Avola Goshiye & One Acre Fund

2019 Seed Project

Seed Cleaning & Bagging Protocol Guide

I. General plan of the day- timing, tasks, workers needed

a. The machine can generally process 9 Qt of seed per hour, and our goal is to run the machine for 2 shifts, from 9 am – 1 pm (4 hours) and 2 pm – 6 pm (4 hours), meaning 8 total hours for the day, which should results in around 72 Qt being processed.

b. Refer to the Seed Cleaning & Bagging Scheduler & Tracker for use in planning the lots to clean for the week, and check this and adjust at the end of each day based on the actual quantity done that day. If we start to get behind schedule then we may want to consider running the machine for more hours on a given day to catch up
c. Every day of the cleaning/bagging process 16 total people must be present, with the following role assignments. In addition to what is written, ALL workers will help to clean the machine and shed up at the end of each day:

Role	Responsibilities/tasks	Number of people needed
Shift Leader	*Ensure all workers know their proper tasks, orient or train them as needed. This will include managing use of correct lot(s) that day *Run safety check of machine before turning it on *Turn on the generator and all the machines, in the proper order, and turn them off again in the proper order when the shift is done or in case of a problem *Monitor the full process, ensure it is running smoothly, identify and correct any problems *Note down results and adjust schedule for the next day as needed on Schedule & Tracker document *Check inventory of crucial materials daily, if anything is running low inform Yibeltal so he can order more *Communicate results and problems/solutions to Yibeltal + leader scheduled for next day	1
WH > Shed Seed movers	*Carry 9 Qt of seed of the designated lot from WH to machine shed at the beginning of every hour, putting onto tarp in waiting area *Carry back the 9 Qt of processed and bagged seed at the end of each hour, put back in the WH in the same section from which raw seed originally came	3
Seed lifters in shed	*Break down the 1 Qt bags into smaller units (25 kg) that are more manageable to carry up the ramp to the platform *Carry the seed up the platform; do this continually and quickly throughout the 8 hours of the machine running	3
Seed feeders	*Pour the teff seed from bag or buckets into the hopper at the top of the Precision Air Classifier 1, ensuring that the hopper is always full and the flow is smooth and uniform	2
Discharge Leader-Trash	*Find empty sacks at beginning of day and hook up to the 4 different parts of the machine from which discharge will be expelled (1 on machine 1, 2 on machine 3, 1 on machine 5) *Circle the machine and check is constantly to see if any of the discharge sacks are filling up *When a sack gets close to filling up, get another sack, get the Discharge Assistant to help. One of you should remove the sack attached to the machine while the other quickly comes underneath with the new bag and attaches it *Check the trash materials by hand, inspect whether a lot of good seed is in them. If you find this (and especially if it changes during the day) inform the Shift Leader *Dispose of the extra material in a designated area (throw away discharge from machine 1 & 3, but keep and tie off sacks from machine 5 since this can be kept as grain, put into designated area of WH)	1

Discharge Leader- Good Seed	*Stand at the final point of release for the cleaned seed with a bag. When it gets close to filling up have the Discharge Assistant come with a new sack. Pull away the first sack as the Assistant comes underneath the new sack. Try to avoid any seed falling on the ground. *Move the filled clean seed back into the waiting area for bagging, make sure to carefully stand it up so it doesn't fall. If very full then tie it off to prevent leaks *Return to the machine and take back over holding the sack from the Assistant *Check quality of seed coming out of the machine continually and if you see any major problems report it to the Shift Leader	1
Discharge assistant	*Help the Discharge Leads for both Trash and Good Seed to attach new sacks when they get full, as needed *Otherwise, walk around the machine on an on-going basis with a broom and dust pan and continually sweep up any seed or trash getting on the floor *Depending on the quality and quantity of the seed found on the floor, put it in the proper place (dispose of it, put into waiting area bags to be run back through the machine, or put it into the clean seed sacks near the bagging area)	1
Bag fillers	*Use scoop to put 15 kg of cleaned teff seed into the green bags with the Avola Goshiye labels *Check weight of bags on scale, adjust until they are 15 kg exactly	2
Bag sewers	*Use the sewing machine to sew the green bags shut *Replace the string and oil the sewing machines as needed *If there is a problem with the sewing machine, solve the problem	2

II. Safety & Sanitation

a. Materials that always must be kept on hand:
   i. Extra sacks, good quality with no holes or rips- at least 20 extras each day
   ii. 2-3 Brooms
   iii. 1-2 Dust pans
   iv. 1-2 Mops
   v. 1-2 Buckets or Jerry cans of water
   vi. Gas for the generator
   vii. Oil for the generator
   viii. Grease for the Seed machine
   ix. Grease for the sewing machines
   x. Extra string for the sewing machines
   xi. Wrenches
   xii. Extra bolts
   xiii. Cans of compressed air, for cleaning the machine
   xiv. Rags for cleaning the machine
   xv. Long-handled duster for cleaning high parts of machine
   xvi. Rough-sided sponges for cleaning screens on Screen Grader
   xvii. Extra insulation tape (for plugging gaps, if seed is coming out)

b. General WH and Shed Sanitation Rules:
   i. After the machine is done running of the day workers should use long-handles dusters, brooms and rags to wipe off all lose material that has accumulated on the sides and top and corners of the machine

ii. After this, then the floor of the seed machine shed must be swept thoroughly and then to remove all loose teff seed, dust and other materials
iii. After sweeping the seed machine shed must also be mopped with water (soap is optional) to thoroughly clean our any dust
iv. The warehouse should also be thoroughly swept every day
v. All efforts possible must be made to prevent rat or other pest attacks in both the machine shed and the WH. This includes sealing up any holes found in the shed or WH walls, putting out and regularly baiting and cleaning rat traps, putting out rat poison, etc.
vi. All stacks of seed left overnight in either the shed or the WH should be at minimum 30 cm from any wall and must be raised off the floor either on pallets or at least on a tarp

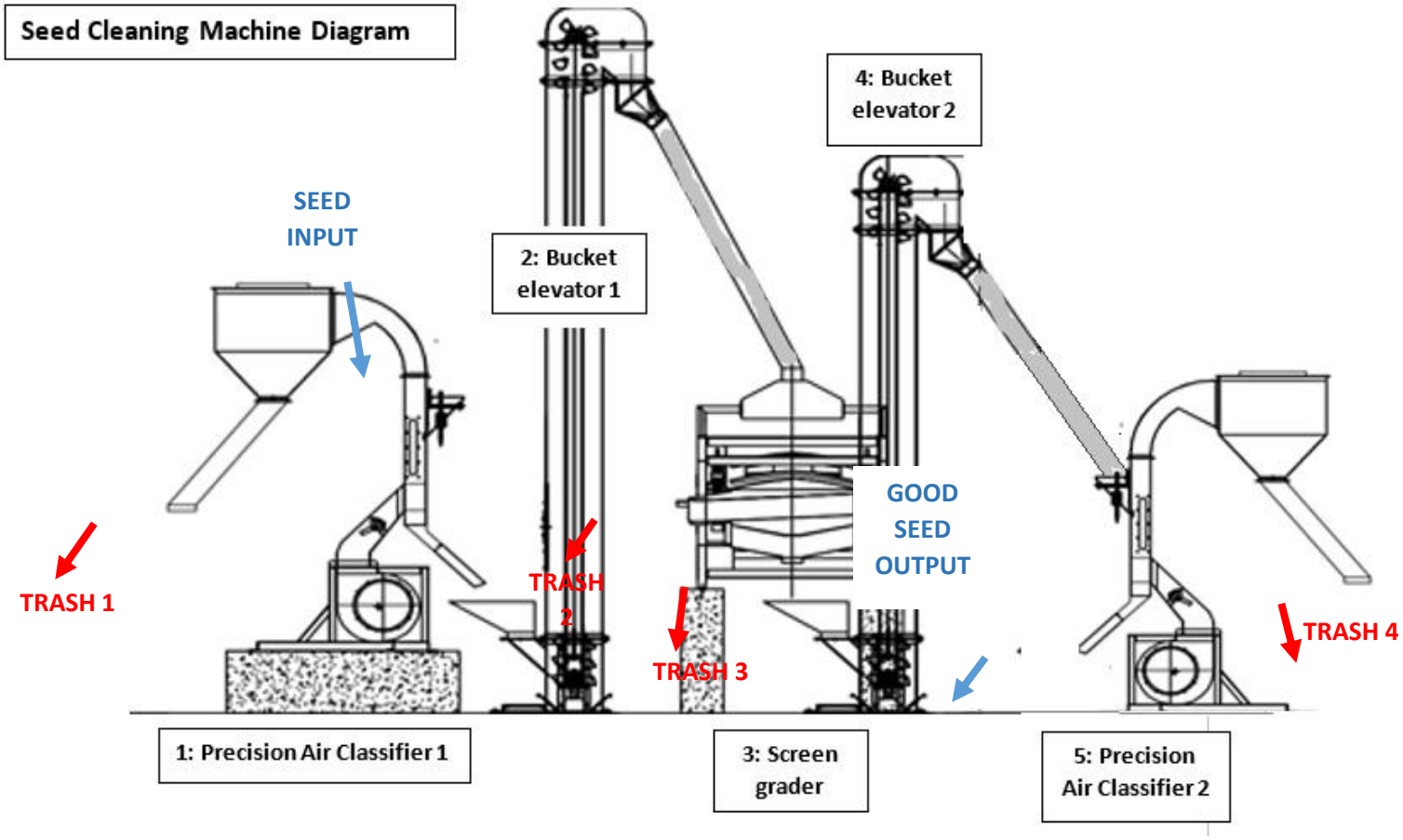
c. Keeping the seed machine clean
    i. At the end of every day, open the levers of the 2 Precision Air Classifiers to full air (far right setting) and turn those machines on for 3-5 minutes without seed in them to run and clean out loose particles
    ii. Open up and clean the Screen Grader 1 time per week.
        1. Do not remove the screens in order to clean them, this process is highly involved. You should only remove the screens if you are changing them for a new crop or to deal with a problem
        2. Instead, try to use a long-handled duster to reach inside and clean the machines of dry dust
        3. You can also tie a wet rag onto the end of a stick and push that inside to clean off the screens somewhat. But you must then allow the machine to air dry thoroughly before using it again
        4. When cleaning screens in Screen Grader, be gentle. Do not use any wire brushes or sharp-edged things and do not hit or tap the screens

d. Machine safety rules:
    i. In the morning before turning on the machine do a walk around and inspect the area for any problems. In particular check that:
        1. No motors are jammed
        2. No wires are frayed or cut
        3. There are no cracks in the machine
        4. There are no materials jamming the fan wheel or other components.
        5. No hoses are broken or jammed
    ii. If there is a problem then call your manager and discuss, try to get the problem fixed before turning the machine on
    iii. ALL WORKERS involved in the process must wear closed-toed shoes and clothes that are not loose fitting or long, as these can get caught in the machine. If they have something loose fitting or long it should be rolled up
    iv. Stay away from the pulley belt assembly while machine is working
    v. Never climb on the machines while they are running
    vi. Never overload the cleaning machine with more quantity than it is rated for (1 ton of seed passing through per hour)

vii. When climbing up and getting from platforms for machine operation, take your time and be careful. If you are jumping around you might hurt yourself or the expensive machine

viii. Avoid putting more than 2 Qt of seed and 3 people onto the wooden platform at one time

III. Instructions for operating Seed Cleaning Machine



a. Setting up the machine for teff

i. Generally this should be done 1 time for the season and then not changes, though the Shift Leader should check and confirm that everything is correct at the beginning of the day, adjust anything that accidentally got changed

ii. In the Screen Grader:

1. Make sure that the bottom screen installed is a piece of plastic that should not allow any seed to pass through
2. Make sure that the top screen is the fine mesh, should be 1 mm square holes

iii. For Precision Air Classifier 1:

1. Make sure that the two handles which open and close the input slot are open wide enough that the teff seed pour inside will flow down at a rate of around 9-10 Qt per hour, no faster or slower
2. Make sure that the lever at the bottom of the machine which controls airflow is in the center position. This means medium air flow

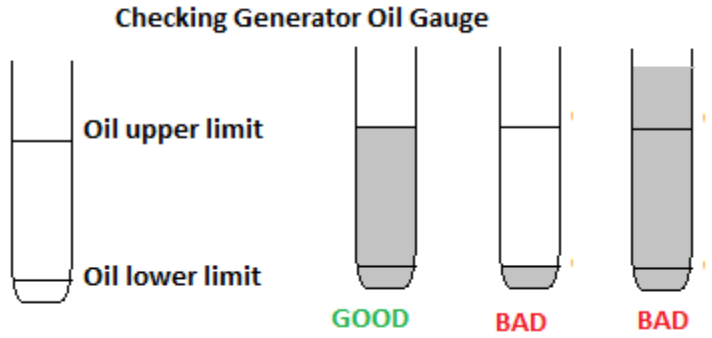
iv. For Precision Air Classifer 2:

1. At this stage the teff is already mostly clean and we don't want to lose much more of the seed, so the air level should be lower than with the first Precision Air Classifier
2. Adjust the lever into a position that is 2 cm away from being fully to the left

b. Turning on the machine

i. Check if generator is ready to turn on, no problems

1. First check the gas level and make sure it is completely full (do this at the beginning of every 4 hour shift)
    a. Open the top circular handle that is closest to the generator shed door
    b. Look at the indicator line, it should be fully red if the gas level is full
    c. You can also put a stick into the tank to test the level
    d. If the gas is not full at the time of the check then fill it up
2. Check the oil level as well, in case of problems
    a. Open the top circular handle that is closest to the back of the generator shed
    b. Check the oil level using the indicator line or stick. Make sure it is neither below the lower limit or above the upper limit
    c. Generally you should not need to add any oil, unless there is a problem and the motor is burning oil
    d. However, you will change the oil every 200 hours of operation



    e. Check the fuel pipes
    f. Inspect all instruments and warning lamps
    g. Check the battery electrolyte
        i. Remove the battery cap and check the level
        ii. If it is below the upper level limit then add distilled water until it reached the upper limit line, but do not over fill
        iii. Be very careful not to touch the electrolyte solution in the battery, it can cause burns and blindness

iv. If you do touch the solution by accident flush immediately with large amounts of water, then go to the doctor

h. Check the grounding protection
i. Check for oil and air leakage
j. Check for loosening of each component
    i. Tighten any loose bolts
    ii. Pay special attention to air cleaner, muffler and AC generator
k. Eliminate all foreign substances inside or outside the machine
    i. This includes moving any tools inside or on or near the machine
    ii. This especially includes moving anything that might be blocking the muffler and engine, or the air intake and outlet of the machine
l. Check for cleanliness of the engine
m. Check electrical wires to make sure they do not have any slackness, any holes or fraying, and are all properly connected

ii. Turn on the generator
    1. Flip the battery switch to the ON position
    2. Flip the main switch to the OFF position
    3. Turn the switch key of the engine to START position
    4. Allow the engine to pre-heat for 3-5 minutes
    5. Check the display of the Volt meter, it should say 230 V for single phase or 400 V for three-phase
    6. Put the main switch to ON position
iii. Turn on the machines:
    1. Press the green button for machine 5 (last Precision Air Classifer) until it lights up, wait 30 seconds and make sure it is running smoothly
    2. Press the green button for machine 4 (second Elevator) until it lights up, wait 30 seconds and make sure it is running smoothly
    3. Press the green button for machine 3 (Screen Grader) until it lights up, wait 30 seconds and make sure it is running smoothly
    4. Press the green button for machine 2 (first Elevator) until it lights up, wait 30 seconds and make sure it is running smoothly
    5. Press the green button for machine 1 (first Precision Air Classifer) until it lights up, wait 30 seconds and make sure it is running smoothly

c. Loading seed into the first machine (1), the Precision Air Classifier
    i. Make sure that the input slot is open to the proper size (Shift leader should be in charge of double checking this)
    ii. Carry 1-2 Quintals of seed up to the top of the wooden platform to make sure there is plenty of seed ready to be loaded quickly
    iii. Have one worker pour the seed from a sack or bucket into the input slot in such a way that it is evenly spread out across the length of the slot for uniform feeding
    iv. Continue to add seed to the slot quickly so that the slot never gets empty; a second worker should help to prepare the bags of seed and pass them to the worker who is

pouring in the seed to ensure that this goes quickly and avoid any gaps of time with no seed in the slot

d. Monitor the flow of the grain through the machine
    i. The Shift leader should walk around and check through the observations windows as all as the points of visible discharge of the seed from one machine to the next to ensure that the seed is flowing smoothly on its own from machine 1 > 5.
    ii. If there is a back-up and seed is not moving from one machine to the other then the machine must be stopped and the problem identified and resolved immediately

e. Dealing with chaff and other materials expelled from machine
    i. Tie bags off to the 4 points of trash discharge before the machine is started
    ii. Ensure that the Discharge Leader for Trash monitors these regularly and is ready to remove and replace any sacks that fill up, then dispose of the trash or move it to a designated area outside of the shed
        1. Trash from Machine 1 (Precision Air Clarifier 1): throw away in mixed trash pile outside of shed
        2. Trash from Machine 3 (Screen Grader): throw away in mixed trash pile outside of shed
        3. Trash from Machine 5 (Precision Air Clarifier 2): Tie off these bags, write “Grain” and put into a section of the WH allocation for grain
    iii. This worker should regularly check the sacks of collected trash and inform the Shift leader if he/she believes that there is too much good seed in any of the stages
    iv. If there is too much good seed going into the trash then we may need to reduce the amount of air on one or both of the 2 Precision Air Classifiers or widen the input slot on the first machine. This can be done without turning the machine off
    v. We also may need to consider checking and adjusting the screens in the Screen Grader. To do this the machine must be turned off first

f. Collecting cleaned seed at the end of the process
    i. Have a worker (Discharge Leader- Good Seed) stand at the output area of the last machine, Precision Air Clarifier 2, and hold a sack to catch all the seed
    ii. When the sack is close to being full the Discharge Assistant should help to bring a new sack and immediately put it into place when the full sack is pulled away. Try to avoid any teff falling on the floor as much as possible
    iii. Move the filled clean seed back into the waiting area for bagging, make sure to carefully stand it up so it doesn’t fall. If very full then tie it off to prevent leaks
    iv. Discharge Leader for Good Seed should then return to the machine and take back over holding the sack from the Assistant
    v. Throughout the shift, check the quality of seed coming out of the machine continually and if you see any major problems (particularly if there is a change in the quality of the seed coming out of the machine) report it to the Shift Leader immediately
        1. If too much chaff is making its way into the Good Seed then we pay need to turn the air level higher on the Precision Air Classifier 1 and/or 2, reduce the size of

the input slot on Precision Air Classifier 1 and/or 2, or possibly change or adjust one of the screens inside the Screen Grader

g. Turning off the machine
    i. Every time that the machine must be turned off follow these proper procedures
    ii. First, make stop feeding any new seed into machine 1, and allow it to run all the through from machine 1 > 5. Only when there is no more seed coming out of machine 5 should you turn off the machine
    iii. Turn off the cleaning machine
        1. Start by pressing the red button for Machine 1, the first Precision Air Classifier. Wait 10-20 seconds to allow it to stop
        2. Then press the red button for Machine 2, the first Elevator. Wait 10-20 seconds to allow it to stop
        3. Then press the red button for Machine 3, the Screen Grader. Wait 10-20 seconds to allow it to stop
        4. Then press the red button for Machine 4, the second Elevator. Wait 10-20 seconds to allow it to stop
        5. Finally, press the red button for Machin 5, the last Precision Air Classifier. Wait 10-20 seconds to allow it to stop
    iv. Turn off the generator
        1. Go outside to the generator
        2. Turn off the main switch that connects the generator to the seed machine (looks like 3 circuit breakers connected to one another)
        3. Now turn the key to the OFF position and wait for the generator motor to come to a halt
        4. Then flip the battery switch to OFF

IV. Bagging process
a. Materials needed each day:
    i. Bags (15 kg capacity, green, with Avola Goshiye logo)
    ii. Permanent markers (5-10)
    iii. Tarp
    iv. Cords for plugging machines into power source
    v. Digital scale, plugged into power source
    vi. Plastic pitchers (2)
    vii. 2 hand-held sewing machines, plugged into power source
    viii. String for sewing machines
    ix. Scissors
b. Steps for bagging
    i. Filling bags:
        1. Take 1 Qt bags from the cleaned seed waiting area near machine 5 (the second) Precision Air Classifier and slide it over to the bagging area
        2. Scoop out seed from those bags using a pitcher and pour into the 15 kg bags

3. Weigh the bag on the digital scale to check at it is 15 kg; add or remove seed as needed to get to 15 kg exactly
4. Place the filled bag in the sewing area
5. Generally we suggest 2 workers should be in charge of this task each day

ii. Sewing and labeling the bags:
1. Use the hand-held sewing machines for this task
2. Place one top corner of the filled bag into the sewing machine input slot
3. Press the button to turn on the sewing machine and then pull the sewing machine across the top of the bag at a medium, even pace
4. When reaching the other end of the bag, release the button. Cut off the excess string with scissors
5. Use a marker to write in the Seed Variety and Class on the bag on the appropriate lines
6. Stack the filled, sealed, labeled bags to the side of the sewing area

iii. Moving bags back to WH
1. Workers should come regularly and carry these bags out of the shed and back to the WH, since there is not much storage area in the shed
2. These bags should be stacked in the same location of the WH form which the raw seed of this lot was originally taken
3. At the end of the day there should be no clean seed remaining in the machine shed—all should be sealed into the 15 kg bags and all should be moved back to the WH

V. Scheduling & Tracking Documentation

a. Based on measured quantities of seed per lot, machine speed, days available for working, etc., Yibeltal should create a draft schedule of when to do the seed cleaning and bagging, and goals for quantity per day. This should be pre-filled on the Seed Cleaning & Bagging Scheduling & Tracking Sheet, which should be printed in hard copy and kept by the Shift Leader each day of work
b. On the day of work the Shift Leader should try to accomplish the goals written on the sheet, cleaning and bagging the designated lot numbers of seed and completing the quantity goals
c. At the end of every day the Shift leader must write the actual work accomplished in the sections for this
d. Depending on the work accomplished the Shift Leader should also make adjustments to the scheduled plan for the next day (i.e. if did not finish the lot expected to finish, then this must be done the next day, pushing the whole schedule back)
e. Eniyew should check the hard copy of the Seed Cleaning & Bagging Scheduling & Tracking Sheet every 1-3 days and data enter the results and adjusted schedule into the computer, then share with Yibe
f. If the schedule changes then Yibe should print an updated version of the sheet and provide a new hard copy for the Shift leaders to use as quickly as possible, but definitely no later than Monday morning of each new week
g. Every day of operation there must be a Shift Leader and 15 other workers, but these do not always need to be the same people

i. Eniyew should take the lead on determining who will be the shift leader for each day of the week and making sure that 15 workers are scheduled and informed of their allocated days

VI. Machine and Generator Maintenance & Troubleshooting

a. Generator Maintenance:
    i. Every 250 hours of operation:
        1. Replace the engine oil with fresh oil
        2. Replace the oil filter
        3. Inspect and clean the air cleaner components
        4. Check the specific weight of the battery
    ii. Every 500 hours of operation:
        1. Inspect and clean the cooling fan
        2. Replace the fuel strainer core
        3. Check terminals and wiring of all circuits
    iii. Every 1,000 hours of operations:
        1. Clean the inside of the engine's fuel tank
        2. Check the space between engine valves
        3. Adjust the fuel nozzles
        4. Check the spraying time of the fuel
        5. Check the shock proof rubber
        6. Check the nylong tube and rubber tube
        7. Check the sound-absorbing material
    iv. Do the daily monitoring activities mentioned in "starting the generator" section and then correct any problems before starting the generator
    v. When doing maintenance:
        1. SHUT OFF THE MACHINE before doing anything!
        2. After shutting off the machine, allow it to cool before doing maintenance
        3. Loosen the cable on the battery at the negative pole when working on the generator, but remember to reattach when done.
        4. Never turn over the battery
            a. You must be careful with the battery because improper use of battery can result in explosion and injury!
        5. Only allow special authorized, trained agents to do work
        6. Make sure maintenance workers where a face shield, rubber gloves and protective clothing
        7. Do not contact generator or any loading parts with wet or bare hands
b. Regular maintenance needed for Precision Air Classifier
    i. Open up and check the Precision Air Classifier machines every 1-2 days, clean thoroughly and remove any materials that is stuck inside, especially around the fan wheel
    ii. Lubricate the moto bearing after every 2,000 working hours
    iii. Check bolts of the motors every 15-20 days of, tighten if they have started to come loose
c. Regular maintenance needed for Screen Grader

i. Every week: Open up and clean the screens without removing them, using a long-handled duster and a wet rag attached to a stick. Be gentle, do not bang the screens.
ii. Screen changing- between crops or in case of a problem:
    1. Open front door.
    2. Remove feed inlet tray.
    3. The nuts of the tensioning clamps on side panel plate on both sides.
    4. The screen is now ready to be removed by sliding it out of the machine.
    5. Replace with the required screen by uniformly sliding the new screen between the two tensioning clamps.
    6. After screen is in place, tighten the tensioning clamps uniformly by drawing them evenly and about as tight as possible with one hand
    7. Re-fit the inlet tray and tighten all fasteners

d. Common problem troubleshooting

Problem	**Symptoms**	**Solutions**
Precision Air Classifier Motor failing to wind	*Short circuit *Heavy load on motor *Motor runs in single phase *Voltage fluctuation	*Use correct range of DOL starter *Avoid adding weight more than 3 *Make sure supply of voltage is uniform. If not so use MCB (Main circuit breaker)
Precision Air Classifier Motor has damage to bearings	*Heavy load due more auxiliary weight *Absence of grease *Grease doesn't reach up to bearing housing *Presence of dust	*Avoid adding auxiliary weight *Grease every 2,000 working hours *Check grease tubes for air bubbles. If present, remove the tube and get bubble out
Precision Air Classifer Motor housing cracked	* Greasing is missing in the bearing, in turns bearing will get jammed and will rotate on OD of bearing *Motor clamp wedge bolt gets loose	*Cover in case of motor *Grease regularly *Do proper tightening to avoid rotation of motor