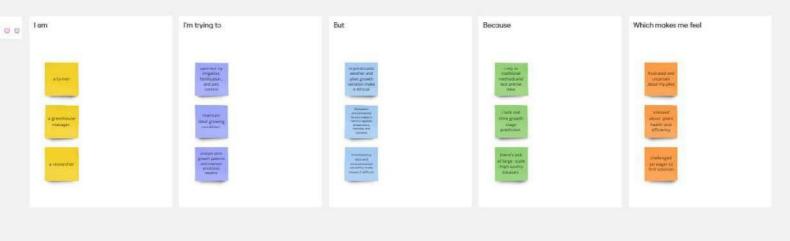
# **Customer Problem Statement Template**





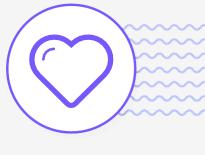
# **Empathymap** canvas

Usethisframeworktoempathizewith acustomer, user, or any person who isaffectedbyateam'swork. Document and discuss your observations and note your assumptionstogainmoreempathy forthepeopleyouserve.

OriginallycreatedbyDaveGrayat

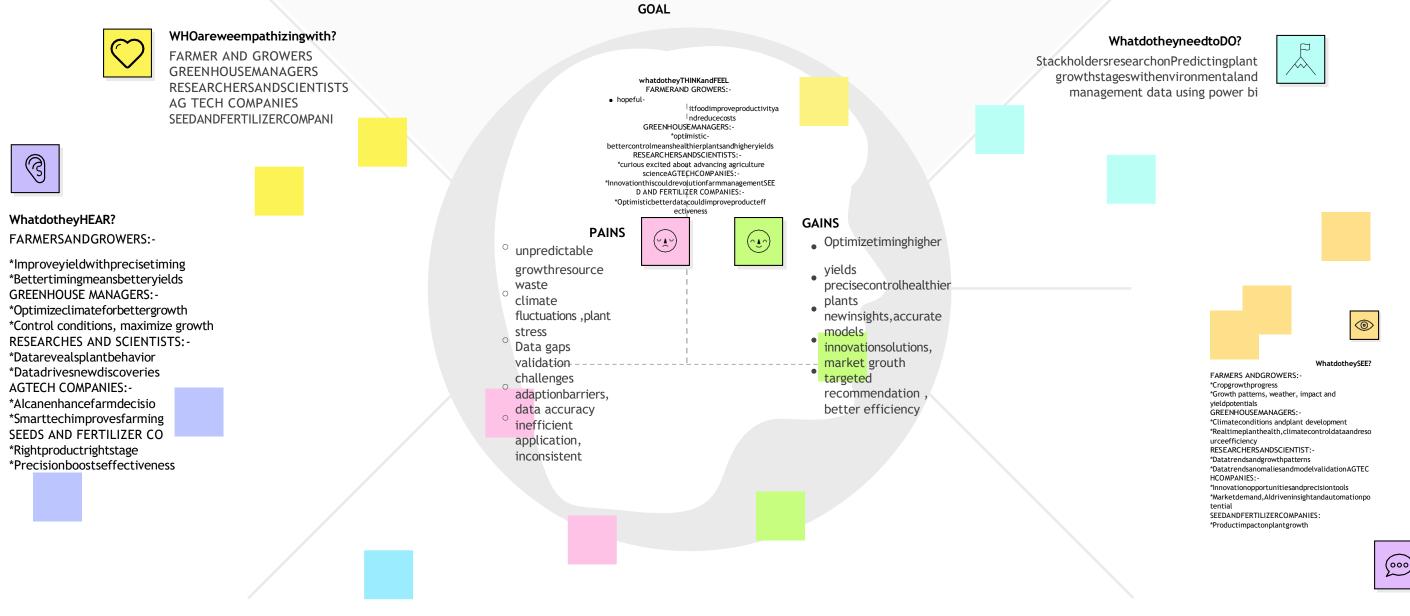


Sharetemplatefeedback



# Developsharedunderstandingandempathy

Summarize the data you have gathered related to the people that areimpactedbyyourwork. It will help you generate ideas, prioritize features, or discuss decisions.



FARMERANDGROWERS:-Adjust irrigation , fertilization , and pest control • GREENHOUSEMANAGERS:-

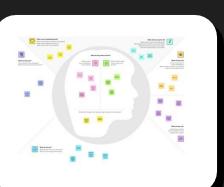
what others thoughts and feelings might influence their behavior?plant growth periodicity in fluenced by environmental conditions, management practicesand internal factors all of which interact dynamically to shape growth patterns.



# WhatdotheySAY?

FARMERANDGROWERS:-\*"Whenshould/waterand fertilizer"? GREENHOUSEMANAGERS:-\*"Istheclimaterightforplant growth"? RESEARCHERSANDSCIENTIST: -\*"Whatpatternsdothedata reveal"? AGTECH COMPANIES:-\*"Howcanwemakeformaking smarter"? SEEDANDFERTILIZER

COMPANIES:-\*"Whichproductworksbestat each stage"?



Need some inspiration? Seeafinishedversion of this template to kickstart your work. Openexample





WhatdotheyDO?

farmers

• Monitorandcontroltemperature,

\* RESEARCHERSANDSCIENTISTS:-

• Analyzegrowthtrendsandvalidate

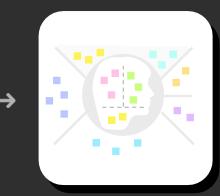
• SEEDANDFERTILIZERCOMPANIES:-

Createtargetedrecommendationfor

humidity and light

models
AGTECH COMPANIES:-

\*DevelopAldrivenprediction



## 1. CUSTOMER SEGMENT(S)

ABC Greenhouses (Commercial greenhouse operators seeking standardized growth conditions)

Green Earth Farms (Organic farmers optimizing yield consistency)

Future Grow Tech (Smart farming technology developers validating their solutions)

#### 6. CUSTOMER CONSTRAINTS CS

Budget limitations for advanced technology adoption

Limited technical expertise in data analytics among greenhouse operators Availability of accurate, real-time environmental

### 5. AVAILABLE SOLUTIONS

CC

RC

Manual observation and trial-and-error adjustments Traditional farming knowledge passed down without data-driven insights

AS

BE

СН

Extract online & offline CH of BE

Explore AS

Generic agricultural software without predictive capabilities

### 2. JOBS-TO-BE-DONE / PROBLEMS

J&P Identifying optimal environmental and management conditions for plant growth

Standardizing growth conditions across different locations

Ensuring consistent organic crop yields Validating smart farming solutions for better growth predictions

#### 9. PROBLEM ROOT CAUSE

Lack of precise, data-driven insights into how environmental and management factors affect plant

Inconsistent application of best farming practices across different locations

#### 7. BEHAVIOUR

Experimenting with different soil types, watering schedules, and fertilizers Seeking recommendations from agronomists or online farming communities Adopting smart farming technologies for monitoring and automation

#### 3. TRIGGERS

Inconsistent plant growth across different greenhouses Variability in organic crop yields impacting business

Need to validate and improve smart farming technology to gain market trust

### 4. EMOTIONS: BEFORE / AFTER

Before: Frustration, uncertainty about growth variability, inefficiency in resource allocation

After: Confidence in decision-making, optimized growth conditions, improved yield and productivity

### 10. YOUR SOLUTION

EM

SL A Power BI-driven predictive analytics solution that helps farmers analyze growth factors and optimize

Interactive dashboards for easy visualization and decision-making

Decomposition tree analysis to break down key factors influencing growth

Standardized recommendations for soil, watering, and environmental conditions

Would you like me to refine this further for specific use cases or stakeholders

## 8. CHANNELS of BEHAVIOUR

Online: Researching agricultural best practices, engaging in farming forums, using farm management software

#### 8.2 OFFLINE

Consulting agronomists, attending farming expos, trialing different growing conditions manually

🔺 AMALTAMA

TR & dentify strong

# Project Design Phase ProposedSolutionTemplate

Date	15February2025
TeamID	LTVIP2025TMID21354
Project Name	Predicityplantgrowthstageswith environmentandmanagementdatausing powerBI
MaximumMarks	2 Marks

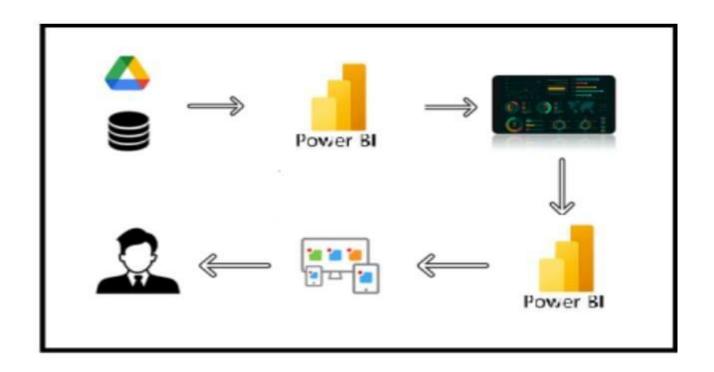
# ${\bf Proposed Solution Template:}$

Project teams hall fill the following information in the proposed solution template.

S.No.	Parameter	Description
1.	Temperature(°C):Measuresheat levelsaffectingplantdevelopment.	Description: Higher temperatures accelerate growth, but excessive heat can cause stress and reduce yield.
2.	Humidity(%):Representsmoisture content in the air.	Description:Lowhumidityincreases transpiration,whilehighhumiditymayleadto disease outbreaks.
3.	SoilMoisture(%):Indicateswater availability in the soil.	Description:Adequatemoisturesupportsroot function, while drought stress slows growth.
4.	SoilTemperature(°C):Theheatlevel in the soil impacting root activity.	Description: Warmer soil boosts germination and nutrient uptake, while colds oil inhibits root expansion.
5.	SolarRadiation(W/m²):Measures sunlight intensity received by the plant.	Description:Essentialforphotosynthesis;low radiation slows growth, while excessive exposure can cause leaf scorching.
6.	Precipitation(mm):Totalrainfall received over time.	Description: Too little precipitation leads to waterstress, while excess rainfall may cause root diseases and flooding.

# Project Design Phase-II TechnologyStack(Architecture&Stack)

Date	31January3035
TeamID	LTVIP2025TMID21336
ProjectName	Predictingplantgrowthstageswithenvironmental andmanagementdatausingpower BI
MaximumMarks	4Marks



### **Technical Architecture:**

The Deliverable shall include the architectural diagram as below and the information as per the table 1&table 2

Table-1:Components&Technologies:

S. No	Component	Description	Technology
1.	DataCollection	Gatheringplantgrowthandenvironmentaldata.	PowerBI,Excel
2.	DataLoading	Importingdataintotheanalysisenvironment.	PowerBI
3.	DataCleaning	Handlingmissingvalues, standardizing formats.	PowerBI
4.	DataVisualization	Creatinggrowthstagecharts,trends,and dashboards.	PowerBI
5.	Scenario1	WaterFrequencyAccordingtoItsSoilType	PowerBIVisualization(Matrix)
6.	Scenario2	AverageTemperaturebyTemperatureRange Description	PowerBIVisualization(waterfallchart)
7.	Scenario3	TemperatureandItsDescriptionAccordingtoPlant Growth	PowerBIVisualization(Keyinfluencers)
8.	Scenario4	GrowthMilestoneCountbyFertilizerType	PowerBIVisualization(Donutchart t)
9.	Scenario5	AverageHumiditybyHumidityLevelDescription	PowerBIVisualization(Ribbonchart)
10.	Scenario6	GrowthMilestoneCountAccordingtoItsSoil Type PowerBIVisualization(Decompos	
11.	Scenario7	Average SunlightHoursbySoilType	PowerBIVisualization(Piechart)
12.	Scenario8	GrowthMilestonePercentagebyWater Frequency PowerBIVisualization(Treemap	
13.	Scenario9	GrowthMilestoneCountbyHumidityLevel Description	PowerBIVisualization(Area chart)
14.	Scenario10	GrowthMilestone Count	PowerBIVisualization(Gauge)
15.	Scenario11	AverageHumidity,AverageTemperature,Average Sunlight Hours	PowerBIVisualization( Table)

16.	ReportCreation	Generatinginteractivereportsonplantgrowth.	
	·		PowerBI
17.	DataExport	Exportingprocessed insights.	PowerBI,Excel

# Table-2:ApplicationCharacteristics:

S. No	Characteristics	Description	Technology
1.	Scalability	Handleslargedatasetscoveringmultipleplant types.	PowerBI,Excel
2.	Interactivity	Allowsfilteringbyplanttype,environmentfactors.	PowerBI(DAX,PowerQuery)
3.	Performance	Optimizedqueriesforefficientanalysis.	PowerBI( DAX)
4.	Usability	User-friendlydashboardsforagriculturalinsights.	PowerBI
5.	Automation	Automateddatarefreshforupdatedinsights.	PowerBI

Scenario: predicityplantgrowth stages with environmental and managementdatausing power bi



How does someone become aware of this service?



Enter

begin the process?

# **Engage**

Inthecoremomentsinthe process, what happens?



# **Exit**

What do people typically experienceastheprocessfinishes?



# Extend

Whathappensafterthe experience is over?



# **Experiencesteps**

Whatdoestheperson(orpeople)at thecenterofthisscenariotypically experience in each step?

collectenvironmental (e.g., temperature, humidity, and moisture)

andmanagementdata

temperature, humidity,

soil, moisture, light

exposureect

attractfarmersresearchers

explore data using visualization (charts, scatter plots )to understandtrendsand patterns

integratethisdatapower

bi you can use power bi

data connecters to

import dataform

different sources

Whatdopeopleexperienceas they

analyze data with powerbisAltoolsare integrate predictive models (forecasting)

handle missing values

normaliseorscalethe

environmentaldataif

necessary

create dashboards for decisionmakerstotrack growth stages share insightsandreportswith stake holders

usehistoricaldataof

plant growth stages

and correlate with

environmental

monitorgrowthstages continuouslywithreal time data updates

growthstagesofplants

overtime predicted

growthstages based on

current data



# **Interactions** Whatinteractionsdotheyhaveateach

step along the way? People: Whodotheyseeortalkto?

- Places: Wherearethey?
- Things: What digital touch points or physical objects do they use?



# At each step, what is a person's

primary goal or motivation? ("Helpme..." or "Helpmeavoid...")

and investors by demonstratingthevalueof predictive analytics in agriculture

provideaintuitiveon boarding experience foruserstoinputand access data

after interactive making

dashboardsandreal time insights for proactive decision provideseamlessdata export options for externalreportingand compliance purposes

scale the system to supportadvancedAIdriven predictions



# **Positive moments** Whatstepsdoesatypicalpersonfind

enjoyable, productive, fun, motivating, delightful, or exciting?

importenvironmental data(temperature humiditysunlightsoil moisture) etc

use powers biDAX (data analysis expressions)andpower querytobuildcomplex calculations

usepowerbiforecasting featuretopredictfuture growth stages based on historical data

createadashboardthat summarizes the plant growth stages and predictionineasyformat develop a monitoring dashboardforongoing tracingofplantgrowth stages in real time



# **Negative moments**

Whatstepsdoesatypicalpersonfind frustrating, confusing, angering, costly, or time-consuming?

orperceivedcomplexity high inital costs may discourage early adaption

duetolackoffamiliarity

develop a users friendlyonboarding process with guided tutorialsandsupport

users might face

challenges with data

migrationfromlegacy

systems

overloadofinformation mayoverusersmaking it difficulttoextract actionableinsights

lack of support for transitioning to alternative solutions couldcreatedependency

continuousupdateand changes may require training



# Areasofopportunity

Product School Created in partnership with Product School

Howmightwemakeeachstepbetter? Whatideasdowehave?Whathave others suggested?

leverage marketing campaignstoshowcase success stories and tangible benefits

enhance data visualization with customizable dashboard tocatertodifferentuser needs

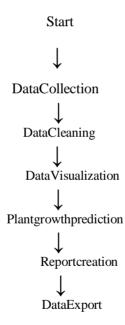
providetransitionplans collaboratewithresearch orintegrationpathways institutions to improve for users moving to alternative solutions predictiveanalyticswith advancedAlmodels



## ProjectDesignPhase-II DataFlowDiagram&UserStories

Date	31January2025
TeamID	LTVIP2025TMID21354
ProjectName	Predictingplantgrowthstageswithenvironmentaland management data using power BI
MaximumMarks	4Marks

**DataFlowDiagrams:** ADataFlowDiagram(DFD)isatraditionalvisualrepresentationoftheinformationflowswithinasystem. AneatandclearDFDcandepicttherightamountofthe system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.



## **UserStories**

Use the below template to list all the users to ries for the product.

UserType	Functional Requirement (Epic)	UserStory Number	UserStory/Task	Acceptancecriteria	Priority	Release
Dataanalyst	DataCollection	USN-1	As a data analyst, I want to collect plant growth datafromgreenhousesensors, weather stations, and farm records.	Data collected from IoT sensors, climate data sources, and manual farm logs.	high	Sprint-1
Dataanalyst	DataCleaning	USN-2	Asadataanalyst, Iwanttopreprocess plant growth datas oth a titis free from errors and inconsistencies.	Data is cleaned, missing valueshandled, and formats standardized.	medium	Sprint-1
Dataanalyst	DataVisualization	USN-3	Asadataanalyst,Iwanttovisualizeplantgrowth trends using Power BI so that I can generate meaningfulinsights.PowerBIdashboardsdisplay plant	PowerBldashboardsdisplay plantgrowthpatternsbysoil type,waterfrequency,and temperature.	high	Sprint-2
Greenhouse Manager	Plantgrowth prediction	USN-4	As a greenhouse manager, I want to analyze historicalplantgrowthtrendstostandardizebest practices.	Reports highlight optimal environmentalconditionsfor plant growth.	high	Sprint-2
Agri-Tech Company	Reportcreation	USN-5	Asaarri-techcompany,usercanexportsforfurther analysis.	Icancreatereports.	medium	Sprint-2
Farmers	DataExport	USN-6	Asafarmer, Iwant to export analyzed plant growth datas othat Icanuse it for yield planning.	UserscanexportdatainCSV, PDF, and Excelformats.	medium	Sprint-2

# ProjectDesignPhase-II SolutionRequirements(Functional&Non-functional)

Date	31January2025
TeamID	LTVIP2025TMID21354
ProjectName	Predicityplantgrowthstageswithenvironmentand managementdatausingpowerBl
MaximumMarks	4Marks

# FunctionalRequirements:

Following are the functional requirements of the proposed solution.

FRNo.	FunctionalRequirement(Epic)	SubRequirement(Story/Sub-Task)
FR-1	Dataingestionandintegration	Systemshouldimportenvironmentaldata(eg; temperature, humidity, rainfall, soil moisture
FR-2	Dataprocessingand transformation	Systemshouldcleannormalisationandtransformraw data inti structure dataset. Data aggregate a cross different time framer ( daily, weekly, monthly).
FR-3	Predictive analytics model	Implementationmachine, learning models to predict plant growth stage based on the environmental and data model
FR-4	Visualizationandreporting	Interactivedashboarddisplayingcurrentandpredicted plantgrowthstagesgroupsandhearnapsrepresenting environmental influences on growth
FR-5	Usersmanagementand accessibility	Rolebasedaccesscontrolfordifferentusersabilityto set permission for data access and modifications
FR-6	Alertsandnotification	System should generate alerts for adverse the environmental conditions affectingplant growth Notificationthroughemailormobilefordecision—makingsupport
FR-7	IntegrationwithpowerBl	Seamlessintegration with power BI for real—timedata visualization

### Non-functional Requirements:

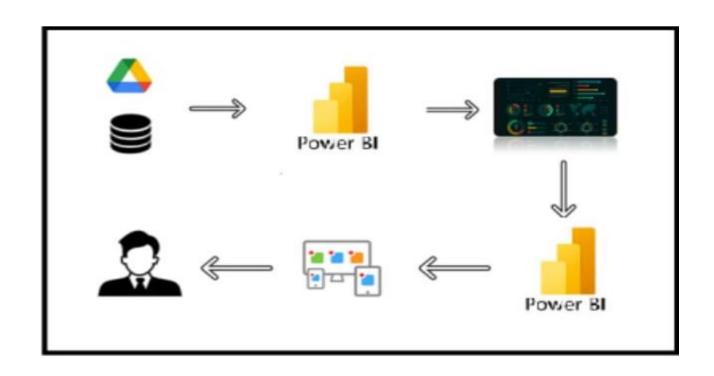
Following are the non-functional requirements of the proposed solution.

FRNo.	Non-FunctionalRequirement	Description
NFR-1	Performanceandscalability	System should handle large dates efficiency
		scalabilityarchitecturetosupportmultipleframe and
		large scale agriculture operations

NFR-2	Reliabilityandavailable	Ensurehighavailabilitywithminimaldowntime implementation and back over strategies
NFR-3	Securityandcompliance	Dataencryptionforstorageandtransmissionrole based authentication for access control
NFR-4	Usabilityandaccessibility	Institute user interface with minimal training requiredsupportformultipledevices(tablet, mobile, desktop)
NFR-5	Maintainabilityandextensibility	Modular architecture for easy update and enhancementswelldocumentscodeandsystem process
NFR-6	Dataaccuracyandconsistency	Implementdatavalidationmechanismtoensure accuracy regular update and synchronisation to avoid outdated information
NFR-7	Responsetime	System should provide near real time data update dashboardshouldloadwithinafewsecondsforan optimal user experience

# Project Design Phase-II TechnologyStack(Architecture&Stack)

Date	31January 2025
TeamID	LTVIP2025TMID21354
ProjectName	Predictingplantgrowthstageswithenvironmental and
	management data using power BI
MaximumMarks	4Marks



### TechnicalArchitecture:

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3.	Performance	Optimizedqueriesforefficientanalysis.	PowerBI(DAX)
4.	Usability	User-friendlydashboardsforagriculturalinsights.	Power BI
5.	Automation	Automateddatarefreshforupdatedinsights.	Power BI

# ProjectPlanningPhase ProjectPlanningTemplate(ProductBacklog,SprintPlanning,Stories,Story points)

Date	15February2025
TeamID	LTVIP2025TMID21354
ProjectName	Predicityplantgrowthstageswithenvironment and management data using powerBl
MaximumMarks	5Marks

# ProductBacklog,SprintSchedule,andEstimation(4Marks)

Usethebelowtemplatetocreateproductbacklogandsprintschedule

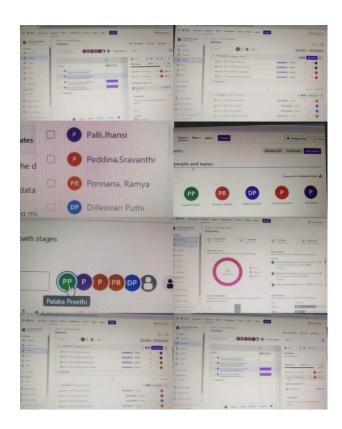
Sprint	Functional Requirement(Epic)	UserStory Number	UserStory/Task	StoryPoints	Priority	Team Members
Sprint-1	Datacollection	USN-1	"Asafarmmanager, Iwanttocollectreal-time environmental and management datasothat can monitor plant	2	High	P.Jhansi
Sprint-1	Datacleaning	USN-2	"Asadataanalyst, Iwanttocleanandstructure incoming data so that predictions are more accurate."	1	High	P.preeti
Sprint-2	Datavisualization	USN-3	"Asanagronomist, Iwanttovisualize growth trends and environmental factors to optimize farm decisions."	2	Low	P.Dilleswari
Sprint-1	Growthoptimization	USN-4	"As an agricultural scientist, I want to analyse theeffectsofsoilmoistureandtemperatureon plant growth."	2	Medium	P.sravanthi
Sprint-1	Smartfarming insights	USN-5	"As an AI model developer, I want to generate predictiveinsightssofarmerscantakeproactive actions."	1	High	P.Ramya
Sprint-2	Datareport	USN-6	"Asafarmowner, Iwanttogenerate periodic reports on plant growth and environmental conditions for better farm management."	1	High	P.preeti

# ProjectTracker, Velocity & Burndown Chart: (4 Marks)

Sprint	TotalStory Points	Duration	SprintStartDate	SprintEndDate (Planned)	Story Points Completed (as on PlannedEndDate)	SprintReleaseDate (Actual)
Sprint-1	20	6Days	24Oct2022	29Oct2022	20	29Oct2022
Sprint-2	20	6Days	31Oct2022	05Nov2022		
Sprint-3	20	6Days	07Nov2022	12Nov2022		
Sprint-4	20	6Days	14Nov2022	19Nov2022		

### Velocity:

Imaginewehavea10-daysprintduration,andthevelocityoftheteamis20(pointspersprint).Let'scalculatetheteam'saveragevelocity(AV)per iteration unit (story points per day)



## ProjectDevelopmentPhase Model Performance Test

Date	10February2025
TeamID	LTVIP2025TMID21354
ProjectName	Predicting plant growth stages with environmentalandmanagementdatausing power BI
MaximumMarks	

### ModelPerformanceTesting:

Project teams hall fill the following information in model performance testing template.

