Guide to Cultivation of Tea

AMALGAMATED PLANTATIONS

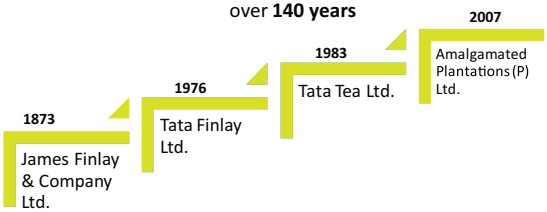
A TATA Enterprise

2014

Amalgamated Plantations

Amalgamated Plantations Private Limited (APPL) isn't like any other tea plantation company. It is one of India's largest and most revered tea producers. One, with a rich heritage that goes back over a century. And a legacy shared with the house of the Tatas.

Experience and expertise in **Tea Cultivation and Manufacture** for over **140 years**



Putting People First

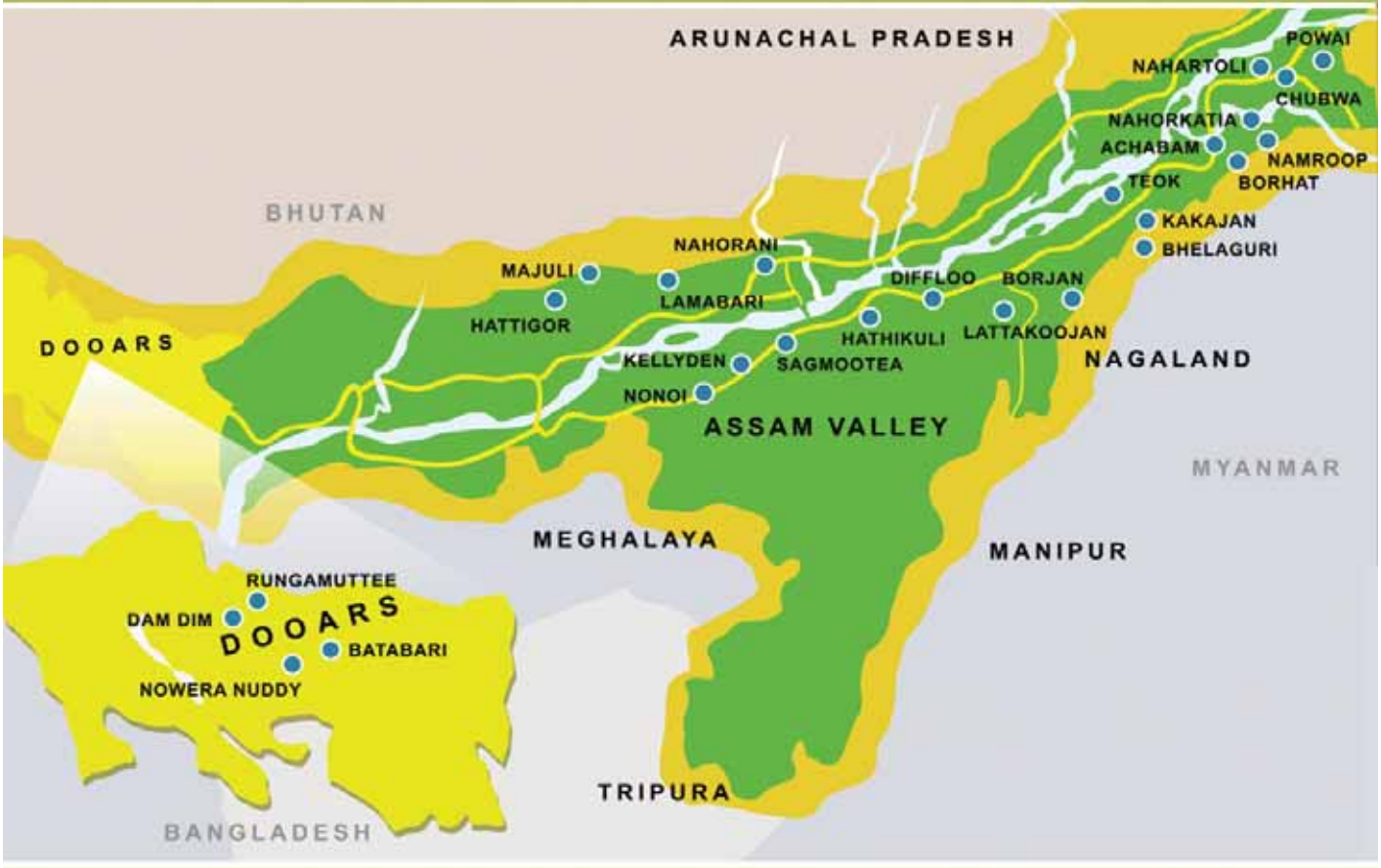
As a corporate who makes agri products for consumers across the globe, we take pride in the people who make us- our employees, all 31,000 of them.

The stakeholders include Tata Global Beverages Ltd. (TGBL), IFC (a part of the World Bank group) and most of our employees.APPL has over 21000 shareholders-about half of them women.

APPL Highlights

- Annual turnover to of over Rs 550 crore
- The 2nd largest producer and supplier of tea in India (40 m kg)
- The 2nd largest producer of orthodox teas (5m kg)
- 23,092 hectares grant area out of which 14304 is tea gardens
- Kakajan-The largest tea estate in area (1650 hectares)
- Powai tea factory-India's largest tea processing centre (5m kgs/ annum)
- Namroop, Borjan and Majuli- among the top 20 tea gardens in India
- Hathikuli-India's largest integrated organic tea estate (687 Ha)
- Independent R&D recognized by DSIR, Delhi
- 3 integrated packaging units packing over 30 million kgs of Tea for Tata Global Beverages Ltd
- Over 5 lakh shade trees planted with Pepper vines. Total of 7 lakh trees will be covered by 2017
- 150 Ha of fisheries across 11 estates. 6 fish hatcheries under operations producing more than 15 crore spawns
- APPL Foundation, an independant trust of APPL works for the welfare of the general public, in the spheres of education & skill development, health care, heritage & culture.
- APPL Foundation runs state-of-the-art vocational training centres at Rowta and Chubwa and Referral Hospital at Chubwa.

Our Homeland



Our 25 tea gardens are strategically located along the length of Brahmaputra Valley and Sub-Himalayan terrain in Eastern India

Tea

where it grows well

Soil

Land	:	Upland, well drained soil. Low lying marginal areas must be avoided.
Soil Depth	:	90cm or more.
Slope	:	if more than 2%, planting should be done in contours.
Texture	:	Fertile sandy loam to loam.
Bulk density	:	should be less than 1.4 g/cc.
pH	:	4.5 to 5.5
Organic carbon	:	minimum 1%.

Climate

Co-ordinates	:	45°N to 35°S latitude; upto 2500m above mean sea level. Entire NE India falls in this geographical location.
Atmospheric temperature	:	13°C to 30°C optimum.
Relative Humidity	:	Average annual 60% or above.
Rainfall	:	minimum 120cm well distributed rain; minimum 5cm per month is ideal.

Hence the soil should be tested properly before finalizing selected area for planting tea.

Making the fields:

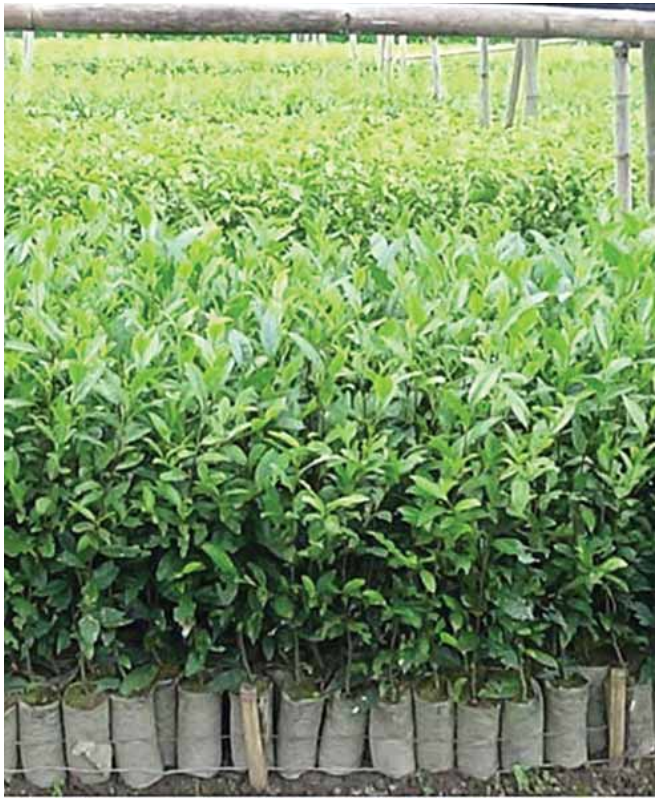
- Make blocks or sections of maximum 15bigha area.
- If an area is of 20 bigha size, divide into 2 sections of 10 bigha each.

Selection of planting Material:

- Select clones or bi-clonal seed stocks depending upon suitability for the agro-climatic zone / locality – based on performance record of neighboring tea areas. Viz. TV-1, TV-9, TV-17, TV-23, TV-25, TV-26, Tinali-17, P-126, S3A3, S3A1, T3E3, TS-491, TS-520 etc.
- In general, 60% of the planted area should be under clonal plants & 40% under Seed plants. At least 5 different clones should make up the clonal area.

Nursery:

- Well drained upland area should be selected near road for easy transportation.
- Having perennial source of water.
- Soil used for nursery propagation should have pH of 4.5 to 5.0; organic carbon minimum 1%.
- If the soil parameters are not satisfactory, the same should be amended following recommended SOPs.
- Sleeve filling for spring propagation is done in Dec-Jan.
- Prepare nursery in East-West direction.
- Take cuttings during April-May to June. Taking cuttings and putting into sleeves should be done during early morning or evening hours under shade.



Nursery aftercare:

- Regular watering is important.Regular manual weeding should be done.
- When plants attain a height of 25-30cms, the smaller ones should be sorted & consolidated.
- When plants attain 3-4 new leaf stage, apply YTD mixed with sand in 1:9 ratio - @ 5g (1spoon) per plant by forking into sleeve top soil. Preparation of 1Kg YTD: Urea 220g + SSP 310g + MOP 250g + Sand 220 = 1000g or 1Kg.
- Insect pest and disease infestation if any should be corrected with recommended cultural & chemical methods.

Land Preparation for planting tea:

Proper land preparation is essential. If the land is earlier cultivated area, the soil should be rehabilitated by growing Guatemala grass for about 2 years.

Drainage:

- The root zone of tea plant should be free from excess moisture and hence a proper system of drainage is essential in tea cultivation.
- The size and length of various drains in the intricate drainage system of tea depend upon slope & texture of the soil.

Tea Planting

- Healthy plants having 12-16 nos. leaves with 45 cm height are ideal for planting.
- Age of plants should be 12-14 months or more.
- Considering prevalence of drought like situations in winter, best time for planting in NE India is April-June after receipt of pre-monsoon rains but before onset of heavy monsoon rains.
- Ideal spacing for planting is 105 X 75cm in single hedge system which will accommodate about 1600plants per bigha.
- The size of the planting pit should be 30-45cm wide & 45-60cm deep, dug just before planting.
- Planting pit mixture: 2-3Kg Compost or well rotten cattle manure; 30g Rock phosphate; 30g single super phosphate.

Young tea upbringing

- Several operations are carried out to form a robust frame of the tea bush at the young stage, so that the tea bush could produce its potential yield on attaining maturity.
- Some of these operations are – De-budding, De-Centering, Lung Pruning or Thumb pruning, first Frame formation prune (FFP) and final FFP. These are specialized operations with details of different heights and other criteria.

Pruning operations

- After the final FFP, the tea bushes are considered as mature tea.
- The mature tea will be henceforth pruned in a cycle of 3-4 years; giving skiffing operation and keeping upprune years in between prune years.
- There are various types of prunes as per requirement of tea sections/plants
    - Light Prune – 4to5 cm above last prune mark.
    - Medium prune – 50-65cm above ground level.
    - Height Reduction Prune – 70-75cm above ground level.
    - Deep Skiff – after LP, about 12 cm above LP mark.
    - Medium Skiff – Just to remove congestion or Crow's feet.
    - Light Skiff – at last tipping level or 1cm above.

Post pruning care:

- Immediately after pruning, the cut ends should be treated with 10% Trichoderma bio agent or Indopaste.
- Instead of Trichoderma, Copper Oxychloride can also be used @ 0.25% concentration (25gram in 10Litres).
- After pruning, dry, diseased stems and any other unproductive branches should be cut & cleaned with the help of small knife. If required spray COC after Knife Cleaning operation.

Mineral nutrition or Fertilization

To maintain fertility of the soil and to achieve sustainable crop production, balanced application of nutrients is very important. Further, addition of organic matter to the soil is of utmost importance to maintain long term productivity of the soil.

Fertilizer recommendation for Young Tea –

Age of Tea (Yr.)	Quantity per plant	Splits	Interval Bet Splits in Weeks	Method
0	10gram	2	8	Ring by forking
1+	15 gram	4	8	Ring by forking
2+	20 gram	4	8	Ring by forking
3+	30 gram	3	10	Ring by forking
4+	65kg per bigha	3	10	Stripe broadcast

YTD (if soil potassium level is > 100ppm) to be prepared in a ratio of NPK @ 10:5:10kg per 100Kg YTD. If soil potassium is below 100ppm, the ratio of NPK will be 10:5:15kg per 100kg YTD.

For mature tea, the dosage of fertilizers depends on cycle yield of tea sections and detail TRA recommended chart is available for the purpose.

Plucking & Green Leaf handling

- Plucking is the main economic and labour intensive activity of the tea garden. New growth, mainly top 2-3 leaves and the bud is plucked at regular interval and this is called the plucking operation. The shoots thus plucked are taken to the tea factory for manufacturing tea.
- The new growth taking place after pruning & skiffing operations is plucked at a certain height initially to form the table of foliage – this operation is called Tipping. The foliage left on the tea bush after tipping operation is the maintenance foliage which does the photosynthesis for production of crop.
- Tipping heights depend upon type of pruning & skiffing.

Type of plucking

1. **Janam plucking:-** Plucking just above Janam leaves (Ideal for NE India Situations).

2. **Fish Leaf plucking:-** plucking above the fish leaf (GolPat) – not suitable for this region.

3. **Step-Up Plucking:-** Plucking by leaving one leaf on the plucking table; this is done when maintenance foliage is damaged due to pest, hail or any other biotic/abiotic stress.

Standard of plucking

1. **Standard plucking:** All new shoots above plucking table is plucked leaving single buds and all 1leaf+buds. This should be practiced when growth conditions are good between June to September.

2. **Black plucking:** Everything above the plucking table is plucked; this is practiced to remove dormant shoots (banjhi) and to remove pest infested shoots.

Plucking Interval:

The interval in days between two consecutive rounds of plucking in the same section is called plucking interval. Standard interval is 7days; but in peak growing period it can be 5-6 days in June-September. However, in early and late seasons plucking interval can be 9-10days depending upon growth of shoots.

would like to highlight the point here that, deliberate delay in plucking rounds by STGs to achieve bigger sized shoots and more crop may result higher crop in initial few rounds but in long run of the growing season, the number of rounds decreases which results in less overall crop with very low quality of leaf. There is every possibility that the low quality leaf will also fetch low price and the factories receiving these low quality leaves will have to bear the burn of making low quality made tea.##

Some tips for good plucking operation

- Adopt Janam Plucking.
- Leave small 1Leaf+bud and single buds on plucking table.
- Don't dip hands below plucking table.
- Don't break erect leaves of maintenance foliage into half.
- Don't keep lot of plucked shoot in hand, transfer frequently to the basket. And do not put excess leaf into same bag by applying pressure. Leaf quality will deteriorate.

Transportation of Green Leaf

1. Before transporting the green leaf to factory if the leaves need to be stored for some time, these should be thinly spread under shade of thatched roof in airy & well ventilated place.
2. The green leaves if possible should be carried in baskets or bags to the factory and the leaf carrying vehicle should have such facility instead of carrying in big heaps.
3. Utmost care should be taken not to damage the leaf during transportation.

Fine leaf percentage

- Take 100gram representative green leaf by taking several small quantities from random spots.
- From this 100g, un-bruised green 2leaf+bud portions are considered fine leaf and separated out (if required by breaking the fine portion from bigger shoots).
- Take weight of the fine leaf portion which denotes fine leaf percentage.

Plant Protection

Pests

- Tea being perennial mono-crop and grown under hot & humid climate of NE India is host to several insect & mite pests.
- There are about 15 major pests of tea, which when infest can cause damage and loss of crop to tune of 5-25% depending upon severity of infestation.
- Giving below a chart of some of the major pests and their damage symptom.

LOOPER CATERPILLAR

Site of attack	Damage Symptom
Tender & Mature leaves	First instar caterpillar eat out very small holes along margin & cut small pieces at margin. Late instar caterpillar prefers mature leaves.

RED SLUG CATERPILLAR

Site of attack	Damage Symptom
Mature leaves (mostly under-surface), bark	Early instar feed from under surface of leaves. When mature leaves are not available, attacks bark.

HELOPELTIS (TEA MOSQUITO BUG)

Site of attack	Damage Symptom
Tender leaf, bud & tender shoot	Nymphs make small circular spots on young shoot/leaves; size of punch mark increases with age of nymphs. Adults make large irregular spots which turn light brown translucent spot & later become dark brown.

GREENFLY OR JASSID

Site of attack	Damage Symptom
Tender leaf & bud	Both adults & nymphs cause damage. The affected leaves become uneven and curl downward, the margins turns brown & dries up causing rim blight.

THRIPS

Site of attack	Damage Symptom
Tender leaf & bud	Both adults & larvae live & feed inside the folds of unopened or partly opened buds and on young leaves. The puncture marks appear as minute brown spots & the slits made in continuous lines in the bud later from corky sand papery lines along the midrib.

RED SPIDER MITE

Site of attack	Damage Symptom
Upper surface of mature leaf	Very minute reddish brown spots develop at the feeding point of adults & nymphs which later coalesce and the whole leaves and foliage may turn reddish brown or bronze – making the infested field distinct.

- For managing the above pests, integrated pest management approach should be adopted emphasizing cultural & mechanical methods and reducing use of chemicals as practical as possible.
- While selecting chemical pesticides, one should strictly follow the Tea Board's recommended plant protection code. This document covers all IPM tools very nicely.

Plant Protection:

Diseases:

The hot humid climate of NE India also favours occurrence of various fungal diseases in tea. Some of the common diseases are mentioned below –

Nursery : - Damping off; Collar Rot.

Main Field:

Leaf diseases: - Blister blight; Black rot; Grey blight, brown blight.

Branch diseases: - Branch canker; Red Rust; Fusarium die back.

Root diseases: - Charcoal Stump rot; Brown root rot; Violet root rot.

For symptoms, nature of damage and integrated management of the above diseases separate notes are available.

Weed Management in Tea:

All the un-necessary & harmful plants inside tea garden are called weeds.

- Weeds compete with tea plants for soil nutrients, water and space.
- Weeds serve as shelter or alternative host of many tea pests.
- Weeds may cause crop loss of up to 10-15%.

Giving below names of few commonly found weeds in tea ecosystem –

Soft Weeds:

1. Ageratum (Gundhuwa bon)
2. Oxalis (Tengeshi bon)
3. Axonopus compressus (Carpet grass)
4. Borreria (Gahori bon)

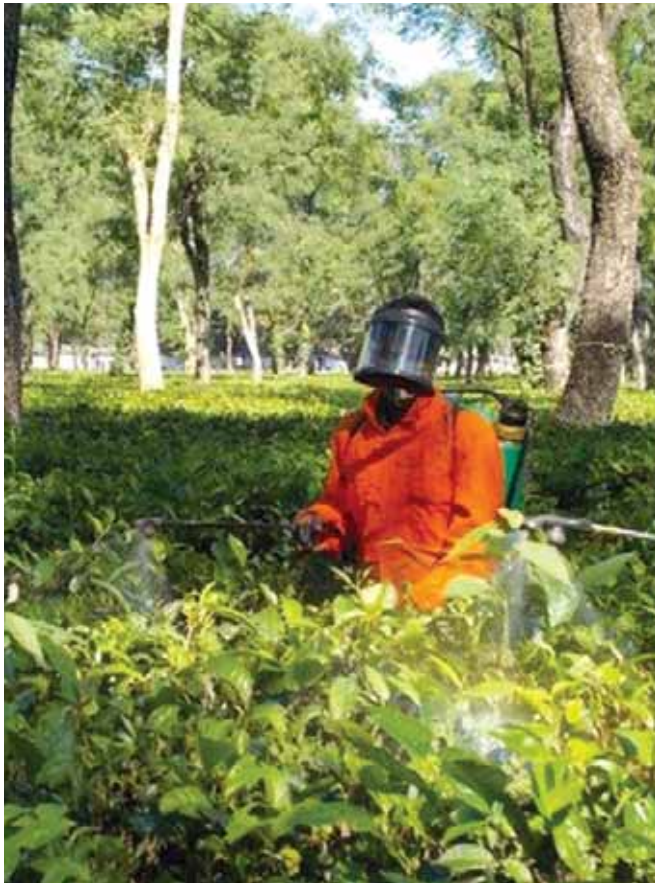
Noxious Weeds

1. Cyperus pilosus (Harkota bon)
2. Eleusine indica (Bobosa bon)
3. Digitaria sangunalis (Makarjuli)
4. Cynodon dactylon (Dubori bon)
5. Mimosa pudica (Nilaji bon)
6. Ferns (Dhekia)
7. Eupatorium odoratum (German habi)
8. Imperata cylindrical (Ulu kher)
9. Mikania

- Soft weeds are the ones which do not compete much with tea and need to be maintained at lower height by sickling.
- Noxious weeds on the other hand compete with tea and need to be uprooted with root to prevent spread.
- For chemical control of weeds, only Tea board's PPC approved herbicides should be used at right dose & in right time.

Maximum Residue Limit (MRL):

Pesticide residue level in made tea is a very serious issue and hence it is the responsibility of the tea growers to use pesticides very judiciously following good agronomic practices (GAP) as per plant protection code issued by Tea board of India.



FAQS

1. What is 1Ha area in bighas?

- 1 Ha = 7.5 Bighas;
- 1 Ha = 2.47 Acre;
- 1Acre = 3 Bighas.

2. What is the basic Soil parameters required for cultivation of Tea?

- Soil pH should be 4.5 to 5.5.
- Organic Matter content should be preferably 2.0% and not less than 1.75%.
- The land should not be in low lying area where there is problem of drainage.

3. What should be the ideal spacing of planting tea?

- Current recommendation of TTRI, Tocklai is 105cm (Row to Row) X 75cm (Plant to Plant) in single hedge method.
- Plant population per Bigha will be approximately 1600 – 1700 bushes.

4. What should be the ideal size of planting pit?

- The ideal size is 45 Dia X 60cm depth which is difficult to achieve with normal task of work. Hence a pit size of 30cm Dia X 45cm depth will serve the purpose adequately.

5. What are most suitable shade tree species?

- For temporary shade – Melia azadirach ("Ghura Neem"); Indigofera teysmanii ("Neel Gosh"); Albizzia molucana ("Rotamara").
- For Permanent shade – Albizzia odoratissima ("Saam Koroi"); Derris robusta ("Mousita"); Acacia lenticularis ("Kaitia Koroi"); Albizzia lebbek ("Kothia koroi"); Albizzia procera ("Boga Koroi").
- There should be a mixture of 2-3 species of shade trees in a section.

6. What are ideal time of fertilizer split applications during the growing season?

- 1st split – April/May
- 2nd split – June (UP Teas) and July (LP/DS Teas)
- 3rd split - September.

7. Tell us something about foliar application of nutrients in tea?

- There may be two types of foliar application in mature tea – Cropping season time foliar and winter foliar. Season time foliar is applied for additional supply of nutrients which the plants can absorb fast & easily for crop production. However, the winter foliar is applied to impart drought resistance to the tea plants.
- Season time foliar: Urea 500gram + Zinc Sulphate 500gram mixed in 65Litres of water per Bigha. 4 – 6 rounds of this foliar should be applied during April/May to Sept/Oct at monthly interval.
- Winter foliar: MOP 500gram + Magnesium Sulphate 500gram mixed in 65Litres of water per Bigha. 4-6 rounds of this foliar should be applied during Nov/Dec to Jan/Feb at fortnightly interval.

8. Tell us something about drains in tea?

- There are three different types of drains – Field drain (Pothoruwa nulla); Collector drain (Sangrahok nulla); Main drain (Pradhan Nulla).
- The dimensions of the drains are given below –

Drain	Depth, cm	Width at bottom, cm	Gradient %
Field drain	105 (3.5ft)	20-25 (8" to 10")	0.2
Collector drain	120 (4ft)	30-50 (12" to 20")	0.15
Main drain	150 (5ft)	50-100 (20" to 40")	0.1

9. Tell us something about Integrated Pest Management (IPM) in tea?

- IPM is a sustainable approach for managing pests by combining cultural, physical, biological & chemical tools in a way that minimizes economic, health and environmental risks.
- Cultural control – cold weather practices, ground sanitation, soil nutrition, soil amelioration, water management, shade management, plucking, pruning/skiffing & weed control etc.
- Physical control – manual hand collection of pests, use of light trap, heat treatment use of colour traps etc.
- Biological control – conservation and augmentation of natural enemies/predators; use of herbal extracts for pest management & use of inorganic compounds like paraffinic oil as adjuvant & use of biological agents like beauvaria, trichoderma etc.
- Chemical control – select & use only Tea board approved chemicals which are listed in the PPF document of tea board.

PLANT PROTECTION CODE (PPC)

Consumers are now increasingly demanding products produced sustainably without adversely impacting the environment. Given this demand, the need to embrace sustainability becomes more and more important. Tea Board is, therefore, focusing on developing sustainable tea code based on Indian realities and globally accepted sustainability principles.

One of the important components of the code is safe usage of plant protection products and adherence to safety standards for production of safer, healthier and more environmentally friendly teas.

The Plant Protection Code is guided by the following principles:

1. PPFs are essential inputs in the tea cultivation for achieving optimum productivity under present Indian conditions.
2. PPC aims to achieve sustainability through Good Agricultural Practices (GAP) including integrated pest management, promotion of alternative control strategies (Biological control etc.) to gradually reduce the dependence on chemicals.
3. PPC shall focus on responsible chemical management that includes proper selection, judicious usage, safe storage and proper disposal, occupational health and safety and green chemistry.
4. PPC is committed to minimising the possible negative impact of pesticides on humans, wildlife and the environment. We will achieve this through effective governance, review and monitoring.

INTEGRATED PEST AND DISEASE MANAGEMENT IN TEA PLANTATIONS

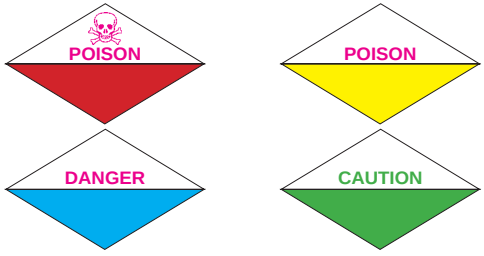
Integrated Pest Management (IPM) can be defined as a system that utilizes all suitable methods and techniques of control in as a compatible manner as possible, to maintain pest incidence at levels below those causing economic loss of crop. Several non-chemical approaches such as cultural, biological, physical and mechanical have been recommended for incorporation with chemical control measures against various pests of tea. Effective control of pests depends not only on the judicious use of chemical pesticides, but also on various cultural operations, which help in reducing pest population without any harmful effect on the environment and beneficial organisms.

Table 1. Hazard categorisation of PPFs

Classification of pesticides	Colour of the lower triangle	Symbol and signal word* on upper triangle
Extremely toxic	Bright Red	Skull and cross bones 'POISON' in red
Highly toxic	Bright Yellow	'POISON' in red
Moderately toxic	Bright Blue	DANGER
Slightly toxic	Bright Green	CAUTION

* Signal words in Indian languages may also be given in addition to those in English

Plate I: Hazard categorisation of pesticides



Do's and Don'ts in tea pest management:

- Monitor the incidence of pests by assessing their populations in the field.
- Mark the areas from where the pest attack starts and start appropriate control.
- Integrate cultural control methods with biological and chemical control measures.
- Use pesticides only when it is absolutely essential
- Do not reduce the recommended concentration of pesticides
- Do not mix two or more pesticides.Do not unduly drench soil.
- Do not add wetting agents unless recommended
- Do not allow the growth of weeds in ravines, along drains, foot-paths and vacant patches.Do not allow cattle inside the tea field

Guidelines for safe and effective use of pesticides

- Read carefully the label on the pesticide container
- Use only the recommended pesticide and buy them only from standard sources.

- Apply pesticides at the correct dosage and by the recommended method
- Use protective clothing like overalls, gloves, goggles, rubber gum-boots and wide-rimmed hats.Do not wear clothes contaminated with pesticides
- Clean the protective clothing by washing with soap and water
- Do not allow children, sick persons and pregnant and nursing mothers to handle pesticides.Keep the pesticides locked in store room
- Do not use leaking sprayers. Avoid contamination of skin, mouth and eyes.
- Never spray against the wind and do not inhale the pesticide while mixing
- Do not allow humans and livestock to enter the pesticide sprayed fields for a safe period.
- Do not wash pesticide containers near wells or running streams
- Wash hands and exposed skin thoroughly with soap and water before eating, drinking and after work.Keep clean water, soaps and towels ready for use.
- Keep pesticides in their original labeled containers.
- Do not decant pesticides into unlabeled containers, except for immediate use.
- Dispose the containers safely after thoroughly emptying and washing. They may be buried in a place away from wells or water sources.
- Never reuse the container for any other purposes: it is impossible to remove the traces of pesticides from the containers.
- Make sure that those who handle and apply pesticides understand and follow the safety precautions.
- In any case of pesticide poisoning, the affected person should be taken to the nearest hospital or a doctor called in as soon as possible. Before medical assistance reaches the spot, first-aid may be given to the patient.

CALENDAR OF FIELD OPERATIONS FOR SMALL TEA GROWERS

(prepared as per TRA & Tea Board guidelines)

MONTH/ PRACTICES	OPERATIONS	REMARK (Please TICK)
JANUARY		
LAND PREPARATION	Fill up the pits and old subsidiary drains.	
	Complete land profile survey.	
	Avoid ploughing in locations marked for main and sub-main drain.	
	Ameliorate the soil based on soil test.	
	Follow a sequence of cross ploughing - cross harrowing - sub soiling - cross harrowing- levelling.	
SOIL REHABILITATION	Mimosa invisa seeds are to be drilled in alternate rows of Guatemala to be planted.	
TEA NURSERY	Prepare the beds.	
	Water the autumn propagated cuttings judiciously.	
	Complete sowing of seeds and cover with thin mulch.	
SHADE NURSERY	Apply organic manure @ 2.5kg, 200g Dolomite and 125g SSP per m 2 during bed preparation.	
	Cover the beds with fast degradable mulching material.	
	Make the drains 60cm deep in between the beds and 90cm in the periphery.	
YOUNG TEA PRUNING	Do the operation sub ject to satisfactory level of root starch and soil moisture.	
MATURE TEA PRUNING/ SKIFFING	Medium prune: Complete by middle of the month.	
	Light prune & Deep skiff: Complete by end of the month.	
	Medium skiff: Complete by end of the month.	
	Light skiff & Level of skiff: Complete by middle of the month and avoid in droughty areas.	

	Cleaning: Complete hand de-banjhi and KCO.	
MANURING	Continue foliar application of MOP and Magnesium.	
PLUCKING	Level the plucking surface and pluck off banjhis.	
MULCHING	Mulch all newly planted areas	
WEED CONTROL & CULTIVATION	Uproot the ferns, creepers and hardy woody perennials.	
	Fork/light hoe after LP/MP in heavy textured soil.	
	Complete ground leveling where necessary.	
PEST & DISEASE CONTROL	Control on spot the initial infestation of pests.	
	Fork the soil to collect Chrysalids of Looper and bunch caterpillar.	
	Give alkali[l'e wash on bush frame and control termite.	
FEBRUARY		
LAND PREPARATION	Lay the subsidiary, sub-main and main drains.	
	Complete final ground levelling.	
REHABILITATION	Plant Guatemala cuttings in non droughty areas.	
INTERCROPPING	Sow Crotalaria seeds in between alternate tea rows In proposed as well as newly planted teas.	
NURSERY	Complete bed preparation, sleeve filling and overhead shade.	
	Regularly water the sleeves allowing the soil to settle.	
	The depression in the sleeves to be filled up.	
TEA PLANTING	Start planting towards the later part of the month subject to availability of rain / irrigation.	
SHADE PLANTING	Plant shade saplings following rains.	
	Ensure proper ramming during planting.	
PRUNINGISKIFFING	Complete frame forming prune by middle of the month.	
	Thumb prune or de-centre the early autumn planted· plants free from acute moisture stress.	
MANURING	Spray MOP and Magnesium Sulphate if drought prevails.	
PLUCKING	Hand level the plucking table.	

MULCHING	Mulch the newly planted areas.	
DRAINAGE	Complete cleaning, deepening, re-grading of the drains.	
CULTIVATION PRACTICES	Fill up the collar depression and level the ground.	
PEST & DISEASE CONTROL	Monitor incidence of pests and spray on spot.	
	Helopeltis infested patches should be plucked black ensuring thorough removal of infested shoots.	
	Hand-collect I light trap the moths of Looper and Red slug.	
	Undertake insecticidal spraying in seed bari.	
	Complete control measures against Termite.	
MARCH		
NURSERY .	Propagate cuttings from ready primaries.	
	Transfer the rooted cuttings from bed to sleeve.	
	Water the sleeves judiciously.	
SHADE	Sow the seeds and cover with a thin layer of mulch.	
	Keep the sleeves I beds moist.	
	Complete infilling of shade in mature tea.	
PLANTING	Do planting I infilling subject to satisfactory level of soil moisture.	
	Mark out the space for planting permanent shade.	
MULCHING	Mulch newly planted areas.	
MANURING	Apply first split of manure in UP teas under adequate soil moisture.	
	Apply YTD mixture in young tea.	
	Apply YTD and sand mixture (1:9) in sleeves with cuttings of 4-5 leaves.	
PLUCKING	Continue janam plucking of UP teas at shorter interval.	
	Adopt liberal plucking in teas defoliated I died back.	
REHABILITATION & GREEN CROP	Complete planting of rehabilitation crop.	
	Sow the seeds of crotalaria in newly planted tea.	
WEED CONTROL	Apply pre-emergent herbicides if programmed.	
	Apply post-emergent weedicides depending on weed growth.	

CULTIVATION	Fork I light hoe LP IMP teas in heavy textured soil of droughty areas.	
PEST & DISEASE CONTROL	Monitor pest incidence and control on spot.	
	Neem or other botanical pesticides and bio-control agents should be applied.	
	Spray insecticides on shade up to manageable height.	
	Remove second year green crop.	
	Hand collect caterpillar pest and light trap the moths.	
	Spray COG in Red rust I Black rot infected areas.	
	Spray pesticide in seed bari.	
APRIL		
NURSERY	Continue propagation of cuttings.	
	Complete preparation of beds for autumn and keep under mulch cover.	
	Remove the weeds and fill up if depression exists with sandy soiJ.	
	Complete sowing of shade tree seeds.	
	Ensure that the sleeves/beds where tea seed was sown do not go dry.	
PLANTING	Continue planting ahd infilling.	
	Complete shade planting.	
	Ensure proper ramming while planting.	
MANURING	Apply YTD and sand mixture to the sleeves with plants of 4-5 leaves.	
	Apply first dose of NPK manuring in young and mature teas.	
	Apply Urea and Zinc Sulphate as foliar on weaker teas.	
PLUCKING	Pluck close to janam and remove banjhis from UP teas.	
	Tip the DS and LP teas at appropriate measure at shorter interval.	
	Raise a leaf in debilitated unprune teas towards the end of first flush.	
	Unprune teas suffered from drought should be plucked liberally.	
REHABILITATION & GREEN CROP	Complete planting of rehabilitation and green crop.	
DRAINAGE	Clean the drains by removing the silt.	
WEED CONTROL	Apply weedicides on active weed growth depending on type of weed.	

WEED CONTROL	Avoid application of weedicides in 0 and +1 year tea.	
	If unavoidable spray using protective shield.	
	Sickle between the rows and hand weed the collar in young tea.	
	The regrowth of woody perennial and creepers should be uprooted manually.	
PEST & DISEASE CONTROL	As far as possible restrict use of pesticides to spot.	
	Use only TRA recommended pesticides at appropriate dilution on target.	
	Restrict use of hard pesticide to safeguard the predators.	
	Apply pesticides on shade tree trunk against Borer and Looper.	
	Spray copper fungicides against Red rust and Black rot.	
MAY		
NURSERY	Continue planting of cuttings.	
	Repair the drip damage.	
	Thin out the green crop from seed nursery.	
	Spray pesticides against pests.	
PLANTING	Continue planting.	
MANURING	Apply Urea (1%) and Zinc sulphate (1%) in plantation having banjhi problem.	
	Complete application of first dose of manuring in young and mature tea.	
Y.T. MANAGEMENT	De-centre I thumb prune the established plants.	
	Re-centre the strong central branches within 30cm.	
PLUCKING	Remove banjhi and maintain a flat plucking surface.	
	Do not allow creep LPI DS teas.	
	Tip the MP/RP teas at 30cm above the pruning height.	
REHABILITATION & GREEN CROP	Do weeding if necessary.	
	Green crop should be thinned out.	
	Apply NPK mixture (2:1:2) containing 60kg N, 30kg P2 05 and 60kg K2 0 per hectare in Guatemala.	
WEED CONTROL	Complete first round of weedicide application.	
	Sickle the weeds in between the rows and hand clean around collar in young teas.	

PESTS & DISEASES CONTROL	Restrict use of chemical pesticides to spot.	
	For blanket application use Botanicals including Neem, Sulphur and bio-control agents.	
	Spray copper fungicides against Red rust, Black rot and nursery diseases.	
	Control Fusarium dieback with two rounds of Hexaconazole (1:1OOOHV) at fortnightly interval.	
JUNE		
NURSERY	Continue planting of cuttings.	
	Repair drip damage.	
	Thin out the shade seedlings and fill up the vacancies.	
	Keep the seeded beds weed free.	
	Adjust overhead shade to maintain adequate slope.	
PLANTING	Complete planting of tea and infills.	
PRUNING & SKIFFING	Thumb prune I de-centre the established tea plant and infills.	
	De-bud the weaker (single stemmer) plants. Complete recentering of strong branches.	
PLUCKING	Regularly remove banjhi from the table.	
	Maintain a uniform plucking surface.	
	Allow the pockets in the plucking table to fill up.	
MANURING	Apply second dose of YTD mixture in young tea and nursery.	
	In mature unprune teas apply second dose of NPK fertilizer.	
	In weak and waterlogged teas, apply Urea, DAP and MOP as foliar.	
WEED CONTROL	Apply second round of weedicide as per need.	
	Resort to sickling and hand-weeding of collar. region in very young tea.	
	Avoid damage to lower branches and collar depression from manual weeding.	
PESTS & DISEASES CONTROL	Monitor pest incidence and adopt control measures on spot. Ensure proper supervision while spraying.	
	Hand collect the late instar caterpillars before spraying pesticide. Avoid repetition of same pesticide.	
	Use fungicides against Red rust & Black rot.	

	Improve ventilation in Helopeltis infested areas by lopping lower branches of shade and side branches of tea bush.	
JULY		
NURSERY	Repair drip damaged sleeves.	
	Thin out the green crop in between the beds from seed nursery.	
	Give a round of weeding in shade nursery.	
PRUNING & SKIFFING	Deep skiff the mother bushes.	
	Thumb prune I de-centre if deferred.	
	Go for an airy skiff in UP teas with uneven plucking surface.	
	Introduce MS in some weaker UP teas.	
MANURING	Apply second dose of fertilizer in LP I DS teas.	
	In waterlogged areas defer application to September	
	Apply foliar NPK mixture in waterlogged and weaker teas.	
PLUCKING	Pluck at regular shorter interval.	
	Maintain uniformity of plucking surface.	
	Pluck black in the event of excessive banjhi formation.	
REHABILITATION & GREEN CROP	Lop the well grown Guatemala grass at 30cm.	
	Lop periodically Mimosa in a mixed stand.	
	Lop the lower branches of Crotalaria.	
DRAINAGE	Ensure free flow of drains.	
	Record water table build up in waterlogged areas.	
	Record the average flood level in outlets.	
WEED CONTROL	Spray weedicide on spot depending on weed flora.	
	Sickle the weeds in very young tea avoiding injury to the plants.	
PEST & DISEASE CONTROL	Monitor and apply pesticides on spot at the initial infestation.	
	Ineffective pesticide should not be repeated.	
	Lop the lower branches of tea and shade in Helopeltis infested areas.	
	Proper supervision from mixing of pesticides through its application is required.	
	Fungicides should be applied in Red rust and Black rot infected teas.	

AUGUST		
NURSERY	Repair drip damage.	
	Hand weeding in tea and shade nursery.	
	Thin out the overhead shade if necessary.	
	Scrap the mossy growth and fork lightly the sleeves.	
	Remove green crop from seed nursery.	
	Spray appropriate insecticides as and when required.	
YOUNG TEA	Check and fill up the collar depression.	
MANURING	Apply a round of YTD and sand mixture (1:9) in the sleeve.	
	Apply YTD mixture at recommended dose and method in young tea.	
	Apply NPK manure to deep skiffed mother bushes.	
	Apply foliar NPK mixture to waterlogged teas.	
PLUCKING	Avoid creep and maintain a flat plucking surface. Pluck at shorter interval leaving smaller shoots.	
REHABILITATION & GREEN CROP	Lop the well grown Guatemala grass at 30cm.	
	Lop Mimosa in a mixed stand if situation arise.	
	Lop the lower branches of Crotalaria.	
DRAINAGE	Ensure free flow of drains.	
WEED CONTROL	Repeat application of weedicide where necessary.	
	Avoid spraying weedicides on drain edge.	
	Repeat sickling and hand weeding of collar in very young tea.	
PEST & DISEASE CONTROL	Use acaricides and insecticides only on infested patches.	
	Adopt cultural control measures side by side with the chemical control.	
	Hand collect or light trap moths of looper.	
	Spray two rounds of COC/Hexaconazole at 15 days interval against Black rot.	
	Skiff the severely Helopeltis infested patches before pesticide application.	
	Improve ventilation by lopping lower branches of shade and tea bush.	

SEPTEMBER		
NURSERY	To harden the plants for autumn and spring planting thin out the overhead shade.	
	Keep the shade and seed nursery free from weeds.	
PLUCKING	Fill up the pockets by plucking upto the average level of creep..	
	Introduce black plucking in the event of excessive banjhiness.	
	Contain creep in LP I DS teas within the permissible limit.	
	Allow the peripheral shoots to come up to the level of the table.	
PRUNING	Lop the side branches of MP/RP bushes if vacancy infilling was done.	
MANURING	Apply second split of NPK fertilizer in waterlogged mature tea.	
	Where third split is practised should be applied.	
	Apply a round of NPK (2:1:2) mixture @ 30kg N/ha in young tea.	
	Apply additional dose of 60kg P2 05 /ha in tea proposed for MP/RP.	
REHABILITATION & GREEN CROP	Lop Guatemala at 30 em above the last cut mark.	
	Cut the rehabilitation and cover crop from the areas to be planted.	
MULCHING	Collect and apply mulch material in young tea.	
WEED CONTROL	Apply weedicide as per need. Hand-weed the young tea areas.	
	Sickle the weeds at ground level to restrict flowering.	
PEST & DISEASE CONTROL	Apply acaricides thoroughly as chances of resurgence of mite is more.	
	Assess the level of Helopeltis infestation to adopt proper control strategies.	
	Apply COC or Hexaconazole depending on the persistence of Black rot.	
	Spray appropriate termiticide in young tea.	
	Spray insecticides against caterpillar and borer in young shade trees.	
	Undertake insecticidal spray in seed baries.	
	Hand-collect or light trap the moths of looper & Red slug.	

OCTOBER		
LAND PREPARATION	Use jungle jim for pulverizing Guatemala.	
	Minor depression should be filled up.	
NURSERY	Start autumn propagation of cuttings.	
	Allow the ready plants to be hardened after sorting out.	
	Start filling up the sleeves for seed nursery.	
	Hand weed the shade nursery.	
PLANTING	Start autumn planting of tea.	
MANURING	Apply last dose of YTD mixture in sleeve plants.	
	Apply foliar Urea and Zinc Sulphate at fortnightly interval.	
	Complete application of 3rd split if programmed.	
PLUCKING	Maintain plucking round particularly in proposed UP teas.	
	Step up by a leaf in the proposed UP teas if status of maintenance foliage is inadequate.	
	Rest the bushes severely damaged by Black rot as well as the teas to be medium pruned.	
MULCHING	Mulch the newly planted tea.	
WEED CONTROL	Hand weed the creepers and woody perennials.	
	Only spot application is required.	
	Sickle the weeds where manual control is practiced.	
PESTS & DISEASES CONTROL	Spray pesticides on spot.	
	Apply bio-pesticides like Beauveria bassiana against Helopeltis and Bacillus subtilis against Black rot at fortnightly interval.	
	Apply termiticide in the plantation having termite infestation.	
	Continue application of acaricide being vulnerable to mite attack.	
NOVEMBER		
LAND PREPARATION	Uproot tea and shade.	
	Fill up the pits formed from uprooted tea bush and shade tree.	
	Fill up the subsidiary and sub main drains.	

NURSERY	Complete autumn planting of cuttings.	
	Water the sleeves/Tooting bed with hand sprayer.	
	Sow the crack seeds in the sleeves/beds and cover with a fast degradable mulch.	
PLANTING	Complete planting of tea.	
PRUNING & SKIFFING	Start pruning of mature teas in non drougtity areas from mid of the month retaining a healthy breather and knife clean the bush frame.	
	Prune clonal mother bushes and knife clean thoroughly.	
	Apply alkaline wash or Trichoderma 5% suspension on the bush frame.	
MANURING	Apply foliar MOP at fortnightly interval in all proposed UP teas.	
	Spray MOP (2%) two rounds at fortnightly interval in proposed MP areas.	
PLUCKING	Complete stepping up of the table wherever necessary to keep unprune.	
	Pluck off the banjhis from the table regularly.	
	Keep under rest the proposed medium prune teas and Black rot infected bushes.	
MULCHING	Mulch the newly planted teas.	
PESTS & DISEASES CONTROL	Restrict use of acaricides and insecticides only to the infested patches.	
	For blanket application use only Neem or other botanical products and Sulphur formulation.	
	Apply bio-pesticide like Beauveria bassiana against Helopeltis and Bacillus subtilis against Black rot if not applied in the previous month.	
	Treat the Black rot infected areas with two fortnightly rounds of Carboxin in absence of biocides. All Helopeltis punched shoots should be plucked off.	
DECEMBER		
LAND PREPARATION	Mark the location of sub-main and main drains to avoid ploughing.	
	Soil should be tested for necessary amelioration.	
	Follow a sequence of cross ploughing - cross harrowing - sub soiling – cross harrowing- levelling.	

CALENDAR OF FIELD OPERATIONS FOR SMALL TEA GROWERS
(prepared as per TRA & Tea Board guidelines)

NURSERY	Do watering as and when necessary in both tea and shade nursery.	
	Continue sowing of tea seeds and cover the sleeve or bed with a thin layer of dry mulch.	
LIGHT PRUNE	Continue pruning and knife cleaning operation.	
MEDIUM PRUNE	Start the operation from mid of the month and complete preferably by the end of the month.	
	Apply Indopaste or Trichoderma 20% paste on cut surfaces quickly after prune. Leave a healthy breather in each bush.	
DEEP SKIFF	Start the operation from middle of the month.	
PRUNING (MOTHER BUSH)	Prune mother bushes for spring propagation.	
	Thorough knife cleaning is essential.	
BUSH SANITATION	Complete hand de-Banjhi and knife cleaning out operations in already pruned and skiffed teas.	
	Apply alkaline wash or Trichoderma biocide (5%) suspension on the bush frame.	
MANURING	Continue foliar application of MOP and Magnesium Sulphate.	
	Collect soil samples for analysis to prepare manuring programme.	
PLUCKING	Maintain a flat plucking surface.	
	Bushes suffering from moisture stress should not be plucked.	
DRAINAGE	Deepen and re-grade the drains.	
	Complete contour survey of areas to be planted in next spring	
PEST & DISEASE CONTROL	Only spot control if noticed.	
	Take control measure for termite removing the earth runs and dead branches.	

AMALGAMATED PLANTATIONS
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Approved chemicals for use on Tea

As on December'2014, following is the list –

The list is dynamic and may change from time to time based on the CIB approved list of pesticides for use in tea and this may be seen from the website of Tea Board.

Sl. No.	Product (Chemical Name)
	Acaricides
1	Dicofol 18.5 EC
2	Ethion 50 EC
3	Fenazaquin 10 EC
4	Fenpyroximate 5 EC/SC
5	Hexythiazox 5.45 EC
6	Propargite 57 EC
7	Sulphur 80 WP
8	Sulphur 40 WP
9	Sulphur 52 SC
10	Spiromesifen 22.9
11	Etoxazole 10 SC
12	Flumite 20 SC
13	Flufenzine 20 SC
	Insecticides
14	Azadirachtin 1 EC
15	Azadirachtin 5 EC
16	Bifenthrin 8 SC
17	Clothianidin 50 WDG

Sl. No.	Product (Chemical Name)
18	Deltamethrin 2.8 EC
19	Fenpropathrin 30 EC
20	Phosalone 35 EC
21	Quinalphos 25 EC
22	Quinalphos 20 AF
23	Thiacloprid 21.7 SC
24	Thiamethoxam 25WG
	Fungicides
25	Carbendazim 12% + Mancozeb 63% WP
26	Hexaconazole 5 EC
27	Propiconazole 25 EC
	Herbicides
28	Glyphosate 41 SL
29	Glyphosate 71 SG
30	Glufosinate Amonium 13.5 SL
31	Glyphosate Ammonium salt 5 SL
32	Oxyfluorfen 23.5 EC
33	Paraquat Dicloride 24 WSC

AMALGAMATED PLANTATIONS

A TATA Enterprise

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