Good Agricultural Practices

&

Good Manufacturing Practices Standard for Tea

(Version 1.0)

Tea Research Association

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INTRODUCTION

Tocklai Tea Research Institute of Tea Research Association has been the pioneer R&D organization globally in the field of tea research and engineering since 1911. Through its wide range of R&D activities, TRA Tocklai has made tea plantations economically viable in North India and have made significant contributions by developing more than 200 tea cultivars, suitable agro-techniques and location specific package of practices for nutrition, crop protection, tea processing, methodology of sustainable tea plantations and production. TRA Tocklai invented the Rotorvane machine and was closely associated with the invention of the CTC machine. The Association also provides crucial extension services as well as accredited analytical support to the industry for ensuring effective transfer of technology and quality of tea respectively. Regular training on tea husbandry and technology is also offered to various stakeholders from tea nursery to factory management.

Keeping in view the needs of research support and continuous innovations to bring about transformational change in the tea industry of Assam, West Bengal, Tripura and other North-Eastern states of India, TRA intends to integrate Good Agricultural Practices and Good Manufacturing Practices in the form of TRA-TOCKLAI GAP-GMP Standard, aligned with the United Nation's Sustainable Development Goals. The Standard supports strategies which will contribute to improving overall farm practices, management systems and sustainability performance.

TRA-TOCKLAI GAP-GMP Standard recognizes the challenges faced by the tea industry due to climate change and prescribes climate-resilient practices to adapt and mitigate climate change impacts, improving resilience of the industry. The recommended practices on maintaining healthy soils, conserving water and energy resources, avoiding deforestation, encouraging afforestation programme, planting climate-smart planting material, protecting natural ecosystems and biodiversity, reducing GHG emissions etc. would significantly contribute towards a climate-resilient tea industry.

TRA believe that adoption of the best practices, indicated in the Standard, would contribute towards a people and planet positive tea industry by 2030 with continuous improvements.

Mission

Support the tea industry through research, innovation, technology and training at the highest level of excellence to bring about transformational change to achieve the sustainable goals.

Vision

Provide technology led innovations to the tea industry, ensuring production, quality and environmental and social sustainability, while addressing the issues faced by the industry in tea trade globally, taking advantage of scientific and

innovative technology and emerging scopes for transformational changes and move towards self-sufficiency by 2030.

Scope

The TRA-TOCKLAI GAP-GMP Standard is applicable for tea production and manufacturing within the boundary of the farm that are members of Tea Research Association.

All tea producer members of the Tea Research Association would be certified under the TRA-TOCKLAI GAP-GMP Standard and would be able to use the logo 'tCertified GAP GMP' in their bulk packaging and retail packs.

Revision

The TRA-TOCKLAI GAP-GMP Standard is a dynamic document which will be periodically reviewed by a panel of experts, scientists of TRA and other key stakeholders of the certification programme for continuous improvements. Revised versions will be published accordingly and circulated to stakeholders.

Copyright

CHAPTER – 1

Management System

The management system is a framework of policies, processes and procedures for planning, executing and monitoring operations in a systematic manner, that ensures implementation of the best management practices to comply with the TRA-TOCKLAI GAP and GMP Standard for Tea. The management system is dynamic and incorporates the results of internal and external assessment to encourage and support continuous improvement.

TRA-TOCKLAI aims to ensure that the farms are managed in a manner that is efficient, transparent, inclusive, sustainable and economically viable, following the best practices indicated in the standard. A robust and efficient management system also facilitates external assessors to a great extent.

1.1 The top management of the unit shall have commitment to comply with the standard and strive for continuous improvement.

A statement from the top management stating the organization's commitment to implement and comply with the requirements of the TRA-TOCKLAI GAP-GMP STANDARD and work towards continuous improvements. The document has to be signed by any member of the top management with the name, designation and seal of the signatory. The document should have validity period mentioned therein.

1.2 The certified producer shall have a policy statement to comply with the Standard at all times.

The following policy statements must be in place -

Policy to comply with the Standard at all times.
Employment Policy
Social Policy
Child Labour Policy
Environment Policy
Health and Safety Policy
Wildlife Policy
Waste Management Policy

All the policies must be duly signed by Head of the organization with validity period of the policies clearly mentioned. The name of the signatory and designation mentioned in all the policies.

1.3 The certified producer shall have an organizational structure to plan, manage, implement compliance and continuous improvement programmes.

The roles and responsibilities of personnel in the structure shall have to well defined and documented.

- An organizational structure (organogram) to manage implementation and compliance with the standard.
- Names, designation and responsibility of the personnel in the organizational structure clearly defined.

1.4 The certified unit shall have a map of the farm showing tea fields, manufacturing unit, conservation area, natural ecosystems, water bodies, human settlements, buffer zones and factory layout.

1.5 All records and documentation required for compliance with the Standard shall be maintained at least for 4 years and all records shall have to be updated as and when it is required for compliance.

1.6 Producers shall comply with all legal / regulatory compliances in accordance with the National / State laws and maintain all relevant documents.

1.7 The certified producer shall have trained internal auditors to conduct internal audit twice a year to ensure compliance and continuous improvements.

- Trained personnel for internal audit or self-assessment for compliance and continuous improvement.
- Two internal audits in a year.
- Training records of internal auditors.

1.8 The certified unit shall conduct periodic risk assessment and mitigate compliance risks.

- Risk assessment at least once in a year for compliance with the Standard. (Documentation)
- Risk assessment of all field and factory operations and steps to minimise / mitigate risks. (Documentation)

1.9 The units shall maintain a training plan / schedule and conduct training programmes on management system, GAP, GMP, Health & Safety, and Environment. All training records to be maintained with information on training topics, date of training, trainer, attendance sheet with signature / thumb impression and photographs.

- Training Plan
- Training schedule
- Training topic
- Training faculty
- Training documentation with attendance sheets
- Photographs

CHAPTER – 2

Good Agricultural Practices (GAP)

Good Agricultural Practices (GAP) in tea husbandry is a collection of principles to apply for production and post production processes in the tea estates, resulting in the production of safe and quality tea, while taking into account the three pillars of sustainability. GAP is vital to have climate smart sustainable tea production.

Site Selection

2.1 There shall be no deforestation of notified forest for planting tea. No conversion of natural notified forests and ecosystems into tea cultivation after 1st January, 2012.

2.2 The certified producer shall comply with TRA-TOCKLAI's recommendations on selection of site for tea cultivation.

Factors to be taken into consideration for land planning are – steepness of land, depth of soil and drainage characteristics. Shallow soils underlaid by gravel, pebbles and coarse sand and low-lying areas with poor or no outfall for drainage should not be included. (Encyclopaedia Serial No. 189/1 File under L2).

Land Preparation

2.3 The producer shall follow TRA-TOCKLAI's recommendations on land preparation for extension planting, uprooting and replanting.

New Planting/Virgin area: Land should be prepared one year ahead of proposed planting. The land should be cleared and levelled during winter. A topography survey has to be made for designing a proper drainage system. Need based ploughing and harrowing has to be done. Prior to planting, soil testing has to be done in TRA Laboratory.

Uprooted Area: Ploughing and cross-ploughing twice up to a depth of ~40 cm is required when the soil is neither too wet nor too dry. Thereafter, subsoiled up to a depth of ~ 70 cm, taking care not to subsoil the lines of main drains. Necessary soil pH correction should be undertaken as per soil testing report prior to ploughing. Layout of drainage network as per the topography of the land.

2.4 The producer shall follow TRA-TOCKLAI's recommendations on rehabilitation of uprooted areas.

Rehabilitation crops like Guatemala grass, Pusa Giant Hybrid Napier, Mimosa etc. to be planted and kept for a period of 18 - 24 months. Soil test reports.

Choice of Planting Materials

2.5 Producers shall not use any genetically modified / transgenic planting materials.

2.6 Planting materials with characteristics like good quality, high yield, tolerance to drought, water logging, pests and diseases shall have to be selected.

Refer to Field Management in Tea, 2020 Edition, Chapter - Choice of Planting Material for Tea Cultivation; Page 3 – 10.

2.7 Clones and seed material of diverse genetic origin shall have to be used as planting material. (Proportion of Seed and Clonal material should be in the ration of 1:1)

- Clones – TV (Tocklai Vegetative) and Garden series clones as recommended by TRA-TOCKLAI.
- Seed – Biclonal Seed Stock as recommended by TRA-TOCKLAI.
- Minimum number of clones in the entire planted area in a unit shall be 5 (five).

2.8 No single planting material shall occupy more that 10% of the planted area.

Planting

2.9 Producers shall follow all the guidelines for planting tea as per TRA-TOCKLAI's package of practices.

The following factors has to considered and implemented as per recommendation in – Tea Encyclopaedia; Field Management in Tea, 2020 Edition, (Page 34 – 35).

- Plant spacing and density
- Orientation of hedges
- Standard of plants
- Time of planting
- Planting pit size
- Planting pit mixture
- Planting technique

Young Tea Management

2.10 Young tea management practices shall have to be in accordance with TRA-TOCKLAI's recommendations for both autumn and spring planting.

Refer Table 3 (a) and (b) on Technique of Young Tea Management and also Post Planting Care in Field Management in Tea, 2020 Edition, Page 37 – 39.

Tipping and Plucking

2.11 Tipping in various prunes / skiffs shall have to be done as per TRA-TOCKLAI recommendation after spot verification, for providing adequate maintenance foliage, a flat even plucking surface on top of the tea bush and to facilitate adequate wood development in the bush frame.

Refer to the table from Field Management in Tea, 2020 Edition – Page 75

2.12 Plucking round, plucking system and standard of plucking shall have to be done based on TRA-TOCKLAI's recommendations.

Plucking round – Ideally 28 – 36 rounds of plucking to be done in a year. This includes both plains and hilly areas. (In case of Darjeeling other hilly areas plucking rounds will vary as per situation).

Plucking system – Janam plucking

Plucking standard – Field Management in Tea, 2020 Edition (Page 82) Table - 5

Soil and Nutrient Management

2.13 Regenerative agricultural practices on soil health management shall have to be practiced.

- Minimum tillage / disturbance of soil - Adoption of all recommended practices to prevent minimum loss of top soil during tillage
- Vegetative cover on exposed soil.
- Soil conservation measures.

2.14 Soil analysis of all tea growing sections shall have to be done in recognised laboratories and reports available. (TRA lab)

Soil sampling method: In general tea section areas are big and there are heterogeneity in terms of soil characteristics and fertility. Therefore, right soil sampling method is key to minimise erroneous test reports. For large areas it is recommended to divide the areas into blocks of 2 hectares and follow the steps given below –

- Take at least 20 borings at random over a block and bulk them to give one representative sample of that particular block. Before taking samples, remove surface debris and take samples with a clean ordinary 2.5 cm carpenter's auger.
- The sampling point should be away from paths/roads, drains, shade trees and vacant patches. Samples should be collected from the space between two plants in a row but not from between rows.
- Take separate top (0-15 cm) and subsoil (15-30 cm) samples. This is done by taking the top soil sample first, cleaning the auger and inserting it in the same hole again for collecting the sub soil sample at the required depth for collecting the sub soil sample. The top and sub soil borings collected from different spots are then bulked and mixed separately to give representative top and sub soil samples, Top and sub soil should never be mixed together.
- Repeat the same procedure for the remaining blocks.
- For determining suitability for nursery, extension, replanting and from problematic areas, soil samples can be sent anytime of the year barring two months following fertilizer application.
- For routine soil sampling it is preferred that the soil samples be sent in the period December to March avoiding two months following fertilizer application.
- The final composite samples to be sent for analysis should be about half a kilogram.
- Proper care must be taken in packing and labelling the samples before these are sent for analysis. Soil samples should be packed in double polythene bags and adequately labelled both inside and outside the bags. The label must contain the name of the garden, the relevant section number, block number and depth and date of collection. A batch of properly packed and adequately labelled soil samples should then be sent in a hard paper carton for analysis.

2.15 Use of organic manure, inorganic fertilizer and foliar nutrition shall be as per TRA-TOCKLAI guidelines both for young and mature tea.

Organic Manure: Application based on soil test report.

If the organic C < 1%, cattle manure @ 3 – 5 T/Ha/Yr or Decomposed oil cake @2 – 3 T /Ha/Yr.

Inorganic Fertilizer:

(Field Management in Tea, 2020 Edition, Page 142, Table 6 and 7). Mention about cycle yield as basis for fertilizer dose)

Foliar Nutrition: Field Management in Tea, 2020 Edition – Page 143 (Micronutrients & Stress)

2.16 Proper and adequate manure / fertilizer storage facilities shall be available. All guidelines for proper storage shall have to be followed to avoid contamination of nearby areas and water bodies and also to avoid loss of nutrients due to improper storage.

2.17 All chemical fertilizers shall have to be received well in packed condition with proper labelling specification shall be mentioned - percentage of active nutrient content by the manufacturer with ISI mark as well as with details of the address of manufacturer.

2.18 The unit shall have a fertilizer programme in place for all tea sections and maintain application records.

Section wise fertilizer programme document.

2.19 All chemical fertilizers shall have to be tested for presence of impurities and heavy metals.

2.20 Proper personal protective equipment (PPE) shall be provided to the workers mixing and applying fertilizers.

- Apron
- Gloves (Nitrile gloves)
- Applicable footwear

2.21 Proper mixing of fertilizers shall have to be done under supervision and care taken not to spill beyond the mixing point. Impermeable sheets should be used over the ground for mixing.

Documented SOP for mixing fertilizer

<u>Pruning and Skiffing</u>

2.22 The unit shall have a pruning policy in place.

2.23 A pruning programme shall be available for every tea section.

Section-wise pruning programme document

2.24 Records on pruning operation shall be available.

Pruning operation document / register

2.25 The unit shall follow recommendations of TRA-TOCKLAI on prune/skiff, pruning time, pruning cycle, prune/skiff height, pruning equipment and practices followed for various types of prune/skiff before, during and after prune/skiff operations.

Refer to Chapter – Important Considerations in Pruning and Skiffing (Field Management in Tea, 2020 Edition – Page 86 – 96)

2.26 All safety measures shall have to followed to prevent injury to personnel during pruning operations. Necessary training should be imparted to all persons engaged in pruning.

- Safe operating procedure document.
- Training on safe operating procedure and training documents
- Use of appropriate PPE
- First Aid (FA) Box on site during operations.

Shade Management

2.27 The unit shall have a shade management policy in place.

2.28 Shade planting and management practices shall have to be followed as per TRA-TOCKLAI's guidelines using recommended species as permanent and temporary shade.

(Starting with transplanting, method of planting, time of planting, planting pit, pit mixture, spacing, shade mixture, rotation, recommended shade tree species – Field Management in Tea, 2020 Edition (Page 48 – 50)

2.29 In case of young teas during 0 and +1 year unit shall sow green crop seed in planted area as per recommendation of TRA-Tocklai to provide quick shade as well as a part of organic matter management.

Field Management in Tea, 2020 Edition, Page 38 – Shade and Green Cropping

Pest Management

2.30 Producers shall have a policy and plan for integrated pest management (IPM).

IPM policy and plan document

2.31 Unit shall have a system for pest surveillance and early detection of pests. An effective system will facilitate spot application of agrochemicals rather than blanket application that will help reducing agrochemical load and cost.

SOP for pest surveillance and record

2.32 Unit shall adopt spraying of botanical extract as recommended by TRA-TOCKLAI.

Field Management in Tea, 2020 Edition, (Page No. 159 – 160) and Hand Book on Indigenous Herbs with Potential for Tea Pest Management.

2.33 Unit shall adopt using alternative and environment-friendly control measures like light traps, sticky traps, hand collection, mechanical methods and TRA recommended cultural practices.

Field Management in Tea, 2020 Edition; Chapter – Integrated Management of Tea Pest (Page 170 – 190) and Special Bulletin on Integrated Management of Tea Pest in North East India. 2018

2.34 Unit shall use only recommended agrochemicals (insecticides & fungicides) approved by CIB-RC and FSSAI with tea label.

Plant Protection Code (PPC)

2.35 Agrochemicals application shall have to be at only TRA-TOCKLAI recommended dosage.

Updated versions of quarterly advisory bulletin with latest dosage of PPC approved agrochemicals.

2.36 Agrochemicals application register/ records with all necessary information shall have to be maintained –

- Section No
- Application date
- Area covered
- Name of agrochemicals
- Dosage used
- Dilution
- Target pest
- Type of spray machine used (High volume, Low volume)
- Volume of water used
- Spot / blanket spray

2.37 Agrochemicals spraying shall have to be need-based, except botanical extracts as recommended by TRA-TOCKLAI. No spraying to be done as prophylactic measures.

2.38 Producers shall aim for reduction in agrochemicals consumption, therefore, shall have a plan for agrochemicals reduction.

2.39 Pre-harvest interval between spraying and plucking shall have to be maintained as per standard recommendation of TRA-TOCKLAI.

Updated versions of quarterly advisory bulletin with latest dosage of PPC approved agrochemicals.

2.40 Proper PPE shall have to be used by personnel handling and spraying agrochemicals.

- Oufit (Dangri)
- Face mask
- Googles
- Cap
- Gloves (Nitrile)
- Footwear

2.41 Buffer zones of at least 10 metres shall have to be maintained in tea areas adjacent to human activity, terrestrial and aquatic natural ecosystems. Organic / botanical formulations shall have to be used in buffer zones instead of chemical agrochemicals. A vegetative barrier shall have to be maintained separating the tea growing area and with areas of human activity and natural ecosystems.

2.42 Farm shall have designated areas for mixing agrochemicals with clear signages for workers. The mixing points shall be away from natural ecosystems – both terrestrial and aquatic, drinking water sources and area of human activity.

2.43 Spraying of agrochemicals should not be done in terrestrial ecosystems i.e. on natural vegetations inside the farm where tea is not grown.

No agrochemical spraying beyond the crop (tea) area.

2.44 Before conducting spraying operation, the area to be sprayed shall be cordoned off to restrict entry of persons other than the personnel engaged in the operation. Proper signage should be put in place to warn persons that spraying operation is on.

- Erect barriers to prevent entry of unauthorized persons
- Use of signages

2.45 Post spraying, proper signages should be put to restrict any persons from entering the sprayed area for the next 48 hours.

2.46 The unit shall have regular maintenance and calibration of spraying equipment and records maintained. The spraying machines shall have to be numbered and the calibration record shall have the following information.

- Date of maintenance / calibration
- Sprayer identification number
- Type of sprayer
- Pressure (psi)
- Type of nozzles
- Nozzle discharge rate

- Record of change of spare parts

2.47 All agrochemicals shall have to be stored properly in a storage room with signages / labels in local language understandable to the workers. The agrochemicals storage should be safe and accessible only to trained authorised personnel. The storage should be well ventilated and ideally be in a place away from places having human activity.

2.48 The agrochemicals storage shall have arrangements to contain accidental spillage.

2.49 The agrochemicals storage shall have hand wash facilities with soap and running water. Also, first aid and fire-fighting facilities shall be made available.

2.50 The unit shall not use banned and expired agrochemicals. In the absence of disposal of banned / expired agrochemicals, they should be stored in trunks / iron cage under lock and key (sealed) so that no personnel can have access to these agrochemicals. An inventory record of banned/expired agrochemicals shall have to be maintained separately.

2.51 The empty agrochemicals containers shall have to be triple rinsed with water, cut, punctured and stored in a safe and designated storage area for disposal through authorised vendors. The storage area should not be easily accessible.

2.52 Spraying machines and PPE shall have to be washed and stored properly after each spraying operations.

Designated area for PPE and spraying machines

2.53 Units shall provide bathing facilities for the spraying personnel after spraying operations.

<u>Weed Management</u>

2.54 The unit shall adopt an integrated approach for weed management with a combination of cultural, manual, mechanical, and chemical control methods as recommended by TRA-TOCKLAI.

Annexure - I

2.55 The unit shall adopt all agro practices as recommended by TRA-TOCKLAI both in case of young and mature teas to obtain quick ground coverage by the tea bushes so as to suppress the weed growths.

2.56 Producers shall not aim for clean cultivation. Rather adopt practices to maintain a thin vegetative cover to avoid exposure of soil to the vagaries of nature.

2.57 Mulching of exposed soil e.g. in young tea shall have to be practiced for suppressing weed growth, soil moisture conservation and avoid soil erosion.

2.58 The unit shall have a policy of planting leguminous cover crops in young tea fields as recommended by TRA-TOCKLAI. The practice, besides protecting the soil, helps fixing nitrogen in soil and adding organic matter to the soil thus, promoting soil health.

Suggested to remove. (This can remain in the Standard till the publishing of the next version but need not be implemented or evaluated).

2.59 Producers shall use manual and mechanical control methods like hand weeding, sickling, tillage, hoeing, cheel hoeing alternately with other control methods.

Same as 2.54. In hilly areas sickling and manual removal

2.60 The unit shall have an herbicide usage policy in accordance with TRA's recommendations for judicious and minimal use of chemical herbicides. Only herbicides approved by CIB-RC to be used in tea, shall be applied in dosage recommended by TRA-TOCKLAI.

Annexure - I on criterion 2.54. Usage record maintained

2.61 The unit shall use only spray machines and nozzles recommended by TRA-TOCKLAI for spraying herbicides.

Machine psi – 10 to 15 psi

Spraying nozzles – WFN-25, WFN-40 and WFN - 62

Field Management in Tea, 2020 Edition – Tips for effective spraying (Page 163 – table) and Annexure - I

2.62 Herbicides shall not be sprayed on road side, drain edges and other terrestrial ecosystems that exists within the farm.

2.63 Herbicide application register/ records with all necessary information shall have to be maintained –

- Section No
- Application date
- Area covered
- Name of herbicide

- Dosage used
- Dilution
- Target weed
- Type of nozzle used
- Volume of water used
- Spot / Blanket spray

Drainage and Irrigation

2.64 The farm shall have a good and scientific and efficient drainage system for sustainable production.

2.65 The farm shall maintain all drains for optimum performance. Cleaning of drains shall have to be undertaken periodically to prevent water logging which otherwise will negatively impact sustainable production.

2.66 The farm shall take utmost care not to clear vegetation on drain sides. Cleaning of bottom surface should be done maintaining the gradient as per TRA-TOCKLAI's recommendations.

2.67 The farm shall plant grasses like vetiver, lemon and citronella on drain edges to prevent collapse of drain sides as well as to utilise it as a source of mulch material.

2.68 The farm shall ensure that clean water free from harmful pollutants is used for irrigation.

2.69 Scheduling and quantity of water for irrigation shall be based on TRA-TOCKLAI recommendations.

Social

2.70 The farm shall respect and comply with the 'Workers Rights' guaranteed by law i.e. The Plantation Labour Act, 1951 and Factory Act,1948.

Compliance on wage, child labour, adolescent worker, overtime and other statutory benefits as per law.

Biodiversity

2.71 The farm shall maintain biodiversity – preservation and conservation of flora and fauna. Prohibition on hunting.

Maintain natural vegetation outside the tea area in the estate.

Maintain list of flora a fauna within the state.

2.72 No disruptive activities on animal corridors shall be practiced.

2.73 Afforestation programme should be in place with native species.

Waste water management

2.74 Untreated waste water, including sewage water, shall not be released outside the farm.
Installation of filtration structure using sand, gravel, charcoal etc as filtration material.

Installation of ETP

2.75 Treated waste water shall be tested for the parameters specified by the Pollution Control Board.

Pollution Control Board Website

2.76 Treated waste water parameters shall be withing the range specified by the Pollution Control Board before it is discharged into external environment.

Pollution Control Board Website

CHAPTER – 3

Good Manufacturing Practices (GMP)

Good Manufacturing Practices (GMP) is system that consists of processes, procedures and documentation that ensures safe and quality tea is consistently produced according to set quality and food safety standards. Implementing GMP can help cut down on losses and waste, avoid product recall, seizure and penalty. Overall, it protects both the producers and the consumers from negative food safety issues. The areas that can influence the safety and quality of products which the GMP guidelines address are –

- Raw material
- Quality management
- Sanitation and hygiene
- Building and facilities
- Equipment
- Personnel
- Validation and qualification
- Complaints
- Documentation and record keeping
- Inspection and audits

Harvesting

3.1 A management policy and plan on harvesting quality raw material i.e. green leaf should be in place to ensure harvesting of green leaf at the right time and size defined in the policy / plan.

3.2 In sections where agrochemical was applied, the harvesting time should be adjusted in such a way that harvesting is done taking into account the prescribed pre-harvest interval.

3.3 A hygiene procedure shall be in place for the harvesting process covering reusable harvesting containers / bags, tools and equipment and handling areas. All harvesting tools / equipment, bags, containers, weighing areas, transfer areas are clean and hygienic.

3.4 All persons handling green leaf shall be trained on importance and maintenance of personal hygiene. The worker should also be trained not to carry / keep any personal medication, foodstuffs, oils, footwear etc. inside the harvesting basket / bag. Training records should be maintained.

3.5 Workers should have access to clean and safe water for drinking and washing hands at the worksite.

3.6 All weighing equipment used for weighing shall be calibrated once a year. Record of calibration should be maintained.

Transportation of harvest

3.7 Farm vehicles used for transportation of harvested leaf are cleaned and maintained to prevent contamination from contaminants like soil, dirt, manure etc.

3.8 All hygienic practices are followed during loading and unloading of green leaf.

Withering

3.9 Harvested leaf from the field is unloaded into clean withering troughs.

3.10 Maintain cleanliness and hygienic condition of the troughs including personal hygiene of the persons engaged in unloading and spreading the leaf on the trough.

3.11 Adequate guard should be installed to prevent access to the withering fans in the troughs.

3.12 The unit shall follow all the guidelines / SOP of TRA-TOCKLAI on withering parameters like spreading of leaf, thickness of spread, duration of wither, application of ambient and hot air and use of equipment like hygrometer, dry and wet bulb thermometer, moisture meter etc. to monitor and ensure proper withering.

3.13 Withered leaf must be loosely packed in basket / bag while sending it for further processing.

3.14 Physical hazards in withered leaf (e.g. stones, dirt, metal, plastics etc) shall be separated by shifting prior to further processing.

3.15 All troughs are cleaned after every manufacture. Cleaning records should be maintained.

Leaf Maceration (Orthodox and CTC Manufacture)

3.16 Maceration of withered leaf for CTC and Orthodox manufacture shall be done as per TRA-TOCKLAI guidelines, using machines like rotor vane, rolling table and CTC machines.

3.17 Heat generated during the maceration shall have to be kept within the range prescribed by TRA-TOCKLAI to avoid deterioration of quality parameters.

3.18 The unit shall follow all other operating parameters, including machines as recommended by TRA-TOCKLAI.

3.19 All machine operators and workers in this area shall be trained periodically on safe operating procedures, hygiene and potential risks and hazards. Trainings should be documented.

3.20 All workers use appropriate PPE.

Fermentation / Oxidation

3.21 Fermentation / oxidation of macerated leaf is carried out in continuous fermenting machines (CFM) / on floor / gumla. The specifications on fermentation time, temperature, thickness of spread, airflow in CFM, humidification parameters, physical appearance, colour of the fermented leaf and other organoleptic parameters shall be as prescribed by TRA-TOCKLAI.

3.22 In case of floor fermentation, adequate measures for maintaining hygiene shall be taken. A coating of food grade epoxy flooring is suitable to avoid hygiene and microbial contamination.

3.23 Workers shall use appropriate PPE.

Wet tea area machinery

3.24 All machines and the floor in the wet tea area i.e. maceration and fermenting area and conveyor belts shall be thoroughly washed and cleaned with high velocity hot water / steam after a day's manufacture. The unit shall ensure that the water used for washing and cleaning the machines is potable. The cleaning agents used shall have approved for use in food industry.

3.25 Exposed movable parts of all machines in the wet tea area have safety guards.

3.26 The conveyor belt in the CFM and the gumlas used for fermentation should be of food grade material.

3.27 All machines shall have a maintenance schedule and records. Food grade lubricants should be used.

3.28 All machine operators and workers in this area shall be trained periodically on standard operating procedures, hygiene, potential risks and hazards. Trainings should be documented.

Dry tea area machinery

3.29 All exposed movable parts of all machines in the dry tea area shall have safety guards.

3.30 All machines shall have a maintenance schedule and records. Food grade lubricants should be used.

3.31 All machine operators and workers in this area shall be trained periodically on standard operating procedures, hygiene, potential risks and hazards. Trainings should be documented.

3.32 Machineries shall be cleaned after every manufacture.

3.33 Collection and storage buckets / boxes and packaging material in the dry tea area shall be of food grade material, including the conveyor belts.

3.34 Packed and unpacked tea shall be stored under proper storage conditions as laid down in TRA-TOCKLAI guidelines.

3.35 The packed tea shall conform to the prescribed parameters by TRA-TOCKLAI.

Waste water management

3.36 Untreated waste water, including sewage water, shall not be released outside the manufacturing unit.

3.37 Treated waste water shall be tested for the parameters specified by the Pollution Control Board.

3.38 Treated waste water parameters shall be within the range specified by the Pollution Control Board before it is discharged into the external environment

CHAPTER – 4

Traceability

A credible GAP and GMP certification programme provide the supply chain stakeholders the confidence that the tea is produced according to the standard with a transparent system in place to track the product from the farmer's level to the retailers along the supply chain. The requirements provide a framework to accurately record certified tea and their segregation from non-certified tea.

4.1 If the farm manufacture outsourced green leaf (non-certified), besides its own leaf, the farm shall maintain a traceability procedure.

4.2 Recording of own volume (certified) and outsourced volume (non-certified) green leaf receipt are maintained.

4.3 The farm shall a maintain all documentation at different stages of processing which demonstrates segregation at all stages.

4.4 Record of sale of certified and non-certified tea. Sale volume of certified tea do not exceed certified production.

4.5 Clear physical segregation of the non-certified outsourced leaf is maintained.

4.6 Signages to demonstrate physical segregation shall be put in places where it is required.

4.7 All factory workers and supervisors are trained on traceability and trainings documented.

4.8 A product recall procedure shall be in place in line with food safety management system and FSSAI requirements. Mock product recall exercise shall be conducted periodically to validate the procedure.

CHAPTER – 5

Water

Water is the most critical resource for agriculture production worldwide, accounting for about 70% of world's fresh water withdrawals. There is an enormous challenge to produce almost 50% more food by 2030 and double production by 2050. This will probably have to be achieved with less water, mainly because of pressures from urbanization, industrialization and climate change. With the climate change impacts – uneven distribution of rainfall, drought, flood, dry water aquifers etc., clearly visible in the tea growing areas, it is very important that the tea producing units adopt practices to conserve, recycle and use water efficiently without any wastage.

5.1 The farm shall comply with the national / state legislation with respect to water source and have necessary approval from the concerned authorities.

5.2 The farm shall have a water conservation policy statement and a plan in place.

5.3 The farm shall record the quantity of water used for various purpose in the farm e.g. domestic, manufacturing, irrigation, spraying operations, washing, health care facilities etc. Water flow meters shall have to be installed at suitable location to track the water usage.

5.4 The farm shall have a plan to reduce water usage.

5.5 The farm shall ensure that all measures are in place to control wastage of water.

5.6 The farm shall ensure that only the required quantity of water is transported for spraying operations.

5.7 The farm shall follow TRA guidelines on quantity of water to be used for irrigation at different times of the year.

5.8 The farm shall plan and install rain water harvesting facilities wherever possible.

CHAPTER – 6

Occupational Health & Safety

Worker's health and safety is of paramount importance for business profitability and sustainability. A healthy workforce and a safe working environment are key to productivity.

6.1 The farm shall have policy on Occupational Health & Safety.

6.2 The farm shall comply with the Occupational Health and Safety requirements as per the Plantation Labour Act and Factories Act.

6.3 Health & Safety committee shall have to be constituted with representation from all sections of the employees and Medical Officer of the farm as the Chairman of the committee. The list of contact persons along with their phone numbers shall be displayed in prominent locations so that one can contact them easily in case of any emergencies.

6.4 Health & Safety committee shall meet quarterly to review occupation and health and safety measures in the farm.

6.5 Risk assessment on all farm operations shall have to be conducted and take necessary measures to mitigate the risks.

6.6 All accidents, both major and minor shall have to be recorded and maintained to analyse root cause and take steps to prevent occurrence.

6.7 The farm shall provide appropriate and adequate PPE to workers engaged in agrochemicals spraying, handling of agrochemicals, plucking, fertilizer application, manufacturing, boiler operations, workshops, electricians, genset operators etc.

6.8 The factory shall have a map of fire safety and evacuation plan with fire exits and position of fire-fighting equipment clearly marked. The escape paths leading to the fire exits in the factory shall be clearly marked and free from any obstructions. Fire exits in the factory shall have to be easily accessible.

6.9 Fuel storage areas inside the farm shall have to be secured so that no persons, other than the authorised personnel, can access the facility easily. The storage facility shall have arrangements for containing accidental spillage and fire-fighting equipment in the vicinity.

6.10 First aid box shall have to be provided at the farm office and manufacturing unit. Mobile first aid box shall be made available at plucking, spraying, fertilizer application etc. sites.

6.11 A group of workers from various operational areas should be trained on First Aid so that they can provide first aid at worksite as and when required.

6.12 The farm shall have a training plan / schedule and conduct training programmes on Health & Safety covering topics like fire safety, mock fire drills, health & hygiene, first aid, spraying, handling of agrochemicals and all other potential risks came out of risk assessment and the measures to mitigate the risks. All training records to be maintained with information on training topic, date of training, trainer, attendance sheet with signature / thumb impression and photographs.

6.13 Hygiene stations (bathing facilities) for spraying workers and washing arrangements for washing spray machines and PPE shall have to provided.

6.14 Clean and hygienic toilets shall be provided separately for male and female workers.

6.15 Clean and safe drinking shall be provided to the workers. Water samples from the water source shall be tested at authorized laboratory and test reports available.

6.16 No adolescent and women workers should be engaged in hazardous work.

CHAPTER – 7

Waste Management

Waste management forms an integral part of Good Agricultural Practices and Good Manufacturing Practices. A tea farm generates various types of waste throughout its operations and it is essential to have a robust management and safe disposal mechanism.

7.1 The farm shall have a waste management plan exploring 3R of waste management i.e. Reduce, Reuse and Recycle.

7.2 A Standard Operating Procedure have to be in place for storage, handling and disposal of various types of both hazardous and non-hazardous wastes generated within the farms.

7.3 Storage, handling and disposal do not pose health and safety risks to the people working and residing in the farms and also the natural ecosystems.

7.4 Waste shall be segregated depending on waste management and disposal options. Organic / biodegradable waste is composted or processed for use as organic manure. Recyclable wastes are recycled.

7.5 Storage area is safe, secured and not accessible. Only authorized persons have access to the storage area. Persons handling waste use proper PPE.

7.6 Hazardous waste including bio-medical waste shall be stored and disposed as per procedure prescribed by Pollution Control Board.

7.7 Waste shall not be burnt except in incinerators specifically designed for a type of waste.

7.8 Materials like plastics, PVC etc. is never burnt.

7.9 Vendors collecting waste for disposal are registered and approved by Pollution Control Board.

7.10 All workers and residents of the farm shall be periodically trained on waste management and training records maintained.

7.11 Waste collecting baskets / bins / receptacles are placed in appropriate locations with colour codes for different wastes both in the field, factory, schools, hospital, creche etc.

2.54 Weeds can be controlled manually by physical force, mechanically with the help of implements and chemically by using herbicides. Some cultural practices also indirectly control some specific weeds by altering their habitat conditions.

2.54.1 Cultural methods

i. Deep ploughing in new section

ii. Timely young tea bringing up operations

iii. Mulching

iv. Use of weed free manure

v. Spacing/plant density

vi. Infilling in vacancy

2.54.2. Physical/ Mechanical methods:

i. Manual weeding/Hand weeding/ Hand removal
ii. Cheeling
iii. Fork Thullying
iv. Sickling

2.54.3 Chemical weed control:

The chemical method of weed control involves use of synthetic chemicals to interfere with the metabolic processes of plants so as to stop or otherwise alter the process. As a result the plant cannot grow or live normally and gets killed. Chemical weed control is less laborious, more efficient, and less time consuming than all other methods of weed control.

The success of chemical weed control depends upon many factors, like proper identification of weeds, selection of appropriate herbicides, application of herbicides at the appropriate time and in correct dosage and minimum soil disturbance etc.

Special considerations before Chemical control:

Application of Herbicides

- Herbicides are used diluted with water.
- To apply evenly over the whole section of tea, knapsack type sprayers fitted with special herbicide nozzles are used for spraying.
- Power sprayers should not be used as there will be drift to crop plants.

- Proper care of men and machine should be taken while at work and after the job too.
- Spray should not be done against wind direction or in strong sun.
- Spray should start at the top and come down to the foot in case of slopes, and not in the reverse way.
- Clean water should be used, as dirty water clog the nozzles and reduce herbicide efficacy.

Spraying of Herbicides

i. Herbicide mixtures/cocktails

There are several herbicides that are compatible and may be applied in cocktails to obtain efficient and economic control of weeds and become effective against an otherwise resistant weed situation. Some of these combinations are enumerated in Table 1.

Table 1. Different herbicide cocktails

Type of Weed flora	Herbicide Cocktails	
	In Young tea	In Mature tea
Predominantly Grassy	Oxyfluorfen + Glyphosate 41 SL	Glyphosate + Glufosinate Ammonium
		Glyphosate + Oxyfluorfen
Mixed weed		Glyphosate + Glufosinate Ammonium
Thatch		Glyphosate + Glufosinate Ammonium
Broad leaf and Grass		Indaziflam + Glyphosate isopropyl ammonium

ii. Rate of application

The optimum rate of application of different herbicides is presented in Table 2.

Table 2. Doses of herbicide application

Herbicide	Dilution (amount per 200 L of water)
Paraquat Dichloride 24%SL/WSC: First round	670 ml
Second round	500 ml
Glyphosate: a) on Polygonum and Saccharum	1500 ml
b) on other perennials	1000 ml
Glufosinate Ammonium 13.5SL	1500 ml
Oxyflurofen 23.5EC	500 ml

Indaziflam 1.65% w/w + Glyphosate isopropyl ammonium 44.63% w/w SC	1000ml
Saflufenacil 70 % WG	22.22g
Triasulfuron 20% WG	50g
Carfentrazone ethyl 0.43% + Glyphosate 30.82EW	1200ml
Oxyflurofen 2.5% + Isopropyl amine salt of Glyphosate 41%w/w SC	

iii. Nozzles for specific purposes

Target of Spraying	Code No.	Spray angle (Degree)	Delivery pressure	Discharge per minute (cc)	Remarks
Weeds	WFN 24	25	10 - 15 PSI (700-1050 g/sq cm)	172	Suitable for spot spray & young tea area using shield
	WFN 40	40		470	For blanket application in young and mature tea
	WFN 62	95		1230	Road side, hola side, non-tea area