6. QUALITY ASSURANCE

6. QUALITY ASSURANCE

PROCESS SUMMARY

Objective:

- Ensure the quality of seeds at various stages
- Declaring quality results at right time

Process Overview:

Seed Testing Laboratory

1. Germination Test
2. Moisture Test
3. ODV Test
4. Field Emergence Test
5. PH & EC Test
6. Vigour Test
7. Soil cold Test
8. Proficiency Test

ELISA Test

Field Quality

1. Parent Seed Field Inspection
2. Production Field Inspection
3. Grow out Test

Process beginning:

- Receipt of samples from various departments

Process ending:

- Declaration of results for the received samples

Key Inputs

Particulars	From	Document Reference
Lot arrival plan	Production	PRC/COT/025
Samples for testing	Breeder, Parent Seed, Production & Processing	-
Sowing Report for field inspection	Parent seed and Production	QAS/COM/030
Inputs for budget	Accounts	-

Key Outputs

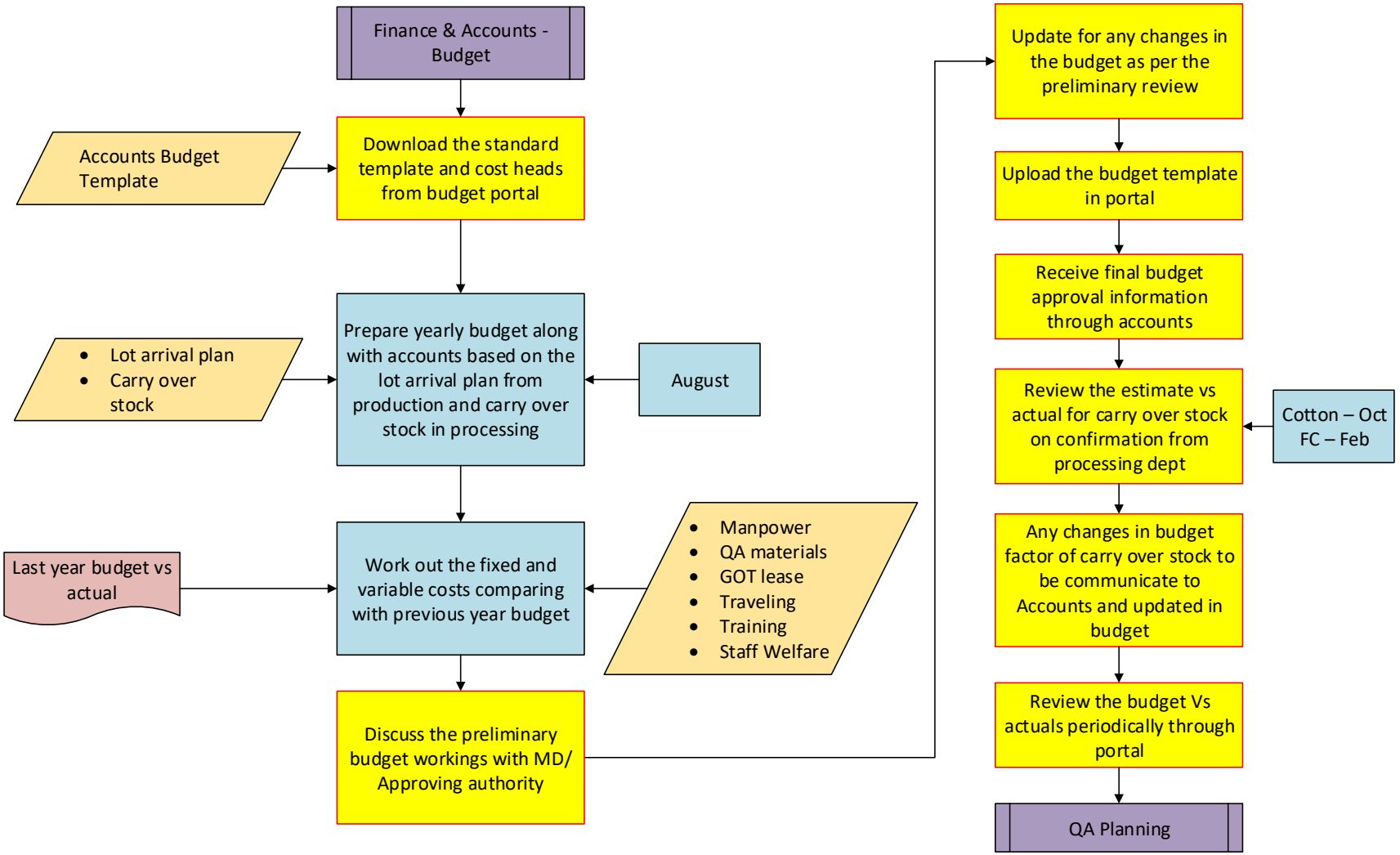
Particulars	To	Document Reference
Quality results	Breeder, Parent Seed, Production & Processing	QAS/COM/020

Key Documents / Register / Files

S no	Document / Register Name	Document Format	Document Reference
1	BtK Protein Analysis	Software Report	QAS/COM/001
2	Disposal approval	Excel	QAS/COM/002
3	EC & PH Register	Manual Register	QAS/COM/003
4	ELISA Plate register	Manual Register	QAS/COM/004
5	ELISA Sample inward	Excel	QAS/COM/005
6	Flowering stage inspection schedule	Excel	QAS/COM/006
7	GC transfer list	Software form	QAS/COM/010
8	Genetic Purity Observation register	Manual Register	QAS/COM/011
9	Germ Count Recording Sheet	Software form	QAS/COM/012
10	GOT Population counting register	Software form	QAS/COM/013
11	Grower wise due payment	Software Report	QAS/COM/014
12	ODV Test register	Manual Register	QAS/COM/015
13	QA Sample Acknowledgement	Pre-printed form	QAS/COM/016
14	QA Standard	Word	QAS/COM/017
15	QA Transfer list	Software form	QAS/COM/018
16	QC Checklist	Software report	QAS/COM/019

S no	Document / Register Name	Document Format	Document Reference
17	QC Out	Software form	QAS/COM/020
18	Replication Tag	Software form	QAS/COM/026
19	Sample inward register	Manual Register	QAS/COM/027
20	Sample receipt file	Manual Register	QAS/COM/028
21	Sowing and recording sheet	Pre-printed form	QAS/COM/029
22	Sowing Report - GOT	Pre-printed form	QAS/COM/030
23	STL sample acknowledgement form	Pre-printed form	QAS/COM/032
24	Vigour test Recording Sheet	Software form	QAS/COM/033
25	Parent Seed Characters - Cotton	Excel	PSD/COT/009
26	Parent Seed Characters - Field Crops	Excel	PSD/FCD/009
27	In gate pass	Pre-printed form	GEN/COM/023
28	Out gate pass	Pre-printed form	GEN/COM/001
29	Carry over stock	Software Report	GEN/COM/044
30	Field inspection report	Pre-printed form	GEN/COM/004
31	Grower Pass Book	Pre-printed form	GEN/COM/006
32	Lot arrival plan	Excel	GEN/COM/045
33	Payment Requisition	Excel	GEN/COM/046
34	Stock Transfer Shipment	Software form	GEN/COM/009
35	Manpower request form	Pre-printed form	HRM/COM/002
36	Training Feedback Form	Pre-printed form	HRM/COM/057
37	Training record	Pre-printed form	HRM/COM/056

6.1 QUALITY ASSURANCE BUDGET PROCESS



Sub-process Owner:
Manager - QA

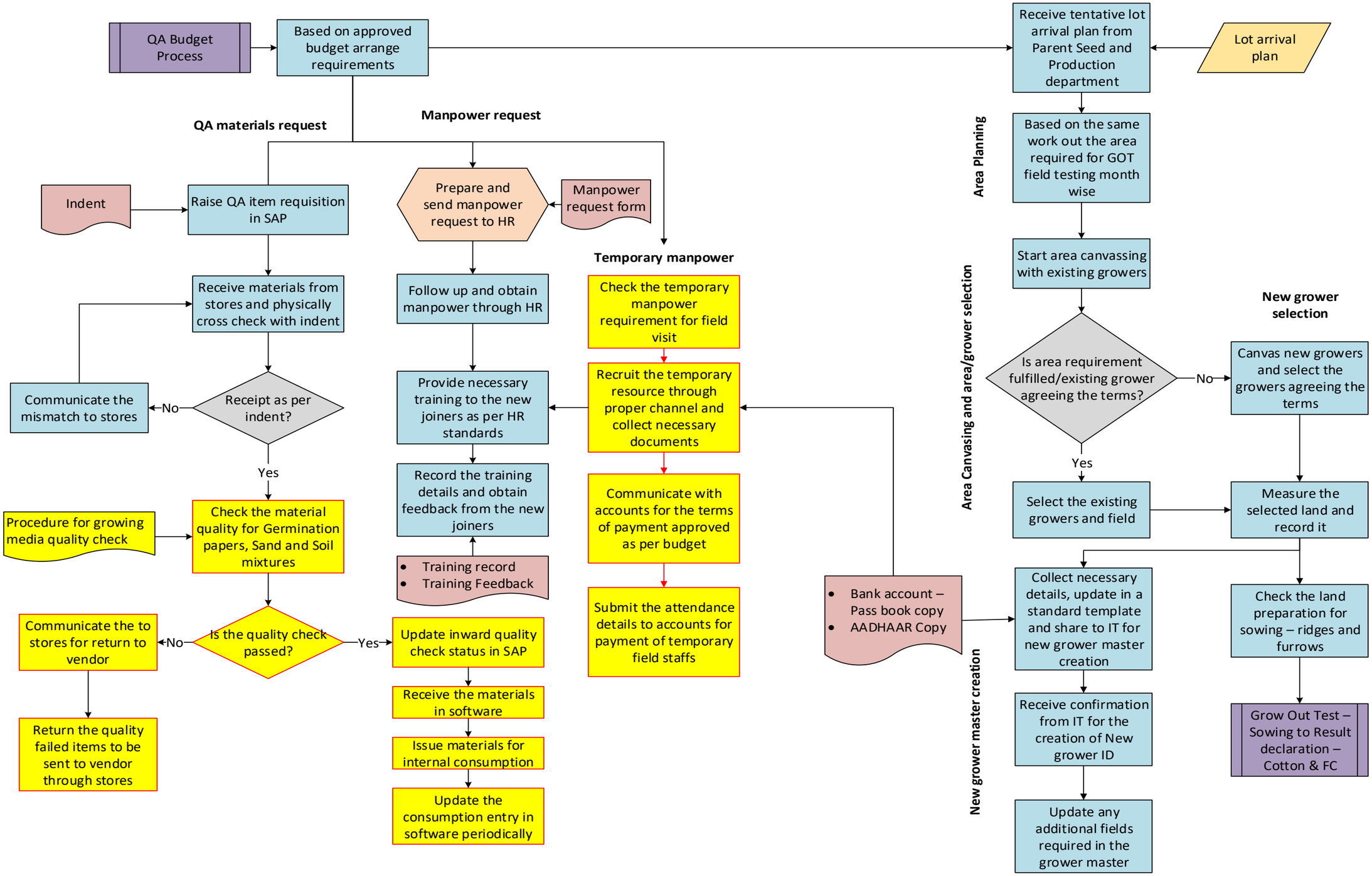
Departments Involved:
Parent Seed
Processing
QA

Key activities:
6.1.1 Budget preparation
6.1.2 Budget approval and monitoring

Process	Maker	Checker	Approver
6.1.1 Budget preparation			
1) Login to the budget portal and download the standard budget template and cost heads	Manager – QA		
2) Share the standard budget template to QA team for budget preparation	Manager – QA		
3) Prepare yearly budget along with accounts based on the lot arrival plan from production and carry over stock in processing	Asst. Manager/Deputy Manager	Manager - QA	
4) Work out the fixed and variable costs comparing with last year budget vs actual, • Manpower – Regular & Temporary • QA materials • GOT lease • Travelling • Training • Staff welfare	Asst. Manager/Deputy Manager	Manager – QA/Head – Commercial & Cotton Parent Seed	
5) Get appointment from MD/Approving authority and discuss the preliminary budget workings	Manager - QA	Accounts team/ Head – Commercial & Cotton Parent Seed	Management
6.1.2 Budget approval and monitoring			
6) Update the budget for any changes as per the preliminary review with MD/Approving authority	Asst. Manager/Deputy Manager	Manager - QA	
7) Upload the budget template in budget portal	Manager - QA	Head – Commercial & Cotton Parent Seed	
8) Receive the final budget approval information through accounts	Manager - QA	Head –	

Process	Maker	Checker	Approver
		Commercial & Cotton Parent Seed	
9) Review the estimate Vs actual for carry over stock on confirmation from processing department Cotton – October End & FC – February end	Manager - QA	Head – Commercial & Cotton Parent Seed	
10) Any changes in budget factor due to the above needs to be communicated to accounts and to be updated in the budget	Manager - QA	Head – Commercial & Cotton Parent Seed	
11) Review the budget Vs actual periodically through portal	Manager - QA	Head – Commercial & Cotton Parent Seed	

6.2 QUALITY ASSURANCE – PLANNING



Sub-process Owner:
Manager - QA

Departments Involved:
Parent Seed
Processing
QA

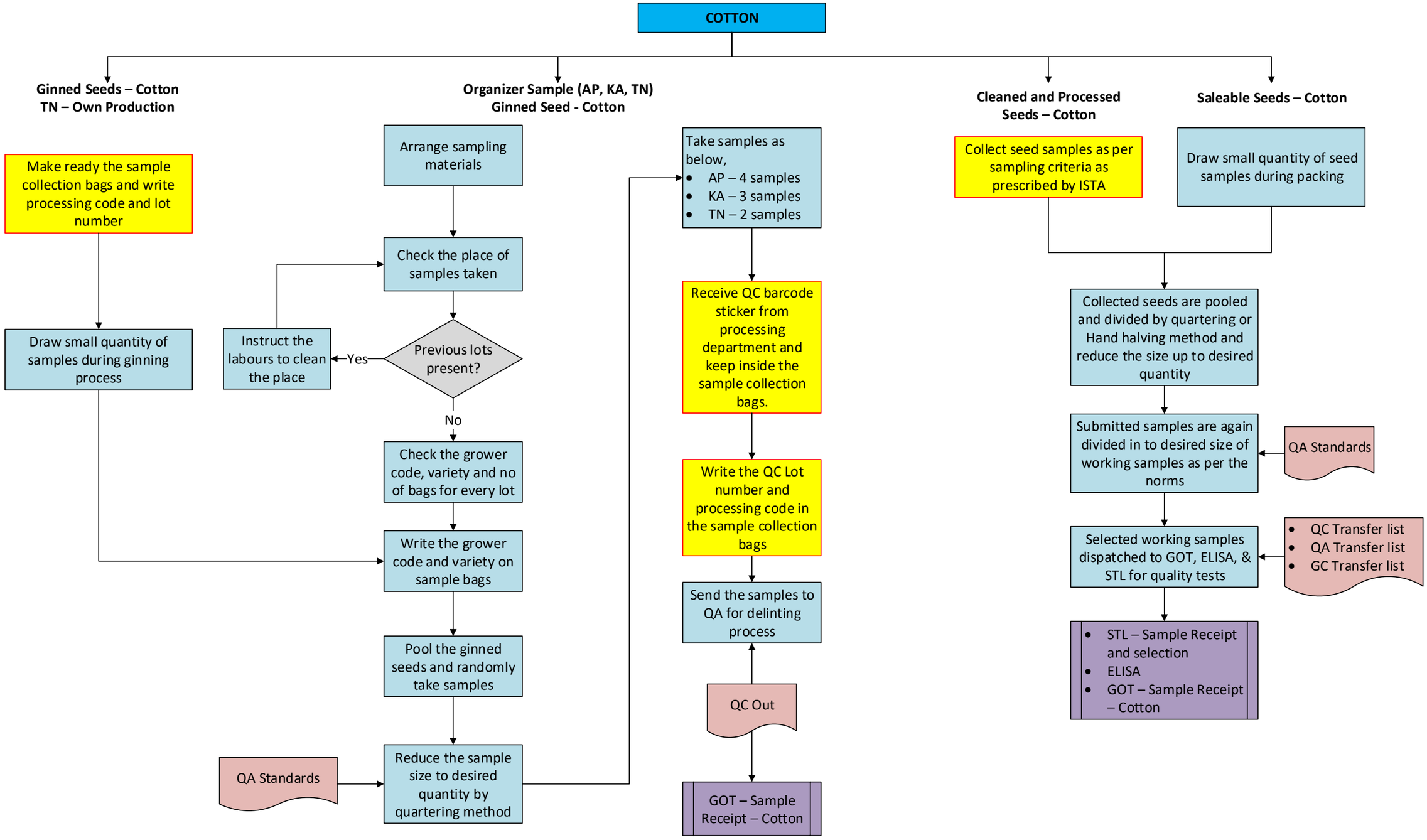
Key activities:
6.2.1 Material planning
6.2.2 Manpower planning
6.2.3 GOT Field selection

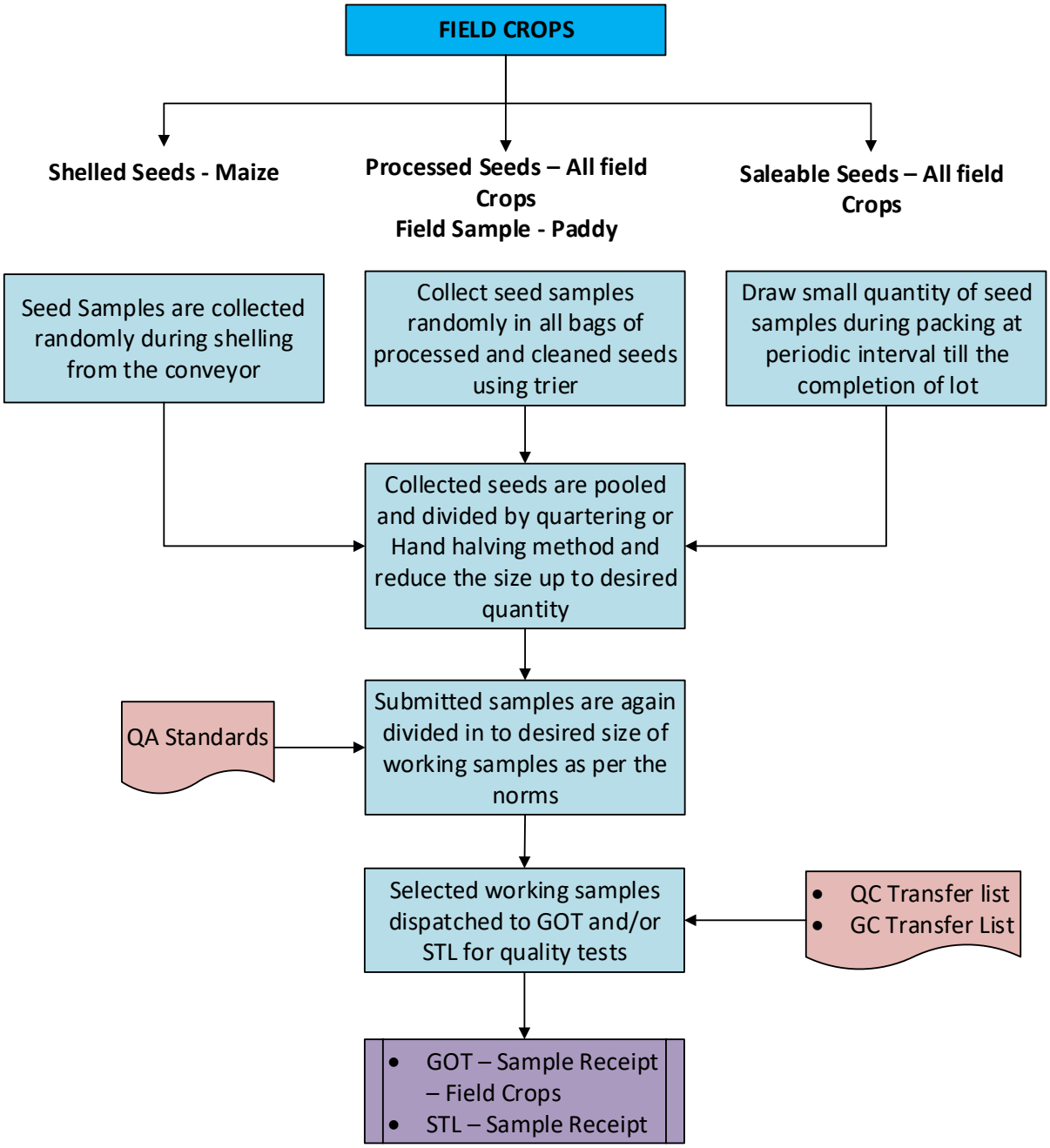
Process	Maker	Checker	Approver
6.2.1 Material Planning			
1) Based on approved budget arrange for QA materials such as lab chemicals, consumables, growing media, stationeries,	Asst. Manager/Deputy Manager	Manager - QA	
2) Raise QA item requisition in SAP	Data entry operator	Asst. Manager/Deputy Manager	Manager - QA
3) Receive material from store through stock transfer shipment and physically cross check with indent	Lab Assistants	Asst. Manager/Deputy Manager	
4) Communicate the mismatch to stores in case of the receipt is not as per the indent	Asst. Manager/Deputy Manager	Manager - QA	
5) Check the material quality for germination papers, sand and soil mixture as per QA standards • Procedure for growing media quality check	Lab Assistants	Asst. Manager/Deputy Manager	
6) Communicate to stores for returning the materials in case the quality check is not passed	Asst. Manager/Deputy Manager	Manager - QA	
7) Return the quality failed materials to stores through gate pass to be returned to vendor	Lab Assistants	Asst. Manager/Deputy Manager	Manager - QA
8) Update the inward quality check status in SAP	Data entry operator	Asst. Manager/Deputy Manager	Manager - QA
9) Receive the materials in Software for the quality check passed items	Data entry operator	Asst. Manager/D	

Process	Maker	Checker	Approver
		eputy Manager	
10) Issue material for internal consumption and update the consumption entry in software periodically	Data entry operator	Asst. Manager/Deputy Manager	
6.2.2 Manpower Planning			
Regular Manpower			
1) Prepare and send manpower request to HR through manpower request form	Asst. Manager/Deputy Manager	Manager - QA	
2) Follow up and obtain manpower through HR and provide necessary training to new joiners as per standards • QA Training Checklist	Asst. Manager/Deputy Manager	Manager - QA	
3) Record the training details and obtain feedback from the new joiners • Training attendance • Training Assessment • Training feedback	Asst. Manager/Deputy Manager	Manager - QA	
Temporary Manpower			
1) Check the temporary manpower requirement for field visit during season	Asst. Manager/Deputy Manager	Manager - QA	
2) Recruit the temporary manpower through proper channel • Reference • Resources deployed during previous season • Authorized contractor	Asst. Manager/Deputy Manager	Manager - QA	
3) Collect necessary documents from the temporary resource such as , • Bank pass book copy • ID Proof - AADHAAR	Asst. Manager/Deputy Manager	Manager - QA	
4) Provide necessary training to new joiners as per standards • QA Training Checklist	Asst. Manager/Deputy Manager	Manager - QA	
5) Record the training details and obtain feedback from the new joiners • Training attendance • Training Assessment • Training feedback	Asst. Manager/Deputy Manager	Manager - QA	
6) Communicate with accounts for the terms of payment approved as per budget	Asst. Manager/Deputy Manager	Manager - QA	
7) Maintain field attendance for the temporary QA assistants	Asst.	Manager -	Manager -

Process	Maker	Checker	Approver
and submit the same to accounts for payment as per approval	Manager/Deputy Manager	QA	QA
6.2.3 GOT field selection process			
1) Receive tentative lot arrival plan data from parent seed and production department	Deputy Manager	Manager - QA	
2) Ensure the area required for GOT field testing month wise Based on the same work out	Deputy Manager	Manager - QA	
3) Start area canvassing with existing growers and check if the area requirement fulfills the growers and agreeing terms and conditions	Field Supervisors/Field Assistants	Deputy Manager	
4) Select the grower and field agreeing terms and conditions	Deputy Manager	Manager - QA	
5) Measure the selected land and record the measurement	Field Supervisors/Field Assistants	Deputy Manager	
6) Check the land preparation for sowing –ridges and furrows	Field Supervisors/Field Assistants	Deputy Manager	
7) In case the area requirement does not fulfills the grower's terms and conditions then canvas the new grower and select the grower agreeing terms and conditions	Field Supervisors/Field Assistants	Deputy Manager	
8) Collect necessary details from new growers, update the same in a standard template and share to it for new grower master creation in software	Field Supervisors/Data entry operator	Deputy Manager	
9) Receive confirmation from IT towards creation of new grower master	Data entry operator	Deputy Manager	
10) Measure the selected land and record the measurement	Field Supervisors/Field Assistants	Deputy Manager	
11) Check the land preparation for sowing –ridges and furrows	Field Supervisors/Field Assistants	Deputy Manager	

6.3 SAMPLING


COTTON
Ginned Seeds – Cotton
TN – Own Production
Make ready the sample collection bags and write processing code and lot number
Draw small quantity of samples during ginning process
Write the grower code and variety on sample bags
Pool the ginned seeds and randomly take samples
Reduce the sample size to desired quantity by quartering method
QA Standards
Organizer Sample (AP, KA, TN)
Ginned Seed - Cotton
Arrange sampling materials
Check the place of samples taken
Previous lots present?
Yes
Instruct the labours to clean the place
No
Check the grower code, variety and no of bags for every lot
Take samples as below,
AP – 4 samples
KA – 3 samples
TN – 2 samples
Receive QC barcode sticker from processing department and keep inside the sample collection bags.
Write the QC Lot number and processing code in the sample collection bags
Send the samples to QA for delinting process
QC Out
GOT – Sample Receipt – Cotton
Cleaned and Processed Seeds – Cotton
Collect seed samples as per sampling criteria as prescribed by ISTA
Saleable Seeds – Cotton
Draw small quantity of seed samples during packing
Collected seeds are pooled and divided by quartering or Hand halving method and reduce the size up to desired quantity
Submitted samples are again divided in to desired size of working samples as per the norms
QA Standards
Selected working samples dispatched to GOT, ELISA, & STL for quality tests
QC Transfer list
QA Transfer list
GC Transfer list
STL – Sample Receipt and selection
ELISA
GOT – Sample Receipt – Cotton


FIELD CROPS
Shelled Seeds - Maize
Processed Seeds – All field Crops
Field Sample - Paddy
Saleable Seeds – All field Crops
Seed Samples are collected randomly during shelling from the conveyor
Collect seed samples randomly in all bags of processed and cleaned seeds using trier
Draw small quantity of seed samples during packing at periodic interval till the completion of lot
Collected seeds are pooled and divided by quartering or Hand halving method and reduce the size up to desired quantity
QA Standards
Submitted samples are again divided in to desired size of working samples as per the norms
Selected working samples dispatched to GOT and/or STL for quality tests
QC Transfer list
GC Transfer List
GOT – Sample Receipt – Field Crops
STL – Sample Receipt

Sub-process Owner:
Assistant manager - QA

Departments Involved:
Parent Seed
Processing
QA

Crops Covered:
All Crops

Key activities:
6.3.1 Cotton – Ginned Seeds
6.3.2 Cotton – Processed and Saleable Seeds
6.3.3 Field Crops – Shelled Seeds (Maize)
6.3.4 Field Crops – Processed Seeds (All Crops)

Process	Maker	Checker	Approver
6.3.1 Cotton – Ginned Seeds			
Tamil Nadu – Growers sample			
1) Make ready the sample collection bags and write the processing code and lot number manually in it	QA - Assistants	Asst. Manager/Deputy Manager	
2) Draw small quantity of samples during ginning process	QA - Assistants	Asst. Manager/Deputy Manager	
3) Pool the ginned seeds and randomly take samples	QA - Assistants	Asst. Manager/Deputy Manager	
4) Reduce the sample size to desired quantity by quartering method	QA - Assistants	Asst. Manager/Deputy Manager	
5) Receive QC barcode sticker from processing department and keep inside the sample collection bags.	QA - Assistants	Asst. Manager/Deputy Manager	
6) Write the QC Lot number and processing code in the sample collection bags	QA - Assistants	Asst. Manager/Deputy Manager	
7) Send GOT samples to QA for delinting process	QA - Assistants	Asst. Manager/Deputy Manager	
Organizer Sample (AP, KA, TN)			
1) Arrange sampling material and check the place of samples that are taken away	QA - Assistants	Asst. Manager/Deputy Manager	
2) Ensure if previous lot are available and instruct the labours	QA -	Asst.	

Process	Maker	Checker	Approver
to clean the place	Assistants	Manager/Deputy Manager	
3) Check the grower code, variety and no of bags for every lot and write the grower code and variety on sample bags	QA - Assistants	Asst. Manager/Deputy Manager	
4) Pool the ginned seeds and randomly take samples	QA - Assistants	Asst. Manager/Deputy Manager	
5) Reduce the sample size to desired quantity by quartering method	QA - Assistants	Asst. Manager/Deputy Manager	
6) Take samples as below • AP – 4 samples • KA – 3 samples • TN – 2 samples	QA - Assistants	Asst. Manager/Deputy Manager	
7) Receive QC barcode sticker from processing department and keep inside the sample collection bags.	QA - Assistants	Asst. Manager/Deputy Manager	
8) Write the QC Lot number and processing code in the sample collection bags	QA - Assistants	Asst. Manager/Deputy Manager	
9) Send GOT samples to QA for delinting process	QA - Assistants	Asst. Manager/Deputy Manager	
6.3.2 Cotton - Processed & Saleable seeds			
Cleaned and Processed Seeds			
1) Collect seed samples as per sampling criteria as prescribed by ISTA	QA - Assistants	Asst. Manager/Deputy Manager	
2) Collected seeds are pooled and divided by quartering or hand halving method and reduce the size up to desired quantity	QA - Assistants	Asst. Manager/Deputy Manager	
3) Check the samples submitted are again divided in to the desired size of working samples as per the QA standards	QA - Assistants	Asst. Manager/Deputy Manager	
4) Selected working samples dispatched to GOT, ELISA & STL for quality test	QA - Assistants	Asst. Manager/Deputy Manager	
Saleable seeds			
1) Draw small quantity of seed samples during packing at periodic interval till the completion of lot	QA – Assistants/Processing Assistants	Asst. Manager/Deputy Manager	

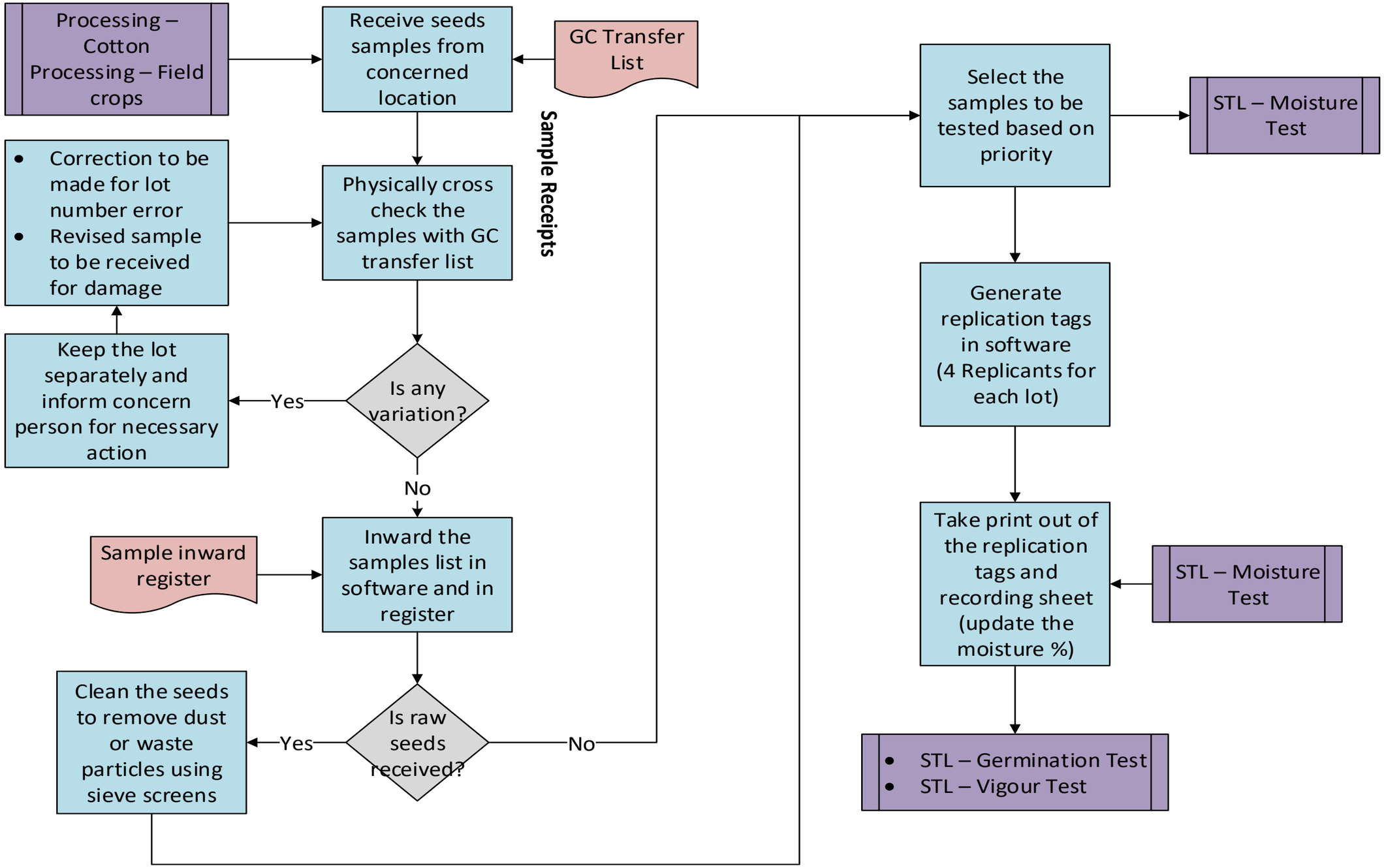
Process	Maker	Checker	Approver
2) Collected seeds are pooled and divided by quartering or hand halving method and reduce the size up to desired quantity	QA – Assistants/Processing Assistants	Asst. Manager/Deputy Manager	
3) Check the samples submitted are again divided in to the desired size of working samples as per the QA standards	QA – Assistants/Processing Assistants	Asst. Manager/Deputy Manager	
4) Selected working samples dispatched to STL for quality test	QA – Assistants/Processing Assistants	Asst. Manager/Deputy Manager	
6.3.3 Field crops – Maize - Shelled seeds			
1) Seed samples are collected randomly during shelling from the conveyor	QA – Assistants/Plant Assistants	Deputy Manager/Plant Manager	
2) Ensure that collected seeds are pooled and divided by quartering or hand halving method and reduce the size up to desired quantity	QA – Assistants/Plant Assistants	Deputy Manager/Plant Manager	
3) Submit the samples as per the QA standards and divide them into desired size of working samples as follows • Selected working samples dispatched to GOT & STL for quality tests • Selected working samples dispatched to STL for quality tests	QA – Assistants/Plant Assistants	Deputy Manager/Plant Manager	
6.3.4 Processed & Saleable Seeds			
Processed and Cleaned Seeds – All Field crops			
1) Update as collect seed samples as per sampling criteria as prescribed by ISTA	QA – Assistants/Plant Assistants	Deputy Manager/Plant Manager	
2) Ensure that collected seeds are pooled and divided by quartering or hand halving method and reduce the size up to desired quantity	QA – Assistants/Plant Assistants	Deputy Manager/Plant Manager	
3) Submit the samples as per the QA standards and divide them into desired size of working samples	QA – Assistants/Plant Assistants	Deputy Manager/Plant Manager	
4) Selected working samples dispatched to GOT & STL for quality tests	QA – Assistants/Plant Assistants	Deputy Manager/Plant Manager	

Process	Maker	Checker	Approver
Salable seeds – All filed crops			
1) Draw small quantity of seed samples during packing at periodic interval till the completion of lot	QA – Assistants/Plant Assistants	Deputy Manager/Plant Manager	
2) Ensure that collected seeds are pooled and divided by quartering or hand halving method and reduce the size up to desired quantity	QA – Assistants/Plant Assistants	Deputy Manager/Plant Manager	
3) Submit the samples as per the QA standards and divide them into desired size of working samples	QA – Assistants/Plant Assistants	Deputy Manager/Plant Manager	
4) Selected working samples dispatched to STL for quality tests	QA – Assistants/Plant Assistants	Deputy Manager/Plant Manager	

Seed Testing Laboratory – Overall Testing Process

- **Germination Test**
  - **Roll towel method**
    - Cotton
    - Wheat
    - Bajra
    - Mustard
    - Sun Flower
  - **Sand Method**
    - Maize
    - Rice
- **Moisture Test**
  - All Crops
- **ODV Test**
  - Rice
- **Field Emergence Test**
  - Cotton
  - Maize
  - Sun Flower
- **EC & PH Test**
  - Cotton – Delinted Seeds
- **Vigour Test**
- **Soil Cold Test**
  - Maize

6.4 STL – SAMPLE RECEIPT AND PREPARATION PROCESS



Sub-process Owner:
Assistant manager - QA

Departments Involved:
Parent Seed
Processing
QA

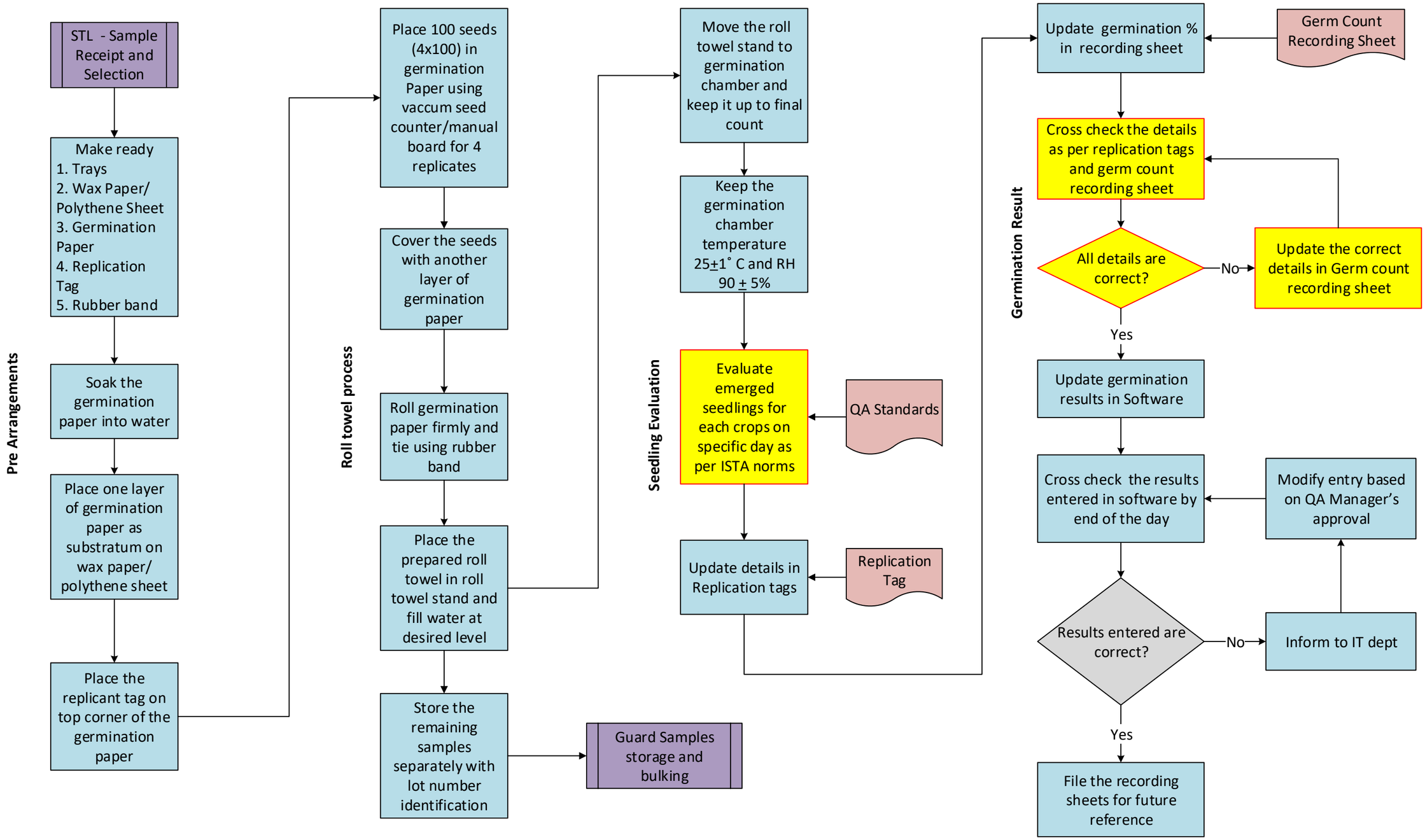
Crops Covered:
All Crops

Key activities:
6.4.1 Sample Receipt and preparation

Process	Maker	Checker	Approver
6.4.1 Sample Receipt and Preparation			
1) Receive processed/raw seed samples from concerned processing/production location	QA - Assistants	Asst. Manager	
2) Physically cross check the samples with GC transfer list, • Unit Code • Document number • QC Lot number • Process Code • Item Classification • Priority	QA - Assistants	Asst. Manager	
3) If any variation found between the samples and list then inform the respective person for corrective action • Correction to be made for any errors in lot number • Replacement of samples to be provided in case of damaged/lot mismatch	QA - Assistants	Asst. Manager	
4) Record the samples received in Sample inward register	QA - Assistants	Asst. Manager	
5) Receive the sample lots in software	Data entry operator	Asst. Manager	
6) In case raw seeds received from production field then the seeds have to be cleaned using sieve screens to remove the dust or waste particles	QA - Assistants	Asst. Manager	
7) Select the samples to be tested based on priority	QA - Assistants	Asst. Manager	
8) Generate replication tags in software – 4 replications for each lot	QA - Assistants	Asst. Manager	
9) Take print out of the replication tags and germ count recording sheet	QA - Assistants	Asst. Manager	

6.5 SEED TESTING LABORATORY - GERMINATION TEST

Roll Towel Method - Cotton, Wheat, Bajra, Mustard and Sunflower



Sand Method – Maize and Paddy

Preparation

STL - Sample Receipt and Selection

Select properly graded and sterilized sand

Pour required quantity of water to moisten the sand

Place moist sand in sand trays – 4 trays

Sand Method

Make 100 holes over sand using Impression board

Place replicant tags on the layer borders

Place 100 seeds into the holes (4 x 100)

Store the remaining samples separately with lot number identification

Guard Samples storage and bulking

Cover the seeds with sand

Move the sand trays to germination chamber and keep up to final count

Keep the germination chamber temperature 25±1˚ C and RH 90 ± 5%

Evaluation process

Evaluate emerged seedlings for each crops on specific day as per ISTA norms

QA Standards

Update details in Replication tags

Replication Tag

Germination Result

Update germination % in recording sheet

Germ Count Recording Sheet

Cross check the details as per replication tags and germ count recording sheet

All details are correct?

No

Update the correct details in Germ count recording sheet

Yes

Update germination results in Software

Cross check the results entered in software by end of the day

Modify entry based on QA Manager's approval

Results entered are correct?

No

Inform to IT dept

Yes

File the recording sheets for future reference

Sub-process Owner:
Assistant manager - QA

Departments Involved:
Parent Seed
Processing
QA

Crops Covered:

1. **Roll towel**
   - Cotton
   - Wheat
   - Bajra
   - Mustard
   - Sunflower
2. **Sand method**
   - Maize
   - Rice

Key activities:
6.5.1 Roll towel method
6.5.2 Sand method

Process	Maker	Checker	Approver
6.5.1 Roll towel method			
1) Make the following ready for roll towel method germination test • Trays • Wax Papers/Polythene sheets • Germination Papers • Replication Tags – Lot wise • Lot wise samples	QA - Assistants	Asst. Manager	
2) Soak the germination paper into water and drain the excess water	QA - Assistants	Asst. Manager	
3) Place one layer of germination paper as substratum on wax paper/polythene sheet	QA - Assistants	Asst. Manager	
4) Place the replication tag on top corner of the germination paper lot wise	QA - Assistants	Asst. Manager	
5) Take 100 seeds and place the same in germination paper using vacuum seed counter/mount board for each replicants/lot (4 replicants x 100 seeds)	QA - Assistants	Asst. Manager	
6) Cover the seeds with another layer of germination paper	QA - Assistants	Asst. Manager	
7) Roll the germination paper firmly and tie the same using rubber band to ensure no seeds were fall down	QA - Assistants	Asst. Manager	
8) Place the prepared roll towels in roll towel stand and fill the	QA - Assistants	Asst.	

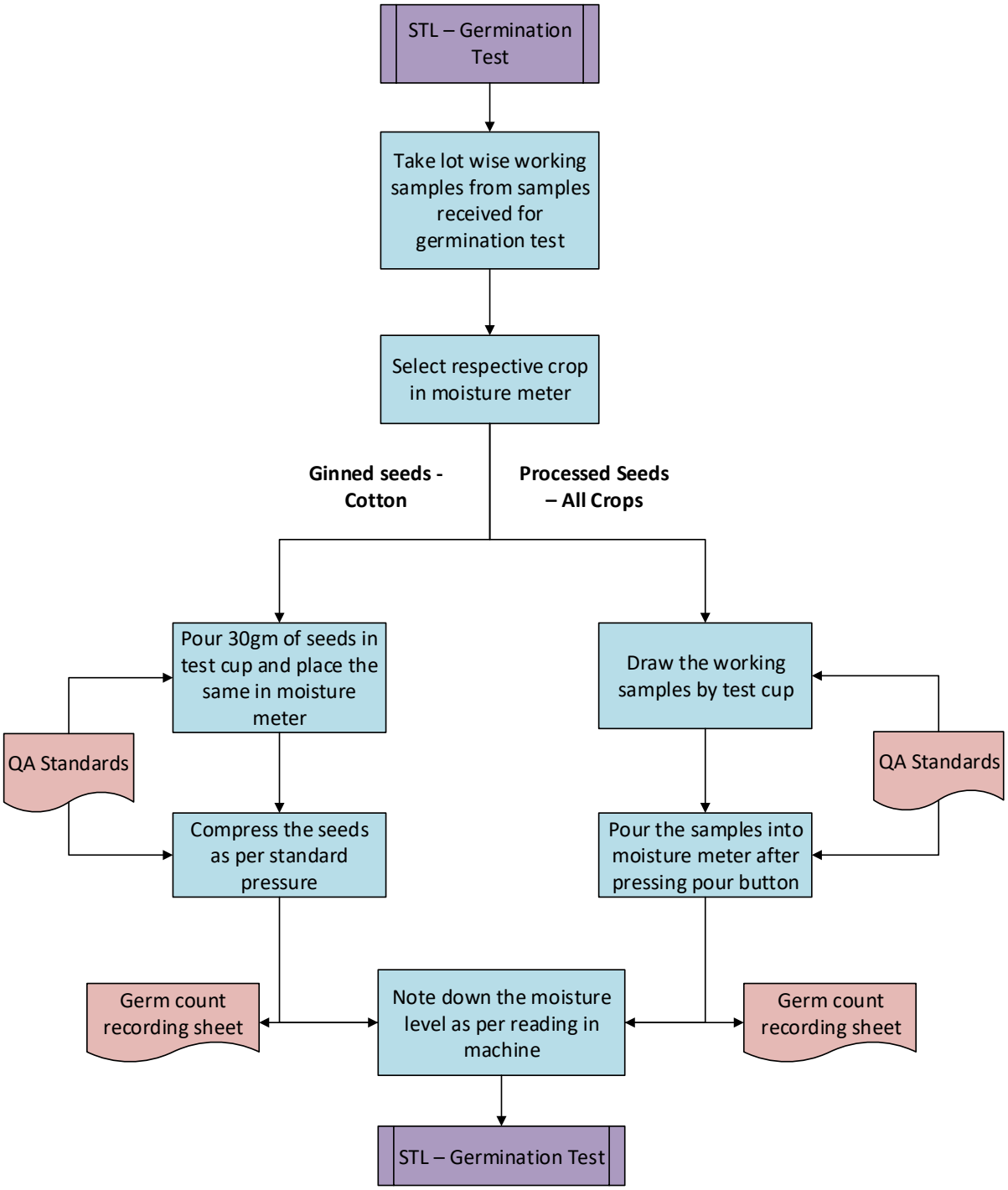
Process	Maker	Checker	Approver
stand with water at desired level		Manager	
9) Store the remaining samples separately with lot number identification	QA - Assistants	Asst. Manager	
10) Move the roll towel stand to germination chamber and keep it up to final count	QA - Assistants	Asst. Manager	
11) Keep the germination chamber temperature at 25 ± 1°C and RH 90 ± 5%	QA - Assistants	Asst. Manager	
12) Evaluate the germination count for each crop on specific day as per ISTA norms **Germination observance day:** • Cotton – 8th day • Wheat – 8th day • Bajra – 7th day • Mustard – 7th day • Sunflower – 10th day **Germination %:** • Cotton – 75% • Wheat – 85% • Bajra – 75% • Mustard -85% • Sunflower – 70%	QA - Assistants	Asst. Manager	
13) Update the germination details in replication tags	QA - Assistants	Asst. Manager	

14) Update the germination % for all tested lots in germination count recording sheet
 	
• Date of Test
• GC_IN_NO
• GC_OUT_NO
• Variety/Hybrid
• Lot No
• Lab Test No
• Replication (1 to 4)
  ➢ NS%
  ➢ ABS%
  ➢ HS%
  ➢ FUG%
  ➢ DS%
• Moisture %
• Pure Seed
• Weed Seed
• Inert Matter
• OCS%
	QA - Assistants	Asst. Manager	

Process	Maker	Checker	Approver
15)Cross check the details randomly as per replication tags with the germination count recording sheet	Assistant Manager		
16)In case of any variation then update the correct details in the germination count recording sheet	QA - Assistants	Asst. Manager	
17)In case of no variation then update the germination results in software	Data entry operator	Assistant Manager	
18)On end of the day cross check the recording sheet and germination results entered in software	Assistant Manager	Manager – QA	
19)If any error in data entry, then communicate the error details to IT with corrective action to be made in software	Assistant Manager	Manager – QA	
20)Rectification/modification entry to be made in software based on QA managers approval	Data entry operator	Assistant Manager	Manager – QA
21)File the recording sheets day wise for future reference	QA - Assistants	Asst. Manager	
6.5.2 Sand method			
1) Select properly graded and sterilized sand as per QA standards	QA - Assistants	Asst. Manager	
2) Pour required quantity of water to moisten the sand	QA - Assistants	Asst. Manager	
3) Place the moist stand in sand trays – 4 layers	QA - Assistants	Asst. Manager	
4) Make 100 holes over sand in each layer using impression board	QA - Assistants	Asst. Manager	
5) Place the replicants tags in the border of each layers	QA - Assistants	Asst. Manager	
6) Take 100 seeds from the selected lots and put it into the holes of each sand layers	QA - Assistants	Asst. Manager	
7) Store the remaining seed samples from the specific lots as remaining samples with lot number identification	QA - Assistants	Asst. Manager	
8) Cover the seeds in the sand trays with sand	QA - Assistants	Asst. Manager	
9) Move the sand trays to germination room and keep it up to the final count of germination observed	QA - Assistants	Asst. Manager	
10)Keep the germination room temperature at 25 $\pm$ 1°C and RH 90 $\pm$ 5%	QA - Assistants	Asst. Manager	
11)Evaluate the germination count for each crop on specific day as per ISTA norms **Germination observance day:** • Maize – 7th day • Rice – 10th day **Germination %:** • Maize – 90% • Rice – 80%	QA - Assistants	Asst. Manager	
12)Update the germination details in replication tags	QA - Assistants	Asst.	

Process	Maker	Checker	Approver
		Manager	
13)Update the germination % for all tested lots in recording sheet • Date of Test • GC_IN_NO • GC_OUT_NO • Variety/Hybrid • Lot No • Lab Test No • Replication (1 to 4) ➢ NS% ➢ ABS% ➢ HS% ➢ FUG% ➢ DS% • Moisture % • Pure Seed • Weed Seed • Inert Matter • OCS%	QA - Assistants	Asst. Manager	
14)Cross check the details randomly as per replication tags with the germination count recording sheet	Assistant Manager		
15)In case of any variation then update the correct details in the germination count recording sheet	QA - Assistants	Asst. Manager	
16)Update the germination results in software	Data entry operator	Assistant Manager	
17)On end of the day cross check the recording sheet and germination results entered in software	Assistant Manager	Manager – QA	
18)If any error in data entry, then communicate the error details to IT with corrective action to be made in software	Assistant Manager	Manager – QA	
19)Rectification/modification entry to be made in software	Data entry operator	Assistant Manager	Manager – QA
20)File the recording sheets day wise for future reference	QA - Assistants	Asst. Manager	

6.6 SEED TESTING LABORATORY - MOISTURE TEST



Sub-process Owner:
Assistant manager - QA

Departments Involved:
Parent Seed
Processing
QA

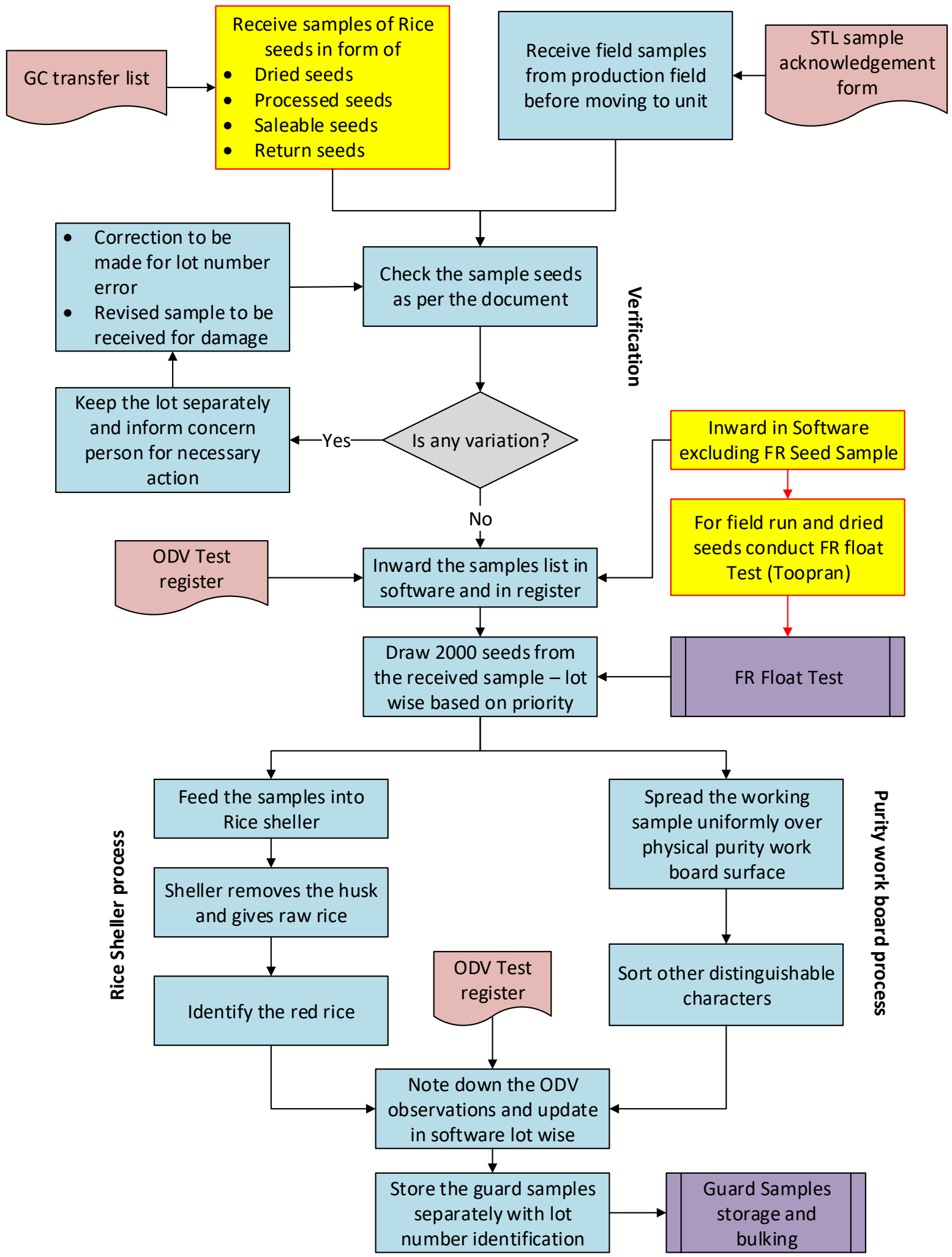
Crops Covered:
All Crops

Key activities:
6.6.1 Ginned Seeds - Cotton
6.6.2 Processed Seeds – All Crops

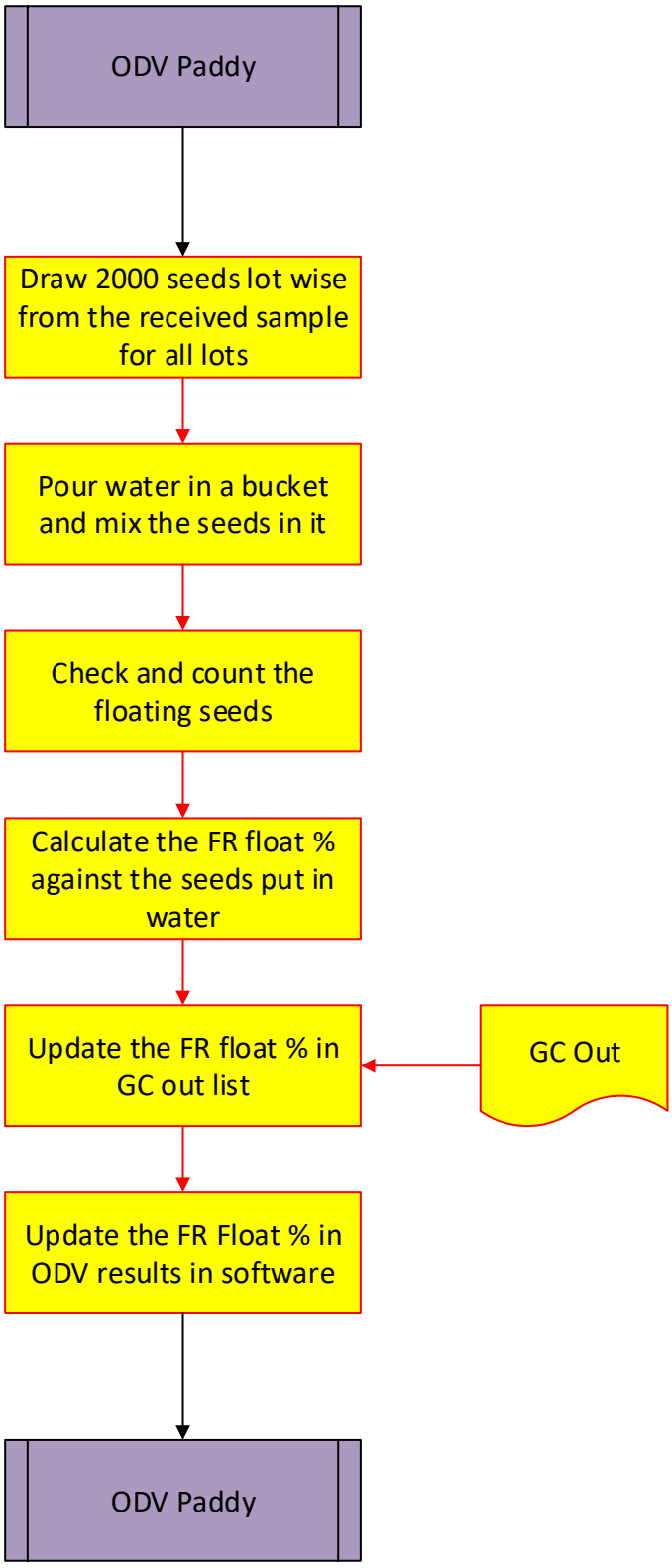
Process	Maker	Checker	Approver
6.6.1 Ginned Seeds – Cotton			
1) Take lot wise working samples from the samples received for germination test	QA - Assistants	Asst. Manager	
2) Select the respective crop (Cotton) in moisture meter	QA - Assistants	Asst. Manager	
3) Take 30 grams of ginned seeds in test cup and place the same in moisture meter	QA - Assistants	Asst. Manager	
4) Compress the seeds as per standard pressure	QA - Assistants	Asst. Manager	
5) Note down the moisture level in recording sheet as per reading in the moisture meter	QA - Assistants	Asst. Manager	
6.6.2 Processed Seeds – All crops			
1) Take lot wise working samples from the samples received for germination test	QA - Assistants	Asst. Manager	
2) Select the respective crop in moisture meter • Cotton • Wheat • Maize • Bajra • Mustard • Rice • Sunflower	QA - Assistants	Asst. Manager	
3) Take working samples in test cup and place the same in moisture meter	QA - Assistants	Asst. Manager	
4) Put the samples taken in test cup into the moisture meter after pressing pour button	QA - Assistants	Asst. Manager	
5) Note down the moisture level in recording sheet as per reading in the moisture meter	QA - Assistants	Asst. Manager	

6.7 SEED TESTING LABORATORY – OTHER DISTINGUISHABLE VARIETY (ODV) TEST

Rice – Field Run, Dried, Processed and Saleable Seeds



6.7 B SEED TESTING LABORATORY – FR FLOAT TEST (TOOPRAN)



Sub-process Owner:
Assistant manager - QA

Departments Involved:
Parent Seed
Processing
QA

Crops Covered:
Rice

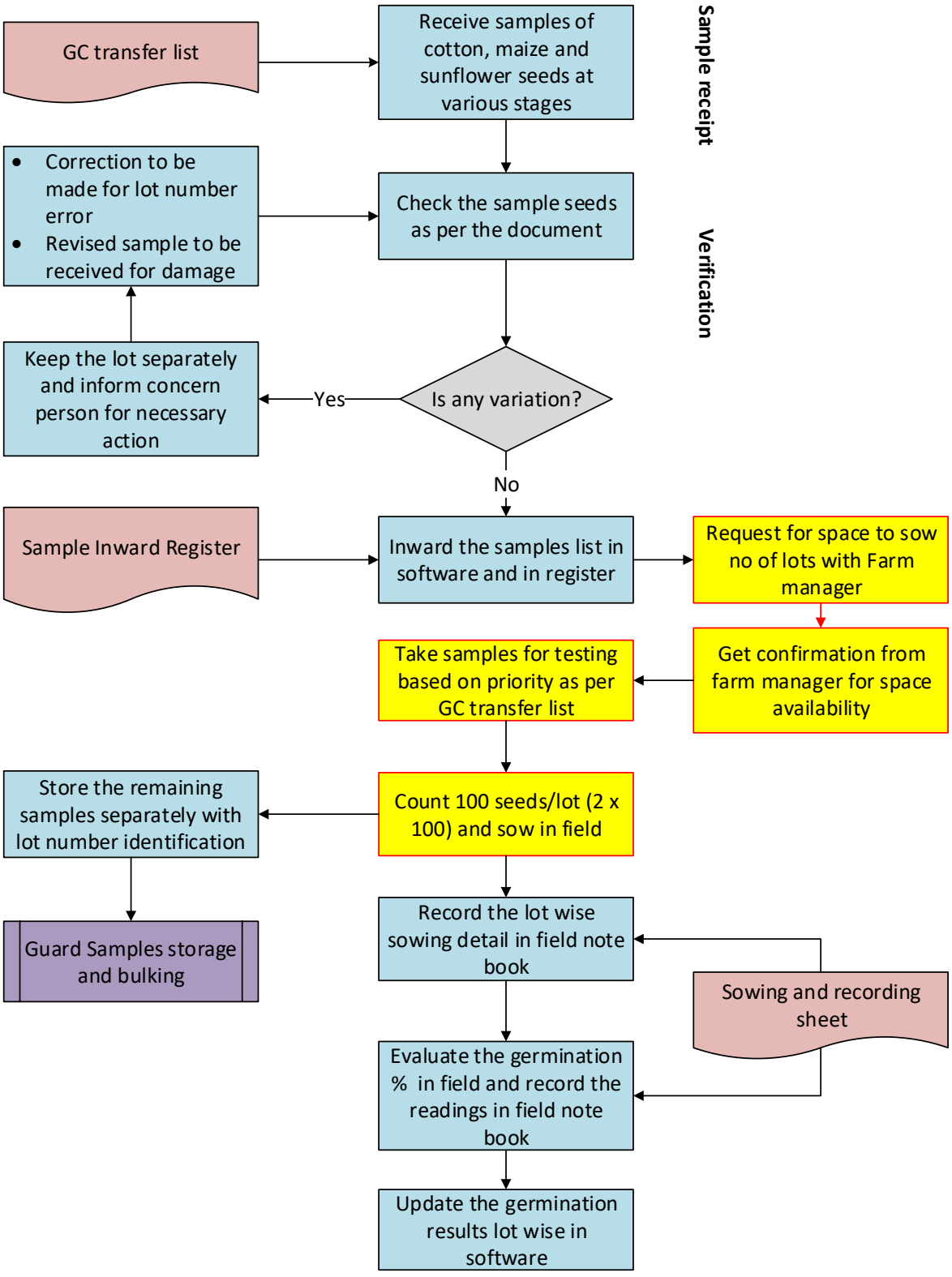
Key activities:
6.7.1 Samples receipt
6.7.2 Rice shelling process
6.7.3 Purity work board process
6.7.4 FR Float Test - TOOPRAN

Process	Maker	Checker	Approver
6.7.1 Samples receipt			
1) Receive Rice seeds sample from production and processing departments in various stages as below, • Field samples • Dried seeds • Processed seeds • Saleable seeds • Return Seeds	QA - Assistants	Asst. Manager	
2) Check the received samples with the document received during inward • Field run seeds Vs STL sample acknowledgement form • Other stage seeds Vs GC transfer list	QA - Assistants	Asst. Manager	
3) If there is any variation in the samples received and document, then keep the lots separately and inform concern person for necessary action as below, • Correction to be made for any errors in lot number • Replacement of samples to be provided in case of damaged/lot mismatch	QA - Assistants	Asst. Manager	
4) Record the samples received in Sample inward register	QA - Assistants	Asst. Manager	
5) Receive the sample lots in software excluding Field sample	Data entry operator	Asst. Manager	

Process	Maker	Checker	Approver
6) FR Float test to be conducted for field run/dried seeds received at Toopran plant	QA - Assistants	Lab Incharge	
7) Prioritize the lots based on the QC transfer list and take samples for testing	QA - Assistants	Asst. Manager	
8) Draw 2000 seeds from the received sample as working sample	QA - Assistants	Asst. Manager	
6.7.2 Rice Sheller Process			
1) Feed the samples into rice sheller	QA - Assistants	Asst. Manager	
2) Sheller removes the rice and gives raw rice	QA - Assistants	Asst. Manager	
3) Note down the ODV observations in ODV test register	QA - Assistants	Asst. Manager	
4) Update the ODV results in software	Data entry operator	Asst. Manager	
5) Store the remaining seed samples from the specific lots as remaining samples with lot number identification	QA - Assistants	Asst. Manager	
6.7.3 Purity work board process			
1) Spread the working sample uniformly over physical purity work board surface	QA - Assistants	Asst. Manager	
2) Sort the other distinguishable varieties manually using magnifying glass/through experience referring the morphological characters	QA - Assistants	Asst. Manager	
3) Note down the ODV observations in ODV test register	QA - Assistants	Asst. Manager	
4) Update the ODV results in software	Data entry operator	Asst. Manager	
5) Store the remaining seed samples from the specific lots as guard samples with lot number identification	QA - Assistants	Asst. Manager	
6.7.4 FR Float Test – TOOPRAN			
1) Draw 2000 seeds lot wise from the received sample for all lots	QA - Assistants	Lab Incharge	
2) Pour water in a bucket and mix the seeds in it	QA - Assistants	Lab Incharge	
3) Check and count the floating seeds	QA - Assistants	Lab Incharge	
4) Calculate the FR float % against the no of seeds put in water	QA - Assistants	Lab Incharge	
5) Update the FR float % in GC out list	QA - Assistants	Lab Incharge	
6) Update the FR Float % in ODV results in software	QA - Assistants	Lab Incharge	

6.8 SEED TESTING LABORATORY – FIELD EMERGENCE TEST

Cotton – Carry over stock, Return & Saleable seeds
Maize & Sun flower - Fresh, Carry over stock, Return & Saleable seeds



Sub-process Owner:
Assistant manager - QA

Departments Involved:
Parent Seed
Processing
QA

Crops Covered:
Cotton – Carry over stock, Return and Saleable seeds
Maize – Fresh, carry over stock, Return and Saleable seeds

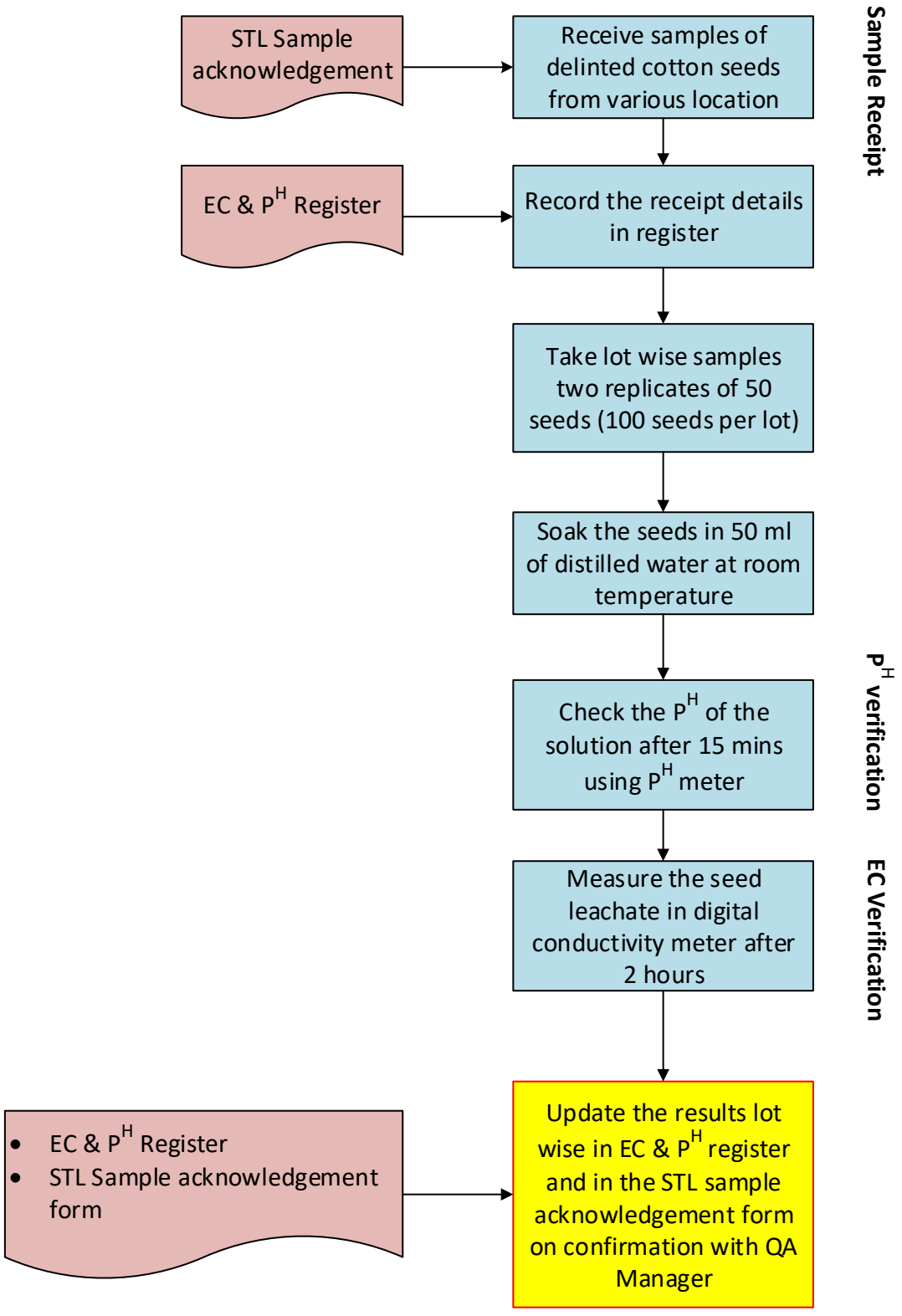
Key activities:
6.8.1 Samples receipt
6.8.2 Sowing and germination evaluation

Process	Maker	Checker	Approver
6.8.1 Samples receipt			
1) Receive cotton, maize and sunflower seeds sample from processing department in various stages as below, • Fresh - Maize • Carry over stock – Cotton and Maize • Return seeds – Cotton and Maize • Saleable seeds – Cotton and Maize	QA - Assistants	Asst. Manager	
2) Check the received samples with the GC transfer list • GC Out No • Site • Warehouse • Stage • Lot Number • Item Code • Transfer Document number	QA - Assistants	Asst. Manager	
3) If there is any variation in the samples received, then keep the lots separately and inform concern person for necessary action as below, • Correction to be made for any errors in lot number • Replacement of samples to be provided in case of damaged/lot mismatch	QA - Assistants	Asst. Manager	
4) Record the samples received in Sample inward register	QA - Assistants	Asst. Manager	
5) Receive the sample lots in software	Data entry operator	Asst. Manager	

Process	Maker	Checker	Approver
6) Get confirmation from processing team for the lots priority and take samples from the received lots based on the same	QA - Assistants	Asst. Manager	
6.8.2 Sowing and Germination evaluation			
1) Request for space to sow no of lots with farm manager	Asst. Manager		
2) Get confirmation from farm manager for space availability and communicate to assistants for sowing	Asst. Manager		
3) Take samples for testing based on priority as per GC transfer list and GC out reference	QA - Assistants	Asst. Manager	
4) Draw 200 seeds (100 seeds per lot) from the received sample as working sample and sow in own field	QA - Assistants	Asst. Manager	
5) Store the remaining seed samples from the specific lots as guard samples with lot number identification	QA - Assistants	Asst. Manager	
6) Evaluate the germination % in the field crop wise as per ISTA norms • Maize – 7^{th} day • Cotton – 8^{th} day	QA - Assistants	Asst. Manager	
7) Record the sowing and germination count details in sowing and recording sheet	QA - Assistants	Asst. Manager	
8) Update the germination results lot wise in software	Data entry operator	Asst. Manager	

6.9 SEED TESTING LABORATORY – P^H & EC TEST

Cotton – Delinted Seeds



Sub-process Owner:
Assistant manager – QA

Departments Involved:
Parent Seed
Processing
QA

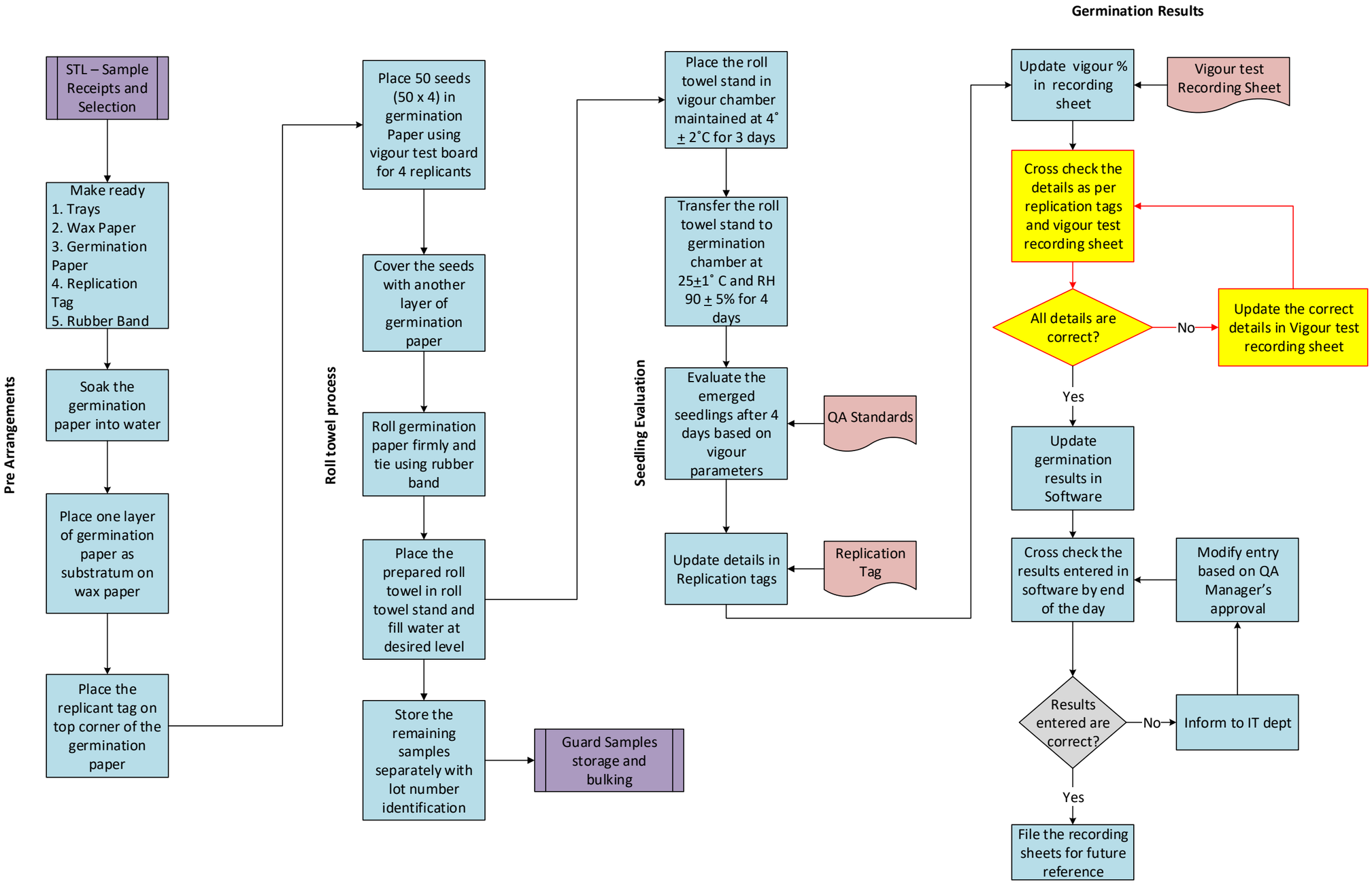
Crops Covered:
Cotton – Delinted Seeds

Key activities:
6.10.1 Potential of Hydrogen (P^H) Test & Electrical Conductivity (EC) Test

Process	Maker	Checker	Approver
6.9.1 Potential of Hydrogen Test & Electrical Conductivity Test			
1) Receive samples of delinted cotton seeds from various processing location through STL sample acknowledgement	QA - Assistants	Asst. Manager	
2) Check the received samples with the document • Unit • Kind of sample • Variety • Lot No • Stage	QA - Assistants	Asst. Manager	
3) If there is any variation in the samples received, then keep the lots separately and inform concern person for necessary action as below • Correction to be made for any errors in lot number • Replacement of samples to be provided in case of damaged/lot mismatch	QA - Assistants	Asst. Manager	
4) Record the samples received in EC and P^H register	QA - Assistants	Asst. Manager	
5) Take a lot wise samples that has two portions of 50 seeds (100 seeds per lot) and take distilled water	QA - Assistants	Asst. Manager	
6) Soak the seeds in 50 ml of distilled water and keep in room temperature	QA - Assistants	Asst. Manager	
7) Check the P^H of the solution using P^H meter after 15 minutes	QA - Assistants	Asst. Manager	
8) Verify EC by Measuring the seeds leach ate in digital conductivity meter after 2 hours	QA - Assistants	Asst. Manager	
9) Update the result lot wise in EC register and in the STL sample acknowledgement form on confirmation with QA Manager	QA - Assistants	Asst. Manager	QA Manager

6.10 SEED TESTING LABORATORY – VIGOUR TEST

Maize



Sub-process Owner:
Assistant manager - QA

Departments Involved:
Parent Seed
Processing
QA

Crops Covered:
Maize

Key activities:
6.10.1 Roll towel method - Maize

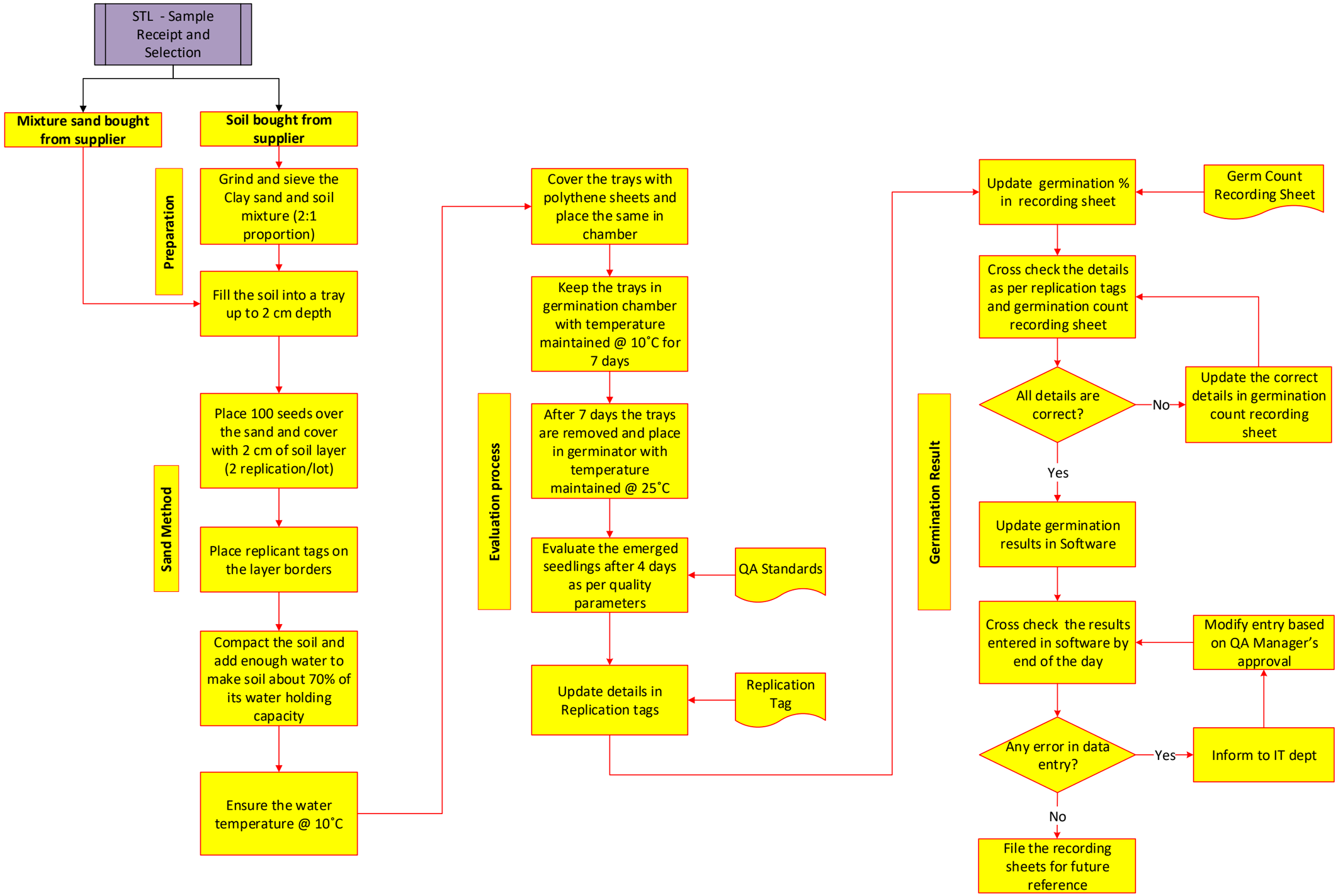
Process	Maker	Checker	Approver
6.10.1 Roll towel method – Maize			
Pre-arrangements			
1) Take printout of the replication tags and the recording sheets	QA - Assistants	Asst. Manager	
2) Arrange the followings ready for the roll towel process • Trays • Wax papers • Germination paper • Replication tag	QA - Assistants	Asst. Manager	
3) Soak the germination paper into water and place one layer of germination paper as substratum on wax paper	QA - Assistants	Asst. Manager	
4) Place the replication tag on top corner of the germination paper	QA - Assistants	Asst. Manager	
Roll towel process			
5) Place 50 seeds (50*4) in germination paper using vacuum seed counter for 4 replicants	QA - Assistants	Asst. Manager	
6) Cover the seeds with another layer of germination paper and roll firmly and tie using rubber band	QA - Assistants	Asst. Manager	
7) Place the prepared roll towel in roll towel stand and fill water at desired level	QA - Assistants	Asst. Manager	
8) Store the remaining samples separately with lot number identification	QA - Assistants	Asst. Manager	
Seedling Evaluation			
9) Place the roll towel stand in refrigerator once the water is filled at the desired level and maintain 4°C for 3 days	QA - Assistants	Asst. Manager	
10) Transfer the roll towel stand to germination chamber at 25°C for 4 days	QA - Assistants	Asst. Manager	
11) Evaluate the emerging seedlings after 4 days based on vigour parameters and update the details in replication tag	QA - Assistants	Asst. Manager	
12) Update the Vigour % for all tested lots in recording sheet	QA - Assistants	Asst. Manager	

Process	Maker	Checker	Approver

• Date of Test
• GC_IN_NO
• GC_OUT_NO
• Variety/Hybrid
• Lot No
• Lab Test No
• Replication (1 to 4)
  ➢ NS%
  ➢ ABS%
  ➢ HS%
  ➢ FUG%
  ➢ DS%
• Moisture %
• Pure Seed
• Weed Seed
• Inert Matter
• OCS%			

13) Cross check the details randomly as per replication tags with the Vigour count recording sheet	Assistant Manager		
14) In case of any variation then update the correct details in the Vigour count recording sheet	QA - Assistants	Asst. Manager	
15) Update the Vigour test results in software	Data entry operator	Assistant Manager	
16) On end of the day cross check the recording sheet and vigour test results entered in software	Assistant Manager	Manager – QA	
17) If any error in data entry, then communicate the error details to IT with corrective action to be made in software	Assistant Manager	Manager – QA	
18) Rectification/modification entry to be made in software	Data entry operator	Assistant Manager	Manager – QA
19) File the recording sheets day wise for future reference	QA - Assistants	Asst. Manager	

6.10 B - SEED TESTING LABORATORY – SOIL COLD TEST – MAIZE



Sub-process Owner:
Assistant manager - QA

Departments Involved:
Parent Seed
Processing
QA

Crops Covered:
Maize

Key activities:
6.10.B Soil Cold test - Maize

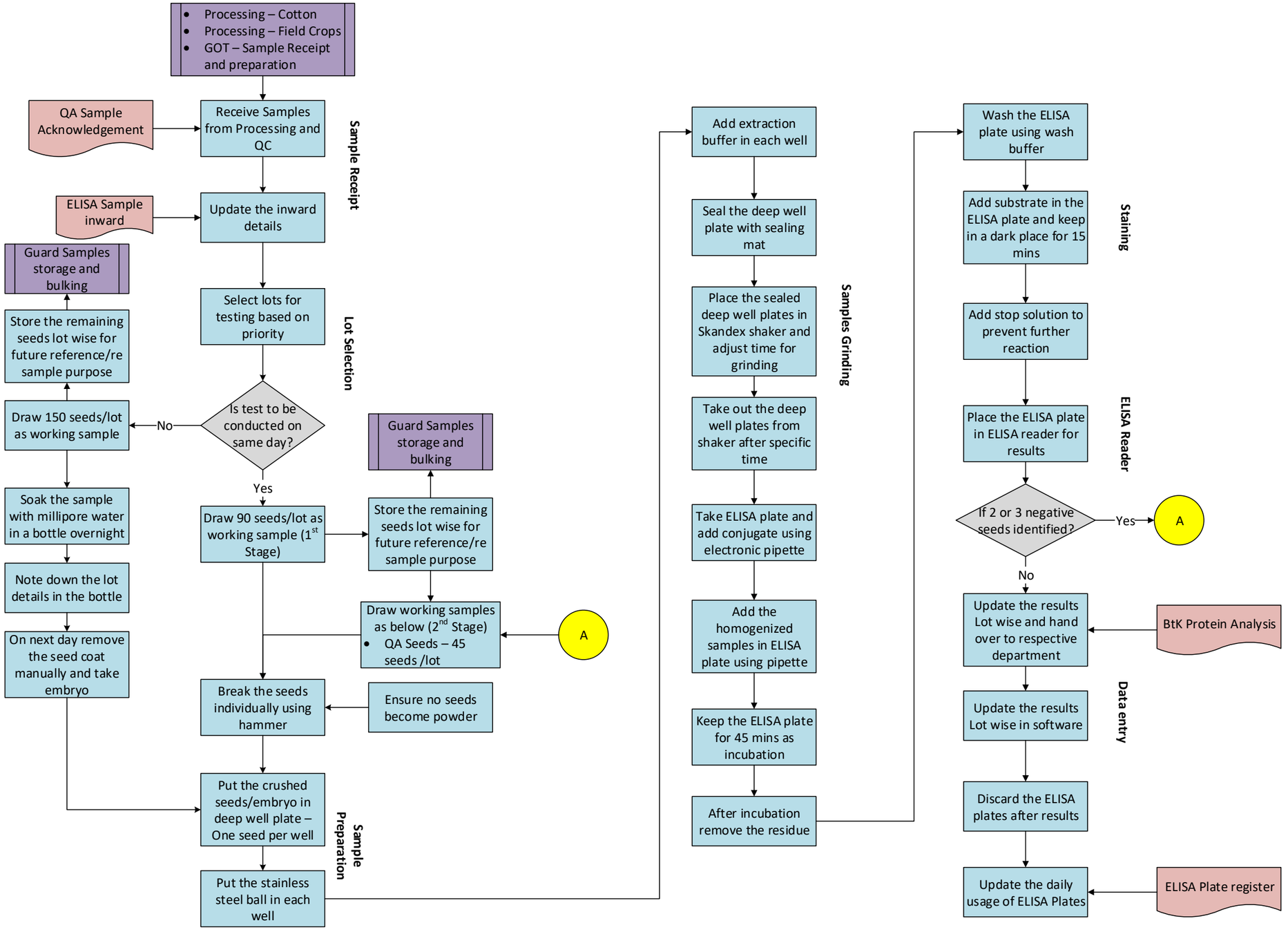
Process	Maker	Checker	Approver
6.10.B soil cold Test – Maize			
Preparation			
Soil bought from Supplier 1) Grind the sieve the clay sand and soil mixture with the proportion of 2:1	QA - Assistants	Asst. Manager	
2) Fill the soil mixture into a tray up to 2cm depth	QA - Assistants	Asst. Manager	
Sand Method			
3) Place 100 seeds over the sand and cover with 2cm of soil layer (2replication/lot)	QA - Assistants	Asst. Manager	
4) Place replication tags on the layer borders	QA - Assistants	Asst. Manager	
5) Compact the soil and add enough water to make soil about 70% of its water holding capacity	QA - Assistants	Asst. Manager	
6) Ensure the water temperature @ 10˚C	QA - Assistants	Asst. Manager	
Seedling Evaluation			
7) Cover the trays with polythene sheets/wax paper and place the same in chamber	QA - Assistants	Asst. Manager	
8) Keep the trays in germination chamber with temperature maintained @ 10˚C for 7 days	QA - Assistants	Asst. Manager	
9) After 7 days the trays are removed and place in germinator with temperature maintained @ 25˚C	QA - Assistants	Asst. Manager	
10) Evaluate the emerged seedlings after 4 days as per quality parameters	QA - Assistants	Asst. Manager	
11) Update details in Replication tags	QA – Assistants	Asst. Manager	
12) Update the germination % for all tested lots in recording sheet	QA - Assistants	Asst. Manager	

Process	Maker	Checker	Approver

• Date of Test
• GC_IN_NO
• GC_OUT_NO
• Variety/Hybrid
• Lot No
• Lab Test No
• Replication (1 to 4)
  ➢ NS%
  ➢ ABS%
  ➢ HS%
  ➢ FUG%
  ➢ DS%
• Moisture %
• Pure Seed
• Weed Seed
• Inert Matter
• OCS%			

13) Cross check the details randomly as per replication tags with the germination count recording sheet	Assistant Manager		
14) In case of any variation then update the correct details in the germination count recording sheet	QA - Assistants	Asst. Manager	
15) Update the germination results in software	Data entry operator	Assistant Manager	
16) On end of the day cross check the recording sheet and germination results entered in software	Assistant Manager	Manager – QA	
17) If any error in data entry, then communicate the error details to IT with corrective action to be made in software	Assistant Manager	Manager – QA	
18) Rectification/modification entry to be made in software	Data entry operator	Assistant Manager	Manager – QA
19) File the recording sheets day wise for future reference	QA - Assistants	Asst. Manager	

6.11 ELISA TEST - COTTON



Sub-process Owner:
Research Associate

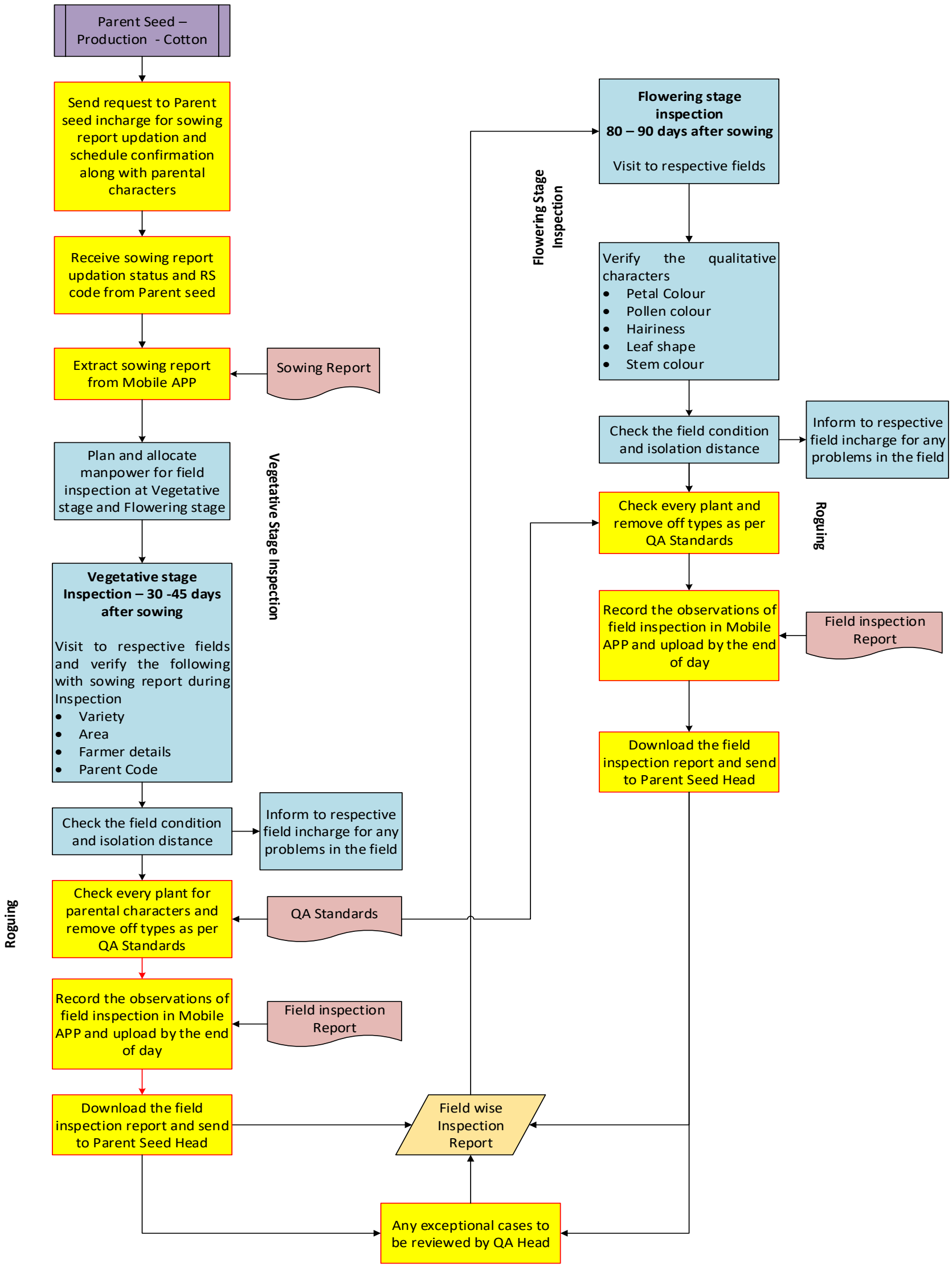
Departments Involved:
Parent Seed
Processing
QA

Key activities:
6.11.1 ELISA Test

Process	Maker	Checker	Approver
6.11.1 ELISA Test			
1) Receive Samples from processing and QC from QA sample acknowledgement	QA - Assistant	Research Associate	
2) Update the ELISA sample inward details	QA - Assistant	Research Associate	
3) Select lots for testing based on priority and draw 90 seeds/lot as working sample if the test is conducted on the same day	QA - Assistant	Research Associate	
4) Store the remaining seeds lot wise for future reference or re sample purpose as per remaining sample storage and bulking	QA - Assistant	Research Associate	
5) Break the individually using hammer and ensure no seeds become powder	QA - Assistant	Research Associate	
6) In case the test is not done on the same day, then draw 150 seeds/lot as working sample and Store the remaining seeds lot wise for future reference or re sample purpose	QA - Assistant	Research Associate	
7) Soak the Sample with millipore water in a bottle overnight	QA - Assistant	Research Associate	
8) Note down the lot details in the bottle and the next day remove the seed coat manually and take embryo	QA - Assistant	Research Associate	
9) Put the crushed seeds/embryo in deep well plate – one seed per well	QA - Assistant	Research Associate	
10) Put the stainless-steel ball in each well and pour 1 ml of extraction buffer in each well	QA - Assistant	Research Associate	
11) Seal the deep well plate with sealing mat	QA - Assistant	Research Associate	
12) Place the sealed deep well plates in skandex shaker and adjust time for grinding	QA - Assistant	Research Associate	
13) Take out the deep well plats from shaker after specific time	QA - Assistant	Research Associate	
14) Take ELISA plate and add conjugate using electronic pipette and add homogenized samples	QA - Assistant	Research Associate	
15) Keep the ELISA plate for 45 minutes as incubation and remove the residue after incubation	QA - Assistant	Research Associate	

Process	Maker	Checker	Approver
16) Wash the ELISA plate using wash buffer and add substrate in the ELISA plate and keep in a dark place for 15 minutes	QA - Assistant	Research Associate	
17) Add stop solution to prevent further reactions	QA - Assistant	Research Associate	
18) Place the ELISA plate in ELISA reader for results	QA - Assistant	Research Associate	
19) In results, if 2 or 3 negative seeds identified, then draw the working samples in the second stage as below and continue the same process above, • QA – 45 seeds/lot	QA - Assistant	Research Associate	
20) Update the result lot wise and hand over to respective department	Research Associate	Manager – QA	
21) Update the result lot wise in software and discard the ELISA plates after results	Research Associate	Manager – QA	
22) Update the daily usage of ELISA plates in ELISA plate register	Research Associate	Manager – QA	

6.12 FIELD QUALITY – PARENT SEED FIELD INSPECTION (COTTON)



Sub-process Owner:

Deputy Manager - QA

Departments Involved:

Parent Seed
Processing
QA

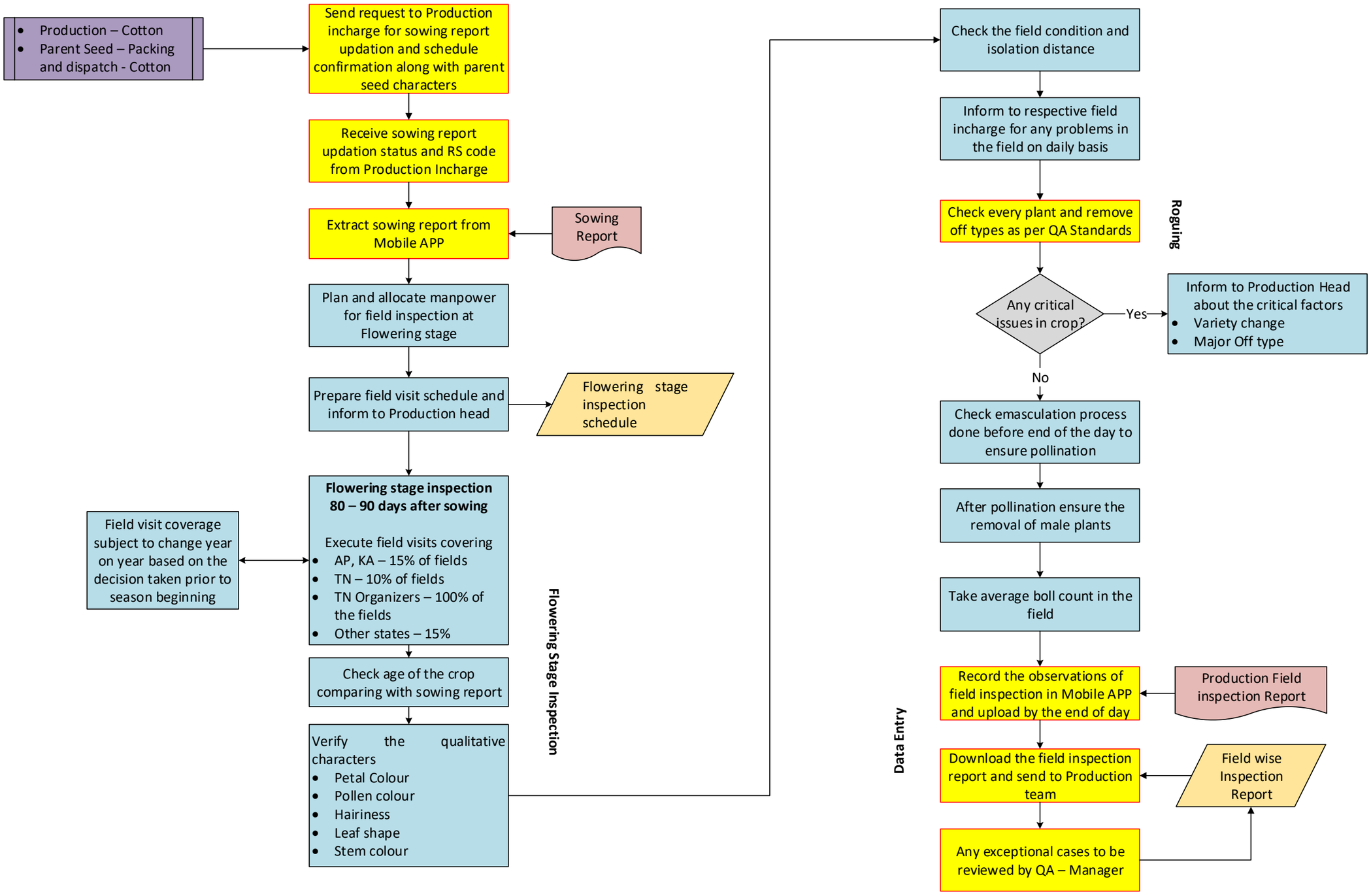
Key activities:

6.12.1 Pre-arrangements
6.12.2 Vegetative stage inspection
6.12.3 Flowering stage inspection

Process	Maker	Checker	Approver
6.12.1 Pre-arrangements			
1) Send request to Parent seed incharge for sowing report updation and schedule confirmation along with parental characters	Deputy Manager	Manager – QA	
2) Receive sowing report updation status and RS code from Parent Seed Incharge	Deputy Manager	Manager – QA	
3) Communicate the sowing report updation and RS code information to field staffs	Deputy Manager	Manager – QA	
4) Extract sowing report from Mobile APP	Deputy Manager	Manager – QA	
5) Allocate manpower for field inspection and send the vegetative stage and flowering stage inspection schedule to Parent Seed Incharge	Deputy Manager	Manager – QA	
6.12.2 Vegetative stage inspection			
1) Conduct field inspection between 30 – 45 days after sowing and verify the following with sowing report during inspection • Variety • Area • Farmer details • Hybrid Code	Field Supervisors/Field Assistants	Deputy Manager	
2) Check every plant for parental characters and remove off types as per QA standards	Field Supervisors/Field Assistants	Deputy Manager	
3) Record the observations of field inspections in Mobile App and upload the same by end of the day which will be interfaced to SAP	Field Supervisors/Field Assistants	Deputy Manager	
4) Download the Field inspection report from software and send to Parent Seed Head by marking cc to QA manager and respective team	Data Entry Operator	Deputy Manager/ Manager - QA	

Process	Maker	Checker	Approver
5) Any exceptional cases identified in field to be reported to QA Manager and the same needs to be reviewed	Deputy Manager	Manager – QA	
6.12.3 Flowering stage inspection			
1) Conduct flowering stage inspection between 80 – 90 days after sowing and verify the following qualitative characters, • Petal colour • Pollen colour • Hairiness • Leaf shape • Stem colour	Field Supervisors/Field Assistants	Deputy Manager	
2) Check the field condition and isolation distance and inform the respective field incharge for any problems in the field	Field Supervisors/Field Assistants	Deputy Manager	
3) Check every plant and remove off types as per QA standards	Field Supervisors/Field Assistants	Deputy Manager	
4) Record the observations of field inspections in Mobile App and upload the same by end of the day which will be interfaced to SAP	Field Supervisors/Field Assistants	Deputy Manager	
5) Download the Field inspection report from software and send to Parent Seed Head by marking cc to QA manager and respective team	Data Entry Operator	Deputy Manager/ Manager – QA	
6) Any exceptional cases identified in field to be reported to QA Manager and the same needs to be reviewed	Deputy Manager	Manager - QA	

6.13 FIELD QUALITY – PRODUCTION FIELD INSPECTION (COTTON)



Sub-process Owner:
Deputy Manager - QA

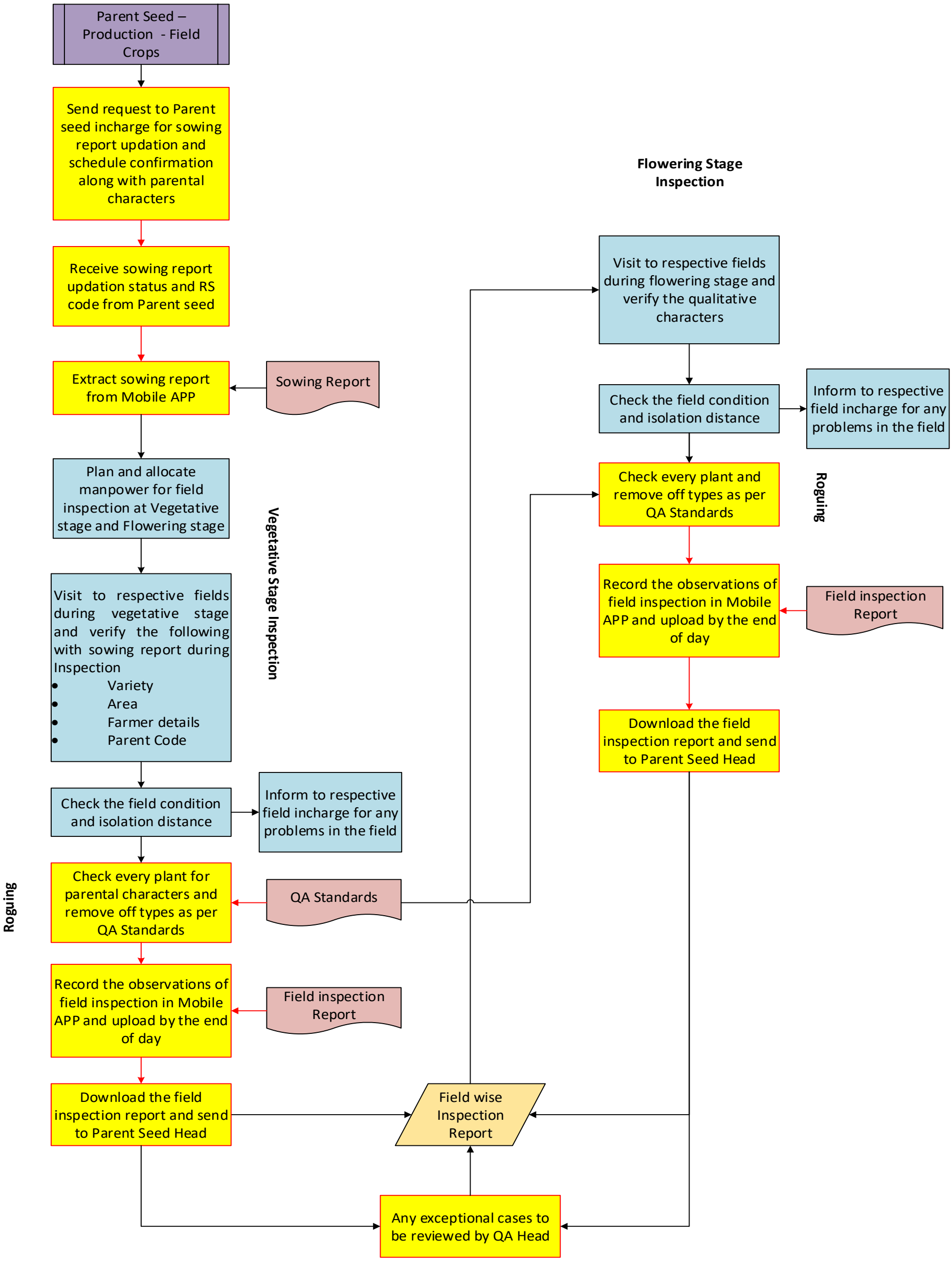
Departments Involved:
Parent Seed
Processing
QA

Key activities:
6.13.1 Pre-arrangements
6.13.2 Flowering stage inspection

Process	Maker	Checker	Approver
6.13.1Pre arrangements			
1) Send request to Production incharge for sowing report updation and schedule confirmation along with parent seed characters location wise	Deputy Manager	Manager - QA	
2) Receive sowing report updation status and RS code from Production Incharge	Deputy Manager	Manager - QA	
3) Communicate the sowing report updation and RS code information to field staffs	Deputy Manager	Manager - QA	
4) Extract sowing report from Mobile APP	Deputy Manager	Manager - QA	
5) Plan and allocate manpower for field inspection at flowering stage	Deputy Manager	Manager – QA	
6) Prepare flowering stage inspection schedule and inform to production head	Deputy Manager	Manager – QA	
6.13.2 Flowering stage inspection			
1) Execute field visits covering flowering stage inspection 80 -90 days after sowing • AP, KA – 15% of fields • TN – 10% of field • TN Organizers – 100% of the fields • Other states –15%	Field Supervisors/Field Assistants	Deputy Manager	
2) Check age of the crop comparing with sowing report in Mobile APP	Field Supervisors/Field Assistants	Deputy Manager	
3) Verify the qualitative characters • Petal colour • Pollen colour • Hairiness • Leaf shape • Stem colour	Field Supervisors/Field Assistants	Deputy Manager	
4) Check the field conditions and isolation distance and inform the respective field incharge for any problems in the field on daily basis	Field Supervisors/Field Assistants	Deputy Manager	

Process	Maker	Checker	Approver
5) Check every plant and remove off types as per QA Standards and ensure there is no critical issue in crops	Field Supervisors/Field Assistants	Deputy Manager	
6) In case of detecting critical issues, inform production head about the critical factors • Variety change • Major off type	Field Supervisors/Field Assistants	Deputy Manager	
7) Check emasculation process done before end of the day to ensure pollination	Field Supervisors/Field Assistants	Deputy Manager	
8) After pollination ensure the removal of male plants	Field Supervisors/Field Assistants	Deputy Manager	
9) Take average boll count in the field	Field Supervisors/Field Assistants	Deputy Manager	
10) Record the observations of the field inspection in Mobile APP and upload the same by end of day which will be interfaced to SAP	Field Supervisors/Field Assistants	Deputy Manager	
11) Download the Field inspection report from software and send to Production team by marking cc to QA manager and respective team	Data Entry Operator	Deputy Manager/ Manager – QA	
12) Any exceptional cases identified in field to be reported to QA Manager and the same needs to be reviewed	Deputy Manager	Manager - QA	

6.14 FIELD QUALITY – PARENT SEED FIELD INSPECTION (FIELD CROPS)



Sub-process Owner:
Deputy Manager - QA

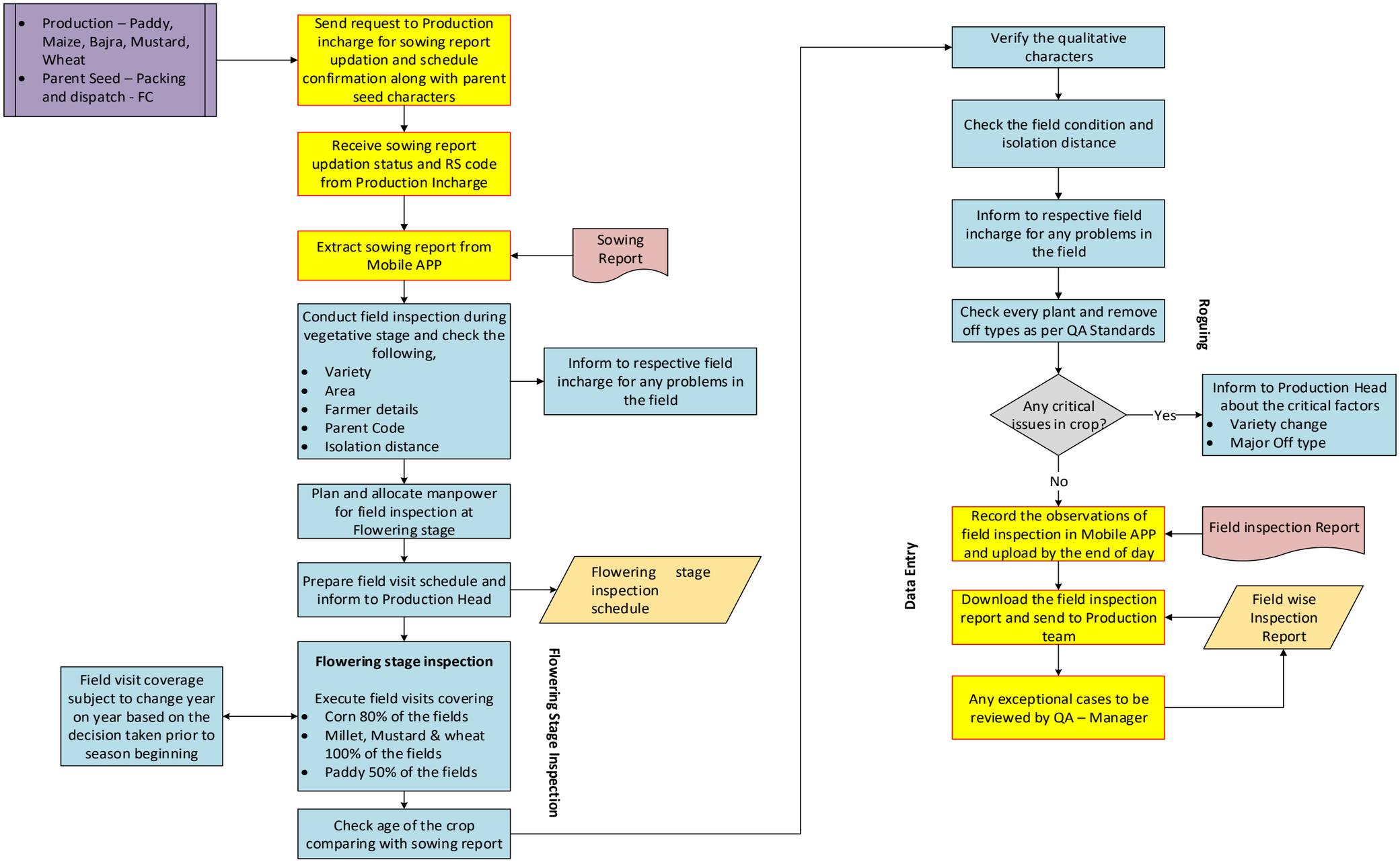
Departments Involved:
Parent Seed
Processing
QA

Key activities:
6.14.1 Pre-arrangements
6.14.2 Vegetative stage inspection
6.14.3 Flowering stage inspection

Process	Maker	Checker	Approver
6.14.1 Pre-arrangements			
1) Send request to Parent seed incharge for sowing report updation and schedule confirmation along with parental characters	Deputy Manager	Manager – QA	
2) Receive sowing report updation status and RS code from Parent Seed Incharge	Deputy Manager	Manager – QA	
3) Communicate the sowing report updation and RS code information to field staffs	Deputy Manager	Manager – QA	
4) Extract sowing report from Mobile APP	Deputy Manager	Manager – QA	
5) Allocate manpower for field inspection and send the vegetative stage and flowering stage inspection schedule to Parent Seed Incharge	Deputy Manager	Manager – QA	
6.14.2 Vegetative stage inspection			
1) Visit to respective fields during vegetative stage and verify the following with sowing report during inspection • Variety • Area • Farmer details • Hybrid code	Field Supervisors/Field Assistants	Deputy Manager	
2) Check the field condition and isolation distance and inform to respective field incharge for any problems in the field	Field Supervisors/Field Assistants	Deputy Manager	
3) Check every plant for parental character and remove off types as per QA standards	Field Supervisors/Field Assistants	Deputy Manager	
4) Record the observations of field inspection in Mobile APP and upload by the end of day which will be interfaced to SAP	Field Supervisors/Field Assistants	Deputy Manager	
5) Download the Field inspection report from software and send to Parent Seed Head by marking cc to QA manager and respective team	Data Entry Operator	Deputy Manager/ Manager -	

Process	Maker	Checker	Approver
		QA	
6) Any exceptional cases identified in field to be reported to QA Manager and the same needs to be reviewed	Deputy Manager	Manager – QA	
6.14.3 Flowering stage inspection			
1) Visit to respective fields during flowering stage and verify the qualitative characters	Field Supervisors/Field Assistants	Deputy Manager	
2) Check the field condition and isolation distance and inform to respective field incharge for any problems in the field	Field Supervisors/Field Assistants	Deputy Manager	
3) Check every plant and remove off types as per QA Standards	Field Supervisors/Field Assistants	Deputy Manager	
4) Record the observations of field inspections in Mobile App and upload the same by end of the day which will be interfaced to SAP	Field Supervisors/Field Assistants	Deputy Manager	
5) Download the Field inspection report from software and send to respective production team by marking cc to QA manager	Data Entry Operator	Deputy Manager/ Manager – QA	
6) Any exceptional cases identified in field to be reported to QA Manager and the same needs to be reviewed	Deputy Manager	Manager - QA	

6.15 FIELD QUALITY – PRODUCTION FIELD INSPECTION (FIELD CROPS)



Sub-process Owner:
Deputy Manager - QA

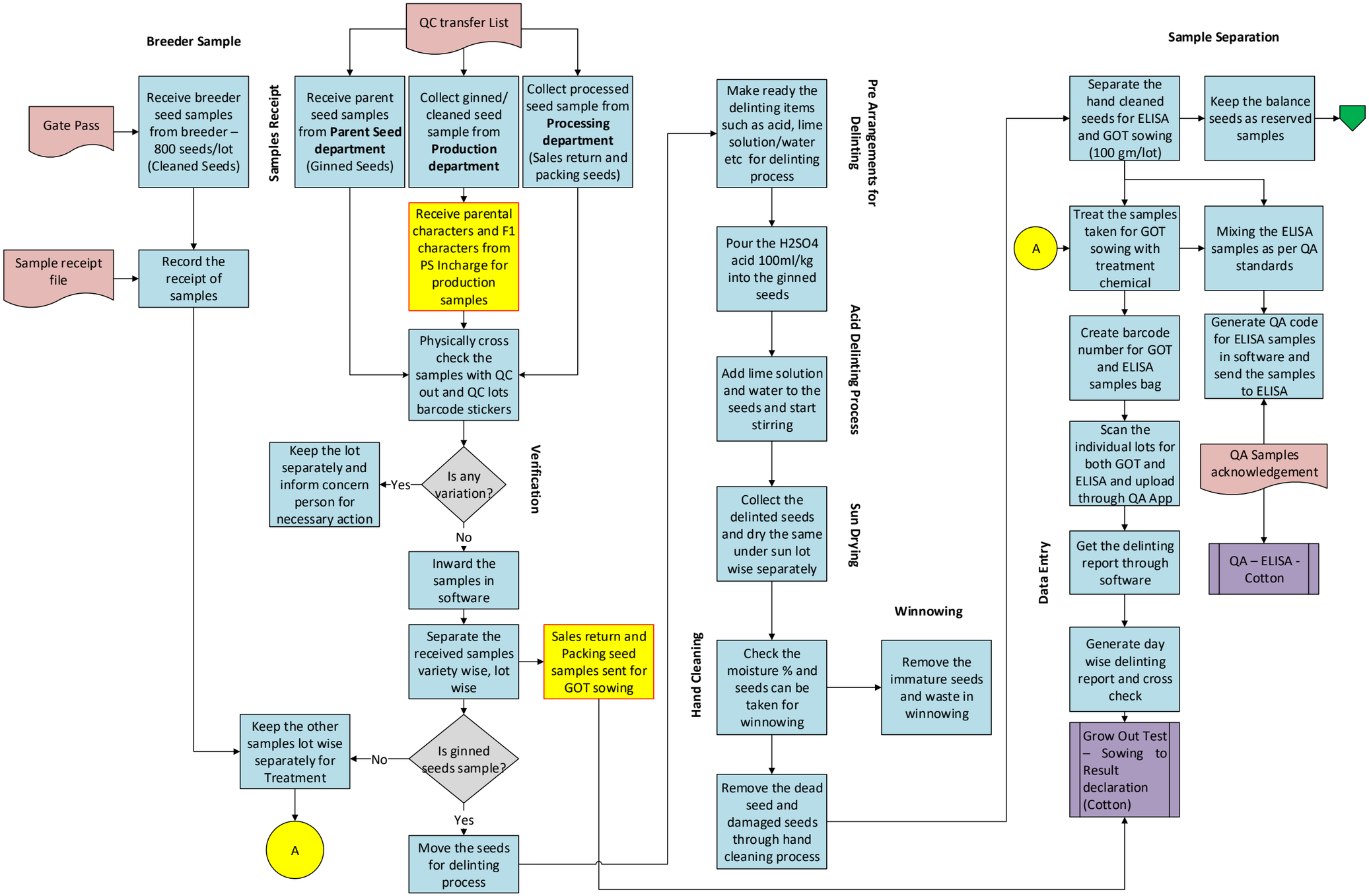
Departments Involved:
Parent Seed
Processing
QA

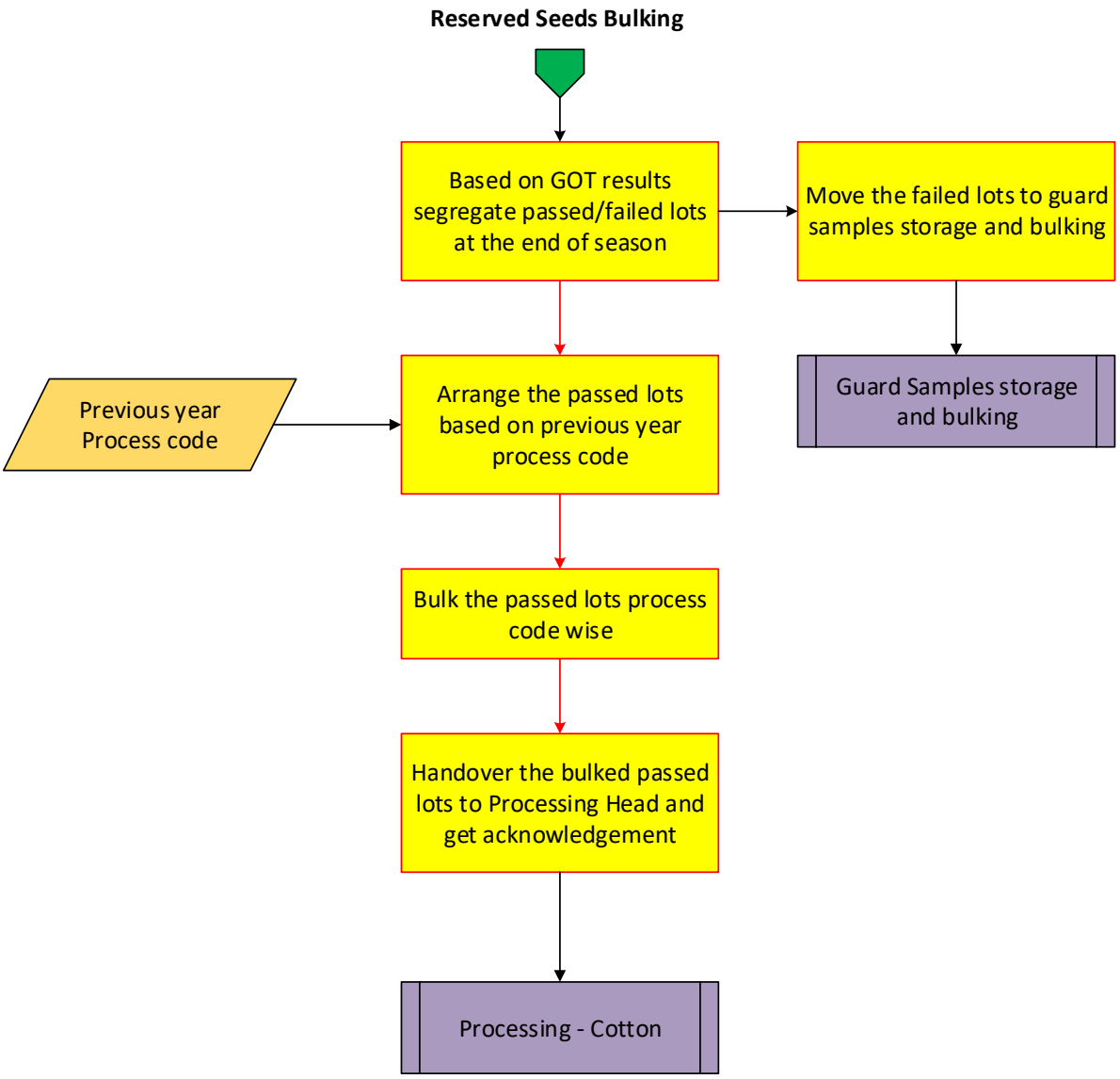
Key activities:
6.15.1 Pre-arrangements
6.15.2 Flowering stage inspection

Process	Maker	Checker	Approver
6.15.1 Pre-arrangements			
1) Send request to Production incharge for sowing report updation and schedule confirmation along with parent seed characters	Deputy Manager	Manager - QA	
2) Receive sowing report updation status and RS code from Production Incharge	Deputy Manager	Manager - QA	
3) Communicate the sowing report updation and RS code information to field staffs			
4) Extract sowing report from Mobile APP			
Vegetative Stage Inspection			
5) Conduct vegetative stage inspection and check the following, • Variety • Area • Farmer details • Hybrid code • Isolation distance	Field Supervisors/Field Assistants	Deputy Manager	
6) Inform to respective production incharge in case of any problems identified in the field	Field Supervisors/Field Assistants	Deputy Manager	
7) Plan and allocate manpower for field inspection at flowering stage	Deputy Manager	Manager – QA	
8) Prepare Flowering stage inspection schedule and inform to GM – Production	Deputy Manager	Manager – QA	
6.15.2 Flowering stage inspection			
1) Execute the Flowering stage inspection that cover • Corn 80% of the fields • Millet, Mustard & wheat 100% of fields • Paddy 50% of the fields	Field Supervisors/Field Assistants	Deputy Manager	
2) Check age of the crop comparing with sowing report and verify the qualitative characters	Field Supervisors/Field Assistants	Deputy Manager	

Process	Maker	Checker	Approver
3) Check the field condition and isolation distance and inform respective field incharge for any problems in the field	Field Supervisors/Field Assistants	Deputy Manager	
4) Check every plant and remove off types and ensure there is no critical issue in the crop	Field Supervisors/Field Assistants	Deputy Manager	
5) Inform to Production Head about the critical factor as follows • Variety change • Major off type	Field Supervisors/Field Assistants	Deputy Manager	
6) Record the observations of the field inspection in Mobile APP and upload the same by end of day which will be interfaced to SAP	Field Supervisors/Field Assistants	Deputy Manager	
7) Download the Field inspection report from software and send to Production team by marking cc to QA manager and respective team	Data Entry Operator	Deputy Manager/ Manager – QA	
8) Any exceptional cases identified in field to be reported to QA Manager and the same needs to be reviewed	Deputy Manager	Manager - QA	

6.16 GROW OUT TEST SAMPLE RECEIPT AND PREPARATION (COTTON)




Reserved Seeds Bulking
Based on GOT results segregate passed/failed lots at the end of season
Move the failed lots to guard samples storage and bulking
Guard Samples storage and bulking
Previous year Process code
Arrange the passed lots based on previous year process code
Bulk the passed lots process code wise
Handover the bulked passed lots to Processing Head and get acknowledgement
Processing - Cotton

Sub-process Owner:
Assistant manager - QA

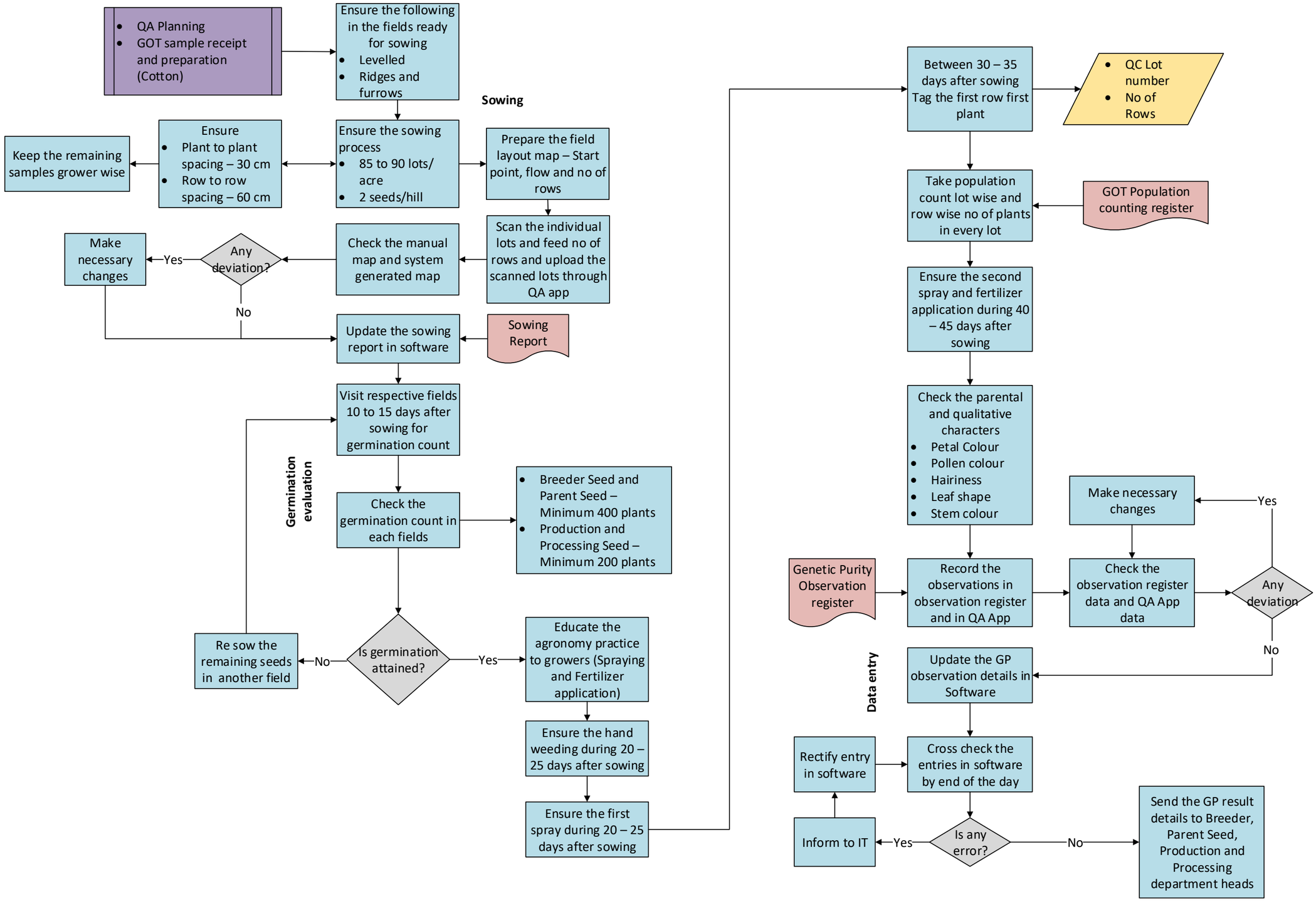
Departments Involved:
Parent Seed
Processing
QA

Key activities:
6.16.1 GOT Sample receipts and verification
6.16.2 Acid delinting process
6.16.3 Sample separation
6.16.4 Reserved Seeds bulking

Process	Maker	Checker	Approver
6.16.1 GOT sample receipts and verification			
1) Collect GC transfer list based on the samples receipt • Receive parent seed sample from Parent seed department (Ginned seeds) • Collect Ginned/cleaned seed sample from production department • Collect processed seed sample from processing department (sales return and packing seeds) • Receive parental characters and F1 characters from Parent Seed Incharge for production samples	Deputy Manager	Manager - QA	
2) Physically cross check the samples with QC out and QC lots barcode stickers	Deputy Manager	Manager - QA	
3) In case of variation, keep the lot separately and inform concern person for necessary action	Deputy Manager	Manager - QA	
4) Ensure there is no variation and inward the samples in software and separate the received samples in variety wise and lot wise	Data entry operator/QA Assistants	Deputy Manager	
5) Send the packing and sales return samples for GOT sowing	QA Assistants	Deputy Manager	
6) Check the ginned seeds samples and move the seeds for delinting process	Deputy Manager	Manager - QA	
7) In case of no ginned seed samples then keep the other samples lot wise separately for treatment	Deputy Manager	Manager - QA	
6.16.2 Acid delinting process			
1) Make ready the delinting items such as acid, lime solution/ water etc. for delinting process	QA Assistants	Deputy Manager	
2) Pour the H2SO4 acid 100ml/kg into the ginned seeds and add lime solution and water to the seeds and start stirring	QA Assistants	Deputy Manager	
3) Collect the delinted seeds and dry the same under the sun in separate lot wise	QA Assistants	Deputy Manager	
4) Check the moisture % and seed can be taken for	QA Assistants	Deputy	

Process	Maker	Checker	Approver
winnowing and remove the immature seeds and waste in winnowing		Manager	
5) Remove the dead seed and damaged seeds through hand cleaning process	QA Assistants	Deputy Manager	
6.16.3 Sample separation			
1) Separate the hand cleaned seeds for ELISA and GOT sowing (100 gm/lot), keep the balance seeds as reserved samples	QA Assistants	Deputy Manager	
2) Treat the samples taken for GOT sowing with treatment chemical	QA Assistants	Deputy Manager	
3) Mix the ELISA samples as per QA standards and generate QA code for ELISA samples in software and send the samples to ELISA as per QA samples acknowledgement	QA Assistants/ Data entry operator	Deputy Manager	
4) Create barcode number for GOT samples and ELISA sample bags	Data entry operator	Deputy Manager	
5) Scan the individual lots for both GOT and ELISA and upload through QA app	QA Assistants/ Data entry operator	Deputy Manager	
6) Data entry the delinting details and update in software and generate day wise delinting report and cross check	Data entry operator	Deputy Manager	
6.16.4 Reserved Seeds sample bulking			
1) Based on GOT results segregate passed/failed lots at the end of season	QA Assistants	Deputy Manager	
2) Move the failed lots to guard samples storage and bulking	QA Assistants	Deputy Manager	
3) Arrange the quality passed lots based on previous year process code	QA Assistants	Deputy Manager	
4) Bulk the quality passed lots process code wise	QA Assistants	Deputy Manager	
5) Handover the bulked passed lots to Processing Head and get acknowledgement	QA Assistants	Deputy Manager	

6.17 GROW OUT TEST – SOWING TO RESULT DECLARATION – COTTON



Sub-process Owner:
Deputy Manager - QA

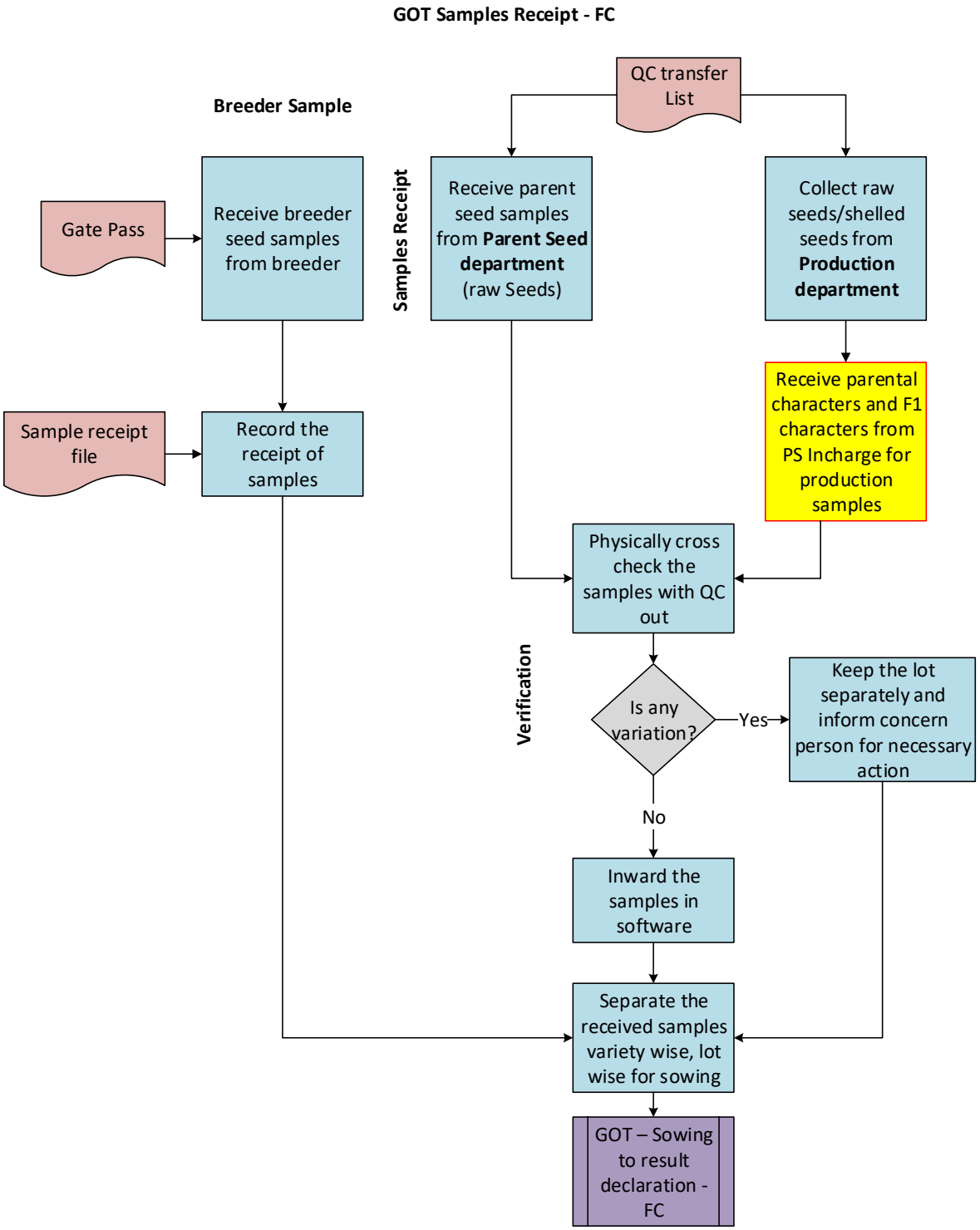
Departments Involved:
Parent Seed
Production
Processing
QA

Key activities:
6.17.1 Sowing
6.17.2 Germination evaluation
6.17.3 Field monitoring
6.17.4 Results declaration

Process	Maker	Checker	Approver
6.17.1 Sowing			
1) Ensure the following in the fields that are ready for sowing as follows • Levelled • Ridges and furrows	Field Supervisors/Field Assistants	Deputy Manager	
2) Ensure the sowing process based on • 85 to 90 lots/acre • 2 seeds /hill	Field Supervisors/Field Assistants	Deputy Manager	
3) Ensure the sowing as follows • Plant to plant spacing 30 cm • Row to row spacing 60 cm And keep the remaining samples in grower wise	Field Supervisors/Field Assistants	Deputy Manager	
4) Prepare the field layout map – start point, flow and no of rows	Field Supervisors/Field Assistants	Deputy Manager	
5) Scan the individual lots and feed the no of rows and upload the scanned lots through QA app	Field Supervisors/Field Assistants	Deputy Manager	
6) Check the manual map and system generated map and ensure if there is any deviation and make necessary changes	Deputy Manager	Manager – QA	
7) Update the sowing report in software	Data entry operator	Deputy Manager	
6.17.2 Germination evaluation			
1) Visit the respective fields between 10 to 15 days after sowing for germination count in each field based on • Breeder seed and parent seed – minimum 400 plants • Production and processing seed – minimum 200 plants	Field Supervisors/Field Assistants	Deputy Manager	

Process	Maker	Checker	Approver
2) Ensure the germination has attained and proceed to field monitoring	Field Supervisors/Field Assistants	Deputy Manager	
3) In case of germination not attained then re sow the remaining seeds in another field and observe germination	Field Supervisors/Field Assistants	Deputy Manager	
6.17.3 Field monitoring			
1) Educate the agronomy practice to growers for spraying and fertilizer application	Field Supervisors/Field Assistants	Deputy Manager	
2) Check the hand weeding and first spraying during 20 to 25 days after sowing	Field Supervisors/Field Assistants	Deputy Manager	
3) Tag the first row first plant between 30 to 35 days after sowing and update the following in the tag, • QC lot number • No of rows	Field Supervisors/Field Assistants	Deputy Manager	
4) Ensure the population count lot wise and row wise for the number of plants in every lot and update in GOT population counting register	Field Supervisors/Field Assistants	Deputy Manager	
5) Ensure the second spray and fertilizer application during 40 to 45 days after sowing	Field Supervisors/Field Assistants	Deputy Manager	
6) Check the parental and qualitative characters based on • Petal colour • Pollen colour • Hairiness • Leaf shape • Stem colour	Field Supervisors/Field Assistants	Deputy Manager	
6.17.4 Results declaration			
1) Record the observations in genetic purity observation register and in QA app	Field Supervisors/Field Assistants	Deputy Manager	
2) Check the observation register data and QA app data and ensure if there is any deviation and make necessary changes	Field Supervisors/Field Assistants	Deputy Manager	
3) Update the GP observations details in software	Data entry operator	Deputy Manager	
4) Cross check the entries in software at the end of the day and ensure if there is any error and inform IT department to rectify it	Deputy Manager	Manager – QA	
5) Send the GP result details to breeder, parent seed, production and processing department heads	Deputy Manager	Manager – QA	

6.18 GROW OUT TEST SAMPLE RECEIPT – FIELD CROPS



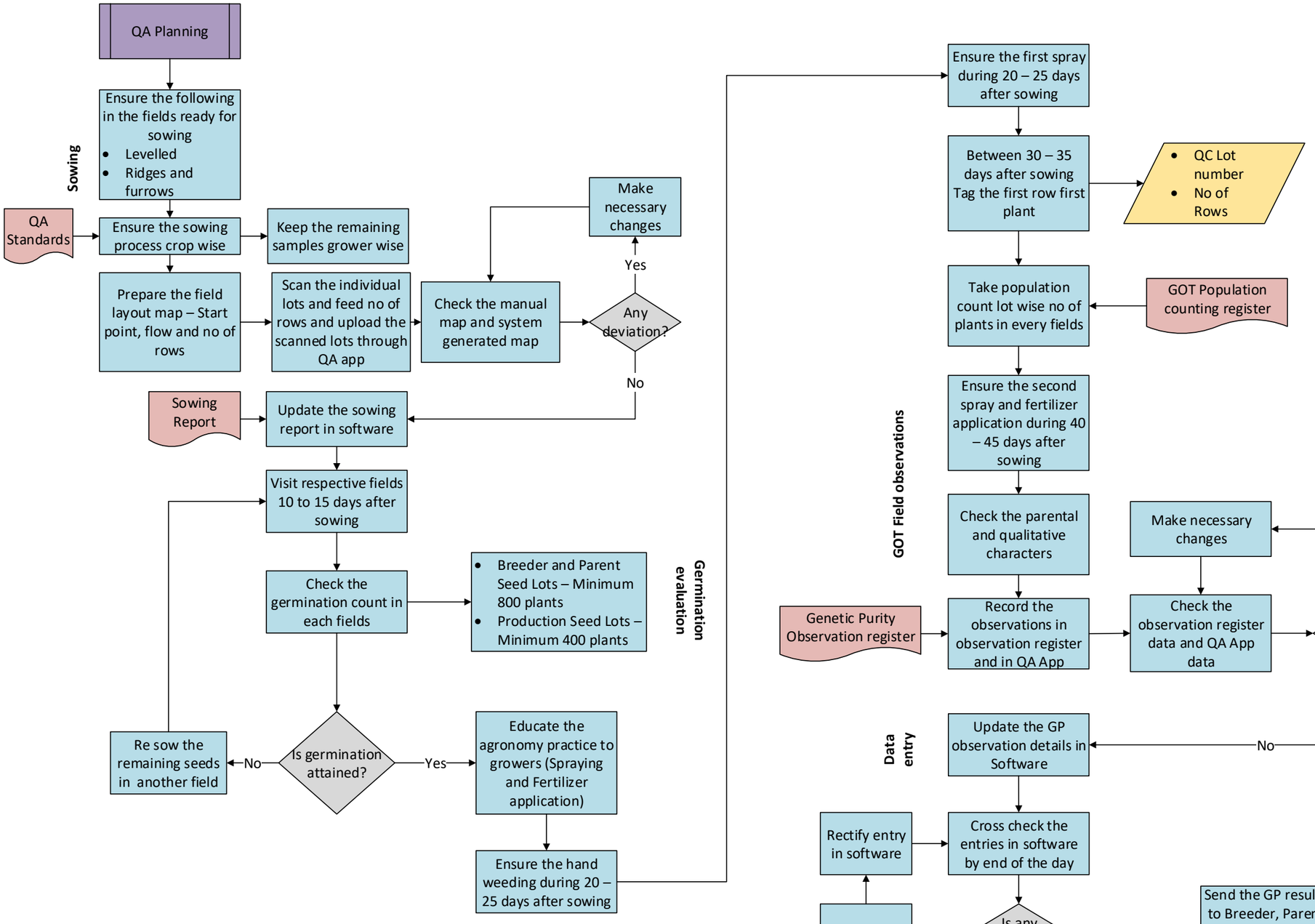
Sub-process Owner:
Deputy Manager - QA

Departments Involved:
Parent Seed
Processing
QA

Key activities:
6.18.1 Samples from breeder
6.18.2 Samples from Parent seed and Production

Process	Maker	Checker	Approver
6.18.1 Samples from breeder			
1) Receive breeder seed samples from respective breeder	Deputy Manager	Manager – QA	
2) Record the receipt of samples in sample receipt file	Deputy Manager	Manager – QA	
3) Separate the received samples variety wise and lot wise for sowing	Deputy Manager	Manager – QA	
6.18.2 Samples from Parent Seed and Production			
1) Receive parent seed samples from parent seed department (Raw seeds)	Deputy Manager	Manager – QA	
2) Collect raw seeds or shelled seeds from production department	Deputy Manager	Manager – QA	
3) Receive parental characters and F1 characters from PS Incharge for production samples	Deputy Manager	Manager – QA	
4) Check the samples physically for any variations with QC out	Deputy Manager	Manager – QA	
5) In case of variations, keep the lot separately and inform concern person for necessary action	Deputy Manager	Manager – QA	
6) Inward the samples in software and separate the received samples variety wise and lot wise for GOT sowing	Data entry operator/Deputy Manager	Deputy Manager/ Manager - QA	

6.19 GROW OUT TEST – SOWING TO RESULT DECLARATION – FIELD CROPS



Sub-process Owner:
Deputy Manager - QA

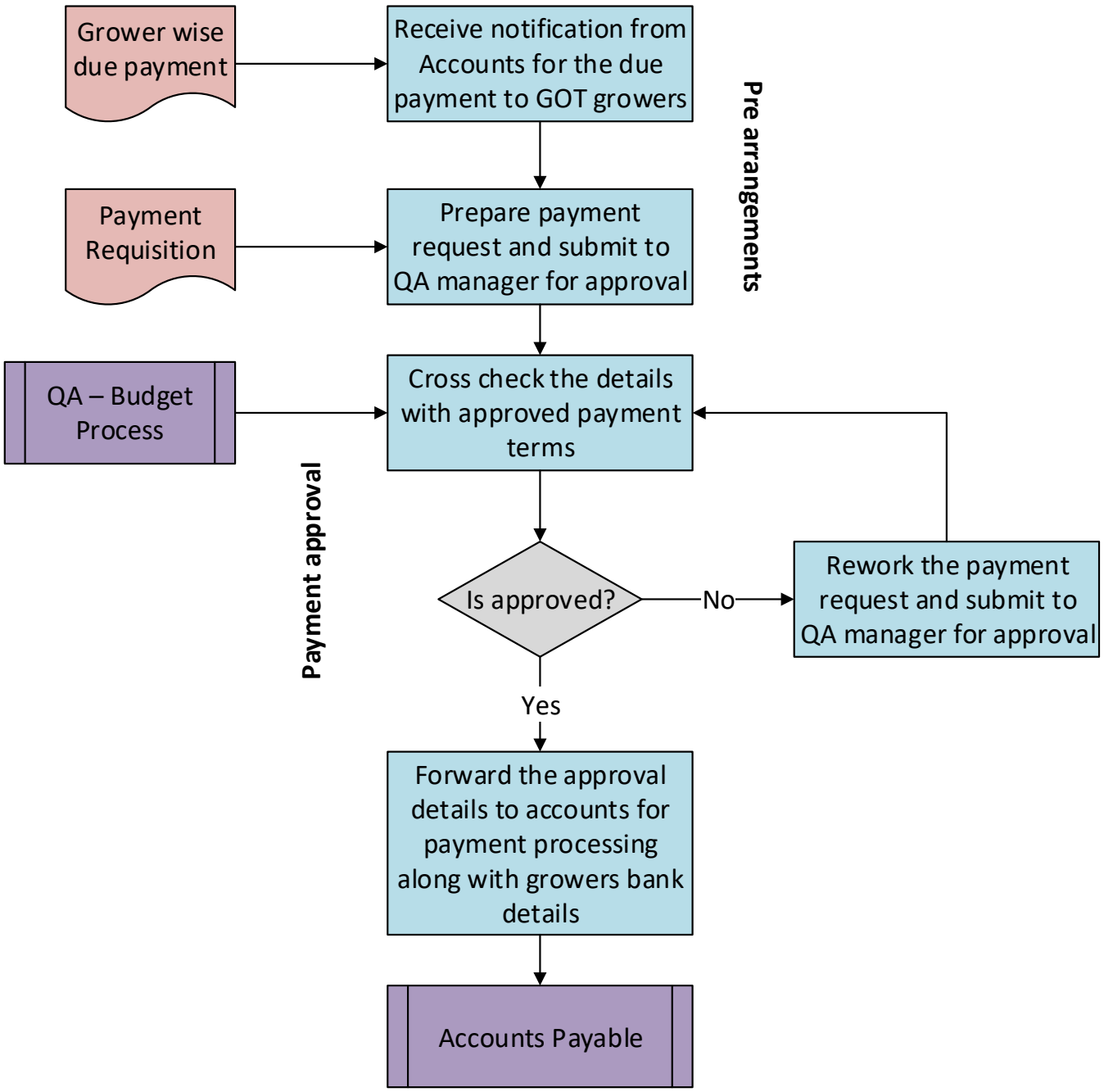
Departments Involved:
Parent Seed
Processing
QA

Key activities:
6.19.1 Sowing
6.19.2 Germination evaluation
6.19.3 Field monitoring
6.19.4 Results declaration

Process	Maker	Checker	Approver
6.19.1 Sowing			
1) Ensure the following in the fields that are ready for sowing • Levelled • Ridges and furrows	Field Supervisors/Field Assistants	Deputy Manager	
2) Ensure the sowing process crop wise and keep the remaining samples grower wise	Field Supervisors/Field Assistants	Deputy Manager	
3) Prepare the field layout map and start point flow and no of rows	Field Supervisors/Field Assistants	Deputy Manager	
4) Scan the individual lots and feed no of rows and upload the scanned lots through QA app	Field Supervisors/Field Assistants	Deputy Manager	
5) Check the manual map and system generated map and ensure if there are any deviations	Field Supervisors/Field Assistants	Deputy Manager	
6) In case of deviation make necessary changes and cross check with the manual map and system generated map	Field Supervisors/Field Assistants	Deputy Manager	
7) Update the sowing report in the software	Data entry operator	Deputy Manager	
8) Visit the respective fields between 10 to 15 days after sowing	Field Supervisors/Field Assistants	Deputy Manager	
6.19.2 Germination Evaluation			
1) Check the germination count in each field for germination evaluation based on • Breeder and parent seed lots – Minimum 800 plants • Production seed Lots – Minimum 400 plants	Field Supervisors/Field Assistants	Deputy Manager	
2) If the germination is attained educate the agronomy practice to growers for spraying and fertilizer application	Field Supervisors/Fi	Deputy Manager	

Process	Maker	Checker	Approver
	eld Assistants		
3) In case the germination does not attain then Re sow the remaining seeds in another field and visit the field between 10 to 15 days after sowing and evaluate germination	Field Supervisors/Field Assistants	Deputy Manager	
6.19.3 Field Monitoring			
1) Ensure the hand weeding and the first spray during 20 to 25 days after sowing	Field Supervisors/Field Assistants	Deputy Manager	
2) Check days between 30 to 35 days after sowing and tag the first row and first plant as flows: • QC Lot number • No of rows	Field Supervisors/Field Assistants	Deputy Manager	
3) Take population count lot wise and no of plants in every fields and update the same in GOT population counting register	Field Supervisors/Field Assistants	Deputy Manager	
4) Ensure the second spray and fertilizer application during 40 to 45 days after sowing	Field Supervisors/Field Assistants	Deputy Manager	
5) Check the parental and qualitative characters and record the observations in Genetic purity observation register and in QA app	Field Supervisors/Field Assistants	Deputy Manager	
6.19.4 Result declaration			
1) Ensure if there is any deviation and make necessary changes and cross check the observation register data and QA app data	Field Supervisors/Field Assistants	Deputy Manager	
2) Data entry the GP observation details in software	Data entry operator	Deputy Manager	
3) Cross check the entries in the software at the end of the day	Deputy Manager	Manager – QA	
4) In case of error inform to IT and rectify entry in software	Data entry operator	Deputy Manager	
5) Send the GP result details to breeder, parent seed, production and processing department heads	Deputy Manager	Manager – QA	

6.20 GOT – PAYMENT ARRANGEMENT



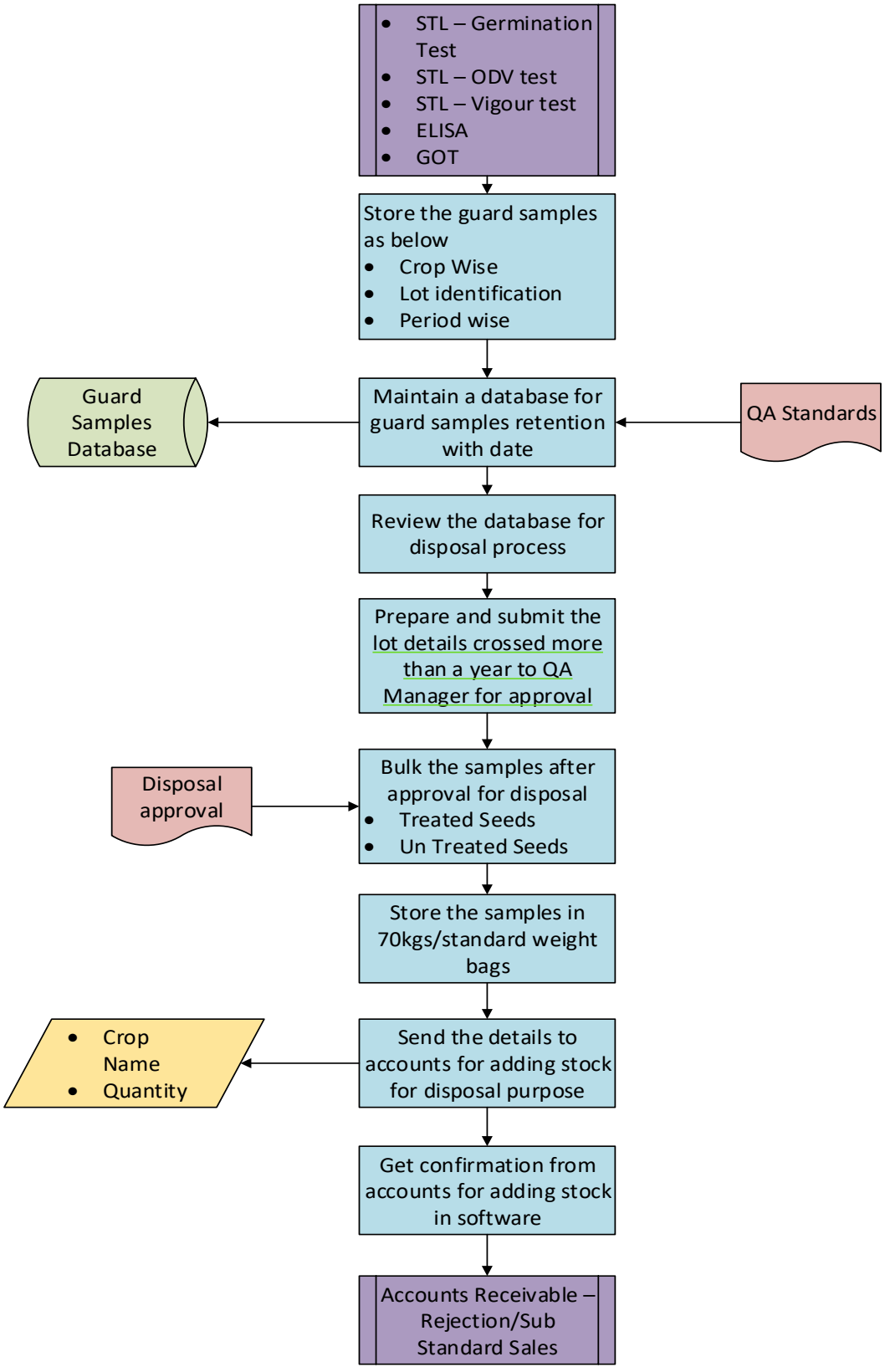
Sub-process Owner:
Deputy Manager - QA

Departments Involved:
QA
Accounts

Key activities:
6.20.1 Pre-arrangements
6.20.2 Payment approval

Process	Maker	Checker	Approver
6.20.1 Pre-arrangements			
1) Receive notification from accounts for the due payment to GOT growers	Deputy Manager	Manager – QA	
2) Prepare payment request and submit to QA manager for approval	Deputy Manager	Manager – QA	
6.20.2 Payment approval			
1) Cross check the details with QA budget for approved payment terms	Manager – QA	Manager – QA	Manager – QA
2) Check whether it is approved and forward the approval details to accounts for payment processing along with grower's bank details	Deputy Manager	Manager – QA	
3) If it is not approved then rework the payment request and submit to QA manager for approval	Deputy Manager	Manager – QA	Manager – QA

6.21 GUARD SAMPLES STORAGE AND BULKING



Sub-process Owner:
Assistant Manager - QA

Departments Involved:
Accounts
QA

Key activities:
6.21.1 Guard samples storage
6.21.2 Guard samples bulking and disposal

Process	Maker	Checker	Approver
6.21.1 Guard samples storage			
1) Store the guard samples as below • Crop wise • Lot identification • Period wise	Asst. Manager	Manager - QA	
2) Maintain a guard sample database for retention with date as per QA standards	Asst. Manager	Manager - QA	
3) Review the database for disposal process	Asst. Manager	Manager - QA	
6.21.2 Guard samples bulking and disposal			
1) Prepare and submit the lot details crossed more than a year to QA manager for approval and bulk the samples after approval as follows • Treated seeds • Un treated seeds	Asst. Manager	Manager - QA	
2) Store the samples in 70 kgs/ standard weight bags	QA Assistants	Asst. Manager	
3) Send the details to accounts for adding stock for disposal purpose based on • Crop Name • Quantity	Asst. Manager	Manager - QA	
4) Get confirmation from accounts for adding stock in software	Asst. Manager	Manager - QA	
5) Coordinate with accounts for the disposal of samples	Asst. Manager	Manager - QA	