



COMSATS University Islamabad (CUI)

**Software Requirement Specification
(SRS DOCUMENT)**

for

AgroTech

Version 1.0

By

Mohammad Ammar Ali CIIT/FA21-BSE-042/ISB

Muhammad Moiz CIIT/FA21-BSE-044/ISB

Muaaz Bin Mukhtar CIIT/FA21-BSE-045/ISB

Supervisor

Ms. Saira Beg

Bachelor of Science in Software Engineering (2021-2025)

Revision History

Name	Date	Reason for Changes	Version

Application Evaluation History

Comments (by committee) *include the ones given at scope time both in doc and presentation	Action Taken

Supervised by
Ms. Saira Beg

Signature_____

Table of Contents

1. Introduction.....	1
1.1 Purpose.....	1
1.2 Scope.....	1
1.3 Modules.....	2
1.3.1 User Profiling.....	2
1.3.2 Soil Analysis	2
1.3.3 Climate Analysis	2
1.3.4 Crop Recommendation.....	2
1.3.5 AgroTech Chatbot (AI powered helping assistant).....	2
1.3.6 Crop Health Monitoring	2
1.3.7 Yield Estimation and Prediction	3
1.3.8 Crop Maturity Assessment	3
1.3.9 Harvesting Assist	3
1.3.10 Transportation Assist	3
1.3.11 Storage Assist.....	3
1.3.12 Online Marketplace.....	4
1.3.13 Reports and Analytics	4
1.4 Overview.....	4
2. Overall Description	4
2.1 Product Perspective.....	4
2.2 User classes and characteristics	6
2.3 Operating Environment.....	6
2.4 Design and Implementation Constraints	6
3. Requirement Identifying Technique	7
3.1 Use Case Diagrams	7
3.2 Admin Detail Use Cases	12
3.2.1 Sign-Up	12
3.2.2 Sign-In.....	13
3.2.3 Manage Registered Users.....	14
3.2.4 Manage User Complaints	15
3.2.5 Manage Reports	16
3.2.6 Switch Profile.....	17
3.2.7 Manage Profile	18
3.2.8 Sign-Out	19
3.3 Farmer Detail Use Cases.....	20
3.3.1 Sign-Up	20
3.3.2 Sign-In.....	21
3.3.3 Current Soil Analysis	22
3.3.4 Previous Soil Analysis	23
3.3.5 Weather Analysis	24
3.3.6 Climate Analysis	25
3.3.7 Crop Recommendation.....	26
3.3.8 Tutorials	27
3.3.9 AI Chatbot.....	28
3.3.10 Register Complaints	29
3.3.11 Feedback and Reviews	30
3.3.12 Identify Crop Stresses	31
3.3.13 Identification of Crop Diseases	32
3.3.14 Periodic Crop Health Monitoring.....	33
3.3.15 Estimate Crop Yield.....	34

3.3.16	Assess Yield Risk Factors	35
3.3.17	Crop Maturity Assessment	36
3.3.18	Crop Quality Assessment	37
3.3.19	Optimal Harvesting Schedule.....	38
3.3.20	Harvesting Tools and Techniques	39
3.3.21	Harvesting Tools Catalog.....	40
3.3.22	Transport Recommendation	41
3.3.23	Transportation	42
3.3.24	Packaging Assist	43
3.3.25	Climate-Controlled Storage Reservation	44
3.3.26	Crop Quality Grading.....	45
3.3.27	Switch Profile.....	46
3.3.28	Manage Profile	47
3.3.29	Sign-Out	48
3.4	Customer Detail Use Cases.....	49
3.4.1	Sign-Up	49
3.4.2	Sign-In.....	50
3.4.3	Access Products	51
3.4.4	Bidding.....	52
3.4.5	Switch Profile.....	53
3.4.6	Manage Profile	54
3.4.7	Sign-Out	55
3.5	Seller Detail Use Cases	56
3.5.1	Set Profile.....	56
3.5.2	Upload Product/Service.....	57
3.5.3	Bidding.....	58
3.5.4	Reports and Analytics	59
3.5.5	Feature Products.....	60
3.5.6	Manage Profile	61
3.5.7	Sign-Out	62
4.	Functional Requirements	63
4.1	UC-1.1: Sign Up	63
4.1.1	FR-1: Initiate.Registration.....	63
4.1.2	FR-2: Input.Credentials.....	63
4.1.3	FR-3: Validate.Credentials.....	64
4.1.4	FR-4: Confirm.Registration	64
4.1.5	FR-5: Handle.Invalid.Input	65
4.2	UC-1.2 Sign In	65
4.2.1	FR-6: Initiate.SignIn.Process	65
4.2.2	FR-7: Input.Credentials.....	66
4.2.3	FR-8: Verify.Credentials.....	66
4.2.4	FR-9: Handle.Invalid.Credentials	67
4.3	UC-1.3 Manage Registered Users.....	67
4.3.1	FR-10: Access.User.Management.....	67
4.3.2	FR-11: Display.Registered.Users.....	68
4.3.3	FR-12: Select.Registered.User	68
4.3.4	FR-13: Manage.User.Account.....	69
4.3.5	FR-14: Process.User.Account.Changes	69
4.3.6	FR-15: Notify.Admin.About.Issues	70
4.4	UC-1.4: Manage User Complaints.....	70
4.4.1	FR-16: Access.Complaint.Management	70
4.4.2	FR-17: Display.Complaint.List.....	71
4.4.3	FR-18: Select.A.Particular.Complaint	71
4.4.4	FR-19: Review.Complaint.Details	72

4.4.5	FR-20: Address.Complaint.....	72
4.4.6	FR-21: Update.Complaint.Status	73
4.5	UC-1.5: Manage Reports	73
4.5.1	FR-22: Access.Reports.Management.....	73
4.5.2	FR-23: Display.Reports.List	74
4.5.3	FR-24: Select.And.Apply.Filters.To.The.Report	74
4.5.4	FR-25: Generate.Required.Reports	75
4.5.5	FR-26: Notifies.Admin.About.Issues.....	75
4.6	UC-1.6: Switch Profile.....	76
4.6.1	FR-27: Access.Switch.Profile	76
4.6.2	FR-28: Displays.Available.Profiles.....	76
4.6.3	FR-29: Selects.Profile	77
4.6.4	FR-30: Switch.To.Selected.Profile.....	77
4.7	UC-2.1: Sign Up	78
4.7.1	FR-31: Initiate.Registration.....	78
4.7.2	FR-32: Enter.Credentials.....	78
4.7.3	FR-33: Validate.Credentials.....	79
4.7.4	FR-34: Confirm.Registration	79
4.7.5	FR-35: Handle.Invalid.Input	80
4.8	UC-2.2: Sign In.....	80
4.8.1	FR-36: Initiate.SignIn.Process	80
4.8.2	FR-37: Enter.Credentials.....	81
4.8.3	FR-38: Verify.Credentials.....	81
4.8.4	FR-39: Handle.Invalid.Credentials	82
4.9	UC-2.3: Current Soil Analysis.....	82
4.9.1	FR-40: Access.Soil.Analysis.....	82
4.9.2	FR-41: Input.SoilData.for.Analysis	83
4.9.3	FR-42: Validate.Soil.Information	83
4.9.4	FR-43: Confirm.Soil.Analysis.....	84
4.9.5	FR-44: Error.Notification.For.Soil.Analysis.....	84
4.10	UC-2.4: Previous Soil Analysis	85
4.10.1	FR-45 Access.Previous.Soil.Analysis.....	85
4.10.2	FR-46 Retrieve.Previous.Soil.Analysis.Data	85
4.10.3	FR-47: Handle.Missing.Previous.Data.....	86
4.10.4	FR-48: Validate.Previous.Soil.Data	86
4.10.5	FR-49 Confirm.Previous.Soil.Analysis.....	87
4.10.6	FR-50 Error.Notification.For.Previous.Soil.Analysis	87
4.11	UC-2.5: Weather Analysis	88
4.11.1	FR-51: Access.Weather.Analysis.....	88
4.11.2	FR-52: Input.Current.Weather.Data.....	88
4.11.3	FR-53: Validate.Weather.Data.....	89
4.11.4	FR-54: Confirm.Weather.Analysis	89
4.11.5	FR-55: Error.Notification.For.Weather.Analysis.....	90
4.12	UC-2.6: Climate Analysis.....	90
4.12.1	FR-56: Access.Climate.Analysis.....	90
4.12.2	FR-57: Select.Location.From.Search.Bar	91
4.12.3	FR-58: Retrieve.Climate.Of.Selected.Location.Via.ThirdParty	91
4.12.4	FR-59: Confirm.Climate.Analysis	92
4.12.5	FR-60: Error.Notification.For.Climate.Analysis.....	92
4.13	UC-2.7: Crop Recommendation	93
4.13.1	FR-61: Access.Crop.Recommendation	93
4.13.2	FR-62: Provide.Crop.Recommendations	93
4.13.3	FR-63: View.Crop.Characteristics	94
4.13.4	FR-64: Confirm.Crop.Selection	94

4.13.5	FR-65 Error.Notification.For.Crop.Recommendation	95
4.14	UC-2.8: Tutorials	95
4.14.1	FR-66: Access.Tutorials	95
4.14.2	FR-67: Display.Tutorials.List	96
4.14.3	FR-68: View.Selected.Tutorial	96
4.15	UC-2.9: AI Chatbot.....	97
4.15.1	FR-69: Initiate.Chatbot.Interaction	97
4.15.2	FR-70: Display.FAQ.Options	97
4.15.3	FR-71: Option.Selection.Or.Query.Prompt.....	98
4.15.4	FR-72: Process.Queries.....	98
4.15.5	FR-73: Manage.Unrecognized.Queries.....	99
4.15.6	FR-74: Provide.Responses	99
4.15.7	FR-75 Email/Phone.Support.In.Case.Of.Technical.Difficulties	100
4.16	UC-2.10: Register Complaints.....	100
4.16.1	FR-76: Initiate.Complaint.Registration.....	100
4.16.2	FR-77: Collect.Complaint.Details.....	101
4.16.3	FR-78: Register.The.Complaint	101
4.16.4	FR-79: Confirm.Complaint.Status	102
4.16.5	FR-80: Error.Notification.And.Direct.To.Support.....	102
4.17	UC-2.11: Feedback and Reviews.....	103
4.17.1	FR-81: Access.Feedback.And.Reviews	103
4.17.2	FR-82: Display.User.Reviews.....	103
4.17.3	FR-83: Select.Submit.Feedback.Option.....	104
4.17.4	FR-84: Display.Domains.For.Feedbacks	104
4.17.5	FR-85: Submit.Feedback.....	105
4.17.6	FR-86: Update.Feedback.Register	105
4.17.7	FR-87: Error.Notification.For.Technical.Issues.....	106
4.18	UC-2.12: Identify Crop Stresses	106
4.18.1	FR-88: Access.Identify.Crop.Stress	106
4.18.2	FR-89: Display.Registered.Crops.List	107
4.18.3	FR-90: Select.A.Particular.Crop	107
4.18.4	FR-91: Analyze.Crop.Data.....	108
4.18.5	FR-92: Select.Unregistered.Crops.Option	108
4.18.6	FR-93: Enter.Unregistered.Crops,Details	109
4.18.7	FR-94: Crop.Stress.Report.Generation	109
4.18.8	FR-95: Error.Notification.For.Technical.Issues.....	110
4.19	UC-2.13: Identification of Crop Diseases.....	110
4.19.1	FR-96: Access.Identify.Crop.Disease	110
4.19.2	FR-97: Input.Crop.Details.....	111
	FR-98: Identification.Of.Disease	111
4.19.3	FR-99: Crop.Diagnosis.Report.Generation	112
4.19.4	FR-100: Error.Notification.For.Technical.Issues.....	112
4.20	UC-2.14: Periodic Crop Health Information.....	113
4.20.1	FR-101: Access.Periodic.Crop.Health.Monitoring	113
4.20.2	FR-102: Select.Schedule	113
4.20.3	FR-103: Provide.Crop.Data.....	114
4.20.4	FR-104: Assess.Provided.Data.....	114
4.20.5	FR-105: Periodic.Crop.Health.Report.Generation	115
4.20.6	FR-106: Error.Notification.For.Technical.Issues.....	115
4.21	UC-2.15: Estimate Crop Yield.....	116
4.21.1	FR-107: Access.Estimate.Crop.Yield	116
4.21.2	FR-108: Display.Crops.List	116
4.21.3	FR-109: Select.A.Particular.Crop	117
4.21.4	FR-110: Select.Values.Of.Yield.Factors.....	117

4.21.5	FR-111: Crop.Yield.Estimation	118
4.21.6	FR-112: Crop.Yield.Report.Generation	118
4.21.7	FR-113: Error.Notification.For.TechnicalIssues	119
4.22	UC-2.16: Assess Yield Risk Factors	119
4.22.1	FR-114: Access.Yield.Risk.Assessment	119
4.22.2	FR-115: Data.Collection.From.User	120
4.22.3	FR-116: Risk.Assessment.Report.Generation	120
4.22.4	FR-117 Provide.Risk.Mitigation.Strategies	121
4.23	UC-2.17: Crop Maturity Assessment	121
4.23.1	FR-118: Access.Crop.Maturity.Assessment	121
4.23.2	FR-119: Upload.Images.Of.Crops	122
4.23.3	FR-120: Determine.Crop.Maturity	122
4.23.4	FR-121: Crop.Maturity.Report.Generation	123
4.24	UC-2.18: Crop Quality Assessment	123
4.24.1	FR-122: Access.Crop.Quality.Assessment	123
4.24.2	FR-123: Input.Crop.Quality.Factors	124
4.24.3	FR-124: Analyze.Quality.Factors	124
4.24.4	FR-125: Crop.Quality.Report.Generation	125
4.25	UC-2.19: Optimal Harvesting Schedule	125
4.25.1	FR-126: Access.Harvesting.Schedule	125
4.25.2	FR-127: Develop.Optimal.Harvesting.Schedule	126
4.25.3	FR-128: Update.Harvesting.Schedule	126
4.25.4	FR-129: Track.Schedule	127
4.26	UC-2.20: Harvesting Tools and Techniques	127
4.26.1	FR-130: Retrieve.crop.details	127
4.26.2	FR-131: Recommend.harvesting.tools	128
4.26.3	FR-132: Recommend.harvesting.techniques	128
4.26.4	FR-133: Notify.On.Technical.Errors	129
4.27	UC-2.21: Harvesting tools catalog	129
4.27.1	FR-134: Retrieve.Tools.Catalog	129
4.27.2	FR-135: Display.Tools.Information	130
4.27.3	FR-136: Select.A.Particular.Tool	130
4.27.4	FR-137: Update.Database	131
4.28	UC-2.22: Transport Recommendation	131
4.28.1	FR-138: Access.Transport.Recommendation	131
4.28.2	FR-139: Display.Suitable.Transport	132
4.28.3	FR-140: Select.Tranportation	132
4.28.4	FR-141: Notify.On.Technical.Errors	133
4.29	UC-2.23: Transportation	133
4.29.1	FR-142: Book.Ride	133
4.29.2	FR-143: Enter.PickUp.DropOff.Location	134
4.29.3	FR-144: Notify.On.Technical.Error	134
4.30	UC-2.24: Packaging Assist	135
4.30.1	FR-145: Access.Packaging.Assist	135
4.30.2	FR-146: Input.Particular.Crop.Details	135
4.30.3	FR-147: Recommend.Packaging.Material	136
4.30.4	FR-148: Display.Material.Details	136
4.30.5	FR-149: Notify.On.Technical.Errors	137
4.31	UC-2.25: Climate-Controlled Storage Reservation	137
4.31.1	FR-150: Retrieve.Crop.Details	137
4.31.2	FR-151: Recommend.Suitable.Temperature.And.Storage.Conditions	138
4.31.3	FR-152: Display.Storage.Provider	138
4.31.4	FR-153: Reserve.Storage.Facility	139
4.31.5	FR-154: Update.Database.After.Reservation	139

4.31.6	FR-155: Notify.On.Technical.Errors	140
4.32	UC-2.26: Crop Quality Grading.....	140
4.32.1	FR-156: Retrieve.Crop.Details.....	140
4.32.2	FR-157: Provide.Grading.Tips.Based.On.Standards.....	141
4.32.3	FR-158: Generate.Quality.Index.Report	141
4.32.4	FR-159: Notify.On.Technical.Errors	142
4.33	UC-2.27: Switch Profile.....	142
4.33.1	FR-160: Access.Switch.Profile	142
4.33.2	FR-161: Displays.Available.Profiles.....	143
4.33.3	FR-162: Selects.A.Profile	143
4.33.4	FR-163: Switch.To.Selected.Profile.....	144
4.34	UC-2.28 Manage Profile.....	144
4.34.1	FR-164: Manipulate.Profile.Information	144
4.34.2	FR-165: Validate.Profile.Information.Format.....	145
4.34.3	FR-166: Apply.Changes.....	145
4.35	UC-2.29 Sign Out	146
4.35.1	FR-167: Initiates.SignOut.Process	146
4.35.2	FR-168: Terminate.User.Session	146
4.36	UC-3.1 Sign Up	147
4.36.1	FR-169: Initiate.Registration.....	147
4.36.2	FR-170: Enter.Credentials.....	147
4.36.3	FR-171: Validate.Credentials.....	148
4.36.4	FR-172: Confirm.Registration	148
4.36.5	FR-173: Handle.Invalid.Input	149
4.37	UC-3.2 Sign In	149
4.37.1	FR-174: Initiate.SignIn.Process	149
4.37.2	FR-175: Enter.Credentials.....	150
4.37.3	FR-176: Verify.Credentials.....	150
4.37.4	FR-177: Handle.Invalid.Credentials	151
4.38	UC-3.3 Access Products	151
4.38.1	FR-178: Access.Catalog.....	151
4.38.2	FR-179: Display.Products.List.....	152
4.38.3	FR-180 Search.Product	152
4.38.4	FR-181: Select.A.Particular.Product.....	153
4.38.5	FR-182: Display.Product.Details	153
4.38.6	FR-183: Review.Products	154
4.38.7	FR-184: Buy.Products.....	154
4.38.8	FR-185: Update.Database	155
4.39	UC-3.4 Bidding.....	155
4.39.1	FR-186: Access.Bidding.Section	155
4.39.2	FR-187: Display.Products.List.....	156
4.39.3	FR-188: Search.Product	156
4.39.4	FR-189: Select.A.Particular.Product.....	157
4.39.5	FR-190: Display.Bidding.Details	157
4.39.6	FR-191: Bid.Price	158
4.39.7	FR-192: Bid.Acceptance	158
4.39.8	FR-193: Payment	159
4.39.9	FR-194: Update.Database	159
4.40	UC-3.5 Switch Profile.....	160
4.40.1	FR-195: Access.Switch.Profile	160
4.40.2	FR-196: Displays.Available.Profiles.....	160
4.40.3	FR-197: Selects.A.Profile	161
4.40.4	FR-198: Switch.To.Selected.Profile.....	161
4.41	UC-3.6 Manage Profile.....	162

4.41.1	FR-199: Manipulate.Profile.Information	162
4.41.2	FR-200: Validate.Profile.Information.Format.....	162
4.41.3	FR-201: Apply.Changes.....	163
4.42	UC-3.7 Sign Out	163
4.42.1	FR-202: Initiates.SignOut.Process	163
4.42.2	FR-203: Terminate.User.Session	164
4.43	UC-4.1 Set Profile.....	164
4.43.1	FR-204: Switch.Profile	164
4.43.2	FR-205: Input.Product.Details	165
4.43.3	FR-206: Input.Bank.Details	165
4.43.4	FR-207 Register.Seller.....	166
4.43.5	FR-208: Validate.Registration.Data.....	166
4.43.6	FR-209: Grant.Seller.Dashboard.Access.....	167
4.44	UC-4.2 Upload Product/Service	167
4.44.1	FR-210: Select.Upload.Product.In.Marketplace	167
4.44.2	FR-211: Enter.Product.Type.And.Details	168
4.44.3	FR-212: Upload.Quality.Index.Document	168
4.44.4	FR-213: Upload.Product	169
4.44.5	FR-214: Validate.Product.Data	169
4.44.6	FR-215: Upload.Product.To.Marketplace	170
4.44.7	FR-216: Notify.Incorrect.Data	170
4.44.8	FR-217: Re-enter.Product.Data.....	171
4.44.9	FR-218: Retry.Upload.....	171
4.45	UC-4.3 Bidding.....	172
4.45.1	FR-219: Access.Bidding.Section	172
4.45.2	FR-220: Uploading.product	172
4.45.3	FR-221: Upload.Quality.Index.Document	173
4.45.4	FR-222: Verify.Product.Data	173
4.45.5	FR-223: Upload.Product.For.Bidding	174
4.45.6	FR-224: Notify.Seller.....	174
4.45.7	FR-225: Best.Bid.Selection.....	175
4.45.8	FR-226 Update.Database	175
4.46	UC-4.4 Reports and Analytics	176
4.46.1	FR-227 Access.Reports.And.Analytics.....	176
4.46.2	FR-228: Display.Available.Reports	176
4.46.3	FR-229: Select.And.Filter.Report	177
4.46.4	FR-230: Report.Generation.....	177
4.47	UC-4.5 Feature products.....	178
4.47.1	FR-231: Access.Promotion	178
4.47.2	FR-232: Display.Promotion.Rates	178
4.47.3	FR-233 Select.Suitable.Promotion.....	179
4.47.4	FR-234: Selecting.The.Product.....	179
4.47.5	FR-235: Payment.Method	180
4.47.6	FR-236: Update.Database	180
4.48	UC-4.6 Manage Profile.....	181
4.48.1	FR-237: Manipulate.Profile.Information	181
4.48.2	FR-238: Validate.Profile.Information.Format.....	181
4.48.3	FR-239: Apply.Changes.....	182
4.49	UC-4.7 Sign Out	182
4.49.1	FR-240: Initiates.SignOut.Process	182
4.49.2	FR-241: Terminate.User.Session	183
5.	Non-Functional Requirements.....	184
5.1	Reliability.....	184
5.2	Usability.....	184

5.3	Performance	184
5.4	Security	184
6.	External Interface Requirements	185
6.1	User Interfaces Requirements	185
6.2	Software interfaces.....	185
6.3	Hardware interfaces	185
6.4	Communications interfaces.....	185
7.	References	186
8.	Plagiarism Report	187

1. Introduction

The Software Requirement Specification (SRS) document for “AgroTech” provides a detailed overview of the software system designed to enhance the agricultural productivity through innovative technological solutions. This document provides details for the development and deployment of a comprehensive platform addressing the key challenges in modern farming. The purpose of this SRS is to outline the functional and non-functional requirements for “AgroTech”, offering a clear understanding of project’s scope, intended functionalities and target users. This document provides details of system’s major components, which include modules for crop recommendation by analysis of soil and climate, crop maturity assessment, crop health monitoring, yield estimation and prediction, harvesting scheduling and techniques, AI powered chatbot, and access to a platform with various services like transportation and storage vendors, a marketplace to buy and sell crops. This document will detail the roles and responsibilities of key stakeholders, task division among team members and tools and technologies used throughout the project. By serving this SRS, we intend to establish a strong foundation for successful execution of “AgroTech”, ensuring that the system effectively addresses farmers’ needs by boosting agricultural productivity, sustainability and profitability.

1.1 Purpose

The product specified in this document is “AgroTech”, a comprehensive software solution designed to enhance agricultural productivity, sustainability and profitability. “AgroTech” aims to provide farmers with advanced tools for crop recommendation, crop maturity assessment, crop health monitoring, AI powered chatbot, yield estimation, transport and tools services, and a marketplace.

This SRS is intended for following types of readers:

- **Developers:** To understand the functional and non-functional requirements, ensuring they can build the system according to the specifications.
- **Project Managers:** To track project progress, manage resources, and ensure that the project stays according to schedule and scope.
- **Marketing Staff:** To comprehend the system’s features and functionalities, enabling them to position and promote the product efficiency in the market.
- **Users:** Particularly farmers and agricultural consultants, to gain insight into the capabilities of the AgroTech system and understand how it will meet their needs.
- **Testers:** To design and execute test cases that ensure the system functions correctly and meets the specified requirements.
- **Document Writers:** To create user manuals, help guides, and other documentation that will assist users in effectively utilizing the AgroTech system.

1.2 Scope

AgroTech is a web-based application. It revolutionizes agricultural practices by empowering farmers with advanced tools and data driven decision making capabilities along with streamlining soil and crop monitoring process, utilization of resources and marketplace. It uses artificial intelligence, machine learning, and image processing to provide efficient crop recommendations, monitoring, management and marketing, enhancing the resource optimization and allocation. It provides a single platform to assist throughout the lifecycle of crop. AgroTech includes four main types of users, Admin, Farmers,

Sellers and Customers. Admin holds the highest level of authority and access, he can access, add, remove and view anything. Farmers can access the recommendation and monitoring functionalities along with option to buy and sell crops. Customers only have access to marketplace for buying agricultural products and reviewing them, however they have option to register for Seller profile through which they can provide services. Sellers have access to marketplace to sell their products/services. They can bid their products too. Moreover, they can view reviews and reports.

1.3 Modules

1.3.1 User Profiling

FE-1: Sign-up (Select user type (Admin, Farmer, Customer)).

FE-2: Sign-in.

FE-3: Manage Profile (Edit, View, Deactivate Account, Change Password).

FE-4: Recover Account.

FE-5: Social Sign-in (Gmail etc.).

1.3.2 Soil Analysis

FE-1: Analyzes Nitrogen, Phosphorus, Potassium content in soil.

FE-2: Analyzes previous soil record.

FE-3: Farmers can give input according to specific needs to analyze soil.

1.3.3 Climate Analysis

FE-1: Analyzes seasonal weather.

FE-2: Analyzes climate according to specific location.

1.3.4 Crop Recommendation

FE-1: Uses the reports of soil and climate analysis to recommend crops.

FE-2: Provides different options according to the budget.

FE-3: Provides pros and cons of different crops on that soil.

FE-4: Provides tutorials for methods of planting crops.

1.3.5 AgroTech Chatbot (AI powered helping assistant)

FE-1: Provides assistance according to user queries.

FE-2: Provides educational content, tutorials to help user learn about the system.

FE-3: Provides facility of different channels like email and phone support.

1.3.6 Crop Health Monitoring

FE-1: Identify stresses in crops including water, nutrient, and pest infestations stress etc.

FE-2: Identify visual symptoms of diseases in crops and classify them against databases.

FE-3: Provides information about crop health periodically using images for timely intervention to minimize damage.

1.3.7 Yield Estimation and Prediction

FE-1: Utilizes ML models on factors such as temperature, rainfall, soil moisture, and nutrient availability to estimate crop yield.

FE-2: Provides accurate yield prediction for planning and resource allocation.

FE-3: Assesses yield risk factors such as drought, disease outbreaks, and pest infestations, allowing farmers to implement risk mitigation measures.

1.3.8 Crop Maturity Assessment

FE-1: Using Image Recognition (IR) to assess crop maturity and readiness for harvesting.

FE-2: Determines optimal time for harvesting based on crop growth and maturity indicators.

FE-3: Provides feedback to farmers on crop readiness to optimize harvest scheduling.

FE-4: Assess the quality of crops based on factors such as sugar content, starch levels, size, color, and overall visual appearance.

1.3.9 Harvesting Assist

FE-1: Provides a scheduling tool to plan and manage harvesting activities, specifying crop types, quantities and preferred dates.

FE-2: Recommend tools and techniques for harvesting.

FE-3: Provides access of a catalog of harvesting equipment for rent and purchasing.

FE-4: Provides detailed guidelines for proper handling of tools and freshly harvested crops, helping farmers maintain quality of the crop.

1.3.10 Transportation Assist

FE-1: Provides a facility of transportation to farmer directly from platform, specifying pickup and delivery locations.

FE-2: Provides option of different recyclable and biodegradable packaging material for sustainable transportation practices.

FE-3: Provides shortest route to desired location for fuel efficient transportation, minimizing emissions and transportation costs.

FE-4: Provides facility of logistic planning for scheduling time and routes to deliver.

FE-5: Provides facility of different delivery options based on types and quantity of crops.

FE-6: Provides facility of guide lining to farmer for packaging crops securely for better transportation.

1.3.11 Storage Assist

FE-1: Provides facility to reserve climate-controlled storage facilities through this platform.

FE-2: Provides option to assess crop quality and assign grades providing buyers an accurate information.

FE-3: Provides different training suggestions to improve farmer's grading skills.

FE-4: Provides guidelines for complete process of storage and handling techniques for each quality grade.

1.3.12 Online Marketplace

FE-1: Provides facility to list item with their name, description, price, quality grade and image.

FE-2: Provides facility to manage inventory, track orders through single dashboard.

FE-3: Provides facility to perform digital marketing campaigns directly through platform.

FE-4: Provides description of farming practices used to harvest these crops to highlight their eco-friendly processes.

FE-5: Provides facility to customers to directly buy crops at listed prices.

FE-6: Provides facility to customers to participate in bidding process.

FE-7: Provides facility to farmers to manage inventory levels.

FE-8: Provides secure online payment gateways.

1.3.13 Reports and Analytics

FE-1: System will provide comparative reports and analytics about user engagement (before and after using our tool).

FE-2: System will provide reports containing various terms of webpage (visits, webpages visited at max etc.)

FE-3: System will provide reports about sales and revenues (total crop sale, total pesticides and fertilizers sale, total renting equipment).

FE-4: System will provide user with various filters for user to filter out required data.

1.4 Overview

The remainder of this SRS document is organized into several key sections, each designed to provide a comprehensive understanding of the “AgroTech” project. The document is structured to guide the reader from a high-level overview of the system to detailed technical specifications, ensuring that all aspects of the project are thoroughly documented and easy to navigate.

2. Overall Description

This section presents a high-level overview of the product and the environment in which it will be used, the anticipated users, and known constraints, assumptions, and dependencies.

2.1 Product Perspective

The “AgroTech” system is an entirely new product design to revolutionize the agricultural sector by integrating advanced technologies into traditional farming practices. Unlike existing agricultural solutions, AgroTech stands as a pioneering product in its domain, leveraging cutting-edge technologies such as Artificial Intelligence, Machine Learning and Image Processing to provide actionable insights and support to farmers throughout the lifecycle of crops.

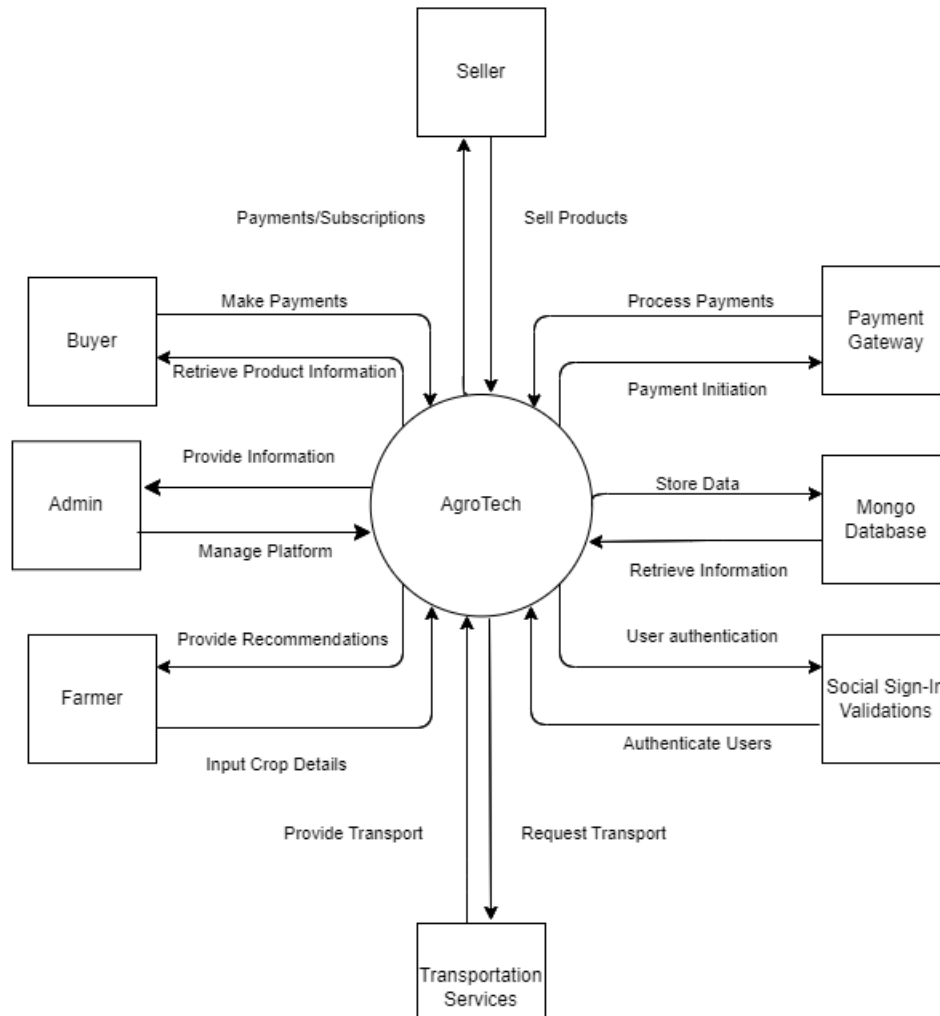


Figure 1 Context Diagram

2.2 User classes and characteristics

Table 1 Shows user classes and characteristic for AgroTech

User class	Description
Admin	Admin is the super user who oversees the AgroTech system. They can manage user profiles and actions. They monitor the system performance, manage complaints and subscriptions. Admin can also generate reports and analytics for analysis of system, users, performance etc.
Farmer	Farmer is facilitated with recommendations and assistance throughout the lifecycle of a crop. He can get recommendations, monitoring and techniques for his crops. Also, he can access AgroTech chatbot for knowledge and queries. He can get reports and analytics for the whole process.
Seller	Seller can offer his products according to the pricing guidelines of system base on quality. He can upload pictures, description and process of how product was made available. If seller wants to sell a large stock he can put it in bidding. He can view reviews and feedbacks from users and reports and analytics from system.
Customer	Customer has access to marketplace. He can view, review and buy any product. He can also join on going biddings if he is looking for a large stock.

2.3 Operating Environment

OE-1: The system shall operate correctly with the following web browsers: Chrome 93 and above, Firefox 88 and above, Opera 72 and above, Edge 16 and above, and Safari 11.1.1 and above.

2.4 Design and Implementation Constraints

CON-1: The system will use free tier of MongoDB which provides us with 512Mb of free storage.

CON-2: The system will use Stripe API for visa and master card payments.

CON-3: The system will use a basic authentication mechanism provided by Firebase for user sign-in (through google), which may have limitations on the number of concurrent users.

CON-4: System will use API for transportation module.

CON-5: System will use Open API GPT-3.5 for AgroTech Chatbot.

CON-6: System will use third party services for transportation services.

3. Requirement Identifying Technique

3.1 Use Case Diagrams

Admin

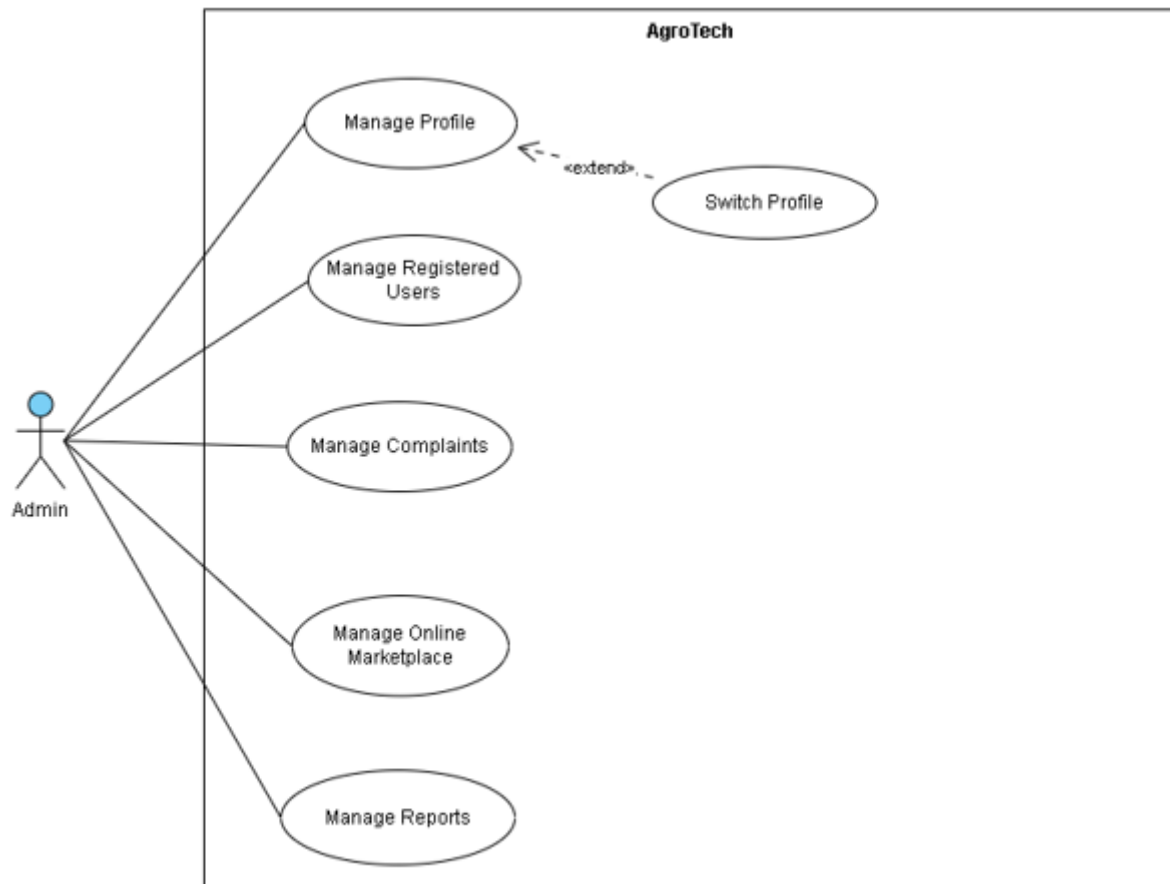


Figure 2: Admin Use Case Diagram

Farmer

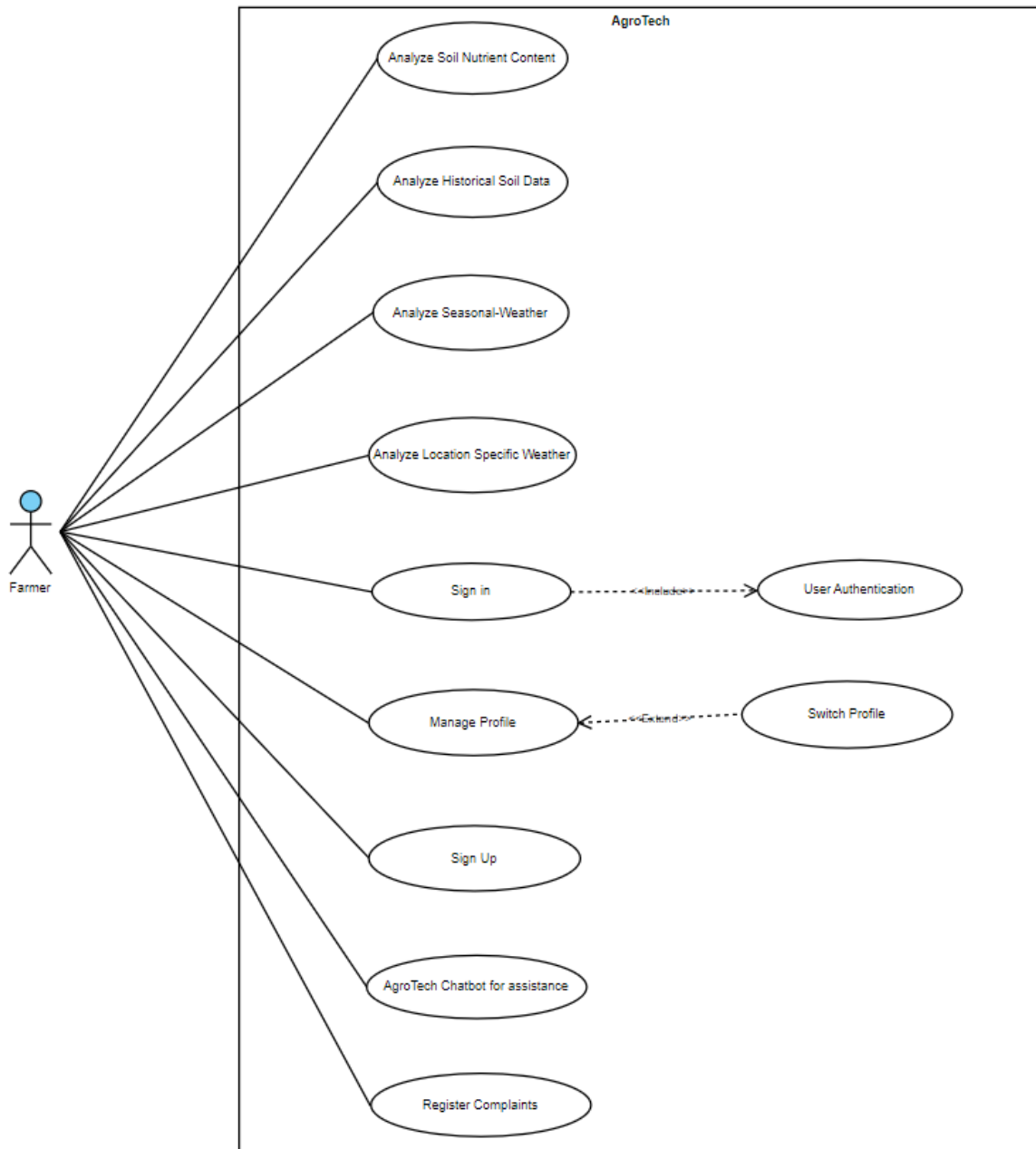


Figure 3.1: Farmer Use Case Diagram



Figure 3.2: Farmer Use Case Diagram

Customer

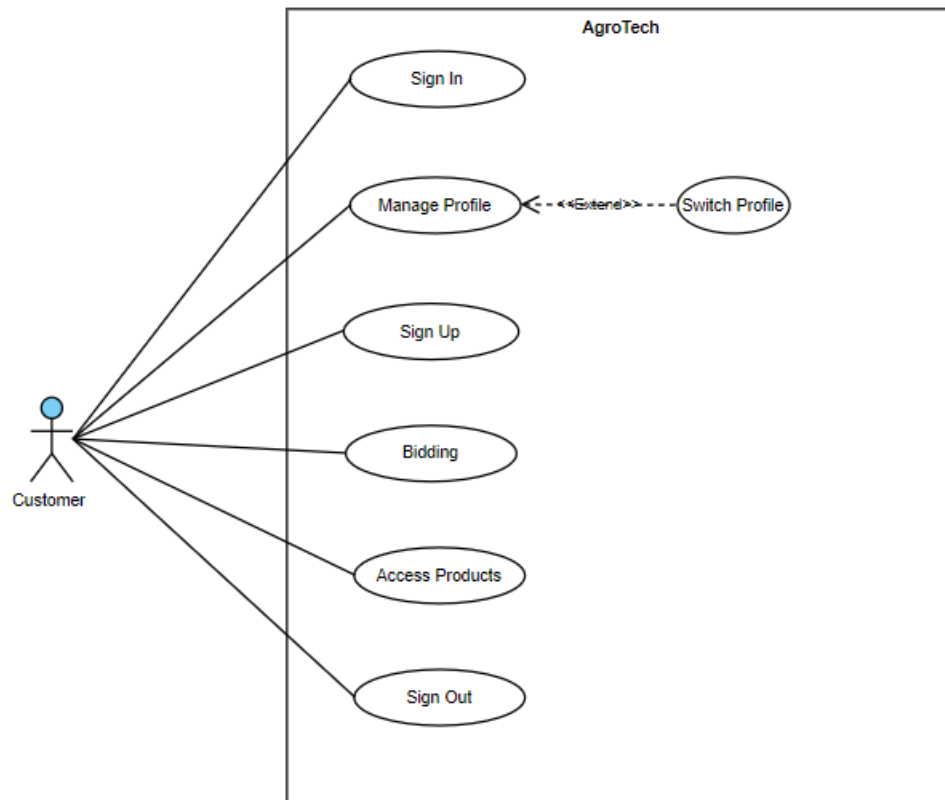


Figure 4: Customer Use Case Diagram

Seller

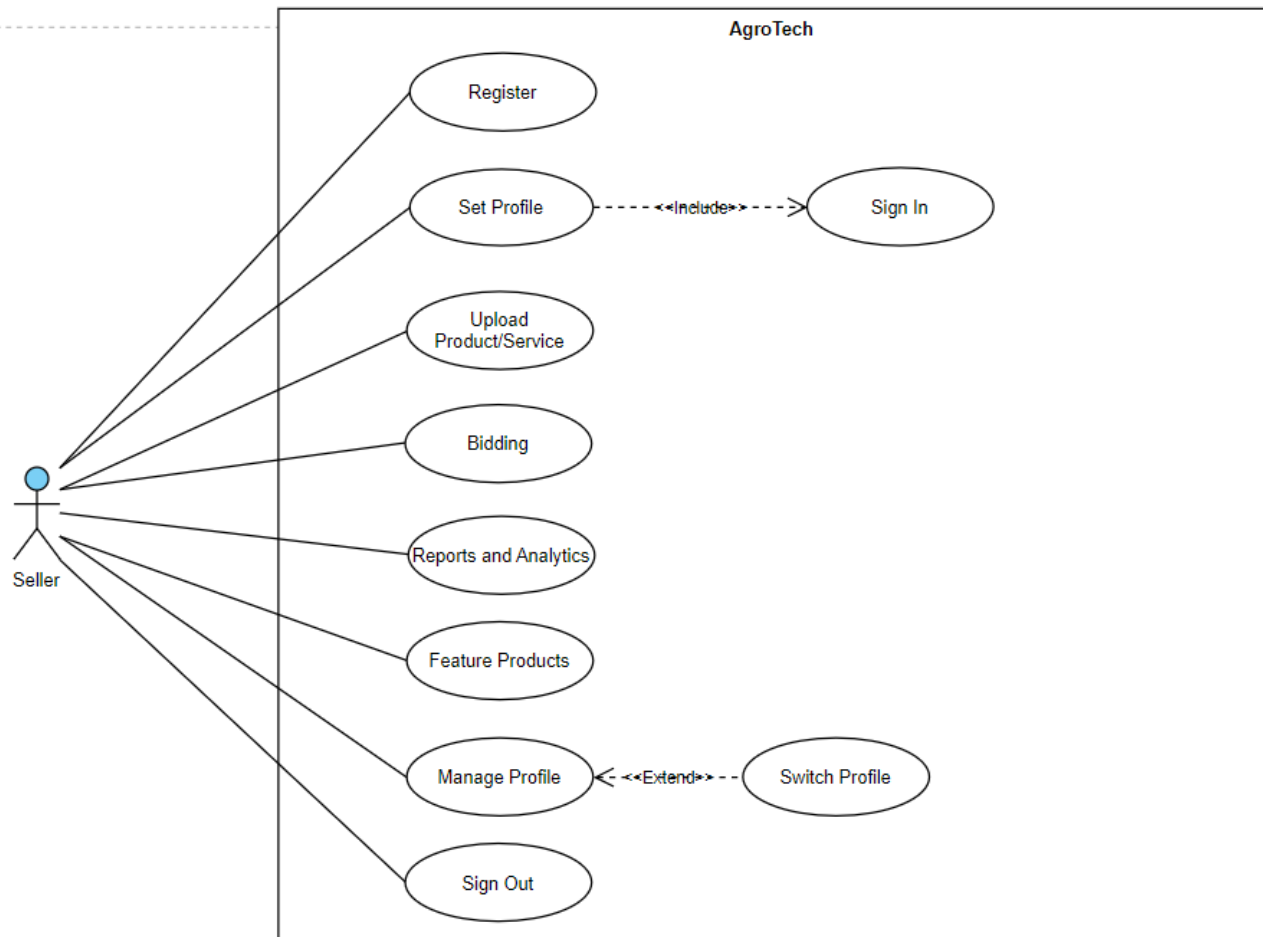


Figure 5: Seller Use Case Diagram

3.2 Admin Detail Use Cases

3.2.1 Sign-Up

Use Case ID: UC-1.1

Use Case Name: Sign-Up

Description: This use case explains the creation of admin account within the system.

Table 2 Sign-Up detailed use case

Actors:	Admin
Trigger:	User initiates registration process by clicking sign-up button
Preconditions:	PRE-1: Attempting user must not have an existing account in the system.
Postconditions:	POST-1: Successful creation of user's account within the system.
Normal Flow:	<ol style="list-style-type: none">1. User clicks Sign-Up button.2. User enters email address.3. User creates a strong password.4. User enters their username.5. System reviews the provided information for completeness and correctness.6. User clicks on Register button.7. System confirms the successful registration and navigates to Sign-In page.
Alternative Flows:	<p>5A. If entered information is detected incomplete or invalid, system highlights the errors or mistakes.</p> <p>5B. User re-enters the details.</p> <p>5C. Continues from 5th step of normal flow.</p>
Exceptions:	7A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	<ol style="list-style-type: none">1. User is not registered in the system.

3.2.2 Sign-In

Use Case ID: UC-1.2

Use Case Name: Sign-In

Description: This use case explains how admin access his account within the system.

Table 3 Sign-In detailed use case

Actors:	Admin
Trigger:	User initiates sign-in process by clicking sign-in button
Preconditions:	PRE-1: Attempting user must have an existing account in the system.
Postconditions:	POST-1: Successful logging in and granting access to the system.
Normal Flow:	<ol style="list-style-type: none">1. User clicks Sign-In button.2. User enters email address and password.3. User clicks on Sign-In button.4. System reviews the provided information for its correct format, and checks credentials against the stored data.5. System confirms the successful sign-in and grants access to their personal dashboard.
Alternative Flows:	<ol style="list-style-type: none">1A. User opts for third party sign-in (Google).1B. System navigates to respective third party's service page.1C. Third party authenticates the user.1D. Continues from 5th step of normal flow.4A. If entered information is detected incomplete or invalid, system highlights the errors or mistakes.4B. User re-enters the details.4C. Continues from 3rd step of normal flow.
Exceptions:	5A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	<ol style="list-style-type: none">1. User is registered in the system to avail services.

3.2.3 Manage Registered Users

Use Case ID: UC-1.3

Use Case Name: Manage Registered Users

Description: This use case explains how admin is able to view and manage registered users' accounts.

Table 4 Manage Registered Users detailed use case

Actors:	Admin
Trigger:	Admin selects user management from admin dashboard.
Preconditions:	PRE-1: Admin is logged into the system.
Postconditions:	POST-1: Successful monitoring/modification of user accounts as required.
Normal Flow:	<ol style="list-style-type: none">1. Admin selects user management option.2. System displays a list of registered users.3. Admin selects a particular user.4. System shows user activity and gives various options.5. Admin chooses to edit, deactivate or delete user's account.6. System proceeds the request and confirms the updates.
Alternative Flows:	None
Exceptions:	6A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Admin must have proper authorization to manage user accounts.
Assumptions:	None

3.2.4 Manage User Complaints

Use Case ID: UC-1.4

Use Case Name: Manage User Complaints

Description: This use case explains how admin is able to view and manage complaints by users.

Table 5 Manage User Complaints detailed use case

Actors:	Admin
Trigger:	Admin selects complaint management from admin dashboard.
Preconditions:	PRE-1: Admin is logged into the system.
Postconditions:	POST-1: Successful addressing/solution of user complaints as required.
Normal Flow:	<ol style="list-style-type: none">1. Admin selects complaint management option.2. System displays a list of registered complaints.3. Admin selects a particular complaint to view details.4. Admin takes suitable action against the complaint to resolve or address the issue.5. System confirms the action and updates the complaint status.
Alternative Flows:	None
Exceptions:	5A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Admin must have proper authorization to manage user complaints.
Assumptions:	None

3.2.5 Manage Reports

Use Case ID: UC-1.5

Use Case Name: Manage Reports

Description: This use case explains how admin is able to view and analyze reports.

Table 6 Manage Reports detailed use case

Actors:	Admin
Trigger:	Admin selects reports and analytics from admin dashboard.
Preconditions:	PRE-1: Admin is logged into the system.
Postconditions:	POST-1: System successfully generates and shows accurate reports.
Normal Flow:	<ol style="list-style-type: none">1. Admin selects reports and analytics option.2. System displays a list of available reports.3. Admin selects a particular report to view details and applies filters as needed.4. System generates the required reports according to the filters.
Alternative Flows:	None
Exceptions:	3A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Admin must have proper authorization to manage reports.
Assumptions:	None

3.2.6 Switch Profile

Use Case ID: UC-1.6

Use Case Name: Switch Profile

Description: This use case explains how admin is able to switch profiles.

Table 7 Switch Profile detailed use case

Actors:	Admin
Trigger:	Admin selects switch profile from admin dashboard.
Preconditions:	PRE-1: Admin is logged into the system.
Postconditions:	POST-1: System successfully switches the profile.
Normal Flow:	<ol style="list-style-type: none">1. Admin selects switch profile option.2. System shows available profiles (farmer, seller, customer).3. Admin selects the profile he wants to switch to.4. System switches to the requested profile and give access to its dashboard.
Alternative Flows:	None
Exceptions:	4A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Requested profile must be registered to get access.
Assumptions:	<ol style="list-style-type: none">1. Admin has registered each profile available for switching.

3.2.7 Manage Profile

Use Case ID: UC-1.7

Use Case Name: Manage Profile

Description: This use case explains how admin is able to manage and modify his profile.

Table 8 Manage Profile detailed use case

Actors:	Admin
Trigger:	Admin selects switch profile from admin dashboard.
Preconditions:	PRE-1: Admin is logged into the system.
Postconditions:	POST-1: System successfully modifies the profile.
Normal Flow:	<ol style="list-style-type: none">1. Admin selects manage profile option.2. System loads the user profile.3. Admin selects the field (picture, number, password etc.) and modifies it.4. System verifies.5. System updates the database.
Alternative Flows:	<p>5A. System notifies the user about unsuccessful verification.</p> <p>6A. Continues from 3rd step of Normal Flow</p>
Exceptions:	5A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Requested profile must be registered to get access.
Assumptions:	None

3.2.8 Sign-Out

Use Case ID: UC-1.8

Use Case Name: Sign-Out

Description: This use case explains how admin is able to sign-out from system.

Table 9 Sign-Out detailed use case

Actors:	Admin
Trigger:	Admin selects sign-out from dashboard.
Preconditions:	PRE-1: Admin is logged into the system.
Postconditions:	POST-1: System successfully logs out the user.
Normal Flow:	1. Admin selects sign-out option. 2. System terminates the session and loads the sign-in page.
Alternative Flows:	None
Exceptions:	2A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Requested profile must be registered to get access.
Assumptions:	None

3.3 Farmer Detail Use Cases

3.3.1 Sign-Up

Use Case ID: UC-2.1

Use Case Name: Sign-Up

Description: This use case explains the creation of farmer account within the system.

Table 10 Sign-Up detailed use case

Actors:	Farmer
Trigger:	User initiates registration process by clicking sign-up button
Preconditions:	PRE-1: Attempting user must not have an existing account in the system.
Postconditions:	POST-1: Successful creation of user's account within the system.
Normal Flow:	<ol style="list-style-type: none">1. User clicks Sign-Up button.2. User enters email address.3. User creates a strong password.4. User enters their username.5. System reviews the provided information for completeness and correctness.6. User clicks on Register button.7. System confirms the successful registration and navigates to Sign-In page.
Alternative Flows:	<p>5D. If entered information is detected incomplete or invalid, system highlights the errors or mistakes.</p> <p>5E. User re-enters the details.</p> <p>5F. Continues from 5th step of normal flow.</p>
Exceptions:	7A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	<ol style="list-style-type: none">1. User is not registered in the system.

3.3.2 Sign-In

Use Case ID: UC-2.2

Use Case Name: Sign-In

Description: This use case explains how admin access his account within the system.

Table 11 Sign-In detailed use case

Actors:	Farmer
Trigger:	User initiates sign-in process by clicking sign-in button
Preconditions:	PRE-1: Attempting user must have an existing account in the system.
Postconditions:	POST-1: Successful logging in and granting access to the system.
Normal Flow:	<ol style="list-style-type: none">1. User clicks Sign-In button.2. User enters email address and password.3. User clicks on Sign-In button.4. System reviews the provided information for its correct format, and checks credentials against the stored data.5. System confirms the successful sign-in and grants access to their personal dashboard.
Alternative Flows:	<ol style="list-style-type: none">1A. User opts for third party sign-in (Google).1B. System navigates to respective third party's service page.1C. Third party authenticates the user.1D. Continues from 5th step of normal flow.4D. If entered information is detected incomplete or invalid, system highlights the errors or mistakes.4E. User re-enters the details.4F. Continues from 3rd step of normal flow.
Exceptions:	5A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	<ol style="list-style-type: none">1. User is registered in the system

3.3.3 Current Soil Analysis

Use Case ID: UC-2.3

Use Case Name: Current Soil Analysis

Description: This use case explains how farmer gives soil information to system for analysis

Table 12 Current Soil Analysis detailed use case

Actors:	Farmer
Trigger:	User selects soil analysis option from dashboard.
Preconditions:	PRE-1: Attempting user must have an existing account in the system.
Postconditions:	POST-1: Successful analysis of soil.
Normal Flow:	<ol style="list-style-type: none">1. User clicks soil analysis button.2. User enters soil information from tests (Nitrogen, Phosphorus, Potassium).3. User clicks on OK button.4. System reviews the provided information for its correctness.5. System gives a confirmation to user.
Alternative Flows:	None
Exceptions:	5A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	<ol style="list-style-type: none">1. User has accurate and valid soil test data for analysis.

3.3.4 Previous Soil Analysis

Use Case ID: UC-2.4

Use Case Name: Previous Soil Analysis

Description: This use case explains how farmer gives soil information to system for analysis

Table 13 Previous Soil Analysis detailed use case

Actors:	Farmer
Trigger:	User selects previous soil analysis option from dashboard.
Preconditions:	PRE-1: Attempting user must have an existing soil record in the system.
Postconditions:	POST-1: Successful analysis of previous soil.
Normal Flow:	<ol style="list-style-type: none">1. User clicks previous soil analysis button.2. System checks if previous soil data is available and views it to user.3. User clicks on OK button.4. System reviews the provided information for its correctness.5. System gives a confirmation to user.
Alternative Flows:	<ol style="list-style-type: none">2A. System notifies user that there is no previous record.3A. Farmer enters the previous record manually and presses OK.4A. Continues from 4th step of normal flow.
Exceptions:	<ol style="list-style-type: none">5A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	<ol style="list-style-type: none">1. System has stored previous soil data for analysis.

3.3.5 Weather Analysis

Use Case ID: UC-2.5

Use Case Name: Weather Analysis

Description: This use case explains how farmer gives weather information to system for analysis

Table 14 Weather Analysis detailed use case

Actors:	Farmer
Trigger:	User selects weather analysis option from dashboard.
Preconditions:	PRE-1: Attempting user must have performed soil analysis.
Postconditions:	POST-1: Successful analysis of weather.
Normal Flow:	<ol style="list-style-type: none">1. User clicks weather analysis button.2. User enters current weather of the area.3. User clicks on OK button.4. System reviews the provided information for its correctness.5. System gives a confirmation to user.
Alternative Flows:	None
Exceptions:	5A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	None

3.3.6 Climate Analysis

Use Case ID: UC-2.6

Use Case Name: Climate Analysis

Description: This use case explains how farmer is able to do climate analysis

Table 15 Climate Analysis detailed use case

Actors:	Farmer
Trigger:	User selects climate analysis option from dashboard.
Preconditions:	PRE-1: Attempting user must have performed soil analysis.
Postconditions:	POST-1: Successful analysis of climate.
Normal Flow:	<ol style="list-style-type: none">1. User clicks climate analysis button.2. User selects the location from search bar.3. User clicks on OK button.4. System fetches the climate of selected area from third party.5. System gives a confirmation to user.
Alternative Flows:	None
Exceptions:	5A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	None

3.3.7 Crop Recommendation

Use Case ID: UC-2.7

Use Case Name: Crop Recommendation

Description: This use case explains how farmer is able to get crop recommendations.

Table 16 Crop Recommendation detailed use case

Actors:	Farmer
Trigger:	User selects crop recommendation option from dashboard.
Preconditions:	PRE-1: Attempting user must have performed soil, weather and climate analysis.
Postconditions:	POST-1: Successful crop recommendations.
Normal Flow:	<ol style="list-style-type: none">1. User clicks crop recommendation button.2. System gives multiple recommendations using the analysis (soil, weather, climate).3. User selects a crop to view its characteristics.4. System shows the pros and cons of selected crop.5. User clicks OK to confirm crop.6. System updates database and notifies the user.
Alternative Flows:	None
Exceptions:	6A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	System provides valid crop recommendation according to the inputs.

3.3.8 Tutorials

Use Case ID: UC-2.8

Use Case Name: Tutorials

Description: This use case explains how farmer is able to get tutorials for various techniques.

Table 17 Tutorials detailed use case

Actors:	Farmer
Trigger:	User selects tutorials option from dashboard.
Preconditions:	PRE-1: Attempting user must be logged into the system.
Postconditions:	POST-1: User is able to view requested tutorial selected.
Normal Flow:	<ol style="list-style-type: none">1. User clicks tutorials button.2. System gives a list of available tutorials.3. System views the requested tutorial.
Alternative Flows:	None
Exceptions:	3A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	None

3.3.9 AI Chatbot

Use Case ID: UC-2.9

Use Case Name: AI Chatbot

Description: This use case explains how farmer interacts able with chatbot for assistance.

Table 18 AI Chatbot detailed use case

Actors:	Farmer
Trigger:	User selects AgroTech chatbot from dashboard.
Preconditions:	PRE-1: Attempting user must be logged into the system.
Postconditions:	POST-1: User is able to get assistance from AI chatbot.
Normal Flow:	<ol style="list-style-type: none">1. User clicks AgroTech chatbot button.2. System opens the chatbot window.3. Chatbot greets the user and provides options for Frequently Asked Questions (FAQs).4. User interacts with chatbot by selecting an option or giving prompts.5. Chatbot generates responses against the given prompts.
Alternative Flows:	None
Exceptions:	2A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	AI Chatbot is trained on relevant data and provide accurate information to the user.

3.3.10 Register Complaints

Use Case ID: UC-2.10

Use Case Name: Register Complaints

Description: This use case explains how farmer is able to get register complaints.

Table 19 Register Complaints detailed use case

Actors:	Farmer
Trigger:	User selects register complaint from dashboard.
Preconditions:	PRE-1: Attempting user must be logged into the system.
Postconditions:	POST-1: User is able to register complaint and view its status successfully.
Normal Flow:	<ol style="list-style-type: none">1. User clicks register complaint button.2. System displays domains for complaints.3. User selects appropriate option and writes and submits the complaint.4. System updates the complaint register and views complaint status to user.
Alternative Flows:	None
Exceptions:	4A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	None

3.3.11 Feedback and Reviews

Use Case ID: UC-2.11

Use Case Name: Feedback and Reviews

Description: This use case explains how farmer is able to view and submit feedback and reviews.

Table 20 Feedback and Reviews detailed use case

Actors:	Farmer
Trigger:	User selects feedback and reviews from dashboard.
Preconditions:	PRE-1: Attempting user must be logged into the system.
Postconditions:	POST-1: User is able to view and submit feedback and reviews successfully.
Normal Flow:	<ol style="list-style-type: none">1. User clicks feedbacks and reviews button.2. System displays reviews from users and gives option for feedback.3. User selects feedback option.4. System shows domains for feedbacks.5. User selects appropriate option and submits feedback.6. System updates the feedback register.
Alternative Flows:	None
Exceptions:	6A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	None

3.3.12 Identify Crop Stresses

Use Case ID: UC-2.12

Use Case Name: Identify Crop Stresses

Description: Identifies stresses in crops, including water, nutrient and pest infestations.

Table 21 Identify Crop Stresses detailed use case

Actors:	Farmer
Trigger:	User selects identify crop stress from dashboard.
Preconditions:	PRE-1: Attempting user must have crops in growing stage.
Postconditions:	POST-1: User is able to view report on crop stress rate successfully.
Normal Flow:	<ol style="list-style-type: none">1. User clicks on “Identify Crop Stress” button2. User selects the crop from the list of registered crops.3. System analyzes the data about the crop like water, nutrient and pest stress4. System generates and presents a detailed report about crop stresses to the user
Alternative Flows:	<ol style="list-style-type: none">2a. User clicks on “Unregistered Crops” option.2b. System prompts user to enter details of the crops.2c. User enter details of the crops and process continues from step-3.
Exceptions:	6A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	It is assumed that the System will have up-to-date list of crops.

3.3.13 Identification of Crop Diseases

Use Case ID: UC-2.13

Use Case Name: Identification of Crop Diseases

Description: Identifies visual symptoms of diseases and classify them against diseases in the database

Table 22 Identification of Crop Diseases detailed use case

Actors:	Farmer
Trigger:	User selects identify crop diseases from dashboard.
Preconditions:	PRE-1: System has a database containing list of diseases including symptoms.
Postconditions:	POST-1: User is able to view diagnosis report generated by the system.
Normal Flow:	<ol style="list-style-type: none">1. User clicks “Identify crop diseases” button.2. User enter details about crop including images of the affected crop or symptoms.3. System uses image recognition technology and machine learning to identify the symptoms of disease in the crop.4. System compares symptoms with its database.5. System generates and presents a detailed report about diseases to the user.
Alternative Flows:	<ol style="list-style-type: none">2a. User submits invalid images or symptoms.2b. System notifies the user to reenter the details.2c. User reenters the details and process continues from step-3.
Exceptions:	6A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	None

3.3.14 Periodic Crop Health Monitoring

Use Case ID: UC-2.14

Use Case Name: Provide periodic crop health monitoring

Description: Periodically provides crop health monitoring to minimize crop damage.

Table 23 Periodic Crop Health Monitoring detailed use case

Actors:	Farmer
Trigger:	User selects periodic crop health from dashboard.
Preconditions:	PRE-1: User must be logged in to the system. PRE-2: User must have crops in growing stage.
Postconditions:	POST-1: The system provides periodic crop health report to the user.
Normal Flow:	<ol style="list-style-type: none">1. User selects the schedule to periodically monitor crops.2. System prompts user to collect the data about the crops at given intervals.3. User provides the data at the defined intervals4. System uses ML model and Image Recognition Technology to assess the health of crops.5. System generates and provides the crop health report to the user.
Alternative Flows:	None
Exceptions:	6A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	None

3.3.15 Estimate Crop Yield

Use Case ID: UC-2.15

Use Case Name: Estimate Crop Yield

Description: Utilizes ML model to estimate and predict crop yield using factors such as temperature, rainfall, soil nutrient etc.

Table 24 Crop Yield detailed use case

Actors:	Farmer
Trigger:	User selects estimate crop yield from dashboard.
Preconditions:	PRE-1: User has logged in to the system. PRE-2: The User has entered relevant crop data.
Postconditions:	POST-1: System generates estimated yield report.
Normal Flow:	1. User clicks 'Estimate Crop Yield' button. 2. User selects a crop from the list of crops. 3. User selects the values of factors such as temperature, rainfall, soil nutrient. 4. System utilizes ML model on factors. 5. System generates and presents the detailed yield report to the user.
Alternative Flows:	None
Exceptions:	6A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	User has entered valid crop data for estimation.

3.3.16 Assess Yield Risk Factors

Use Case ID: UC-2.16

Use Case Name: Assess yield risk factors

Description: Assesses yield risk factors (such as disease outbreaks, pest infestation) and suggest mitigation strategies to deal with these risks.

Table 25 Assess Yield Risk Factors detailed use case

Actors:	Farmer
Trigger:	User selects assess yield risk from dashboard.
Preconditions:	PRE-1: The user is logged in to the system. PRE-2: The system has up-to-date yield data.
Postconditions:	POST-1: User is able to view report on risk assessment.
Normal Flow:	1. User clicks “Assess Yield Risk” button. 2. System collects data about drought, pest infestation and disease outbreaks. 3. System generates and presents the risk assessment report to the user. 4. User clicks on “Provide Recommendations” button. 5. System provides risk mitigation strategies to deal with these risks.
Alternative Flows:	None
Exceptions:	6A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	System will have up-to-date crop yield data for risk assessment.

3.3.17 Crop Maturity Assessment

Use Case ID: UC-2.17

Use Case Name: Crop Maturity Assessment

Description: Assesses crop maturity and readiness for harvesting

Table 26 Crop Maturity Assessment detailed use case

Actors:	Farmer
Trigger:	User selects assess crop maturity from dashboard.
Preconditions:	PRE-1: Attempting user must have grown crops.
Postconditions:	POST-1: User is able to view report on crop maturity successfully.
Normal Flow:	<ol style="list-style-type: none">1. User clicks “Assess Crop Maturity” button.2. User uploads the images of the crop.3. System uses Image Recognition technology to determine the crop maturity.4. System generates and provides a detailed crop maturity report to the user.5. User assesses whether the crop is ready for harvesting or not.
Alternative Flows:	None
Exceptions:	6A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	None

3.3.18 Crop Quality Assessment

Use Case ID: UC-2.18

Use Case Name: Crop Quality Assessment

Description: Assesses crop quality for harvesting

Table 27 Crop Quality Assessment detailed use case

Actors:	Farmer
Trigger:	User selects assess crop quality from dashboard.
Preconditions:	PRE-1: Attempting user must have grown crops.
Postconditions:	POST-1: User is able to view report on crop quality report successfully.
Normal Flow:	<ol style="list-style-type: none">1. User clicks “Assess Crop Quality” button.2. System prompts the user to enter factors such as starch, sugar content, size, color etc.3. User enter the factors in to the system.4. System analyzes the factors and generates a crop quality report.5. System provides the report to the user to assess crop quality.
Alternative Flows:	None
Exceptions:	6A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	None

3.3.19 Optimal Harvesting Schedule

Use Case ID: UC-2.19

Use Case Name: Optimal Harvesting Schedule

Description: Develop an optimal schedule for harvesting the crop.

Table 28 Optimal Harvesting Schedule detailed use case

Actors:	Farmer
Trigger:	User selects harvesting schedule from dashboard.
Preconditions:	PRE-1: Attempting user must have mature crops.
Postconditions:	POST-1: User is able to get optimal schedule for harvesting the crop.
Normal Flow:	<ol style="list-style-type: none">1. User clicks harvesting schedule button.2. System retrieves the crop maturity reports and develops an optimal schedule for best timing of harvesting.3. User makes changes in schedule as needed and update it after finalized.4. System keeps track of the schedule.
Alternative Flows:	None
Exceptions:	2A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	None

3.3.20 Harvesting Tools and Techniques

Use Case ID: UC-2.20

Use Case Name: Harvesting Tools and Techniques

Description: Recommends suitable tools and techniques for the crop grown by farmer.

Table 29 Harvesting Tools and Techniques detailed use case

Actors:	Farmer
Trigger:	User selects harvesting tools and techniques from dashboard.
Preconditions:	PRE-1: Attempting user must have his crop details in system.
Postconditions:	POST-1: User is able to get suitable recommendations for tools and techniques for his crop.
Normal Flow:	<ol style="list-style-type: none">1. User clicks harvesting tools and techniques button.2. System retrieves the crop details and recommends suitable tools and techniques for harvesting.
Alternative Flows:	None
Exceptions:	2A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	System has adequate information about the crop type to suggest appropriate harvesting tools and techniques.

3.3.21 Harvesting Tools Catalog

Use Case ID: UC-2.21

Use Case Name: Harvesting Tools Catalog

Description: Shows catalog of available harvesting tools for rent and sale.

Table 30 Harvesting Tools Catalog detailed use case

Actors:	Farmer
Trigger:	User selects harvesting tools catalog from catalogs from dashboard.
Preconditions:	PRE-1: Attempting user must have performed tools and techniques recommendation.
Postconditions:	POST-1: User is able to view, purchase and review products.
Normal Flow:	<ol style="list-style-type: none">1. User clicks harvesting tools catalog from catalogs.2. System retrieves the tools and techniques recommendation details and shows catalog for suitable tools.3. User selects a particular product and proceeds to view, purchase or review product.4. System updates the database and marketplace.
Alternative Flows:	<ol style="list-style-type: none">2A. User uses search bar to find tools.3A. System shows results for searched product.4A. Continues from 3rd step of Normal Flow.
Exceptions:	<ol style="list-style-type: none">4A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	None

3.3.22 Transport Recommendation

Use Case ID: UC-2.22

Use Case Name: Transport Recommendation

Description: Recommends transport type according to crop type and weight.

Table 31 Transport Recommendation detailed use case

Actors:	Farmer
Trigger:	User selects transport recommendation from dashboard.
Preconditions:	PRE-1: Attempting user must have harvested the crops.
Postconditions:	POST-1: User is able to get transport recommendation.
Normal Flow:	<ol style="list-style-type: none">1. User clicks transport recommendation from dashboard.2. System retrieves the crop and harvesting details and shows suitable transport types.3. User can select a particular transportation type from there.
Alternative Flows:	None
Exceptions:	2A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	None

3.3.23 Transportation

Use Case ID: UC-2.23

Use Case Name: Transportation

Description: User can book transportation for crops and track it.

Table 32 Transportation detailed use case

Actors:	Farmer
Trigger:	User selects book ride from transportation in dashboard.
Preconditions:	PRE-1: Attempting user must have harvested crops.
Postconditions:	POST-1: User is able to get transport and track it.
Normal Flow:	<ol style="list-style-type: none">1. User clicks book ride from transport recommendation2. User enters pickup and drop off location.3. System searches for available service providers for recommended transport and shows it to user.4. User selects the suitable ride.5. System starts the ride and provides live location to user and best routes to driver till the ride ends.
Alternative Flows:	<ol style="list-style-type: none">1A. User searches for any transportation type and selects it.2A. Continues from 2nd step of Normal Flow.
Exceptions:	<ol style="list-style-type: none">3A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	None

3.3.24 Packaging Assist

Use Case ID: UC-2.24

Use Case Name: Packaging Assist

Description: User gets recommendations for suitable, sustainable and biodegradable packaging materials.

Table 33 Packaging Assist detailed use case

Actors:	Farmer
Trigger:	User selects packaging assist from dashboard.
Preconditions:	PRE-1: Attempting user must have harvested crops.
Postconditions:	POST-1: User is able to get suitable packaging material recommendation.
Normal Flow:	<ol style="list-style-type: none">1. User clicks packaging assist from dashboard.2. System retrieves the harvesting and crops details.3. System recommends sustainable and biodegradable packaging materials which is suitable for crop type and size.4. User can view pros and cons of any material by selecting it.
Alternative Flows:	<ol style="list-style-type: none">2A. User enters any crop type and size.3A. Continues from 3rd step of Normal Flow.
Exceptions:	<ol style="list-style-type: none">3A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	None

3.3.25 Climate-Controlled Storage Reservation

Use Case ID: UC-2.25

Use Case Name: Climate-Controlled Storage Assist

Description: User can get suitable temperature and storage recommendations. User can view, review and reserve any storage place.

Table 34 Climate-Controlled Storage Reservation detailed use case

Actors:	Farmer
Trigger:	User selects Climate-Controlled Storage from dashboard.
Preconditions:	PRE-1: Attempting user must have harvested crops.
Postconditions:	POST-1: User is able to get climate-controlled storage reservations.
Normal Flow:	<ol style="list-style-type: none">1. User clicks climate-controlled storage from dashboard.2. System retrieves the harvesting and crops details.3. System recommends suitable temperature and storage recommendations for crop.4. System shows storage providers.5. User can view, review and reserve storage.6. System updates the database.
Alternative Flows:	None
Exceptions:	6A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	None

3.3.26 Crop Quality Grading

Use Case ID: UC-2.26

Use Case Name: Crop Quality Grading

Description: User can get assistance to grade his crops and make groups.

Table 35 Crop Quality Grading detailed use case

Actors:	Farmer
Trigger:	User selects Crop Quality Grading from dashboard.
Preconditions:	PRE-1: Attempting user must have harvested crops.
Postconditions:	POST-1: User is able to group crops based on quality and get a quality index.
Normal Flow:	<ol style="list-style-type: none">1. User clicks crop quality grading from dashboard.2. System retrieves the harvesting and crops details.3. System recommends various grading tips according to standards and crop characteristics.4. User can make a table for information about different grades of crop.5. System makes a report of quality index showing crop quality and quantity.6. User can use this index in marketplace to show customers.
Alternative Flows:	None
Exceptions:	5A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	None

3.3.27 Switch Profile

Use Case ID: UC-2.27

Use Case Name: Switch Profile

Description: This use case explains how farmer is able to switch profiles.

Table 36 Switch Profile detailed use case

Actors:	Farmer
Trigger:	Farmer selects switch profile from dashboard.
Preconditions:	PRE-1: Farmer is logged into the system.
Postconditions:	POST-1: System successfully switches the profile.
Normal Flow:	<ol style="list-style-type: none">1. Farmer selects switch profile option.2. System shows available profiles (seller, customer).3. Farmer selects the profile he wants to switch to.4. System switches to the requested profile and give access to its dashboard.
Alternative Flows:	None
Exceptions:	4A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Requested profile must be registered to get access.
Assumptions:	None

3.3.28 Manage Profile

Use Case ID: UC-2.28

Use Case Name: Manage Profile

Description: This use case explains how Farmer is able to manage and modify his profile.

Table 37 Manage Profile detailed use case

Actors:	Farmer
Trigger:	Farmer selects switch profile from dashboard.
Preconditions:	PRE-1: Farmer is logged into the system.
Postconditions:	POST-1: System successfully modifies the profile.
Normal Flow:	<ol style="list-style-type: none">1. Farmer selects manage profile option.2. System loads the user profile.3. Admin selects the field (picture, number, password etc.) and modifies it.4. System verifies.5. System updates the database.
Alternative Flows:	<ol style="list-style-type: none">5A. System notifies the user about unsuccessful verification.6A. Continues from 3rd step of Normal Flow
Exceptions:	5A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Requested profile must be registered to get access.
Assumptions:	None

3.3.29 Sign-Out

Use Case ID: UC-2.29

Use Case Name: Sign-Out

Description: This use case explains how farmer is able to sign-out from system.

Table 38 Sign-Out detailed use case

Actors:	Farmer
Trigger:	Farmer selects sign-out from dashboard.
Preconditions:	PRE-1: Farmer is logged into the system.
Postconditions:	POST-1: System successfully logs out the user.
Normal Flow:	1. Farmer selects sign-out option. 2. System terminates the session and loads the sign-in page.
Alternative Flows:	None
Exceptions:	2A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Requested profile must be registered to get access.
Assumptions:	User is logged in the system.

3.4 Customer Detail Use Cases

3.4.1 Sign-Up

Use Case ID: UC-3.1

Use Case Name: Sign-Up

Description: This use case explains the creation of customer account within the system.

Table 39 Sign-Up detailed use case

Actors:	Customer
Trigger:	User initiates registration process by clicking sign-up button
Preconditions:	PRE-1: Attempting user must not have an existing account in the system.
Postconditions:	POST-1: Successful creation of user's account within the system.
Normal Flow:	<ol style="list-style-type: none">1. User clicks Sign-Up button.2. User enters email address.3. User creates a strong password.4. User enters their username.5. System reviews the provided information for completeness and correctness.6. User clicks on Register button.7. System confirms the successful registration and navigates to Sign-In page.
Alternative Flows:	<p>5A. If entered information is detected incomplete or invalid, system highlights the errors or mistakes.</p> <p>5B. User re-enters the details.</p> <p>5C. Continues from 5th step of normal flow.</p>
Exceptions:	7A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	User is not registered in the system

3.4.2 Sign-In

Use Case ID: UC-3.2

Use Case Name: Sign-In

Description: This use case explains how admin access his account within the system.

Table 40 Sign-In detailed use case

Actors:	Customer
Trigger:	User initiates sign-in process by clicking sign-in button
Preconditions:	PRE-1: Attempting user must have an existing account in the system.
Postconditions:	POST-1: Successful logging in and granting access to the system.
Normal Flow:	<ol style="list-style-type: none">1. User clicks Sign-In button.2. User enters email address and password.3. User clicks on Sign-In button.4. System reviews the provided information for its correct format, and checks credentials against the stored data.5. System confirms the successful sign-in and grants access to their personal dashboard.
Alternative Flows:	<ol style="list-style-type: none">1A. User opts for third party sign-in (Google).1B. System navigates to respective third party's service page.1C. Third party authenticates the user.1D. Continues from 5th step of normal flow. <ol style="list-style-type: none">4A. If entered information is detected incomplete or invalid, system highlights the errors or mistakes.4B. User re-enters the details.4C. Continues from 3rd step of normal flow.
Exceptions:	5A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	User is registered in the system.

3.4.3 Access Products

Use Case ID: UC-3.3

Use Case Name: Access Products

Description: User can view, review and buy products.

Table 41 Access Products detailed use case

Actors:	Customer
Trigger:	User opens catalog from dashboard.
Preconditions:	PRE-1: Attempting user must be signed in.
Postconditions:	POST-1: User should be able to view, review and buy products.
Normal Flow:	<ol style="list-style-type: none">1. User opens catalog from dashboard.2. System shows a list of products to user.3. User can search for a particular product.4. User clicks on a product.5. System shows product details.6. User can give reviews about it or add to cart to buy.7. System updates the database
Alternative Flows:	None
Exceptions:	7A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	None

3.4.4 Bidding

Use Case ID: 3.4

Use Case Name: Bidding

Description: If user wants to buy large number of crops, he can join bidding.

Table 42 Bidding detailed use case

Actors:	Customer
Trigger:	User clicks on bidding in dashboard.
Preconditions:	PRE-1: Attempting user must be signed in.
Postconditions:	POST-1: User should be able to bid and buy products.
Normal Flow:	<ol style="list-style-type: none">1. User opens bidding from dashboard.2. System shows a list of ongoing bids.3. User can search for a particular product.4. User clicks on a product.5. System shows bidding details.6. User can bid his price.7. System notifies the user when farmer accepts any bid.8. User then performs payment if his bid is accepted and can give reviews.9. System updates the database.
Alternative Flows:	None
Exceptions:	7A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Users must be registered to avail services provided by the system.
Assumptions:	Users understand the payment process and is ready to complete it once the bid is accepted.

3.4.5 Switch Profile

Use Case ID: UC-3.5

Use Case Name: Switch Profile

Description: Customer can switch to other profiles if registered.

Table 43 Switch Profile detailed use case

Actors:	Customer
Trigger:	Customer selects switch profile from dashboard.
Preconditions:	PRE-1: Customer is logged into the system.
Postconditions:	POST-1: System successfully switches the profile.
Normal Flow:	<ol style="list-style-type: none">1. Farmer selects switch profile option.2. System shows available profiles (seller, others if registered).3. Farmer selects the profile he wants to switch to.4. System switches to the requested profile and give access to its dashboard.
Alternative Flows:	None
Exceptions:	4A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Requested profile must be registered to get access.
Assumptions:	The user is already registered for multiple profiles.

3.4.6 Manage Profile

Use Case ID: UC-3.6

Use Case Name: Manage Profile

Description: This use case explains how customer is able to manage and modify his profile.

Table 44 Manage Profile detailed use case

Actors:	Customer
Trigger:	Customer selects switch profile from dashboard.
Preconditions:	PRE-1: Customer is logged into the system.
Postconditions:	POST-1: System successfully modifies the profile.
Normal Flow:	<ol style="list-style-type: none">1. Customer selects manage profile option.2. System loads the user profile.3. Customer selects the field (picture, number, password etc.) and modifies it.4. System verifies.5. System updates the database.
Alternative Flows:	<p>5A. System notifies the user about unsuccessful verification.</p> <p>6A. Continues from 3rd step of Normal Flow</p>
Exceptions:	5A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Requested profile must be registered to get access.
Assumptions:	Users are familiar with profile management.

3.4.7 Sign-Out

Use Case ID: UC-3.7

Use Case Name: Sign-Out

Description: This use case explains how customer is able to sign-out from system.

Table 45 Sign-Out detailed use case

Actors:	Customer
Trigger:	Customer selects sign-out from dashboard.
Preconditions:	PRE-1: Customer is logged into the system.
Postconditions:	POST-1: System successfully logs out the user.
Normal Flow:	1. Customer selects sign-out option. 2. System terminates the session and loads the sign-in page.
Alternative Flows:	None
Exceptions:	2A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Requested profile must be registered to get access.
Assumptions:	None

3.5 Seller Detail Use Cases

3.5.1 Set Profile

Use Case ID: 4.1

Use Case Name: Set Profile

Description: This use case explains how a user can register to be a seller.

Table 46 Set Profile detailed use case

Actors:	Seller
Trigger:	User switches to seller profile.
Preconditions:	PRE-1: Attempting user has already registered account. PRE-2: Attempting user must not have registered to be a seller already.
Postconditions:	POST-1: User should be able to access seller dashboard.
Normal Flow:	1. User switches to seller profile. 2. User enters details about type of products he would sell. 3. User enters his bank details. 4. User presses register. 5. System validates data 6. System gives access to seller dashboard.
Alternative Flows:	6A. System notifies user for incorrect data. 7A. User re-enters data. 8A. Continues from 4 th step of Normal Flow.
Exceptions:	5A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Requested profile must be registered to get access.
Assumptions:	The user is registered in the system.

3.5.2 Upload Product/Service

Use Case ID: 4.2

Use Case Name: Upload Product/Service

Description: This use case explains how a user is able to upload his product in marketplace.

Table 47 Upload Product/Service detailed use case

Actors:	Seller
Trigger:	User clicks upload product in marketplace.
Preconditions:	PRE-1: User must have registered seller account.
Postconditions:	POST-1: User must be able to upload his product.
Normal Flow:	<ol style="list-style-type: none">1. User clicks upload product in marketplace.2. User enters product type, details and pictures.3. User uploads quality index document if available.4. User clicks upload.5. System checks data and rates for correctness.6. System uploads it.
Alternative Flows:	<ol style="list-style-type: none">6A. System notifies user for incorrect data.7A. User re-enters data.8A. Continues from 4th step of Normal Flow.
Exceptions:	6A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Requested profile must be registered to get access.
Assumptions:	None

3.5.3 Bidding

Use Case ID: 4.3

Use Case Name: Bidding

Description: This use case explains how a seller can upload his product and receive bids for it.

Table 48 Bidding detailed use case

Actors:	Seller
Trigger:	User clicks on bidding in dashboard.
Preconditions:	PRE-1: User must have registered seller account.
Postconditions:	POST-1: User must be able to bid his product.
Normal Flow:	<ol style="list-style-type: none">1. User clicks upload product in bidding.2. User enters product type, details, time limit and pictures.3. User uploads quality index document if available.4. User clicks upload.5. System checks data and rates for correctness.6. System uploads it.7. System notifies whenever a new price is received.8. User can select the best bid after given time and sell it to that customer.9. System updates database accordingly.
Alternative Flows:	<ol style="list-style-type: none">6A. System notifies user for incorrect data.7A. User re-enters data.8A. Continues from 4th step of Normal Flow.
Exceptions:	<ol style="list-style-type: none">9A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Requested profile must be registered to get access.
Assumptions:	The system will provide notifications to user if a bid is made.

3.5.4 Reports and Analytics

Use Case ID: 4.4

Use Case Name: Reports and Analytics

Description: This use case explains how a seller can view his reports (revenue, profits etc.) and progress.

Table 49 Reports and Analytics detailed use case

Actors:	Seller
Trigger:	Seller selects reports and analytics from dashboard.
Preconditions:	PRE-1: Seller is logged into the system.
Postconditions:	POST-1: System successfully generates and shows accurate reports.
Normal Flow:	<ol style="list-style-type: none">1. User selects reports and analytics option.2. System displays a list of available reports.3. User selects a particular report to view details and applies filters as needed.4. System generates the required reports according to the filters.
Alternative Flows:	None
Exceptions:	3A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Requested profile must be registered to get access.
Assumptions:	None

3.5.5 Feature Products

Use Case ID: 4.5

Use Case Name: Feature Products

Description: This use case explains how a seller can promote his products.

Table 50 Feature Products detailed use case

Actors:	Seller
Trigger:	Seller selects promotion from dashboard.
Preconditions:	PRE-1: Seller is logged into the system. PRE-2: Seller must have active gig.
Postconditions:	POST-1: Seller must get his product featured.
Normal Flow:	1. User selects promotion option. 2. System displays a list of promotion rates. 3. User selects suitable promotion. 4. System asks to select the gigs to be featured. 5. User selects required gigs and proceeds to payment 6. System updates the database.
Alternative Flows:	None
Exceptions:	6A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Requested profile must be registered to get access.
Assumptions:	None

3.5.6 Manage Profile

Use Case ID: UC-4.6

Use Case Name: Manage Profile

Description: This use case explains how seller is able to manage and modify his profile.

Table 51 Manage Profile detailed use case

Actors:	Seller
Trigger:	Seller selects switch profile from admin dashboard.
Preconditions:	PRE-1: Seller is logged into the system.
Postconditions:	POST-1: System successfully modifies the profile.
Normal Flow:	<ol style="list-style-type: none">1. Seller selects manage profile option.2. System loads the user profile.3. Seller selects the field (picture, number, password etc.) and modifies it.4. System verifies.5. System updates the database.
Alternative Flows:	<p>5A. System notifies the user about unsuccessful verification.</p> <p>6A. Continues from 3rd step of Normal Flow</p>
Exceptions:	5A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Requested profile must be registered to get access.
Assumptions:	The user is familiar with profile management.

3.5.7 Sign-Out

Use Case ID: UC-4.7

Use Case Name: Sign-Out

Description: This use case explains how seller is able to sign-out from system.

Table 52 Sign-Out detailed use case

Actors:	Seller
Trigger:	Seller selects sign-out from dashboard.
Preconditions:	PRE-1: Seller is logged into the system.
Postconditions:	POST-1: System successfully logs out the user.
Normal Flow:	1. Seller selects sign-out option. 2. System terminates the session and loads the sign-in page.
Alternative Flows:	None
Exceptions:	2A. If technical error occurs, system notifies the user and advise them to retry or seek help from support assistance.
Business Rules	Requested profile must be registered to get access.
Assumptions:	The user is logged in the system.

4. Functional Requirements

Admin Functional Requirements

4.1 UC-1.1: Sign Up

4.1.1 FR-1: Initiate.Registration

Table 53: Initiate.Registration FR

Identifier	FR-1
Title	Initiate.Registration
Requirement	The user shall be able to initiate registration by clicking on Sign up button
Source	UC-1.1
Rationale	Provide users an option to register in to the system
Business Rule	None
Dependencies	FR-2, FR-3, FR-4, FR-5
Priority	High

4.1.2 FR-2: Input.Credentials

Table 54: Input.Credentials FR

Identifier	FR-2
Title	Input.Credentials
Requirement	The user shall be able to input credentials to register in the system.
Source	UC-1.1
Rationale	Allow users to enter credentials to register as a Admin.
Business Rule	None
Dependencies	FR-3
Priority	High

4.1.3 FR-3: Validate.Credentials

Table 55: Validate.Credentials FR

Identifier	FR-3
Title	Validate.Information
Requirement	The system should validate the correctness and accuracy of user entered email, password and username before proceeding with registration
Source	Muaaz Bin Mukhtar
Rationale	The system ensure that the user entered credentials are correct and accurate and could be used as a valid email and password.
Business Rule	None
Dependencies	FR-4
Priority	High

4.1.4 FR-4: Confirm.Registration

Table 56: Confirm.Registration FR

Identifier	FR-4
Title	Confirm.Registration
Requirement	The system shall confirm the successful registration of user's account and display a message that user account is created.
Source	Muaaz Bin Mukhtar
Rationale	To ensure that the user's account is successfully created and allow them to sign in to his account.
Business Rule	The user must be directed to the login page after successful sign up.
Dependencies	FR-5, FR-6
Priority	High

4.1.5 FR-5: Handle.Invalid.Input

Table 57: Handle.Invalid.Input FR

Identifier	FR-5
Title	Handle.Invalid.Input
Requirement	The system shall display a message that information is invalid if the user enters invalid input.
Source	Muaaz Bin Mukhtar
Rationale	To ensure that the user enters valid data so that sign up is successful.
Business Rule	The system must validate each field and notifies user if there is any error or missing field.
Dependencies	None
Priority	Medium

4.2 UC-1.2 Sign In

4.2.1 FR-6: Initiate.SignIn.Process

Table 58: Initiate.SignIn.Process FR

Identifier	FR-6
Title	Initiate.SignIn.Process
Requirement	The user shall be able to initiate the sign in process by clicking on “Sign In” button.
Source	Muaaz Bin Mukhtar
Rationale	Provide users an option to access their accounts and services.
Business Rule	The user must be registered to initiate sign in process.
Dependencies	FR-7
Priority	High

4.2.2 FR-7: Input.Credentials

Table 59: Enter.Credentials FR

Identifier	FR-7
Title	Input.Credentials
Requirement	The system shall prompt the user to input their registered credentials to authenticate their identity.
Source	Muaaz Bin Mukhtar
Rationale	To ensure that the user enters registered credentials to successfully log in to the system
Business Rule	Email and password must match the one stored in database.
Dependencies	FR-8
Priority	High

4.2.3 FR-8: Verify.Credentials

Table 60: Verify.Credentials FR

Identifier	FR-8
Title	Verify.Credentials
Requirement	The system shall verify credentials against database to authenticate the user.
Source	Muaaz Bin Mukhtar
Rationale	To ensure that the user enter credentials to successfully to log in to the system
Business Rule	The system must verify the user-entered credentials against database and directs the user to admin dashboard upon successful verification.
Dependencies	FR-9
Priority	High

4.2.4 FR-9: Handle.Invalid.Credentials

Table 61: Handle.Invalid.Credentials FR

Identifier	FR-9
Title	Handle.Invalid.Credentials
Requirement	The system should display the message “Invalid Credentials” if the user enters invalid credentials.
Source	Muaaz Bin Mukhtar
Rationale	To ensure that the user does not enter invalid credentials.
Business Rule	The system must limit invalid login attempts to the maximum of five consecutive failures.
Dependencies	FR-10
Priority	Medium

4.3 UC-1.3 Manage Registered Users

4.3.1 FR-10: Access.User.Management

Table 62: Access.User.Management FR

Identifier	FR-10
Title	Access.User.Management
Requirement	The admin shall be able to access the user management section by clicking the “User Management” button from the dashboard
Source	Muaaz Bin Mukhtar
Rationale	To ensure that the admin manage registered users.
Business Rule	Only users with admin privileges are authorized to access the user management section.
Dependencies	FR-11, FR-12, FR-13, FR-14, FR-15
Priority	High

4.3.2 FR-11: Display.Registered.Users

Table 63: Display.Registered.Users FR

Identifier	FR-11
Title	Display.Registered.Users
Requirement	The system shall display all the users that are registered when the user accesses the user management section.
Source	Muaaz Bin Mukhtar
Rationale	To ensure that system display all the registered users to the admin.
Business Rule	None
Dependencies	FR-12
Priority	High

4.3.3 FR-12: Select.Registered.User

Table 64: Select.Registered.User FR

Identifier	FR-12
Title	Select.Registered.User
Requirement	The user shall be able to select a user from the list of registered users.
Source	Muaaz Bin Mukhtar
Rationale	To enable the admin to select a particular user.
Business Rule	None
Dependencies	FR-13
Priority	High

4.3.4 FR-13: Manage.User.Account

Table 65: Manage.User.Account FR

Identifier	FR-13
Title	Manage.User.Account
Requirement	The user shall be able to modify, deactivate or delete a user account upon selecting the user.
Source	Muaaz Bin Mukhtar
Rationale	To enable the admin to manage and modify user accounts.
Business Rule	None
Dependencies	FR-14
Priority	High

4.3.5 FR-14: Process.User.Account.Changes

Table 66: Process.User.Account.Changes FR

Identifier	FR-14
Title	Process.User.Account.Changes
Requirement	The system shall process all modifications, deletions or deactivations requested by the admin.
Source	Muaaz Bin Mukhtar
Rationale	To enable the system to execute all the changes requested by the admin.
Business Rule	None
Dependencies	FR-15
Priority	High

4.3.6 FR-15: Notify.Admin.About.Issues

Table 67: Notify.Admin.about.Issues FR

Identifier	FR-15
Title	Notify.Admin.About.Issues
Requirement	The system shall update admin in case of any errors during the processing of changes to the user account and suggests retrying.
Source	Muaaz Bin Mukhtar
Rationale	The system shall update admin in case of any errors during the processing of changes to the user account and suggest retrying.
Business Rule	None
Dependencies	None
Priority	Medium

4.4 UC-1.4: Manage User Complaints

4.4.1 FR-16: Access.Complaint.Management

Table 68: Access.Complaint.Management FR

Identifier	FR-16
Title	Access.Complaint.Management
Requirement	The admin shall be able to access the complaint management section by clicking on “Access Complaint Management” button from the dashboard.
Source	Muaaz Bin Mukhtar
Rationale	To enable the admin to manage and resolve user complaints.
Business Rule	Only users with admin privileges are authorized to access the complaint management section.
Dependencies	FR-17, FR-18, FR-19, FR-20, FR-21
Priority	High

4.4.2 FR-17: Display.Complaint.List

Table 69: Display.Complaint.List FR

Identifier	FR-17
Title	Display.Complaint.List
Requirement	The system shall display a list of registered complaints when the admin accesses the complaint management section.
Source	Muaaz Bin Mukhtar
Rationale	To enable the system to display a list of registered complaints.
Business Rule	None
Dependencies	FR-18
Priority	High

4.4.3 FR-18: Select.A.Particular.Complaint

Table 70: Select.A.Particular.Complaint FR

Identifier	FR-18
Title	Select.A.Particular.Complaint
Requirement	The user shall be able to select a particular complaint from the list of registered complaints.
Source	Muaaz Bin Mukhtar
Rationale	To enable the admin to select a particular user complaint.
Business Rule	None
Dependencies	FR-19
Priority	High

4.4.4 FR-19: Review.Complaint.Details

Table 71: Review.Complaint.Details FR

Identifier	FR-19
Title	Review.Complaint.Details
Requirement	The admin shall be able to review the details of a selected complaint from the displayed list.
Source	Muaaz Bin Mukhtar
Rationale	To enable the admin to review a particular complaint.
Business Rule	None
Dependencies	FR-20
Priority	High

4.4.5 FR-20: Address.Complaint

Table 72: Address.Complaint FR

Identifier	FR-20
Title	Address.Complaint
Requirement	The user shall be able to resolve or address the selected complaint by taking appropriate actions.
Source	Muaaz Bin Mukhtar
Rationale	To enable the admin to take appropriate actions to resolve a complaint.
Business Rule	None
Dependencies	FR-21
Priority	High

4.4.6 FR-21: Update.Complaint.Status

Table 73: Update.Complaint.Status FR

Identifier	FR-21
Title	Update.Complaint.Status
Requirement	The system shall update the complaint status and confirm the action taken by the user.
Source	Muaaz Bin Mukhtar
Rationale	To enable the system to accurately reflect the current status of complaints.
Business Rule	None
Dependencies	None
Priority	High

4.5 UC-1.5: Manage Reports

4.5.1 FR-22: Access.Reports.Management

Table 74: Access.Reports.Management FR

Identifier	FR-22
Title	Access.Reports.Management
Requirement	The admin shall be able to access the reports management section by clicking on “Reports Management” button on the dashboard.
Source	Muaaz Bin Mukhtar
Rationale	To enable the admin to manage and generate various reports.
Business Rule	Only users with admin privileges are authorized to access the reports management section.
Dependencies	FR-23, FR-24, FR-25, FR-26
Priority	High

4.5.2 FR-23: Display.Reports.List

Table 75: Display.Reports.List FR

Identifier	FR-23
Title	Display.Reports.List
Requirement	The system shall display a list of reports when admin access the reports management section
Source	Muaaz Bin Mukhtar
Rationale	To enable the admin to generate a specific report from the list.
Business Rule	None
Dependencies	FR-24
Priority	High

4.5.3 FR-24: Select.And.Apply.Filters.To.The.Report

Table 76: Select.And.Apply.Filters.To.The.Report FR

Identifier	FR-24
Title	Select.And.Apply.Filters.To.the.Report
Requirement	The user selects a particular report from the list and apply filters as needed.
Source	Muaaz Bin Mukhtar
Rationale	To enable the admin to select and apply filter to the report.
Business Rule	None
Dependencies	FR-25
Priority	High

4.5.4 FR-25: Generate.Required.Reports

Table 77: Generate.Required.Reports FR

Identifier	FR-25
Title	Generate.Required.Reports
Requirement	The system shall generate required reports according to the filters.
Source	Muaaz Bin Mukhtar
Rationale	To enable the system to generate reports according to the filters applied.
Business Rule	None
Dependencies	FR-26
Priority	High

4.5.5 FR-26: Notifies.Admin.About.Issues

Table 78: Notifies.Admin.About.Issues FR

Identifier	FR-26
Title	Notifies.Admin.About.Issues
Requirement	The system shall notify admin in case of any errors during the generation of reports and suggests retrying.
Source	Muaaz Bin Mukhtar
Rationale	The system shall notify admin in case of any errors during the generation of reports and suggests retrying.
Business Rule	None
Dependencies	None
Priority	Medium

4.6 UC-1.6: Switch Profile

4.6.1 FR-27: Access.Switch.Profile

Table 79: Access.Switch.Profile FR

Identifier	FR-27
Title	Access.Switch.Profile
Requirement	The admin shall access switch profile by clicking on “Switch Profile” option on the dashboard
Source	Muaaz Bin Mukhtar
Rationale	To enable the admin to switch profile.
Business Rule	Only users with admin privileges are authorized to access the switch profile section.
Dependencies	FR-28, FR-29, FR-30
Priority	High

4.6.2 FR-28: Displays.Available.Profiles

Table 80: Displays.Available.Profiles FR

Identifier	FR-28
Title	Displays.Available.Profiles
Requirement	The system shall display the available profiles when user access switch profile.
Source	Muaaz Bin Mukhtar
Rationale	To enable admin to select a specific profile from the available profiles.
Business Rule	None
Dependencies	FR-29
Priority	High

4.6.3 FR-29: Selects.Profile

Table 81: Selects.Profile FR

Identifier	FR-29
Title	Selects.Profile
Requirement	The admin selects a desired profile from the available profiles.
Source	Muaaz Bin Mukhtar
Rationale	To enable the admin switch to desired profile.
Business Rule	None
Dependencies	FR-30
Priority	High

4.6.4 FR-30: Switch.To.Selected.Profile

Table 82: Switch.To.Selected.Profile FR

Identifier	FR-30
Title	Switches.To.Selected.Profile
Requirement	The system shall switch to the profile selected by the admin and provide access to the corresponding dashboard.
Source	Muaaz Bin Mukhtar
Rationale	To allow the admin to switch between profiles (e.g. farmer, seller, customer) and manage actions.
Business Rule	Requested profile must be registered to gain access.
Dependencies	None
Priority	High

Farmer Functional Requirements

4.7 UC-2.1: Sign Up

4.7.1 FR-31: Initiate.Registration

Table 83: Initiate.Registration FR

Identifier	FR-31
Title	Initiate.Registration
Requirement	The user shall be able to initiate registration by clicking on Sign up button
Source	Muaaz Bin Mukhtar
Rationale	Provide user an option to register in to the system
Business Rule	None
Dependencies	FR-32, FR-33, FR-34, FR-35
Priority	High

4.7.2 FR-32: Enter.Credentials

Table 84: Enter.Credentials FR

Identifier	FR-32
Title	Enter.Credentials
Requirement	The user shall be able to enter credentials.
Source	Muaaz Bin Mukhtar
Rationale	Allow users to enter credentials to register as a Farmer.
Business Rule	None
Dependencies	FR-33
Priority	High

4.7.3 FR-33: Validate.Credentials

Table 85: Validate.Credentials FR

Identifier	FR-33
Title	Validate.Credentials
Requirement	The system should validate the correctness and accuracy of user entered email, password and username before proceeding with registration
Source	Muaaz Bin Mukhtar
Rationale	The system ensure that the user entered credentials are correct and accurate and could be used as a valid email and password.
Business Rule	None
Dependencies	FR-34
Priority	High

4.7.4 FR-34: Confirm.Registration

Table 86: Confirm.Registration FR

Identifier	FR-34
Title	Confirm.Registration
Requirement	The system shall confirm the successful registration of user's account and display a message that user account is created.
Source	Muaaz Bin Mukhtar
Rationale	To ensure that the user's account is successfully created and allow them to sign in to his account.
Business Rule	The user must be directed to the login page after successful sign up.
Dependencies	FR-35, FR-36
Priority	High

4.7.5 FR-35: Handle.Invalid.Input

Table 87: Handle.Invalid.Input FR

Identifier	FR-35
Title	Handle.Invalid.Input
Requirement	The system shall display a message that information is invalid if the user enters invalid input.
Source	Muaaz Bin Mukhtar
Rationale	To ensure that the user enters valid data so that sign up is successful.
Business Rule	The system must validate each field and notifies user if there is any error or missing field.
Dependencies	None
Priority	High

4.8 UC-2.2: Sign In

4.8.1 FR-36: Initiate.SignIn.Process

Table 88: Initiate.SignIn.Process FR

Identifier	FR-36
Title	Initiate.Sign.In.Process
Requirement	The user shall be able to initiate the sign in process by clicking on “Sign In” button.
Source	Muaaz Bin Mukhtar
Rationale	Provide users an option to access their accounts and services.
Business Rule	None
Dependencies	FR-37, FR-38, FR-39
Priority	High

4.8.2 FR-37: Enter.Credentials

Table 89: Enter.Credentials FR

Identifier	FR-37
Title	Enter.Credentials
Requirement	The system shall prompt the user to enter their registered credentials to authenticate their identity.
Source	Muaaz Bin Mukhtar
Rationale	To ensure that the user enters registered credentials to successfully log in to the system
Business Rule	Email and password must match the one stored in database.
Dependencies	FR-38
Priority	High

4.8.3 FR-38: Verify.Credentials

Table 90: Verify.Credentials FR

Identifier	FR-38
Title	Verify.Credentials
Requirement	The system shall verify credentials against database to authenticate the user.
Source	Muaaz Bin Mukhtar
Rationale	To ensure that the user enter credentials to successfully to log in to the system
Business Rule	None
Dependencies	FR-39
Priority	High

4.8.4 FR-39: Handle.Invalid.Credentials

Table 91: Handle.Invalid.Credentials FR

Identifier	FR-39
Title	Handle.Invalid.Credentials
Requirement	The system shall display the message “Invalid Credentials” if the user enters invalid credentials.
Source	Muaaz Bin Mukhtar
Rationale	To ensure that the user does not enter invalid credentials.
Business Rule	None
Dependencies	None
Priority	Medium

4.9 UC-2.3: Current Soil Analysis

4.9.1 FR-40: Access.Soil.Analysis

Table 92: Access.Soil.Analysis FR

Identifier	FR-40
Title	Access.Soil.Analysis
Requirement	The system shall allow users to access soil analysis by clicking on “Soil Analysis” button on the dashboard.
Source	Muaaz Bin Mukhtar
Rationale	To allow the user to initiate the soil analysis process.
Business Rule	Users must have appropriate permissions to access soil analysis services.
Dependencies	FR-41, FR-42, FR-43
Priority	High

4.9.2 FR-41: Input.SoilData.for.Analysis

Table 93: Input.SoilData.for.Analysis FR

Identifier	FR-41
Title	Input.SoilData.for.Analysis
Requirement	The system shall allow the user to input soil information (Nitrogen, Phosphorus, Potassium).
Source	Muaaz Bin Mukhtar
Rationale	To allow the user to input soil data for analysis.
Business Rule	None
Dependencies	FR-42, FR-44
Priority	High

4.9.3 FR-42: Validate.Soil.Information

Table 94: Validate.Soil.Information FR

Identifier	FR-42
Title	Validate.Soil.Information
Requirement	The system shall validate the correctness of provided information (Nitrogen, Phosphorus, Potassium) provided by the user
Source	Muaaz Bin Mukhtar
Rationale	To ensure that the user enters valid information for soil analysis.
Business Rule	None
Dependencies	FR-43
Priority	High

4.9.4 FR-43: Confirm.Soil.Analysis

Table 95: Confirm.Soil.Analysis FR

Identifier	FR-43
Title	Confirm.Soil.Analysis
Requirement	The system shall provide a confirmation message to the user on the successful submission and validation of soil information.
Source	Muaaz Bin Mukhtar
Rationale	The system provides information to user that soil information is submitted and validated successfully.
Business Rule	None
Dependencies	FR-44, FR-62
Priority	Medium

4.9.5 FR-44: Error.Notification.For.Soil.Analysis

Table 96: Error.Notification.For.Soil.Analysis FR

Identifier	FR-44
Title	Error.Notification.For.Soil.Analysis
Requirement	The system shall notify user in case of any errors during the process of soil analysis and suggests retrying.
Source	Muaaz Bin Mukhtar
Rationale	The system shall notify user in case of any errors during the process of soil analysis and suggests retrying.
Business Rule	None
Dependencies	None
Priority	Medium

4.10 UC-2.4: Previous Soil Analysis

4.10.1 FR-45 Access.Previous.Soil.Analysis

Table 97: Access.Previous.Soil.Analysis FR

Identifier	FR-45
Title	Access.Previous.Soil.Analysis
Requirement	The system shall allow users to access previous soil analysis by clicking on “Previous Soil Analysis” button on the dashboard.
Source	Muaaz Bin Mukhtar
Rationale	To allow the user to initiate the previous soil analysis process.
Business Rule	Users must have appropriate permissions to access previous soil analysis services.
Dependencies	FR-46, FR-47, FR-48, FR-49
Priority	High

4.10.2 FR-46 Retrieve.Previous.Soil.Analysis.Data

Table 98: Retrieve.Previous.Soil.Analysis.Data FR

Identifier	FR-46
Title	Retrieve.Previous.Soil.Analysis.Data
Requirement	The system shall retrieve previous soil analysis data if it is available and displays it to the user.
Source	Muaaz Bin Mukhtar
Rationale	To allow the system retrieve the previous soil analysis data and displays it to the user.
Business Rule	None
Dependencies	FR-47
Priority	High

4.10.3 FR-47: Handle.Missing.Previous.Data

Table 99: Handle.Missing.Previous.Data FR

Identifier	FR-47
Title	Handle.Missing.Previous.Data
Requirement	The system shall notify the user that there is no previous data available.
Source	Muaaz Bin Mukhtar
Rationale	To inform the user that there is no previous data available.
Business Rule	None
Dependencies	FR-48
Priority	High

4.10.4 FR-48: Validate.Previous.Soil.Data

Table 100: Validate.Previous.Soil.Data FR

Identifier	FR-48
Title	Validate.Previous.Soil.Data
Requirement	The system shall validate the correctness of retrieved previous soil data.
Source	Muaaz Bin Mukhtar
Rationale	To ensure the accuracy of previous soil data before further analysis.
Business Rule	The system must validate the correctness and accuracy of retrieved soil data.
Dependencies	FR-49
Priority	High

4.10.5 FR-49 Confirm.Previous.Soil.Analysis

Table 101: Confirm.Previous.Soil.Analysis FR

Identifier	FR-49
Title	Confirm.Previous.Soil.Analysis
Requirement	The system shall provide a confirmation message to the user after the successful retrieval and validation of previous soil data.
Source	Muaaz Bin Mukhtar
Rationale	To inform the farmer about successful analysis of previous soil data.
Business Rule	None
Dependencies	FR-50, FR-62
Priority	High

4.10.6 FR-50 Error.Notification.For.Previous.Soil.Analysis

Table 102: Error.Notification.For.Previous.Soil.Analysis FR

Identifier	FR-50
Title	Error.Notificationo.For.Previous.Soil.Analysis
Requirement	The system shall notify user in case of any errors during the process of previous soil analysis and suggests retrying.
Source	Muaaz Bin Mukhtar
Rationale	The system shall notify user in case of any errors during the process of previous soil analysis and suggests retrying.
Business Rule	None
Dependencies	None
Priority	High

4.11 UC-2.5: Weather Analysis

4.11.1 FR-51: Access.Weather.Analysis

Table 103: Access.Weather.Analysis FR

Identifier	FR-51
Title	Access.Weather.Analysis
Requirement	The system shall allow users to access weather analysis by clicking on “Weather Analysis” button on the dashboard.
Source	Muaaz Bin Mukhtar
Rationale	To allow the user to initiate the weather analysis process.
Business Rule	Users must have appropriate permissions to access weather analysis services.
Dependencies	FR-52, FR-53, FR-54
Priority	High

4.11.2 FR-52: Input.Current.Weather.Data

Table 104: Input.Current.Weather.Data FR

Identifier	FR-52
Title	Input.Current.Weather.Data
Requirement	The system shall allow the user to input current weather data for analysis
Source	Muaaz Bin Mukhtar
Rationale	To allow the user to input weather data for analysis.
Business Rule	None
Dependencies	FR-53, FR-55
Priority	High

4.11.3 FR-53: Validate.Weather.Data

Table 105: Validate.Weather.Data FR

Identifier	FR-53
Title	Validate.Weather.Data
Requirement	The system shall validate the correctness of provided weather data.
Source	Muaaz Bin Mukhtar
Rationale	To ensure the accuracy of weather data before analysis.
Business Rule	None
Dependencies	FR-54, FR-55
Priority	High

4.11.4 FR-54: Confirm.Weather.Analysis

Table 106: Confirm.Weather.Analysis FR

Identifier	FR-54
Title	Confirm.Weather.Analysis
Requirement	The system shall provide a confirmation message to the user on the successful submission and validation of weather data
Source	Muaaz Bin Mukhtar
Rationale	To inform the user of successful analysis of weather data.
Business Rule	None
Dependencies	FR-55, FR-62
Priority	High

4.11.5 FR-55: Error.Notification.For.Weather.Analysis

Table 107: Error.Notification.For.Weather.Analysis FR

Identifier	FR-55
Title	Error.Notification.For.Weather.Analysis
Requirement	The system shall notify user in case of any errors during the process of weather analysis and suggests retrying.
Source	Muaaz Bin Mukhtar
Rationale	The system shall notify user in case of any errors during the process of weather analysis and suggests retrying.
Business Rule	None
Dependencies	None
Priority	Medium

4.12 UC-2.6: Climate Analysis

4.12.1 FR-56: Access.Climate.Analysis

Table 108: Access.Climate.Analysis FR

Identifier	FR-56
Title	Access.Climate.Analysis
Requirement	The system shall allow users to access climate analysis by clicking on “Climate Analysis” button on the dashboard.
Source	Muaaz Bin Mukhtar
Rationale	To allow the user to initiate the climate analysis process.
Business Rule	Users must have appropriate permissions to access climate analysis services.
Dependencies	FR-57, FR-58, FR-59
Priority	High

4.12.2 FR-57: Select.Location.From.Search.Bar

Table 109: Select.Location.From.Search.Bar FR

Identifier	FR-57
Title	Select.Location.From.Search.Bar.
Requirement	The system shall allow the user to select particular location from search bar for climate analysis.
Source	Muaaz Bin Mukhtar
Rationale	To allow the user to select a location for climate analysis.
Business Rule	None
Dependencies	FR-58, FR-60
Priority	High

4.12.3 FR-58: Retrieve.Climate.Of.Selected.Location.Via.ThirdParty

Table 110: Retrieve.Climate.Of.Selected.Location.Via.ThirdParty FR

Identifier	FR-58
Title	Retrieve.Climate.Of.Selected.Location.Via.ThirdParty
Requirement	The system shall retrieve the climate of selected location.
Source	Muaaz Bin Mukhtar
Rationale	To allow the user to select a location for climate analysis, aiding in informed decision-making for farming activities.
Business Rule	None
Dependencies	FR-59, FR-60
Priority	High

4.12.4 FR-59: Confirm.Climate.Analysis

Table 111: Confirm.Climate.Analysis FR

Identifier	FR-59
Title	Confirm.Climate.Analysis
Requirement	The system shall provide a confirmation message to the user on the successful analysis and validation of climate data.
Source	Muaaz Bin Mukhtar
Rationale	To inform the user of successful analysis of climate data.
Business Rule	None
Dependencies	FR-60, FR-62
Priority	High

4.12.5 FR-60: Error.Notification.For.Climate.Analysis

Table 112: Error.Notification.For.Climate.Analysis FR

Identifier	FR-60
Title	Error.Notification.For.Climate.Analysis
Requirement	The system shall notify user in case of any errors during the process of climate analysis and suggests retrying.
Source	Muaaz Bin Mukhtar
Rationale	The system shall notify user in case of any errors during the process of climate analysis and suggests retrying.
Business Rule	None
Dependencies	None
Priority	Medium

4.13 UC-2.7: Crop Recommendation

4.13.1 FR-61: Access.Crop.Recommendation

Table 113: Access.Crop.Recommendation FR

Identifier	FR-61
Title	Access.Crop.Recommendation
Requirement	The system shall allow users to access crop recommendation by clicking on “Crop Recommendation” button on the dashboard.
Source	Muaaz Bin Mukhtar
Rationale	To allow the user to initiate the crop recommendation process.
Business Rule	User must have completed soil, weather and climate analysis
Dependencies	FR-62, FR-63, FR-64
Priority	High

4.13.2 FR-62: Provide.Crop.Recommendations

Table 114: Provide.Crop.Recommendations FR

Identifier	FR-62
Title	Provide.Crop.Recommendations
Requirement	The system shall provide multiple crop recommendation based on soil, weather and climate analysis.
Source	Muaaz Bin Mukhtar
Rationale	To allow the system to provide recommendation based on soil, weather and climate analysis.
Business Rule	None
Dependencies	FR-63, FR-65
Priority	High

4.13.3 FR-63: View.Crop.Characteristics

Table 115: View.Crop.Characteristics FR

Identifier	FR-63
Title	View.Crop.Characteristics
Requirement	The user selects a crop from the recommended list of crops to view its characteristics, including pros and cons
Source	Muaaz Bin Mukhtar
Rationale	To enable the user to make informed decisions by understanding the benefits and drawbacks of each crop
Business Rule	None
Dependencies	FR-64, FR-65
Priority	High

4.13.4 FR-64: Confirm.Crop.Selection

Table 116: Confirm.Crop.Selection FR

Identifier	FR-64
Title	Confirm.Crop.Selection
Requirement	The system shall allow the user to confirm the selected crop after viewing its characteristics.
Source	Muaaz Bin Mukhtar
Rationale	To allow the user to confirm the selected crop based on analysis and personal preference.
Business Rule	None
Dependencies	FR-65
Priority	High

4.13.5 FR-65 Error.Notification.For.Crop.Recommendation

Table 117: Error.Notification.For.Crop.Recommendation FR

Identifier	FR-65
Title	Error.Notification.For.Crop.Recommendation
Requirement	The system shall notify user in case of any errors during the process of crop recommendation and suggests retrying.
Source	Muaaz Bin Mukhtar
Rationale	The system shall notify user in case of any errors during the process of crop recommendation and suggests retrying.
Business Rule	None
Dependencies	None
Priority	Medium

4.14 UC-2.8: Tutorials

4.14.1 FR-66: Access.Tutorials

Table 118: Access.Tutorials FR

Identifier	FR-66
Title	Access.Tutorials
Requirement	The system shall allow the user to access tutorials by clicking on “Tutorials” option on the dashboard.
Source	Muaaz Bin Mukhtar, Ammar Ali, Muhammad Moiz
Rationale	To allow the user to access learning materials provided by the system.
Business Rule	None
Dependencies	FR-67
Priority	High

4.14.2 FR-67: Display.Tutorials.List

Table 119: Display.Tutorials.List FR

Identifier	FR-67
Title	Display.Tutorials.List
Requirement	The system shall display a list of tutorials when user access the Tutorials section.
Source	Muaaz Bin Mukhtar, Ammar Ali, Muhammad Moiz
Rationale	To enable the user to access and choose a specific tutorial from the list.
Business Rule	None
Dependencies	FR-68
Priority	High

4.14.3 FR-68: View.Selected.Tutorial

Table 120: View.Selected.Tutorial FR

Identifier	FR-68
Title	View.Selected.Tutorial
Requirement	The system shall display the selected tutorial when user selects one from the list of tutorials.
Source	Muaaz Bin Mukhtar, Ammar Ali, Muhammad Moiz
Rationale	To ensure the user can view the selected tutorial.
Business Rule	None
Dependencies	None
Priority	High

4.15 UC-2.9: AI Chatbot

4.15.1 FR-69: Initiate.Chatbot.Interaction

Table 5321: Initiate.Chatbot.Interaction FR

Identifier	FR-69
Title	Initiate.Chatbot.Interaction
Requirement	The system shall allow users to initiate interaction with the Chabot by clicking on “AgroTech Chatbot” button on the dashboard.
Source	Muaaz Bin Mukhtar, Muhammad Moiz
Rationale	To provide user a simple way to seek help about the system.
Business Rule	None
Dependencies	FR-70, FR-71, FR-72, FR-73, FR-74
Priority	High

4.15.2 FR-70: Display.FAQ.Options

Table 122: Display.FAQ.Options FR

Identifier	FR-70
Title	Display.FAQ.Options
Requirement	The system shall greet the user and display a list of Frequently Asked Questions (FAQs) options when user clicks “AgroTech Chatbot” button on the dashboard
Source	Muaaz Bin Mukhtar, Muhammad Moiz
Rationale	To provide user with guidance and help quickly by display Frequently Asked Questions (FAQs) options.
Business Rule	FAQ options should be up-to-date and covers a broad range of issues
Dependencies	FR-71
Priority	High

4.15.3 FR-71: Option.Selection.Or.Query.Prompt

Table 123: Option.Selection.Or.Query.Prompt FR

Identifier	FR-71
Title	Option.Selection.Or.Query.Prompt
Requirement	The user selects an option from provided FAQs or prompt a query.
Source	Muaaz Bin Mukhtar, Muhammad Moiz
Rationale	To provide user options to convey its problems to the system.
Business Rule	None
Dependencies	FR-72
Priority	High

4.15.4 FR-72: Process.Queries

Table 124: Process.Queries FR

Identifier	FR-72
Title	Process.Queries
Requirement	The user shall process user queries and provide response based on the query
Source	Muaaz Bin Mukhtar, Muhammad Moiz
Rationale	To ensure that the system can understand and address user queries efficiently, providing responses to help users resolve issues or access information.
Business Rule	None
Dependencies	FR-73
Priority	High

4.15.5 FR-73: Manage.Unrecognized.Queries

Table 125: Manage.Unrecognized.Queries FR

Identifier	FR-73
Title	Manage.Unrecognized.Queries
Requirement	If the chatbot does not recognize a user's query, it shall request clarification or provide general assistance.
Source	Muaaz Bin Mukhtar, Muhammad Moiz
Rationale	To ensure that the user's queries are processed properly without any confusion.
Business Rule	None
Dependencies	FR-74
Priority	High

4.15.6 FR-74: Provide.Responses

Table 126: Provide.Responses FR

Identifier	FR-74
Title	Provide.Responses
Requirement	The system shall provide responses to user queries within a few seconds to ensure optimal user experience.
Source	Muaaz Bin Mukhtar, Muhammad Moiz
Rationale	To enhance user satisfaction by offering prompt and helpful responses to their queries or issues.
Business Rule	None
Dependencies	FR-75
Priority	High

4.15.7 FR-75 Email/Phone.Support.In.Case.Of.Technical.Difficulties

Table 127: Email/Phone.Support.In.Case.Of.Technical.Difficulties FR

Identifier	FR-75
Title	Email/Phone.Support.In.Case.Of.Technical.Difficulties
Requirement	The system shall direct users to contact support via email/phone in case of technical difficulties.
Source	Muaaz Bin Mukhtar, Muhammad Moiz
Rationale	To ensure that the user get necessary assistance even when the chatbot is unavailable.
Business Rule	None
Dependencies	None
Priority	Medium

4.16 UC-2.10: Register Complaints

4.16.1 FR-76: Initiate.Complaint.Registration

Table 128: Initiate.Complaint.Registration FR

Identifier	FR-76
Title	Initiate.Complaint.Registration
Requirement	The system shall allow users to initiate the complaint registration process by clicking on “Register Complaint” button on the dashboard
Source	Muaaz Bin Mukhtar, Muhammad Moiz
Rationale	To provide users a simple way to register complaints.
Business Rule	None
Dependencies	FR-77, FR-78, FR-79
Priority	High

4.16.2 FR-77: Collect.Complaint.Details

Table 129: Collect.Complaint.Details FR

Identifier	FR-77
Title	Collect.Complaint.Details
Requirement	The system shall allow user to enter details of the complaint, such as problem type and problem description.
Source	Muaaz Bin Mukhtar, Muhammad Moiz
Rationale	To ensure that the user entered all the necessary details for support team to resolve the problem.
Business Rule	The system must ensure all the details entered are complete and there are no missing fields.
Dependencies	FR-78, FR-80
Priority	High

4.16.3 FR-78: Register.The.Complaint

Table 130: Register.The.Complaint FR

Identifier	FR-78
Title	Register.The.Complaint
Requirement	User is able to register complaint and view its status successfully
Source	Muaaz Bin Mukhtar, Muhammad Moiz
Rationale	To ensure that the users are provided with an easy way to register complaints.
Business Rule	Complaints must be logged into the system database and assigned to the relevant authority based on the nature of the issue.
Dependencies	FR-79, FR-80
Priority	High

4.16.4 FR-79: Confirm.Complaint.Status

Table 131: Confirm.Complaint.Status FR

Identifier	FR-79
Title	Confirm.Complaint.Status
Requirement	The system shall notify the user once the complaint is successfully registered and forwarded to the appropriate authority.
Source	Muaaz Bin Mukhtar, Muhammad Moiz
Rationale	To ensure that users are informed about the status of their complaint, providing them with confirmation and satisfaction that their issue is being addressed.
Business Rule	None
Dependencies	FR-80
Priority	High

4.16.5 FR-80: Error.Notification.And.Direct.To.Support

Table 132: Error.Notification.And.Direct.To.Support FR

Identifier	FR-80
Title	Error.Notification.And.Direct.To.Support
Requirement	The system shall notify the user of any technical difficulties and provide instructions to contact support via email or phone.
Source	Muaaz Bin Mukhtar, Muhammad Moiz
Rationale	To ensure that users can still register complaints even when the complaint registration is unavailable.
Business Rule	None
Dependencies	None
Priority	Medium

4.17 UC-2.11: Feedback and Reviews

4.17.1 FR-81: Access.Feedback.And.Reviews

Table 133: Access.Feedback.And.Reviews.Option FR

Identifier	FR-81
Title	Access.Feedback.And.Reviews
Requirement	The system shall allow the user to access feedback and reviews by clicking on “Feedback and Reviews” option on the dashboard.
Source	Muaaz Bin Mukhtar, Muhammad Moiz
Rationale	To ensure that users can submit feedback to the system.
Business Rule	Users must have appropriate permissions to access feedback and reviews section.
Dependencies	FR-82, FR-83, FR-84, FR-85, FR-86
Priority	High

4.17.2 FR-82: Display.User.Reviews

Table 134: Display.User.Reviews FR

Identifier	FR-82
Title	Display.User.Reviews
Requirement	The system shall display list of reviews provided by other users.
Source	Muaaz Bin Mukhtar, Muhammad Moiz
Rationale	To enable user to see existing reviews before submitting their own feedback.
Business Rule	None
Dependencies	FR-83, FR-87
Priority	High

4.17.3 FR-83: Select.Submit.Feedback.Option

Table 135: Select.Submit.Feedback.Option FR

Identifier	FR-83
Title	Select.Submit.Feedback.Option
Requirement	The system shall allow user to submit feedback by clicking on “Submit Feedback” option.
Source	Muaaz Bin Mukhtar, Muhammad Moiz
Rationale	Users need the opportunity to submit feedback for continuous improvement.
Business Rule	None
Dependencies	FR-84, FR-87
Priority	High

4.17.4 FR-84: Display.Domains.For.Feedbacks

Table 136: Display.Domains.For.Feedbacks FR

Identifier	FR-84
Title	Display.Domains.For.Feedbacks
Requirement	The system shall display feedback domains (system performance, user interface etc.) for user to select from.
Source	Muaaz Bin Mukhtar, Muhammad Moiz
Rationale	To ensure that user selects appropriate domain for certain feedback.
Business Rule	None
Dependencies	FR-85, FR-87
Priority	High

4.17.5 FR-85: Submit.Feedback

Table 137: Submit.Feedback FR

Identifier	FR-85
Title	Submit.Feedback
Requirement	The system shall allow user to submit feedback through a form.
Source	Muaaz Bin Mukhtar, Muhammad Moiz
Rationale	To ensure that feedback is collected in a structured format.
Business Rule	None
Dependencies	FR-86, FR-87
Priority	High

4.17.6 FR-86: Update.Feedback.Register

Table 138: Update.Feedback.Register FR

Identifier	FR-86
Title	Update.Feedback.Register
Requirement	The system shall update the feedback register with the provided feedback input.
Source	Muaaz Bin Mukhtar, Muhammad Moiz
Rationale	To ensure all the feedbacks provided by the user are stored for future use.
Business Rule	None
Dependencies	FR-87
Priority	High

4.17.7 FR-87: Error.Notification.For.Technical.Issues

Table 139: Error.Notification.For.Technical.Issues FR

Identifier	FR-87
Title	Error.Notification.For.Technical.Issues
Requirement	The system shall notify the user of any technical difficulties and guide user to retry or contact support.
Source	Muaaz Bin Mukhtar, Muhammad Moiz
Rationale	Ensure proper communication in case of technical issues and enhance user experience.
Business Rule	None
Dependencies	None
Priority	Medium

4.18 UC-2.12: Identify Crop Stresses

4.18.1 FR-88: Access.Identify.Crop.Stress

Table 140: Access.Identify.Crop.Stress FR

Identifier	FR-88
Title	Access.Identify.Crop.Stress
Requirement	The system shall allow the user to identify crop stress by clicking on “Identify Crop Stress” option on the dashboard.
Source	Muhammad Moiz
Rationale	To allow to user to initiate the identify crop stress process.
Business Rule	Users must have appropriate permissions to access identify crop stress.
Dependencies	FR-89, FR-90, FR-91, FR-92, FR-93, FR-94
Priority	High

4.18.2 FR-89: Display.Registered.Crops.List

Table 141: Display.Registered.Crops.List FR

Identifier	FR-89
Title	Display.Registered.Crops.List
Requirement	The system shall display the list of registered crops when the user clicks on “Identify Crop Stress” option on the dashboard.
Source	Muhammad Moiz
Rationale	To allow the system to display all the registered crops in a list.
Business Rule	None
Dependencies	FR-90, FR-95
Priority	High

4.18.3 FR-90: Select.A.Particular.Crop

Table 142: Select.A.Particular.Crop FR

Identifier	FR-90
Title	Select.A.Particular.Crop
Requirement	The user selects a particular crop from the list of registered crops.
Source	Muhammad Moiz
Rationale	To ensure that the user selects a particular crop according to his personal preference and requirement.
Business Rule	None
Dependencies	FR-91, FR-95
Priority	High

4.18.4 FR-91: Analyze.Crop.Data

Table 143: Analyze.Crop.Data FR

Identifier	FR-91
Title	Analyze.Crop.Data
Requirement	The system shall analyze the selected crop according to crop conditions such as water stress, nutrient levels and pest infestations.
Source	Muhammad Moiz
Rationale	Accurate crop health assessment requires analyzing environmental factors and crop conditions.
Business Rule	None
Dependencies	FR-92, FR-95
Priority	High

4.18.5 FR-92: Select.Unregistered.Crops.Option

Table 144: Select.Unregistered.Crops.Option FR

Identifier	FR-92
Title	Select.Unregistered.Crops.Option
Requirement	The system shall allow the user to select an option for unregistered crops from the list of registered crop options.
Source	Muhammad Moiz
Rationale	To enable users select unregistered crops option from the list.
Business Rule	None
Dependencies	FR-93, FR-95
Priority	High

4.18.6 FR-93: Enter.Unregistered.Crops,Details

Table 145: Enter.Unregistered.Crops,Details FR

Identifier	FR-93
Title	Enter.Unregistered.Crops,Details
Requirement	The system shall allow the user to enter the details of unregistered crops after clicking the “Unregistered Crops” option.
Source	Muhammad Moiz
Rationale	To enable users to enter details of unregistered crops in the system and entered data is sent to the registered crops list.
Business Rule	None
Dependencies	FR-94, FR-95
Priority	High

4.18.7 FR-94: Crop.Stress.Report.Generation

Table 146: Crop.Stress.Report.Generation FR

Identifier	FR-94
Title	Crop.Stress.Report.Generation
Requirement	The system shall generate and presents a detailed report to the user after analyzing crop conditions.
Source	Muhammad Moiz
Rationale	To allow the system generate a detailed report regarding crop stresses.
Business Rule	None
Dependencies	FR-95
Priority	High

4.18.8 FR-95: Error.Notification.For.Technical.Issues

Table 147: Error.Notification.For.Technical.Issues FR

Identifier	FR-95
Title	Error.Notification.For.Technical.Issues
Requirement	The system shall notify the user of any technical difficulties and guide user to retry or contact support.
Source	Muhammad Moiz
Rationale	Ensure proper communication in case of technical issues and enhance user experience.
Business Rule	None
Dependencies	None
Priority	Medium

4.19 UC-2.13: Identification of Crop Diseases

4.19.1 FR-96: Access.Identify.Crop.Disease

Table 148: Access.Identify.Crop.Disease FR

Identifier	FR-96
Title	Access.Identify.Crop.Disease
Requirement	The system shall allow the user to identify crop disease by clicking on “Identify Crop Disease” option on the dashboard.
Source	Muhammad Moiz
Rationale	To allow to user to initiate the crop disease identification process.
Business Rule	Users must have appropriate permissions to access identify crop disease.
Dependencies	FR-97, FR-98, FR-99
Priority	High

4.19.2 FR-97: Input.Crop.Details

Table 149: Input.Crop.Details FR

Identifier	FR-97
Title	Input.Crop.Details
Requirement	The system shall allow the user to input crop details (including images and symptoms) for crop disease detection.
Source	Muhammad Moiz
Rationale	To allow the user to enter all the crop details including clear images of the affected crop or symptoms.
Business Rule	None
Dependencies	FR-98, FR-100
Priority	High

FR-98: Identification.Of.Disease

Table 150: Identification.Of.Disease FR

Identifier	FR-98
Title	Identification.Of.Disease
Requirement	The system shall use Image Recognition and ML models to identify symptoms of disease in the crop by comparing it with the existing database.
Source	Muhammad Moiz
Rationale	To identify the symptoms of disease in the crop using image recognition and ML model.
Business Rule	None
Dependencies	FR-99, FR-100
Priority	High

4.19.3 FR-99: Crop.Diagnosis.Report.Generation

Table 151: Crop.Diagnosis.Report.Generation FR

Identifier	FR-99
Title	Crop.Diagnosis.Report.Generation
Requirement	The system shall generate and presents a detailed diagnosis report to the user about crop disease.
Source	Muhammad Moiz
Rationale	To provide users with a detailed diagnosis report that helps in understanding diseases in crops using image recognition and machine learning.
Business Rule	None
Dependencies	FR-100
Priority	High

4.19.4 FR-100: Error.Notification.For.Technical.Issues

Table 152: Error.Notification.For.Technical.Issues FR

Identifier	FR-100
Title	Error.Notification.For.Technical.Issues
Requirement	The system shall notify the user of any technical difficulties in crop disease detection process and guide user to retry or contact support.
Source	Muhammad Moiz
Rationale	Ensure proper communication in case of technical issues and enhance user experience.
Business Rule	None
Dependencies	None
Priority	High

4.20 UC-2.14: Periodic Crop Health Information

4.20.1 FR-101: Access.Periodic.Crop.Health.Monitoring

Table 153: Access.Periodic.Crop.Health.Monitoring FR

Identifier	FR-101
Title	Access.Periodic.Crop.Health.Monitoring
Requirement	The system shall allow the user to access periodic crop health monitoring by clicking on “Periodic Crop Health” option on the dashboard.
Source	Muhammad Moiz
Rationale	To allow the user to initiate periodic crop monitoring process.
Business Rule	Users must have appropriate permissions to access periodic crop health monitoring.
Dependencies	FR-102, FR-103, FR-104, FR-105
Priority	High

4.20.2 FR-102: Select.Schedule

Table 154: Select.Schedule FR

Identifier	FR-102
Title	Select.Schedule
Requirement	The user selects the schedule to collect information about crop health at certain intervals
Source	Muhammad Moiz
Rationale	To allow the user to select schedule for crop monitoring at certain intervals.
Business Rule	None
Dependencies	FR-103, FR-106
Priority	High

4.20.3 FR-103: Provide.Crop.Data

Table 155: Provide.Crop.Data FR

Identifier	FR-103
Title	Provide.Crop.Data
Requirement	The system shall inform the user to collect information about crops and user provides the data at certain intervals
Source	Muhammad Moiz
Rationale	To allow the user to provide crop data to the system at certain intervals.
Business Rule	None
Dependencies	FR-104, FR-106
Priority	High

4.20.4 FR-104: Assess.Provided.Data

Table 156: Assess.Provided.Data FR

Identifier	FR-104
Title	Assess.Provided.Data
Requirement	The system shall use image recognition and ml model to assess the health of crops.
Source	Muhammad Moiz
Rationale	To enable the system to assess the health of crops.
Business Rule	None
Dependencies	FR-105, FR-106
Priority	High

4.20.5 FR-105: Periodic.Crop.Health.Report.Generation

Table 157: Periodic.Crop.Health.Report.Generation FR

Identifier	FR-105
Title	Periodic.Crop.Health.Report.Generation
Requirement	The system shall generate and presents a periodic crop health report to the user.
Source	Muhammad Moiz
Rationale	To provide users with a periodic crop health report that helps users to monitor health of crops at certain intervals.
Business Rule	None
Dependencies	FR-106
Priority	High

4.20.6 FR-106: Error.Notification.For.Technical.Issues

Table 158: Error.Notification.For.Technical.Issues FR

Identifier	FR-106
Title	Error.Notification.For.Technical.Issues
Requirement	The system shall notify the user of any technical difficulties and guide user to retry or contact support.
Source	Muhammad Moiz
Rationale	To ensure proper communication and enhance user experience.
Business Rule	None
Dependencies	None
Priority	Medium

4.21 UC-2.15: Estimate Crop Yield

4.21.1 FR-107: Access.Estimate.Crop.Yield

Table 159: Access.Estimate.Crop.Yield FR

Identifier	FR-107
Title	Access.Estimate.Crop.Yield
Requirement	The system shall allow the user to access estimate crop yield by clicking on “Estimate Crop Yield” option on the dashboard.
Source	Muhammad Moiz
Rationale	To allow user to initiate estimate crop yield process.
Business Rule	Users must have appropriate permissions to access estimate crop yield.
Dependencies	FR-108, FR-109, FR-110, FR-111, FR-112
Priority	High

4.21.2 FR-108: Display.Crops.List

Table 160: Display.Crops.List FR

Identifier	FR-108
Title	Display.CropsList
Requirement	The system shall display the list of crops when the user clicks on “Estimate Crop Yield” option on the dashboard.
Source	Muhammad Moiz
Rationale	To allow the system display all the crops in a list.
Business Rule	None
Dependencies	FR-109, FR-113
Priority	High

4.21.3 FR-109: Select.A.Particular.Crop

Table 161: Select.A.Particular.Crop FR

Identifier	FR-109
Title	Select.A.Particular.Crop
Requirement	The user selects a particular crop from the list of crops.
Source	Muhammad Moiz
Rationale	To ensure that the user selects a particular crop according to his personal preference and requirement.
Business Rule	None
Dependencies	FR-110, FR-113
Priority	High

4.21.4 FR-110: Select.Values.Of.Yield.Factors

Table 162: Select.Values.Of.Yield.Factors FR

Identifier	FR-110
Title	Select.Values.Of.Yield.Factors
Requirement	The user selects the values of yield factors such as temperature, rainfall, soil nutrient.
Source	Muhammad Moiz
Rationale	To allow the user to select the values of yield factors for yield estimation.
Business Rule	None
Dependencies	FR-111, FR-113
Priority	High

4.21.5 FR-111: Crop.Yield.Estimation

Table 163: Crop.Yield.Estimation FR

Identifier	FR-111
Title	Crop.Yield.Estimation
Requirement	The system shall utilize machine learning (ML) models to estimate crop yield based on factors such as temperature, rainfall, soil nutrient levels.
Source	Muhammad Moiz
Rationale	To provide accurate yield estimation by analyzing environmental and soil conditions using machine learning
Business Rule	None
Dependencies	FR-112, FR-113
Priority	High

4.21.6 FR-112: Crop.Yield.Report.Generation

Table 164: Crop.Yield.Report.Generation FR

Identifier	FR-112
Title	Crop.Yield.Report.Generation
Requirement	The system shall generate and presents a detailed yield estimation report to the user.
Source	Muhammad Moiz
Rationale	To provide users with a detailed yield estimation report that helps in understanding potential harvest outcomes based on factors such as temperature, rainfall and soil nutrient.
Business Rule	None
Dependencies	FR-113
Priority	High

4.21.7 FR-113: Error.Notification.For.TechnicalIssues

Table 165: Error.Notification.For.TechnicalIssues FR

Identifier	FR-113
Title	Error.Notification.For.TechnicalIssues
Requirement	The system shall notify the user of any technical difficulties and guide user to retry or contact support.
Source	Muhammad Moiz
Rationale	To ensure proper communication and enhance user experience.
Business Rule	None
Dependencies	None
Priority	Medium

4.22 UC-2.16: Assess Yield Risk Factors

4.22.1 FR-114: Access.Yield.Risk.Assessment

Table 166: Access.Yield.Risk.Assessment FR

Identifier	FR-114
Title	Access.Yield.Risk.Assessment
Requirement	The system shall allow the user to access yield risk assessment by clicking on “Yield Risk Assessment” option on the dashboard.
Source	Muhammad Moiz
Rationale	To allow user to initiate assess yield risk process.
Business Rule	Users must have appropriate permissions to access yield risk assesmmment.
Dependencies	FR-115, FR-116, FR-117
Priority	High

4.22.2 FR-115: Data.Collection.From.User

Table 167: Data.Collection.From.User FR

Identifier	FR-115
Title	Data.Collection.From.User
Requirement	The system shall collect data from user regarding drought, pest infestation and disease outbreaks.
Source	Muhammad Moiz
Rationale	To allow the user to provide crucial data that initiates the assess yield risk process.
Business Rule	None
Dependencies	FR-116
Priority	High

4.22.3 FR-116: Risk.Assessment.Report.Generation

Table 168: Risk.Assessment.Report.Generation FR

Identifier	FR-116
Title	Risk.Assessment.Report.Generation
Requirement	The system shall generate and present a detailed risk assessment report to the user.
Source	Muhammad Moiz
Rationale	To provide users with a detailed risk assessment report that helps in understanding risks associated with crop yield.
Business Rule	None
Dependencies	FR-117
Priority	High

4.22.4 FR-117 Provide.Risk.Mitigation.Strategies

Table 169: Provide.Risk.Mitigation.Strategies FR

Identifier	FR-117
Title	Provide.Risk.Mitigation.Strategies
Requirement	The system shall provide risk mitigation strategies to deal with the risks associated with crop yield
Source	Muhammad Moiz
Rationale	To assist users in taking measures to minimize risks that could negatively impact crop yield, ensuring better productivity and resource management.
Business Rule	None
Dependencies	None
Priority	High

4.23 UC-2.17: Crop Maturity Assessment

4.23.1 FR-118: Access.Crop.Maturity.Assessment

Table 170: Access.Crop.Maturity.Assessment FR

Identifier	FR-118
Title	Access.Crop.Maturity.Assessment
Requirement	The system shall allow the users to access crop maturity assessment by clicking on “Crop Maturity Assessment” option on the dashboard.
Source	Muaaz Bin Mukhtar, Muhammad Moiz
Rationale	To allow users to initiate assess crop maturity assessment process.
Business Rule	Users must have appropriate permissions to access crop maturity assessment.
Dependencies	FR-119, FR-120, FR-121, FR-122
Priority	High

4.23.2 FR-119: Upload.Images.Of.Crops

Table 171: Upload.Images.Of.Crops FR

Identifier	FR-119
Title	Upload.Images.Of.Crops
Requirement	The user uploads the images of crops by clicking on the “Upload Images” option.
Source	Muaaz Bin Mukhtar, Muhammad Moiz
Rationale	To enable the user to upload the images of crop.
Business Rule	None
Dependencies	FR-120
Priority	High

4.23.3 FR-120: Determine.Crop.Maturity

Table 172: Determine.Crop.Maturity FR

Identifier	FR-120
Title	Determine.Crop.Maturity
Requirement	The system shall determine the crop maturity by analyzing the images uploaded by the user
Source	Muaaz Bin Mukhtar, Muhammad Moiz
Rationale	To enable the system to analyze the images using image recognition technology and determine whether the crops are mature, providing valuable insights for harvesting decisions.
Business Rule	None
Dependencies	FR-121
Priority	High

4.23.4 FR-121: Crop.Maturity.Report.Generation

Table 173: Crop.Maturity.Report.Generation FR

Identifier	FR-121
Title	Crop.Maturity.Report.Generation
Requirement	The system shall generate and present the crop maturity report to the user.
Source	Muaaz Bin Mukhtar, Muhammad Moiz
Rationale	To provide users with a crop maturity report that helps in understanding maturity of crops.
Business Rule	None
Dependencies	None
Priority	High

4.24 UC-2.18: Crop Quality Assessment

4.24.1 FR-122: Access.Crop.Quality.Assessment

Table 174: Access.Crop.Quality.Assessment FR

Identifier	FR-122
Title	Access.Crop.Quality.Assessment
Requirement	The system shall allow the users to access crop quality assessment by clicking on “Crop Quality Assessment” option on the dashboard.
Source	Muhammad Moiz
Rationale	To allow users to initiate crop quality assessment process.
Business Rule	Users must have appropriate permissions to access crop quality assessment.
Dependencies	FR-123, FR-124, FR-125
Priority	High

4.24.2 FR-123: Input.Crop.Quality.Factors

Table 175: Input.Crop.Quality.Factors FR

Identifier	FR-123
Title	Input.Crop.Quality.Factors
Requirement	The system shall allow user to input crop quality factors such as starch, sugar content, size, color and other relevant characteristics.
Source	Muhammad Moiz
Rationale	To enable the system to assess crop quality, providing detailed insights for grading, market pricing, or processing decisions
Business Rule	None
Dependencies	FR-124
Priority	High

4.24.3 FR-124: Analyze.Quality.Factors

Table 176: Analyze.Quality.Factors FR

Identifier	FR-124
Title	Analyze.Quality.Factors
Requirement	The system shall analyze the input crop quality factors to generate a detailed crop quality report.
Source	Muhammad Moiz
Rationale	To provide users with an accurate and data-driven assessment of crop quality, enabling them to make informed decisions.
Business Rule	None
Dependencies	FR-125
Priority	High

4.24.4 FR-125: Crop.Quality.Report.Generation

Table 177: Crop.Quality.Report.Generation FR

Identifier	FR-125
Title	Crop.Quality.Report.Generation
Requirement	The system shall generate and present the crop quality report to the user.
Source	Muhammad Moiz
Rationale	To provide users with a crop quality report that helps in understanding quality of crops.
Business Rule	None
Dependencies	None
Priority	High

4.25 UC-2.19: Optimal Harvesting Schedule

4.25.1 FR-126: Access.Harvesting.Schedule

Table 178: Access.Harvesting.Schedule FR

Identifier	FR-126
Title	Access.Harvesting.Schedule
Requirement	The system shall allow the users to select harvesting schedule by clicking on “Harvesting Schedule” option on the dashboard.
Source	Ammar Ali, Muhammad Moiz
Rationale	To allow users to initiate the optimal harvesting schedule process.
Business Rule	Users must have appropriate permissions to access crop quality assessment.
Dependencies	FR-127, FR-128, FR-129
Priority	High

4.25.2 FR-127: Develop.Optimal.Harvesting.Schedule

Table 179: Develop.Optimal.Harvesting.Schedule FR

Identifier	FR-127
Title	Develop.Optimal.Harvesting.Schedule
Requirement	The system shall develop optimal harvesting schedule by retrieving and analyzing crop maturity reports.
Source	Ammar Ali, Muhammad Moiz
Rationale	To ensure the crops are harvested at the right time to maximize yield and quality.
Business Rule	None
Dependencies	FR-128
Priority	High

4.25.3 FR-128: Update.Harvesting.Schedule

Table 180: Update.Harvesting.Schedule FR

Identifier	FR-128
Title	Update.Harvesting.Schedule
Requirement	The user updates the developed harvesting schedule
Source	Ammar Ali, Muhammad Moiz
Rationale	To ensure that the schedule developed is optimal for harvesting
Business Rule	The system must create an optimal schedule after analyzing all the critical factors outlined in the crop maturity report.
Dependencies	FR-129
Priority	High

4.25.4 FR-129: Track.Schedule

Table 181: Track.Schedule FR

Identifier	FR-129
Title	Track.Schedule
Requirement	The system shall track the progress of the developed harvesting schedule, providing updates as necessary.
Source	Ammar Ali, Muhammad Moiz
Rationale	To ensure the harvesting schedule is being followed, enabling timely interventions and adjustments to optimize the harvesting process.
Business Rule	None
Dependencies	None
Priority	High

4.26 UC-2.20: Harvesting Tools and Techniques

4.26.1 FR-130: Retrieve.crop.details

Table 182: Retrieve.crop.details FR

Identifier	FR-130
Title	Retrieve.crop.details
Requirement	The system shall fetch the user's crop details when the user clicks the harvesting tools and techniques option.
Source	Ammar Ali, Muhammad Moiz
Rationale	To ensure accurate recommendation, the system must fetch related crop data from the database.
Business Rule	Users must have registered crops in the system for precise recommendations.
Dependencies	FR-131
Priority	High

4.26.2 FR-131: Recommend.harvesting.tools

Table 183: Recommend.harvesting.tools FR

Identifier	FR-131
Title	Recommend.harvesting.tools
Requirement	The system shall recommend relevant harvesting tools based on the crop details been fetched.
Source	Ammar Ali, Muhammad Moiz
Rationale	To ensure the accuracy, efficiency and crop quality it helps users to use appropriate tools.
Business Rule	According to crop growth and type the recommendation should align with it.
Dependencies	FR-132, FR-133
Priority	High

4.26.3 FR-132: Recommend.harvesting.techniques

Table 184: Recommend.harvesting.techniques FR

Identifier	FR-132
Title	Recommend.harvesting.techniques
Requirement	The system shall recommend relevant harvesting techniques based on the crop type and condition.
Source	Ammar Ali, Muhammad Moiz
Rationale	To ensure that crop is harvesting efficiently and their quality is maintaining in the process, it must recommend the correct technique.
Business Rule	Techniques recommended should follow back to best agricultural practices for each crop.
Dependencies	FR-133
Priority	High

4.26.4 FR-133: Notify.On.Technical.Errors

Table 185: Notify.On.Technical.Errors FR

Identifier	FR-133
Title	Notify.On.Technical.Errors
Requirement	The system shall notify if any technical issue occurs during the process and provide related steps for support or retrying the operation.
Source	Ammar Ali, Muhammad Moiz
Rationale	To ensure the effectiveness, the users must be informed about the technical issue so they can resolve them without any problem.
Business Rule	The system should provide user-friendly pop-up error messages as well as troubleshooting steps.
Dependencies	None
Priority	Medium

4.27 UC-2.21: Harvesting tools catalog

4.27.1 FR-134: Retrieve.Tools.Catalog

Table 186: Retrieve.Tools.Catalog FR

Identifier	FR-134
Title	Retrieve.Tools.Catalog
Requirement	The system shall retrieve the catalog of harvesting tools according to user's recommendations when user clicks the "Harvesting Tools" catalog option.
Source	Ammar Ali
Rationale	To ensure that the user has access to tools related to their crops so they can make purchase or rent them.
Business Rule	Only tools related to the recommended techniques should be displayed
Dependencies	FR-135
Priority	High

4.27.2 FR-135: Display.Tools.Information

Table 187: Display.Tools.Information FR

Identifier	FR-135
Title	Display.Tools.Information
Requirement	The system shall display detailed description about every tool in the catalog including price, availability for rent and user reviews.
Source	Ammar Ali
Rationale	It helps users make decision about purchasing and renting the tools by providing detailed information.
Business Rule	Tools should be filtered according to user's recommendation details.
Dependencies	FR-136
Priority	High

4.27.3 FR-136: Select.A.Particular.Tool

Table 188: Select.A.Particular.Tool FR

Identifier	FR-136
Title	Select.A.Particular.Tool
Requirement	The user selects a particular crop from the displayed list of tools and proceeds to view, purchase or review
Source	Ammar Ali
Rationale	To ensure that the user selects a particular tool according to his personal requirement.
Business Rule	None
Dependencies	FR-137
Priority	High

4.27.4 FR-137: Update.Database

Table 189: Update.Database FR

Identifier	FR-137
Title	Update.Database
Requirement	The system shall update the database once the user has taken an action against a particular tool.
Source	Ammar Ali
Rationale	To ensure that the all the information regarding harvesting tools is up-to-date in the database.
Business Rule	None
Dependencies	None
Priority	High

4.28 UC-2.22: Transport Recommendation

4.28.1 FR-138: Access.Transport.Recommendation

Table 190: Access.Transport.Recommendation FR

Identifier	FR-138
Title	Access.Transport.Recommendation
Requirement	The system shall allow user to access transport recommendation when the user clicks the “Transport Recommendation” option from the dashboard
Source	Ammar Ali
Rationale	To ensure that the system recommend suitable transportation when user access transport recommendation.
Business Rule	None
Dependencies	FR-139, FR-140
Priority	High

4.28.2 FR-139: Display.Suitable.Transport

Table 191: Display.Suitable.Transport FR

Identifier	FR-139
Title	Display.Suitable.Transport
Requirement	The system shall retrieve crop details from databasae and show suitable transport types related to crop type and weight.
Source	Ammar Ali
Rationale	To ensure that the user can select tha best vehicle to easily transport crops.
Business Rule	The transport type must match the crop quantity and weight to easily transport them.
Dependencies	FR-140, FR-141
Priority	High

4.28.3 FR-140: Select.Tranportation

Table 192: Select.Tranportation FR

Identifier	FR-140
Title	Select.Tranportation
Requirement	The system shall allow the user to select specific transport type when user click the specified option.
Source	Ammar Ali
Rationale	To provide farmers flexibility in selecting the most appropriate transportation type.
Business Rule	None
Dependencies	FR-141
Priority	High

4.28.4 FR-141: Notify.On.Technical.Errors

Table 193: Notify.On.Technical.Errors FR

Identifier	FR-141
Title	Notify.On.Technical.Errors
Requirement	The system shall notify the user if any technical issue occurs while performing any task about retrieving crop details or transport recommendations and guide them to contact support team or retry.
Source	Ammar Ali
Rationale	To provide smooth user experience, the system must provide support services.
Business Rule	None
Dependencies	None
Priority	High

4.29 UC-2.23: Transportation

4.29.1 FR-142: Book.Ride

Table 194: Book.Ride FR

Identifier	FR-142
Title	Book.Ride
Requirement	The system shall allow the user to book ride from the dashboard to transport their crops by selecting the “Book Ride” option.
Source	Ammar Ali
Rationale	To provide users a convenient way to arrange ride for their crop transportation.
Business Rule	None
Dependencies	FR-143, FR-144
Priority	High

4.29.2 FR-143: Enter.PickUp.DropOff.Location

Table 195: Enter.PickUp.DropOff.Location FR

Identifier	FR-143
Title	Enter.PickUp.DropOff.Location
Requirement	The system shall allow the user to select the pickup and dropoff location for their transportation.
Source	Ammar Ali
Rationale	To ensure that the system knows all details about the delivery to easily transport crops.
Business Rule	User must provide valid location data to process the booking.
Dependencies	FR-144
Priority	High

4.29.3 FR-144: Notify.On.Technical.Error

Table 195: Notify.On.Technical.Error FR

Identifier	FR-144
Title	Notify.On.Technical.Error
Requirement	The system shall notify the user if any technical issue occurs while performing any task.
Source	Ammar Ali
Rationale	To ensure that user is clear and aware of system issues and can take preventive steps to resolve them.
Business Rule	Clear and actionable error message must be shown to user if any error occurs.
Dependencies	None
Priority	High

4.30 UC-2.24: Packaging Assist

4.30.1 FR-145: Access.Packaging.Assist

Table 196: Access.Packaging.Assist FR

Identifier	FR-145
Title	Access.Packaging.Assist
Requirement	The system shall allow users to access packaging assist when the user clicks “packaging assist” button on the dashboard.
Source	Ammar Ali
Rationale	To ensure that the system recommend suitable packaging guide when user access packaging assist.
Business Rule	None
Dependencies	FR-146, FR-147, FR-148
Priority	High

4.30.2 FR-146: Input.Particular.Crop.Details

Table 197: Input.Particular.Crop.Details FR

Identifier	FR-146
Title	Input.Particular.Crop.Details
Requirement	The user inputs the specified crop details
Source	Ammar Ali
Rationale	To ensure that the system recommends good packaging material when the user inputs the specified crop details.
Business Rule	None
Dependencies	FR-147, FR-149
Priority	High

4.30.3 FR-147: Recommend.Packaging.Material

Table 198: Recommend.Packaging.Material FR

Identifier	FR-147
Title	Recommend.Packaging.Material
Requirement	The system shall recommend suitable packaging materials related to crop details when the user access packaging assist.
Source	Ammar Ali
Rationale	To ensure that the system recommend suitable packaging material when user clicks recommend packaging material.
Business Rule	None
Dependencies	FR-148, FR-149
Priority	High

4.30.4 FR-148: Display.Material.Details

Table 199: Display.Material.Details FR

Identifier	FR-148
Title	Display.Material.Details
Requirement	The system shall display the appropriate details of recommended material like how it is good for the specified crop.
Source	Ammar Ali
Rationale	To ensure that the system displays details of a material when user select the specified crop.
Business Rule	Displayed packaging material must be recommended according to the user-inputted crop details.
Dependencies	FR-149
Priority	High

4.30.5 FR-149: Notify.On.Technical.Errors

Table 200: Notify.On.Technical.Errors FR

Identifier	FR-149
Title	Notify.On.Technical.Errors
Requirement	The system shall notify if any technical issue occurs during the process and provide related steps for support or retrying the operation.
Source	Ammar Ali
Rationale	To ensure the effectiveness, the users must be informed about the technical issue so they can resolve them without any problem.
Business Rule	The system should provide user-friendly pop-up error messages as well as troubleshooting steps.
Dependencies	None
Priority	Medium

4.31 UC-2.25: Climate-Controlled Storage Reservation

4.31.1 FR-150: Retrieve.Crop.Details

Table 201: Retrieve.Crop.Details FR

Identifier	FR-150
Title	Retrieve.Crop.Details
Requirement	The system shall fetch the user's harvesting and crop details when the user clicks the climate-controlled storage reservation button.
Source	Ammar Ali
Rationale	To ensure accurate, the system must fetch related crop data from the database.
Business Rule	Users must have registered crops in the system for precise recommendations.
Dependencies	FR-151, FR-152, FR-153, FR-154
Priority	High

4.31.2 FR-151: Recommend.Suitable.Temperature.And.Storage.Conditions

Table 202: Recommend.Suitable.Temperature.And.Storage.Conditions FR

Identifier	FR-151
Title	Recommend.Suitable.Temperature.And.Storage.Conditions
Requirement	The system shall provide suitable temperature and storage conditions related to crop type and size.
Source	Ammar Ali
Rationale	To ensure quality of crops by providing the optimal storage environment.
Business Rule	Recommendations must align with the crop's related storage requirements.
Dependencies	FR-152, FR-155
Priority	High

4.31.3 FR-152: Display.Storage.Provider

Table 203: Display.Storage.Provider FR

Identifier	FR-152
Title	Display.Storage.Provider
Requirement	The system shall provide suitable list of storage providers offering climate-controlled storage, allowing the user to review them.
Source	Ammar Ali
Rationale	To find user's suitable storage facilities
Business Rule	Only climate-controlled storage providers will be shown.
Dependencies	FR-153, FR-155
Priority	High

4.31.4 FR-153: Reserve.Storage.Facility

Table 204: Reserve.Storage.Facility FR

Identifier	FR-153
Title	Reserve.Storage.Facility
Requirement	The system shall allow user to reserve a selected climate-controlled facility.
Source	Ammar Ali
Rationale	To ensure the preservation of crops, it allows users to reserve storage space.
Business Rule	None
Dependencies	FR-154, FR-155
Priority	High

4.31.5 FR-154: Update.Database.After.Reservation

Table 205: Update.Database.After.Reservation FR

Identifier	FR-154
Title	Update.Database.After.Reservation
Requirement	The system shall update the database after reservation of storage facility.
Source	Ammar Ali
Rationale	To ensure consistency and efficiency, all information is up-to-date within the system.
Business Rule	None
Dependencies	FR-155
Priority	High

4.31.6 FR-155: Notify.On.Technical.Errors

Table 206: Notify.On.Technical.Errors FR

Identifier	FR-155
Title	Notify.On.Technical.Errors
Requirement	The system shall notify if any technical issue occurs during the process and provide related steps for support or retrying the operation.
Source	Ammar Ali
Rationale	To ensure the effectiveness, the users must be informed about the technical issue so they can resolve them without any problem.
Business Rule	The system should provide user-friendly pop-up error messages as well as troubleshooting steps.
Dependencies	None
Priority	Medium

4.32 UC-2.26: Crop Quality Grading

4.32.1 FR-156: Retrieve.Crop.Details

Table 207: Retrieve.Crop.Details FR

Identifier	FR-156
Title	Retrieve.Crop.Details
Requirement	The system shall fetch the user's harvesting and crop details when the user clicks the crop quality grading button.
Source	Ammar Ali
Rationale	To ensure accurate results, the system must fetch related crop data from the database.
Business Rule	Users must have registered crops in the system for precise recommendations.
Dependencies	FR-157
Priority	High

4.32.2 FR-157: Provide.Grading.Tips.Based.On.Standards

Table 208: Provide.Grading.Tips.Based.On.Standards FR

Identifier	FR-157
Title	Provide.Grading.Tips.Based.On.Standards
Requirement	The system shall recommend good quality grading tips to ensure the quality and characteristics of crops.
Source	Ammar Ali
Rationale	To help users in classifying and grading their crops to ensure their quality standards.
Business Rule	Grading standard should align with the industry practices.
Dependencies	FR-158, FR-159
Priority	High

4.32.3 FR-158: Generate.Quality.Index.Report

Table 209: Generate.Quality.Index.Report FR

Identifier	FR-158
Title	Generate.Quality.Index.Report
Requirement	The system shall provide a quality index report to show crop quality and quantity.
Source	Ammar Ali
Rationale	To provide an accurate and efficient way to grade crop quality that can be used to assess user.
Business Rule	The quality index must align with industry practices
Dependencies	FR-159
Priority	High

4.32.4 FR-159: Notify.On.Technical.Errors

Table 210: Notify.On.Technical.Errors FR

Identifier	FR-159
Title	Notify.On.Technical.Errors
Requirement	The system shall notify if any technical issue occurs during the process and provide related steps for support or retrying the operation.
Source	Ammar Ali
Rationale	To ensure the effectiveness, the users must be informed about the technical issue so they can resolve them without any problem.
Business Rule	None
Dependencies	None
Priority	Medium

4.33 UC-2.27: Switch Profile

4.33.1 FR-160: Access.Switch.Profile

Table 211: Access.Switch.Profile FR

Identifier	FR-160
Title	Access.Switch.Profile
Requirement	The user shall access switch profile by clicking on “Switch Profile” option on the dashboard
Source	Ammar Ali
Rationale	To enable the user to switch profile.
Business Rule	Users must have appropriate permissions to access switch profile.
Dependencies	FR-161, FR-162, FR-163
Priority	High

4.33.2 FR-161: Displays.Available.Profiles

Table 212: Displays.Available.Profiles FR

Identifier	FR-161
Title	Displays.Available.Profiles
Requirement	The system shall display the available profiles when user access switch profile.
Source	Ammar Ali
Rationale	To enable user to select a specific profile from the available profiles.
Business Rule	None
Dependencies	FR-162
Priority	High

4.33.3 FR-162: Selects.A.Profile

Table 213: Selects.A.Profile FR

Identifier	FR-162
Title	Selects.A.Profile
Requirement	The user selects a desired profile from the available profiles.
Source	Ammar Ali
Rationale	To enable the user switch to desired profile.
Business Rule	None
Dependencies	FR-163
Priority	High

4.33.4 FR-163: Switch.To.Selected.Profile

Table 214: Switch.To.Selected.Profile FR

Identifier	FR-163
Title	Switch.To.Selected.Profile
Requirement	The system shall switch to the profile selected by the admin and provide access to the corresponding dashboard.
Source	Ammar Ali
Rationale	To allow the user to switch between profiles (seller, customer) and manage actions.
Business Rule	Requested profile must be registered to gain access.
Dependencies	None
Priority	High

4.34 UC-2.28 Manage Profile

4.34.1 FR-164: Manipulate.Profile.Information

Table 215: Manipulate.Profile.Information FR

Identifier	FR-164
Title	Manipulate.Profile.Information
Requirement	The system shall display the user's stored profile information and allow them to select and update individual fields.
Source	Ammar Ali
Rationale	To give users control over updating their personal information stored in the system.
Business Rule	All information fields must be editable, and changes must follow the correct data format.
Dependencies	FR-165
Priority	Low

4.34.2 FR-165: Validate.Profile.Information.Format

Table 216: Validate.Profile.Information.Format FR

Identifier	FR-165
Title	Validate.Profile.Information.Format
Requirement	The system shall validate the updated profile information to ensure that the data follows the correct format (e.g., email format, phone number length).
Source	Ammar Ali
Rationale	To prevent incorrect or invalid data from being saved to the user's profile.
Business Rule	All updates must comply with data validation rules (e.g., valid email addresses, phone numbers).
Dependencies	FR-166
Priority	Low

4.34.3 FR-166: Apply.Changes

Table 217: Apply.Changes FR

Identifier	FR-166
Title	Apply.Changes
Requirement	The system shall apply the changes after the user clicks the "Apply" button and the system successfully validates the changes.
Source	Ammar Ali
Rationale	To update the user's profile with the latest information provided.
Business Rule	The system must ensure that updated information is saved correctly across system
Dependencies	None
Priority	Medium

4.35 UC-2.29 Sign Out

4.35.1 FR-167: Initiates.SignOut.Process

Table 218: Initiates.SignOut.Process FR

Identifier	FR-167
Title	Initiates.SignOut.Process
Requirement	The user shall be able to initiate the sign-out process by clicking on the "Sign Out" button in the profile management section.
Source	Ammar Ali
Rationale	To allow users to safely end their session and log out of the system.
Business Rule	None
Dependencies	FR-168
Priority	High

4.35.2 FR-168: Terminate.User.Session

Table 219: Terminate.User.Session FR

Identifier	FR-168
Title	Terminate.User.Session
Requirement	The system shall terminate the user's session and redirect them to the Sign In page after the user successfully signs out.
Source	Ammar Ali
Rationale	To ensure the user is securely logged out and no longer has access to restricted areas.
Business Rule	None
Dependencies	None
Priority	High

Customer Functional Requirements

4.36 UC-3.1 Sign Up

4.36.1 FR-169: Initiate.Registration

Table 220: Initiate.Registration FR

Identifier	FR-169
Title	Initiate.Registration
Requirement	The user shall be able to initiate registration by clicking on Sign up button
Source	Ammar Ali
Rationale	Provide user an option to register in to the system.
Business Rule	None
Dependencies	FR-170, FR-171, FR-172, FR-173
Priority	High

4.36.2 FR-170: Enter.Credentials

Table 221: Enter.Credentials FR

Identifier	FR-170
Title	Enter.Credentials
Requirement	The user shall be able to enter credentials.
Source	Ammar Ali
Rationale	Allow users to enter credentials to register as a customer.
Business Rule	None
Dependencies	FR-171
Priority	High

4.36.3 FR-171: Validate.Credentials

Table 222: Validate.Credentials FR

Identifier	FR-171
Title	Validate.Credentials
Requirement	The system shall validate the correctness and accuracy of user-entered email, password and username before proceeding with registration
Source	Ammar Ali
Rationale	The system ensure that the user entered credentials are correct and accurate and could be used as a valid email and password.
Business Rule	None
Dependencies	FR-172
Priority	High

4.36.4 FR-172: Confirm.Registration

Table 223: Confirm.Registration FR

Identifier	FR-172
Title	Confirm.Registration
Requirement	The system shall confirm the successful registration of user's account and display a message that the user account is created.
Source	Ammar Ali
Rationale	To ensure that the user's account is successfully created and allow them to sign in to his account.
Business Rule	The user must be directed to the login page after successful sign up.
Dependencies	FR-173, FR-174
Priority	High

4.36.5 FR-173: Handle.Invalid.Input

Table 224: Handle.Invalid.Input FR

Identifier	FR-173
Title	Handle.Invalid.Input
Requirement	The system shall display a message that information is invalid if the user enters invalid input.
Source	Ammar Ali
Rationale	To ensure that the user enters valid data so that sign up is successful.
Business Rule	The system must validate each field and notifies user if there is any error or missing field.
Dependencies	None
Priority	High

4.37 UC-3.2 Sign In

4.37.1 FR-174: Initiate.SignIn.Process

Table 225: Initiate.SignIn.Process FR

Identifier	FR-174
Title	Initiate.SignIn.Process
Requirement	The user shall be able to initiate the sign in process by clicking on “Sign In” button.
Source	Ammar Ali
Rationale	Provide users an option to access their accounts and services.
Business Rule	None
Dependencies	FR-175
Priority	High

4.37.2 FR-175: Enter.Credentials

Table 226: Enter.Credentials FR

Identifier	FR-175
Title	Enter.Credentials
Requirement	The system shall prompt the user to enter their registered credentials to authenticate their identity.
Source	Ammar Ali
Rationale	To ensure that the user enters registered credentials to successfully log in to the system
Business Rule	Email and password must match the one stored in database.
Dependencies	FR-176
Priority	High

4.37.3 FR-176: Verify.Credentials

Table 5427: Verify.Credentials FR

Identifier	FR-176
Title	Verify.Credentials
Requirement	The system shall verify credentials against database to authenticate the user.
Source	Ammar Ali
Rationale	To ensure that the user enter credentials to successfully to log in to the system
Business Rule	None
Dependencies	FR-177
Priority	High

4.37.4 FR-177: Handle.Invalid.Credentials

Table 228: Handle.Invalid.Credentials FR

Identifier	FR-177
Title	Handle.Invalid.Credentials
Requirement	The system shall display the message “Invalid Credentials” if the user enters invalid credentials.
Source	Ammar Ali
Rationale	To ensure that the user does not enter invalid credentials.
Business Rule	None
Dependencies	None
Priority	Medium

4.38 UC-3.3 Access Products

4.38.1 FR-178: Access.Catalog

Table 229: Access.Catalog FR

Identifier	FR-178
Title	Access.Catalog
Requirement	The user shall access catalog by clicking on “Access Catalog” option on the dashboard
Source	Ammar Ali
Rationale	To enable the user view, buy or review products from the catalog.
Business Rule	User must be logged in.
Dependencies	FR-179, FR-180, FR-181, FR-182, FR-183, FR-184, FR-185
Priority	High

4.38.2 FR-179: Display.Products.List

Table 230: Display.Products.List FR

Identifier	FR-179
Title	Display.Products.List
Requirement	The system shall display the list of products when the user clicks on “Access Catalog” option on the dashboard
Source	Ammar Ali
Rationale	To enable the user buy or review a product from the displayed list.
Business Rule	None
Dependencies	FR-180
Priority	High

4.38.3 FR-180 Search.Product

Table 231: Search.Product FR

Identifier	FR-180
Title	Search.Product
Requirement	The system shall provide an option to the user to search a product
Source	Ammar Ali
Rationale	To enable users to efficiently find specific products from a large catalog, improving user experience and engagement
Business Rule	None
Dependencies	FR-181
Priority	High

4.38.4 FR-181: Select.A.Particular.Product

Table 232: Select.A.Particular.Product FR

Identifier	FR-181
Title	Select.A.Particular.Product
Requirement	The user shall be able to select a particular product from the list.
Source	Ammar Ali
Rationale	To enable users buy or review a particular product from the catalog.
Business Rule	None
Dependencies	FR-182
Priority	High

4.38.5 FR-182: Display.Product.Details

Table 233: Display.Product.Details FR

Identifier	FR-182
Title	Display.Product.Details
Requirement	The system shall display detailed description about the product in the catalog including price, user reviews, available stock.
Source	Ammar Ali
Rationale	It helps users make decision about purchasing the products.
Business Rule	None
Dependencies	FR-183
Priority	High

4.38.6 FR-183: Review.Products

Table 234: Review.Products FR

Identifier	FR-183
Title	Review.Products
Requirement	The system shall display an option for user to review the products.
Source	Ammar Ali
Rationale	To enable users to provide feedback on products, enhancing product visibility and assisting other users.
Business Rule	None
Dependencies	FR-184
Priority	High

4.38.7 FR-184: Buy.Products

Table 235: Buy.Products FR

Identifier	FR-184
Title	Buy.Products
Requirement	The system shall display an option for user to buy the products.
Source	Ammar Ali
Rationale	To provide users with the ability to purchase products directly through the system with add to cart option, enhancing the shopping experience and increasing conversions.
Business Rule	None
Dependencies	FR-185
Priority	High

4.38.8 FR-185: Update.Database

Table 236: Update.Database FR

Identifier	FR-185
Title	Update.Database
Requirement	The system shall update the database after user makes a purchase from the catalog.
Source	Ammar Ali
Rationale	To ensure consistency and efficiency, all information is up-to-date within the system.
Business Rule	None
Dependencies	None
Priority	High

4.39 UC-3.4 Bidding

4.39.1 FR-186: Access.Bidding.Section

Table 237: Access.Bidding.Section FR

Identifier	FR-186
Title	Access.Bidding.Section
Requirement	The user shall access bidding section by clicking on “Bidding” option on the dashboard
Source	Ammar Ali
Rationale	To enable the user to make a bid to purchase a product according to his own range.
Business Rule	None
Dependencies	FR-187, FR-188, FR-189, FR-190, FR-191, FR-192, FR-193, FR-194
Priority	High

4.39.2 FR-187: Display.Products.List

Table 238: Display.Products.List FR

Identifier	FR-187
Title	Display.Products.List
Requirement	The system shall display the list of products when the user clicks on “Bidding” option on the dashboard
Source	Ammar Ali
Rationale	To enable the system to display a list of products for user to choose from.
Business Rule	None
Dependencies	FR-188
Priority	High

4.39.3 FR-188: Search.Product

Table 239: Search.Product FR

Identifier	FR-188
Title	Search.Product
Requirement	The system shall provide an option to the user to search a product
Source	Ammar Ali
Rationale	To enable users to efficiently find specific products from a large catalog, improving user experience and engagement
Business Rule	None
Dependencies	FR-189
Priority	High

4.39.4 FR-189: Select.A.Particular.Product

Table 240: Select.A.Particular.Product FR

Identifier	FR-189
Title	Select.A.Particular.Product
Requirement	The user shall be able to select a particular product from the list.
Source	Ammar Ali
Rationale	To enable users to make a bid for a particular product from the catalog.
Business Rule	None
Dependencies	FR-190
Priority	High

4.39.5 FR-190: Display.Bidding.Details

Table 241: Display.Bidding.Details FR

Identifier	FR-190
Title	Display.Bidding.Details
Requirement	The system shall display Bidding details once the user selects a particular product from the list.
Source	Ammar Ali
Rationale	To allow the users view if there are bids made for a particular product.
Business Rule	None
Dependencies	FR-191
Priority	High

4.39.6 FR-191: Bid.Price

Table 242: Bid.Price FR

Identifier	FR-191
Title	Bid.Price
Requirement	The user selects “Bid Price” option to make a bid for a product.
Source	Ammar Ali
Rationale	To allow the users make a bid to purchase a product.
Business Rule	None
Dependencies	FR-192
Priority	High

4.39.7 FR-192: Bid.Acceptance

Table 243: Bid.Acceptance FR

Identifier	FR-192
Title	Bid.Acceptance
Requirement	The system shall notify the user if the bid is accepted by the farmer.
Source	Ammar Ali
Rationale	To notify the user whether the bid is accepted or not by the farmer
Business Rule	None
Dependencies	FR-193
Priority	High

4.39.8 FR-193: Payment

Table 244: Payment FR

Identifier	FR-193
Title	Payment
Requirement	The system shall display the payment window if the user's bid is accepted by the farmer
Source	Ammar Ali
Rationale	To allow the users make a payment to purchase the product.
Business Rule	None
Dependencies	FR-194
Priority	High

4.39.9 FR-194: Update.Database

Table 245: Update.Database FR

Identifier	FR-194
Title	Update.Database
Requirement	The system shall update the database after user's bid is accepted and purchase is made from the catalog.
Source	Ammar Ali
Rationale	To ensure consistency and efficiency, all information is up-to-date within the system.
Business Rule	None
Dependencies	None
Priority	High

4.40 UC-3.5 Switch Profile

4.40.1 FR-195: Access.Switch.Profile

Table 246: Access.Switch.Profile FR

Identifier	FR-195
Title	Access.Switch.Profile
Requirement	The user shall access switch profile by clicking on “Switch Profile” option on the customer dashboard.
Source	Ammar Ali
Rationale	To enable the user to switch profile if registered.
Business Rule	User must be logged in.
Dependencies	FR-196
Priority	High

4.40.2 FR-196: Displays.Available.Profiles

Table 247: Displays.Available.Profiles FR

Identifier	FR-196
Title	Displays.Available.Profiles
Requirement	The system shall display the available profiles when user access switch profile.
Source	Ammar Ali
Rationale	To enable user to select a specific profile from the available profiles where the user is registered.
Business Rule	None
Dependencies	FR-197
Priority	High

4.40.3 FR-197: Selects.A.Profile

Table 248: Selects.A.Profile FR

Identifier	FR-197
Title	Selects.A.Profile
Requirement	The user selects a desired profile from the available profiles.
Source	Ammar Ali
Rationale	To enable the user switch to desired profile (farmer or seller).
Business Rule	None
Dependencies	FR-198
Priority	High

4.40.4 FR-198: Switch.To.Selected.Profile

Table 249: Switch.To.Selected.Profile FR

Identifier	FR-198
Title	Switch.To.Selected.Profile
Requirement	The system shall switch to the profile selected by the admin and provide access to the corresponding dashboard.
Source	Ammar Ali
Rationale	To allow the user to switch between profiles (farmer, seller) and manage actions.
Business Rule	Requested profile must be registered to gain access.
Dependencies	None
Priority	High

4.41 UC-3.6 Manage Profile

4.41.1 FR-199: Manipulate.Profile.Information

Table 250: Manipulate.Profile.Information FR

Identifier	FR-199
Title	Manipulate.Profile.Information
Requirement	The system shall display the user's stored profile information and allow them to select and update individual fields.
Source	Ammar Ali
Rationale	To give users control over updating their personal information stored in the system.
Business Rule	All information fields must be editable, and changes must follow the correct data format.
Dependencies	FR-200
Priority	Low

4.41.2 FR-200: Validate.Profile.Information.Format

Table 251: Validate.Profile.Information.Format FR

Identifier	FR-200
Title	Validate.Profile.Information.Format
Requirement	The system shall validate the updated profile information to ensure that the data follows the correct format (e.g., email format, phone number length).
Source	Ammar Ali
Rationale	To prevent incorrect or invalid data from being saved to the user's profile.
Business Rule	All updates must comply with data validation rules (e.g., valid email addresses, phone numbers).
Dependencies	FR-201
Priority	Low

4.41.3 FR-201: Apply.Changes

Table 252: Apply.Changes FR

Identifier	FR-201
Title	Apply.Changes
Requirement	The system shall apply the changes after the user clicks the "Apply" button and the system successfully validates the changes.
Source	Ammar Ali
Rationale	To update the user's profile with the latest information provided.
Business Rule	The system must ensure that updated information is saved correctly across system
Dependencies	None
Priority	Medium

4.42 UC-3.7 Sign Out

4.42.1 FR-202: Initiates.SignOut.Process

Table 253: Initiates.SignOut.Process FR

Identifier	FR-202
Title	Initiates.SignOut.Process
Requirement	The user shall be able to initiate the sign-out process by clicking on the "Sign Out" button in the profile management section.
Source	Ammar Ali
Rationale	To allow users to safely end their session and log out of the system.
Business Rule	None
Dependencies	FR-203
Priority	High

4.42.2 FR-203: Terminate.User.Session

Table 254: Terminate.User.Session FR

Identifier	FR-203
Title	Terminate.User.Session
Requirement	The system shall terminate the user's session and redirect them to the Sign In page after the user successfully signs out.
Source	Ammar Ali
Rationale	To ensure the user is securely logged out and no longer has access to restricted areas.
Business Rule	None
Dependencies	None
Priority	High

Seller Functional Requirements

4.43 UC-4.1 Set Profile

4.43.1 FR-204: Switch.Profile

Table 255: Switch.Profile FR

Identifier	FR-204
Title	Switch.Profile
Requirement	The system shall allow the users to switch their profile to a seller account
Source	Ammar Ali
Rationale	To allow users to initiate the seller registration process
Business Rule	Users must not have registered as a seller.
Dependencies	FR-205
Priority	High

4.43.2 FR-205: Input.Product.Details

Table 256: Input.Product.Details FR

Identifier	FR-205
Title	Input.Product.Details
Requirement	The system shall provide form to users to input product details they intend to sell.
Source	Ammar Ali
Rationale	To collect necessary information about the product to set up the seller profile
Business Rule	None
Dependencies	FR-206
Priority	High

4.43.3 FR-206: Input.Bank.Details

Table 257: Input.Bank.Details FR

Identifier	FR-206
Title	Input.Bank.Details
Requirement	The system shall allow the user to input their bank details for receiving payments.
Source	Ammar Ali
Rationale	To facilitate future transactions and payments to the user.
Business Rule	None
Dependencies	FR-207
Priority	High

4.43.4 FR-207 Register.Seller

Table 258: Register.Seller FR

Identifier	FR-207
Title	Register.Seller
Requirement	The system shall allow the users to register as a seller when they click on the “Register” button after entering all the details.
Source	Ammar Ali
Rationale	To ensure that the user’s seller account is successfully created and allow them to sign in to his account.
Business Rule	None
Dependencies	FR-208
Priority	High

4.43.5 FR-208: Validate.Registration.Data

Table 259: Validate.Registration.Data FR

Identifier	FR-208
Title	Validate.Registration.Data
Requirement	The system shall validate all user-inputted details including product and bank details to complete registration.
Source	Ammar Ali
Rationale	To ensure that the user enters valid data so that registration is successful.
Business Rule	The system must validate each data field and notifies user if there is any error or missing field.
Dependencies	FR-209
Priority	High

4.43.6 FR-209: Grant.Seller.Dashboard.Access

Table 260: Grant.Seller.Dashboard.Access FR

Identifier	FR-209
Title	Grant.Seller.Dashboard.Access
Requirement	The system shall grant the access of seller dashboard to the user upon the successful validation
Source	Ammar Ali
Rationale	To enable users to manage their products and services.
Business Rule	None
Dependencies	None
Priority	High

4.44 UC-4.2 Upload Product/Service

4.44.1 FR-210: Select.Upload.Product.In.Marketplace

Table 261: Select.Upload.Product.In.Marketplace FR

Identifier	FR-210
Title	Select.Upload.Product.In.Marketplace
Requirement	The system shall allow the user to click “Upload Product” option in the marketplace.
Source	Ammar Ali
Rationale	To initiate the process of uploading products in the marketplace.
Business Rule	None
Dependencies	FR-211
Priority	High

4.44.2 FR-211: Enter.Product.Type.And.Details

Table 262: Enter.Product.Type.And.Details FR

Identifier	FR-211
Title	Enter.Product.Type.And.Details
Requirement	The system shall allow the user to enter product type and details on clicking “Upload Product” option.
Source	Ammar Ali
Rationale	To collect product information and images from the seller for product listing.
Business Rule	None
Dependencies	FR-212
Priority	High

4.44.3 FR-212: Upload.Quality.Index.Document

Table 263: Upload.Quality.Index.Document FR

Identifier	FR-212
Title	Upload.Quality.Index.Document
Requirement	The system shall allow the user to upload the quality index document as part of the bidding process.
Source	Ammar Ali
Rationale	To include additional information about product quality to increase buyer’s interest in the product
Business Rule	None
Dependencies	FR-213
Priority	Medium

4.44.4 FR-213: Upload.Product

Table 264: Upload.Product FR

Identifier	FR-213
Title	Upload.Product
Requirement	The system shall provide an "Upload" button for the user to submit product details.
Source	Ammar Ali
Rationale	To finalize the product submission process and list the product in the marketplace.
Business Rule	None
Dependencies	FR-214
Priority	High

4.44.5 FR-214: Validate.Product.Data

Table 265: Validate.Product.Data FR

Identifier	FR-214
Title	Validate.Product.Data
Requirement	The system shall validate all user-inputted details including product type, details and images to ensure correctness and accuracy.
Source	Ammar Ali
Rationale	To ensure that the user enters valid data so that crop listing is successful.
Business Rule	The system must validate each data field and notifies user if there is any error or missing field.
Dependencies	FR-215, FR-216
Priority	High

4.44.6 FR-215: Upload.Product.To.Marketplace

Table 266: Upload.Product.To.Marketplace FR

Identifier	FR-215
Title	Upload.Product.To.Marketplace
Requirement	The system shall allow the user to upload product to marketplace listing upon the successful validation
Source	Ammar Ali
Rationale	To make the product visible to potential buyers in the marketplace
Business Rule	None
Dependencies	None
Priority	Medium

4.44.7 FR-216: Notify.Incorrect.Data

Table 267: Notify.Incorrect.Data FR

Identifier	FR-216
Title	Notify.Incorrect.Data
Requirement	The system shall notify the user if the product data is incorrect or incomplete.
Source	Ammar Ali
Rationale	To inform the user of errors so that they can fix and re-submit the product
Business Rule	None
Dependencies	FR-217
Priority	Medium

4.44.8 FR-217: Re-enter.Product.Data

Table 268: Re-enter.Product.Data FR

Identifier	FR-217
Title	Re-enter.Product.Data
Requirement	The system shall allow the user to re-enter the product data if an error notification is displayed.
Source	Ammar Ali
Rationale	To allow the user a chance to fix data and reupload product
Business Rule	The system must allow the user to correct and re-submit product data after an error notification.
Dependencies	FR-218
Priority	Medium

4.44.9 FR-218: Retry.Upload

Table 269: Retry.Upload FR

Identifier	FR-218
Title	Retry.Upload
Requirement	The system shall allow the user to retry the upload process after fixing the data.
Source	Ammar Ali
Rationale	To allow the user to continue the process after an error without starting over.
Business Rule	Only registered sellers can access the bidding section.
Dependencies	None
Priority	High

4.45 UC-4.3 Bidding

4.45.1 FR-219: Access.Bidding.Section

Table 270: Access.Bidding.Section FR

Identifier	FR-219
Title	Access.Bidding.Section
Requirement	The user shall access bidding section by clicking on “Bidding” option on the dashboard
Source	Ammar Ali
Rationale	To enable the user to make a product available for bid according to his own range.
Business Rule	Only registered sellers can access the bidding section.
Dependencies	FR-220, FR-221, FR-222, FR-223, FR-224, FR-225, FR-226
Priority	High

4.45.2 FR-220: Uploading.product

Table 271: Uploading.product FR

Identifier	FR-220
Title	Uploading.product
Requirement	The system shall allow user to add a product for bidding by uploading product details, type, time limit and pictures.
Source	Ammar Ali
Rationale	To enable the user to make a list of their products for bids coming from buyers.
Business Rule	None
Dependencies	FR-221, FR-222
Priority	High

4.45.3 FR-221: Upload.Quality.Index.Document

Table 272: Upload.Quality.Index.Document FR

Identifier	FR-221
Title	Upload.Quality.Index.Document
Requirement	The system shall allow the user to upload the quality index document as part of the bidding process.
Source	Ammar Ali
Rationale	To provide buyer with the great knowledge about the product and its quality.
Business Rule	None
Dependencies	FR-222
Priority	High

4.45.4 FR-222: Verify.Product.Data

Table 273: Verify.Product.Data FR

Identifier	FR-222
Title	Verify.Product.Data
Requirement	The system shall verify the correctness and completeness of the product details, product pictures and quality index.
Source	Ammar Ali
Rationale	To make the product information accurate and ensure it before making the product available for bidding.
Business Rule	None
Dependencies	FR-223
Priority	High

4.45.5 FR-223: Upload.Product.For.Bidding

Table 274: Upload.Product.For.Bidding FR

Identifier	FR-223
Title	Upload.Product.For.Bidding
Requirement	The system shall upload the product for bidding once the verification completes.
Source	Ammar Ali
Rationale	To make the product available for potential buyers.
Business Rule	None
Dependencies	FR-224
Priority	High

4.45.6 FR-224: Notify.Seller

Table 275: Notify.Seller FR

Identifier	FR-224
Title	Notify.Seller
Requirement	The system shall notify the seller once a new bid is made by the user for the product.
Source	Ammar Ali
Rationale	To keep the seller updated about bidding activity and help them to track bids.
Business Rule	None
Dependencies	FR-225
Priority	High

4.45.7 FR-225: Best.Bid.Selection

Table 276: Best.Bid.Selection FR

Identifier	FR-225
Title	Best.Bid.Selection
Requirement	The system shall allow the user to select the best bid from the list of bids to initiate selling of the products
Source	Ammar Ali
Rationale	To ensure the user selects the best bid from the list.
Business Rule	The system must enable the user to compare and select the best bid based on predefined criteria such as price, quantity, and buyer reliability.
Dependencies	FR-226
Priority	High

4.45.8 FR-226 Update.Database

Table 277: Update.Database FR

Identifier	FR-226
Title	Update.Database
Requirement	The system shall update the database after user accepts the bid and purchase is made from the catalog.
Source	Ammar Ali
Rationale	To ensure consistency and efficiency, all information is up-to-date within the system.
Business Rule	None
Dependencies	None
Priority	High

4.46 UC-4.4 Reports and Analytics

4.46.1 FR-227 Access.Reports.And.Analytics

Table 278: Access.Reports.And.Analytics FR

Identifier	FR-227
Title	Access.Reports.And.Analytics
Requirement	The system shall allow user to access reports and analytics when the user clicks on “reports and analytics” option on the dashboard.
Source	Ammar Ali
Rationale	To allow the user to generate reports according to his requirements.
Business Rule	Only registered sellers can access reports and analytics section
Dependencies	FR-228, FR-229, FR-230
Priority	High

4.46.2 FR-228: Display.Available.Reports

Table 279: Display.Available.Reports FR

Identifier	FR-228
Title	Display.Available.Reports
Requirement	The system shall display list of available reports when user clicks on “reports and analytics” option.
Source	Ammar Ali
Rationale	To ensure the accuracy, system will provide the list of available reports.
Business Rule	None
Dependencies	FR-229
Priority	High

4.46.3 FR-229: Select.And.Filter.Report

Table 280: Select.And.Filter.Report FR

Identifier	FR-229
Title	Select.And.Filter.Report
Requirement	The system shall allow user to select and filter the specific report to click and shows the detailed information about it.
Source	Ammar Ali
Rationale	To ensure the accuracy of information the system must allow the user to select and filter the specific reports
Business Rule	None
Dependencies	FR-230
Priority	High

4.46.4 FR-230: Report.Generation

Table 281: Report.Generation FR

Identifier	FR-230
Title	Report.Generation
Requirement	The system shall generate the report according to the specific needs and inputs of the user.
Source	Ammar Ali
Rationale	To ensure the quality and accuracy of information the system must provide the reports according to specific needs of user.
Business Rule	None
Dependencies	None
Priority	High

4.47 UC-4.5 Feature products

4.47.1 FR-231: Access.Promotion

Table 282: Access.Promotion FR

Identifier	FR-231
Title	Access.Promotion
Requirement	The system shall allow user to access promotion when the user clicks on “promotion” option on the dashboard.
Source	Ammar Ali
Rationale	To allow the user to market its products on the seller marketplace.
Business Rule	Only registered sellers can access promotion section.
Dependencies	FR-232 , FR-233, FR-234, FR-235, FR-236
Priority	High

4.47.2 FR-232: Display.Promotion.Rates

Table 283: Display.Promotion.Rates FR

Identifier	FR-232
Title	Display.Promotion.Rates
Requirement	The system shall display list promotion rates according to specific features.
Source	Ammar Ali
Rationale	To allow the user to market its product the system must allow the user to buy promotion to make its ads about the product with specific feature included in promotion.
Business Rule	None
Dependencies	FR-233
Priority	High

4.47.3 FR-233 Select.Suitable.Promotion

Table 284: Select.Suitable.Promotion FR

Identifier	FR-233
Title	Select.Suitable.Promotion
Requirement	The system shall allow user to select specific promotion according to his need with specific features.
Source	Ammar Ali
Rationale	To allow the user to select the specific promotion according to his need.
Business Rule	None
Dependencies	FR-234
Priority	High

4.47.4 FR-234: Selecting.The.Product

Table 285: Selecting.The.Product FR

Identifier	FR-234
Title	Selecting.The.Product
Requirement	The system shall allow user to select the product to be used as gig to market it.
Source	Ammar Ali
Rationale	To help the user to market his product the system must allow the user to select his product.
Business Rule	None
Dependencies	FR-235
Priority	High

4.47.5 FR-235: Payment.Method

Table 286: Payment.Method FR

Identifier	FR-235
Title	Payment.Method
Requirement	The system shall display the payment window if the user selects the specified gig.
Source	Ammar Ali
Rationale	To allow the users make a payment to purchase the required promotion to market his gig.
Business Rule	None
Dependencies	FR-236
Priority	High

4.47.6 FR-236: Update.Database

Table 287: Update.Database FR

Identifier	FR-236
Title	Update.Database
Requirement	The system shall update the database after the user make payment about the promotion of the gig
Source	Ammar Ali
Rationale	To ensure consistency and efficiency, all information is up-to-date within the system.
Business Rule	None
Dependencies	None
Priority	High

4.48 UC-4.6 Manage Profile

4.48.1 FR-237: Manipulate.Profile.Information

Table 288: Manipulate.Profile.Information FR

Identifier	FR-237
Title	Manipulate.Profile.Information
Requirement	The system shall display the user's stored profile information and allow them to select and update individual fields.
Source	Ammar Ali
Rationale	To give users control over updating their personal information stored in the system.
Business Rule	All information fields must be editable, and changes must follow the correct data format.
Dependencies	FR-238
Priority	Low

4.48.2 FR-238: Validate.Profile.Information.Format

Table 289: Validate.Profile.Information.Format FR

Identifier	FR-238
Title	Validate.Profile.Information.Format
Requirement	The system shall validate the updated profile information to ensure that the data follows the correct format (e.g., email format, phone number length).
Source	Ammar Ali
Rationale	To prevent incorrect or invalid data from being saved to the user's profile.
Business Rule	All updates must comply with data validation rules (e.g., valid email addresses, phone numbers).
Dependencies	FR-239
Priority	Low

4.48.3 FR-239: Apply.Changes

Table 290: Apply.Changes FR

Identifier	FR-239
Title	Apply.Changes
Requirement	The system shall apply the changes after the user clicks the "Apply" button and the system successfully validates the changes.
Source	Ammar Ali
Rationale	To update the user's profile with the latest information provided.
Business Rule	The system must ensure that updated information is saved correctly across system
Dependencies	None
Priority	Medium

4.49 UC-4.7 Sign Out

4.49.1 FR-240: Initiates.SignOut.Process

Table 291: Initiates.SignOut.Process FR

Identifier	FR-240
Title	Initiates.SignOut.Process
Requirement	The user shall be able to initiate the sign-out process by clicking on the "Sign Out" button in the profile management section.
Source	Ammar Ali
Rationale	To allow users to safely end their session and log out of the system.
Business Rule	None
Dependencies	FR-241
Priority	High

4.49.2 FR-241: Terminate.User.Session

Table 292: Terminate.User.Session FR

Identifier	FR-241
Title	Terminate.User.Session
Requirement	The system shall terminate the user's session and redirect them to the Sign In page after the user successfully signs out.
Source	Ammar Ali
Rationale	To ensure the user is securely logged out and no longer has access to restricted areas.
Business Rule	None
Dependencies	None
Priority	High

5. Non-Functional Requirements

5.1 Reliability

REL-1: The system must remain functional with at least 85% uptime 24/7.

REL-2: The system must be fault tolerant 95% of the times.

REL-3: In case of failure, it will require a hot refresh to resolve most issues.

REL-4: In case when the whole system becomes dysfunctional, an average downtime of 10-15 hours would be required to get it running again depending on the intensity of default.

5.2 Usability

USE-1: AgroTech will allow users get response from each module in less than 1 minute.

USE-2: System will follow simple workflow allowing users to access any major feature within 3 clicks.

USE-3: System will be easy to use and provide tooltips for all advanced features, ensuring that every type of user can easily navigate through platform within 1 hour of use.

USE-4: System Interface will be responsive and compatible with common web browsers (Chrome, Firefox etc.).

5.3 Performance

PER-1: 95% of analysis and reports will be generated and displayed within 5 seconds when processed over a 10 Mbps or faster internet connection.

PER-2: System should be able to handle 1000 concurrent users with no degradation in response time, maintaining an average processing speed of 2 seconds per request.

PER-3: 90% of chatbot queries shall be responded to within 5 seconds, with a maximum response time of 10 seconds during peak hours.

PER-4: System should ensure that recent pictures of yield are uploaded every month.

5.4 Security

SEC-1: User passwords must be stored using industry standard hashing algorithms.

SEC-2: All communication between client and server must be encrypted by HTTPS.

SEC-3: System will implement protection against common web vulnerabilities (injection, cross-site scripting etc.).

6. External Interface Requirements

6.1 User Interfaces Requirements

UI-1: System shall use responsive design framework to ensure compatibility across different desktop devices.

UI-2: Color scheme should be minimal for a cleaner and professional look.

UI-3: Buttons should have effects like hover to provide visual feedback to users.

UI-4: Error messages should be displayed in red so they are clearly visible.

UI-5: System should use commonly used icons (save, del etc.) for ease of use.

6.2 Software interfaces

SI-1: System will integrate Stripe API for handling payments.

SI-2: System will integrate Firebase API for social sign-ins.

SI-3: System will integrate API for transportation module.

SI-4: System will integrate Open API GPT-3.5 for AgroTech Chatbot.

SI-5: System will use third party services for transportation module.

6.3 Hardware interfaces

AgroTech is a web-based application and requires no direct hardware interfaces.

6.4 Communications interfaces

CI-1: System will use SMTP to send emails to users for account verification, password resets, and important updates.

CI-2: System will use HTTPS for all client-server communications to ensure data security.

CI-3: System must provide clear messages when API rate limits are exceeded, including guidance on when the limit will reset.

7. References

1. CropIn Technology Solutions Private Limited. "Cropin Grow". Internet: <https://www.cropin.com/>. May. 5, 2024 [May. 5, 2024]
2. Folio3. "Folio3 Agtech". Internet: <https://agtech.folio3.com/>. May. 1 2024 [May. 2, 2024]
3. KhetiBuddy. "KhetiBuddy Home Gardening App". Internet: <https://khetibuddy.com/ca/>. Apr 18, 2024 [April. 25, 2024].
4. BivatecLtd. "Crop Manager - Farming app". https://play.google.com/store/apps/details?id=com.bivatec.crop_manager&hl=en&gl=TR. March. 18, 2024 [April. 25, 2024]
5. BivatecLtd. "Crop Farmers App". <https://play.google.com/store/apps/details?id=com.bivatec.cropfarmersguide&hl=en&gl=TR>. Jul 24, 2023 [May. 6, 2024]

8. Plagiarism Report

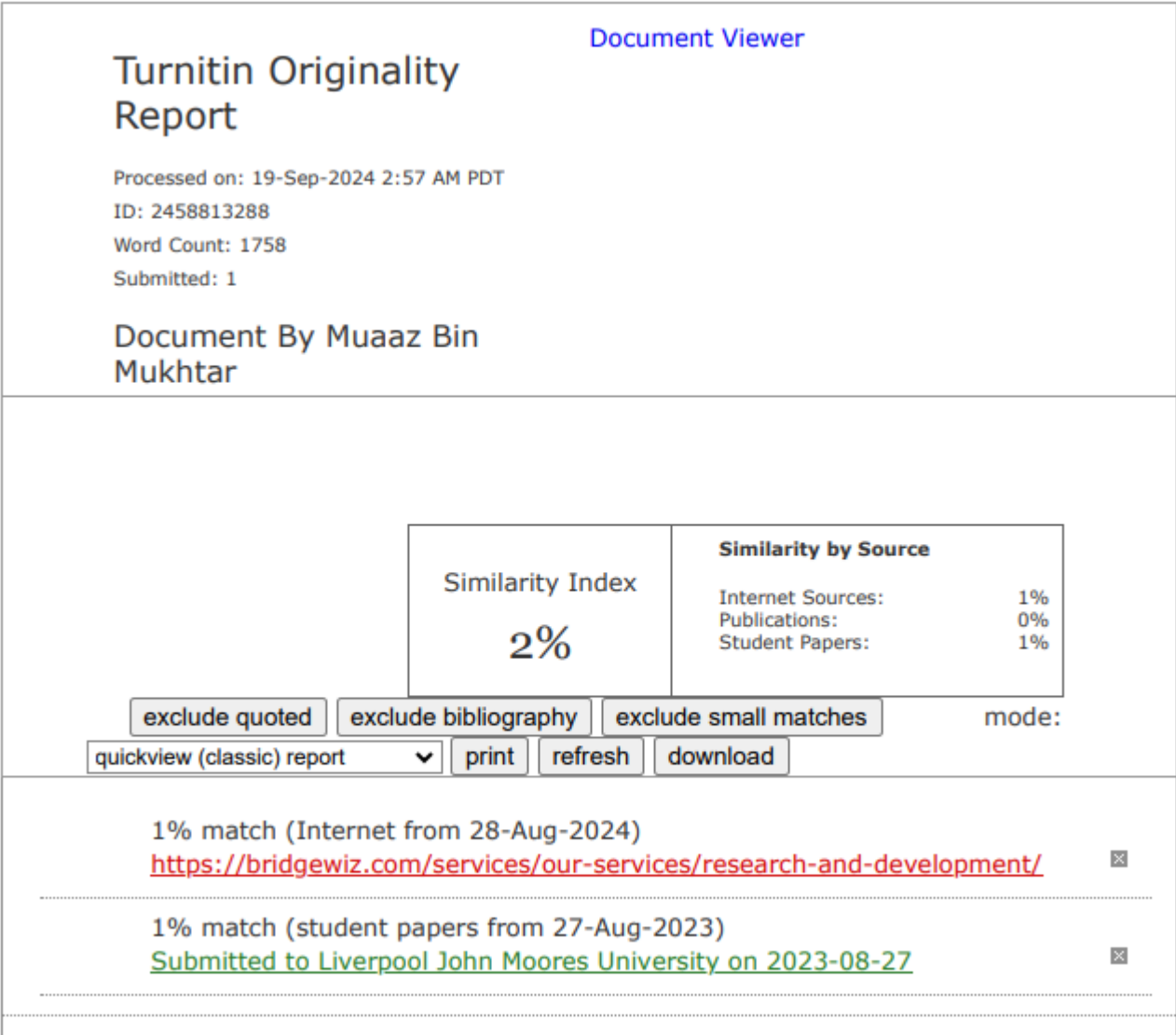


Figure 6: Plagiarism Report