

AgriTrust Connect – Phase 5: Apex Programming (Developer) Report

- **Project Title:** AgriTrust Connect – Sustainable Agriculture CRM
- **Phase:** 5 – Apex Programming (Developer)
- **Date:** 24 September 2025
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1. Introduction

Phase 5 focused on implementing developer-level functionality in AgriTrust Connect using Apex Classes, Triggers, and Asynchronous Processing. The goal of this phase was to extend system automation beyond declarative tools, ensuring scalability, reusability, and advanced business logic handling. Apex development was carried out following Salesforce best practices, including the Trigger-Handler Pattern, Separation of Concerns, and Unit Test Coverage (>75%).

2. Apex Classes

Purpose: Encapsulate business logic for modularity and reusability.

Class Name	Description
FarmManagementHandler	Performs farm-related calculations and validations.
CropCycleTriggerHandler	Handles all trigger logic for Crop Cycle object.
ProcurementTriggerHandler	Handles all trigger logic for Procurement object.
WeatherService	Future method class to asynchronously fetch and store weather data.
ProcurementProcessor	Queueable Apex class for background processing of procurement records.
SearchUtility	Provides reusable, application-wide search helper methods.

3. Apex Triggers

Purpose: Automate complex record-level operations that cannot be achieved with point-and-click tools.

Trigger Name	Object	Events	Purpose
CropCycleTrigger	Crop_Cycle__c	Before Insert/Update	Validate crop cycle data before saving.
ProcurementTrigger	Procurement__c	After Insert	Automatically create a related Traceability Ledger record.

4. Asynchronous Apex

- **Future Methods:** Implemented in **WeatherService** to fetch external weather data asynchronously and store results in a custom object Weather__c.
- **Queueable Apex:** Implemented in **ProcurementProcessor** to process bulk procurement records efficiently in the background.
- **Scheduled Apex:** Implemented via **SeasonalAlertScheduler** to send scheduled seasonal alerts to all farmers, based on their Level__c designation (Primary, Secondary, Tertiary).

5. SOQL, SOSL & Collections

- **SOQL Queries:** Implemented to fetch related farms, crop cycles, and procurement records. Queries use indexed fields where possible for efficiency.
- **Collections:** Lists, Sets, and Maps were implemented for bulk-safe operations, including storing crop cycles, mapping farmer IDs to landholding sizes, and holding unique crop types.
- **SOSL Queries:** Defined for searching across Farmer and Buyer records for future enhancements.

6. Test Classes

Purpose: Validate functionality and achieve Salesforce deployment requirement of 75%+ coverage.

Test Class Name	Coverage Focus
CropCycleTriggerTest	Ensures validations and task creation logic works.
ProcurementTriggerTest	Validates Traceability Ledger creation.
FarmManagementHandlerTest	Validates farm calculations and error handling.
WeatherServiceTest	Validates the asynchronous callout and data handling.
ProcurementProcessorTest	Ensures the Queueable Apex processes records correctly.
SeasonalAlertSchedulerTest	Verifies scheduling logic and correct farmer selection.
SearchUtilityTest	Confirms search methods return accurate results.

7. Phase 5 Outcome

- Apex Classes modularized to encapsulate business logic.
- Trigger-Handler pattern adopted to maintain clean and scalable code.
- Asynchronous Apex implemented for background processing and scalability.
- Test classes developed with coverage above 75%, ensuring deployment readiness.
- Developer foundation of AgriTrust Connect is complete and integrated with earlier automation (Phase 4).

Overall Code Coverage			>>
Class	Percent	Lines	
Overall	100%		
CropCycleTrigger	100%	2/2	
CropCycleTriggerHandler	100%	5/5	
FarmManagementHandler	100%	9/9	
ProcurementProcessor	100%	8/8	
ProcurementTrigger	100%	2/2	
ProcurementTriggerHandler	100%	11/11	
SearchUtility	100%	2/2	
SeasonalAlertScheduler	100%	3/3	
WeatherService	100%	5/5	

Code samples: <https://github.com/srivaishnavi26/AgriTrust-Connect>

Directory:

force-app/main/default/

```
├── triggers/
│   ├── CropCycleTrigger.trigger
│   └── ProcurementTrigger.trigger
└── classes/
    ├── handlers/
    │   ├── CropCycleTriggerHandler.cls
    │   ├── FarmManagementHandler.cls
    │   └── ProcurementTriggerHandler.cls
    ├── services/
    │   ├── ProcurementProcessor.cls
    │   └── WeatherService.cls
    ├── schedulers/
    │   └── SeasonalAlertScheduler.cls
    ├── utils/
    │   └── SearchUtility.cls
    └── tests/
        ├── CropCycleTriggerTest.cls
        ├── FarmManagementHandlerTest.cls
        ├── ProcurementProcessorTest.cls
        ├── ProcurementProcessorTest_Ex...cls
        ├── ProcurementTriggerTest.cls
        ├── SeasonalAlertSchedulerTest.cls
        ├── SearchUtilityTest.cls
        └── WeatherServiceTest.cls
```

Phase 5 is complete and ready for inclusion in the final project report.