Food Basket Optimization for Nigerian Households

Project Plan

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1.   Executive Summary

Why?

Food insecurity is a severe problem in Nigeria, with over a quarter of the population living with food uncertainty. The country ranks 103 out of 121 countries on the 2022 Global Hunger Index. Many Nigerian households struggle to afford a nutritionally adequate diet, leading to poor health outcomes and decreased quality of life. This is a critical issue that requires attention as it affects the health and well-being of over 57 million of Nigeria's 200 million population. As it is crucial for everyone to have equal access to sufficient and nutritious food to meet dietary needs, the purpose of this project is to address food insecurity in Nigeria by designing a nutritious food basket comprised of a list of locally available and affordable food items for Nigerian households.

What?

This is a research project aimed at addressing food insecurity in Nigeria by designing a nutritionally adequate, low-cost, and culturally acceptable food basket for Nigerian households based on their food insecurity level as measured by the Coping Strategies Index (CSI). The CSI assesses the behavior of people when they cannot access enough food. First, the methodology will be to create subgroups of households with similar coping patterns. This will include predicting the food insecurity levels for Nigerian households and identifying homogenous subgroups within Nigerian households at similar food insecurity levels. After profiling the households into subgroups, an optimal food basket will be designed for each household subgroup.

The project will focus on scalability and sustainability, to ensure that the food basket can be implemented in a way that can benefit many households. This may involve working with local suppliers and distributors to ensure that the food basket is affordable and culturally acceptable, as well as developing strategies for scaling up the program to reach more households. The project will commence on October 5, 2022, and is scheduled to end on December 30, 2022.

How?

The main steps for executing the project are as follows:

- Data identification: The first step will be to collect data on Nigerian households including demographics, food consumption and expenditure, and food item nutritional components.
- Data analysis and modeling: The collected data will be analyzed to create sub-groups of households with similar coping patterns and optimized food baskets will be designed.
- Policy recommendations: Based on data analysis and modeling, policy recommendations will be proffered to improve the food security status of Nigerian households.

The project will be led by a project manager who will oversee the project and coordinate the efforts of the team members. The team will consist of two lead data analysts who will manage the data analysis and modeling, a lead report writer who will edit and review the final report, and a professor who will act as the chief advisor for the project and bridge communication between the team and stakeholders. Overall, the team will work together to carry out the project, with the goal of providing a solution that addresses the critical issue of food insecurity in Nigeria and improves the health and well-being of Nigerian households.

Table of Contents

2.   Scope Statement

2.1   Project Justification

Eliminating hunger is one of the most pressing issues facing humanity. Despite numerous efforts to improve food insecurity, the goal of ending hunger remains elusive. With a population of 200 million people, over 57 million Nigerians struggle with insufficient food consumption – as evidenced by the country's 103rd ranking out of 121 countries on the 2022 Global Hunger Index. In Nigeria, particularly among vulnerable populations, food insecurity is a critical issue that has been exacerbated by climate change, economic instability, conflicts, displacement, and the ongoing COVID-19 pandemic. These issues have made it difficult for individuals and households to access sufficient, safe, and nutritious food to meet their dietary needs and food preferences. The COVID-19 pandemic has caused a decrease in food production and increased trade barriers, leading to higher food prices, and putting food consumption at risk for many parts of the country. The rise in on-going conflicts and insurgencies across the country have had negative impacts on livelihoods, food, and nutrition. As access to land, due to insecurity, becomes harder and job opportunities decrease, vulnerable families are forced to resort to cheaper, less nutritious options like *garri* (cassava flour) and selling productive assets to afford food. The World Food Programme reports that 7 out of 10 Nigerians were not able to meet their food needs in 2021, and more than half of the most vulnerable populations had to rely on negative coping strategies. If immediate actions are not taken, the food crisis in Nigeria poses serious risks that could lead to a state of food emergency. This project aims to address this critical issue by designing a nutritious food basket that is affordable for Nigerian households, as ensuring equal access to sufficient and nutritious food is crucial for promoting health and well-being for all.

2.2   Project Description

The primary goal of the project is to design a nutritionally adequate and low-cost food basket for Nigerian households based on the similarity of their food insecurity level as measured by the coping strategies index. The coping strategies index will be used as an indicator of food insecurity level to assess the behavior of households when they do not have access to enough food. Nutritional adequacy will be based on the World Health Organization's recommended daily nutrient intake levels.

To achieve the project's goal, the following sub-goals have been defined:

1. Calculate Nigerian households' food insecurity levels based on the Coping Strategies Index (CSI).
2. Create sub-groups of Nigerian households with similar coping patterns.
3. Predict Nigerian household food insecurity levels.

4. Design optimal food baskets for Nigerian households in fulfillment of the World Health Organization nutrient recommendations while considering affordability and cultural acceptability.

5. Propose policy recommendations based on food basket optimization outcomes.

To achieve the sub-goals outlined above, the project implementation will be split into three main phases. The first phase will entail exploratory data analysis which will include data identification, data collection, data cleaning, feature engineering, feature selection, data visualization and descriptive analysis. This will help to check assumptions and gain initial insights. The second phase will include data modelling to make predictions on unseen data and build optimization plans for decision-making. The third phase will comprise of analysis of the results and proposing recommendations. The commencement date of the project is October 5, 2022, and the project is scheduled to end on December 30, 2022.

2.3   Project Deliverables

The project will address food insecurity amongst Nigerian households through the following deliverables:

- Proposal: A proposal with a clearly defined research question, why the question is interesting and challenging, what data sources and analytical methods would be used to tackle the question, a plan of attack with timeline and team task division.

- Data and model plan: A detailed data plan that summarizes the data sources needed for the project and a summary of the analytical steps that will be used to implement the project.

- Presentation: A presentation slide deck to describe the project and the problem it addresses, assumptions made, data sources, analytical steps, and results.

- Final report: A report that includes problem statement, data summary, analytical formulations, implementation details, analysis, and recommendations.

- Code: Jupyter notebook(s) with all code used for exploratory analysis and implementation. A data dictionary file describing data sources and all data features used for modeling and analysis. ReadMe file explaining instructions for running code files i.e., files to be executed and the order of execution.

2.4   Known Exclusions

- Providing food aid to households: The project aims to design a nutritious food basket that is culturally acceptable and sustainable, but it does not include providing food aid to households.

- Providing long-term financial assistance to households to purchase the food basket: The project aims to design a nutritious food basket that is affordable for Nigerian households, but it does not include providing long-term financial assistance for households to purchase the food basket.
- Building infrastructure for food storage and distribution: The project aims to design a nutritious food basket that can be implemented in a way that can benefit many households, but it does not include building infrastructure for food storage and distribution.
- Providing medical assistance to households: The project aims to improve the health and well-being of Nigerian households through designing a nutritious food basket, but it does not include providing medical assistance to households.
- Providing training to households on how to prepare and cook the food items in the basket: The project aims to design a nutritious food basket that is culturally acceptable, but it does not include providing training to households on how to prepare and cook the food items in the basket.
- Researching on other alternative solutions to food insecurity: The project aims to address food insecurity in Nigeria by designing a nutritious food basket for Nigerian households, but it does not include researching on other alternative solutions to food insecurity.
- Support, maintenance and tracking of the food basket implementation once the project has been completed.

2.5   Project Objectives

2.5.1   Financial Objectives
- The cost of planning and execution of the project will not exceed $ 7,800.00.
- The cost of labor for all team members will not exceed $ 4,800.00.
- The cost of the optimal food basket for each household group will not exceed the current median food expenditure of the household group.

2.5.2   Schedule Objectives
- Phase one of the project, i.e., exploratory data analysis, will occur no later than November 7, 2022.
- Phase two of the project, i.e., data modeling and optimization design, will occur no later than November 21, 2022.
- Phase three of the project, i.e., result analysis and recommendation, will occur no later than December 16, 2022.

- Conclusion of the project and handover of final deliverables will occur no later than December 30, 2022.

2.5.3 Other Objectives

- Ensure that all analytical objectives are achieved.
- Propose at least two policy recommendations to improve the food security status of Nigerian households.

2.6 Project Organization

The team will comprise of five team members who will have the following roles and responsibilities:

Role	Responsibility	Name
Project Sponsor & Project Advisor	The project sponsor is responsible for initiating the project and providing requirements. The project sponsor for this project also doubles as the project advisor for the project and is responsible for providing feedback on the project and guidance where necessary	Peter Z.
Project Manager	The project manager is responsible for project scope, assignments, timelines, and deliverables. Also responsible for communicating directly with the project sponsor and coordinating team members	Rahila S.
Data Analyst	The data analysts are responsible for the exploratory data analysis	Mimi V. & Pearry K.
Data Scientist	The data scientists are responsible for data modeling, optimization and ensuring all analytical objectives are met. They are also responsible for analysis of results and proposal of recommendations	Jessie L. & Rahila S.
Writer & Editor	Responsible for creating and revising all documents pertaining to the project	Rahila S.

3. Stakeholder Analysis

The stakeholders for the project have been identified and their interests, needs, and influence on the project have been analyzed to ensure effective communication, collaboration, and support.

Primary Stakeholders	Role on the Project or Role within the Organization	Contribution to the Project	Project Influence	Communication Plan	Person Responsible to Communicate
Peter Z.	Project Sponsor	Provides guidance and advice throughout project	High	Once a week in-person	Rahila S.
Petra A.	Representative, Local Government Area Humanitarian Affairs Officers	The representative acts as a liaison between the project manager and the focus group. The LGA Humanitarian Officers serve as liaisons to communities within states across Nigeria	Low	Once a month by email	Pearry K.
Adeola B.	Public Health Program Administrator, The Nigerian Ministry of Health	Advises on the recommended daily nutrient intakes for Nigerians, provides health guidelines for the food basket and provides context on the health conditions of Nigerians	High	Once a month by video conference call and twice a month by email	Rahila S.
Stephanie O.	Nutritionist, The Nigerian Ministry of Agriculture	Advises on food and nutrition expectations of the food basket	High	Once a month by video conference call and three times a month by email	Rahila S.
Mofe O.	Special Programs Officer, The Nigerian Ministry of Humanitarian Affairs, Disaster Management and Social Development	Provides guidance on feasibility of the food basket plan	Medium	Once a month by video conference call	Pearry K.

Andrew A.	Consumer Safety Officer, National Agency for Food and Drug Administration and Control	Advises on food safety concerns of the food basket	High	Twice a month by video conference call	Mimi V.
Alice M.	Representative, Focus group of Nigerian households	The representative acts as a liaison between the project manager and the focus group. The focus group of Nigerian households provide data on the attitudes and preferences of Nigerian households	High	Twice a month by video conference call and once a month by email	Rahila S.
Lati B.	Representative, Focus group of food vendors	The representative acts as a liaison between the project manager and the focus group. The focus group of food vendors provide data on the supply chain and stocking habits of food vendors	Medium	Once a month by video conference call	Mimi V.
Secondary Stakeholders					
Sope J.	Country Programs Officer, World Food Programme	Provides guidance on food basket plan based on ongoing food assistance projects	Low	Once a month by email	Mimi V.
Betty O.	Programs Monitoring & Evaluation Officer, Ministry of Economic Planning	Provides guidance on financial feasibility of the food basket for Nigerian households	Low	Once a month by email	Jessie L.

4.   Work Breakdown Structure

The project's activities have been broken down into smaller, manageable components that can be assigned to team members. The work breakdown structure identifies the deliverables, tasks, and durations necessary for project completion, making it easier to monitor progress and manage resources.

		Duration (Days)
Deliverable 1 (1.1)	**Proposal**	
1.1.1	Research Food Insecurity in Nigeria	2
1.1.2	Research Food Insecurity Indicators	3
1.1.3	Compose Research Question	1
1.1.4	Write Proposal	2
Deliverable 2 (1.2)	**Data and Model Plan**	
1.2.1	Find Data Source(S)	5
1.2.2	Write Data Plan	2
1.2.3	Plan Methodology	3
1.2.4	Write Model Plan	4
1.2.5	Compile and Review Data & Model Plan	2
Deliverable 3 (1.3)	**Presentation Slide Deck**	
1.3.1	Prepare Slide Deck	5
1.3.2	Rehearse Presentation Flow	2
1.3.3	Edit Final Draft of Slide Deck	2
Deliverable 4 (1.4)	**Final Report**	
1.4.1	Plan and Prepare Final Report Structure	1
1.4.2	Write Problem Statement	1
1.4.3	Write Data Section	2
1.4.4	Write Methodology Section	8
1.4.5	Write Results Section	2
1.4.6	Write Policy Recommendations, Conclusion and Abstract	5
1.4.7	Edit Final Report	3
1.4.8	Review Final Version of Final Report	1
Deliverable 5 (1.5)	**Code**	
1.5.1	Clean Data	4
1.5.2	Engineer Coping Strategies Index	2
1.5.3	Perform Exploratory Data Analysis	3
1.5.4	Fit and Test Supervised Learning Models	3
1.5.5	Fit and Test Unsupervised Learning Models	3
1.5.6	Formulate Optimization Models	4
1.5.7	Fit Optimization Models for Supervised Learning Groups	3
1.5.8	Fit Optimization Models for Unsupervised Learning Groups	3
1.5.9	Compile and Clean Code	4
1.5.10	Write Data Dictionary and ReadMe File	2

5.   Budget

The project's budget has been estimated based on the activities in the work breakdown structure. An activity-based budget has been created to allocate resources, including personnel and materials, to specific activities, ensuring that the project remains within budget and that resources are used efficiently.
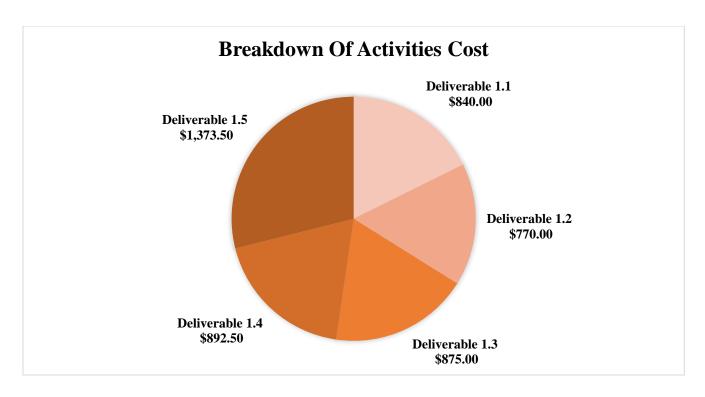
Overhead Costs						
Microsoft Office Software						$ 250.00
Gurobi Optimizer License						$ 2,500.00
Anaconda Software License						$ 144.00
Material Costs (Explanation - Costs Referenced in Budget Below)						
WP	Name		Price/unit		# of units	Total
1.3.2	Logitech Wireless Presenter		$ 35.00		1	$ 35.00
1.5.6	Business Paper		$ 0.50		5	$ 2.50
1.5.6	Pens & Pencils		$ 1.50		4	$ 6.00
Activity Based Budget						
Work Package		Personnel / Materials	Wage / Unit Cost	Hours / Quantity	Total Resource Cost	WP Cost	Deliverable Cost
Deliverable 1.1 Proposal						
1.1.1	Research food insecurity in Nigeria					
		Jessie	$ 17.50	3	$ 52.50	
		Mimi	$ 17.50	3	$ 52.50	
		Pearry	$ 17.50	3	$ 52.50	
		Rahila	$ 17.50	3	$ 52.50	
					WP 1.1.1 Subtotal:	**$ 210.00**
1.1.2	Research food insecurity indicators					
		Jessie	$ 17.50	3	$ 52.50	
		Mimi	$ 17.50	3	$ 52.50	
		Pearry	$ 17.50	3	$ 52.50	
		Rahila	$ 17.50	3	$ 52.50	
					WP 1.1.2 Subtotal:	**$ 210.00**
1.1.3	Compose research question					
		Jessie	$ 17.50	1	$ 17.50	
		Mimi	$ 17.50	1	$ 17.50	
		Pearry	$ 17.50	1	$ 17.50	
		Rahila	$ 17.50	1	$ 17.50	

					WP 1.1.3 Subtotal:	**$ 70.00**
1.1.4	Write proposal					
		Jessie	$ 17.50	4	$ 70.00	
		Mimi	$ 17.50	5	$ 87.50	
		Pearry	$ 17.50	5	$ 87.50	
		Rahila	$ 17.50	6	$ 105.00	
					WP 1.1.4 Subtotal:	**$ 350.00**
					Deliverable 1.1 Cost:	**$ 840.00**
Deliverable 1.2 Data and Model Plan						
1.2.1	Find data source(s)					
		Jessie	$ 17.50	4	$ 70.00	
		Mimi	$ 17.50	5	$ 87.50	
		Pearry	$ 17.50	3	$ 52.50	
		Rahila	$ 17.50	4	$ 70.00	
					WP 1.2.1 Subtotal:	**$ 280.00**
1.2.2	Write data plan					
		Mimi	$ 17.50	3	$ 52.50	
		Pearry	$ 17.50	2	$ 35.00	
		Rahila	$ 17.50	2	$ 35.00	
					WP 1.2.2 Subtotal:	**$ 122.50**
1.2.3	Plan methodology					
		Jessie	$ 17.50	4	$ 70.00	
		Rahila	$ 17.50	4	$ 70.00	
					WP 1.2.3 Subtotal:	**$ 140.00**
1.2.4	Write model plan					
		Jessie	$ 17.50	4	$ 70.00	
		Rahila	$ 17.50	5	$ 87.50	
					WP 1.2.4 Subtotal:	**$ 157.50**
1.2.5	Compile and review data and model plan					
		Rahila	$ 17.50	4	$ 70.00	
					WP 1.2.5 Subtotal:	**$ 70.00**
					Deliverable 1.2 Cost:	**$ 770.00**
Deliverable 1.3 Presentation Slide Deck						
1.3.1	Prepare slide deck					
		Jessie	$ 17.50	3	$ 52.50	
		Mimi	$ 17.50	6	$ 105.00	

		Pearry	$ 17.50	5	$ 87.50
		Rahila	$ 17.50	5	$ 87.50
			WP 1.3.1 Subtotal:		**$ 332.50**
1.3.2	Rehearse presentation flow				
		Jessie	$ 17.50	6	$ 105.00
		Mimi	$ 17.50	7	$ 122.50
		Pearry	$ 17.50	7	$ 122.50
		Rahila	$ 17.50	5	$ 87.50
		Logitech Wireless Presenter	$ 35.00	1	$ 35.00
			WP 1.3.2 Subtotal:		**$ 472.50**
1.3.3	Edit final draft of slide deck				
		Jessie	$ 17.50	2	$ 35.00
		Rahila	$ 17.50	2	$ 35.00
			WP 1.3.3 Subtotal:		**$ 70.00**
			Deliverable 1.3 Cost:		**$ 875.00**
Deliverable 1.4 Final Report					
1.4.1	Plan and prepare final report structure				
		Mimi	$ 17.50	1	$ 17.50
		Rahila	$ 17.50	1	$ 17.50
			WP 1.4.1 Subtotal:		**$ 35.00**
1.4.2	Write problem statement				
		Pearry	$ 17.50	4	$ 70.00
			WP 1.4.2 Subtotal:		**$ 70.00**
1.4.3	Write data section				
		Mimi	$ 17.50	6	$ 105.00
		Pearry	$ 17.50	3	$ 52.50
			WP 1.4.3 Subtotal:		**$ 157.50**
1.4.4	Write methodology section				
		Jessie	$ 17.50	4	$ 70.00
		Rahila	$ 17.50	7	$ 122.50
			WP 1.4.4 Subtotal:		**$ 192.50**
1.4.5	Write results section				

	Rahila	$ 17.50	4	$ 70.00		
				WP 1.4.5 Subtotal:	**$ 70.00**	
1.4.6	Write policy recommendations, conclusion and abstract					
	Pearry	$ 17.50	2	$ 35.00		
	Rahila	$ 17.50	5	$ 87.50		
				WP 1.4.6 Subtotal:	**$ 122.50**	
1.4.7	Edit final report					
	Pearry	$ 17.50	3	$ 52.50		
	Rahila	$ 17.50	6	$ 105.00		
				WP 1.4.7 Subtotal:	**$ 157.50**	
1.4.8	Review final version of final report					
	Jessie	$ 17.50	1	$ 17.50		
	Mimi	$ 17.50	1	$ 17.50		
	Pearry	$ 17.50	1	$ 17.50		
	Rahila	$ 17.50	2	$ 35.00		
				WP 1.4.8 Subtotal:	**$ 87.50**	
				Deliverable 1.4 Cost:		**$ 892.50**
Deliverable 1.5 Code						
1.5.1	Clean data					
	Mimi	$ 17.50	6	$ 105.00		
	Rahila	$ 17.50	4	$ 70.00		
				WP 1.5.1 Subtotal:	**$ 175.00**	
1.5.2	Engineer Coping Strategies Index					
	Mimi	$ 17.50	3	$ 52.50		
	Rahila	$ 17.50	1	$ 17.50		
				WP 1.5.2 Subtotal:	**$ 70.00**	
1.5.3	Perform exploratory data analysis					
	Mimi	$ 17.50	6	$ 105.00		
	Pearry	$ 17.50	2	$ 35.00		
				WP 1.5.3 Subtotal:	**$ 140.00**	
1.5.4	Fit and test supervised learning models					
	Rahila	$ 17.50	6	$ 105.00		
				WP 1.5.4 Subtotal:	**$ 105.00**	

1.5.5	Fit and test unsupervised learning models				
		Jessie	$ 17.50	7	$ 122.50
			WP 1.5.5 Subtotal:		**$ 122.50**
1.5.6	Formulate optimization models				
		Jessie	$ 17.50	6	$ 105.00
		Rahila	$ 17.50	8	$ 140.00
		Business Paper	$ 0.50	5	$ 2.50
		Pens & Pencils	$ 1.50	4	$ 6.00
			WP 1.5.6 Subtotal:		**$ 253.50**
1.5.7	Fit optimization models for supervised learning groups				
		Rahila	$ 17.50	6	$ 105.00
			WP 1.5.7 Subtotal:		**$ 105.00**
1.5.8	Fit optimization models for unsupervised learning groups				
		Jessie	$ 17.50	6	$ 105.00
			WP 1.5.8 Subtotal:		**$ 105.00**
1.5.9	Compile and clean code				
		Jessie	$ 17.50	2	$ 35.00
		Rahila	$ 17.50	5	$ 87.50
			WP 1.5.9 Subtotal:		**$ 122.50**
1.5.10	Write data dictionary and ReadMe file				
		Mimi	$ 17.50	3	$ 52.50
		Pearry	$ 17.50	2	$ 35.00
		Rahila	$ 17.50	5	$ 87.50
			WP 1.5.10 Subtotal:		**$ 175.00**
			Deliverable 1.5 Cost:		**$ 1,373.50**
			Total Activities Cost:		**$ 4,751.00**
			Overhead:		$ 2,894.00
			Total Project Cost:		**$ 7,645.00**

Breakdown Of Activities Cost

- Deliverable 1.1 $840.00
- Deliverable 1.2 $770.00
- Deliverable 1.3 $875.00
- Deliverable 1.4 $892.50
- Deliverable 1.5 $1,373.50

The pie chart illustrates the distribution of activities cost for the project budget based on the project deliverables. The largest portion of the total activities budget is allocated to deliverable 1.5, which is the Code deliverable, accounting for 43.8% of the total activities cost. Deliverables 1.1, 1.2, 1.3 and 1.4 make up the remaining 56.2% of the activities budget, with costs ranging from $770.00 to $892.50. This breakdown of activities cost provides valuable insight into the allocation of resources for the project.

6. Quality Management Plan

To ensure that the project meets its objectives and produces high-quality deliverables, a quality management plan (QMP) has been developed. The QMP identifies the quality standards that the project must meet, and the procedures and processes that will be used to ensure quality.

Measurable Objective: What will you measure?	Why will it be measured?	How will you measure it?	How frequently will the objective be measured?
The cost of the designed food basket compared to the median food expenditure of households in each sub-group. Goal: Increase the proposed affordability of the	To ensure that the food basket design is feasible and affordable for majority (> 60%) of the Nigerian households within each sub-group.	This will be measured by comparing the cost of the designed food basket to the median food expenditure of households in each	Baseline measured at the start of the project. Then measured throughout the development phase of the project after each model is designed i.e., at least once a week after

optimized food basket by 25% for low-income households.		sub-group. The median food expenditure for each sub-group will serve as the benchmark which should not be exceeded.	the first optimization model is designed.
The nutritional value of proposed food baskets. Goal: Increase the percentage of Nigerian households that meet the recommended daily nutrient intake levels by 20%	To determine if the project is meeting its goal of improving the health of Nigerian households.	Analyzing the nutritional value of food baskets before the project commencement and comparing with each optimal food basket design.	Baseline measured at the start of the development phase of the project. Then measured throughout the development phase of the project i.e., at least once (in two days) after every food basket design during optimization.

7.   Risk Management Plan

The project's risks have been identified, analyzed, and prioritized based on their likelihood and potential impact. A risk management plan has been developed to mitigate and monitor risks, including risk response strategies and risk owners. The plan ensures that the project is resilient to potential risks and that project outcomes are not compromised.

Potential	Description of Risk	Project Impact	Response	Responsibility
M	Inaccurate or incomplete data collection.	H	Conduct a thorough review of the data collection process to identify gaps and ensure that all necessary data is collected.	Mimi
H	Inability to achieve nutritional adequacy within the project timeline.	H	Evaluate the modelling plan to ensure nutritional requirements are ranges and not hard limits.	Jessie
H	Low test accuracy for supervised learning models	M	Use multiple supervised learning models to check consistency in predictions and identify areas of disagreement. Also, evaluate performance of models using cross-validation.	Rahila
H	Legal or regulatory restriction on the sale of certain food items	H	Conduct a legal and regulatory review of the candidate food items proposed for the food basket design before commencing the project to identify potential restrictions. Also, include	Pearry

			alternative food items to be considered for inclusion in the food basket design.	
L	Difficulty in communicating project outcomes to stakeholders	L	Develop a clear and concise presentation format that outlines the project objectives, methods, and food basket designs for each household group. Also, the ongoing stakeholder engagement sessions will be used to communicate the project progress and address any questions or concerns before the project conclusion.	Rahila

Key:

Potential Level	Project Impact
H = High	H = High
M = Medium	M = Medium
L = Low	L = Low

8.   Lessons Learned

Undertaking this project management class has given me a great understanding of project management tools such as work breakdown structure, network diagram, and risk management plan. I learned that effective project management tools can greatly improve the success of a project.

Firstly, a work breakdown structure would have been instrumental in achieving the project's sub-goals. The breakdown of the project into manageable tasks would have allowed me to assign responsibilities and resources more effectively. This would have made it easier to track progress and ensure that all tasks were being completed on time and identify where potential issues could arise. For example, it would have helped to prevent two people from working on developing the supervised learning models when one person was not assigned the task and should have been working on the report.

Secondly, a network diagram would have been useful to identify which activities were critical to the project's success and would have ensured that our project was not rushed but completed over an ideal schedule. It would have also helped to identify the critical path, concurrent tasks, and their dependencies. Additionally, it would have shown us which activities needed to be completed on time, which could have been delayed, and which had some flexibility. This would have allowed us to prioritize activities and allocate resources accordingly. For example, the second phase of the project involved data modeling to make predictions on unseen data and build optimization plans for decision-making. This phase consisted of concurrent tasks that were dependent

on the successful completion of the first phase. A network diagram would have identified the concurrent tasks so we could have ensured that necessary resources were available to complete them on time.

Thirdly, a risk management plan would have allowed me to to identify potential risks that could arise during the project's execution. By identifying risks, I could have taken measures to mitigate their impact, such as creating contingency plans. This would have minimized the impact of potential risks and increased the project's chances of success. For example, we could have identified the risk of data collection difficulties and developed a plan to address this risk, such as identifying alternative data sources or undergoing a more efficient data collection process.

Furthermore, working on the class assignments for my project and going through the Obama's Trauma Team case taught me a lot about teamwork. I realized that working in a team requires effective communication, cooperation, and coordination to achieve our goals. It was essential to have everyone understand their roles and responsibilities, set realistic timelines, prioritize tasks, and work together to achieve the project's objectives. A team with diverse skills like ours could have benefitted more from proper task allocation and it would have been more efficient to establish a communication standard before commencing with the project.

Lastly, through the class and various exercises, I have gained valuable insights about myself. One of the most important things I discovered is my passion for tackling complex problems in a structured and meticulous manner. Moreover, as a project manager, I realized the crucial importance of paying close attention to details and communicating effectively with all stakeholders and team members to ensure everyone is on the same page. I also learned that adaptability is key, and I need to be able to proactively mitigate risks and handle unexpected changes. Finally, the final in-class exercise taught me valuable leadership skills that all project managers should possess, such as being supportive of team members, having a keen eye for detail while keeping an eye on the bigger picture, being able to say no when necessary, and being a strategic thinker.

In conclusion, the project management class has taught me about the importance of project planning and the use of project management tools to ensure that projects are successfully completed on time and within budget.

9.   Corrections Log

Section	Correction Made	Page Number
Executive Summary	Updated project schedule dates to match information from network diagram	1
Scope Statement	Updated project schedule dates to match information from network diagram	4
Scope Statement	Updated deliverables to consolidate the Code deliverable with the Data Dictionary and ReadMe file. Also removed the Food Basket Plan deliverable	4
Scope Statement	Updated financial and schedule objectives to match information from network diagram	5-6
WBS	Removed two deliverables (Data Dictionary and ReadMe file) and merged their tasks with another deliverable (Code). Deleted the Food Basket Plan deliverable.	9
Network Diagram	Changed task 1.4.3 LS to 36	n/a
Budget	Made all labor hours whole numbers	10 - 14
QMP	Removed the last objective	15 - 16