3	0,4%
Green bell pepper			1	1	0,1%
Cabbage			1	1	0,1%
Soybean	76		2	78	10,1%
Peanut			1	1	0,1%
Garlic	1		6	7	0,9%
Spinach	126	4	1	131	17,0%
Carrot	124	1	1	126	16,3%
Strawberry Bushes	115		1	116	15,0%
Maize		1	3	4	0,5%
Turnip	3	1	6	10	1,3%
Chickpeas	4		54	2	0,3%
Mung Beans			1	1	0,1%
Pumpkin			4	4	0,5%
Tomatoes	43	2	5	50	6,5%
Okra			4	4	0,5%
Lettuce			8	8	1,0%
Leek	1		18	19	2,5%
Eggplant			5	5	0,6%
Radish			3	3	0,4%
Bootle Gourd			3	3	0,4%
Ridge Gourd			2	2	0,3%
Watermelon			3	3	0,4%
Persian Melon			2	2	0,3%
Grapes			1	1	0,1%
other	1	1		2	0,3%
Frequency	616	73	139	772	
Percentage	74%	9%	17%		

Note: *Participants provided multiple answers

Table 11: Consumption and trading of crops

Crops*	Consumption and Trading					Frequency	Percentage
	100% consume	70% consume and 30% trade	50% consume and 50% trade	30% consume and 70% trade	100% trade		
Saffron	4	8	34	12		58	7,0%
Onion	37	10	9	25	46	127	15,3%
Potato	1	1			1	3	0,4%
Green bell pepper			1			1	0,1%
Cabbage	1					1	0,1%
Soybean	41	7	19	11		78	9,4%
Peanut	1					1	0,1%
Garlic	4	2	1			7	0,8%
Spinach	32	19	48	32		131	15,8%
Carrot	50	18	35	23		126	15,2%
Strawberry Bushes	54	28	20	12	2	116	14,0%
Maize	2		2			4	0,5%
Turnip	5	1	2	2		10	1,2%
Chickpeas	8	1	35	6	8	58	7,0%
Mung Beans	1					1	0,1%
Pumpkin	3	1				4	0,5%
Tomatoes	2	4	21	23		50	6,0%
Okra	2		1	1		4	0,5%
Lettuce	2	1	4	1		8	1,0%
Leek	2	2	2	13		19	2,3%
Eggplant	3	1	1			5	0,6%
Radish		1	1	1		3	0,4%
Bootle Gourd	3					3	0,4%
Ridge Gourd	2					2	0,2%
Watermelon	3					3	0,4%
Persian Melon	1		1			2	0,2%
Grapes		1				1	0,1%
other	1	1				2	0,2%
Frequency	265	107	237	162	57	828	
Percentage	32,0%	12,9%	28,6%	19,6%	6,9%		

Note: *Participants provided multiple answers

Table 12: Access to market

Variables	Frequency (N)	Percentage (%)
Access to market		
Yes	101	67%
Yes, but only when somebody accompanies me	33	22%
No	16	11%
Mahram involvement		
Always	13	10%
1 time a week	29	22%
2-3 times a week	15	11%
2-3 times a month	37	28%
Less than 2 times a month	40	30%
Mode of transportation		
Animals	5	3%
Walking	34	23%
Bus	7	5%
Bicycle	15	10%
Motorbike	10	7%
Car transportation (taxi, own car)	76	51%
Other	3	2%

2024