

# CTTA TEA DIGEST







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*The first cup moistens my lips and throat.*

*The second cup breaks my loneliness.*

*The third cup searches my barren entrail but to  
find therein some thousand volumes of odd ideographs.*

*The fourth cup raises a slight perspiration –  
all the wrongs of life pass out through my pores.*

*At the fifth cup I am purified.*

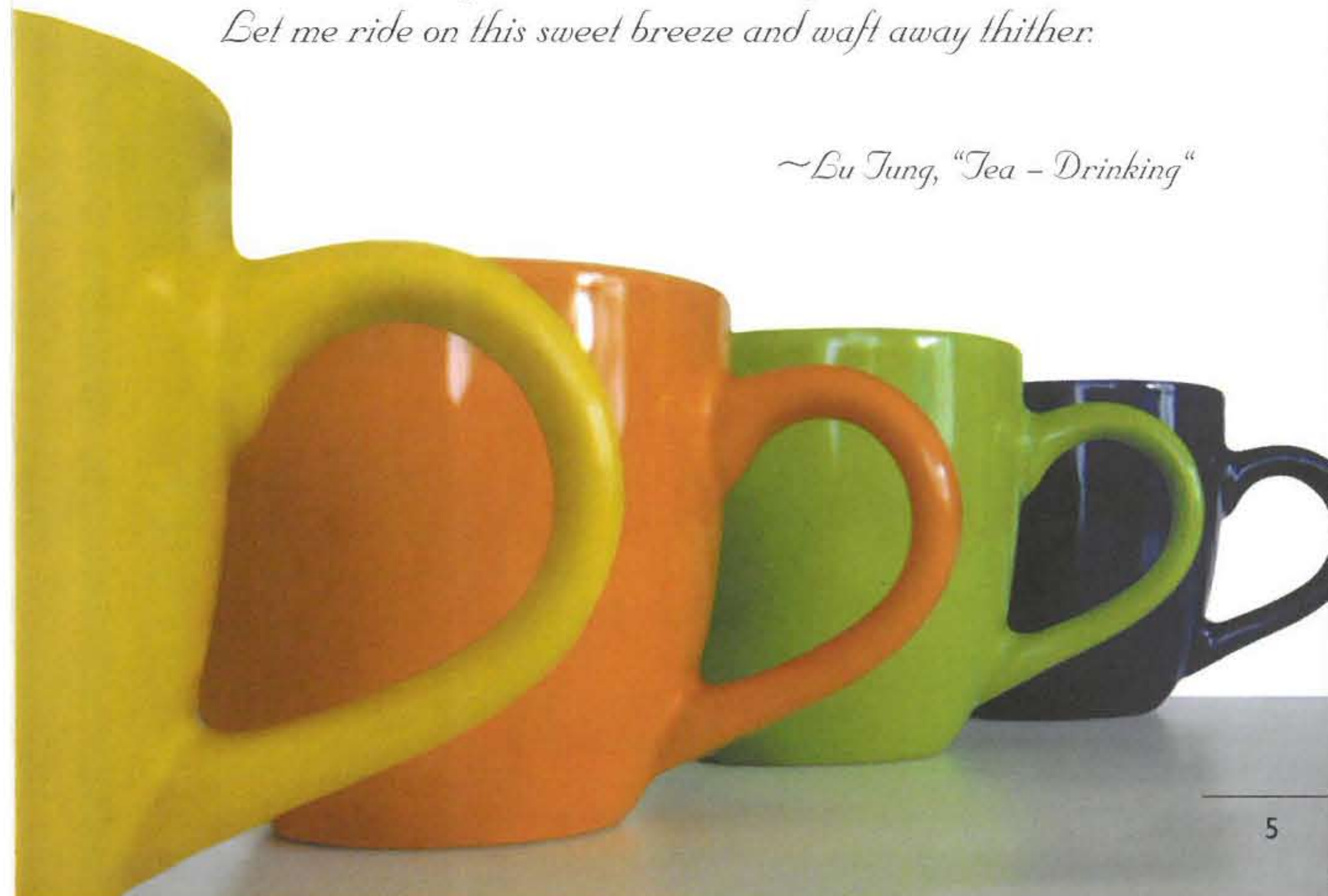
*The sixth cup calls me to the realms of the immortals.*

*The seventh cup – ah, but I could take no more!*

*I only feel the breath of the cool wind that raises  
in my sleeves. Where is Elysium?*

*Let me ride on this sweet breeze and waft away thither.*

*~Lu Jung, "Tea – Drinking"*





*All the teas of India under one roof*



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Calcutta Tea Traders Association

## Why Tea Digest ?

We are pleased to bring to all our readers, a new version of the popular CTTA Digest- the first in the 21st century. The last publication was in 1998- ten years ago.

The objective is to provide all sections of the tea industry, as well as students or just the layman who may be interested in our industry, an overview of the tea business.

We have made the approach more contemporary, emphasising those factors which are crucial today- quality, safety in tea as a food product, innovation and excitement in tea drinking.

We hope you will enjoy owning this book as much as we have enjoyed putting it together for you.







## From the Editor's Desk

### Indian Tea has potential for a promising tomorrow

We are today well into the 21st century. The priorities for the Industry have changed from when the last issue was published.

What is most evident today is the shifting of margins or profits to the consumer end of the value chain. In the past, producers grew and manufactured teas and moved the produce over to well defined sales channels. Sales were almost assured and comfortable, ensuring healthy profits for producers. However, production costs increased and assured export destinations no longer existed post perestroika. Concurrently there was an active section of the trade, the packers, who ardently worked on the Indian consumer building brands and consumer loyalty. Today, the margins or profits have shifted to this segment of the tea value chain- a result of years of assiduous product consistency and marketing. Today Retail markets are also grabbing a

hefty share of the margins with their attractive mall and hypermarket formats that promise visibility of tea products to the upwardly mobile young Indian consumer. The fact that one of the largest producers who forward integrated into the consumer market at the end of the 20th century and has now exited from the business that they started is testimony to this shift of margins.

However, that production can be lucrative is proved as larger groups procure even more estates. Perhaps polarisation has made the business worthwhile for larger producers. Better economies of scale, with uniform systemised practices concentrating on quality and better productivity has resulted in large groups surviving well.

Concurrently, small single estate owners producing special teas and dedicating their produce to specific targeted markets have made production of tea a profitable business.

The growth of "bought leaf factories" has been one of the most important reasons for erosion in values of medium tea manufacturers.

However, there is good scope for tea producers to keep their market territories safe as contemporary demands/statutory requirements





ensure that fly by night producers have limited scope- what the market needs are "clean teas" free of pesticides that come out of systematically monitored agricultural practices. Integration of technological advancements giving a cutting edge to services that producers can offer. This is the forte of the "organized producers" who have control of their produce from planting and plucking to the finished product. Clean warehousing and packing conditions are critical in retaining business shares

The commencement of GI (geographical Indications) status for Darjeeling is a firm step in the correct direction in ensuring the purity and price of this origin which cannot be replicated in any other growing region.

We are all involved in a product which is readily drunk in India and across the world. Thus a basic consumption is assured. However, to increase the offtake of this beverage as well as add value and thus ensure healthier returns for all section of the tea trade the industry needs to continuously innovate and aggressively market its products like other beverages.



The boat is sailing. The sails are lifted. We need to put the wind beneath the sails through exciting innovation and dedicated marketing. As an Industry, let us tap the full potential of this wonderful beverage and make tea a drink that has an exciting tomorrow.



Photograph courtesy: Teekanne

*"I always fear that creation will expire before teatime."*  
~ Sydney Smith





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*Calcutta Tea Traders Association*





*The best quality tea must have creases  
like the leathern boot of Tartar horsemen,  
curl like the dewlap of a mighty bullock,  
unfurl like a mist rising out of a ravine,  
gleam like a lake touched by a zephyr, and  
be wet and soft like a fine earth newly swept by rain.*

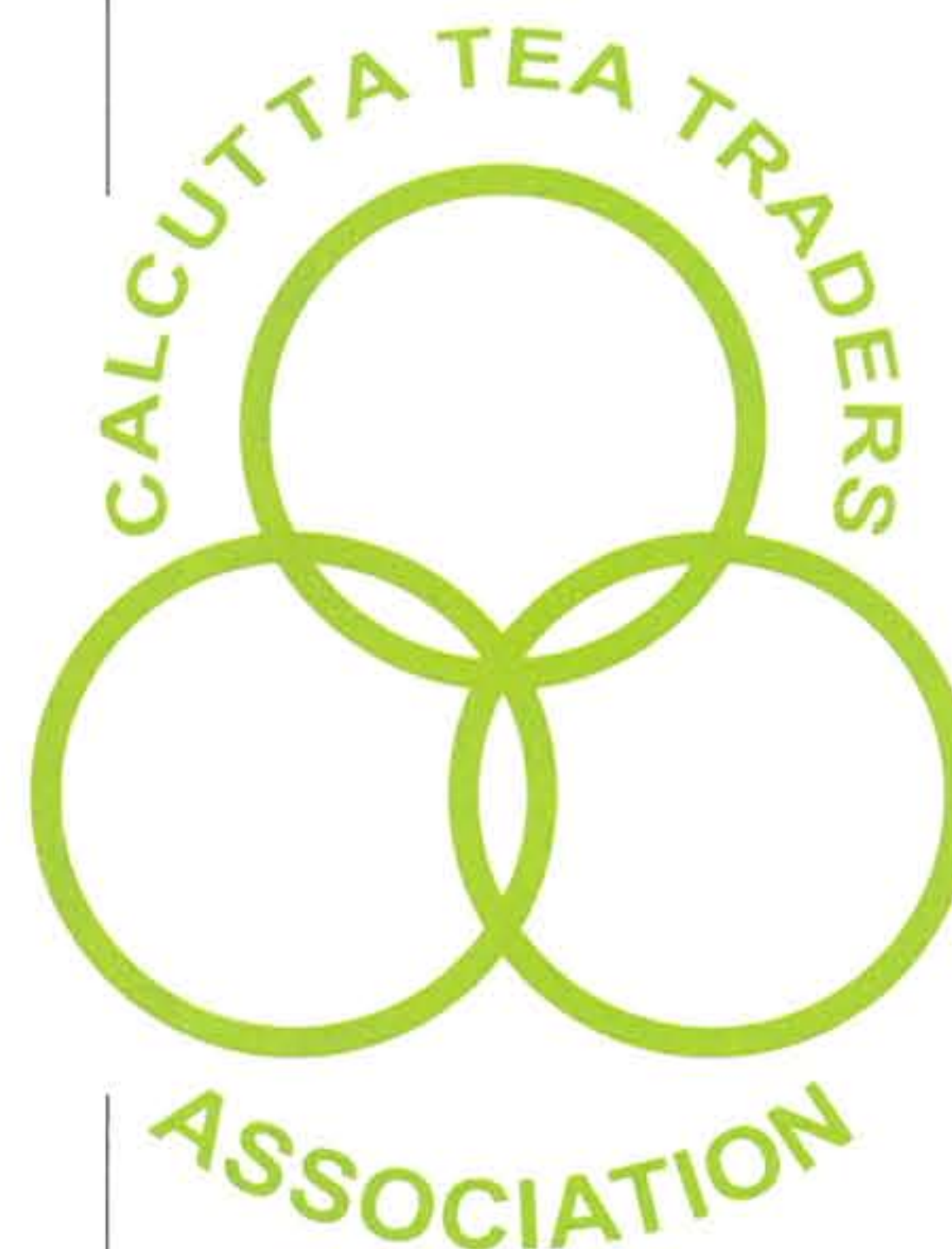
~Lu Yu



## CALCUTTA TEA TRADERS ASSOCIATION

The Calcutta Tea Traders Association was constituted on 15th September 1886 to primarily organise the public tea auctions in Calcutta.

CTTA's emblem comprises three interlocked rings personifying the trinity of buyers, brokers and sellers of tea as its constituent members.







Total Members : 1293  
Warehouses registered with CTTA : 29 - 1,290,000 sq. ft

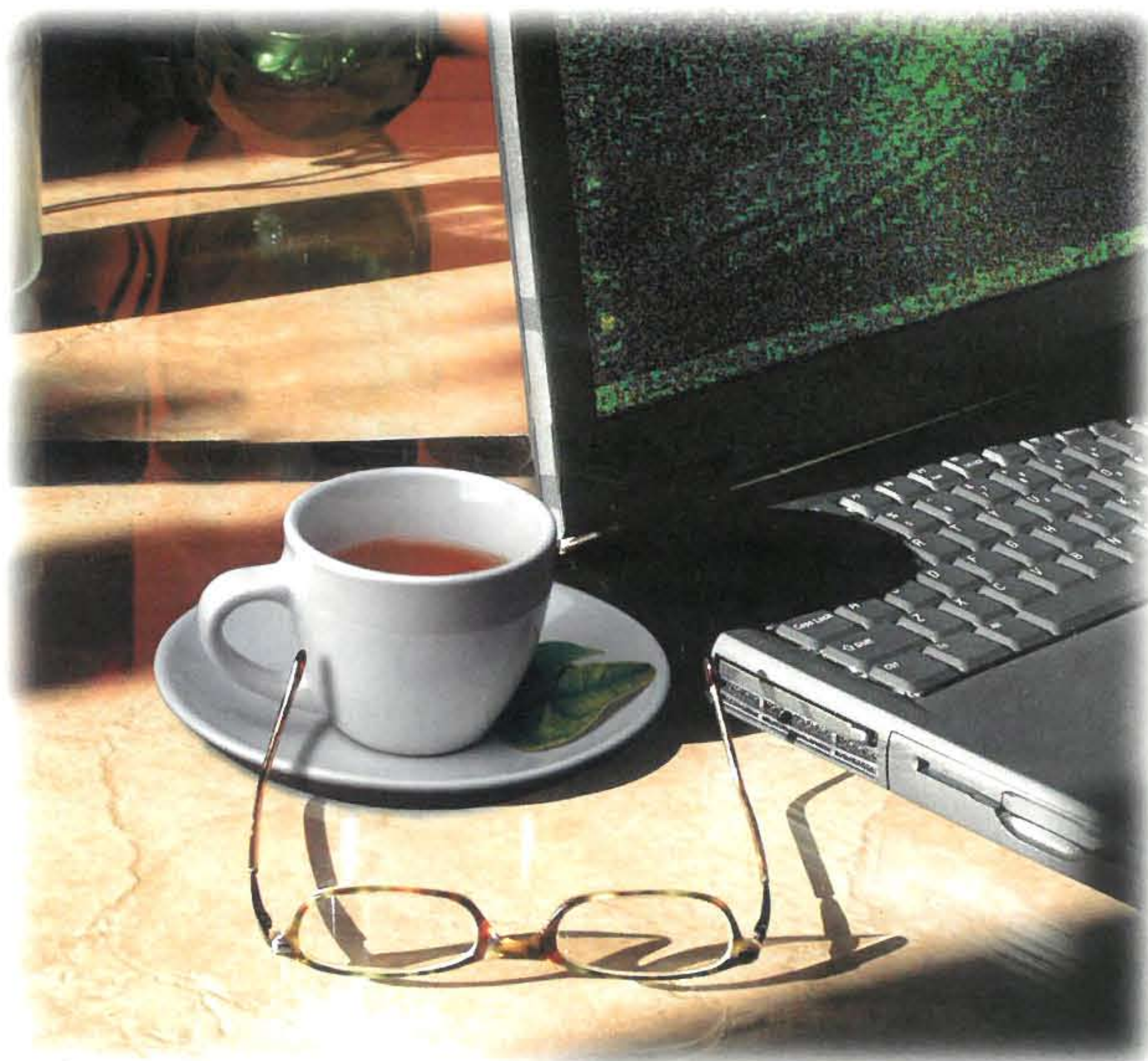
The CTTA organises the public auctions in Kolkata under a licence issued by the Tea Board.

Tea estates and tea factories, registered with the Tea Board under Tea (Marketing) Control Order, 2003 are eligible for admission to CTTA as seller members. Firms/Companies, having a place of business in Kolkata and having registration under West Bengal VAT Act as well as registration with Tea Board under TMCO, 2003 are eligible for admission as buyer members of CTTA. Broker members (auctioneers) should have a place of business in Kolkata, a licence issued by Tea Board under TMCO, 2003 and registration under West Bengal VAT Act.

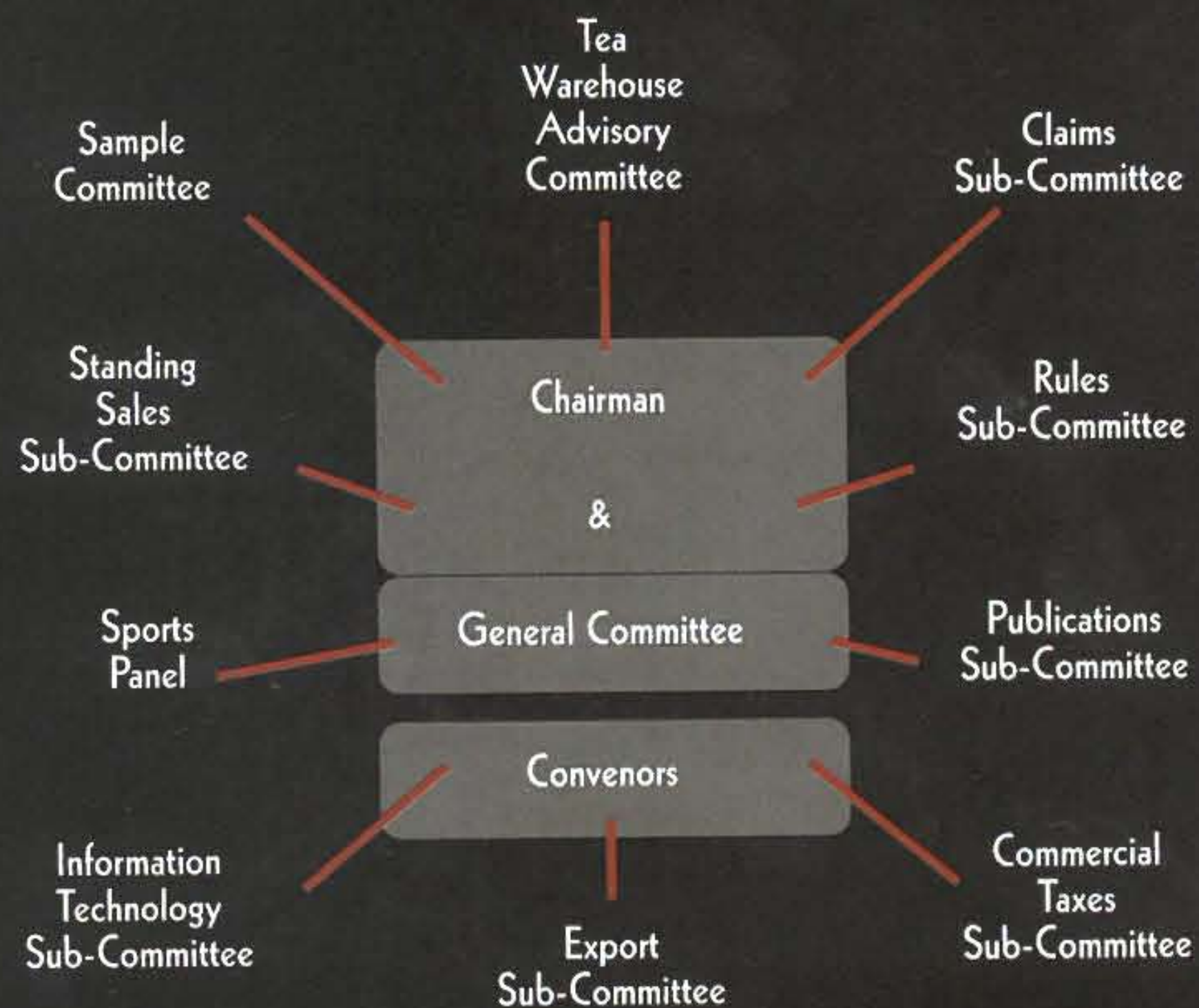
### The Management

- Managed by a General Committee – 5 buyers, 5 sellers and 5 brokers elected from each membership category
- General Committee elects the Chairman and Vice-Chairman.
- The Chairmanship and Vice-Chairmanship of the Association alternate between buyer and seller members only. Broker members do not hold these posts.

The organisation chart is given in the next page.

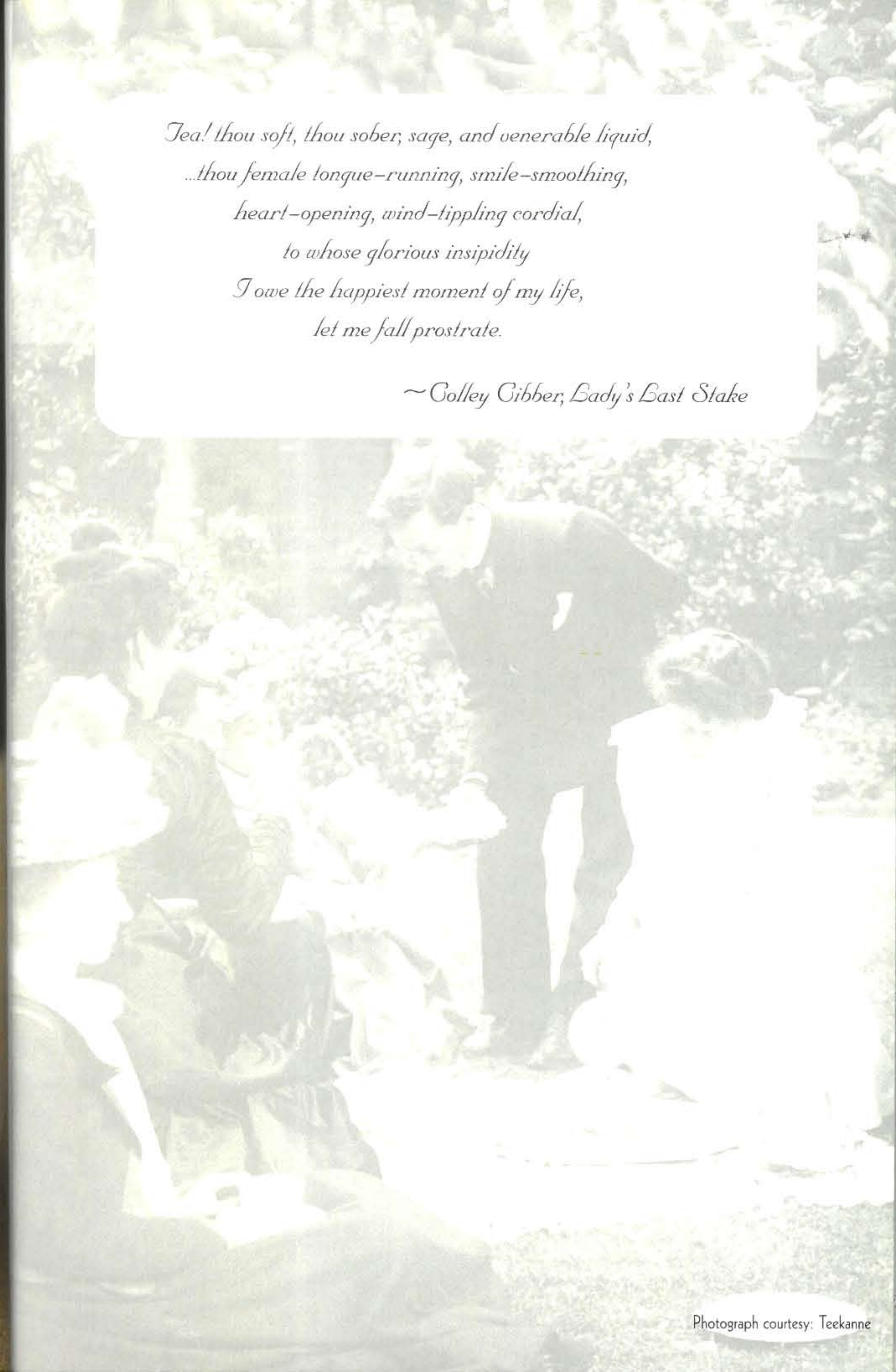




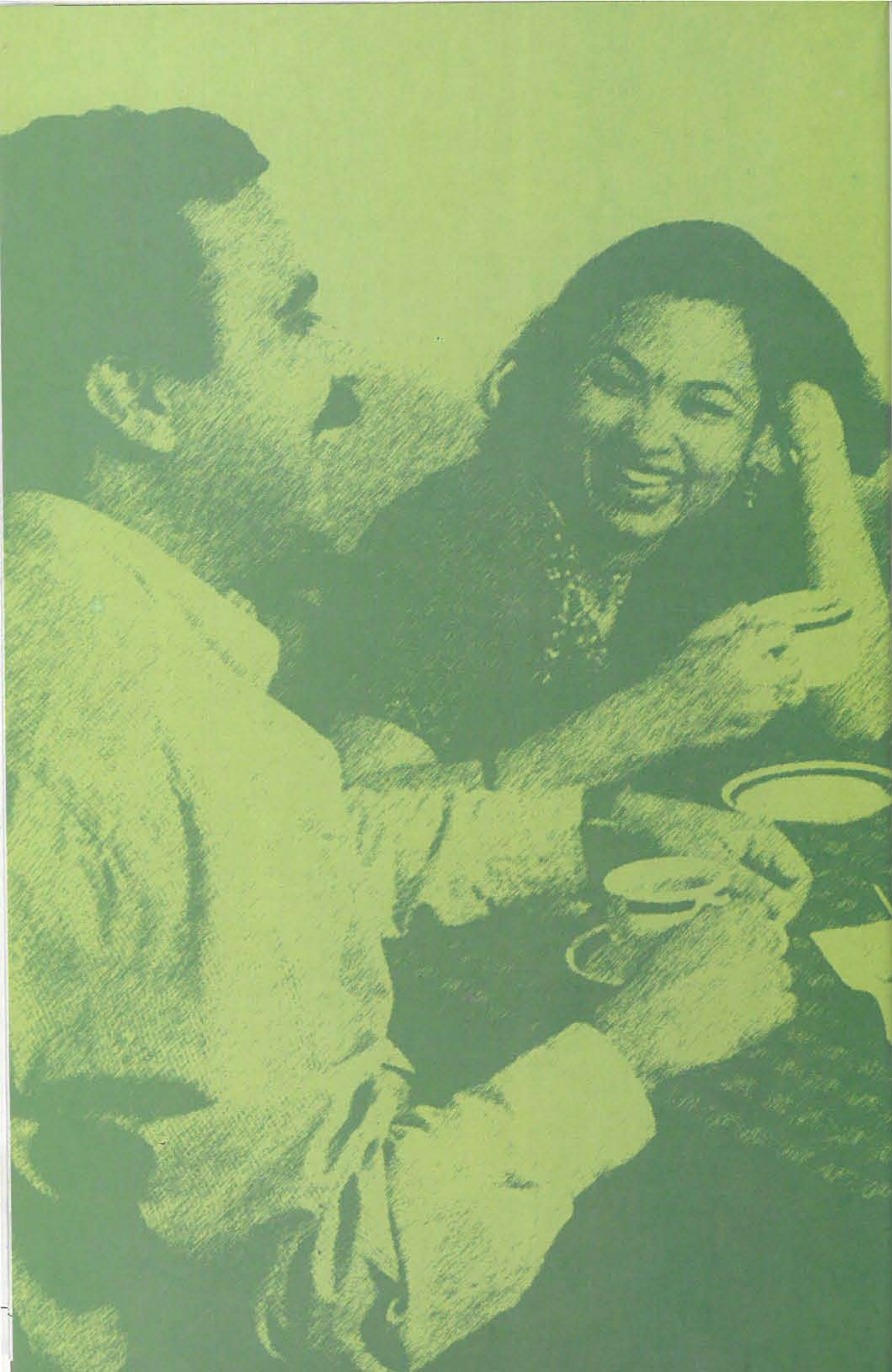


*Tea! thou soft, thou sober, sage, and venerable liquid,  
...thou female tongue-running, smile-smoothing,  
heart-opening, wind-tipling cordial,  
to whose glorious insipidity  
I owe the happiest moment of my life,  
let me fall prostrate.*

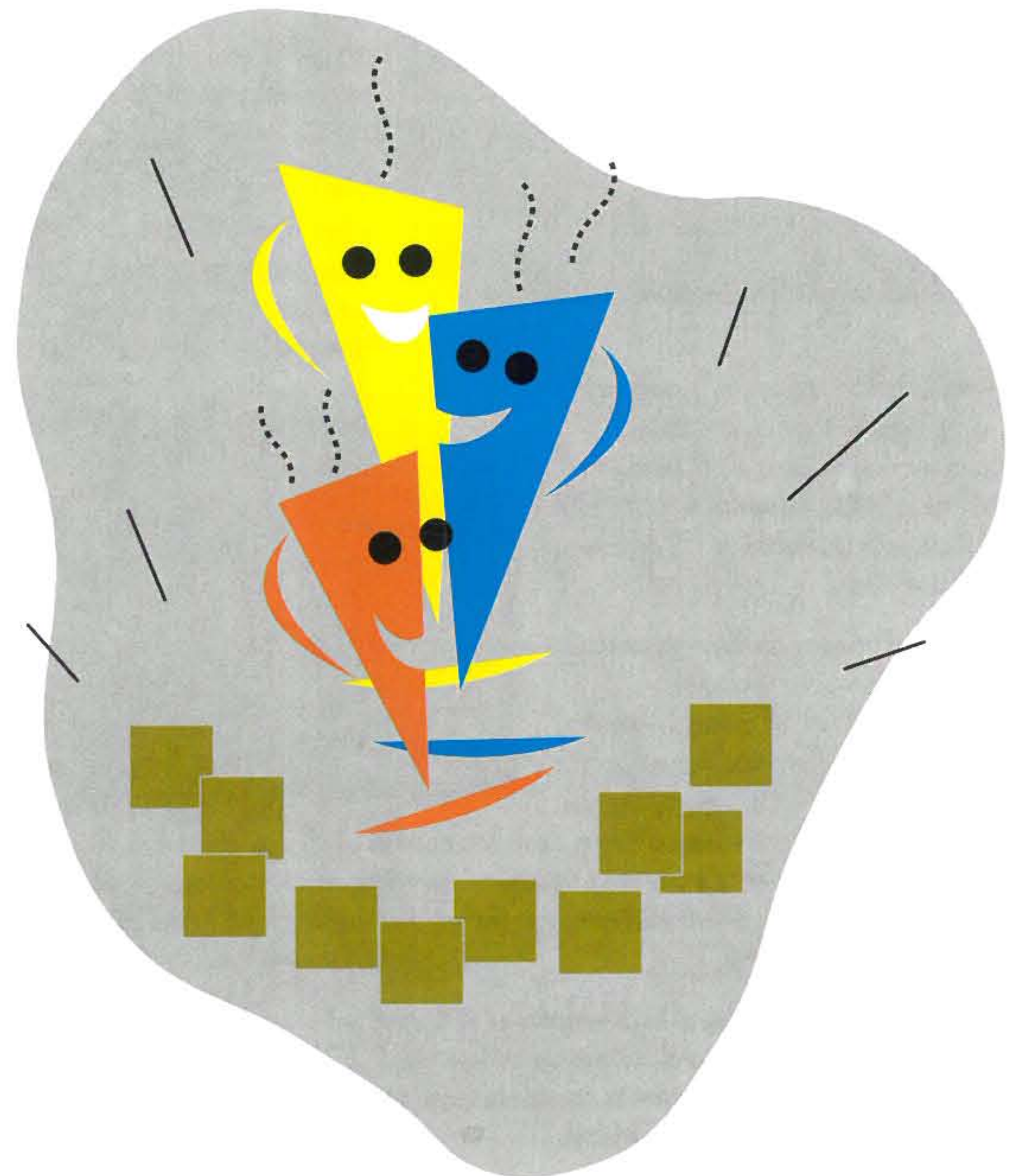
*~Colley Cibber, Lady's Last Stake*







## *Auction System*







## The Auction System

### Why an auction

Tea is a product of infinite variety. No two teas are exactly the same, even if they emanate from the same factory and on the same day. The reasons for such varied qualities are several.



Bush pedigrees, leaf growth and texture respond differently to weather, climate, temperature, humidity, elevation, rainfall, sunshine, slope aspects, plucking standard, production facilities, as well as individualistic concepts, vision and procedures adopted by the tea maker.

The logistics expand exponentially, when considering that in North India there are about 24 tea growing areas, each with its unique ago-microclimate. Spread over 406,000 hectares, more

than 60,000 estates, large and small, many without their own factories, produced as much as 730 million kg of tea in 2006. In addition about 227 million kg is produced in 15 districts of South India.

All these varieties combine to create a basket of tea types and quality characteristics that are extremely complex, with differentiations that range from the finest of nuances to the blatantly obvious.

The diverse product, instead of being clumsily termed as a 'commodity' is actually a blessing, in as much as it serves as a one stop shop with the wherewithal to cater to all preferences and options for both quality and quantity. The price concertina for different qualities and varieties is greatly elastic.

The challenge of exposing all such varieties of teas to all potential markets worldwide was addressed over a century and half ago when the AUCTION SYSTEM was conceived and introduced. The Auctions serve to attract the supply basket to a centralized forum, and magnetise all demand to that platform.



This interaction creates a flashpoint in the form of COMPETITION, where differing qualities of teas establish themselves at various price levels, depending on who wants what more. This competition forms the backbone of price discovery for a bulk tea variety, making the auction Tea industry's only truly acceptable marketing platform that engenders competition.

As a result all international benchmarks for bulk tea prices are created on the auction platform, as are all judgments on the ebbs and flows of demand and supply. Even teas that sell outside the auction system must necessarily use auction levels as their yardstick and this is the Tea industry's only visible pricing structure.

### Inherent advantages

The auction system offers a number of advantages to all concerned sections, such as producers, buyers as well as the government.

### Advantages to the Producers

- The only channel that ensures competition for its produce.
- Forum to sell large volumes in a short time
- Guaranteed payment ( in North India)
- Exposure to all potential markets, domestic and overseas.
- Facilitates quality control or benchmarking against others.
- Major cost advantages on advertising/promotion/distribution.
- Transparency of market movements and ability to judge trends
- The only true price barometer. In fact transactions outside the system use the auction as a yardstick
- Nominal selling cost @ 1%

### Advantages to Buyers

- Availability of wide variety and qualities of tea
- Guaranteed quality
- Assured delivery
- Ability to project forward and plan purchases of quantity and quality







- e) Logistics of tea from over 1,00,000 tea gardens in India available through 7 auction centres
- f) Much lower cost resulting from centralized buying
- g) Major saving in transport, warehousing and stocking costs.
- h) Well defined credit system
- i) Very nominal cost

### Advantages to Government

- a) Accurate, computerized statistical data instantly available
- b) Open and transparent transactions
- c) Major route for export of teas. Merchant exporters use auctions as their main source of supply.
- d) Ability to monitor exports/domestic demand and actual tea price
- e) All auctioneers are government approved and licensed
- f) Collection of sales tax by auctioneers at no cost to the government.

### How an auction

Teas are despatched from various gardens to the auction centres for sale through the appointed brokers. On receipt of the teas, the warehouse keepers issue an "arrival and weightment report." (AWR) which, along with the invoice, is sent to the respective brokers via the auctioneer. The AWR states various details about the tea such as:

- (a) Serial number of AWR and date of issue
- (b) Location of the registered warehouse
- (c) Name and distinctive number of carrier
- (d) Garden mark, grade and serial no of chests/bags
- (e) Invoice no
- (f) Total quantity

- (g) Quantity actually received
- (h) Actual chest numbers
- (i) Short kg, Excess kg, Gross kg, Tare kg, Net kg
- (j) Location of chests in registered warehouse
- (k) Remarks i.e. BR (Broken and Repaired), LC (Leaky Condition), OS (Outwardly sound), WC (Weak condition) and WS (water stained)

The broker on the basis of this information catalogues the teas, following the norms of the auction centre, which are to be offered in each week's sale. Once the pre-determined quantity is reached, the sale is "closed" and the same procedure is carried out for the subsequent sales.

As per directives issued by the Tea Board the catalogue closing time for South Indian auctions, continues to be 11 to 13 days. North Indian centres should not exceed 19 days during the season (i.e. April to November) and for post season (December to March) catalogue closing, the auctions organisers either have the option of removing the present system of regulation on the quantity or offer the products the flexibility to specify the Sale Number subject to a minimum cataloguing time of 19 days.

The brokers catalogue each tea for the particular sale, draw and bind samples for each lot catalogued.



Each lot has to be of a minimum size in order to be catalogued. The minimum lot size for North India CTC sale is 20 packages (with an exception for BPS, small dust and secondary grades) for a garden having production more than 250,000 kg per year. The minimum lot size of 20 packages for CTC teas are for the manufacturing period of June to December. For gardens whose production is below 250,000 kg per year, lots can be offered not below 5 packages in the main catalogue.





In the case of Orthodox tea, for a garden having more than 250,000 kg per year, the minimum size of non-tippy Orthodox tea during the manufacture period July to November only is (TGFOP, GFOP 15 packages and 20 packages GFBOP FBOP GBOP) as for tippy teas, BPS, Fannings, Dust and secondary grades of Orthodox teas are exempted from above norms. For gardens whose production is below 250,000 kg per year, lots can be offered not below 5 packages in main catalogue.



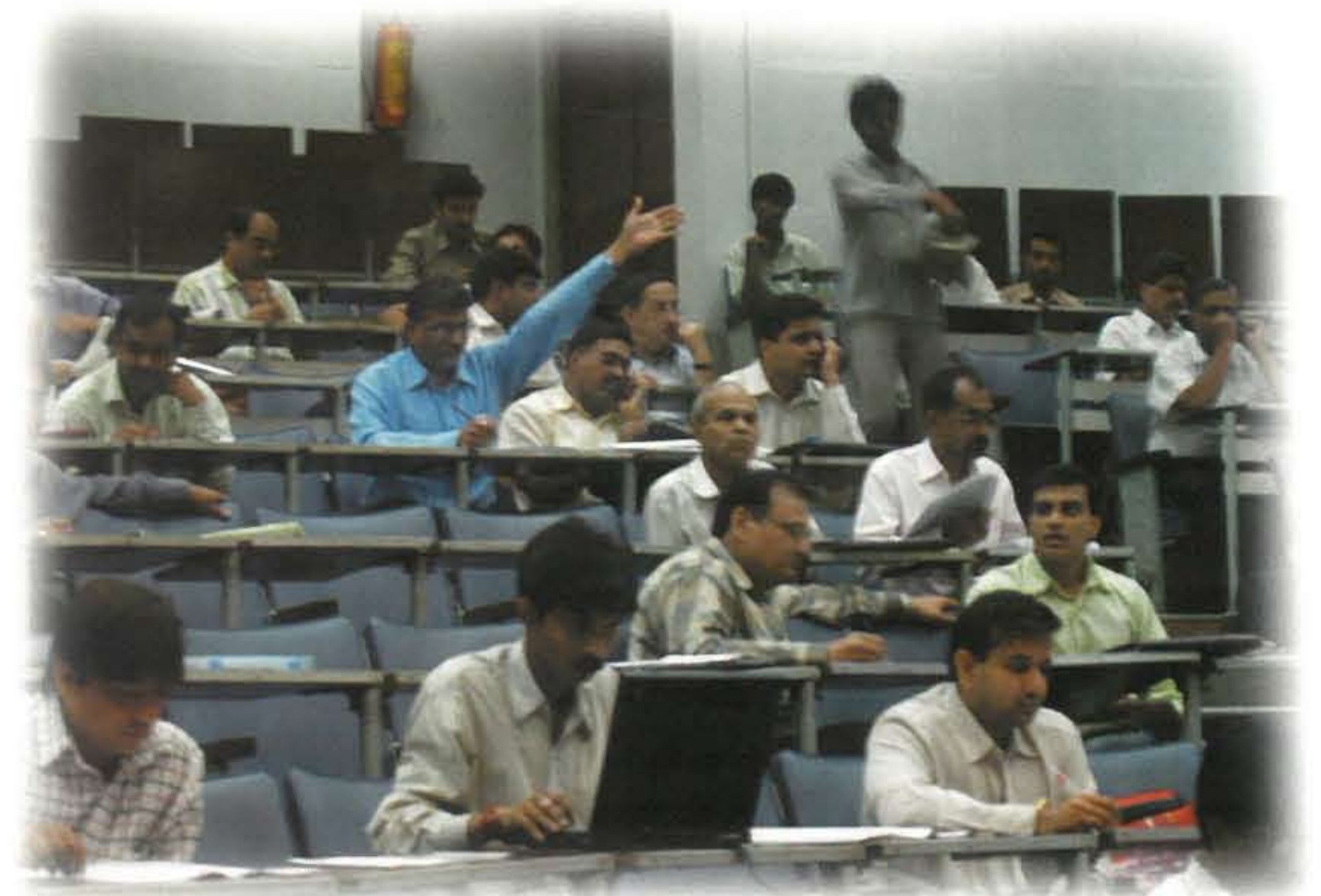
- In case of Darjeeling tea, the minimum lot size would be 5 packages for the main catalogue.
- Small lots (upto 15 packages) are indivisible, while large lots (above 15 packages) are divisible.
- For South Indian auction centres it is 10 packages for the main catalogue.
- The teas, which are below 5 packages or are damaged go to the supplement sale.

Simultaneously brokers distribute the teas to the eligible buyers. These samples are normally distributed two weeks before the sale in order to give the buyers enough time to taste and post to their principals and receive their order in time for the sale. Brokers also verify the contents of the tea to be auctioned and any shortage or damage etc. is reported to the sellers

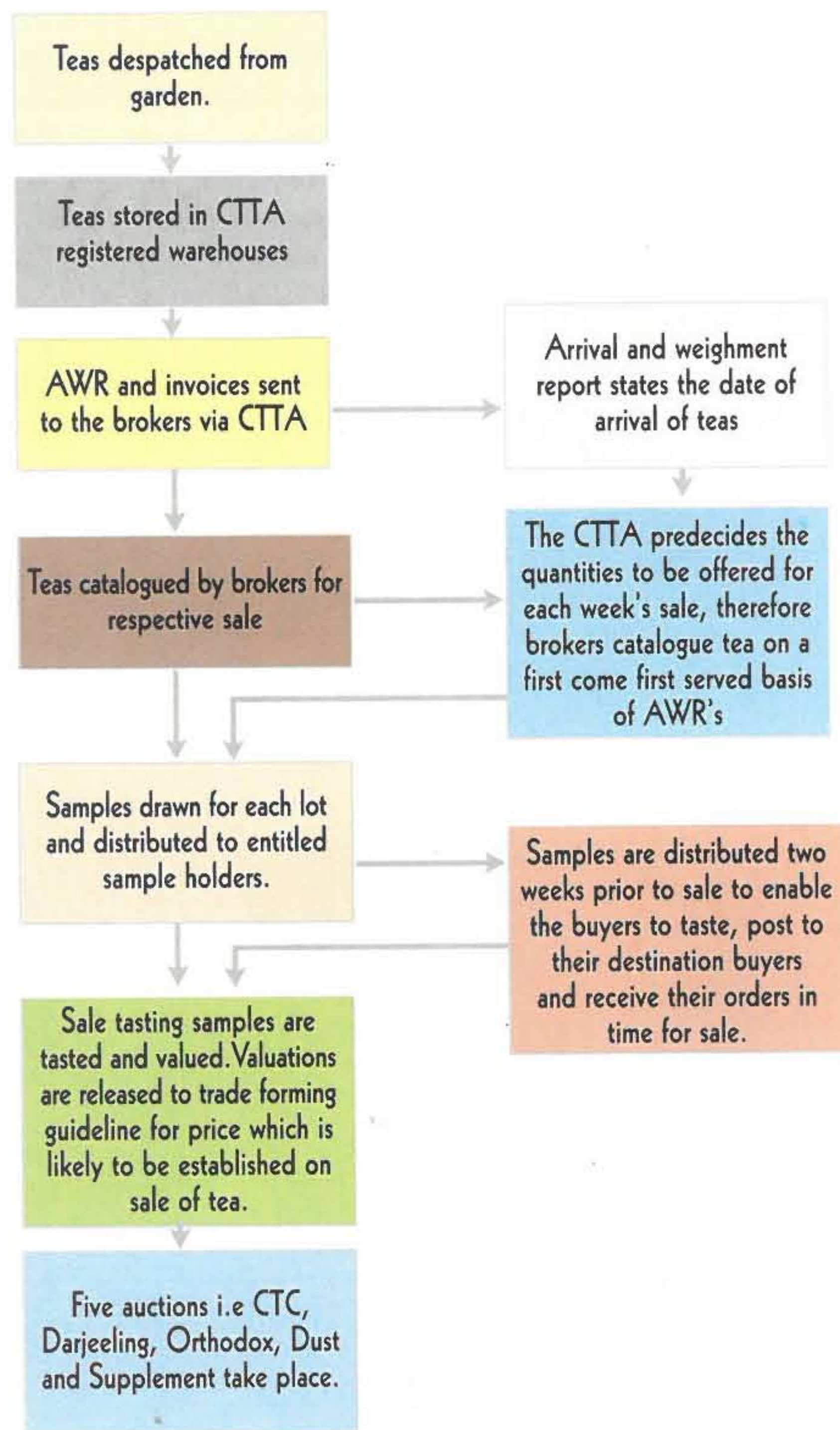
for processing insurance claims. Sampling to buyers via the auction system hence turns into a promotional tool for the sellers.

Based on the AWR and Minimum lot sizes brokers prepared their catalogues within the stipulated closing time. Once each broker's catalogue is ready, he tastes and value his catalogue and the valuation is released to the trade. The valuations are nothing but price indicatives on the basis of which a tea's price is established in tea auction system. The auctioneer's own catalogue is slightly different from the one released to the sale. It incorporates more information, which assists him during the auctions. A typical catalogue contains the broker's lot number, i.e., just a count of how many lots are on sale, the garden invoice number, garden name, grade, gate pass date, chest numbers, gross weight of packages, net weight of packages, total net weight, total number of packages, whether the teas are packaged in paper sacks or chests and which warehouse the teas are stored in.

There are five auctions which take place, i.e., CTC Leaf, Dust, Darjeeling, Orthodox, and Supplement auctions, carry on for two and sometimes three days a week. Bidding in the auction system is an open outcry method where the buyers bid against one another and acts as the price determining mechanism for a particular tea. Depending on the prevalent market the Auctioneer decides what is an acceptable bid. Once the auction is started and the highest bid is achieved the tea is considered sold with the knock of the auctioneers hammer.







In the process of bidding the buyers have to follow certain norms.

The North Indian bidding rules are as follows:

PRICE SLAB	RATE OF ADVANCE BIDDING (Per kg)
Below Rs. 50	Re. 0.50
Rs. 50 and above but less than Rs.100	Re. 1.00
Rs. 100 and above	Rs. 5.00 for Orthodox and Darjeeling teas and Rs.2.00 for CTC and Dust categories.

As for South India, the bidding rules are:

PRICE SLAB	RATE OF ADVANCE BIDDING (Per kg)
Below Rs. 50	Re. 0.50
Rs. 50 and above but less than Rs.100	Re.1.00
Rs. 100 and above	Rs. 2.00

Once a lot is sold reopening of bids is not allowed. As for the unsold lots they are either sold privately or reprinted in a later sale. (CTC and Dust is 4 weeks later and Orthodox and Darjeeling 3 weeks later).

The buyers have the provision that a lot may be divided between two or more buyers but a 5% divisibility premium will be charged upon the knocked down price payable by each of the buyers. Buyers are allowed to bid for one another if the authorisation is provided to the auction organiser one day in advance. However all buyers are required to purchase teas of a minimum of 25% of total sales or 13 sales (whichever is less) in a year in order to be eligible for free trade samples.





After knock of the hammer the deal is sealed. After the Auction is over, the broker issues a 'Delivery Order' (D.O) to the buyer which enables them to collect the teas from the respective warehouse. The seller also gets a sale advice from the broker confirming the lines of tea which have been sold.

The buyer has to make his payment on the 14th day from the sale to the broker who subsequently transfers the payment after keeping his brokerage (The broker charges 1% brokerage to the seller and a buying brokerage [0.30 % for Kolkata, 0.22% for Guwahati and 0.20% for Siliguri] has been implemented from this year. This brokerage is charged on the total bill amount) to the seller on the 15th day. The broker stands as guarantor to the seller for the 14-day prompt and it is his job also to collect sales tax forms for the buyers for account sales which are approved by the sales tax authorities. If there are any claims they are settled amicably between the broker, the buyer and seller.

BROKERS AND BUYERS CONGREGATE ON A PARTICULAR DAY OF THE WEEK. TEAS ARE OFFERED FOR SALE. THE LOT IS SOLD TO THE HIGHEST BIDDER.



DELIVERY ORDER AND CONTRACT IS ISSUED BY THE BROKER TO THE BUYER. DELIVERY ORDER ENABLES THE BUYER TO COLLECT TEAS PURCHASED FROM THE RESPECTIVE WAREHOUSES.



SALE PROMPTS ARE RECEIVED BY BROKERS FROM BUYERS AFTER 14 DAYS OF DATE OF SALE AND IT IS REMITTED TO SELLERS ON THE 15 TH DAY FROM SALE DATE

Thus it is on the basis of this understanding and transparency, that the auction system works. It is the seller, broker and the buyer who are the essential cogs in the working machinery of the auction system. Only a complete harmony between them will result in an efficient and effective system.

#### Establishment of Different Auction Centres

LONDON	10 January 1839; wound up 29 June 1998
CALCUTTA	27 December 1861
COLOMBO	30 July 1883
KOCHI	4 July 1947
CHITTAGONG	16 July 1949
MOMBASA	7 November 1956 (established at NAIROBI and moved to MOMBASA on 14 July 1969)
COONOR	23 March 1963
AMRITSAR	30 April 1964
MOMBASA	14 July 1969
LIMBE	February 1970
GUWAHATI	25 September 1970
DJAKARTA	11 December 1972
SILIGURI	29 October 1976
COIMBATORE	22 November 1980
SINGAPORE	2 December 1981

#### E-Auctions

The E Auctions is the culmination of leveraging the technology of the 21st century. With E Technology having gained so much ground in the past few years, it has become essential to incorporate this technology into our auction system. This technology is being used to strengthen and augment the current auction procedure.





The motivation behind converting the manual auctions into an electronic one is to enhance competition, increase exposure and reduce logistical costs. If the auctions are converted to an electronic system then it increases the number of people who can access it, as the intention is to have a central database. Hence it can be accessed from remote locations. This system will help in cutting down on various costs as one can now access from his own computer in any location. It is aimed to have a central database but this has not yet been achieved and the system is still in the planning stage.

South India, Guwahati have had E Auctions. The E auction system, which is currently operating in South India, is the most developed. It works in the following manner. The catalogue uploaded on the governing body's server on a Friday for the corresponding Wednesday sale. A representative of the governing body starts the server in the morning of each sale day. Here the buyers though have to be present in the auction room in order to participate in the auction as they are connected by Local Area Network. Each page has fifteen lots and the buyers have two and a half minutes to bid on each page. After this there is a 30 second break and then the broker has one minute to decide whether to sell or not. This is known as the knock down time. As this system is being followed there can be no delays in the auction as the time is fixed.



This is how an Electronic Auction works currently. More research and development is being done to upgrade this system. It will be an exciting and vibrant opportunity to the majority of the bulk tea trade if the e-auctions truly achieve the objectives.

CATALOGUE  
UPLOADED ON SERVER

15 LOTS PER PAGE

BUYER HAS  
TWO AND A HALF  
MINUTES PER PAGE  
TO BID

BROKER HAS  
ONE MINUTE  
KNOCKDOWN TIME  
TO DECIDE TO SELL  
PER PAGE



*Tea is instant wisdom – just add water*

*~ Astrid Alauda*



*Exporters of  
Fine Teas  
Since 1972*



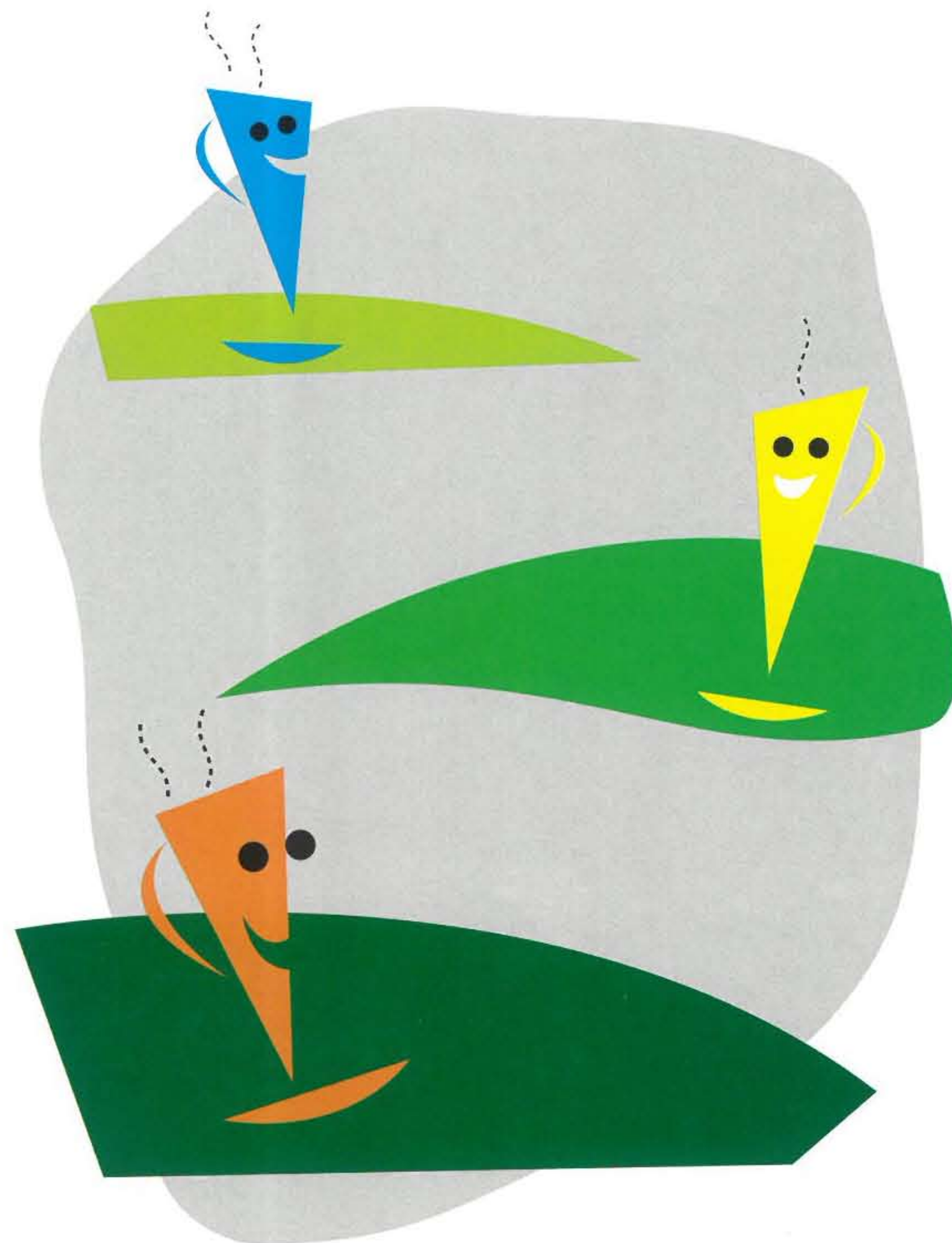
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*Grading & Tasting*





## GRADING AND TASTING



### Grades

During the process of tea processing, whether by the Orthodox or CTC method, the processed leaf is converted into twisted or cut particles of various sizes. In order to ensure uniformity of size in the final marketable product, these particles are passed through sieves of specified perforations to segregate the different sizes evenly into individual grades.

Grade nomenclatures do not necessarily relate to differential quality, but rather to the size of tea leaf in packed invoices.

*Thank God for Tea! What would the world do without tea?  
How did it exist? I am glad I was not born before tea.*

*~ Rev. Sydney Smith*





Indian Black Tea is described by various grade names which are summarized below:

KIND OF TEA	GRADE NAME	NOMENCLATURE
ORTHODOX TEA STGFOP1	Special Tippy Golden Flowery Orange Pekoe one	
TGFOP	Tippy Golden Flowery Orange Pekoe	
TGFOP 1	Tippy Golden Flowery Orange Pekoe one	
GFOP	Golden Flowery Orange Pekoe	

KIND OF TEA	GRADE NAME	NOMENCLATURE
FOP	Flowery Orange Pekoe	
BPS	Broken Pekoe Souchong	
GBOP	Golden Broken Orange Pekoe	
FBOP	Flowery Broken Orange Pekoe	
FOF	Flowery Orange Fannings	









KIND OF TEA	GRADE NAME	NOMENCLATURE
CTC TEA BP	Broken Pekoe	
BOP	Broken Orange Pekoe	
BOPSM	Broken Orange Pekoe Small BP 1 FP Broken Pekoe One Flowery Pekoe	
OF	Orange Fannings	
PD	Pekoe Dust	

KIND OF TEA	GRADE NAME	NOMENCLATURE
D	Dust	
CD	Churamani Dust	
DARJEELING TEA FTGFOP1	Fine Tippy Golden Flowery Orange Pekoe one	
TGBOF	Tippy Golden Broken Orange Fannings	
GOF	Golden Orange Fannings	



## The Palate & the Taster

*You must be completely awake in the present to enjoy the tea.  
Only in the awareness of the present,  
can your hands feel the pleasant warmth of the cup.  
Only in the present, can you savor the aroma,  
taste the sweetness,  
appreciate the delicacy.  
If you are ruminating about the past,  
or worrying about the future,  
you will completely miss the experience  
of enjoying the cup of tea.*

*~ Thich Nhat Hanh,  
The Vietnamese Buddhist monk and philosopher*







## THE PALATE & THE TASTER



Tea tasting is a specialised function demanding talent cultivated during years of training and experience. The sense of taste is only one of the many faculties a taster must cultivate. Of the five human senses, he has to use, four simultaneously. The senses of smell, sight and touch are as essential in tasting tea as is the sense of taste. The term "tea tasting" is therefore a part-nomer for what is a comprehensive examination of tea. Before a taster begins his work, samples of tea are infused or brewed.

A quarter tola (2.9 gm) of each sample is infused in four ounces of boiling water for six minutes.

The liquor or liquid is then separated from the infused leaf. White porcelain cups and pots are used for the purpose to ensure an authentic view of the liquor-colour.

When ready for tasting, the taster first examines two or three ounces of dry-leaf tea. Good black tea should have a uniform black colour with a bloom or sheen. It should contain golden tips (the more the better) which come from the "buds" and not from the two leaves. Brown

stalk and fibre are unwelcome as they represent the hard stem between leaves. The taster checks the size and evenness of the leaves. The style of the tea is just as important; a well-twisted heavy leaf is desirable while a flaky style is not. His sense of touch helps him verify whether the tea is crisp and well-dried. A spongy feel indicates that the tea contains a high percentage of moisture and therefore will not "keep" well but deteriorate early.

Then the taster's eyes turn to the infused leaf to see its colour, its uniformity and brightness. The infused leaf gives a cross-section view of the tea and therefore a look and sniff are helpful.

Until now the taster has not used his palate which is, of course, the most decisive factor in the examination of tea. But before he tastes, he carefully looks at the colour of the liquor to see how bright and golden it is. Often milk is added to the liquor to judge its colour more accurately. He then proceeds to taste by sipping about a spoonful of the liquor and rolling it in his mouth for a few seconds before spitting it out. He cannot generally spend more than a few seconds on one tea as, at the height of the season; a taster has to deal with up to 1,000 cups a day. In the course of the few seconds that the liquor is in his mouth, the taster registers how strong and brisk it is. Strength is thickness while briskness (life or pungency which spring water has but water from a lake does not) is a property of a good tea which will "keep" well. Assam teas are especially known for their thick, brisk liquors that "keep" well.

In these same few seconds, the taster also judges the finer aspects of the liquor. 'Character' is the distinctive taste which depends upon the area in which the tea is grown. Quality is aroma which is found in abundance only during certain seasons of the year when leaf-growth is slow. Flavour or bouquet is the ultimate in tea liquor and, being rare, is keenly sought after. A Darjeeling tea with an outstanding flavour can be worth Rs. 1000/- per kg or more, while a similar tea without this exceptional bouquet may not sell for more than Rs. 40. Trained, sensitive taste buds and a

keen sense of smell are essential to detect so much in such a short time. But this is not all. An encyclopaedic palate memory is a must for a successful tea taster. No tea can be tasted and valued in abstract. The taster must be able to compare it with a number of teas he has







tasted over the years and which are no longer available. Without experience and a long association with a wide range of teas, a taster cannot do justice to his work.

In order to value tea, the taster must know the preferences and biases of markets the world over. Golden tips which can be worth Rs. 400 or more per kg to a buyer in Iran may be difficult to sell in the world's largest tea markets—the U.K. or India.



The taster is often called upon to assist the producer in improving quality. He must be intimately familiar with the various processes of tea manufacture. Otherwise, he cannot relate a shortcoming in the tea with a particular fault in manufacture.

To the layman, a tea taster is an object of much sympathy, as it is popularly believed that he has to renounce alcohol, tobacco and even such bare necessities as chillies and onions. One cannot think of a greater myth more widely cherished. All that the taster needs is a 'normal' palate when he tastes.

There is no substitute for the tea taster. Chemical analysis can help to determine the various constituents of tea but to judge it in its totality remains the taster's monopoly. The entire world's tea depends on the palates of a few hundred tasters for its assessment. The computer may well help man to do his thinking for him but it is doubtful that it will rise to replace the taster's palate.

The glossary of terms relating to tea tasting is presented in "Tasters' Jargon" below:

## DRY LEAF

ATTRACTIVE	well-made : uniform in colour, size and texture
BLACK	tea which has been allowed to ferment as opposed to green tea; also describes colour
BLISTER	blistering of leaf caused by too rapid removal of moisture
BLOOM	sheen or lustre
BOLD	pieces of leaf that are too big for a grade
BROKEN	broken by rolling or passing through a cutter
BROWN	describes colour
CASE-HARDENING	applies mainly to orthodox teas: when outside casing becomes fully fired and prevents core from losing moisture; bold grapenutty CTCs are also susceptible to case-hardening
CHESTY	resinous smell/taste caused by immature or inferior panels or battens
CHEESY	smell/taint caused by inferior glue of panels
CHOPPY	chopped in a breaker mill or cutter rather than a roller
CHUNKY	breakens which are large: desirable feature when applied to tip
CLEAN	evenly sorted grade free from quantities of other grades, stalk and fibre
CREPY	crimped appearance
CURLY	opposite to wiry
CUT	synonymous with choppy
COMMON	plain





DISCOLOURED LEAF	(self-explanatory)
DULL	lacking bloom
DULL TIP	opposed to bright
DUSTY	leaf tea containing small particles
EVEN	consisting of particles of roughly equal size
FIBROUS	presence of excessive fibre
FLAKY	flat, open, poorly made tea
FLAT	open and flaky
GOLDEN TIP	denotes colour of tip
GRAINY	well-made hard leaf
GRAPENUTTY	leaf balled in the process of manufacture
GREY	colour of leaf
GRITTY	leaf which feels hard to the touch
HAIRY	thin fibre: similar to whiskery
IRREGULAR	uneven whole leaf grades
KEEP	well-manufactured tea with good keeping properties
KNOBBLY	round knobbly souchong grades
LARGE	large for market requirements
LEAFY	tea containing larger leaves than normal; coupled with 'useful' denotes a size in demand
MAKE	good style
MILLED	put through cutter or mill
MIXED	exaggerated form of unevenness

NEAT	good leaf of even appearance
OPEN	opposed to twisted or rolled
PALE TIP	(self-explanatory)
POWDERY	very fine light dust, the particles of which tend to cohere
PULVERISED	dusts containing milled or pulverised fibre
RAGGED	rough, shaggy and uneven
RED	(self-explanatory)
ROUGH	irregular and not well-made
SANDY	containing sand
SHELLY	shell-like appearance
SHOTTY	well-made souchong
SILVERY TIP	(self-explanatory)
SMALL	smaller size than normal
SPONGY	flat; flaky
STALKY	excessive stalk
STYLISH	superior appearance
TIPPY	generous tip
TWIST	imparted during rolling
UNEVEN	containing uneven pieces
USEFUL	possessing good blending qualities
WELL-MADE	uniform in colour, size and texture
WELL-TWISTED	(self-explanatory)





WHISKERY	fine hairy fibre, see also hairy
WILD	end season teas having reddish appearance
WIRY	stylish, thin whole leaf

### INFUSED LEAF

AROMA	fragrant smell of tea grown at high elevation
BLACK CURRANT	aroma emitted by black currant bushes: noticed in some Darjeelings
BRIGHT	lively as opposed to dull
COPPERY	(self-explanatory) : denotes good tea
DARK	dull
DULL	opposed to bright
EVEN	uniform in colour
GREEN	generally undesirable
IRREGULAR	mixed
MIXED	more than one colour
UNEVEN	similar to mixed

### LIQUORS

AUTUMNAL	(self-explanatory)
BAGGY	taint from Hessian or sacking
BAKEY	caused by high temperatures during firing
BISCUITY	pleasant characterisitic
BODY	possessing fullness and strength

BOUQUET	superlative flavour
BRASSY	metallic taste
BRIGHT	opposed to dull
BRISK	opposed to flat or soft
BURN	fully fired
BURNT	subjected to extremely high temperatures
CHARACTER	desirable quality: also permits recognition of origin
CHEESY	(see under dry leaf)
CHESTY	(see under dry leaf)
CLEAN	lacking in character but no unpleasant taint or taste
COARSE	unpleasant taste
COLD WEATHER	teas produced after monsoon
COLOUR	(self-explanatory)
COLOURY	depth of colour
CONTAMINATION	foreign taste
CREAMY	precipitate obtained after colling
CROPPY	bright and creamy with character
DRY	slightly high-fired
DULL	neither clear nor bright, nor lively or brisk
EARTHY	taste due to storage under damp conditions
EMPTY	lacking fullness or substance
FINE	exceptional quality and flavour





FLAT	lifeless: lacking briskness
GONE OFF	past its prime
FLAVOURY	(self-explanatory)
FRUITY	unpleasant overripe taste
FULL	possessing colour, strength and substance
FULLY FRIED	slightly over-fired
GERANIUM	reminiscent of aroma of geraniums found in certain Darjeelings
GOLDEN	(self-explanatory)
GRASSY	teas without physical or chemical wither
GREEN/GREENISH	early first flush
HARD	penetrating and desirable strength
HARSHNESS	raw characteristic
HEAVY	thick without briskness
HIGH-FIRED	(self-explanatory)
HUNGRY	lacking cup character
JAMMY	(see raspberry)
LACKING	clean tasting without obvious
LIGHT	lacking depth of colour
MALTY	desirable character
MELLOW	well-matured; opposed to raw
METALLIC	bitter metallic taste
MINTY	mint-like flavour



MOULDY	gone off through age or damaged by water
MUSHY	flat, soggy
MUSTY	suspicion of mould
MUSCATEL	reminiscent of vineyards; characteristic found in excellent Darjeelings
NEW	not having had sufficient time to mellow
NOSE	aroma
OUT OF CONDITION	(self-explanatory)
OLD	(see flat)
PALE	lacking colour except in GREEN teas where liquor should be pale
PAPERY	paper taint
PEACHY	flavour of certain fine Darjeelings
PINKY	brighter; more pink and delicate than coloury
POINT	most desirable brightness and acidity
POINTY	having good point
PRE-AUTUMNAL	(self-explanatory)
PUNGENT	ideal combination of briskness, brightness, strength and flavour
QUALITY	essential characteristic of good tea
RAINS/RAINY	North Indian teas produced during monsoon
RAW	immature
RASPBERRY	flavour akin to raspberry
RED	(self-explanatory)
RICH	mellow liquor abundant in quality and thickness





ROUND	full smooth liquor
SCORCHED	associated with dryness
SELF-DRINKING	palatable in itself not requiring blending
SLATEY	describes colour
SMOKEY	(self-explanatory)
SOGGY	heavy dull liquor
SOFT	opposite to brisk
SPICY	characteristic suggestive of spices
STALE	(self-explanatory)
STEWED/STEWY	incorrectly fired
STRENGTH / STRONG	substance in liquor
SWEATY	unpleasant taste
TAINT	foreign characteristic
THICK	opposed to thin
THIN	lacking body
TINNY	(self-explanatory)
TIRED	flat through age
TOASTY	caused by over-firing
UN SOUND	tainted or lacking keeping properties
WEATHERY	unpleasant taste on some rains teas
WEEDY	thing; cabbagy
WILD	autumnal teas past their prime



WINEY	over fermented under sterile conditions
WOODY	sawdust-like character

### GREEN TEA

GREEN TEA	type of manufacture without fermentation
BLACK	oxidised leaves; an undesirable characteristic
POLISH	processing with powder to give sheen
PALE	liquor colour
CLOUDY	undesirable liquor characteristic
SILKY	smooth and soft texture

### Grades

KIND OF TEA	GRADE NAME	NOMENCLATURE
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### BLACK TEA:

### ORTHODOX TEA

Whole leaf	FP	Flowery Pekoe
	F TGF OP	Fine Tippy Golden Flowery Orange Pekoe
	TGF OP	Tippy Golden Flowery Orange Pekoe
	TGF OP 1	Tippy Golden Flowery Orange Pekoe one
	GF OP	Golden Flowery Orange Pekoe
	FOP	Flowery Orange Pekoe
	OP	Orange Pekoe
Broken	BOP 1	Broken Orange Pekoe one
	GF BOP	Golden Flowery Broken Orange Pekoe
	BPS	Broken Pekoe Souchong
	GBOP	Golden Broken Orange Pekoe
	FBOP	Flowery Broken Orange Pekoe
	BOP	Broken Orange Pekoe





Fannings	GOF	Golden Orange Fannings
	FOF	Flowery Orange Fannings
	BOPF	Broken Orange Pekoe Fannings

Dust	OPD	Orthodox Pekoe Dust
	OCD	Orthodox Churamani Dust
	BOPD	Broken Orange Pekoe Dust
	BOPFD	Broken Orange Pekoe Fine Dust
	FD	Fine Dust
	D-A	Dust A
	Spl. Dust	Special Dust
	G. Dust	Golden Dust
	OD	Orthodox Dust

### CTC TEA

Broken	PEK	Pekoe
	BP	Broken Pekoe
	BOP	Broken Orange Pekoe
	BPS	Broken Pekoe Souchong
	BP 1	Broken Pekoe One
	FP	Flowery Pekoe

Fannings	OF	Orange Fannings
	PF	Pekoe Fannings
	PF 1	Pekoe Fannings One
	BOPF	Broken Orange Pekoe Fannings

Dust	PD	Pekoe Dust
	D	Dust
	CD	Churamani Dust
	PD 1	Pekoe Dust One



Dust	D1	Dust one
	CD 1	Churamani Dust One
	RD	Red Dust
	FD	Fine Dust
	SFD	Super Fine Dust
	RD 1	Red Dust One
	GD	Golden Dust
	SRD	Super Red Dust

### GREEN TEA

Whole leaf	YH	Young Hyson
	FYH	Fine Young Hyson

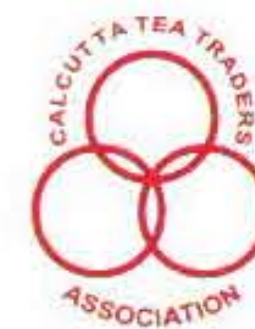
Broken	GP	Gun Powder
	H	Hyson
	FH	Fine Hyson

Fannings	SOURCE	Soumee
Dust	DUST	Dust

*One sip of this will bathe the drooping spirits in delight  
beyond the bliss of dreams*

~ Milton





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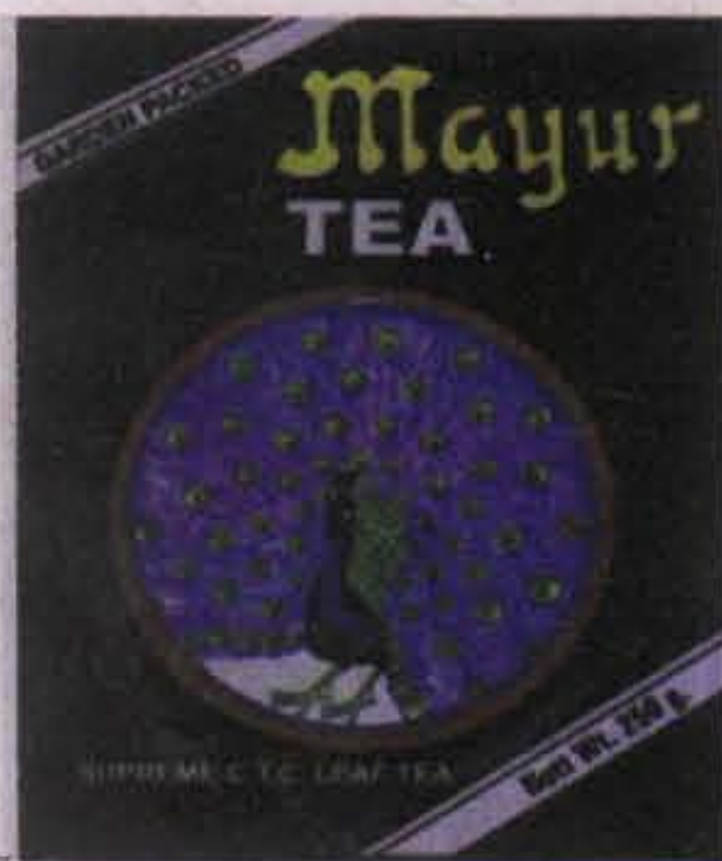
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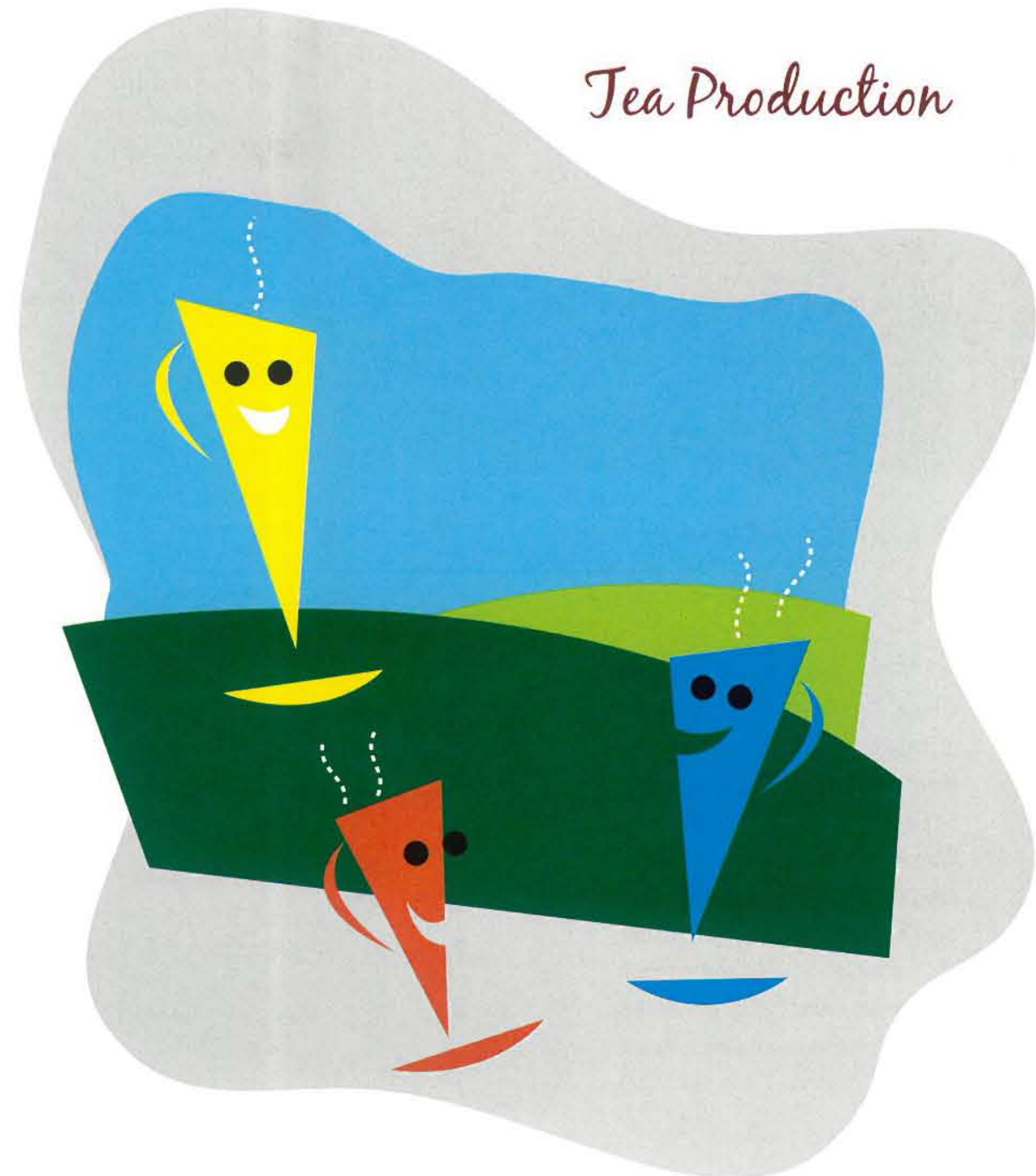
ARUN TEA ESTATE	ASSAM
BETJAN TEA ESTATE	ASSAM
BORKATONEE TEA ESTATE	ASSAM
DOORIA TEA ESTATE	ASSAM
DHERAI TEA ESTATE	ASSAM
GORUNGA TEA ESTATE	ASSAM
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## PACKET TEA



(Associated with Tea Growing for over a Century)

## Tea Production







## TEA PRODUCTION

### Tea is Discovered

Four thousand years ago, the Chinese discovered tea. But millennia later in the mid-nineteen hundreds the tea plant was for the first time commercially exploited. Then under the rule of the British, tea plantations were started. Soon tea estates spread to different parts of the globe, primarily in the tropical and equatorial latitudes, in flat areas as well as in high altitudes.



### India

With nearly 25,000 tea estates, India prides itself as the largest producer and consumer of tea. Almost all the tea produced is 'black tea'; although a small quantity of green tea is also produced. The finest tea comes from the hills of Darjeeling (alt. 6,000 ft.), where there are approximately 42,000

acres of tea cultivation, and the valleys of Assam. Darjeeling, however, represents just over one percent of all the tea produced in India. While teas produced from the plantations in Darjeeling are known for their flavour, Assam teas comprise strong and robust liquors.

### China

China stands next to India in tea production. A variety of tea comes from China, from where it had originated. Roughly two-thirds of China's annual production is green, catering to the popular palate of its people. The most popular variety of Chinese tea is called the 'Keemun', a black tea from Anhui province. Keemun is also used with a flavour as a base for iced tea in the USA.



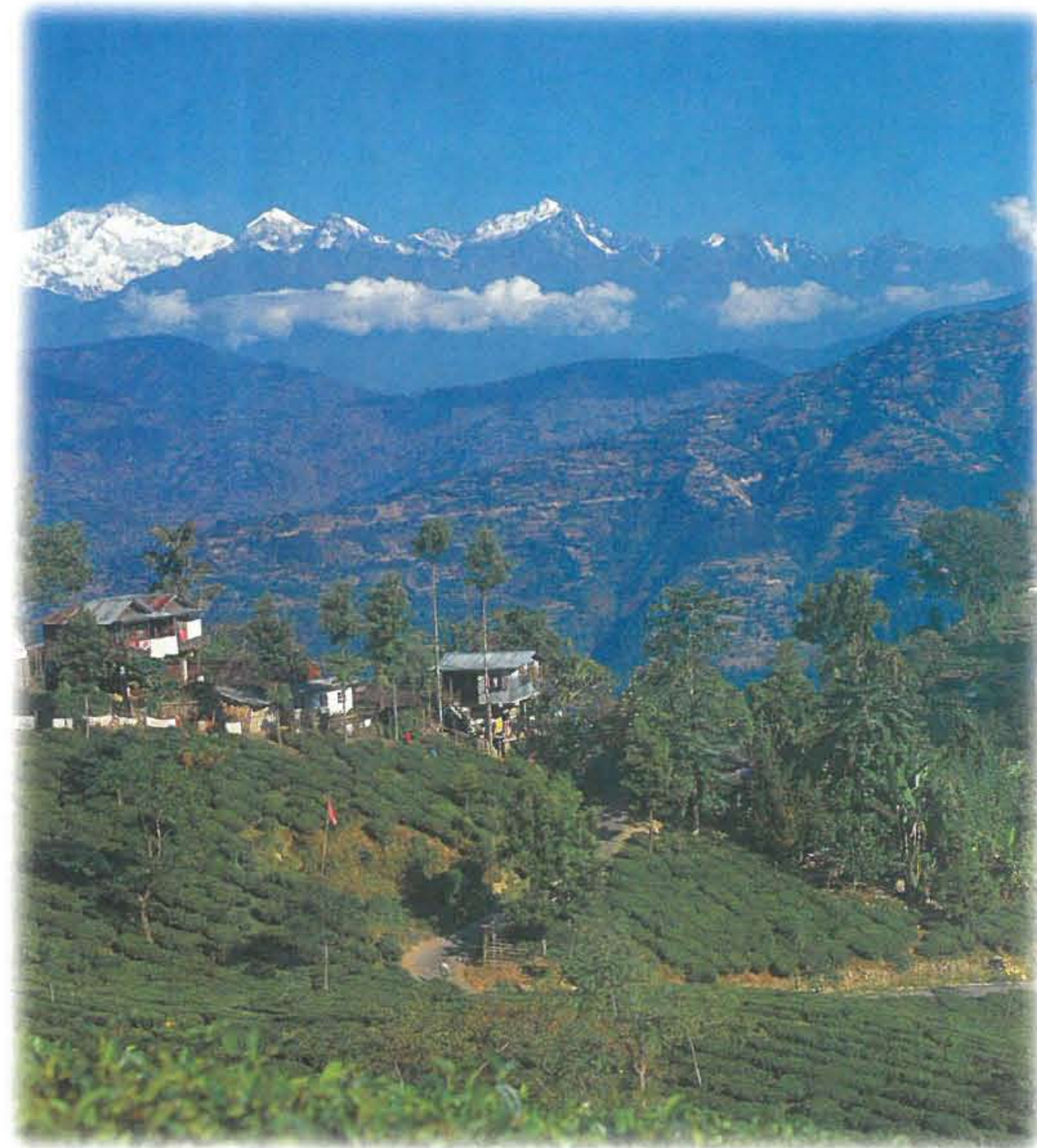
### Sri Lanka

Sri Lanka, the world's third largest tea producer, and the largest exporter, supplies nearly 25% of the world's tea from its 600,000 acres under tea cultivation. Sri Lanka produces black tea, which has brightness and flavour. 40% of Sri Lanka's tea estates are located at an altitude of 4,000 ft.





Calcutta Tea Traders Association



### Major Tea Growing Areas in India

The major tea growing areas in India are located in the Assam Valley, Cachar, Darjeeling, the Dooars in North Bengal and Terai. These are popularly known as North India in tea parlance. Tamil Nadu, Kerala and Karnataka are known as South India. The major part of the production comes from Eastern and North-Eastern parts of India.

The popularity of tea drinking has also prompted other parts of India to set up plantation. Thus, states like Tripura, Arunachal Pradesh, Sikkim and Meghalaya have taken to tea cultivation. Experimental plantations are also on the cards in several other states under Government patronage.

(Based on the report "Tea : The Universal Health Drink" by R. S. Jhawar)



# INDIA : TEA GROWING AREAS



## Manufacturing

### Categorisation of Tea

Tea may be categorised on the basis of:

1. Origin of Tea – e.g., Assam in India, Hunan in China
2. Process – Orthodox, CTC, Legg-Cut.
3. Fermentation – Black, Oolong, Green.
4. Size of Tea – TGFOP, BOP, Dust

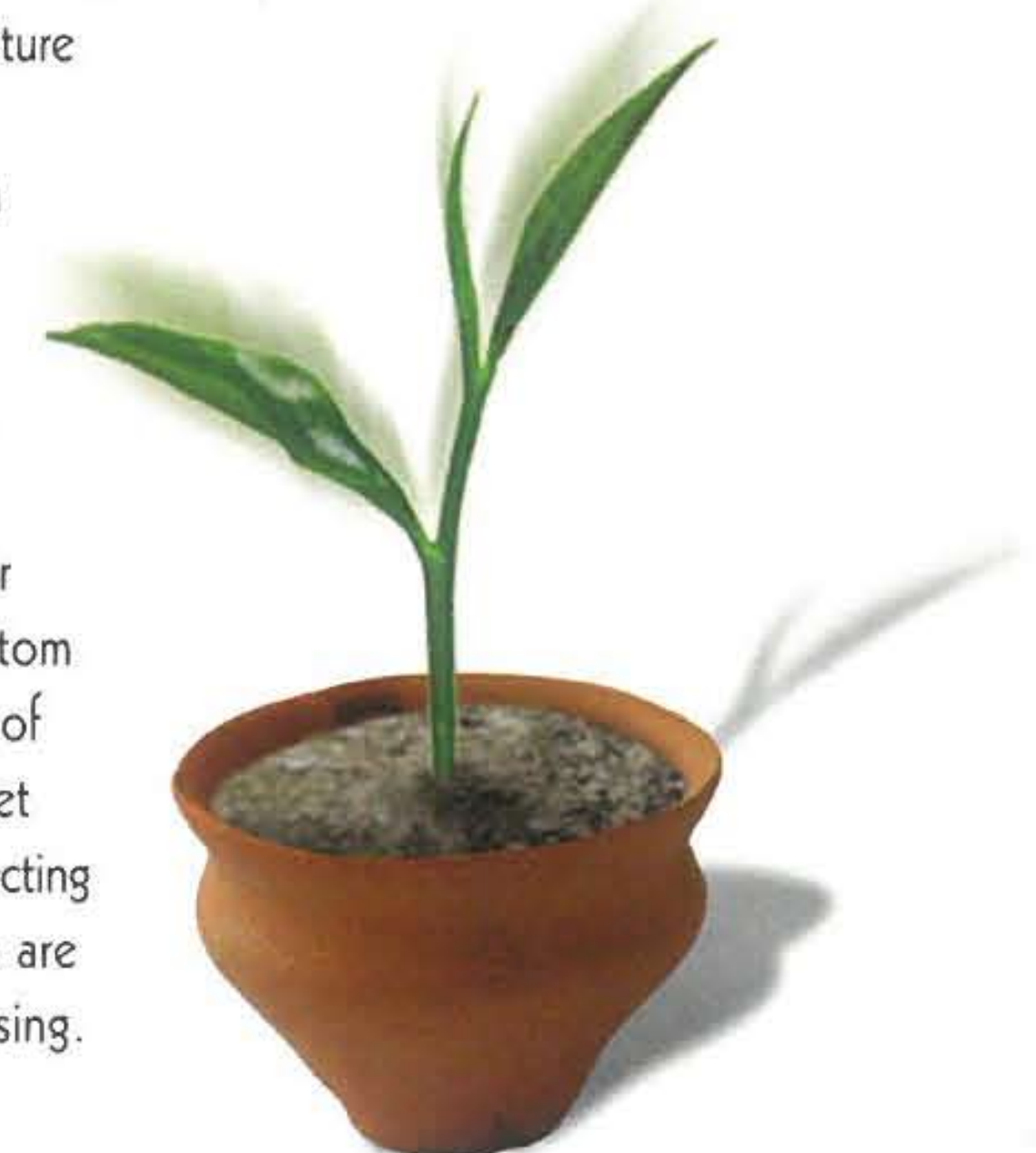
### The Plant

Tea is derived from the plant called *Camellia Sinensis*, an evergreen tree that grows in sub-tropic and tropical regions from sea level to over 6,000 feet. The tea plant has mainly two subspecies: *Camellia Sinensis Sinensis* (a native bush of China which can withstand cold climates) and *Camellia Sinensis Assamica* (the type of tea grown mainly in tropical countries, including India). There are many different kinds of tea grown in different regions of the world, which varies owing to soil and climatic conditions and method of harvesting. Scientists are known to have identified over 80 species of the *Camellia* genus with more than 2,000 varieties of tea.

For commercial plantation, new plants are grown from seeds or clones. They are nurtured in the nurseries for a year or two and then transplanted

into the fields. For commercial production, the tea bushes are pruned to about 2-3 feet in height to ensure easy plucking and skiffing by workers.

The total time required for a tea bush to be mature for plucking is between three to five years, depending on the climatic condition. The tea comes from the tender leaves of the plant and is manually plucked by experienced hands looking for the “two leaves and a bud”. Once plucked, the leaves are placed into baskets carried by the workers on their backs. Proper care is taken to see that the leaves at the bottom of the basket are not crushed by the weight of the leaves above, because once the leaves get bruised, the breakdown of enzymes begins, affecting the quality of tea. After plucking, the leaves are quickly transported to the factory for processing.







The fields have to be kept clean, well fertilised manually with good drainage system and application of proper hygienic pest control measures. Trees are planted for providing shade in between the rows of tea bushes to avoid impact of excessive sun rays.

The productive life of tea bushes is about 50-60 years. Thereafter, productivity and yield tend to decline. The bushes must then be uprooted, the soil needs to be rejuvenated, and thereafter replanted. The cycle is about 5-7 years. From the time of the planting, it takes about 3-5 years before the new tea bush starts giving yield.

### Types of Tea

Tea can be classified according to the country of origin, the size of the processed leaf and more specifically, by the type of manufacturing process followed. The three major categories



resulting from different manufacturing processes are Black Tea, Green Tea and Oolong Tea. While, Black Tea is widely used in India, Green Tea is popular in China, Japan and Taiwan. Oolong is mainly produced in China and Taiwan. Small quantities of Green Tea and Oolong are also produced in India and Sri Lanka.

### Processing different types of tea

**Black Tea:** By far the most popular, Black Tea is produced in the largest quantities among the three varieties is Black Tea. The manufacturing process includes two basic methods – “Orthodox”

and “CTC” (Crush, Tear and Curl). All Black Teas, both orthodox and CTC, go through four basic stages – Withering, Processing, Oxidation and Firing.

**Withering:** A process to reduce the moisture content and to allow some chemical changes to take place in the green leaf by passing warm dry air over the tea leaves for about 18-24 hours.

**Processing:** For “Orthodox” type of tea, the leaves are then rolled in a machine that twists and breaks the leaves to release the natural chemicals that later react with oxygen in the air and give the tea its characteristic aroma and taste. For the “CTC” types, the leaves are passed through a CTC machine which crushes and breaks the leaves.

**Oxidation:** The leaves are then exposed to the atmosphere and allowed to oxidise, when a series of chemical reactions takes place. This produces the strength, colour and aroma associated with Black Tea.







## Black Tea Manufacture



**Drying:** The process of oxidation is stopped at the required level by a process called 'firing' in hot air dryers. The leaves are allowed to retain 3% moisture.

**Sorting:** The dried leaves are then sorted according to size, thereby forming various grades – BOP (Broken Orange Pekoe), BP (Broken Pekoe), Dust, etc.

**Green Tea :** Green Tea has light, weak, brownish-green liquor and generally has a somewhat astringent or pungent flavour. The stages of manufacture of Green Tea are:

**Steaming :** The fresh green leaves are steamed to kill the oxidising enzymes present in them, allowing the final product to stay green.

**Processing:** The steamed tea is then alternately rolled and dried till it becomes dark green.

**Drying:** The processed leaf is dried, but allowed to retain 3% moisture.

**Oolong Tea:** Oolong tea is often called semi-fermented or semi-oxidised tea. The time of picking is crucial for Oolong Tea – the leaves should be neither too young nor too mature.

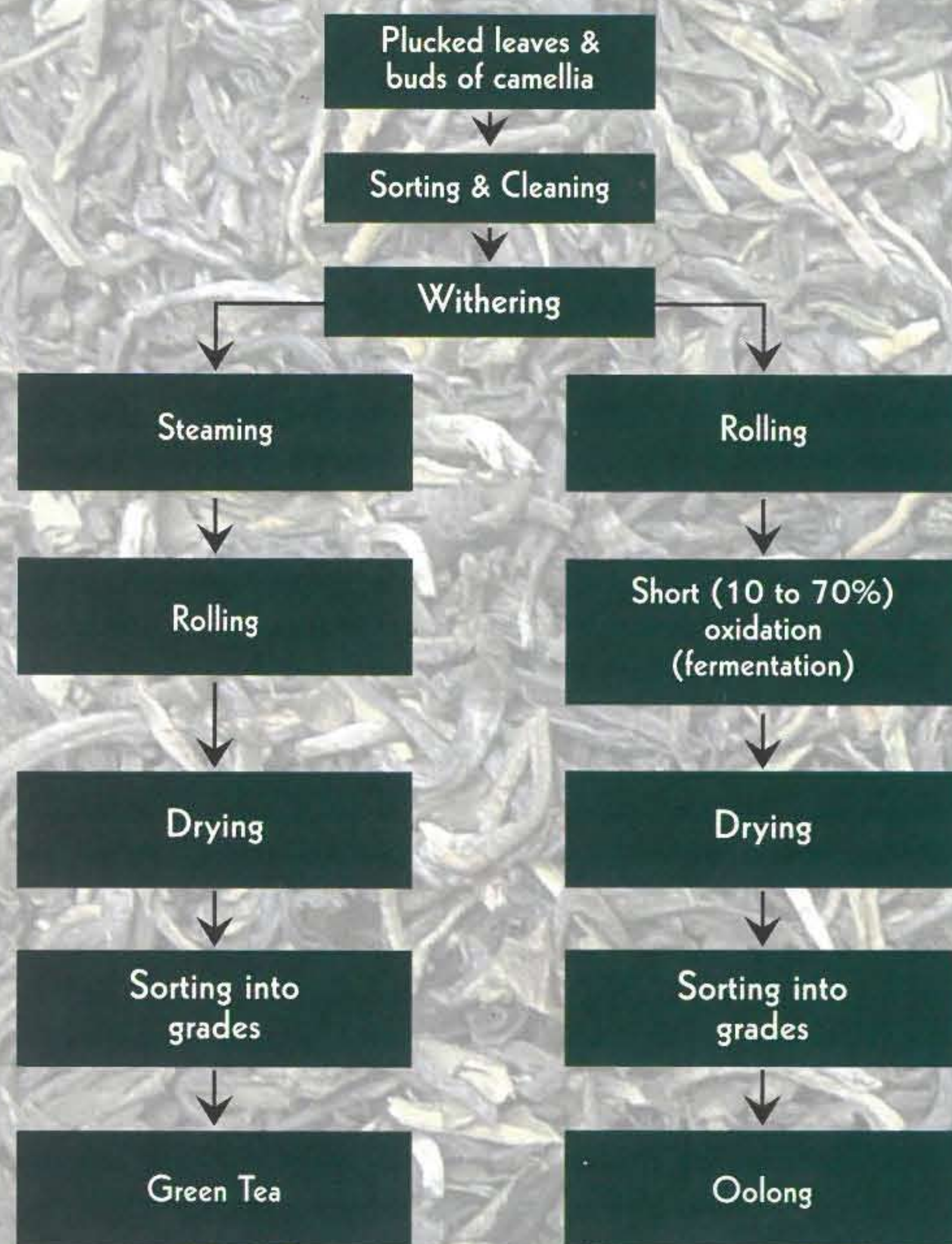
**Processing:** Immediately after plucking, the tea leaves are allowed to wilt for four to five hours in direct sunlight or in warm air inside the factory to remove some of the moisture content. The leaves are then rolled and allowed to react with oxygen in the air. The colour of the leaves change to reddish brown and has a fragrance.







## Green & Oolong Tea Manufacture



**Drying:** The processed leaf is heated to stop oxidation and allowed to retain 3% moisture content.

### Some Other Varieties of Tea

Among the other varieties are: "Organic Tea", "Decaffeinated Tea" and "Flavoured Tea".

**Organic Tea:** Organic Tea is free from chemicals and grown in an environment-friendly ideal condition. Cultivation of organic tea is complicated and governed by international certification bodies which carry out regular checks on the plantation, soils and the processing. Although production of Organic Tea commenced only recently in India, the country has emerged as the largest producer of organic tea in the world.

**Decaffeinated Tea:** A small percentage of people prefer to have decaffeinated tea. Researchers are still trying to find out the best method to remove the caffeine content. Use of carbon dioxide in the process is by far considered the best of the three available methods. Methylene chloride is the cheapest and can be removed easily after decaffeination. Germany and the U.S.A. have, however, banned all tea products where methylene chloride has been used. Some scientists therefore believe that an alternative method with the use ethyl acetate is perhaps the best for the decaffeination process. However, a small percentage of caffeine continues to remain in the Tea in all three processes.

**Flavoured Tea:** The present craze among a section of the youth, especially in the United States, is drinking flavoured teas. A large number of such flavours like jasmine, rose and vanilla are available in the market. While it satisfies the consumer to some extent, the medicinal value or otherwise of the flavoured tea is, however, to be established.

**"Masala" Tea or Spiced Tea:** This tea is used in India by a section of the people, especially in Northern India. However, of late this particular variety has travelled to the United States and found its place in some restaurants as an exotic item. Brewed in milk and water; spices used for this type of tea are usually cardamom, pepper, cinnamon, clove or ginger. Spiced tea makers claim that different spices provide the required medicinal value to the user. It is common to use ginger or clove in tea in India to bring relief from cough and cold. Spice tea also gives warmth during winter days in high altitudes like Kashmir or the foothills of the Himalayan region.



**Herbal Tea :** Herbal tea is not TEA in the real sense. It is an extract of herbs other than camellia sinensis and is recommended in the "Ayurvedic" system of treatment for some ailments.

### How to Make A Good Cup of Tea

There is no hard and fast rule as to how you should make your cup of tea. The process of tea-making varies from person to person and depends on the tea drinker's personal taste.





There are, however, legends of tea ceremonies in Japan where an elaborate process is followed. Although we know that the art of growing, processing, brewing and drinking tea evolved in China, the Chinese never developed any elaborate tea rituals and ceremonies. They are known to follow the "Cha Ching" – the treatise on tea making enunciated by the Tang dynasty scholar and poet Lu Yu. In this book, Lu YU describes the "proper" way of making tea with the water to be used and the "ideal surroundings in which to sip the heavenly nectar". The "Cha Ching" goes on to say that "you need a smokeless fire of charcoal from olive pits. Then one must get fresh water from a slow-moving mountain stream and boil it. ... pour the water over a quarter of an ounce of tea leaves in a white porcelain cup. The cup must be fine enough to hold the heat and not burn the hand that holds it. Then you should throw away that water, add more water to the cup and sip it slowly."

Legends apart, experts in tea today recommend a few golden rules for brewing of perfect tea. Different types of tea need different water temperatures and different infusion times. Use only good quality tea. One small tea spoon of tea per person is a rough guide, although more or less can be added to suit personal taste. Use only freshly boiled water to pour over the tea leaves and infuse for three minutes. Add milk and sugar to taste. Green tea should always be made with water that has been boiled and allowed to cool for a few minutes.

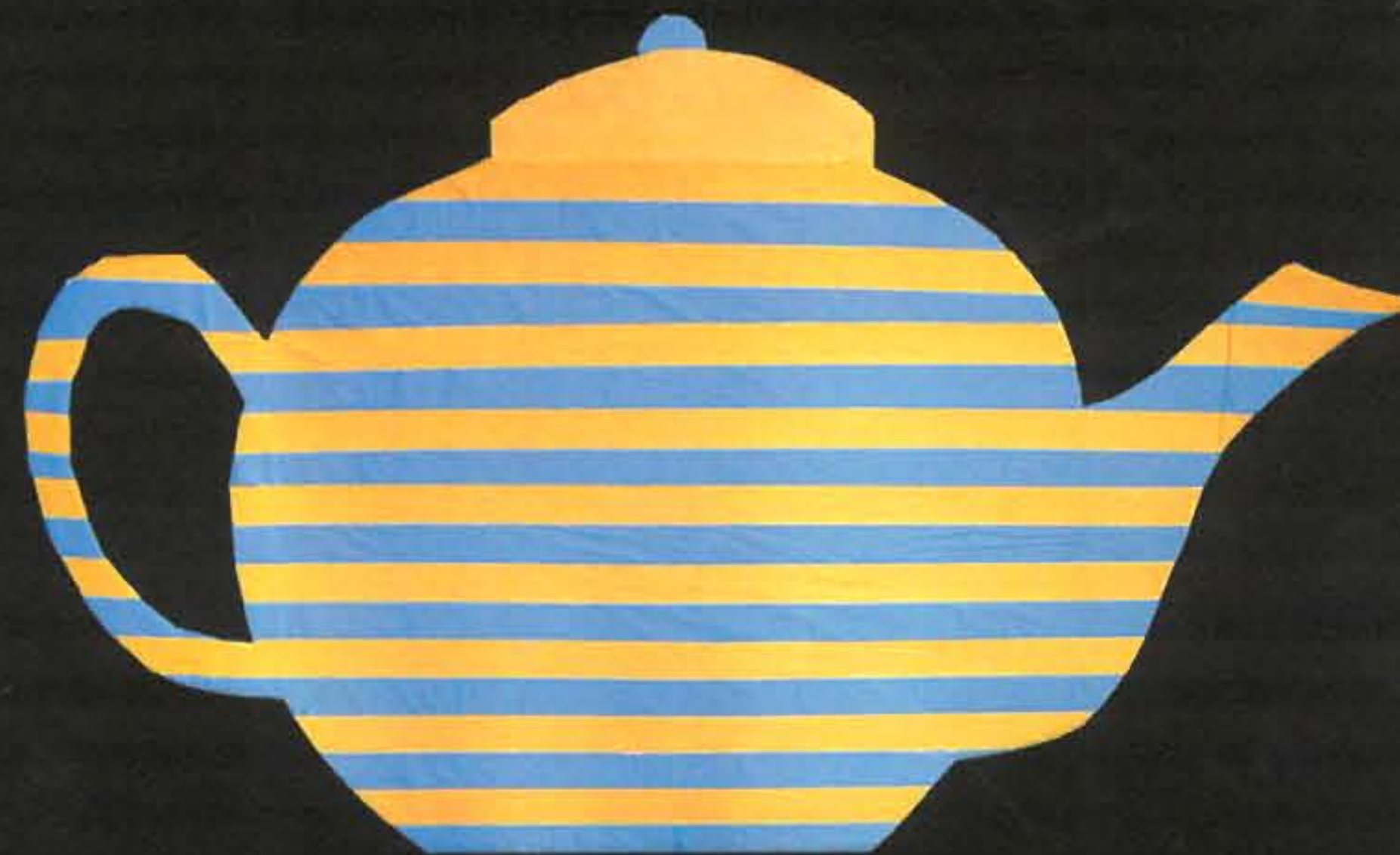
### Tea Drinking Around The Globe

In India, any time is "tea time" and any place a "tea shop". Although it is often brewed and served with milk and sugar separately, it is also boiled in milk and water, and at times with spices and sugar for flavour and taste. The taste of tea differs from the road side tea shops to star hotels, mostly because of the way it is made. While some prefer it black, some take it with milk and sugar. Some others like black tea with a dash of lemon.

"Iced tea" is popular in America, although the taste of tea is somewhat lost in this process. In Tibet, green tea is boiled in water, strained into a churn, and mixed with goat's or yak's milk, butter and salt. In Iran and Afghanistan people drink both green and black tea. In Egypt, tea is brewed strong and served in glasses without milk, sometimes flavoured. Russians drink both green and black tea with a pinch of sugar. In Turkey, mostly black tea is served. Africans prefer strong brewed tea and drink it with milk and sugar like Indians.

(Text based on "Tea: The Universal Health Drink" by R.S. Jhawar)

*"Tea is drunk to forget the din of the world"*  
~ Tien Yiheng



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*"Strange how a teapot can represent at the same time  
the comforts of solitude and the pleasures of company."*

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# A DIAGRAMMATIC REPRESENTATION OF THE FLOW OF TEA FROM THE PRODUCER TO

# THE CONSUMER

## Current

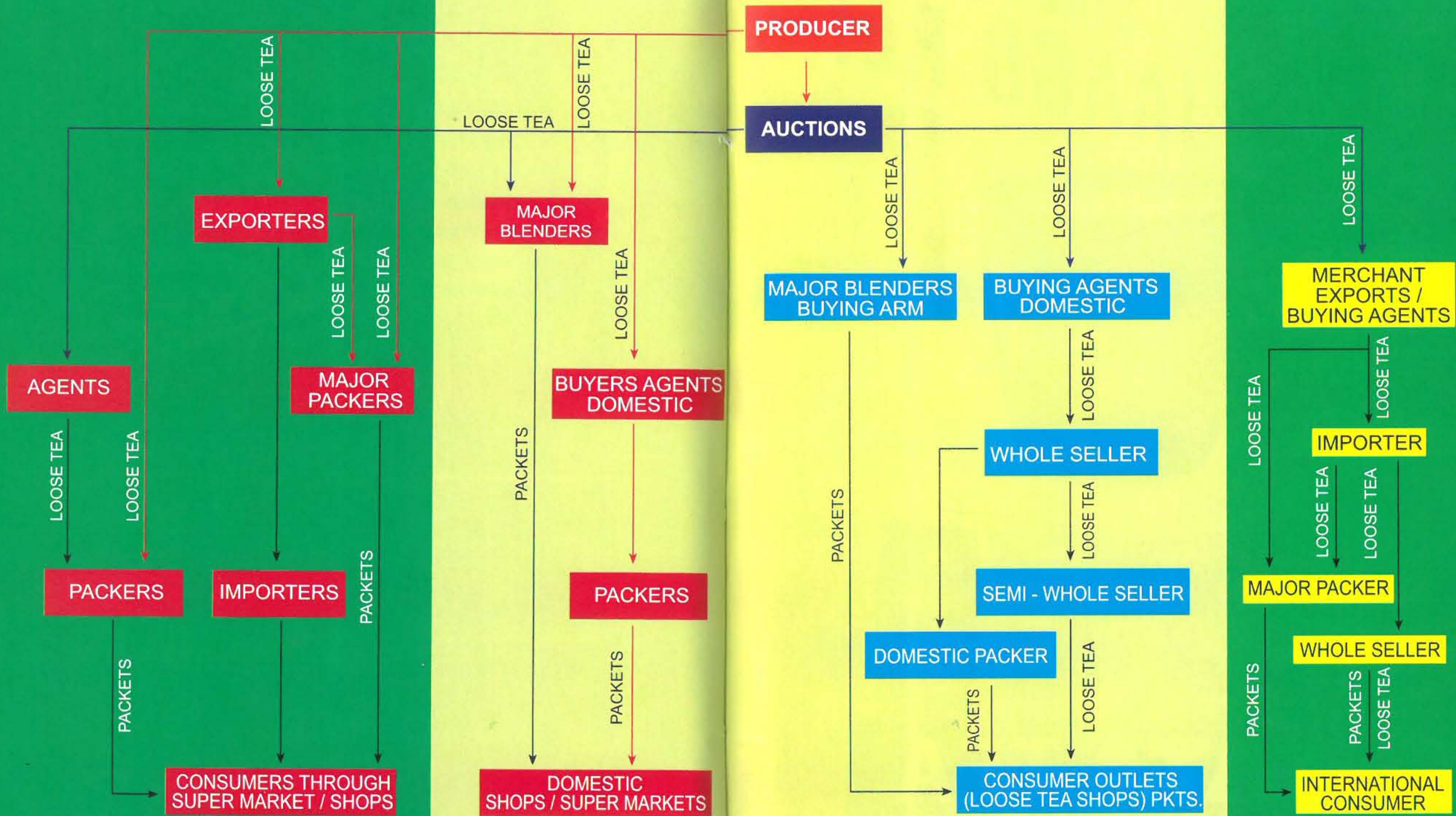
## Traditional

### International

### Domestic

### Domestic

### International



International Domestic

The Producer today accesses the

consumer through multiple channels



**HAR SUBAH  
SIRF UTHO MAT.  
JAAGO RE!**

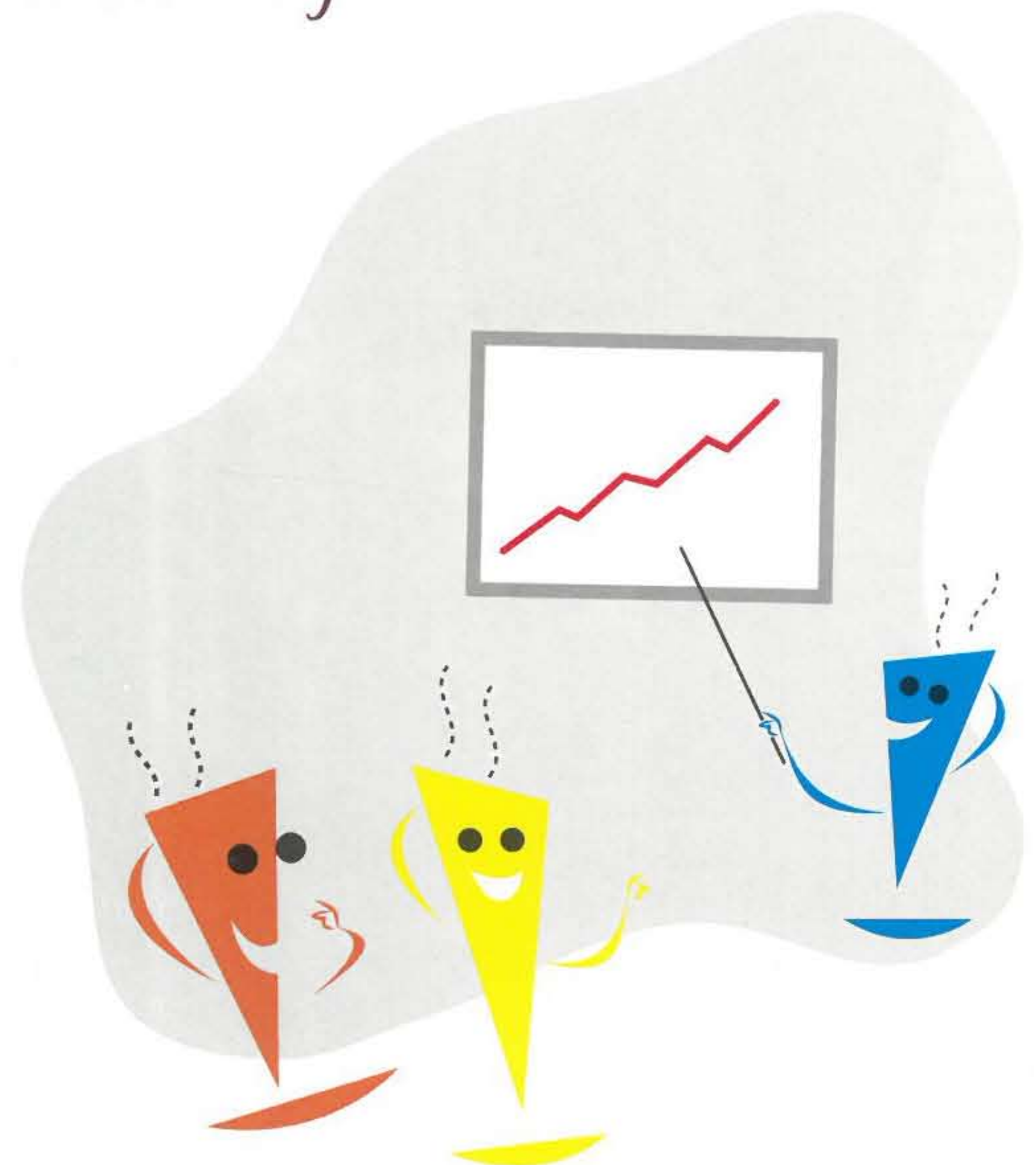
**TATA TEA**

[www.jaagoindia.org](http://www.jaagoindia.org)

The advertisement features a man holding a green cup of tea with the 'Jaago Re!' logo. Below the cup are four packets of Tata Tea: Gold, Agni, Premium, and Life. The background is a warm orange-yellow gradient. At the bottom, a crowd of people is cheering.



*Marketing*







## INDIAN TEA : THE CHANGING DOMESTIC SCENARIO



Over the next two decades the country's middle class is expected to grow from about 5% of the population to more than 40%. This will create the world's 5th largest consumer market. If India continues to grow at the current pace average household incomes will triple over the next two decades. The economic reforms began in India in early nineties and have substantially improved the country's well being. Contrary to popular belief rural India has benefited from this growth. Rural poverty has declined from 94% in 1985 to 61% in 2005. This will reduce further in the years ahead. Lets not forget only 29% of Indians live in the cities. The growth that has pulled millions of people out of the poverty line is also building a huge middle class with increasing purchasing power that will be concentrated in the urban areas. The country's urban population will expand significantly and that's the reason why the multinationals are looking at India as the land of opportunity.

Where does this place the tea industry ? The industry although agricultural was brought under the control of the Commerce Ministry. This was primarily because tea at one time was a major foreign exchange earner. The Tea Board was set up to assist in the development of the industry and to promote Indian Tea in the world market. Over the years however, tea was planted in Africa, Indonesia, Vietnam and a host of smaller countries. The new regions were able to supply tea at a cheaper price and soon Indian tea faced stiff competition. The increasing cost of inputs, the rise in administered costs and social cost gradually made Indian tea a high cost commodity. We were unable to compete inspite of a superior product. Consequently exports stagnated and are now shrinking.

	1998	2000	2003	2005	2006
Exports	210	207	174	199	219
Imports	9	14	10	17	24
Net	201	193	164	182	195

Another major reason for the shift in focus from exports was the belief amongst growers that increase in domestic consumption would escalate tea prices to comfortable levels even if exports fell. These assumptions went awry as apart from a few so called boom years in the eighties and early nineties tea prices hit rock bottom starting from the year 2000. The earlier boom years did more harm than good as it led to much complacency. Consequent to the signing of trade agreements imports of tea was allowed. Moreover, the massive increase in production in the Bought Leaf Sector from a mere 30 MKgs in 1998 to 120 MKgs now also contributed to the excess supply. Growth rate may be slower henceforth as land is getting scarce although new areas can always open up.

Statistics released by the Indian Tea Association clearly indicate that stock levels have depleted at the end of 2007. the Industry is expecting another boom year in 2008. We must however take a lesson from the past and initiate measures to sustain an increase in tea prices in the long term. This would mean preparing ourselves for exploiting the potential of the global market





place. These are enough clues to indicate that to maintain a healthy balance between supply and demand we must continue to export. Boosting exports will happen only if we produce higher quantity of Orthodox teas suitable to the intended markets. We must also target to export more lower priced grades both from North and South India. The major blenders/packeteers are always looking for lower priced teas to act as reducers of their blend cost. This is perhaps the only way to meet the challenge of low priced teas from China, Vietnam, Indonesia, Argentina and some of the African origin teas. The better quality CTCs have to face stiff competition from Kenya and hence increasing exports of this category would depend on how we can improve our productivity and lower cost of production.

The domestic market meanwhile shows promise. 2006 and 2007 witnessed some recovery of average price of tea. However, generally there was over supply particularly during the peak production months in North India i.e. Aug-Oct. During these months supply far exceeds demand with the resultant negative impact on sales, prices and cash flows. The tea industry needs seriously to wake up to the potential of the middle class. India is seeing rapid growth of its middle class which comprises approximately 50 million people, about 5% of the population. In another 15 years with the continuing rise in personal incomes and urbanization this will spur a tenfold increase enlarging to about 580 million or 41% of the population. The middle class will dominate the cities and we can see consumption habits changing fast with the advent of the modern format chain stores. The composition of their spending will

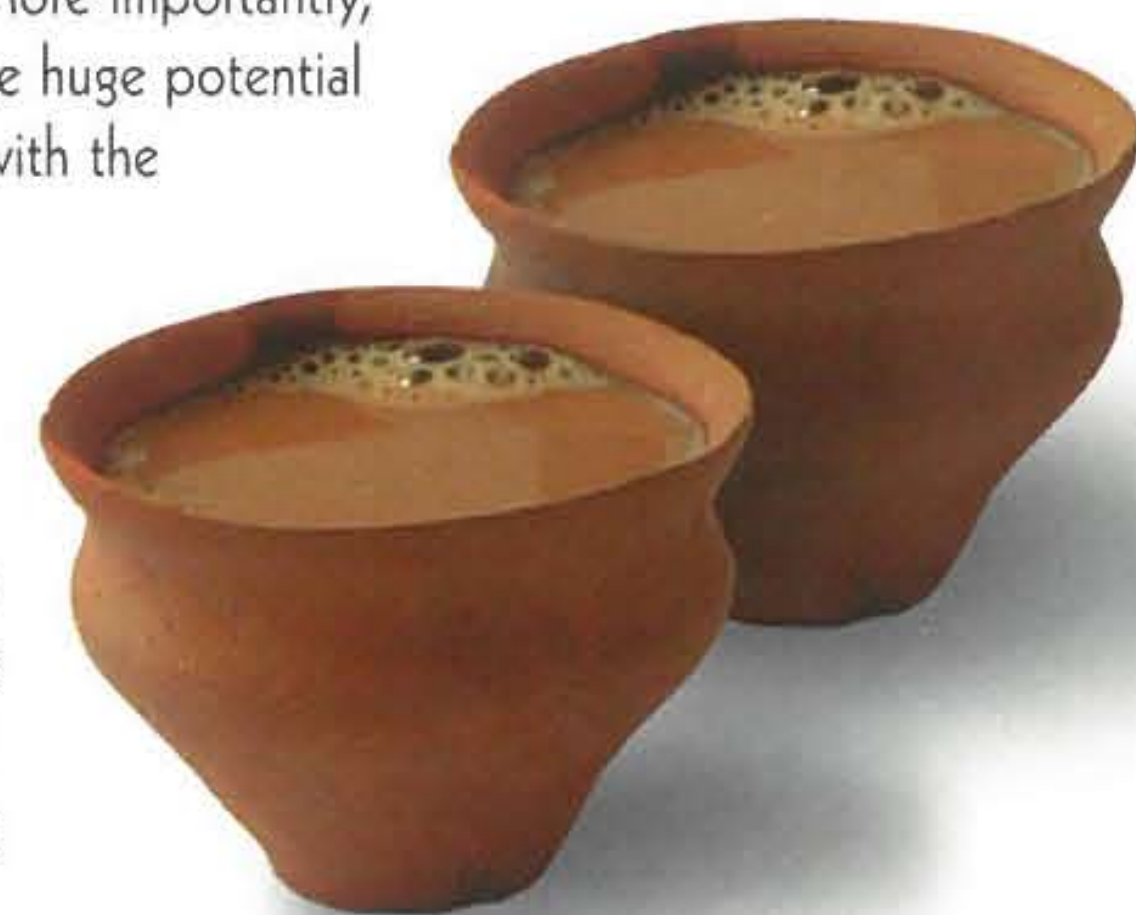
also change. However food and beverages by their very nature will remain the single largest category of expenditure. Expenditure on health, and healthy consumption, education, transportation, accommodation and communications will soar. For marketers this would mean understanding customer needs and aspirations and building strong relationships. Brands can achieve this, which

commodity cannot. It is an established fact that the shift from loose to packet tea has been significant in recent years. The packet tea share of the market in India stagnated below 30% for decades. With the activity of local and multinational players the packet tea share has now grown to around 55%. Even rural India is buying brands. Chain stores have made this possible.



There is also better acceptance of tea bags and other value added products as Convenience, Taste and Variety are sought after by the modern housewife as well as the office goer. The vending business catering to offices and markets has grown by leaps and bounds. It is no secret that Packet tea companies have fared much better than the tea growers. Retailing has proved more lucrative than manufacturing. More importantly, retailers are now better positioned to tap the huge potential since they have already built a relationship with the customer. They have also established distribution channels in a country as large as India.

In order to enjoy the fruits of the economic revival of India, tea producers need to learn to serve the customer end and build the value chain. This will bring growth in revenue and profits on a sustainable basis apart from adding value to the business.



## World

### Overview

The International scene however, is quite different. Unlike in India, tea is seen as less of a commodity. Hence branding and packaging play an important role in influencing consumer preferences. The convenience offered by tea bags makes it more popular particularly in the UK, Ireland, Canada, Australia and New Zealand. Flaky Fannings and Pekoe Dusts are popular grades in these markets for this reason.

Japan and Western Europe, particularly West Germany, are extremely discerning and quality conscious markets. High quality Darjeeling and Orthodox sell in West Germany while the Japanese prefer flavoury Darjeelings, Nilgiris and green teas.

The USSR is a major tea importer, consuming large quantities of Darjeeling and Orthodox varieties which are at times blended with their own produce.

Tea in the USA is mostly drunk as a cold beverage and hence thin-liquoring varieties are preferred. The Egyptians drink tea with sugar but without milk and like a dark liquor.

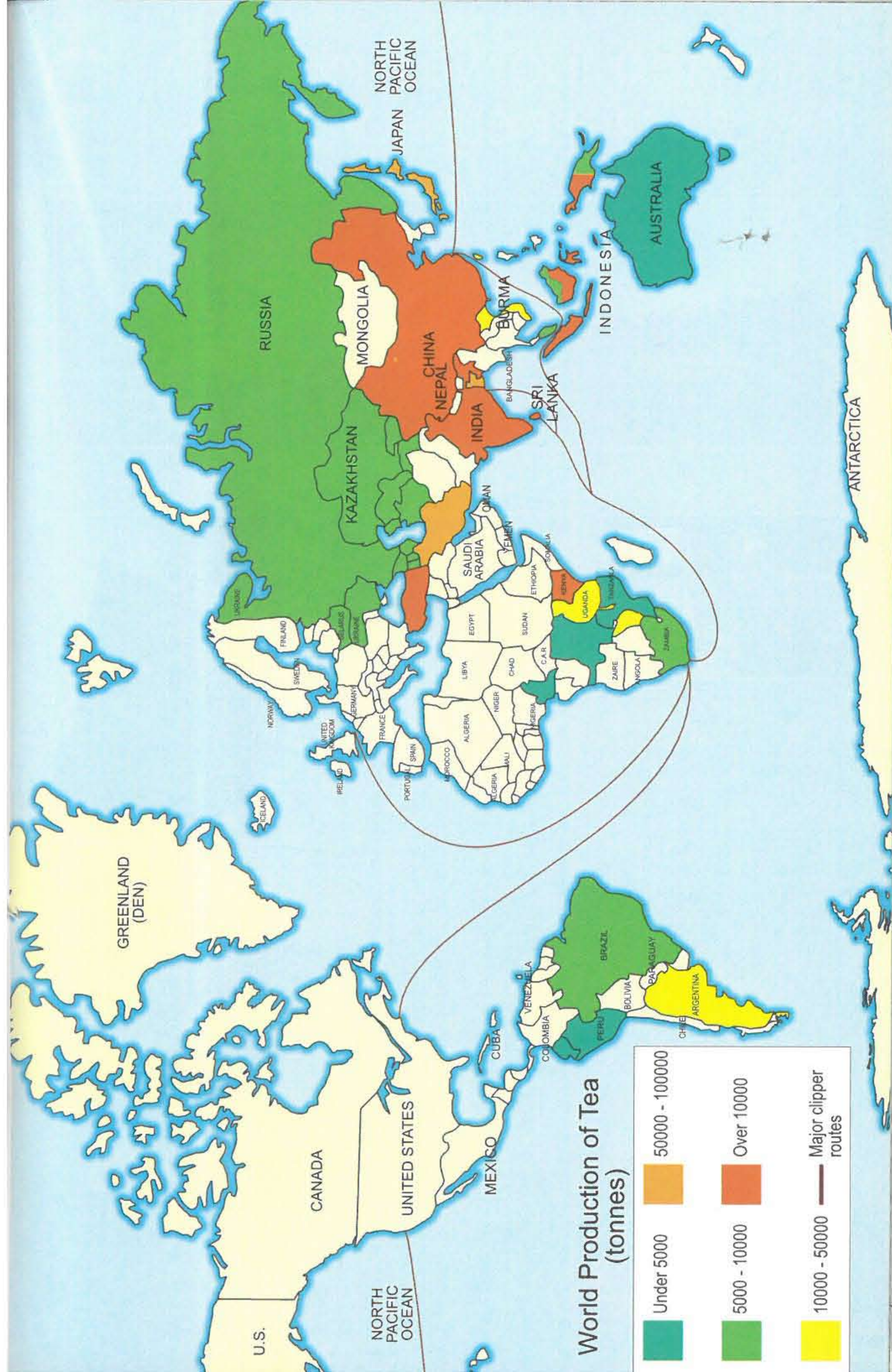
Ultimately consumers the world over are looking for a good cup of tea – whichever way each individual perceives it. One common trend that emerges in spite of the diversity of consumer tastes is the desire for quality. Tea-drinkers across the world are looking for a better cup and are prepared to pay the price for it.





Tea intake patterns also vary considerably in different countries. The table below and the map illustrate.

Country	Tea Consumption (m.kg)	Population (million)	Per capita consumption (kg/head)
<b>High (over 1.0 kg)</b>			
Afghanistan	33	31	1.06
Iraq	27	27	1.03
Ireland	9	4	2.25
Libya	7	6	1.4
Morocco	49	33	1.48
New Zealand	4	4	1.00
Russia	234	143	1.64
Syria	26	18	1.44
United Kingdom	128	61	2.10
<b>Medium (0.50-1.0 kg)</b>			
Australia	14	20	0.70
Canada	13	33	0.72
Egypt	76	79	0.97
Iran	43	69	0.63
Malaysia	14	24	0.58
Pakistan	139	165	0.84
Poland	31	39	0.81
<b>Low (0-0.50 kg)</b>			
France	14	61	0.23
Germany	19	82	0.23
Netherlands	7	16	0.43
South Africa	18	44	0.40
Sudan	13	41	0.31
United States	100	298	0.33





# EVERY MORNING WE SERVE INDIA 1.80 CRORE CUPS OF TEA



World class - State of the art Wagh Bakri factory



Fully automated carton packing machine



Tea bag packing machine



Corporate office

Yes, Wagh Bakri wakes up the nation with 1.80 crore cups of tea everyday. This is because we believe that our teas certainly dissolve differences between the bold and the meek, the rich and the poor, the strong and the not so strong.

Shri Narandas Desai acquired a tea plantation in South Africa in the year 1880. After returning to India from that country, with his 3 sons he developed tea wholesale and retail business in Gujarat. Since then the Desai family has inherited this business and has improved its style in last 125 years. Brand "Wagh Bakri" was registered in the year 1934 and the group entered the packaged tea business in 1980. Today we stand among the top three tea companies of India in the category of packaged tea, with an impressive turnover of over Rs. 250 crores. The group has ISO 9001-2000 Global Standards Certification & HACCP from an international agency and certification from Lacon GmbH for organic teas.

The group's techno savvy plant is spread across 35,000 sq. yards and to add value now it is being expanded by 15,000 sq. yards. It is supported by skilled professionals, and an array of technologically advanced machinery which helps in offering finest tea blends of the best quality to the consumers.

Together these things mark a beginning of the dream to wake up the world every morning and not just a nation.



Tea Group



Certified by Lacon GmbH



**GUJARAT TEA PROCESSORS & PACKERS LTD.**

Wagh Bakri House, Opp. Parimal Garden, Ambawadi,  
Ahmedabad - 380 006, Gujarat, India.

Tel.: +91-79-6606 6222 • Fax: +91-79-2640 5050

e-mail: corp@wbtea.com • Website: www.premiumtea.com

Order online on [www.buytea.com](http://www.buytea.com) to enjoy our teas



## Packaging







## 'PACKING' PUNCH

1. A warranty certifying that the goods mentioned in the invoice are of the nature and quality which they purport to be and conform to the P.F.A act, 1954 (Act No. 37 of 1954) must be clearly mentioned in the Invoice Papers.
2. Arrival and weighment reports, accompanied by invoice copies for all teas meant for cataloguing for the auctions must be sent to the office of the auction organiser i.e. CTTA (Kolkata), GTAC (Guwahati), STAC (Siliguri) by the warehouse. Such AWRs will be stamped with the receiving date, given a serial number and handed over to the broker concerned. As per existing norms, arrival reports received without the relevant invoice papers, will be withheld from printing. It is also important to ensure that both the invoice and AWR carry prominently, the name of the broker, to ensure correct and timely printing.
3. Standardise grade nomenclature. Please ensure that brackets '()' are avoided as ad hoc addition/ omission of these causes confusion and mismatching of invoices by computers.
4. Tea Board norms regarding minimum size of lots must be strictly adhered to.
5. In order to avoid claims/complaints with regard to variation in quality from package to package, special attention must be paid towards bulking of invoices prior to packing, particularly in case of large breaks.
6. Factories must take special care, with the use of mag nets, bulking sheets etc. to ensure that foreign matter does not get mixed with tea.
7. Ensure that all marking/stencilling of packages is done in non-toxic liquid black ink.
8. To avoid wrong delivery and/or delay in delivery, particularly in the case of jute bags, all details must be marked/stencilled/pre-printed clearly with non fading ink. The Garden Mark, Invoice. No. and Grade must be marked on the bottom gusset of bags/sacks.
9. It is important to bear in mind that pesticide residue limits are strictly monitored in the EU, Japan and the USA, as well as other export destinations and these limits are getting increasingly stringent. Adverse findings would have an immediate effect on the acceptability of such teas at these destinations. Lack of support from the buyers, of teas that do not conform is a very real danger. It is equally important to ensure that pesticide residue limits as prescribed under PFA act are adhered to at all times.
10. Teas once printed, cannot be withdrawn from Sale, with the exception of Darjeeling teas. In case teas withdrawn earlier, is to be re-offered in auctions, the relevant Withdrawn Delivery Order should be returned to the auction organiser for onward transmission to the broker.
11. It would be appreciated if muster samples are sent along with a list giving details.







## RECOMMENDATIONS SEASON 2008-2009

As in the past, we would like to highlight certain important points to be borne in mind for the smooth movement of teas through the North Indian Auction System in the forthcoming season.

### 1. INVOICE PAPERS

Receipt of Invoice papers is mandatory for the printing of teas. Arrival & Weighment Reports that are not accompanied by corresponding Invoice papers, complete in all respects, will be withheld from printing in our catalogue as per existing norms.

- a) The invoice must mention the following details:
  - i) Garden Mark.
  - ii) Invoice Number.
  - iii) Grade & number of packages of each grade.
  - iv) Gross, tare and nett weight of each package in each break.
    - a. Total gross and net weight of each break.
    - b. Running package numbers of each break.
    - c. Size of packages used in each break should be clearly indicated.
    - d. Type of lining used in packing each break also should be clearly indicated.
    - e. Year of manufacture.
    - f. Central excise gate pass number and date.
    - g. BIS (ISI) approved or unapproved chests.
  - v) It is important that the undernoted warranty is clearly mentioned in the Invoice paper, failing which the tea in question can not be catalogued.

"I / WE HEREBY CERTIFY THAT FOOD MENTIONED IN THIS INVOICE IS/ARE WARRANTED TO BE OF THE NATURE, AND QUALITY IT PURPORTS TO BE & CONFORM TO THE P.F.A. ACT, 1954" (ACT NO. 37 OF 1954.)

This is a mandatory requirement as per law; failure to comply will invite stringent penalties.

- vi) For invoices packed in bags, the invoice must mention whether heat-sealed/machine stitched or not. In Guwahati, the GTAC has ruled that non heat-sealed/machine stitched bags will be declared as 'weak' and therefore attract an allowance equivalent to the value of 250 gms. of tea per bag.
- vii) It is suggested that the invoice documents for separate categories have the following colour coding in order to expedite printing.

Orthodox	....	Pink
CTC	....	White
Darjeeling	....	Green
All Dusts	....	Blue

Invoice copies should be computer generated on standard computer stationery, the categories i.e. Orthodox, CTC, Darjeeling and Dusts should be clearly indicated on the top.







- viii) The following prefixes should be mentioned against invoice numbers and this is of particular importance for gardens on dual manufacture:

Orthodox	....	O
CTC Leaf	....	C
Darjeeling	....	DJ
Orthodox Dust	....	D(O)
CTC Dust	....	D(C)

Orthodox Dusts should carry the prefix (O) against the grade to differentiate the teas from CTC Dusts.

- ix) Separate invoices should be prepared for CTC and Orthodox and these should not be clubbed together in one invoice paper.

- x) We suggest the following abbreviations should be used as suffixes for Darjeeling grades.

China	....	CH
Clonal	....	CL
Special	....	SP
Muscatel	....	MU
Silver Tip	....	ST
Tippy	....	TP
Vintage	....	VI
Wiry	....	WI

- xi) We would also recommend that brackets '()' are avoided as ad hoc addition/omission of these causes confusion leading to mismatching of invoices by computers.

## 2. ARRIVAL & WEIGHMENT REPORTS / WAREHOUSING

The CTTA has approved of and circulated to all Warehouse keepers, a format for the arrival & weighment report, with the aim of standardizing this particular document. Sellers are earnestly requested to ensure that their warehouses adopt this format, if they



are not already doing so. Warehouses must ensure AWRs are made strictly after weighment of teas.

With effect from 1<sup>st</sup> September 2004, AWRs should be delivered to auction organiser's Office by the registered warehouses only and not by the sellers.

The Organisers office will receive AWRs only between 9 am. to 5 pm. on all working days and upto 1-00 p.m. on closing days.

Warehouses should strictly adhere to all auction committee rules and regulations regarding block/high stacking, delivery of teas against valid delivery orders, check weighment facilities as well as heat sealing/machine stitching facilities for teas packed in bags/paper sacks etc.

## 3. CATALOGUE CLOSING TIME

For the auction centers in North India, the catalogue closing time during the season (i.e. April to November) shall not exceed 19 days. For the remainder of season (December to March), the auction organizer has the option of regulating the quantities on offer or provide the producers the flexibility of specifying the Sale number to catalogue their teas, subject to a minimum of 19 days. During peak season CTC and Dust offerings in the North India auction centers are regulated as follows: Guwahati - 1.30 lakh packages, Kolkata - 1.10 lakh packages and Siliguri - 0.90 lakh packages. These regulations are being applied to fresh arrivals only.

## 4. MARKING

Stencilling on the packages, should be proper and clear, for easy identification of teas at the warehouses. Neat and attractive markings, go a long way in improving the goodwill of the estate with the buyers.

Use of 'HAND HELD ROLLER' marker on paper sacks, instead of traditional stenciling with a brush, greatly improves the quality of marking.







In the past seasons, it has been observed that most cases of wrong deliveries, or delay in deliveries of jute bags, occurred due to insufficient markings on them.

As the number of polythene-lined jute bags for packing tea, is increasing rapidly, it is necessary to take immediate steps to minimise wrong deliveries and delay in deliveries arising from insufficient or illegible markings. All packages must have the following clearly stenciled on them: -

- i) Garden Name           \* iv) Gross Weight
- ii) Invoice No.           \* v) Net Weight
- iii) Grade               \* vi) Tare Weight

\* (The abbreviations G, T, N should be avoided & kg must be stenciled after the weight in figures)

- vii) No. of Packages in the break
- viii) Running / Serial No. of the Packages
- ix) Season / Years of Manufacture

In addition to the above, under the Standards of Weights & Measures (Packaged Commodities), the markings (declarations) required are similar to the marking required under the PF A rules in the case of wholesale packages. Certain additional declarations are required for retail packages.

The following markings must appear on all bulk tea packages:

1. The Words "WHOLESALE PACKAGE" must be marked on top of the package.
2. The word "TEA" should be marked on all packages to indicate the contents of the packages, in addition to the grade of tea.
3. Complete address of the registered office and that of the estate / factory must be marked.

We have pointed out earlier, that certain overseas buyers of Darjeeling, CTC and Orthodox teas would not purchase tea packages stenciled with colours other than black. We would therefore, recommend that all stenciling of exportable teas, are done in non-toxic liquid black ink (coates/Rhino) in order to receive their support in the forthcoming season. This should include company logos, names of warehouses, "Product of India" etc.

## 5. PACKING

- a) According to the directives issued on 6th January, 2003 by the Chairman, Tea Board, the minimum size of lots for estates (except Darjeeling) producing over 2.5 lakh kgs. annually should be as under:

For CTC teas (excluding BPS, the smallest Dust i.e. the CD grade and Secondary grades), 20 packages minimum per lot, for the - manufacturing period June to December only. For the manufacturing period January to May the size of lots may be smaller, as long as it is not below five packages (for printing in the main catalogue).

For Orthodox tea, the minimum size of lots for non-tippy Orthodox tea shall be as under, for the manufacturing period July to November only:

TGFOP	: 15 packages minimum per lot
GFOP	: 15 packages minimum per lot
GFBOP	: 20 packages minimum per lot
FBOP	: 20 packages minimum per lot
GBOP	: 20 packages minimum per lot

Tippy Teas, BPS, Fannings, Dusts and Secondary Grades of Orthodox Teas are exempted from the above norms. For the period December to June the size of lots may be smaller, as long as it is not below five packages (for printing in the main catalogue).

All lots which do not comply with the above rules, will be offered in the supplement section of the catalogue.

- b) We would recommend larger breaks as they minimize 'sampling loss'. However, despatches should not be delayed in order to achieve this, particularly in the first flush period. The Tea Board norms regarding division of lots and issuance of contracts must be kept in mind whilst determining the size of break to be packed.

In the case of CTC/Orthodox all Dust, only one contract will be issued for lots upto 15 packages. Lots having 16 to 34 packages, may be divided amongst 2 buyers. Lots having 35 packages or more, may be divided amongst 3 buyers. No buyer shall get less than 5 packages in case of a division.

Please note that in case of Darjeeling Leaf Teas, lots containing up to 15 packages each will be treated as small lots for the purpose of sampling and such small lots shall be indivisible. For Darjeeling teas, lots containing more than 15 packages each





will be treated as large lots for the purpose of sampling and such large lots may be divided amongst 2 buyers with no buyer getting less than 5 packages in case of a division.

It is important for Darjeeling producers to bear in mind that exporters palletise their purchases. For example, it would be convenient for this purpose to pack break sizes in multiples of 4 for half size paper sacks; R size and Y size chests in multiples of 5 and 6 respectively. Only the best quality may be packed in smaller breaks. We would also recommend for Darjeeling estates that first flush invoices are packed and despatched as expeditiously as possible.

- c) For Dooars teas meant for Siliguri Auction, it is suggested that maximum break size should not exceed 60 packages.
- d) In Guwahati, the GTAC has ruled that bags that are not heat-sealed and machine stitched will be declared as 'weak' and therefore attract an allowance equivalent to the value of 250 gms. of tea per bag. As far as Siliguri is concerned the net weight of tea packed should be a minimum of 21 kgs. and a maximum of 35 kgs. (no Circular has been received after the Tea Board's revised specifications for bags). The tare weight of B size bags should not be less than 700 gms. to avoid any claims. In Kolkata, jute bags not conforming to Tea Board specifications will attract an allowance of 250 gm per bag.

## JUTE BAGS

Tea Board approved, polythene-lined jute bags have become the primary mode of packing, for the domestic market. For gardens in Assam the percentage of all CTC Leaf and Dust grades, to be packed in bags, should be substantially increased. To minimize packing costs,



the use of polypropylene woven sacks (PP) has increased in use, for packing of secondary CTC grades. However, care must be taken while stenciling details on the sacks to insure no smudging takes place.

Second flush teas, suitable for the export market, should be packed in paper sacks particularly the PF and PD grades.

The revised specifications for bags, according to the Tea Board, for North India are as follows:

### a) Bag Type

The jute bag should be machine stitched and the inner polythene bag should be heat sealed. Spacing of the stitches should be 12 stitches per decimeter with one stitch as tolerance.

Size:	A-Type	B- Type
Flat length	69cm ( $\pm$ 2cm)	69cm ( $\pm$ 2cm)
Flat width	54cm ( $\pm$ 2cm)	54cm ( $\pm$ 2cm)
Bottom gusset	26cm ( $\pm$ 2cm)	33cm ( $\pm$ 2cm)

### b) Material

#### 1) Fabric:

The jute fabric of the outer bag should be clear, bright, odourless and made from virgin material of superior jute batch of the specifications 14 OzSq.yd  $\pm$  10z; DW fabric 11 x 14 : all less than 10% moisture regam.

#### 2) Thread for body stitching:

2 ply, high twist, rayon cord, bobbin-115- denier, spindle 1650 denier.

#### 3) Thread for mouth closing:

2 ply, 19/20 cotton threads.

#### 4) Stitching:

2 stitches per decimeter with one stitch as tolerance. The body of the bag must be machine stitched and mouth closing should be done by hand operated stitching machine.

#### 5) Handle:

Each bag should preferably have a handle at the top and/or loops at the bottom corners.

N.B. It is essential to ensure that bags do not bulge.

### c) Inner Polythene Liner

#### i) Material:

CTTA's Circular No.1 05 dated 6th Nov. 2006: as per the Bureau of Indian Standards, the inner liner shall be made of high molecular high density polyethylene





(HMHDPE) film of such thickness that corresponds to its mass of  $34.5 \text{ g/sq.m} \pm 10\%$  (37.5 microns or 150 gauge). The inner liner shall be of food grade, odourless and made from virgin material only. The mouth of the inner liner bag shall be heat-sealed and the inner liner bag shall be placed loosely inside the jute bag. (For Guwahati, use of any other liner would entail an allowance equivalent to the value of 250 gms. of tea per bag.)

ii) Size:

The dimension of the empty polythene bag should be as under:

Size :	A-Type	B-Type
Flat length	92cm ( $\pm 2\text{cm}$ )	102cm ( $\pm 2\text{cm}$ )
Flat width	82cm ( $\pm 2\text{cm}$ )	92cm ( $\pm 2\text{cm}$ )

iii) Tare weight of jute bags with inner liner.

	Non laminated	Laminated
'A' Size	600gm	A' Size 500gm
'B' Size	700gm	B' Size 600gm

iv) Sealing of the Inner liner:

HMHDPE Inner Liner must be heat sealed separately from the outer bag.

d) Printing Details

The garden mark, grade, invoice no., gross weight and net weight should be preprinted / stenciled on the block ends of each bag to facilitate identification.

e) Sampling

Apart from the mouth portion, all sides must be evenly heat sealed. Mouth portion should be heat sealed or folded adequately to ensure that it does not open up while handling and for that, if necessary, the length of the inner liner should be increased. The sampling should be done, by opening the mouth of the bag, and making a slit in the inner liner. After removal of the sample, the inner liner must be heat sealed or reclosed, with  $\frac{1}{2}$  inch wide plastic adhesive tape, and the jute bag must be restitched.

### MULTI-WALL PAPER SACKS (DOMESTIC & EXPORT)

Exporters have been clearly indicating their preference for teas to be packed in paper sacks. This is not only because of ease in shipment but many destinations have increasingly stringent conditions regarding the disposal of packaging material. Indeed, it is strongly recommended that all teas meant for export be packed in paper sacks. There is no separate Indian Standard

for Multiwall Paper Sacks for packing tea for Domestic market thus the CTTA has advised (CTTA's circular No. 21 dated 08/03/06) that the Indian Standard for Multiwall Paper Sacks for packing tea for export should be followed. As regards the marking on Multiwall Paper Sacks containing tea for sale through the Kolkata Auctions, the provisions of PFA Act, 1954 & the Standards of weights & measures (packaged commodities) Rules, 1977 should be followed.

**Material:** The sack shall be made of natural sack Kraft paper or extensible sack Kraft paper conforming to IS 13012.

**Adhesives:** Adhesives should not contain CHLOROPHENOLS as fungicide/bactericide.

**Construction and Style:** The sack shall be of the pasted valve type with flat hexagonal ends of stepped end construction formed from stepped end tube. The valve shall be fitted with an external tuck in sleeve and shall be made of the same material as the battier of the innermost ply. The sack shall comprise of 5 plies of natural sack Kraft paper each of 70 gsm or 4 plies of extensible Kraft paper each of 80 gsm. The inner most ply shall be laminated with aluminium foil of 0.007 mm to 0.009 mm thickness by 20 gsm of polyethylene. All materials used in the construction of the sack (paper, adhesive, polyethylene and aluminium foil) shall be free from taint and odour. No materials or substances containing chlorophenols or their derivatives shall be used.

**Dimension:** The empty sack dimensions shall be as given below:

	FULL SIZE	MEDIUM SIZE	HALF SIZE
SACK LENGTH	1120mm $\pm 10\text{mm}$	760mm $\pm 10\text{mm}$	660mm $\pm 10\text{mm}$
SACK WIDTH	720mm $\pm 10\text{mm}$	610mm $\pm 10\text{mm}$	610mm $\pm 10\text{mm}$
WIDTH OF BOTTOM	180mm $\pm 5\text{mm}$	200mm $\pm 5\text{mm}$	190mm $\pm 5\text{mm}$
VALVE SLEEVE WIDTH	180mm $\pm 5\text{mm}$	200mm $\pm 5\text{mm}$	190mm $\pm 5\text{mm}$

In addition to the required marking each sack should be marked with "USE NO HAND HOOKS".







### Storage:

On receipt of the paper sacks in the factory/warehouse, the following points should be kept in mind while storing the sacks:

- Paper sacks should be stored on pallets/racks. As the ground is often damp, sacks must not be kept/stored on the floor/ ground.
- Periodic checks must be done, to ensure that the paper sacks are not being attacked by termites, etc. In case termites/insects are noticed, the affected sacks should be destroyed.

### Handling:

Filled sacks, should always be moved and handled with care, and should be lifted, with hands underneath, supporting both ends of the sacks.

### Transportation:

In India, most freight is carried by means of surface transport.

- While loading sacks on to a lorry, the filled sacks should not be thrown.
- The full size tea sacks should always be carried by two persons.
- The lorry should be inspected prior to loading to ensure that there are no nails sticking out or other protrusions and sharp edges. All protrusions that are noticed in the lorry, must be covered by cloth or other soft material, so that there is no scope for such protrusions to come into contact with the paper sacks.
- Ensure the lorry should not have carried any fertilizers, petroleum products, chemicals, cosmetics etc. (Materials that may contaminate the teas).
- It is advisable to cover the floor, sides of the lorry by tarpulin / corrugated cardboard sheets and cover the top of the loaded sacks in the lorry with a plastic sheet or tarpaulin.
- It has been found that if sacks are of 220cms height (including pallet) loading into the container is smoother.



### PP WOVEN SACKS

Specifications for PP woven sacks suitable for Packaging of Bulk Tea

Sl.No.	Name	Type
1.	Dimensions	'A' type = 69cm x 54cm x 26cm (+1- 1cm) (Length, Breadth, Gusset)  'B' type = 69cm x 54cm x 33cm (+1- 1cm) (Length, Breadth, Gusset)
2.	Material	Polypropylene raffia grade, UV - stabilized
3.	Weave	10 x 10 mesh
4.	Denier	950 gms / 9000 mm (minimum)
5.	External Lamination	100 gauge polypropylene extrusion coating grade (minimum)
6.	Ends & Picks	38 1 38 (+1-2) (nos. 1 decimeter)
7.	Grammage	100 gms / sq.m. (minimum)
8.	Finish	Matt (non-slippery, printable)
9.	Seam strength	25 kg / 5 cm width (minimum)
10.	Handle	Each sack will have two handles at the top and/or loops at the bottom
11.	Handle Strength	35 gms (minimum)
12.	Thread	Garlon PPMF ( Poly Propylene Multi Filament) Twine - Nw11
13.	Stitching	12 (+1-1) stitches per decimeter
14.	Weight of Sack	150 gms (+1-5%)
15.	Inner liner	82 cm x 92 cm (+1-1 cm) (width x height)
16.	Liner material	150 gauge blend of HMHDPE & LLDPE (minimum)
17.	General	Materials should be odour free, food grade & virgin
18.	Printing ink	Non toxic, scuff proof ink

**NB :** We repeat that the garden invoice copy should clearly indicate the type of packaging for correct cataloguing.





## CHESTS

- Exportable grades should be packed in multiples of 20 for chest size 40 X 50 X 60 cms. and multiples of 25 for chest size 40 X 40 X 60 cms.
- Recommended chest sizes are given below:



### ORTHODOX GRADES

- Whole Leaf
- Brokens
- Fannings & OPD
- OD & OCD

### CHEST SIZE

- S (40 X 50 X 60 cms.)
- S (40 X 50 X 60 cms.)
- R (40 X 40 X 60 cms.)
- Y (40 X 40 X 50 cms.)

### CTC GRADES

- All Brokens & Fannings
- PDs
- Remaining CTC grades

### CHEST SIZE

- S (40 X 50 X 60 cms.)
- R (40 X 40 X 60 cms.)
- R (40 X 40 X 60 cms.)

- The Gross weight of chests must not under any circumstances exceed 55 kgs. This is most important and should be carefully noted.
- Suggested minimum tare weights for different chest sizes are given below. These weights indicate that the quality of materials of the chest components are acceptable.

### CHEST SIZES

- S 40X50X60
- R 40X40X60
- Y 40X40X50

### TARE WEIGHTS

- 5.2 kgs.
- 4.8 kgs.
- 4.2 kgs.

- 'S' size chests are most preferred by exporters, as these are best suited for palletisation. Next in preference, is the 'R' size chest. In fact, there is a Tea Board notification, which

permits teas packed in only the undermentioned sizes for export and customs authorities do not clear teas packed, in any other size of chests, for shipment.

Size	Specification
S	40 X 50 X 60 cms.
R	40 X 40 X 60 cms.
Y	40 X 40 X 50 cms.

- It should be noted that exportable CTC/ORTHODOX FANNINGS, PRIMARY PDs and DUSTs if they are meant for the A. R. E., should be packed using only aluminium and paper linings, as other linings are not approved by them. It should also, however, be borne in mind that A. R. E. buying has been negligible.

## 6. PREVENTION OF FOOD ADULTERATION RULES, 1955 :

We give below the PFA Standards of Black and Green Tea

Black Tea means tea other than Kangra Tea obtained by acceptable processes, exclusively from the leaves, buds and tender stems of plant of the *Camellia sinensis* (L) O. Kuntze. It may be in the form of black or oolong tea. The product shall have the characteristic flavour free from any off odour, taint and mustiness. It shall be free from living insects, moulds, dead insects, insect fragments and rodent contamination visible to the naked eye (corrected if necessary for abnormal vision). The product shall be free from extraneous matter, added colouring matter and harmful substances:

Green Tea means the product derived solely and exclusively, and produced by acceptable process, notably enzyme, inactivation, rolling or comminution and drying, from the leaves, buds and tender stems of varieties of the species *Camellia sinensis* (L) O. Kuntze, known to be suitable for making tea for consumption as a beverage. The product shall have characteristic flavour free from any odour, taint and mustiness. It shall be free from living or dead insects, moulds, insect fragments and rodent contamination visible to the naked eye (corrected if necessary for abnormal vision). The producer shall be free from extraneous matter, added colouring matter and harmful substances.

Provided that the tea may contain "natural flavours" and "natural flavouring substances" which are flavour preparations and single substance respectively, acceptable for human consumption, obtained exclusively by physical processes from materials of plants origin either in their natural state or after processing for human consumption in packaged tea





only. Tea containing added flavour shall bear proper label declaration as provided in sub-rule (YY) of rule 42. Tea used in manufacture of flavoured tea shall conform to the standards of tea. The flavoured tea manufacturers shall register themselves with the Tea Board before marketing flavoured tea. Pectinase enzyme can be added up to a level of 0.2% during manufacture as processing aid. The product shall conform to the following requirement in which all the figures given are expressed on the basis of the material oven-dried at  $103 \pm 2^\circ\text{C}$ .

- (a) Total Ash (mlm) Not less than 4.0 percent and not more than 8.0 percent
- (b) Water Soluble Ash Not less than 45.0 percent of total ash
- (c) Alkalinity of water Not less than 1.0 percent and not more than 3.0 percent.  
soluble ash expressed  
as KOH (m/m)
- (d) Acid-insoluble ash (m/m) Not more than 1.0 percent
- (e) Water extract (m/m) Not less than 32.0 percent
- (f) Crude Fibre (m/m) Not more than 16.5 percent

#### PFA TOLERANCE LIMIT FOR PESTICIDE RESIDUE (INDIAN CODE)

Sl. No.	PFA Rule 65 Name of Insecticide	Food	Tolerance Limit mg/kg (ppm)
7.	Dicofol	Tea (dry manufacture)	5.0 ppm
25.	Ethion (Residues to be determined as ethion and its oxygen analogue and expressed as ethion)	Tea (dry manufacture)	5.0 ppm
70.	Quinalphos	Tea	0.01 ppm
86.	Glyphosphate	Tea	1.0 ppm
97.	Fenazaquin	Tea	3.0 ppm
112.	Glufosinate-ammonium	Tea	0.01 ppm
122.	Propargite	Tea	10.0 ppm

#### 7. IMPORTANT POINTS TO BE BORNE IN MIND FOR EXPORT OF BULK TEA.

European Union directives on pesticide residues:

The European Tea Committee code of practice encourages producers to apply good agricultural practice (GAP) using pesticides only when essential, thus minimizing the levels of pesticide residues in tea.

The levels for the following pesticides remain unchanged-

Ethion	0.02 ppm
Dichlorvos	3 ppm

The following has also been added-

Captan	*0.05 ppm
Folpet	*0.05 ppm

\*Sum of captan and folpet

Japan too has strict Food Sanitation laws and maximum residue limits for pesticide in tea. The Japanese Ministry of Health, Labour and Welfare has introduced the Positive List System for agricultural chemicals remaining in foods and the Ministry is in the process of revising and upgrading current norms.

For imports of tea into the United States, under the Bio-Terrorism Act, (CTTA Circular No. 101, Dated 01.11.2006) it has been made mandatory that each grower has to be registered with the United States Food & Drug Administration (FDA) and that the registration number would have to be mentioned against the estate mark in the Foreign invoice. **THERE IS NO REGISTRATION FEE AND IT IS POSSIBLE TO REGISTER via THE INTERNET, at [www.fda.gov](http://www.fda.gov).**

#### WOOD PACKING MATERIALS:

The United Nations has issued guidelines for regulating Wood Packaging Material in international trade.

These guidelines are for coniferous and non-coniferous raw wood packaging material that may serve as a pathway for plant pests posing a threat mainly to living trees. They cover wood packaging material such as pallets, dunnage, crating, packing blocks, drums, cases, load boards,





pallet collars, and skids which can be present in almost any imported consignment, including consignments which would normally be the target of phytosanitary inspection. Wood packaging made wholly of wood - based products such as plywood, particle board, oriented strand board or veneer that have been created using glue, heat and pressure or a combination thereof should be considered sufficiently processed to have eliminated the risk associated with raw wood. It is unlikely to be infested by raw wood pests during its use and therefore should not be regulated for these pests.

In view of the foregoing, plywood chests would not be subject to the regulatory measures prescribed in ISPM-15 for preventing the entry of plant pests.

However, steps must be taken to ensure that the plywood tea chests are free from woodborers.

## APPROVED MEASURES ASSOCIATED WITH WOOD PACKAGING MATERIAL

### Heat Treatment (HT)

Wood packaging material should be heated in accordance with a specific time temperature schedule that achieves a minimum wood core temperature of 56°C for a minimum of 30 minutes.

Kiln-drying (KD), chemical pressure impregnation (CPI) or other treatments may be considered HT treatments to the extent that these meet the HT specifications. For example, CPI may meet the HT specification through the use of steam, hot water, or dry heat.

Heat treatment is indicated by the mark HT.

Methyl bromide (MB) fumigation for wood packaging.

The wood packaging material should be fumigated with methyl bromide. The treatment is indicated by the mark MB. The minimum standard for methyl bromide fumigation treatment for wood packaging material is as follows:

Temperature	Dosage rate	Minimum concentration (g/m <sup>3</sup> ) at :			
		0.5 hrs	2 hrs	4 hrs	16 hrs
21°C or above	48	36	24	17	14
16°C or above	56	42	28	20	17
11°C or above	64	48	32	22	19

The minimum temperature should not be less than 10°C and the minimum exposure time should be 16 hours.

## SAMPLING NORMS FOR READY REFERENCE (LATEST CTTA NORMS VALID UPTO SALE 26, 2007)

### I. Trade Samples

#### ORTHODOX LEAF, CTC LEAF & ALL DUST

Buyer Category	Large Lots (16 Packages & Above)	Small Lots (Upto 15 Packages)
Small:	30 gms.	30 gms.
Medium	55 gms.	30 gms.
Large	85 gms.	30 gms.

#### DARJEELING LEAF

Buyer Category	Large Lots (16 Packages & Above)	Small Lots (Upto 15 Packages)
Small	30 gms.	30 gms.
Large	75 gms.	30 gms.

### II. Buyer's Purchase Samples

#### ORTHODOX/CTC/DUST

Size of Break	Purchase Sample
Above 34 Packages	150 gms.
16 to 34 Packages	100 gms.
Upto 15 Packages	50 gms.

#### DARJEELING LEAF

Size of Break	Purchase Sample
More than 15 Packages	80 gms.
Upto 15 Packages	40 gms.





### III. Broker's Samples

#### ORTHODOX/CTC/DUST

Size of Break	Broker's Sample
16 Packages & above	100 gms.
Upto 15 Packages	50 gms.

#### DARJEELING LEAF

Size of Break	Broker's Sample
16 Packages & above	200 gms.
Upto 15 Packages	100 gms.

The distribution of free trade samples for reprinted lots will be as per buyers entitlements in small, medium or large, as the case may be.

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*"There is a great deal of poetry and  
fine sentiment in a chest of tea."*

*~Ralph Waldo Emerson,  
Letters and Social Aims*

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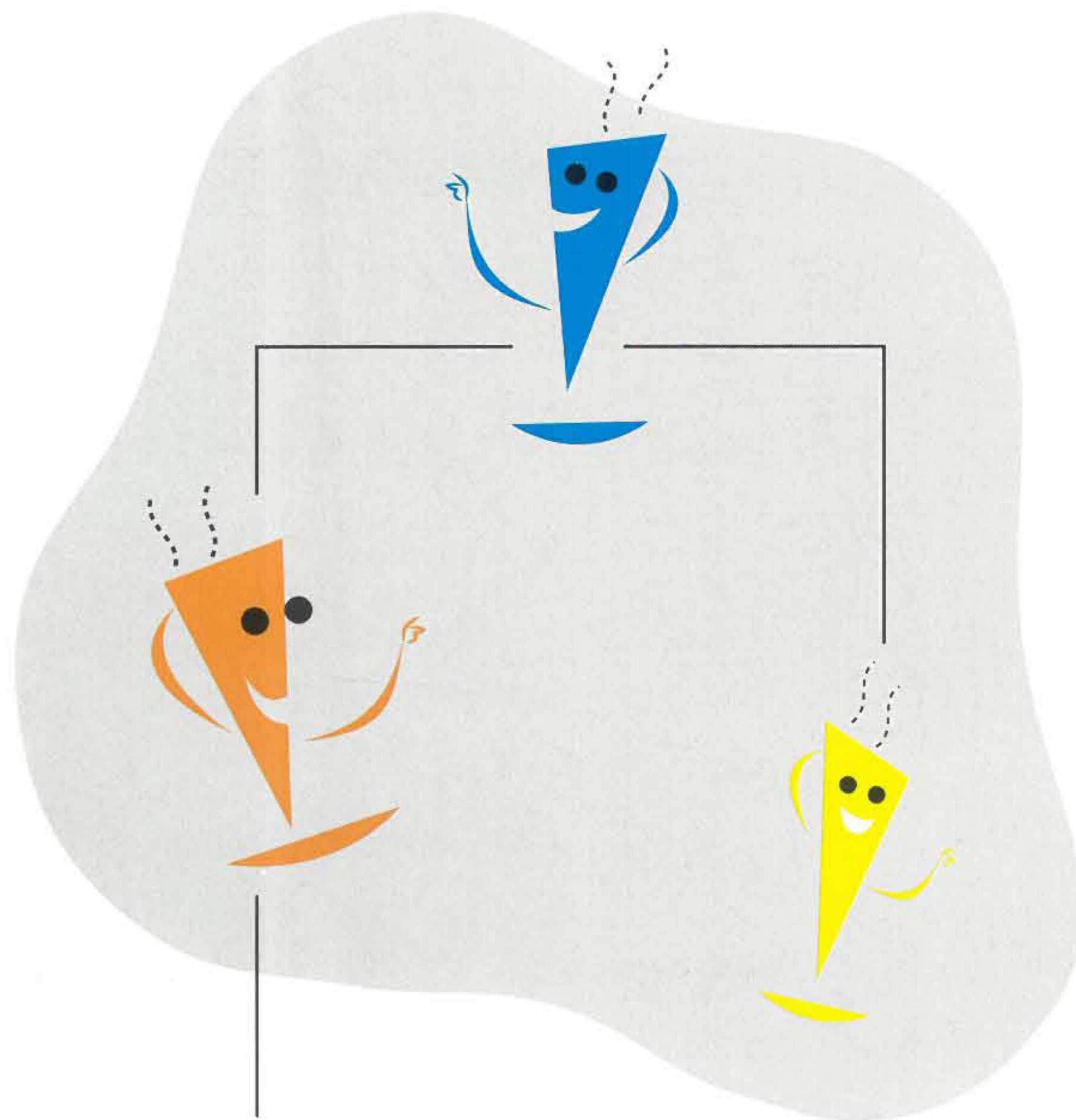
# Dhunseri Group

## In Business of the Future



Dhunseri Tea, a name to reckon with in the world of tea, is a premium quality integrated Tea Company in India. We grow, manufacture & pack tea with utmost care so as to retain its smooth taste, refreshing flavour and exotic aroma. We are people who, blend and taste tea to ensure a variety of superior quality tea. The stress on quality is the top most priority and it is never sacrificed for quantity.

The group has grown from strength to strength – From a single garden company in 1955 with a crop of 3,00,000 kg's it has today 13 Tea Estates with a crop of 13.2 Million Kg's. Kala Ghora, Lal Ghora and Chhote lal are the famous packet Tea brands with an annual sale of around 3 Million Kg's in Rajasthan alone.



Tea Board





## ROLE OF THE TEA BOARD

### Origins & Constitution

Tea is one of the industries, which by an Act of Parliament comes under the control of the Union Government. The genesis of the Tea Board of India dates back to 1903 when the Indian Tea Cess Bill was passed levying a cess on tea exports – the proceeds of which were to be used for the promotion of Indian tea both within and outside the country. This was followed by the formation of the Indian Tea Licensing Committee set up under the Indian Tea Control Act, 1938 and thereafter the Central Tea Board which functioned under the Central Tea Board Act, 1949.

The present Tea Board, set up under section 4 of the Tea Act 1953 was constituted on 1st April, 1954 functioning as a statutory body of the Central Government under the Union Ministry of Commerce and Industry. The Board constitutes of 31 members (including the Chairman) drawn from Members of Parliament, tea producers, tea traders, tea brokers, trade unions, consumers and representatives of governments from the principal tea growing states.



The Tea Board is an apex body of the tea industry in India. While the Tea Act mainly focuses on controls, the scope of the Tea Board's activities is directed towards ensuring overall development of the tea industry and trade – increasing tea production and productivity, improvement in quality, supporting R&D, labour welfare, small grower development, market development, export promotion, collection and dissemination of statistics and regulatory functions such as issuance of licenses, control and monitoring various trade related activities.

### Tea Development

In order to bring about improvement in tea productivity and production and creation of





better processing facilities for qualitative improvement of the product, a number of financial assistance schemes are operated by the Board through the Directorate of Tea Development. The interests of all the sectors, i.e., large medium and small plantations are given due consideration. A brief outline of the financial assistance rendered by the Board under its different schemes is given below.

#### Tea Plantation Development Scheme

The objective of this scheme is productivity improvement through replanting, rejuvenation pruning and consolidation through infilling of vacancies, creation of irrigation facilities, special focus on small tea gardens for enhancing productivity and quality, new planting in the small grower sector in traditional and non-traditional areas, setting up of pilot tea producers' societies, self-help groups, etc.

#### Tea Quality Upgradation & Product Diversification Scheme

This scheme was introduced on 1st September 2003. As the title suggests, its twin objective is to produce quality teas acceptable both in the domestic and international markets with value-addition and also production of speciality teas for niche markets.

#### Human Resources Development Scheme

This scheme seeks to introduce higher standards in plantation management through improvement of skills at all levels from workers to managers also measures filling in critical gaps in labour welfare measures particularly in health and education.

#### Research & Development Scheme (Development)

While the extension of grants-in-aid to research institutions falls within the ambit of the Research Directorate, the R&D needs of small tea growers who account for nearly 20% of all-India tea production is covered by the Directorate of Tea Development. The activities covered under this scheme include extending advisory services, setting up nurseries for supply of good quality planting materials, organising study tours and workshops and strengthening the existing offices of the Board for closer interaction with small growers in non-traditional areas.



#### Price Stabilisation Fund Scheme

This scheme was introduced with effect from April 1, 2003 by the Ministry of Commerce & Industries with a corpus of Rs.500 crore for the benefit of small farmers growing tea, coffee, rubber and tobacco. The scheme aims to provide some compensation as and when the prices of four commodities fall below a certain level. For determining the level of compensation to be provided, an annual price spectrum band for each commodity is fixed based on its 7-year international moving average.

#### Orthodox Tea Production Subsidy Scheme

To encourage production of orthodox teas which are more in demand in the international markets, this scheme was launched in July 2005, to provide for subsidy at the rates of Rs.3/- per kg and Rs.2/- per kg on orthodox leaf grades and orthodox dust grades respectively. An additional incentive is provided at the rate of Rs.2/- per kg for incremental production of orthodox tea over and above that recorded the previous year with the base production recorded in the calendar year 2004.



#### Scheme For Assisting Tea Exporters Towards Meeting Additional Transport & Handling Charges Being Incurred For Teas Exported Through I.C.D. Amingaon

**Objective :** The scope of the original scheme for assisting tea exporters towards meeting handling, packaging, transport freight charges and value addition costs had been extended to compensate exporters who are shipping teas from the I.C.D. Amingaon, Assam, taking into account the additional charges being levied by the shipping companies towards transportation and terminal handling charges arising out of the empty haulage of the containers for the return journey from the port of shipment to Amingaon.

**Duration :** The scheme would be in operation for the period from 1st April, 2007 to 31st March, 2012 i.e. during the 11th Plan Period.

**Scope :** All tea exporters. Registered with Tea Board and holding valid exporters licence are eligible for assistance under the scheme provided :

1. The teas for which incentive under the Scheme is being claimed have been actually shipped through I.C.D. Amingaon.





2. The claim shall be restricted to teas of Indian origin only which are shipped from I.C.D. Amingaon.

**Area of operation :** The scheme extends to the whole of North East India.

**Implementation :** Tea Board will implement the scheme and Deputy Chairman will have full powers of sanction and disbursement under the scheme. Any doubts or disputes arising out of any application will be referred to an Advisory Committee Constituted by Chairman, Tea Board. Thereafter, decision of the Chairman, Tea Board shall be final and binding.

**Assistance :** Financial assistance by way of incentive towards export of tea through I.C.D., Amingaon will be Rs. 1.50 per kg of tea during the period of the scheme.



### Special Purpose Tea Fund

The most important factor afflicting the Indian tea industry is the ageing of tea bushes, leading to declining quality and productivity. This has hiked in the cost of production of Indian tea to one of the highest among major tea exporting countries. To arrest this trend, the Ministry of Commerce and Industry have approved a proposal of the Tea Board for setting up a Special Purpose Tea Fund for extending financial support to the needy tea estates for undertaking replanting, replacement planting and rejuvenation of aged tea bushes to increase productivity and lower costs of production.



The objective is to cover 2.12 lakh hectares over a fifteen-year period. Government approval has been obtained for phase-I of the programme i.e. for activities to be completed till the end of the XI plan period (2007-12). The estimated area to be taken up for re-plantation/rejuvenation during Phase-I would be 85,044 ha comprising re-plantation on 68,154 ha @ 11,359 ha per annum and rejuvenation in 16,890 ha @ 2,815 ha per annum. Government's contribution towards the programme during the period has been fixed at Rs.567.10 crore (capital infusion of Rs. 91 crores to the SPTF and subsidy of Rs.476.10 crore equivalent to 25% of the expected project expenditure of Rs. 1904.40 crore). Continuation of the scheme in the 12th plan period and further till the end of the 15 year programme period would be considered after evaluation of the implementation and success of the programme in Phase.

75% of the assessed unit cost of replanting/replacement planting/rejuvenation pruning and consolidation would be provided to tea gardens by way of term loan (50%) and subsidy (25%). The borrowers are required to bear the balance 25% of the cost.

(Reproduced from the Board's website. For further details of the scheme visit)

### Tea Research

The Tea Board promotes research and extension services activities through granting financial assistance to privately managed research institutes in India such as Tea Research Association (TRA) and United Planters' Association of Southern India – Tea Research Foundation (UPASI-TRF). It also conducts its own research activities at the Darjeeling Tea Research & Development Centre (DTRDC) located at Kurseong in Darjeeling district of West Bengal.

Apart from giving grants-in-aid to TRA and UPASI-TRF financial support is given for specific research schemes conducted by other Institutions and Universities.

### Labour Welfare

The Welfare Branch of the Board undertakes welfare programmes and schemes for the benefit of the tea plantation workers and their dependents classified as under:

- Educational Stipend Scheme and Nehru Award
- General Welfare

The schemes are designed to be supplemental in nature as they cover only those areas not covered by the Plantation Labour Act and its Rules.



World's Gold Standard





### Licensing

The Licensing Branch of the Board is a vital wing for implementation of various statutory and regulatory orders issued by the Government from time to time. The Branch also provides the necessary clarification and guidance to the tea industry and trade in relation to fiscal policies and different legislations concerning tea. The Branch is also a store-house of valuable information concerning production, import and export of tea. A brief description of the various licences and orders are given below.

#### Exporter's/Distributor's Licence

Any person carrying on trading in tea as an exporter or distributor needs a licence under the provisions of the Tea (Distribution & Export) Control Order 2005. The salient points covered under the Order are:

- Definition of tea with separate specifications for green tea, black tea, Kangra tea and instant tea.
- Definition of distributor in relation to import of tea.
- Conformation of tea meant for export according to certain mandatory specifications.
- Conformation of tea imported according to the same mandatory specifications.
- Minimum value addition of 50% in relation to export of imported tea.
- Export of imported tea within 6 months from the date of import.
- Issue of Certificate of Origin for Indian teas by Tea Board for designated areas.
- Power to register export contracts by the Board.
- Power to inspect consignment of tea prior to export.
- Power to prevent shipment of tea from India

#### Tea Waste Licence

Under the Tea Waste (Control) Order, 1959 no person can purchase, hold in stock, sell or offer for sale any tea waste except under certain terms and conditions and a licence granted by the Tea Board. The main objective of this Order is to check misuse of tea waste and to regulate disposal of tea waste for certain purposes.

#### Manufacturing & Marketing Control

Registration and licensing of manufacturers, brokers, buyers and auction organisers are laid out

under the Tea (Marketing) Control Order 2003. The other salient features of this Order are:

- Cancellation/suspension of registration
- Adherence to quality standards of tea as laid down under Prevention of Food Adulteration Act 1954 by manufacturers/buyers and brokers.
- Fixation of price sharing formula for sharing of sale proceeds between the manufacturer and green tea leaf suppliers based on sale proceeds of made tea.
- Provision of sale of made tea outside the public auction system by registered manufacturers to registered buyers (including consignee or commission agent) excluding sale directly to consumers through own retail outlet or brokers.
- Provision for drawing of samples of teas suspected as not conforming to PFA specifications.
- Issue of rules and guidelines in conducting auctions.

### Planting

Permits for extension, replacement planting or replanting are issued in accordance with the Tea Act and Rules.

### Warehousing

Licensing of tea warehouses are laid down under the Tea Warehouse licensing Order 1989.

### Tea Promotion

#### World

The Directorate of Tea Promotion seeks to increase demand for Indian tea worldwide. Promotion is carried out as under:

- Generic promotion through Tea Councils of UK, Germany, Canada and USA to increase overall consumption of tea including activities to communicate the health aspects of tea.
- Uninational (in this case Indian tea) promotional programmes the Board's foreign offices located at London, Moscow, Dubai and New York to enhance demand for Indian tea and increase market share. Activities geared towards facilitating trade through these offices include promotion support extended to importers' brands, exporters' brands, participation in trade fairs and exhibitions, arranging buyer-seller meets and visits by trade delegations.
- Market development activities include market surveys, market analysis and tracking of consumer behaviour. This also includes all relevant information available to importers/exporters and through information dissemination.





- In order to enhance the equity of Indian tea and its assorted brands, Tea Board has registered its geographical indication logos to popularise the usage of these logos.
- Transport subsidy towards meeting additional costs incurred on teas exported through ICD Amingaon.
- Nominal promotional assistance provided directly to exporters under the Market Development Assistance guidelines of the Ministry of Commerce & Industries.

### India

With the slow-down in the rate of growth of domestic consumption of tea, increasing competition from other beverages and global developments in liberalisation of imports under the WTO regime, there has been a revised focus of the Board on tea promotion in India. Generic promotion of tea in India is being done on the basis of:

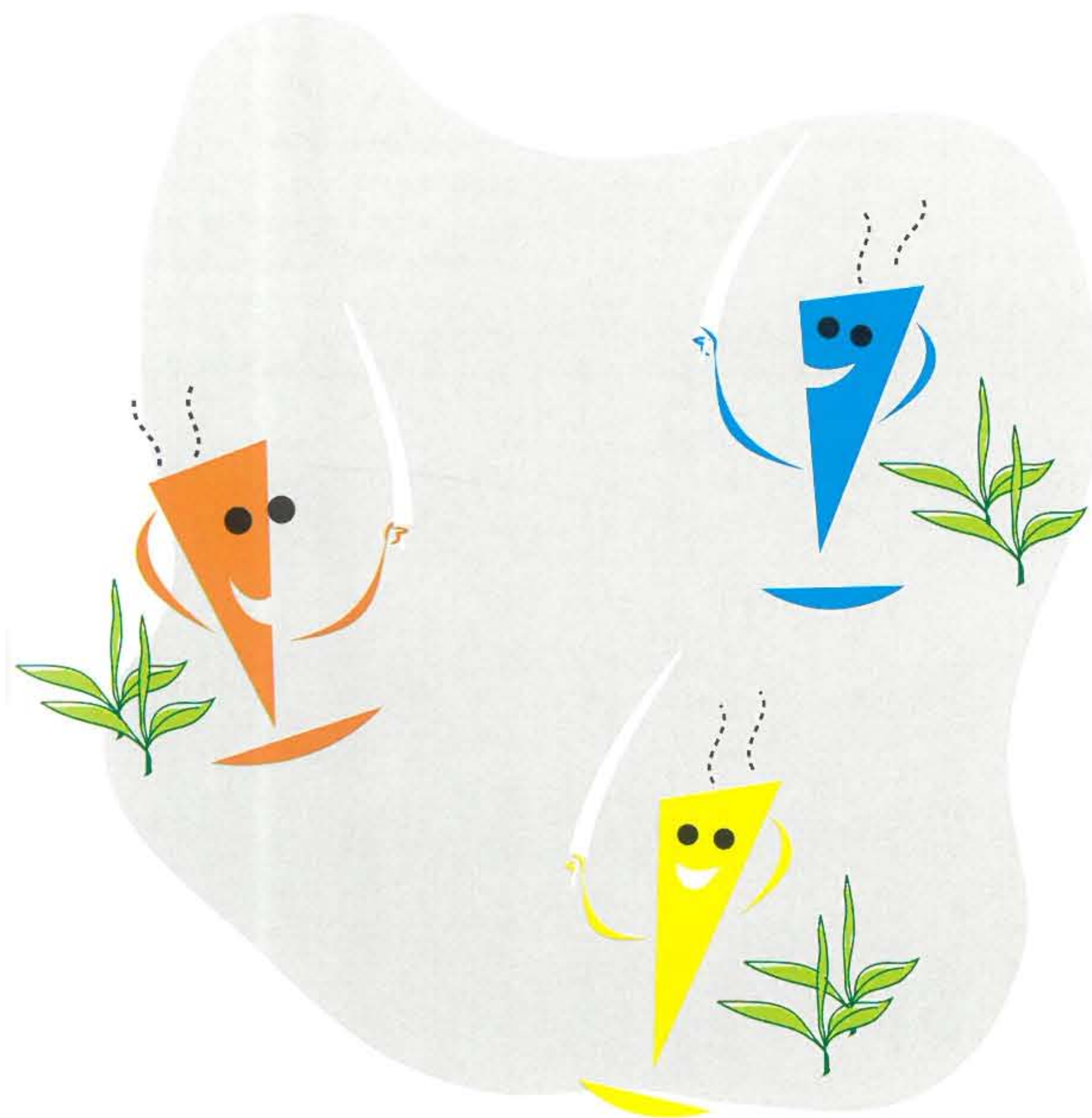
- positioning tea as a good, natural and lifestyle beverage
- educating the public on the regional varieties of teas that are available
- informing the public on the health attributes of tea
- the use of tea in a variety of ways

Using the strapline "chai piyo mast jiyo", Tea Board has been actively advertising the popularisation of tea drinking in various media.

The Board has also been conducting ground-level activities such as sponsorship of college fests, antakshari, dance competitions, dramatics, fashion shows, etc.

(Further information on Tea Board is available in the Board's website )

## Protecting our Teas







## PROTECTING OUR TEA

### Trade Related Intellectual Property Rights (TRIPS)

The Trade Related Aspects of Intellectual Property Rights (TRIPS) Agreement seeks to lay down norms to guide the protection and administration of Geographical Indications (GIs) amongst WTO member countries.

The various clauses of the agreement lay out the parameters governing eligibility and criteria for Geographical Indications of source and seek to harmonise the manner in which GIs are administered and protected in and by member countries. The clauses also guide the manner in which WTO members protect GIs of member countries.

### Geographical Indication & Darjeeling Tea

#### Darjeeling- A Paradise

In the northeast Indian region of Darjeeling, women tea pluckers make their way through mountain slopes every day at dawn in the 87 fabled gardens that have been producing the highly prized black teas for over 150 years. Located on historical estates some perched at altitudes of over 5,000 ft, the gardens are in fact plantations that, at times, stretch over hundreds of acres. But, they are still 'gardens', because all tea grown bears the individual name of the garden in which it is grown.



First planted in early 19th century, the incomparable quality of Darjeeling teas is the result of unique and complex combination of agro-climatic conditions prevailing in the region, altitude, meticulous manufacture and disdain for quantity. The climate of Darjeeling is perfect for tea cultivation. Tea requires at least 50 inches of rainfall annually. Alternate spells of rain and sunshine are considered good for quality and crop. Also, the fog helps in maintaining the required level of moisture. The tea bush grows from a height of 1,500 to 7,000 feet above sea level.

#### Why is the location such a hallmark?

There are both scientific as well as popular religious beliefs behind why Darjeeling is the most suitable place to grow tea. The local people believe that the Himalayan range is the abode



of Shanker Mahadeva and the breath of God bring winds that cool the slopes besides the mist and fog which retain the moisture. The fountain that flows from the piled hair of Shiva provides water for the crop and it thrives. The diversity of Darjeeling tea is further accentuated by differences in day length, temperature and rainfall that depend on the altitude and orientation of the slopes under cultivation.

The quality, reputation and characteristics of Darjeeling tea are essentially attributable to its geographical origin. It possesses a flavour and quality which sets it apart from other teas, giving it the stature of a fine vintage wine. As a result it has won the patronage and recognition of discerning consumers worldwide for more than a century. Darjeeling tea is a rare coveted brew, desired globally, but only grown in a predefined area in India.



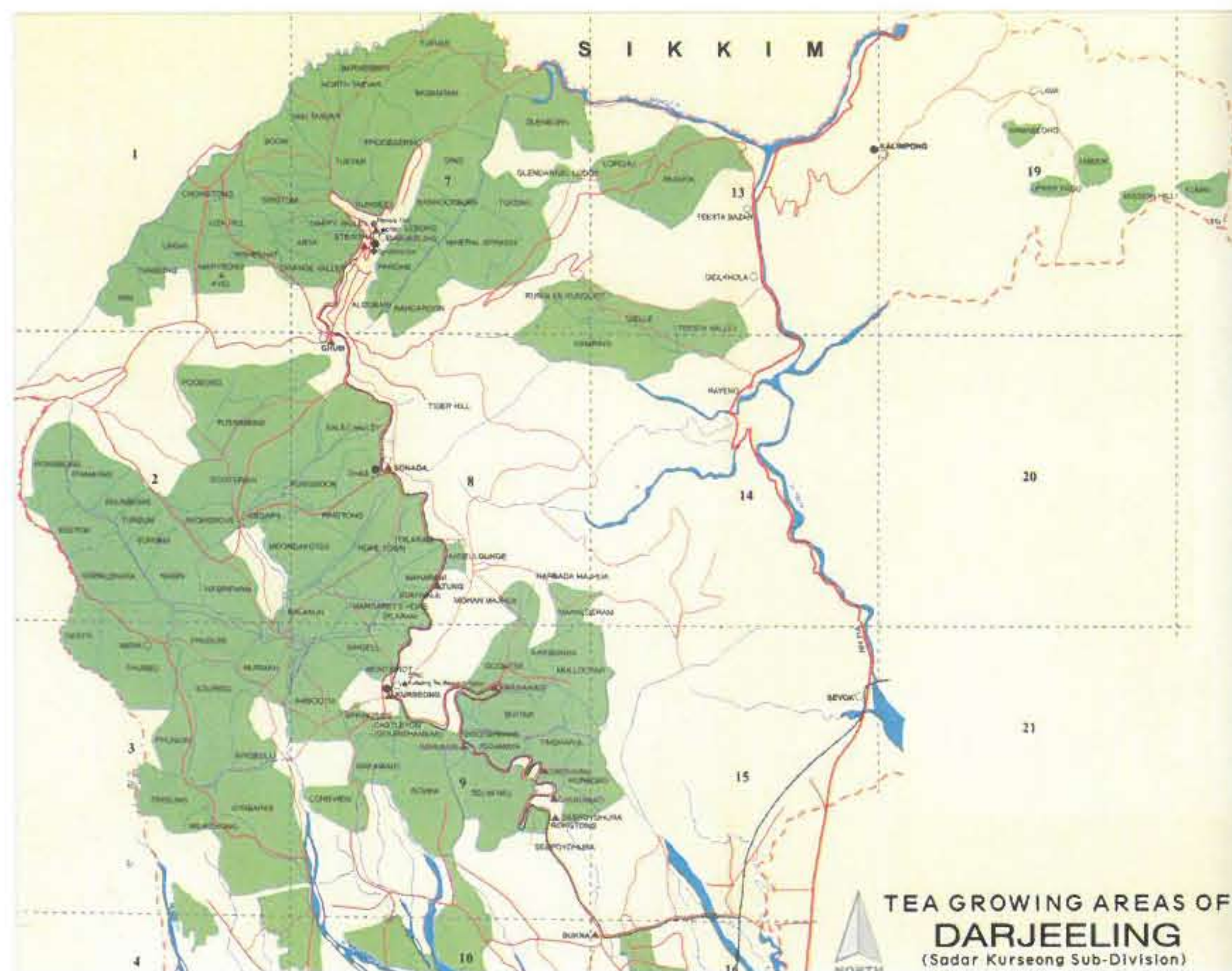


Any member of the trade or general public while ordering or purchasing Darjeeling tea will expect the tea to be cultivated, grown and produced in the defined region of the District of Darjeeling and to have the special characteristics associated with such tea. Consequently, Darjeeling tea that is worthy of its name cannot be grown or manufactured anywhere else in the world. Darjeeling tea cannot be replicated anywhere. It is this equity that is sought to be protected by the Tea Board and the Ministry of Commerce under the norms of the TRIPS Agreement of the WTO.

Just as CHAMPAGNE cannot be manufactured in any place other than the Champagne District of France (even though the grapes used are similar) but has to be referred to as 'sparkling wine', in the same way teas grown and produced outside the defined area of the Darjeeling District in the State of West Bengal in India cannot be called DARJEELING tea even though similar attributes of Darjeeling tea are available in the brew.

### DARJEELING TEA – a Geographical Indication

Under international law, geographical indications mean indications which identify a product as originating in the territory of a member, or a region or locality in that territory, where a given quality, reputation or other characteristic of the product is essentially attributable to its geographical origin.



Darjeeling tea is India's treasured Geographical Indication and forms a very important part of India's cultural and collective intellectual heritage. It is of considerable importance to the economy of India because of the international reputation and consumer recognition enjoyed by it.



In the legal sphere, countries are seeking to protect their own Geographical Indications, either as geographical indications, collective marks or certification marks.

### Tea Board, India

All teas produced in the tea growing areas of India, including Darjeeling, are administered by the Tea Board, India under the Tea Act, 1953. Since its establishment, the Tea Board has had sole administrative control over the growing and exporting of Darjeeling tea and this







has significantly contributed to the reputation enjoyed by Darjeeling tea. The Tea Board has been engaged on a world-wide basis in the protection and preservation of this treasured icon of India's cultural heritage as a geographical indication.

To assist the Tea Board in its role of authenticating regional origin of Darjeeling tea, it has developed the following logo – known as the DARJEELING logo:

At a legal level, Tea Board is the owner of all intellectual property rights in the DARJEELING word and logo both in common law and under the provisions of the following statutes in India:

- The Trade Marks Act 1999: DARJEELING word and logo are registered certification marks of Tea Board;
- The Geographical Indications of Goods (Registration and Protection) Act, 1999: DARJEELING word and logo were the first Geographical Indications to be registered in India;
- The Copyright Act, 1957: The DARJEELING logo is copyright protected and registered as an artistic work.

Use of the DARJEELING word and logo are protected as Geographical Indications in India and as Certification Trade Marks in UK, USA, Australia and India. A major development in this area is the registration of the Darjeeling word as a community collective mark in the European Union.

The DARJEELING logo is presently registered in Belgium, Netherlands, Luxembourg, Germany, Austria, Spain, France, Portugal, Italy, Switzerland, Egypt and Lebanon as a collective mark, in Canada as an official mark, as a trademark in Japan and Russia. The DARJEELING word is also registered as a trademark in Russia.

Tea Board has pending applications for registration of the Darjeeling word as a collective mark in Japan.

As a pre-requisite for domestic and international protection of Darjeeling as a certification trademark and a geographical indication, the Tea Board has formulated and put in place a comprehensive certification scheme wherein the definition of Darjeeling tea has been formulated to mean tea that:

- is cultivated, grown or produced in the 87 tea gardens in the defined geographic areas and which have been registered with the Tea Board;
- has been cultivated, grown or produced in one of the said 87 tea gardens;



- has been processed and manufactured in a factory located in the defined geographic area; and
- when tested by expert tea tasters, is determined to have the distinctive and naturally occurring organoleptic characteristics of taste, aroma and mouth feel typical of tea cultivated, grown and produced in the region of Darjeeling, India.

The certification scheme put in place by the Tea Board covers all stages from the production level to the export stage and meets the dual objective of ensuring that (a) tea sold as Darjeeling tea in India and worldwide is genuine Darjeeling tea produced in the defined regions of the District of Darjeeling and meets the criteria laid down by the Tea Board and (b) all sellers of genuine Darjeeling tea are duly licensed. This licensing program affords the Tea Board the necessary information and control over the Darjeeling tea industry to ensure that tea sold under the certification mark adheres to the standards for DARJEELING tea as set forth by the Tea Board.

Thus, only 100% Darjeeling tea is entitled to carry the DARJEELING logo. While purchasing Darjeeling tea, you need to look for Tea Board's certification and license number otherwise you will not be assured of the taste and character that you expect from Darjeeling tea.

At the administrative level, Tea Board has taken the following steps to ensure the supply chain integrity of Darjeeling tea:

- The use of Darjeeling tea in multi-origin mixtures made subject to correct labelling requirements to protect the customer against any deception or confusion;
- The use of the expression "blended Darjeeling tea" or its variants restricted to a blend of Darjeeling teas only drawn from more than one tea garden within the definition of Darjeeling tea;
- Labelling guidelines formulated and issued to govern and regulate use of Darjeeling name and logo marks as part of trademarks and thus prevent any misuse thereof for teas other than Darjeeling tea;
- Detailed inspection procedures put in place to ensure the integrity and purity of the supply chain for grant of the Certificate of Origin by the Tea Board.
- Customs Notification dated June 25, 2001 issued making all exports of Darjeeling Tea subject to mandatory proof of such certificate of origin.

While the efforts to obtain statutory protection in the DARJEELING word and logo are an essential part of the strategy to protect the integrity of Darjeeling tea, a major plank of all the initiatives undertaken by the Tea Board has been to prevent dilution of the integrity of Darjeeling tea in the following ways:





- preventing dealings in tea which is not drawn from any of the 87 gardens or which is a mixture of non-Darjeeling and Darjeeling teas and sold under and by reference to the name DARJEELING and/or DARJEELING logo;
- action against attempted registration and/or use of Darjeeling not only in respect of tea or related products but other diverse dissimilar products or services as well.

Based on feedback received from the World Wide Watch agency CompuMark which was appointed in 1988 to monitor conflicting marks globally, in the last couple of years several instances of misuse and attempted registrations have been detected and challenged by the Tea Board by way of oppositions/invalidation/cancellation actions, legal notices, court actions and domain name cancellations against third party misuse of Darjeeling. These actions were taken in countries like Bahrain, Belarus, Bangladesh, Canada, Estonia, France, Germany, Israel, Japan, Kuwait, Latvia, Lebanon, Lithuania, Norway, Oman, Russia, Sri Lanka, Taiwan, UK and USA. In India as well, legal notices have been served and oppositions filed whenever Darjeeling has been used incorrectly.

Section 24.9 of the TRIPS (Trade Related Intellectual Property Rights) states that no foreign jurisdiction is obliged to safeguard any Geographical Indication if the same has not been properly protected and enforced in the home country.

With this principle in mind, an online system to monitor the supply chain system of the Darjeeling Tea has been introduced. A Kolkata based software firm, with prior experience in the Tea Trade has been appointed to develop, monitor and maintain a software system where the entire trade chain can be tracked, right from the individual tea gardens to the point of imports and packaging in various countries. The domestic market is also within this accounting system up to the first level of sale and the point of packaging. This system is being extended to ground level checking as well. To this effect, renowned international agency/agencies has been appointed to conduct onsite checks on quality and homogeneity of the teas packed, based on organoleptic parameters as well as the optimum use of the logo and mark. This is undoubtedly a giant leap towards enforcements of rights and protection of reputation across the globe.

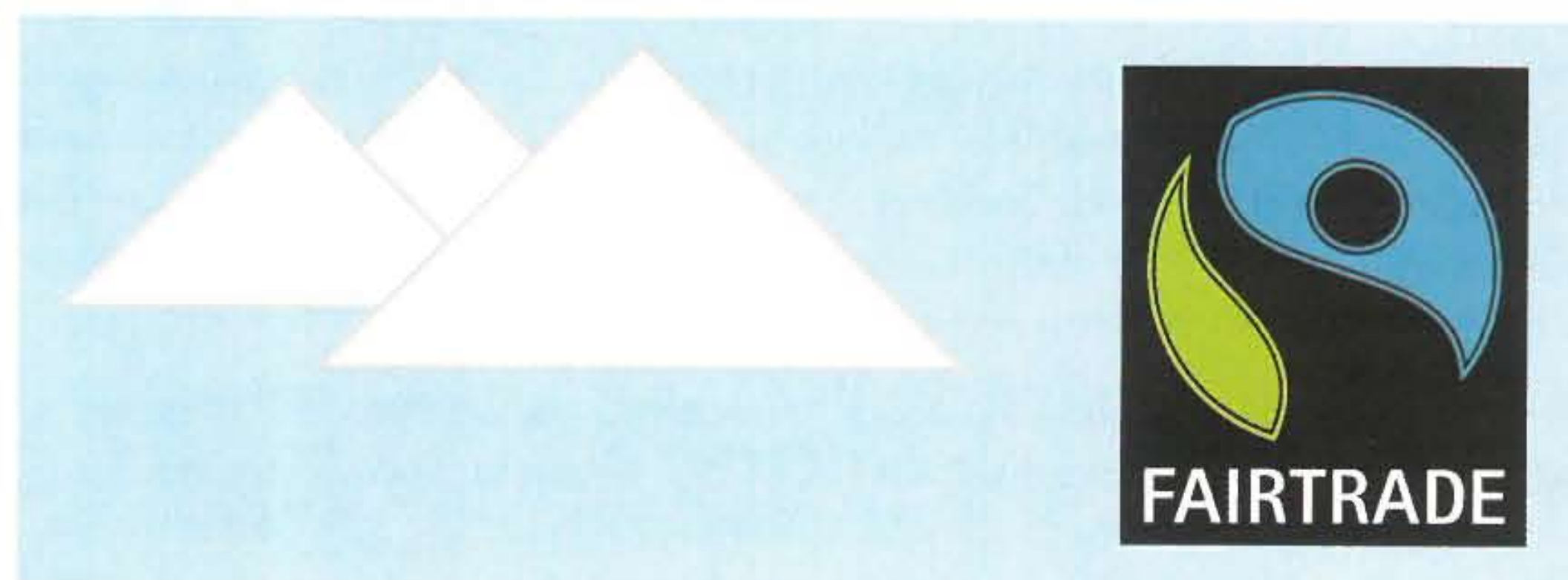


These measures, though slow moving in a lot of cases, have had a cumulative effect. Today, worldwide, there is an increasing awareness of the name Darjeeling as a protected entity.

In the meantime to promote Darjeeling tea and consolidate its equity along with increasing consumer awareness about Darjeeling as a Geographical Indication, the Tea Board is holding festivals in various export markets and running India origin tea campaigns together with retail chains and speciality restaurants. (This includes Assam, Nilgiri as well as Darjeeling tea promotions.) Public relations and educational communication materials are spreading the awareness of India origin teas worldwide as well as in India.

Both Assam and Nilgiri teas are also being protected as Geographical Indications as done earlier in respect of Darjeeling.

(Contributed by Ms. Anindita Roy, Tea Board)



### Fair Trade Practices

Fair Trade certification (usually simply Fairtrade or Fair Trade Certified™ in the United States) is a product certification system designed to allow people to identify products which meet agreed environmental, labour and developmental standards. Overseen by a standard-setting body, FLO International, and a certification body, FLO-CERT, the system involves independent auditing of producers to ensure the agreed standards are met. Companies offering products



that meet the Fairtrade standards may apply for licences to use the Fairtrade Certification Mark for those products.

The FLO International Fairtrade certification system covers a growing range of products, including bananas, honey, oranges, cocoa, cotton, dried and fresh fruits and vegetables, juices, nuts and oil seeds, quinoa, rice, spices, sugar, tea and wine. Fairtrade Labelling Organizations International (FLO), established in 1997, is an umbrella organization that unites 20 Labelling Initiatives in 21 countries and Producer Networks representing Fairtrade Certified Producer Organizations in Central and South America, Africa and Asia.

FLO International offers the following services:

- Development of Fairtrade Standards that benefit small farmers and workers, promote sustainable production, guarantee a fair price and an extra Fairtrade Premium. Fairtrade Standards go further than Codes of Conduct and other social labels: beside minimum requirements that producers and traders must meet, FLO expects them, through progress requirements, to continuously improve working conditions, to increase the environmental sustainability of their activities and to invest in organizational development for workers and small farmers.
- Producer Business Support. It facilitates producers' compliance with the Fairtrade Standards and provides them with information to strengthen their businesses and seize new market opportunities.

Certification is done by an independent international certification company, FLO-CERT GMBH.

FLO-CERT GMBH is responsible for the inspection and certification of producer organisations and traders against the Fairtrade Standards. The independence of the inspections ensures that the Fairtrade Minimum Price reaches the producers and that the Fairtrade Certification Mark is only used on products coming from Fairtrade Certified Producers.

If you want to know more about FLO-CERT services or if you are a producer interested in getting Fairtrade Certified, please visit the FLO-CERT website at: [www.flo-cert.net](http://www.flo-cert.net).

### Corporate Social Responsibility

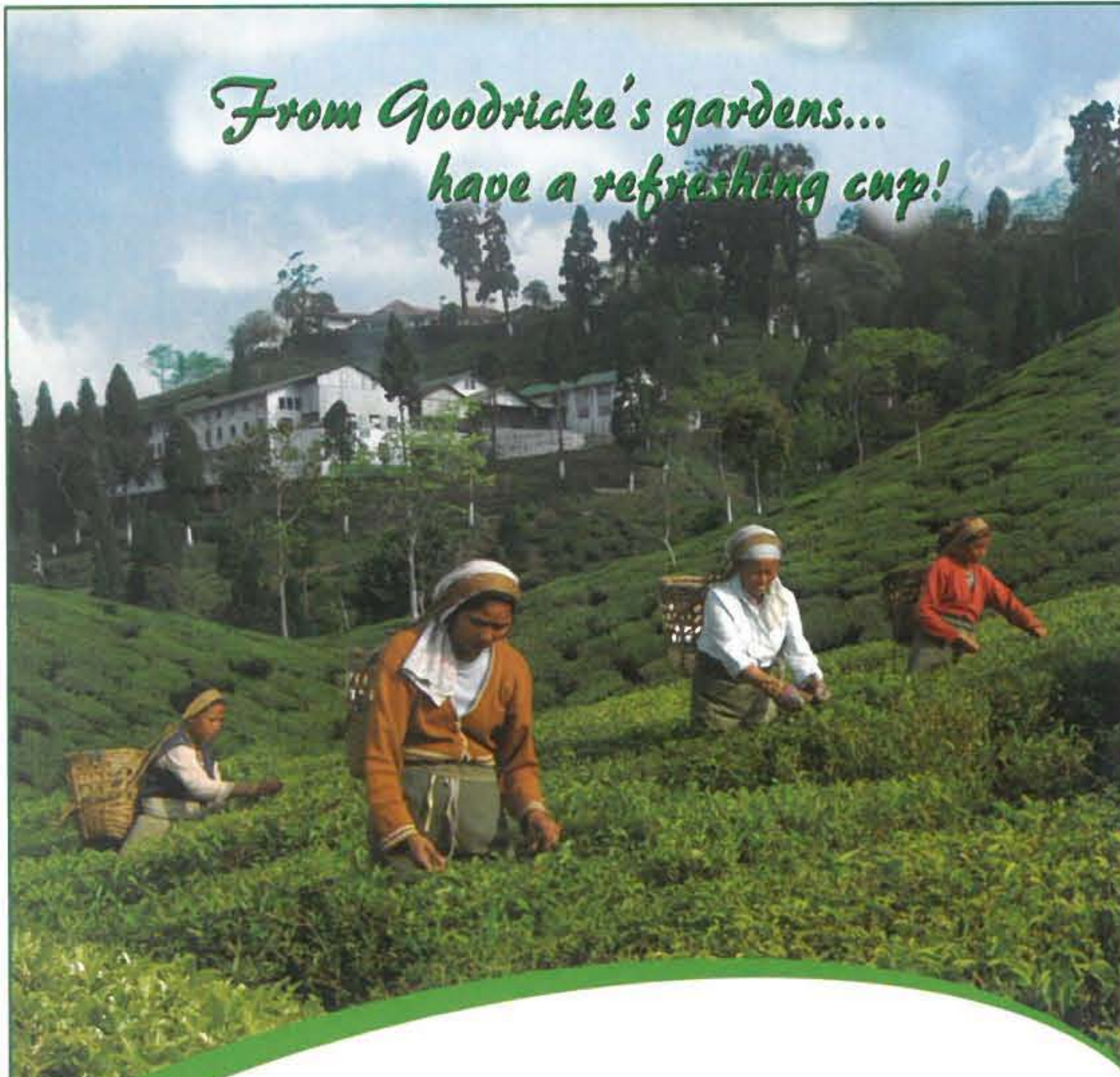
Corporate Social Responsibility (CSR) is a concept which encourages organizations to consider the interests of society by taking responsibility for the impact of the organization's activities on customers, employees, shareholders, communities and the environment in all aspects of its operations. This obligation is seen to extend beyond the statutory obligation to comply with legislation and sees organizations voluntarily taking further steps to improve the quality of life for employees and their families as well as for the local community and society at large.

### List of Tea Gardens producing Darjeeling Tea

- |                            |                               |                             |
|----------------------------|-------------------------------|-----------------------------|
| 1. Alloobari               | 30. Liza Hill                 | 59. Ringtong                |
| 2. Ambik (Hillton)         | 31. Longview (Highlands)      | 60. Risheehat               |
| 3. Arya                    | 32. Lopchu                    | 61. Rohini                  |
| 4. Avongrove               | 33. Margaret's Hope           | 62. Runglee Rungliot        |
| 5. Ambootia                | 34. Marybong                  | 63. Rungmook / Cedars       |
| 6. Badamtam                | 35. Mim                       | 64. Kanchaan View           |
| 7. Barnesbeg               | 36. Mission Hill              | 65. Samabeong               |
| 8. Bannockburn             | 37. Moondakotee               | 66. Selimbong (Rongbong)    |
| 9. Balasun                 | 38. Mohan Majhua              | 67. Soom                    |
| 10. Chongtong (Sirisi)     | 39. Makaibari                 | 68. Singtom                 |
| 11. Chamong                | 40. Mullootar                 | 69. Steinthal               |
| 12. Castleton              | 41. Mahalderam                | 70. Sungma                  |
| 13. Dhajea                 | 42. Monteviot                 | 71. Selim Hill              |
| 14. Dooteriah              | 43. Nagri                     | 72. Singbulli               |
| 15. Dilaram                | 44. Nagri Farm                | 73. Sivitar                 |
| 16. Edenvale               | 45. North Tukvar              | 74. Springside              |
| 17. Ging                   | 46. Narbada Majhua            | 75. Soureni                 |
| 18. Gielle                 | 47. Nurbong                   | 76. Singell                 |
| 19. Glenburn               | 48. Namring & Namring (Upper) | 77. Sepoydhoorah (Chamling) |
| 20. Gopaldhara             | 49. Oaks                      | 78. Seeyok (Spring Valley)  |
| 21. Goomtee                | 50. Okayti                    | 79. Tukvar (Puttabong)      |
| 22. Giddapahar             | 51. Orange Valley             | 80. Tumsong                 |
| 23. Gyabaree & Millikthong | 52. Pandam                    | 81. Turzum                  |
| 24. Happy Valley           | 53. Pashok                    | 82. Tindharia               |
| 25. Jogamaya               | 54. Phoobsering               | 83. Thurbo                  |
| 26. Jungpana               | 55. Poobong                   | 84. Tukdah                  |
| 27. Kalej Valley           | 56. Pussimbing (Minzoo)       | 85. Teesta Valley           |
| 28. Kumai (Snowview)       | 57. Phuguri                   | 86. Upper Fagu              |
| 29. Lingia                 | 58. Rangaroon                 | 87. Vah Tukvar              |



*From Goodricke's gardens...  
have a refreshing cup!*



**Goodricke**  
The Tea People

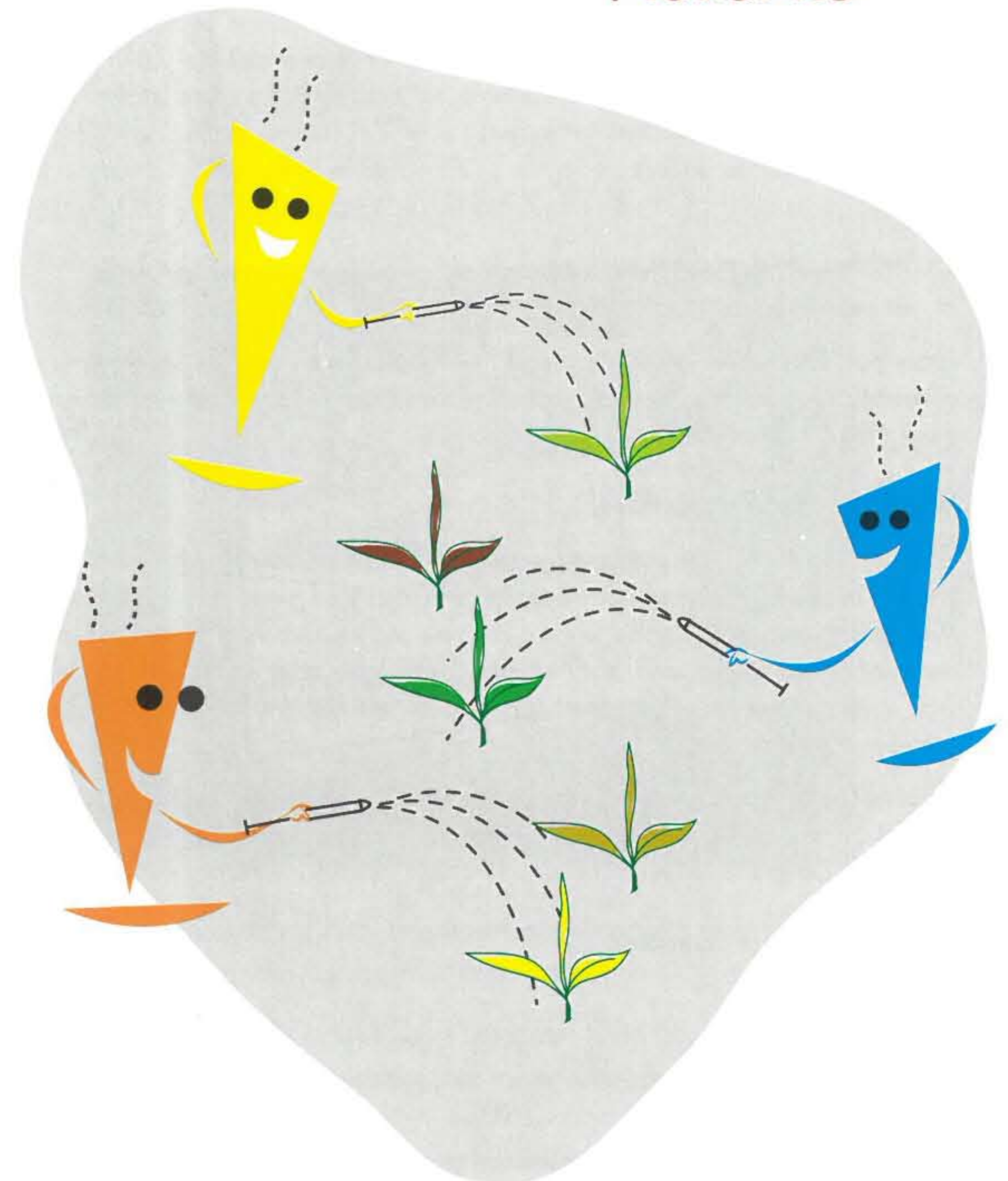
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*Pestisides*







## PESTICIDES & MRLs

### FAQ

#### What are Pesticides?

'Pesticide' is a broad term, covering a range of products that are used to control pests. The slug pellets, ant powder, weed killers, and rat and mouse baits that you may use in your everyday life are all pesticides. Other pesticides you may have heard of include:

- insect killers (insecticides)
- mould and fungi killers (fungicides)
- weedkillers (herbicides)
- slug pellets (molluscicides)
- plant growth regulators
- bird and animal repellents, and
- rat and mouse killers (rodenticides)

Often people only think of pesticides as chemicals, but they include a very large range of different types of products. Some are natural (eg, pyrethrums, obtained from chrysanthemums), while many are altered versions of natural chemicals.

#### Why do we need Pesticides?

Today's modern agriculture produces plentiful food, at a reasonable price, all year round. Most of us take it for granted that we can buy whatever food we want, whenever we want. We rightly expect our food to be safe and nutritious and we have also become used to food, particularly fruit and vegetables, not having any blemishes or other marks. We don't tend to think about how farmers produce food or how it gets from the farm to the shops in "perfect" condition.

Over the last 60 years farmers and growers have changed the way they produce food in order to meet the expectations of consumers, supermarkets and governments. In doing so they have made many changes to the way they farm. This often includes the use of pesticides.

#### Why do farmers use pesticides?

Farmers use pesticides to:

- protect crops from insect pests, weeds and fungal diseases while they are growing
- prevent rats, mice, flies and other insects from contaminating foods whilst they are being stored
- safeguard human health, by stopping food crops being contaminated by fungi



However, as pesticides are used to kill unwanted pests, weeds and moulds, they can also harm people, wildlife and the environment. This is why there are strict controls in place over their sale and use. It is up to everyone who is involved with pesticides, whether they are farmers, professional growers or gardeners, to ensure that they are used safely and effectively.

#### Maximum Residue Levels of pesticides

Maximum Residue Levels (MRLs) are the upper legal levels of a concentration for pesticide residues in or on food or feed. MRLs are set for a wide range of food commodities or plant and animal origin, and they usually apply to the product as put on the market (e.g. oranges including the peel or stone fruit including the stones). MRLs are not simply set as toxicological threshold levels, but they are derived after comprehensive assessment of the properties of the active substance and the residue behaviour on treated crops. An indispensable precondition for setting MRLs is the performance of a risk assessment to ensure consumer safety.



*"Tea's proper use is to amuse the idle, and relax the studious, and dilute the full meals of those who cannot use exercise, and will not use abstinence."*

~ Samuel Johnson





*The World's Cup of Tea*

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*Quality &  
Food Safety*



### ASSAM ESTATES

Addabarie	Bhooteachang	Dehing	Halem	Margherita	Phillobari
Attareekhat	Bogapani	Dekorai	Harchurah	Mijicajan	Phulbari
Baghjan	Bordubi	Dimakusi	Hunwal	Monabarie	Raidang
Bargang	Borengajuli	Dirai	Itakhooli	Namdang	Rajmai
Beesakopie	Boroi	Dirial	Keyhung	Nya Gogra	Rupajuli
Behali	Bukhial	Dirok	Koomsong	Paneery	Samdang
Behora	Corramore	Dufflaghur	Mahakali	Pertabghur	Tarajulie
		Tezapore & Gogra			

### DOOARS ESTATES

Bhatpara Chuapara Central Dooars Jainti Jaybirpara Mathura

Our Associates: **The Moran Tea Company (India) Limited**

Assam Estates – Attabarrie Lepetkatta Moran Sapon



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## QUALITY & FOOD SAFETY PARAMETERS – THE HARD TRUTHS

### QUALITY

#### Introduction

Perception about quality of teas is varied. It is something which differs from individual to individual and is relative. Often questions are raised, such as, 'which garden produces the best quality tea?' Not an easy question, this.

This is because to understand 'quality' of tea, one needs to have a thorough knowledge of the requirement, taste and choice. Consumers of Darjeeling tea may not necessarily appreciate even the second flush Assam tea, or for that matter the best from the Nilgiris in south India.



However, some indicative aspects are there. For instance, in scientific terminology, a minimum platform of quality in terms of chemical characterisation of tea has been set by the Bureau of Indian Standard (BIS), followed by the 'safety' requirement of teas under the Prevention of Food Adulteration Act, 1954 and Rules, 1955 (PFA).

#### Chemical Parameters Determining Quality in Tea

Indian tea is well known for its characteristic strength, liquor, colour, and flavour with special emphasis on its famous silvery tips. The reflections of all these quality attributes of tea are measured and interpreted in terms of biochemical parameters. The main compounds are polyphenols and their derivatives, caffeine, TF & TR, VFCs, amino acids, minerals and total soluble solids which together, by their interactions, are considered to be responsible for the development of quality and aroma in the manufactured tea.

#### Volatile Flavoury Components

The characteristic quality aspects of Indian tea are 'true to type' signifying respective agro-climatic zones and seasons but chemical differentiation of the characteristic qualities are difficult since hundreds of volatile flavoury components (VFC) are involved to determine the quality of finished product. Nevertheless, general standards have been fixed which are considered to be the minimum quality stipulations to isolate the spurious teas. This is essential in view of strategy formulation for production and export and to enter into business contracts.

#### Environmental Influence on Quality Parameters

The quality 'parameters' of tea are determined on the basis of intrinsic natural characteristics to tea plants and the local growing conditions, the ecological ambience and general biological characteristics of the specific areas.

#### Why Variability?

The quality of tea is a highly variable attribute. There is a saying that teas of today may not match with those of tomorrow even in the same garden and factory. This is because, the delicate chemical quality constituents in tender shoots vary in accordance with the genotypes and the process of chemical withering and manufacturing when oxidation process leads to the development of theaflavin (TF) which contributes to the flavours and thearubigin (TR) which are prime factors influencing the quality of tea. Again, the quality of raw material, climate, temperature, soil type, rainfall, mode of handling of raw material, actions of machines, oxidation, drying temperature and interactions of very many other factors including human factor during manufacturing contribute to the quality of the finished products.

Blending is clearly a function of consumer choice. Therefore a great deal of empirical data is generated to understand the tastes and subsequently create the blends. Here, chemical compatibility in blends plays a significant role to achieve a desired degree of taste in the finished product. Role of polyphenols, catechins, TF, TR and their ratio are the main determining





factors for the body, colour, and fragrance of tea. Biochemical indices of these factors have been established. Nevertheless, all blends of teas are required to conform to PFA specifications, and there should be no confusion as to why blends should not be scientifically validated for PFA specifications.

### Associated Factors

In addition to the chemical characteristics of tea which are manifested in the tea plant, limits of foreign bodies often acquired during cultivation and processing of tea are also fixed to ensure protection to health and to avoid injury to humans. Limits for metals, such as, lead (10 ppm max, ECO 6.5 ppm max): copper (150 ppm max) and mycotoxin like aflatoxin (0.03 ppm max) are also fixed under PFA (ref. PFA clause 57A).

IS/PFA/ISO standards and their relevance – passport to international trade

The prime factors under 'safety' requirements of tea are:

- 1) Water extract value or the total soluble solids in the brew – minimum 32%,
- 2) Total ash content should be within 4% to 8%,
- 3) Total ash soluble in boiling distilled water shall not be less than 40% of total ash,
- 4) Ash insoluble in HCL should not be more than 1%,
- 5) Alkalinity of soluble ash should be between 1% and 2.2% as K<sub>2</sub>O crude fibre should not exceed 17% (ref. clause A. 14 of the PFA).



These values are uniformly fixed as laid down under International Standard ISO 3720 and also under Indian Standard. (Ref. IS: 3633, 2003; ISO 3720).

Hence conforming to PFA specifications is a passport to placing teas to the auctioneer or to the market and a visa for entry into the international trade. Therefore, random sampling of tea for testing of chemical parameters is essential at the production and marketing level which is also a must for one's own satisfaction

and to avoid legal complication under the food safety laws. Further, it will help to settle insurance claims and to win disputes with the buyer.



### The process of harmonisation of MRLs for pesticides residue

International scenario: Maximum Residue Limit (MRL)

So far 71 chemicals have been identified and codified separately for tea under EU Regulations. Similarly, CODEX has formulated MRLs for ten pesticides for tea.

Germany has fixed its own MRL for tea for its imports and these are at par with EEC limits excepting for very few stringent limits for certain pesticides. EEC and Germany are trying to harmonise their MRLs. US/FDA and EPA have their own MRLs for pesticides. Japan has its own Food Laws fixing the MRLs for tea and a positive list. Maximum Permissible Residue Limits for Pesticides for all food items are notified by the PFA based on the recommendations of the pesticides residue sub-committee constituted by the Central Committee for Food Standard (CCFS). In India, PFA has, so far, fixed MRL for five chemicals separately for tea.

Data to fix MRL for tea in India are generated by the Tea Research Institutes. Tea Board took the initiative to compile MRLs under Indian situation exclusively for tea. National Tea Research Foundation helped generate data and finalise MRLs for 15 chemicals applied to tea. The status report is placed to the PFA for taking further necessary steps towards notification of MRLs separately for tea.

### Tea Standards

Indian standards on qualities of tea as published by BIS are identical to the corresponding ISO standards-ISO 3720: 1988-Black Tea requirements.

In case of ECO marking for tea, a notification under PFA was made on 30th August 1994 separately indicating stringent criteria for ECO friendliness of tea, particularly for lead (Pb) content.

The following standards on tea are formulated by BIS in sync with the existing international standards. Some other reference standards are also available in the BIS. Additionally Tea Board has recommended specifications for jute laminated bags used for bulk packaging of tea for the domestic market.

**Table 1. Tea related Indian (IS) and International Standards (ISO)**

1. IS 3633:2003	Indian Standard – Specification for Tea
2. IS 2491:1998	Food hygiene-General principles-Code of Practice (second revision)
3. IS 3611:1975	Method of sampling for tea (first revision)
4. IS 4541:1986	Glossary of tea terms (first revision)
5. IS 6273 (Part 1):1973	Guide for sensory evaluation of foods: Part 1 Optimum requirements





6. ISO 3103:1980/  
IS 6400:1993 Method for preparation of tea infusion for sensory evaluation (first revision)
7. ISO 5498:1981/ Method for determination of crude fibre content: IS 10226(Pt 1): 1982 Part 1 General method
8. IS 11123:1984 Method for determination of copper by atomic absorption spectrophotometry
9. IS11773:1986 Method for determination of ethion residues in food commodities. Soil and water
10. IS 12074:1987 Method for determination of lead by atomic absorption spectrophotometry
11. ISO 1572:1980/ Tea-Preparation of ground sample of known IS 13852:1994 dry matter content
12. ISO 1573:1980/  
C IS 13853:1994 Tea-Determination of loss in mass at 103 degree
13. ISO 1576:1987/  
IS 13854:1994 Tea-Determination of total ash
14. ISO 1576:1988/  
IS 13855:1993 Tea-Determination of water-soluble ash and water-insoluble ash
15. ISO 1578:1975/ Tea-Determination of alkalinity of water- IS 13856:1993 soluble ash
16. ISO 1577:1987/  
IS 13857:1993 Tea-Determination of acid-insoluble ash
17. ISO 9768:1994/  
IS 13862:1998 Tea-Determination of water extract (first revision)
18. IS 14629:1999 Method for determination of dicofol residues in agricultural and food Commodities
19. IS 14437:1997 Method for determination of guinalphos residues in agricultural and food Commodities
20. IS 10 (Part I, II, III,  
IV, V): 1974 Specifications for plywood Tea chests-general, specifications for plywood, battens, metal including Fittings, assembly and packing Timber species



21. IS:7239-1974 Specification for gum, ghatti, food grade
22. IS: Specification for ink, stencil, oil base, marking porous surfaces
23. IS: Specification for multi wall paper sets for bulk packaging of tea

IS-Indian standard, ISO-International Organisation for Standardisation

**Table 2. Comparison of PFA standard of India and ISO 3720 (International) for tea.**

Parameter	India PFA	ISO 3720	Method of analysis
Water extract, % (m/m)	32.0	32.0	ISO 9768
Minimum Total ash			
Maximum	8.0	8.0	ISO 1575
Minimum	4.0	4.0	
Water-soluble ash (as percent of total ash)			
Minimum	40.0	45.0	ISO 1576
Alkalinity of water Soluble ash, % (m/m)			
Minimum	1.0}(a)	1.0}* 3.0}*	ISO 1578
Maximum	2.2}		
Acid-insoluble ash %, (m/m)			
Maximum	1.0	1.0	ISO 1577
Crude Fibre, % (m/m)			
Maximum	17.0	16.5	ISO 5498

\*When the alkalinity of water-soluble ash is expressed in terms of millimoles of KOH per 100g of ground sample, the limits shall be –

Minimum 17.8 – Maximum 53.6 (a) as K<sub>2</sub>O

### ISO VS PFA

There are minor differences between the two standards: like ISO standard includes a minimum requirement of water soluble ash as 45% against Indian Standard of 40%. This means that Indian standard is liberal on that account by 5%. Again, in case of Crude Fibre value, international standard is 16.5% (maximum) against the Indian standard of 17%. In case of





## Food Safety

### Good Agricultural Practices

#### What is Good Agricultural Practice?

The concept of Good Agricultural Practices (GAP) has evolved in recent years in the context of a rapidly changing and globalizing food economy and as a result of the concerns and commitments of a wide range of stakeholders about food production and security, food safety and quality, and the environmental sustainability of agriculture. GAP applies recommendations and available knowledge to addressing environmental, economic and social sustainability for on-farm production and post-production processes resulting in safe and healthy food and non-food agricultural products.

#### Why a Good Agriculture Practice Approach?

A critical challenge is to ensure that the expanding use of GAP will take into account the interest of smaller producers in developing countries both for the safety, economy and sustainability of domestic production and livelihood. A broadly accepted approach using GAP principles, generic indicators and practices will help guide debate on national policies and actions and on the preparation of strategies to ensure that all stakeholders participate in and benefit from the application of GAP in the food chain.

#### Producing Safe Foods

Food safety concerns are increasing as once unheard of illness-causing micro-organisms and chemical residues become more prevalent and as products previously considered safe cause an increasing number of illnesses each year. Produce, recently thought of as safe, has been identified as a cause of major foodborne illness outbreaks in recent years.

Illnesses are primarily caused by micro organisms, often referred to as pathogens or biological hazards such as bacteria, viruses, parasites, and fungi. In addition, the produce is exposed to naturally occurring, biological hazards in the soil, water, and air. The potential risk for contamination is increased by production practices using manure for fertilizer and human handling of products. Developing a safety plan helps food producers manage the safety component of their operation by organising the action steps identified as key to reducing those risks. Documenting of current practices and any changes over time allows for monitoring the safety of the food product.

Good Agricultural Practices, more commonly referred to as GAPs, are a set of recommendations that can help improve the quality and safety of the produce grown. These general guidelines can be adapted and/or incorporated into any production system. GAPs focus on four primary components of production and processing: soil, water, hands, and surfaces.

alkalinity of water soluble ash Indian PFA is 2.2% (Maximum) expressed in K<sub>2</sub>O against ISO 3% expressed as KOH. By all accounts, Indian standard is equivalent to International standard ISO 3720 except for very minor differences which can be ignored.

BIS is the Indian authority to formulate standards which are voluntary in nature and expressed as minimum quality requirements for tea. Ministry of Food is the authority to notify any standard in terms of Food Safety as is done with in case of tea. BIS standard and the PFA standard are alike except for minor differences explained between the ISO 3720 and PFA. In the last revision of standard, BIS has adopted the ISO 3720 as the quality standard for tea with dual numbering system such as IS and ISO.

In case of pesticide residue limits (MRL), these are formulated by Central Insecticide Board and by a notification PFA authority had adopted MRLs for food items in which five pesticides are separately marked with MRLs for tea. The international scenario on the pesticide residue for tea is that EU Regulations, CODEX standard, Japan food laws are all different.

In case of metals, PFA has covered separately for tea for Copper, Lead, Iron contents and aflatoxin.

### Conclusion

Considering all the facts related to quality of tea, it is clear that a minimum standard needs to be followed in line with the specifications laid down under the Prevention & Food Adulteration Act, 1954, Rules 1955. This standard fixed in India is by no means inferior to the international requirement. Secondly, additional requirement of volatile flavour compounds (VFCs) are stipulated as per buyer's requirement specifying important classical characteristics like Darjeeling tea.

Variation in quality of tea is not the fault of any individual but it is universal and governed by usual factors like environment, season and technology adopted. However, any variability in quality of tea will conform to the basic requirements as laid down under the PFA. Above all, standard for quality of tea is fixed under the PFA which is mandatory requirement and its violation will attract penalties under the act.

Although most of the parameters for quality of tea are harmonised to various national and international standards, it is still to go a long way, particularly where the question of harmonisation of MRLs for pesticide residue is concerned. Tea Board has taken positive steps in this direction after interactions with the national bodies, European Union, Inter-Governmental Group, FAO and WTO/CODEX Committee for Pesticide Residue.

(Based on the report titled 'Quality in Tea-Related Standards and Specifications', N K Das & T C Chaudhuri; Planters' Chronicle, February 2005)





**Soil** - maintaining "clean soil" reduces the risk of contaminating produce with illness-causing micro organisms found in soil during stages of growth and harvesting. Illness-causing microbes are always present in the soil, but their quantity and resulting risk of product contamination can be increased tremendously by improper manure management and application.

Although manure is a good form of fertilizer, all manure contains pathogens. Some pathogen levels in the soil will decrease over time due to competition from other bacteria in the soil or because of less-than-desirable conditions.

The following steps are recommended to minimize risks from manure.

- Incorporate manure or use cover mulch after application to reduce the risk of physical contamination of product from rain or irrigation splash.
- Reduce microbes through high temperature, aerobic composting.
- Apply manure to cover crops in the fall.
- Apply manure in the spring two weeks before planting and preferably on grain crops or perennials.
- Allow a minimum of 120 days between manure application and fruit or vegetable harvest.

**Water** - Water used for irrigation, cooling, processing, or for cleaning equipment and facilities should be free of microbial contaminants. Water quality and safety can be dependent on the water source.

Municipal water usually has the best quality because of previous testing and safety requirements. Ground or well water will have fewer pathogens than surface water (such as ponds, streams, or rivers) because there is less chance of contamination.

Regularly testing water sources provides documentation that the water is not a source of contamination. The frequency of water testing is dependent on the type of water source and the time of year. Water quality becomes more important as harvest approaches and water contact with the product occurs or increases.

The method and timing of water use also has an effect on its contribution to product contamination. Using drip irrigation instead of sprinklers helps prevent contamination from soil splash and from product contact.



**Hands** - Having "clean hands" refers to the human element involved in food safety during production and processing. The food producer and handler each has an important role in ensuring the safety and quality of foods grown and processed. Poor hygiene and health, unclean clothing or shoes, or unsafe practices on the part of workers can threaten food safety. Providing clean and appropriately stocked restroom and handwashing facilities to field and processing employees helps prevent product contamination. A lack of restrooms results in unnecessary product contaminants in the field.

**Surfaces** - Produce items will have physical contact with many surfaces during harvest and processing. These may include harvest equipment and containers, transport bins, knives and other utensils, sorting and packaging tables, product packaging, and storage areas. Basic GAPs to help ensure clean surfaces include the following:

- Keep potential contaminants, such as soil and manure, out of the processing area or facility.
- Cull soiled produce in the field and damaged produce prior to processing.
- Use plastic containers and totes that are suitable for routine and efficient cleaning and sanitizing.
- Clean and sanitize equipment and facilities daily.
- Consider including a sanitizer in produce rinse water to reduce bacterial contamination.
- Control animal contamination sources, including pets, wildlife, birds, insects, and rodents.
- Develop guidelines for product storage and transportation.



Management steps that are taken to improve product quality can also improve product safety. Product spoilage also is caused by bacteria and molds, so whatever practices are implemented to control product loss from spoilage also will control pathogens.

(Extracted from FAO publication)

### Hazard Analysis and Critical Control Point (HACCP)

Hazard Analysis and Critical Control Point (HACCP) is a process control system designed to identify and prevent microbial and other hazards in food production. It includes steps designed to prevent problems before they occur and to correct deviations as soon as they are detected. Such preventive control system with documentation and verification are widely





recognized by scientific authorities and international organizations as the most effective approach available for producing safe food.

HACCP involves a system approach to identification of hazard, assessment of chances of occurrence of hazards during each phase, raw material procurement, manufacturing, distribution, usage of food products, and in defining the measures for hazard control. In doing so, the many drawbacks prevalent in the inspection approach are provided and HACCP overcomes shortcomings of reliance only on microbial testing.

HACCP enables the producers, processors, distributors, exporters, etc, of food products to utilize technical resources efficiently and in a cost effective manner in assuring food safety.

Food inspection too would be more systematic and therefore hassle-free. It would no doubt involve deployment of some additional finances initially but this would be more than compensated in the long run through consistently better quality and hence better prices and returns.

BIS offers two HACCP Certification schemes to the food industry.

i) HACCP Stand-alone Certification against IS 15000:1998

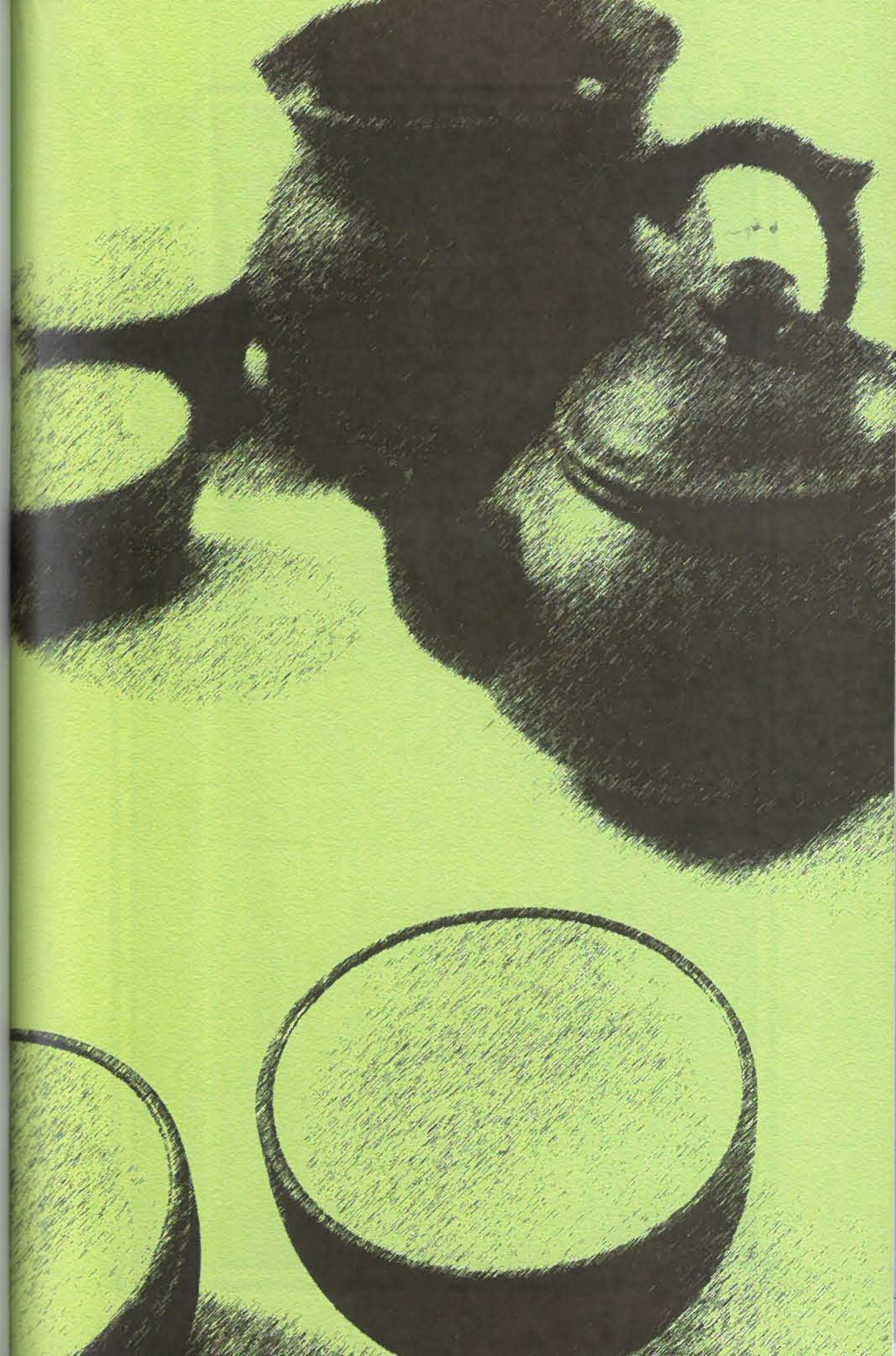
ii) HACCP based Quality System

Certification provides for two Certification through one audit Certification of Quality System against IS/ISO 9000 and Certification of HACCP against IS 15000:1998



Tea Board offers 50% subsidy up to a limit of Rs.75,000 for obtaining HACCP certification from a panel of experts/consultants.

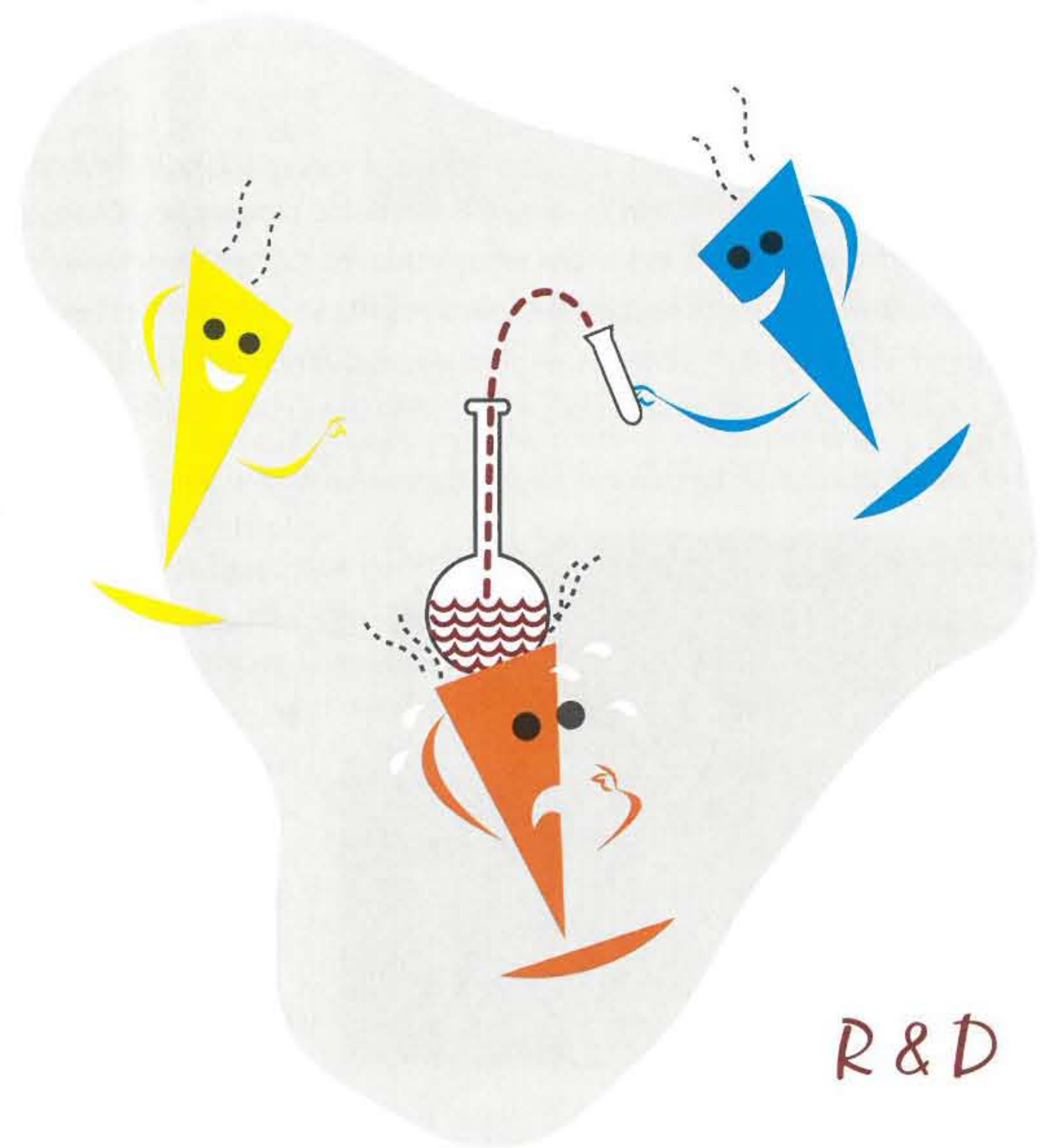
(Extracted from BIS website)





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R & D





## R & D in TEA

### Research Institutions in India

Organised scientific research on tea started in India as early as 1891 as a joint effort between the Indian Tea Association (ITA) and the Agricultural and Horticultural Society of Bengal.

In 1904, a research station on the lines of American Experimental Station was established at Heeleakah Tea Estate, about 32 km south of Jorhat. In 1906, another laboratory was opened at Kannykoory in Cachar.

### Tocklai & Tea Research Association

Tea research was further consolidated by establishing a research complex in the loop of the river Tocklai at Jorhat which started functioning as the Tocklai Experimental Station in 1911. The two stations at Heeleakah and Cachar were closed. The state governments of Assam and West Bengal and the Govt. of India provided sizeable grants towards the recurring expenditure. The period from 1911 to 1961 witnessed the growth and expansion of the Station with more departments and infrastructure being added with research breakthroughs.

Three tea clones, viz., TV1, TV2 and TV3 developed for the first time in the world at



Tocklai were released to the industry in 1949. This marked the beginning of a revolution in clonal selection and vegetative propagation of tea. The first tea machinery invented at Tocklai was the "Rotorvane" by McTear in 1957 that only gave indications of things to follow soon from the Tocklai engineers.

The period also saw a severe financial crisis due to which as

well as increasing running cost, ITA could manage the station only up to 1963. From 1st January, 1964, the management of Tocklai was taken over by the Tea Research Association (TRA) formed as a research body funded partly by the Council of Industrial and Scientific Research (CSIR) and the Tea Board and partly by members of TRA by way of subscription. From that date the services of Tocklai was made available to all member estates of TRA.

Expansion of research and extension services took place thereafter with advisory centres (some with experimental plots) being established at Dikom (Upper Assam), Tezpur (North Bank, Assam), Silcoorie (Cachar, Assam), Darjeeling (West Bengal) and Bengdubi (Terai, West Bengal). An advisory centre had been set up at Nagrakata in Jalpaiguri District of West Bengal as early as 1939 to serve the tea industry in the Dooars. With the formation of TRA, the advisory centre was merged with another small research station earlier set up by the Indian Tea Planters



Association and the Nagrakata Sub-station came into being.

TRA is linked to the Commerce Ministry and the Tea Board for receiving grants-in-aid from the Government. TRA functions under a Council of Management with members elected from the industry, nominees from the Ministry of Commerce, Tea Board, ITA and other sections of the industry. A Scientific Advisory Committee, consisting of scientists drawn from all over India and eminent experts in various disciplines, guides the course of research in TRA.

### UPASI-Tea Research Foundation (UPASI-TRF)

The principal landmark in the history of tea research in South India was the establishment of a Tea Experimental Station in Gudalur in 1926 under the United Planters' Association of Southern India (UPASI). The research activities of UPASI were later separated under a Foundation. Its base lab is now at Valparai with a network of regional centres in Coonoor and Gudalur in Tamil Nadu, Meppadi, Munnar and Vandiperiyar in Kerala and Durgabetta in Karnataka.

During the last seven and half decades, this research organisation, now known as the UPASI Tea Research Foundation (UPASI TRF), had rendered yeomen service to the tea industry in south India. The remarkable achievements of the south Indian tea plantations in the production and productivity of tea bear testimony to the significant contribution of UPASI TRF in the fields of research and extension.

### Darjeeling Tea Research and Development Centre

In order to carry out the research and development activities for the growth and well being of the Darjeeling tea industry, the Darjeeling Tea Research and Development Centre (DTRDC) was established in 1977 at Kurseong with a research farm of 18 hectares attached to it. The Centre is funded by the Tea Board.





### Institute of Himalayan Bioresource Technology (IHBT)

IHBT, a constituent laboratory of CSIR India, is located at the picturesque town of Palampur perched in the lap of majestic snow clad mountain of Dhauladhar in Himachal Pradesh.

The foundation stone of this National lab was laid at CSIR Complex Palampur in 1983 and since 1984, when the Co-ordinating Director was appointed; the Institute pursued developing technologies for sustainable utilization of Himalayan bioresources in the area of tea, floriculture, bamboos and medicinal and aromatic plants. In 1997, the Complex was renamed Institute of Himalayan Bioresource Technology.

### National Tea Research Foundation (NTRF)

The National Tea Research Foundation is functioning as an independent body funded by NABARD, Tea Board and the Tea Industry for sponsoring tea related research all over India.



#### Current Research Trends

##### Research in the field

##### Plant Improvement- New Breeding Techniques, Biotechnology and Transgenics

Conventional methods in tea breeding while providing new clones and varieties have so far immensely benefited the industry. However, large scale vegetative propagation

of a few clones and jats has resulted in a reduction of the gene pool. Newer techniques are now being developed which have opened up the possibility of producing planting materials catering to the specific needs of the tea industry.

Characterization of the material with the help of latest biotechnological tools is the need of the hour which would help in expediting the ongoing breeding work by screening the materials at an early state through marketer assisted selection. Application of techniques such as trait specific genes or cloning of genes for production of various chemicals associated with quality would help in understanding their mechanism of production for utilization in development of superior quality clones. Gene transfer technology would provide alternative means for breeding of materials resistant to various pests and diseases which would



help in reducing the pesticide load. A brief idea of the work being carried out by TRA in this area is given below.

#### Collection and assessment of Germplasms

Germplasms are the basic requirement for development of improved planting material. Wild population of forests and jat populations of tea gardens are the source. The TRA Gene Bank has more than 1800 germplasms accessions which are being maintained and preserved at Tocklai. Plantation of 8 new clonal stocks have been completed under long term agricultural trial to assess the quality, yield and other important parameters. All these new clones show higher EGCG and total catechin values respectively as compared to the present standard quality clones S.3A/3 and TV1.

#### Commercial trial for assessment of new clones

Commercial trial planting of TRA clone P492 have shown significantly higher yield over most high yielding clones as well as better quality with flavour and aroma.



#### Classical breeding

In order to develop improved planting materials through conventional breeding controlled hybridisations are being carried out regularly using standard and quality category clones as parent. Progenies with high yield and quality have been selected and are under different stages of study/assessment.

#### Characterisation

Physiological characterisation of plant materials for selection of drought tolerant genotypes is being done by leaf water potential.



Molecular characterisation and genetic documentation of tea germplasms clones are being carried out using modified AFLP method involving Mse/primers. Data obtained is being used for analysis of genetic similarity and divergence and clustering of cultivars in order to establish genetic relatedness.





### Marker-trait association study

Statistical regression analysis on AFLP makers reveal marker trait association which can be used for further selection of clones under tea molecular breeding programme.

### Molecular markers for disease resistance in tea

A molecular breeding approach has been undertaken to study the genetic homology and divergence of tea cultivars regarding blister blight disease. This information could be useful in the development of genetic mapping population required for linkage mapping and marker assisted selection.

### Molecular documentation of made tea



The study on this subject seeks to help protect Indian tea in the international market.

### Gene cloning

Genes involved in the different metabolic pathways for production of flavour and aroma in tea, are being cloned. Genes for aquaporins (aqua1, water channel proteins) related to water stress are also being cloned which would help in

assessment of clones for drought/water logging conditions.

### cDNA library construction

Plant materials under various sources of biotic stress are collected and total RNA was isolated for construction of cDNA library and for identification of stress induced genes by differential display.

### Molecular analysis of biotic stress in Darjeeling clones due to Jassid infestation

Marker analysis for flavour using cDNA (both single and double stranded) synthesis techniques is being done on Darjeeling clones which were infested by jassids.



### Plant Protection: Integrated Pest & Disease Management



One burning issue of our time is overuse of pesticides and fungicides with consequent effect of pest and disease resistance. Overuse of chemicals has also caused immense damage to the environment. Tea is a commercial cash crop and until a more environment-friendly solution is found,

chemicals will continue to be used. At present, therefore, the way out is to a fine balance between what and how much can be used and consideration for the environment. In any case the use of toxic plant protection chemicals will have to be minimised and ultimately eliminated.

Towards this end, Tocklai has been working towards an integrated pest and disease management using predator pest control techniques along with combination of native botanical and microbial pesticides for controlling diseases of tea.

The experiments conducted in the laboratory and the field have confirmed the fungicidal effects of water and solvent extracts of acorus calamus, cassia tora, xanthium strumarium, cerodendron infortunatum, adhatoda vasica, equiteum arvense and polygonum hydropiper which have shown to inhibit the growth of disease ranging between 25.9 to 85.5 percent. Out of the different native herbal extracts tested cassia tora and acorus calamus have proved to be highly effective against blister blight and black rot diseases.

The antagonistic actinomycetes species isolated from rhizosphere soils of organic and conventional tea areas have shown promise in controlling tea pathogens such as corticum invisium, ustulina zonata, fomes lamaoensis, pestalotia theae and poria hypobrunnea.

### Engineering & Manufacturing

#### Process Automation

#### Introduction

The quality of black tea is primarily determined by:

- Genetic factors — such as clones or varieties of the tea bushes determines the types and amounts of useful constituents in the green leaves





- Environmental factors — such as altitude, climate and soil in the growing region
- Agronomic factors — such as farm management, harvesting and fertiliser applications
- Factory practice — processing conditions, techniques and machinery.

Of these four factors, the first and the second are generally considered as uncontrollable factors for tea production, whereas the third and the fourth are controllable factors. During processing, the quality attributes of black tea are formed gradually by various chemical and biochemical reactions in the leaf. Thus, once the other quality factors (genetic, environmental and agronomic) have been more or less fixed, the processing is critical for producing high quality tea.

### Monitoring of Process Parameters

Because tea factories have, for so many years, been producing teas that always find a market, monitoring for optimum efficiency and quality has not necessarily been built into the production process. Conventionally, teas are manufactured under manual supervision on the basis of acquired skills and experiences. This often leads to inconsistencies in the manufacturing process. In order to make best possible tea from the leaf brought to factory, manufacturing process must be carried out within certain well-defined limits of physical parameters like time, temperature, humidity etc. Presently, tea processing technology is being constantly upgraded with improved machinery and better quality control methods to assess anything that could possibly go wrong, to isolate it, and then modify procedures to ensure that it will not go wrong in the future.

Thus, in order to produce tea on a more rational and scientific basis with the objective of quality enhancement, measuring and monitoring of the key parameters at various stages of processing has turned out to be an essential part of factory operations.

### The Model Tea Factory (MTF)

The Model Tea Factory (MTF) is an industry-level research infrastructure and a complete representative continuous black tea manufacturing factory. It houses the latest generation of tea processing machines coupled with the utmost level of mechanisation. It has been set-up at the Tea Research Association, Tocklai Experimental Station, Jorhat, with the following objectives:



1. To determine the optimum processing conditions for production of quality teas by validating knowledgeable intuitions on the process variables in the Environment Controlled Manufacturing (ECM) unit, having a capacity of 1-4 Kg of green leaf.
2. Re-validation of ECM-proven ideas by scaling-up the process in the MTF, having a capacity 50 Kg per hour.
3. Evaluate the impact of variations in machine parameters/design in pursuit of radical changes in the processing technology towards quality upgradation.
4. Chemical and organoleptic evaluation of quality of the tea produced in the MTF for statistical validation and scientific justification. Extensive production data are logged for such analysis and need-based simulation
5. Propagating the validated knowledge to the industry by way of real-life simulation of observed results.

### Integrated Automation in MTF



While the best industrial tea manufacturing machinery has been commissioned in the Model Tea Factory, each of such machinery has been augmented with various sensors and additional control features.

Around 90 sensors of various types have been installed to monitor variety of process parameters like temperature, humidity, motor speed, moisture, air flow, CO<sub>2</sub>, O<sub>2</sub>, etc. Advanced networking technology along with PC based distributed data acquisition and measurement systems have been applied for on-line monitoring and real-time data logging. Logged operational data permit off-line analysis and model generation to nucleate and support improved production control rules and strategies.







## Brief Outline of Instrumentations Installed in MTF

Processing machinery in the Model Tea Factory have been equipped with various sensors as detailed below:

Withering Trough (Enclosed & Open)

- Leaf moisture Sensors
- Leaf temperature Sensors
- Temperature and RH of air at ambient, above and under the leaf bed Rotorvane
- Leaf temperature sensor at discharge
- Current sensor for motor load
- Interfaced with LCU for CTC. Triplex CTC Machine
- Leaf temperature sensors at each cutting unit
- Current sensor for motor load at each cutting unit
- Variable speed (AC Drive) for motor speed variation
- LCU consisting of Industrial PC and signal transmitters. Continuous Fermenting Machine (CFM)
- Online display of throughput time
- Leaf bed temperature sensors
- RH sensors
- CO<sub>2</sub> sensor
- O<sub>2</sub> sensor
- Camera
- LCU consisting of Industrial PC and signal transmitters. Floor Fermentation (FFM)



- Leaf bed temperature sensors
- RH sensors
- CO<sub>2</sub> sensor
- O<sub>2</sub> sensor
- LCU consisting of Industrial PC and signal transmitters. Gumla Fermenting Trough (GFM)
- Leaf bed temperature sensors
- RH sensors
- Interfaced with LCU for Floor fermentation (FFM). Drier (VFBD)
- Temperature sensors for T1, T2, T3 & T4
- RH sensors at exhaust of wet semi dry and dry zone.
- Airflow sensor (fitted at upstream of the hot air fan)
- LCU consisting of Industrial PC and signal transmitters. Continuous belt Weigher (MCW)
- Continuous and online record of dryer mouth tea
- Interfaced with LCU for Drier

Through appropriate process control and automation for each of the processes, tea producers are now equipped with additional knowledge and know-how on tea processes. Having been



orchestrated in an integrated manner, automation leads towards improved production control rules or strategies and optimization of process parameters, leading to great benefits towards improvement of productivity, efficiency, energy saving and quality of the manufactured black tea.





## Product Innovations

Tocklai has embarked upon development of technology for product diversification over a period of time. This technology development programme dates back to the 80s' when the instant tea project was initiated at Tocklai under Tea Board. After successful completion of the project TRA has undertaken a number of other product development programmes. A Diversification Committee was also constituted by the Council to oversee the programmes on product diversification. This product diversification programme has gained the momentum from 1999 and subsequently the project was expanded with the 10th Plan Project of Product Diversification. Significant products which have so far already been developed are natural tea colours, tea tablets, tea soft drinks and tea flavours. Other products in the process of development are such as tea candy, tea confectionary, etc. A brief description of the products is given below:

### Natural Tea Colour



An attempt has been made for the extraction of tea pigments from tea waste/spent tea and fractionated it using Counter Current Extractor. Two different methods have been used – a) Hot water extraction and b) Solvent extraction.

Extract from the above are fractionated into different fractions by using several solvents of different polarity. The fractions of pigments collected have different colour intensity with significant influence on food products. Pilot scale development is in progress.



### Tea Tablet

Tea tablet has been formulated from instant tea as well as black tea. The tablet formulations available include both hot and cold water soluble tablets. The tablet has a shelf life of 4-6 months depending on the type of formulation and can be chewed, sucked and can also be consumed after dissolving in water.



## Tea Soft Drink

Formulation for tea soft drink has been developed from green as well as black tea. Soft drink formulated from black tea has a shelf life of 4 months and from green tea has a shelf life of 6 months.

### Tea Flavour

Black tea flavour has been extracted using steam distillation method with an yield as high as 100% more than normally achieved through this techniques. The flavour is suitable as food additives as well as has scope for use in the perfumery industry.



## Other Products



The other products which are in various stages of developments are tea candy, tea confectionary, tea flavour using super critical fluid extractor, tea polysaccharide etc.



(Write-up and photographs courtesy of research organisations' websites and contribution by Tea Research Association)





*We are grateful!*

Jay Shree Tea

TATA Tea

Goodricke

Gillanders Arbuthnot & Co. Ltd.

Gujarat Tea Processors & Packers Ltd.

Mcleod Russel India Limited

Bush Tea Company Pvt. Ltd.

Dhunseri Tea.

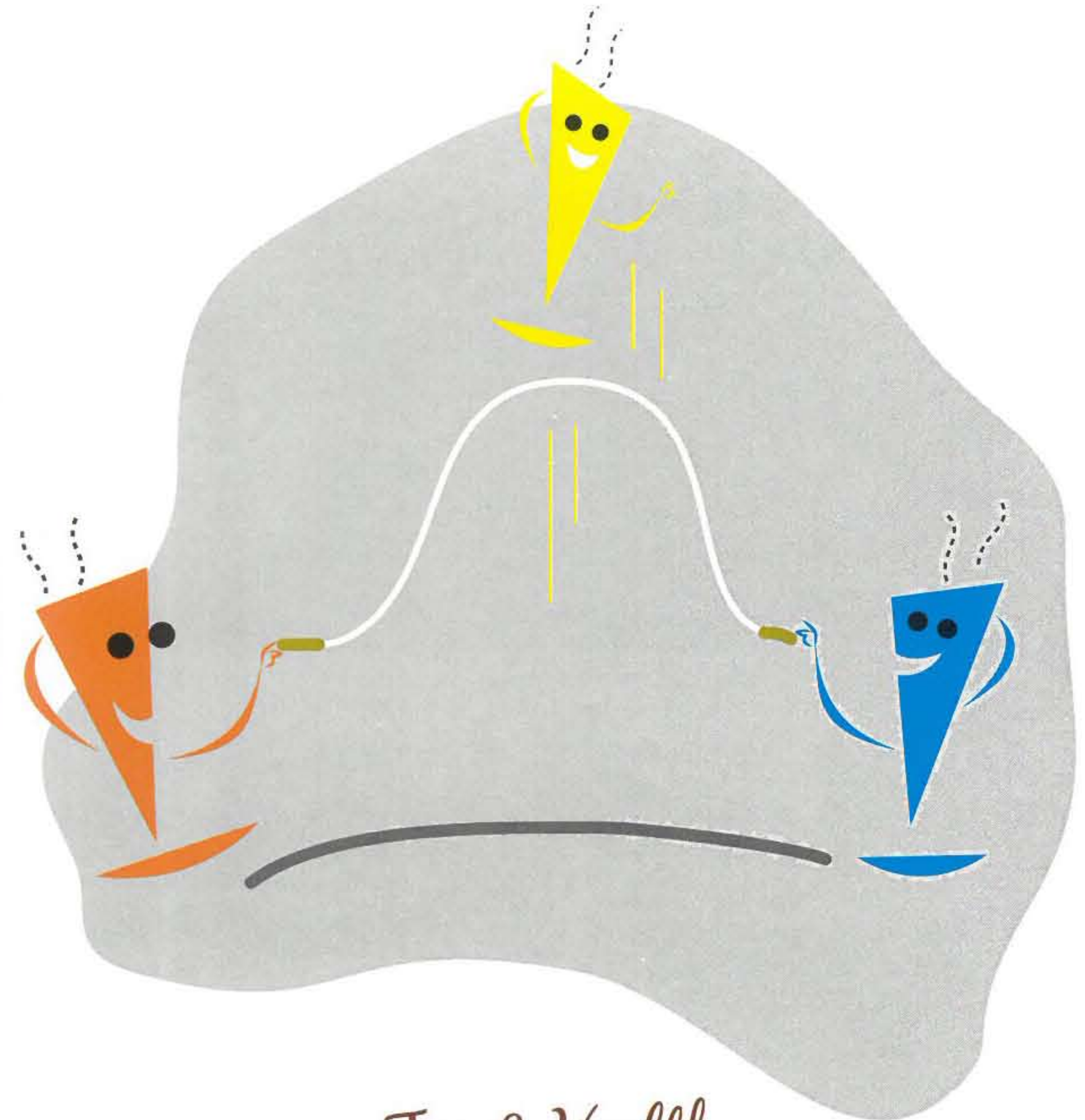
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*Tea & Health*





## TEA & HEALTH

### Executive Summary

Tea is a well loved beverage that is enjoyed all over the world. Its refreshing taste and its mildly stimulating properties makes it one of the most sought after drink across the globe. In recent times research has also confirmed the medicinal value of tea. A beverage that also energises, tea is perhaps one of the few commodities in the world that both satisfies and promotes good health.



**"TEA CONTAINS HEALTH PROMOTING  
INGREDIENTS, LOWERING THE RISK OF  
HEART DISEASE, STROKE & CANCER."**

DR. JOHN WEISBURGER, DIRECTOR EMERITUS  
AMERICAN HEALTH FOUNDATION

A large body of international research has given clear indication of the positive effect of tea consumption on human health. This work was initially done in China, followed by Japan and eventually USA at leading institutions such as Harvard. Tea research now is espoused the world over.

Generally green tea is perceived as 'healthier' than black tea, primarily because the first experiments were done with green tea. However, it has now been established that all types of tea have high levels of anti-oxidant content that is useful for neutralising harmful free radicals present in the human body.



Research has also observed that those consuming 3 or more cups of tea daily exhibit greater benefits (after adjustment of risk factors like age and smoking): And these pertain to:

- **Heart** : Tea flavonoids help to decrease fat oxidation, thereby promoting blood circulation which would tend to minimise heart attacks/stroke.
- **Cancer** : Tea similarly inhibits oxidative changes in DNA consequently decreasing the growth of abnormal cells.
- **Oral Health** : Tea without milk and sugar tends to have a disinfecting effect in the mouth and throat, with a firming effect on the gums.
- **Immunity to Disease** : Certain compounds present in tea indicate strengthening of human immunity and disease.
- **Obesity** : Key findings indicate that tea drinking has a positive influence on fat accumulation by promoting energy expenditure and fat oxidation. Insulin activity also multiplies, assisting those with diabetic symptoms.
- **Risk of Kidney Stones** : Studies have indicated reduced chances of developing kidney stones by regular intake of tea.
- **Bone Health** : It has been observed that tea drinking elderly women had higher mineral density as compared to the control group.

Certainly the knowledge of such benefits explained in the above paragraphs has helped improve an all round perception of tea as not only a great beverage, but a healthy one too!

### Therapeutic Constituents of Tea

Tea has certain chemicals, some of which are as unique as the plant itself. For years, since commercial planting of tea took root in India, research focussed on what comprised the quality element in tea based on the assumption that a single influencing factor or ingredient was responsible.

The perspective quickly changed. Several factors were attributed to the quality aspects of tea. Advancement in chemical research provided that chief constituents of tea leaves were broadly identified to be carbohydrates, proteins, polyphenols, caffeine, thiamine, vitamins and







minerals. The leaf also contains enzymes that facilitate the chemical reactions in processing young shoots to produce green, black and oolong tea.

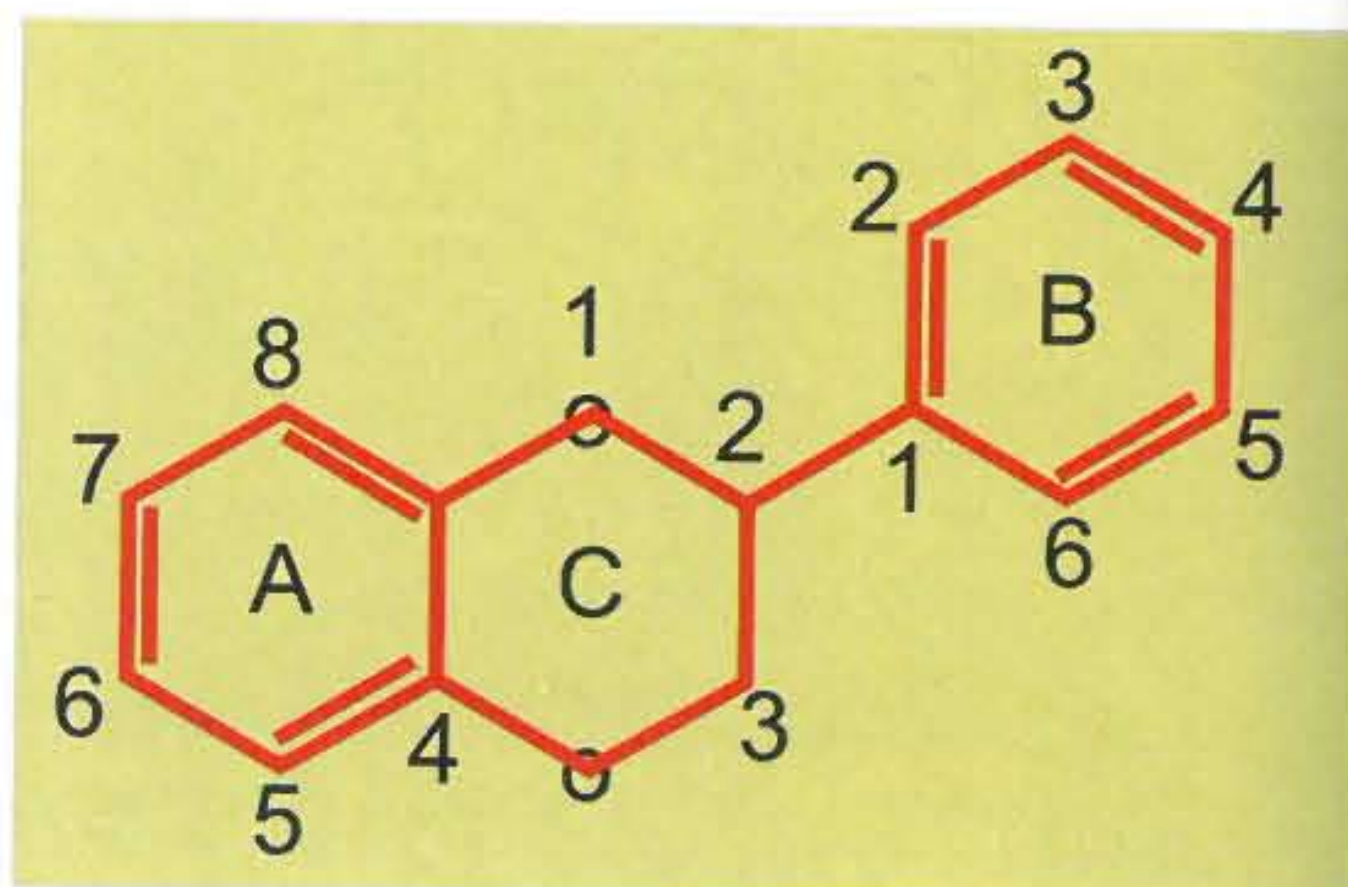
From therapeutic point of view, polyphenols and caffeine are of pivotal importance, though vitamins and minerals are also of considerable medicinal significance. It is generally believed that these chemical constituents of tea, together or separately, and most probably by their interactions, affect both its quality and medicinal attributes.

### Polyphenols

Tea contains 30 to 42% polyphenols on a dry-weight basis, catechins being particularly important.

A cup of tea may contain between 300 - 400 mg of polyphenols. EGCG is the major polyphenolic constituent, contributing to 25 - 40% of the total catechin load of tea.

Polyphenols possess high antioxidant properties and protect human cells from adverse effect of the damaging reactive oxygen species (ROS). The aetiology of most human diseases can be traced to ROS, and in the event polyphenols act as scavengers to prevent damages to cellular macromolecules (Dufresne and Farnworth, 2001).



The catechin content of tea varies according to the genotype. The Assam variety generally accumulates more catechins than the China variety. In the former, catechin accounts for 30% of the dried matter against 20% in other varieties.

### Caffeine

The effect of caffeine on the human system is complex. It stimulates the brain and the nervous system signalling the production of the hormone adenosine which slows down the rate of metabolism, a kind of sedative in effect. It is of interest to note that caffeine and its metabolites do not accumulate in the body as they are generally demethylated, oxidised and excreted.

### Vitamins

Tea contains a wide range of vitamins that include carotene, riboflavin, nicotinic acid, pantothenic acid, ascorbic acid and thiamine, though most of them are lost during the processing of fresh

green tea leaves to black tea. Vitamin B content in black tea ranges from 1.4  $\mu\text{g}$  of biotin to 127.5  $\mu\text{g}$  of riboflavin.

### Carbohydrates

Carbohydrates constitute about 4.5% of the solids extracted in tea infusion. Though concentrated mostly in the roots, carbohydrates are not uncommon in the leaves. From nutritional point of view, carbohydrate content is significant.

### Lipids

Lipids are an interesting group that show marked variation in their chemistry. Young tea leaves, for example, contain more phosphatidyl ethanolamine and phosphatidyl choline than mature leaves, but monogalactosyl diglyceride and digalactosyl glyceride are present in higher concentrations in mature leaves (Roberts, G.R., 1974; Takeo and Tsushida, 1980).

### Carotenoids and Pigments

The fourteen carotenoid compounds identified in tea leaves (Wickremasinghe, 1979) are mostly concentrated in mature leaves. Whether they have any therapeutic significance is not clear. Tea pigments, however, have considerable medicinal properties – particularly beneficial in cardiac diseases. 125-250 mg of green tea pigments thrice per day appears to have good effect on human subjects (Banerjee, 1992a).

### Minerals

Minerals constitute about 4 to 9% of the inorganic matter of tea. Of particular interest for dental health is the fluorine (3-200 ppm) in leaves which could prevent dental decay. The role of aluminium (20-11000 ppm) is controversial, but potassium (9000-34000 ppm) could have a supplementary effect in diets lacking potassium.

### Overall Distribution of Compounds

All parts of the tea plant of any variety store chemicals, though they vary qualitatively as well as in composition. Compounds found in different parts of tea (Table 2.1) would give an idea of the diversity of the compounds in different plant parts (Banerjee, 2002).







Table 2.1 Distribution of chemical compounds in different parts of tea

Compounds	Young leaf	Mature leaf	Green Stem	Mature stem
Polyphenols	++	+	+	+
Amino acids	++	+	+	+
Nucleotides	+	+	+	+
Phosphate esters	+	+	ND	ND
Caffeine, theobromine	++	+	+	+
Lipids	+	+	+	ND
Organic acids	+	+	+	+
Chlorophyll	+	+	+	+
Carotenoids	+	+	+	+
Unsaponifiables	+	+	+	+
Saponin	+	+	+	+
Minerals	+	+	+	+
Volatile Compounds	+	+	+	+

+ = relative abundance; ND = not determined

#### Pharmacological Beneficial Effects on Human Health

- Power of antioxidants is correlated to Life Span Energy Potentials (LSEP).
- Antioxidants and Vitamins prevent a number of diseases
- Maintains homeostasis
- Protects against DNA damage caused by Reactive Oxygen Species from endogenous and exogenous sources
- Powerful chemo preventer of Reactive Oxygen and Nitrogen Species

- Protective against oxidative damage in red blood cells
- Positively influences bone mineral density (BMD) and protects against osteoporosis in elderly women
- Inhibits growth and development of many types of Cancer (increases Apoptosis), atherosclerosis, etc.
- Protective against Cancers induced by chemical carcinogens
- Improves patho-physiological condition
- Germicidal
- Antimutagenic
- Anticarcinogenic
- Detoxifying function
- Combats risk of developing heart disease, high blood cholesterol and high blood pressure. Acts as an Oxygen Radical Scavenger and exerts hypocholesterolemic action.
- EGCG-Treatment of EGCG to skin inhibits ultraviolet radiation induced oxidative stress. Protective effect against oxidative damage to cellular DNA.
- Significant increase of human plasma antioxidant capacity
- Blocks production of Oxygen Free Radicals
- Enhances the level of antioxidant defense enzymes such as SOD and catalase







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Polyphenols	++	+	+	+
Amino acids	++	+	+	+
Nucleotides	+	+	+	+
Phosphate esters	+	+	ND	ND
Caffeine, theobromine	++	+	+	+
Lipids	+	+	+	ND
Organic acids	+	+	+	+
Chlorophyll	+	+	+	+
Carotenoids	+	+	+	+
Unsaponifiables	+	+	+	+
Saponin	+	+	+	+
Minerals	+	+	+	+
Volatile Compounds	+	+	+	+

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- Antioxidants and Vitamins prevent a number of diseases
- Maintains homeostasis
- Protects against DNA damage caused by Reactive Oxygen Species from endogenous and exogenous sources
- Powerful chemo preventer of Reactive Oxygen and Nitrogen Species



- Protective against oxidative damage in red blood cells
- Positively influences bone mineral density (BMD) and protects against osteoporosis in elderly women
- Inhibits growth and development of many types of Cancer (increases Apoptosis), atherosclerosis, etc.
- Protective against Cancers induced by chemical carcinogens
- Improves patho-physiological condition
- Germicidal
- Antimutagenic
- Anticarcinogenic
- Detoxifying function
- Combats risk of developing heart disease, high blood cholesterol and high blood pressure. Acts as an Oxygen Radical Scavenger and exerts hypocholesterolemic action.
- EGCG-Treatment of EGCG to skin inhibits ultraviolet radiation induced oxidative stress. Protective effect against oxidative damage to cellular DNA.
- Significant increase of human plasma antioxidant capacity
- Blocks production of Oxygen Free Radicals
- Enhances the level of antioxidant defense enzymes such as SOD and catalase







- Combats blood sugar (diabetes)
- Protects cigarette smokers from CS-induced oxidative damage and the consequent degenerative diseases
- Prevents dental caries, inhibits plaque formation
- Helps build strong muscles
- Aids growth, digestion and vitality
- Helps better metabolic function
- Prevents many illnesses that cause substantial mortality and morbidity

Prevents onset and subsequent progression of several diseases Maintains body balance

### Frequently Asked Questions about Antioxidants

#### Do black and green teas have similar effects?

Yes. Most studies show similar effects. The antioxidant properties of polyphenols from black and green teas destroy the reactive oxygen species (ROS) and prevent diseases in humans in identical manner. All teas -- green, black or oolong -- have health promoting potential. Of course, the level of vitamins in black tea is reduced due to processing.

#### How much tea should one consume from the health point of view?

Most research shows 5 to 10 cups daily might be optimal with a concentration of about 2% of tea, black or green, in the infusion.

#### Will addition of sugar reduce the antioxidant effect of tea?

Antioxidant potential should remain unchanged; however sugar consumption has its own hazards.

#### Can tea be the panacea for human diseases?

Not really. But the evidence of beneficial effects of tea consumption is convincing in



some cases and only suggestive in others as indicated below:

Disease	Evidence of benefit in humans
Cardiovascular	Strong
Cancer	Varying: population-wise
Diabetes	Suggestive
Obesity	Suggestive
Osteoporosis	Some
Arthritis	Suggestive
Neurological	Some
Bacterial (tooth decay)	Suggestive

Siddiqui, Afaq and Mukthar: Int. J. Tea Sci. 2:6-17: 2003)

### What are antioxidants?

Antioxidants are compounds that help the body to fight harmful free radicals. The free radicals occur naturally in the body but excess amounts increase the risk of coronary attacks and cancer.

### How much antioxidants are present in a cup of brewed tea?

The amount may vary depending on the kind of manufactured tea, but it goes up to 200 mg per cup.

### How does Tea compare with other sources of antioxidants?

Your daily cup by all means is one of the richest sources of antioxidants. Antioxidant activity of tea is greater than the antioxidant activity in 22 fruits and vegetables studied so far.

### Can antioxidant catechins cause any risk if one drinks too many cups of tea per day?

As long as the amount is less than 20 cups of tea per day there shouldn't be any problem. 7 to 15 cups per day gives 900 to 1500 mg of catechins per day. Even 1-2 gms of catechin per day does not cause any toxicity within the human system.





### How do antioxidants work?

Antioxidants, such as they are present in tea, are substances which scavenge excess free radicals generated within our body, and thereby prevent their damaging effects.

### Are antioxidants found in tea natural?

Yes. Antioxidants occur naturally in tea.

### Does adding milk to tea affect the antioxidants?

Adding milk (2%) to tea does not affect the antioxidant activity.

### What are free radicals?

Free radicals are reactive chemicals containing one or more unpaired electrons.

### What is free radical reaction?

Free radicals are unstable molecules with nascent oxygen. To become stable they attack cell membrane, and may accept or donate one electron. But this process leads to generation of more free radicals ad infinitum.

### How are free radicals generated in the body?

Free radicals are produced in the body naturally and as by-products of day to day metabolic activity. Normal production of free radicals ensures protection against foreign invaders in our body leading to disease state. But excess production of free radicals within the body due to pollution and other factors is harmful.

### What are the damaging effects of free radicals?

Increased levels of free radicals damage cell membrane and disturb the delicate balance between cell structure and function. This harmful action is responsible for many human diseases affecting vital parts. These free radicals work against body's immune system creating oxidative stress. This causes diseases like cancer.

### Does our body have defence against free radicals?

The excess free radicals produced within the body are removed by body's own defence mechanism. But under diseased conditions, during aging or due to bad dietary intake, body's defence mechanism becomes inadequate to remove excess free radicals generated.



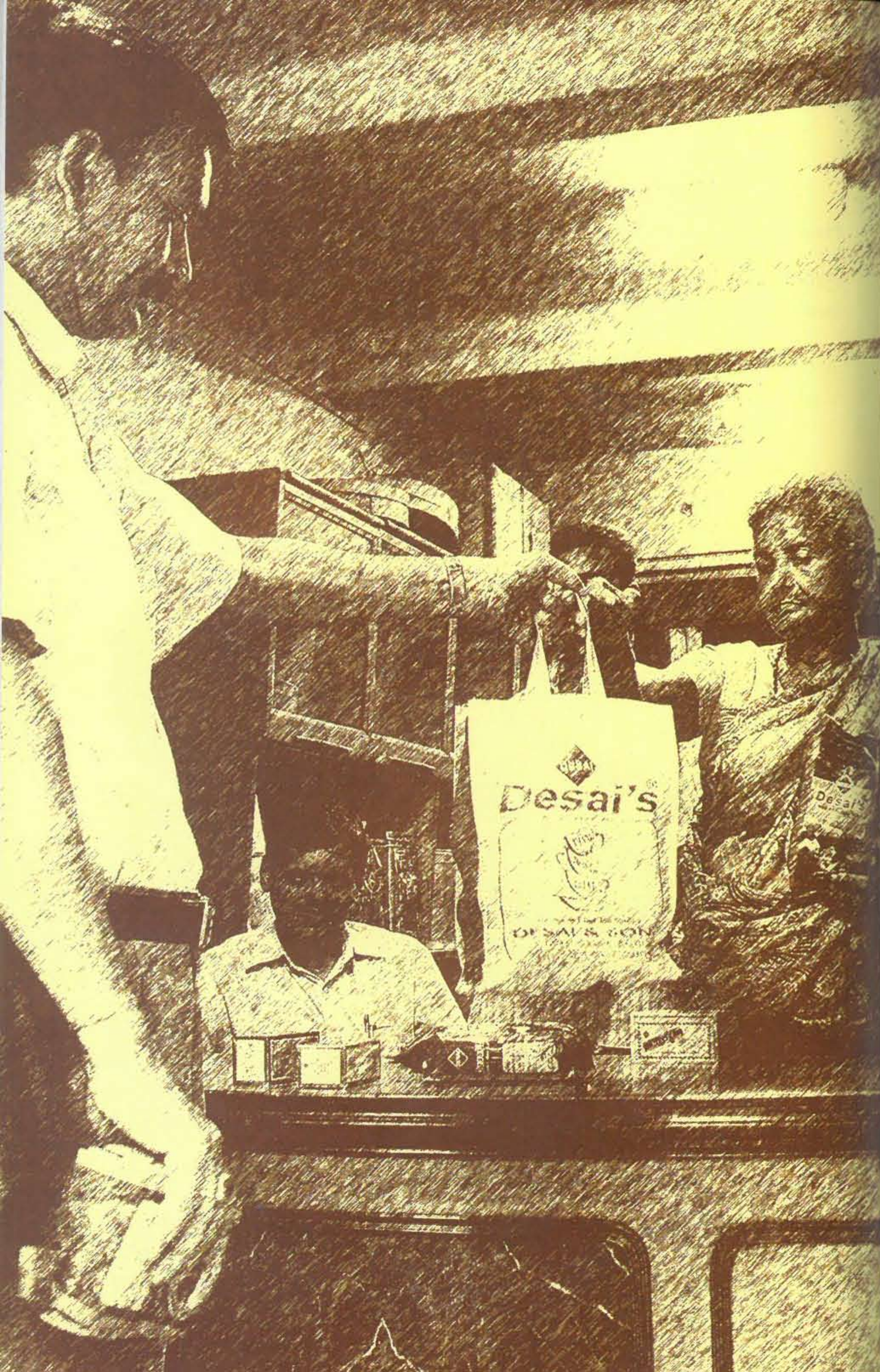
### How much medicinally important compounds are present in the dry black tea?

One gram of black tea contains 3.19 mg of epigallocatechin gall ate and 9.50 mg of theaflavin.

(Source : Medicinal Properties of Black Tea; Editors: B. Banerjee & T. C. Chaudhuri)







*Milestones*







## Milestones

**2737 BC**

Emperor Shan Nong of China discovers Tea, quite accidentally.

**790 AD**

Tea taxed for the first time. First book on Tea written by Lu Yo.

**1368 to 1644**

Traditional styles of Green, Black and Oolong teas make their first appearance under the Ming dynasty

**Early 17th Century**

Tea arrives in the West

**Mid 17th Century**

Tea arrives in the New World

**1669**

British East India Company brings first tea shipment to England

**1773**

The Boston Tea Party

**1810**

Birth of Indian Tea. The Assam plant was found growing on either side of the Brahmaputra in the Northeast. Robert Bruce is credited to have made this discovery and his brother C.A. Bruce continued to search for new tea areas.

**1834**

A Tea Committee was formed by Lord William Bentinck including several employees of the East India Company.

**1838**

The first consignment of Assam tea was exported to England.

East India House. 1808. A Tea auction is in progress



**1839**

First tea auction in London

**1841**

First tea plants cultivated in Darjeeling by Dr Campbell. Commercial planting started in 1856

**1855**

Planting commenced in Cachar



**1856**

Tea cultivation commenced in Kerala and the Nilgiris

**1861**

First public tea auction in India conducted under the instructions of R Thomas & Co.

**1874**

Dooars plantations established. Planting started by Dr Brougham.

**1881**

Formation of Indian Tea Association

**1883**

Establishment of the Colombo Auctions.

**1886**

on 15th September, the Calcutta Tea Traders Association (CTTA) was established



**1887**

First tea roller invented by William Jackson

**1894**

The formation of the United Planters Association of Southern India (UPASI)

**1908**

Invention of the tea bag in the USA.

Tocklai Experimental Station established as the R&D wing of ITA



**1932**

Introduction of CTC manufacture

**1947**

Establishment of the Cochin Tea Auctions

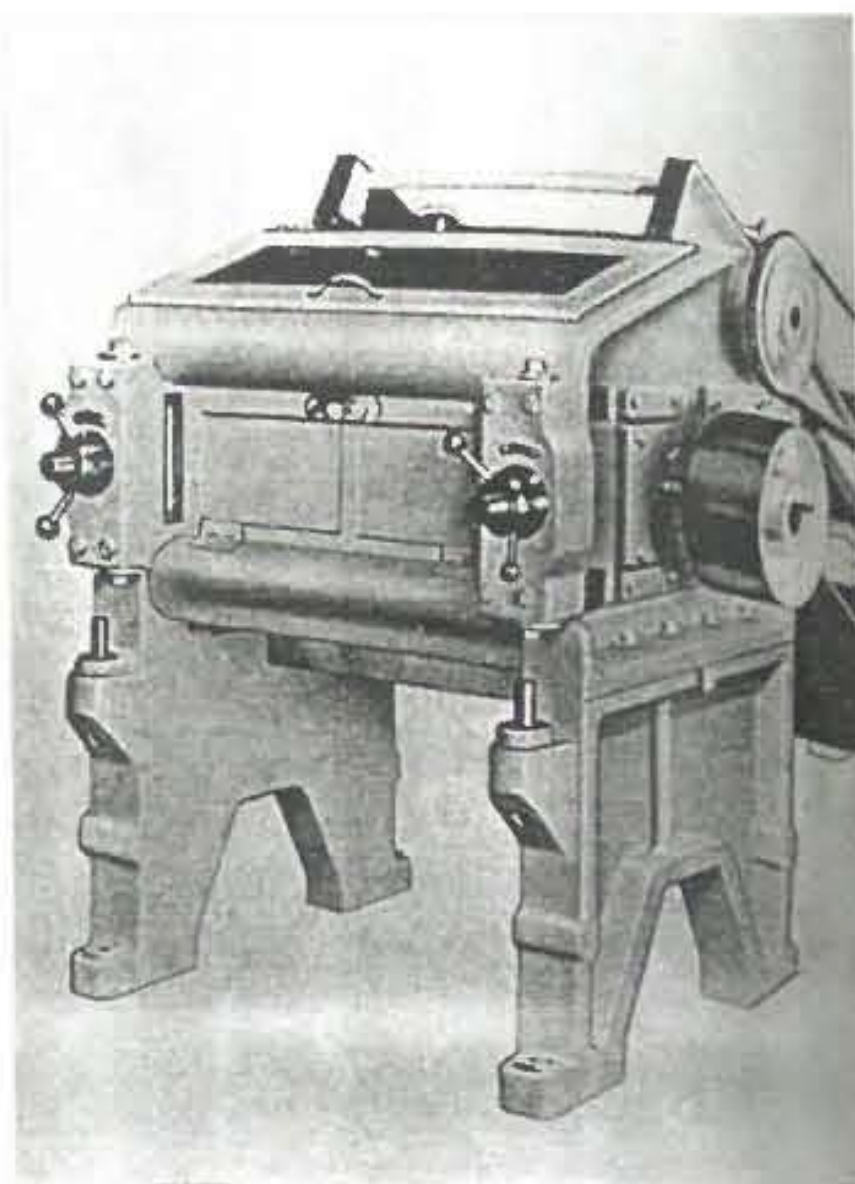
**1962**

Large scale shift from Orthodox to CTC manufacture

**1969**

Establishment of the Mombasa Auctions



**1970**

Establishment of the Guwahati tea auctions

**1978**

RTD in Japan

**1980**

Establishment of the Coimbatore Auctions

**1987**

Vacuum packing

**2004**

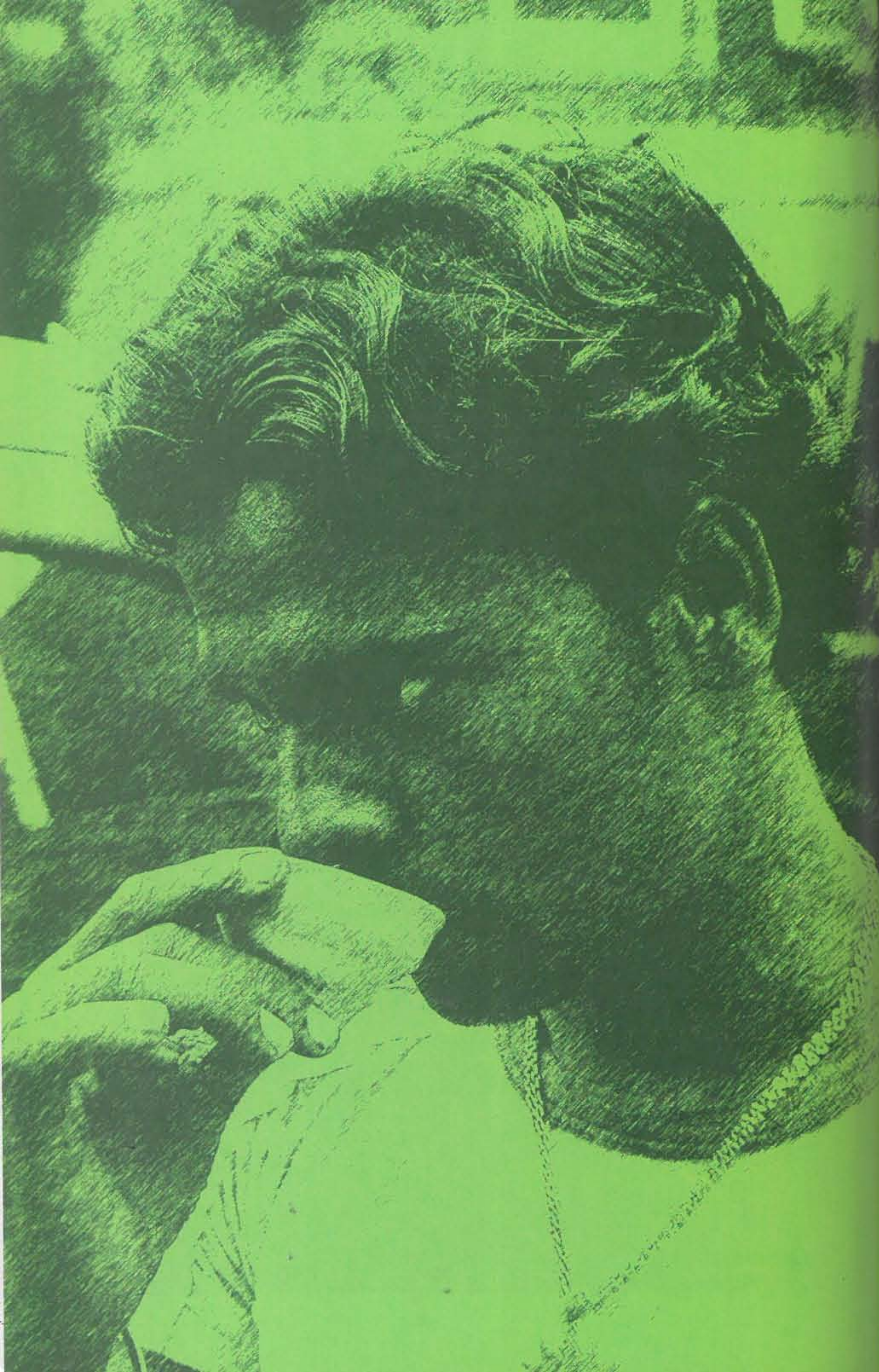
Introduction of Electronic Tea Auction in Coimbatore, India

**2006**

Geographical Indication registration of Darjeeling tea

*What is Tea?**When both the host and guest  
have exchanged their minds,  
only then does the water truly boil.**Since the garden path is a way  
beyond this transient world,  
why not shake off the dust  
which soils the mind?**What is Tea? Simply boiling water,  
making tea, and drinking it.  
Know that this is fundamental.**The garden path, the hut,  
the hosts and guests...  
All are whipped together  
in the Tea, and are without distractions.**~ Sen no Rikyu (1521-91)*





*Don't just  
drink tea*







## DON'T JUST DRINK TEA .....

Did you know that tea is not only a drink but also useful for us in many other ways?

Here are 15 wonderful uses for tea !

1. Apply a wet tea bag on the razor burn to reduce the pain.
2. Place the lukewarm tea bags on your closed eyes to refresh tired eyes.
3. Soak a tea bag in cool water and place it on the site to stop the bleeding and pain of a lost tooth.
4. Place your feet in strong tea concoction to get rid of the unpleasant odour.
5. Soak a tea bag in cool water and place it over the site of injection to relieve the pain.



6. Apply a few wet tea bags on the affected skin after sunburn to reduce the pain.
7. To get pain relief from ivy rash, dip a cotton ball in tea and wipe on the affected part.
8. Gargling with the herbal tea made with peppermint reduces toothache.
9. Wash your hair with a cup of herbal tea after shampooing to make the hair silky and shiny.
10. Clean the wood furniture with a soft cloth dipped in a freshly prepared tea to add shine to them.
11. Sprinkling some used tea bags near the rosebushes enhances their growth by nourishing them.
12. Spark the mirror by cleaning it with a soft cloth dipped in tea.



13. Place a few used tea bags on top of the drainage layer at the bottom of the planter before potting to keep the plants healthier
14. Gargling with the herbal tea made with peppermint reduces toothache.
15. Pour some cups of tea into the compost to accelerate the decomposition and create acid rich compost.



*If you are cold, tea will warm you  
if you are too heated, it will cool you  
if you are depressed, it will cheer you  
if you are exhausted, it will calm you.*

~ William Gladstone





## Appendix







## PREVENTION OF FOOD ADULTERATION (THIRD AMENDMENT) RULES, 2006

**MINISTRY OF HEALTH AND FAMILY WELFARE**  
(Department of Health)

### NOTIFICATION

**New Delhi, the 9th May, 2006**

G.S.R. 277(E). -- Whereas a draft of certain rules further to amend the Prevention of Food Adulteration Rules, 1955, was published, as required by sub-section (1) of section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954), at pages 1 to 7 in the Gazette of India, Extraordinary, Part II, section 3, sub-section (i) dated the 6th May, 2005 under the notification of the Government of India in the Ministry of Health and Family Welfare (Department of Health), Number GSR 277(E) dated the 6th May, 2005 inviting objections and suggestions from all persons likely to be affected thereby before the expiry of a period of sixty days from the date on which the copies of the Official Gazette containing the said notification, were made available to the public;

And whereas the copies of the said Gazette were made available to the public on the 9th May, 2005;

And whereas objections or suggestions received from the public within the specified period on the said draft rules have been considered by the Central Government;

Now, therefore, in exercise of the powers conferred by section 23 of the said Act, the Central Government, after consultation with the Central Committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955, namely:--

- I (1) These rules may be called the Prevention of Food Adulteration (Third Amendment) Rules, 2006.
- (2) They shall come into force on the date of publication in the official Gazette.
2. In the Prevention of Food Adulteration Rules, 1955 (hereinafter referred to as the said rules), in Appendix B, -
  - (i) for item, A. 14, the following shall be substituted, namely, -

**A.14** Tea means tea other than Kangra tea obtained by acceptable processes, exclusively from the leaves, buds and tender stems of plant of the *Camellia sinensis* (L) O. Kuntze. It may be in the form of black or oolong tea. The product shall have the characteristic flavour free from any off odour, taint and mustiness. It shall be free from living insects, moulds, dead insects, insect fragments and rodent contamination visible to the naked



eye (corrected if necessary for abnormal vision). The product shall be free from extraneous matter, added colouring matter and harmful substances:

Provided that the tea may contain "natural flavours" and "natural flavouring substances" which are flavour preparation and single substance respectively, acceptable for human consumption, obtained exclusively by physical processes from materials of plants origin either in their natural state or after processing for human consumption in packaged tea only. Tea containing added flavour shall bear proper label declaration as provided in sub-rule (YY) of rule 42. Tea used in manufacture of flavoured tea shall conform to the standards of tea. The flavoured tea manufacturers shall register themselves with the Tea Board before marketing flavoured tea. Pectinase enzyme can be added up to a level of 0.20% during manufacture as processing aid. The product shall conform to the following requirement in which all the figures given are expressed on the basis of the material oven-dried at 103 2 C

(a) Total Ash (m/n)	Not less than 4.0 percent and not more than 8.0 percent
(b) Water Soluble Ash	Not less than 45.0 percent of total ash
(c) Alkalinity of water soluble ash expressed as KOH (m/m)	Not less than 1.0 percent and not more than 3.0 percent
(d) Acid – insoluble ash (m/m)	Not more than 1.0 percent
(e) Water extract (m/m)	Not less than 32.0 percent
(f) crude Fibre (m/m)	Not more than 16.5 percent

**A.14.01-KANGRA TEA** means tea derived exclusively from the leaves, buds and tender stems of plants of the *Camellia sinensis* or *Camellia* tea grown in Kangra and Mandi valleys of Himachal Pradesh. It shall conform to the following specifications, namely:-

(a) Total ash determined on tea dried to a constant weight at 100°C	4.5 to 9.0 per cent by weight
(b) Total ash soluble in boiling distilled water.	Not less than 34 per cent of total ash
(c) Ash insoluble in dilute hydrochloric acid	Not more than 1.2 per cent by weight on dry basis.
(d) Extract obtained by boiling dried tea (dried to constant weight at 100°C) with 100 part of distilled water for one hour under reflux.	Not less than 23 percent





- (d) Alkalinity of soluble ash expressed as  $K_2O$  basis Not less than 1.0 per cent and not more than 2.2 per cent on dry
- (e) Crude fibre Determined on Tea Not more than 18.5 per cent dried to constant weight at  $100^{\circ}C$

It shall not contain any added colouring matter. It may, also contain 0.2 per cent pectinase enzyme.

Provided that tea may contain Natural Flavours and Natural Flavouring Substances which are flavour preparations and single substance respectively, acceptable for human consumption, obtained exclusively by physical processing from materials of plant origin either in their raw state or after processing for human consumption.

Provided further that such tea containing added flavour shall bear proper label declaration as provided in sub-rule (YY) of the rule 42.

Provided also that tea used in the manufacture of flavoured tea shall conform to the standards of tea.

Provided that if tea is sold or offered, for sale without any indication as to whether it is Kangra tea or not, the standards of quality of tea prescribed in item A. 14 shall apply.

Provided also that Flavoured tea manufacturers shall register themselves with the Tea Board before marketing Flavoured tea.

A.14.02 Green Tea means the product derived solely and exclusively, and produced by acceptable processes, notably enzyme, inactivation, rolling or comminution and drying, from the leaves, buds and tender stems of varieties of the species *Camellia sinensis* (L) O.Kuntze, known to be suitable for making tea for consumption as a beverage. The product shall have characteristic flavour free from any off odour, taint and mustiness. It shall be free from living or dead insects, moulds, insect fragments and rodent contamination visible to the naked eye (corrected if necessary for abnormal vision). The producer shall be free from extraneous matter, added colouring matter and harmful substances.

Provided that the tea may contain "natural flavours" and "natural flavouring substances" which are flavour preparations and single substance respectively, acceptable for human consumption, obtained exclusively by physical processes from materials of plants origin either in their natural state or after processing for human consumption in packaged tea only. Tea containing added flavour shall bear proper label declaration as provided in sub-rule (YY) of rule 42. Tea used in the manufacture of flavoured tea shall conform to the standards of tea. The flavoured tea manufacturers shall register themselves with the Tea Board before marketing flavoured tea. The product shall conform to the following requirements in which all the figures given are expressed on the basis of the material over-dried at  $103 \pm 2^{\circ}C$



# Parameter

## Proposed Standards

- |  |   |
|--|---|
| (a) Total Ash (m/m)  | Not less than 4.0 percent and not more than 8.0 percent   |
| (b) Water – soluble ash  | Not less than 45.0 percent of total ash.                  |
| (c) Alkalinity of water- soluble percent of ash expressed as KOH (m/m) | Not more than 1.0 total ash and not more than 3.0 percent |
| (d) Acid-insoluble ash (m/m)   | Not less than 1.0 percent                                 |
| (e) Water-extract (m/m)  | Not less than 32.0 percent                                |
| (f) Crude fibre (m/m)  | Not less than 16.5 percent                                |
| (f) Total catechins (m/m)  | Not less than 9.0 percent and not more than 19.0 percent  |





ETC - HACCP Guidance Notes for tea producers and processors in the country of origin  
Appendix 4 - Generic Example of a HACCP plan for a Tea Blending Operation (For Illustrative purposes only)

Process step	Hazard	Preventative Measures	CCP No.	Critical Limits	Monitoring		Corrective Action & Responsibility
					Procedure	Frequency	
1 Teas and Herbs Delivered to Original Stores from external source, Inspected and Stored	Fork Lift Mechanical Damage Pest Infestation Transit Damage Non Suitable Packaging, foreign bodies Environmental conditions	(Training pre requisite) (Ref pest control pre requisite) Goods in Checks Material Specificatin Sheet / Goods in Checklist Canopy / Goods in Checklist	No	No major visual damage to delivered products	X101 X132 X085 X038 EX038	Each Delivery Each Batch	Product rejected and returned to supplier, Quality dept informed  Responsibility - Production / Quality
2 Tea unloaded, Inspected and Stored as Blend Kits	Fork Lift Mechanical Damage Pest Infestation Transit Damage Non Suitable Packaging Environmental	(Training pre requisite) (Ref pest control pre requisite) Goods in checks Material spec. Sheet/ Goods in Checklist Canopy / Goods in checklist	No	No visual damage to delivered products.	X101 X132 X085 X038 EX038	Each Delivery of blend kits	Product rejected and returned to supplier, Quality dept. informed.  Responsibility - Production / Quality



4 Bags Cut, Tea drops into System over magnets	Paper Foil Foreign Bodies in Tea	Preventative Measures on Cutting Blade Procedure for Jammed Bags Procedure for broken blade) (Ref. Glass pre-requisite) Documentated Magnet Check Feedback via commodities to supplier on period basis	No	No large amounts of foreign bodies in tea. No foreign bodies added to tea	X216 X207 X249	Each blend	Product placed on hold - reject or release as appropriate. Change magnets and rechallenge  Responsibility - Production / Quality Ops
5 Tea Blended in Vessels	Physical Hazards Introduced (Jewellery, Pens, Nails) by Operator when clearing residual tea before and after organic product run.	Visual (Ref Personal house-keeping pre requisite) (Ref Glass pre-requisite)	No	No foreign bodies added to tea.	X127	Each blend Every 20 working days (min)	Inform manager. Place product on hold and isolate FB or reject blend. Inform Quality Ops.  Responsibility - Production





## EUROPEAN TEA COMMITTEE COMITE EUROPEEN DU THE

ISSUE 7

2nd November 2005

### CODE OF PRACTICE - PESTICIDE RESIDUES IN TEA

#### I INTRODUCTION

Tea, *Camellia sinensis*, is an agricultural product that is predominantly grown and manufactured in developing countries. It is sold on the world market either by Public Auction or Private Treaty (either directly by the producer or via a broker or trader). Whilst the growing of tea without the use of pesticides is, in principle, possible, the world-wide demand is such that a regulated and controlled use of approved pesticides is often necessary to produce a sufficient quantity of appropriate quality tea at an acceptable cost. The use of approved pesticides under Good Agricultural Practice (GAP) results in residues below the maximum residue levels (MRL) given in the relevant legislation. The use of nonapproved pesticides and/or the failure to follow Good Manufacturing Practice (GMP) will result in non-conformance with legislation and is not acceptable to the European Tea Committee (ETC). It is generally impractical for the European Tea Trade to exert any direct control over the growing or processing of tea and consequently has to encourage the growers to apply good agricultural practice, using pesticides only when essential and thus minimising the level of pesticide residues in tea.

The ETC has produced this Code of Practice for use by its members to:

- Facilitate a common approach to discharging their responsibility to supply safe products that conform to the relevant pesticide legislation.
- Provide factual data to assist in effective and ongoing dialogue with the producers relating to pesticide residues and, where appropriate, work with them to reduce, or eliminate, the use of pesticides and thus bring the residue levels within limits recognised as safe by European Authorities.

This Code recommends members of the ETC to:

- Actively monitor pesticide residue levels in the teas, employing enhanced levels of sampling where problems are found.
- Encourage countries of origin towards self-certification using competent local laboratories' who provide Certificates of Analysis giving the results and other relevant details as per the specimen given as Appendix 3

- Purchase only teas meeting the relevant MRLs. D Submit their monitoring data to the ETC for collation and submission to the EU, National Governments and Producing countries as appropriate.
- D Apply this Code to all purchases of tea they intend to import into the EU as it considers that conformance with it provides a high level of assurance that their products are safe and legal

#### 2 SCOPE

The monitoring of pesticide residues forms an integral element in the HACCP process as detailed in the ETC's HACCP Guidance Notes<sup>2</sup>. This Code of Practice applies to green, black and oolong tea from the plant, *Camellia sinensis*. Raw materials from other plants used to prepare infusions that are sometimes generically referred to as 'teas' are specifically excluded from the scope of this Code.

#### 3 PROCEDURES

This Code provides details of the level of sampling to be employed, the sampling procedure, the acceptance criteria and gives guidance on the analytical methodology.

##### 3.1 Acceptance Criteria

Conformance with current EU legislation and, where no EU MRL exists, the German MRLs will apply. A list of current MRLs is given in Appendix 1.

ETC Members should also take note of Regulation (EC) No. 178/2002 of 28 January 2002, Article 12 which states concerning (re-) exports of foodstuffs:

1. Food and feed exported or re-exported from the Community for placing on the market of a third country shall comply with the relevant requirements of food law, unless otherwise requested by the authorities of the importing country or established by the laws, regulations, standards, codes of practice and other legal and administrative procedures as may be in force in the importing country.

In other circumstances, except in the case where foods are injurious to health or feeds unsafe, food and feed can only be exported or re-exported if the competent authorities of the country of destination have expressly agreed, after having been fully informed of the reasons for which and the circumstances in which the food or feed concerned could not be placed on the market in the Community.

2. Where provisions of a bilateral agreement concluded between the Community or one of its Member States and a third country are applicable, food and feed exported from the Community or that Member State to that third country shall comply with said provision.





### 3. Definitions

<b>Offer Sample</b>	Sample of the tea being offered to the Trade prior to sale and which is fully representative of the bulk of the tea to be sold.
<b>Shipping Sample</b>	Sample taken from the tea after it has been contracted and prior to shipment from the country of origin.
<b>Landed Sample</b>	Sample taken from the tea at the first opportunity after landing in the country of receipt e.g. after the tea has been unloaded and brought to account.
<b>Lot</b>	An identifiable quantity of tea delivered at one time and having common characteristics i.e. a defined quantity of tea intended to be uniform e.g. an invoice.
<b>Sub-lot</b>	A designated part of a large lot, e.g. a second delivery of the invoice.
<b>Primary Sample</b>	A small quantity of tea, taken at one time from one point in a single container. Note: The required number of primary samples must be taken randomly from various containers distributed throughout the lot or sub-lot. Primary samples should be 50 g*
<b>Bulk Sample</b>	The combined primary samples homogeneously blended.
<b>Laboratory Sample</b>	A portion of the bulk sample submitted for analysis. Laboratory samples should be a minimum of 100 g.

\* If the amount of tea in each container is less than 50 g the package will constitute a primary sample.

### 3.3 Sampling Programme

The use of pesticides on tea estates and the degree of control exercised in their use varies widely both between and within origins. As a consequence it is impractical to define a single sample plan to be applied for all purchases. Consequently the buyer is free to employ a sample plan based upon the information available to them. This information may for example include, the purchaser's knowledge of the estate or origin, the results of any audits they may have carried out, the results of analyses on previous purchases from the estate or origin, the annual ETC Pesticide Surveillance Report etc. This Code specifies three levels of sampling, 'reduced', 'normal' and



'enhanced' each of which relates to the potential for a lot to meet the acceptance criteria and it is for the buyer to determine at what level to commence sampling.

#### **The sampling levels are:**

**Reduced** - applied to teas that have been shown to consistently meet the acceptance criteria, i.e. 10 or more consecutive lots. In this instance analysis of landed samples is at a frequency necessary to verify the continuance of reduced sampling and it is recommended that the sampling level be 1 % or once per crop season whichever is the greater.

**Normal** - used when between 6 and 10 consecutive lots have met the acceptance criteria. In this instance each offer and/or corresponding shipping sample need not be analysed. Sampling and analysis of the tea delivered (landed) should be sampled and analysed at the discretion of the buyer.

**Enhanced** - used until 6 consecutive delivered lots have met the acceptance criteria. This sampling level requires that each offer and/or corresponding shipping sample be analysed and if the tea is subsequently purchased the delivery (landed) should be sampled and analysed.

Teas from a new origin, region or estate where no independent historical data or information is available, e.g. from the ETC pesticides surveillance report, will be the subject of enhanced sampling until such time as normal or reduced sampling is justified.

### 3.4 Sampling Protocol

Effective sampling is a key element in achieving reliable results since residues are unlikely to be spread evenly across a 'lot'. The sampling frequency given in this Code is based on ISO 1839-1980 Tea - Sampling<sup>3</sup> which the ETC considers to be equivalent to Commission Directive 2002/63/EC of 11th July 2002 on official control sampling for pesticides and is easier to apply to tea as traded between producers and European packers.

The number of containers to be sampled from a lot or sub-lot shall be as per the table below. The containers to be sampled shall be randomly selected by the use of random number tables. Spoons, scoops, borers, sample thieves or other such equipment suitable for taking samples from inside the containers shall be used as well as dividing apparatus for reducing the aggregate sample to the laboratory sample. Samples shall be packed in clean, dry sealed containers and protected from light during storage. Each sample shall be clearly labelled with the place and time of sampling, the name of the estate or blend, the invoice and lot number and any other relevant information.



### NUMBER OF CONTAINERS TO BE SAMPLED

Containers containing more than 20kg of loose tea The minimum number of packages to be sampled from a lot shall be as shown in Table 1

Table 1

NUMBER OF CONTAINERS IN LOT	NUMBER OF CONTAINERS TO BE SAMPLED
2 to 10	2
11 to 25	3
26 to 100	5
101 and above	7

Containers containing less than 20kg of loose tea

The minimum number of containers to be sampled from a lot shall be as shown in Table 2, provided that the mass specified for each laboratory sample is obtained.

Table 2

NUMBER OF CONTAINERS IN LOT	NUMBER OF CONTAINERS TO BE SAMPLED
U to 25	3
26 to 100	5
101 to 300	7
301 to 500	10
501 to 1,000	15
1,001 to 3,000	20
3,001 and above	25

### 4 ANALYTICAL METHODOLOGY

The methodology shall be suitable to produce accurate and reliable results and providing limits of detection and quantification such that compliance with the legislation can be reliably determined. A typical method<sup>4</sup> will involve the following steps, extraction, liquid-liquid partition, gel-permeation chromatography, gas chromatographic separation, followed by detection/identification of individual residues with thermionic (N/P), flame photometric (FP), electron capture (EC) and/or mass spectrometric (MS) detector and quantification of the residues detected. In addition to those pesticides for which MRLs are given in the EU and, where relevant,

the German legislation, teas will also be monitored for a broad spectrum of organochlorine, organophosphorus and pyrethroid pesticides to enable other pesticides, for which MRLs do not exist and which may have been used illegally to be detected.

The pesticide residues most commonly found in teas is given in Appendix 2.

The results should be details.

### References/Notes

- <sup>1</sup> Laboratories are deemed to be competent if they meet the requirements of a recognised accreditation scheme, complying with ISO 17025. Guidance on the requirements for compliance with such a scheme can be found in EU Documents, SANCO/10476/2003 of 50 February 2004 and SANCO/825/00 rev7 of 17<sup>th</sup> March 2004.
- <sup>2</sup> ETC HACCP Guidance Notes (current version)
- <sup>3</sup> ISO 1839-1980 Tea - Sampling
- <sup>4</sup> Specht W, Pelz S, Gilsbach (1995) Fresenius J Anal Chem 353, 183-190

## APPENDIX I

### Maximum Residue Limits as per EU & German Legislation

EU MRLs on Tea (*Camellia sinensis*) in EU Directive 90/642/EC as amended up to Directive 2005/74/EC of 25th October 2005 plus German MRLs where no EU MRL exists

Pesticide Residue	MRL m /k
1,1-Dichloro-2, 2-bis 4-ethyl-phenyl- ethane	0.1*
1,2-Dibromoethane (ethylene dibromide)	0.1*
1,2-Dichloroethane	0.02*
2,4,5-T	0.05*
2,4-D (sum of 2,4-D and its esters expressed as 2,4-D)	0.1*
2 4-DB	0.1*
Abamectin	0.02*
Acephate	0.05*
Acibenzolar-S-methyl	0.05*
Aldicarb	0.05*
Aldrin and Dieldrin combined expressed as Dieldrin	0.02*
Amitraz including the metabolites containing the 2,4-dimethylaniline moiety expressed as amitraz	10.1*
Amitrole (Aminotriazole)	0.02*





Pesticide Residue	MRL m /k
Aramite	0.1*
Atrazine	0.1*
Azimsulfuron	0.1*
Azin hos-eth I	0.1*
Azocyclotin and Cyhexatin (sum of azocyclotin and cyhexatin expressed as cyhexatin)	1 0.1*
Azoxystrobin	0.1*
Barban	0.1*
Benalaxyl	0.1*
Benfuracarb	0.1*
Benomyl / carbendazim thiophanate-methyl	0.1*
Bentazone	0.1*
Bifenthrin	5
Binapacryl	0.1*
Bitertanol	0.1*
Bromophos-ethyl	0.1*
Bromopropylate	0.1*
Bromoxynil including its esters expressed as bromoxynil	0.1*
Buprofezin	0.02 (G)
Camphechlor (Toxaphene)	0.1*
Captafol	0.1*
Carbendazim	0.1*
Carbofuran	0.2*
Carbosulfan	0.1*
Carfentrazone-ethyl (determined as carfentrazone and expressed as carfentrazone-ethyl)	0.02*
Cartap	0.1*
Chlorbenside	0.1*
Chlorbufam	0.1*
Chlordane (sum of cis- and trans-chlordane)	0.02*
Chlorfenayr	0.1*



Pesticide Residue	MRL m /k
Chlorfenson (chlorfenizon)	0.1*
Chlormequat	0.1*
Chlorobenzilate	0.1*
Chlorothalonil (TPN)	0.1*
Chloroxuron	0.1*
Chlorpropham and 4*-hydroxychlorpropham-O-sulphonic acid (4-HSA) expressed as chlor ro ham chlor-[PC]	0.1*
Chlorpyrifos	0.1*
Chlorpyrifos-methyl	0.1*
Chlorthion (Chlorothion)	0.01* (G)
Chlozolate	0.1*
Cinidon-ethyl (sum of cinidon ethyl & its E isomer)	0.1*
Clofentezine	0.05*
Cyazofamid	0.02*
Cyclanilide	0.1*
Cyfluthrin and b-cyfluthrin	0.1*
Cyhalofo-butyl (sum of cyhalofo-butyl & its free acids)	0.05*
Cypermethrin	0.5
Cyromazine	0.05*
Daminozide	0.1*
DDT	0.2*
Deltamethrin	5
Diallate (di-allate)	0.1*
Diazinon	0.05*
Dichlorprop	0.1*
Dichlorvos	0.1*
Dicofol	20
Diifubenzuron	0.05* (G)
Dimethenamid-P including other mixtures of constituent isomers (sum of isomers)	0.02*
Dimethoate / Omethoate expressed as Dimethoate	0.05*





Pesticide Residue	MRL m /k
Dinoseb	0.1*
Dinoterb	0.1*
Dioxathion	0.1*
Diphenylamine	0.05*
Diquat (Deiquat)	0.1*
Disulfoton	0.05*
DNOC	0.1*
Endosulfan (Benzoepin)	3(I)
Endrin	0.01*
EPN	0.01 (G)
Ethephon	0.1 *
Ethion (I) [diethion]	3
Ethofumesate (sum of ethofumesate and the metabolite 2,3-dihydro-3,3-dimethyl-2-oxo-benzofuran-5-yl methane sulphonate expressed as ethofumesate)	0.1*
Ethox sulfuron	0.1*
Ethylene oxide (sum of ethylene oxide and 2-chloro-ethanol expressed as ethylene oxide)	0.2*
Famoxadone	0.05*
Fenamidone	0.05*
Fenamiphos (sum of fenamiphos and its sulphoxide and sulphone expressed as fenamiphos)	0.05
Fenarimol	0.05*
Fenbutatin oxide	0.1*
Fenchlorphos	0.1*
Fenhexamid	0.1*
Fenitrothion MEP	0.5
Fenpropathrin	0.05 (G)
Fenpropimorph	0.1*
Fentin acetate and Fentin hydroxide expressed as Fentin	0.1 *
Fenvalerate (sum of RR and SS isomers) and	0.05*
Esfenvalerate (sum of RS and SR isomers)	0.05*



Pesticide Residue	MRL m /k
Flazasulfuron	0.02*
Florasulam	0.1*
Flucythrinate	0.1*
Flufenacet (sum of all compounds containing the N fluor-o-phenyl-N-isopropyl moiety expressed as flufenacet equivalent)	0.05*
Flumioxazine	0.1*
Fluprysulfuron-methyl	0.05*
Fluroxypyr	0.1*
Flurtamone	0.05*
Foramsulfuron	0.05*
Formothion	0.05*
Fosthiazate	0.05*
Furathiocarb	0.1 *
Glyphosate	2*
Halfenprox	0.01* (G)
Heptachlor	0.02*
Hexachlorobenzene HCB	0.02*
Hexachlorocyclohexane (HCH) sum of isomers except the gamma isomer (BHC)	0.02*
Hexaconazole	0.05*
Imazalil (enilconazole)	0.1*
Imazamox	0.1*
Iodosulfuron-methyl sodium (iodosulfuron-methyl including salts, expressed as iodosulfuron-methyl	1 0.05*
Ioxynil including its esters expressed as ioxynil	0.1*
Iprobenfos (IBP)	0.01 (G)
Irodione	0.1*
Iprovalicarb	0.1*
Isocarbophos	0.01* (G)
Isoproturon	0.1*
Isoxaflutole (sum of isoxaflutole, RPA 202248 and RPA 203328, expressed as isoxaflutole)	0.1*





Pesticide Residue	MRL m /k
Kresoxim methyl	0.1*
Lambda-cyhalothrin	1
Lindane	0.05*
Linuron	0.1*
Malathion	0.5
Maleic hydrazide	0.5*
Maneb Mancozeb Metiram Probineb Zineb sum expressed as Cs2	0.1*
Mecarbam	0.1*
Mecoprop (sum of meco ro - and meco ro expressed as mecoprop)	0.1*
Mepanipyrim and its metabolite (2-anilino-4-(2-hydroxy-propyl)-6-meth I imidine expressed as mepanipyrim	0.02*
Mercury compounds (sum of) expressed as mercury	0.02*
Mesotrione (sum of mesotrione and MNBA (4-methyl-sulfonyl-2-nitro benzoic acid expressed as mesotrione	0.1*
Metalaxyl including other mixtures of constituent isomers (sum of isomers) including Metalaxyl-M (sum of isomers)	0.1*
Methacrifos	0.1*
Methamidophos	0.1*
Methidathion	0.1*
Methomyl / thiodicarb sum expressed as methomyl	0.1*
Methoxychlor	0.1*
Methyl bromide bromomethane	0.05*
Metsulfuron-methyl	0.1*
Molinate	0.1*
Monocrotophos	0.1*
Monolinuron	0.1*
Myclobutanil	0.05*
Nitrofen NIP	0.02*
Oxadiargyl	0.05*
Oxasulfuron	0.1*
Oxydemeton-methyl and demeton-S-methyl sulfone	0.05*



Pesticide Residue	MRL m /k
Paraquat	0.1*
Parathion	0.1 *
Parathion-methyl (sum of Parathion-methyl and para-oxon-methyl expressed as Parathion-methyl) [methyl parathion]	0.05*
Penconazole	0.1*
Pendimethalin	0.1*
Pentachloranisole (PCA)	0.01* (G)
Permethrin	0.1*
Phenkaplon (CMP)	0.01* (G)
Phorate	0.1*
Phosalone	0.1* G
Phosmet (PMP)	0.1*
Phoxim	0.1*
Picolinafen	0.1*
Picoxystrobin	0.1*
Pirimiphos-methyl	0.05*
Prochloraz	0.1*
Procymidone	0.1 *
Profenofos	0.1*
Prohexadion	0.1 *
Propargite (BPPS)	5
Propham	0.1*
Propiconazole	0.1*
Propoxycarbazone, its salts and 2-hydroxy-propoxycarbazone, calculated as propoxycarbazone	0.05*
Propoxur (PHC)	0.1*
Propyzamide	0.05*
Prosulfuron	0.1*
Prothiofos	1 G
Pymetrozine	0.1*
Pyraclostrobin	0.05*





Pesticide Residue	MRL m /k
Pyraflufen-ethyl	0.05*
Pyrazophos	0.1*
Pyridaben	0.01 G
Pyridate	0.1*
Quinalphos (chinalphos)	0.1*
Quinoxifen	0.05*
Quintozene (sum of uintozene and entachloroaniline) (PCNB)	0.05*
Resmethrin	0.2*
S-421	0.01 (G)
Silthiofam	0.1*
Spiroxamine	0.1*
Sulfosulfuron	0.1*
Tau-fluvalinate	0.05* (G)
Tecnazene	0.1*
TEPP [ethyl pyrophosphate]	0.02*
Tetradifon	0.05* G
Thiabendazole (tiabendazole / TBZ)	0.1*
Thifensulfuron-methyl	0.1*
Triadimefon and Triadimenol (sum of triadimefon and triadimenol)	0.2*
Triasulfuron	0.1*
Triazophos	0.05*
Tridemorph	20
Trifloxystrobin	0.05*
Triforine	0.1*
Trimeth Isulfonium cation resulting from the use of I hosate	0.05*
Vinclozolin	0.1*
Zoxamide	0.05*

(G) indicates German MRL {no EU MRL}

\* indicates lower limit of analytical determination

[ ] different name of substance

(I) The European Commission has given the information that the MRL for ethion is likely to drop to the limit of determination when the new EU residue legislation comes into force, i.e. mid 2006.



## APPENDIX 2 \*

### Pesticide Residues observed in Tea

#### Pesticide

Acephate .....	Halfenprox
Aldrin/Dieldrin .....	HCB
Azinphos-ethyl .....	HCH sum of isomers except the gamma isomer
Bifenthrin .....	Iprobenfos
Bromopropylate .....	Isocarbophos
Buprofezin .....	Lambda-Cyhalothrin
Chlordane .....	Lindane
IV Chlorfenapyr .....	Methamidophos
Chlorfenson .....	Methidathion
Chlorpyrifos .....	Monocrotophos
Chlorthion .....	Pentachloranisole
Cyfluthrin .....	Permethrin
Cypermethrin .....	Phenkapton
DDT-total .....	Phosalone
I Deltamethrin .....	Pirimiphos-methyl
Dichlorvos .....	Profenofos
Dicofol .....	Propargite
Diflubenzuron .....	Propiconazole
Dimethoate .....	Prothiofos
Endosulfan-total .....	Pyridaben
EPN .....	Quinalphos
Ethion .....	S-421
Fenpropathrin .....	Tau-Fluvalinate
Fenvalerate/Esfenvalerate .....	Tetradifon
Flucythrinate .....	Triazophos

\* This list will be updated annually at the Spring meeting of the ETC Technical Committee





## APPENDIX 3

## Certificate of Analysis

## CERTIFICATE of ANALYSIS

**Analytical methods:**

Give relevant details or reference to internal method, which will be supplied on request, e.g. extraction & clean-up procedure, columns & detector used '.

**Customer's sample reference:****Analytical laboratory's sample reference:****Results of Analysis:**

Residue	Result (mg/kg)	LOD (mg/kg)	EU MRL (mg/kg)
Organochlorine residues:			
Organophosphorus residues:			
Pyrethroid residues:			
Other pesticide residues:			
Authorised: Date: _____			

- 1 The analytical procedure employed has, as a minimum, determined those residues from the pesticides listed in Appendix 2 (Pesticide Residues Most Frequently Found in Tea) of the current issue of the ETC Code of Practice - Pesticide Residues in Tea.
- 2 If the results are to be compared against MRLs other than those given in the EU this should be indicated.



## REVISION HISTORY

Date	Issue No.	Amendment/s	Reason
15.03.2003	0	Initial draft for comment	
09.04.2003	1	Issued	
20.06.2003	2	Appendix 2 added. Sampling protocol amended.	Provide additional guidance for users Clarification of requirements; correction of typing errors
03.11.2003	3		Appendix 3 (Certificate of Analysis) and Revision History added.
25.11.2003	4	(p1) removed from notes to Appendix I German MRL for Deiquat added to Appendix I	No longer relevant as I implementation date has passed. No EU MRL but MRL in German legislation (dated 5th November 2003)
19.01.2005	5	Update of Reference note I footnotes removed except G and ' from Appendix I Update of Appendix I  Added in [ ] the name of substance as used in specific countries - Fenvalerate / Esfenvalerate and Propiconazole added to Appendix 2; Omethoate deleted	current version of EU documents optimising the readability  Update up to Directive 2004/115/EC of 15th Dec 2004 and editorial alterations some substances have different names especially in countries of origin Update according to monitoring results
20.04.2005		Headline of Appendix II amended	
05.05.2005	6	Footnote concerning ethion added to Appendix I	meeting with Bas Drukker, European Commission
02.11.2005	7	Update of Appendix I	Update up to Directive 2005/74/EC of Oct. 2005





## Polypropylene (PP) Woven Sacks

Specification of PP Woven Sacks recommended is as under :

### Materials

Polypropylene raffia grade, UV-stabilized

### Dimensions (in mm)

Length x Breadth x Height = (690+10) x (540+10) x (260+10)

### Weight of the Sacks (in gm)

150+5%

### Thickness of outer extrusion coat (in gauge)

Minimum

### Ends & Picks (nos./Decimetre)

38+2/38+2

### Denier (gms/9000 mm)

Minimum 950

### Gram mage (gms/m<sup>2</sup>)

Minimum 100

### Finish

Matt (Non-slippery, printable)

### Co-efficient of friction (outer surface to outer surface) (UK)

0.27+5%

### Seam strength (kg/50 mm width)

Minimum 25

### Handle strength (gms)

Minimum 35

### Stitching (no./decimetre)

12+1

### Inner liner

#### Material

Blend of HM-HDPE & LLDPE (High Molecular weight High Density Polyethylene & Linear Low Density Polyethylene)

### Thickness (gauge)

Minimum 150



## Dimensions (in mm) (Flat Bag)

Width x Height = 820+10 x 920+10

### Dart Impact Strength (F50 in gems, height 66 cm)

Minimum 80

### General

Materials should be odour-free, food grade & virgin

### Extractability studies (with n-heptanes)

Maximum limit 60 ppm

### Note :

It is very important to mention that this study is only relevant if the Quality specification of the PP Woven Sacks, & HM-HDPE loose liner is maintained.

## POLYTHENE-LINED JUTE BAGS

Circular No. 94

1st November 1999

To: All Members, Associate Members and Registered Warehouses

### POLYTHENE-LINED JUTE BAGS-REVISED SPECIFICATIONS

Please refer to CTTA Circular No. 22 dated 2nd February 1987 enclosing therein the specifications for polythene-Lined jute bags for bulk packaging of tea in North India and South India.

I now send herewith, for information and necessary action of members, a copy of the letter No. RL-15(39)/99/5189 dated 28th/29th October 1999 from Dr T C Chaudhuri, Director (Research), Tea Board enclosing therein the revised specifications for polythene-lined jute bags for bulk packaging of tea in North India.

As per the revised specifications issued by the Tea Board, polythene-lined jute bags for North India should be of the following sizes:

	A-TYPE	B-TYPE
Flat length	69 cm ± 2 cm	69 cm ± 2 cm
Flat width	54 cm ± 2 cm	54 cm ± 2 cm
Bottom gusset	26 cm ± 2 cm	33 cm ± 2 cm





No. RL=15(39)/99/5189

October 28, 1999

The Secretary  
C.T.T.A. Calcutta

Sub :- Revised specification for polythene lined jute bags  
suitable for bulk packaging in North India.

Dear Sir,

Further to our letter even No. 4567 dated 20/23.8.99, enclosed please find herewith a revised specification for polythene lined jute bags suitable for bulk packaging especially to be complied with in North India.

Yours faithfully,

Encl :- as stated

(T. C. Chaudhuri)  
Director (Research)

### RECOMMENDED SPECIFICATION FOR POLYTHENE LINED JUTE BAGS SUITABLE FOR BULK PACKAGING IN NORTH INDIA

#### (i) Bag type

The jute bag should be machine stitched and the inner polythene bag should be heat sealed. Spacing of the stitches should be 12 stitches per decimetre with one stitch as tolerance.

#### (ii) Material

##### a) Jute fabric

The jute fabric of the outer bag should be clear, bright odourless and made from virgin material of superior jute batch of the specifications 14 OZ. per sq. yard (1)/ (-) 1 OZ; DW Fabric 11 x 14, all less than 10% moisture, regular.

##### b) Thread for Stitching :

2-ply high twist rayon cord.



Bobbin – 1150 denier.

Spindle – 1650 denier.

#### c) Thread for mouth closing :

2-ply 19/20 cotton threads.

#### d) Stitching :

12 stitches per decimetre with one stitch as tolerance. The body of the bag must be machine stitched and mouth closing should be done by hand-operated stitching machine.

#### e) Handle :

Each bag should preferably have a handle at the top and/or loops at the bottom corners.

#### (iii) Inner Polythene Liner

The material of polythene should be 150 gauge HM HDPE made from odour free, grade virgin material.

#### (iv) Bag Size

##### (a) Dimensions of the jute bag when empty should be

	A-TYPE	B-TYPE
Flat length	69 cm +/-2 cm.	69 cm +/-2 cm.
Flat width	54 cm +/-2 cm	54 cm +/-2 cm.
Bottom width	26 cm +/-2 cm.	33 cm +/-2 cm.
(GUSSET)		

##### (b) The dimension of the empty polythene bag should be as under:

	A-TYPE	B-TYPE
Flat length	92 cm +/-2 cm.	102 cm +/-2 cm.
Flat width	82 cm +/-2 cm	92 cm +/-2 cm.

#### (v) Sealing of the Inner Liner

IIM HDPE Inner Liner must be heat sealed separately from the outer cover.

#### (vi) Printing details

The garden mark, grade, invoice no., gross weight and net weight should be preprinted/stencilled on the block ends of each bag to facilitate identification.

#### (vii) Sampling

Excepting mouth portion, all sides must be evenly heat sealed. Mouth portion should be heat sealed or folded adequately to ensure that it does not open up





while handling and for that, if necessary, the length of inner liner should be increased. The sampling should be done either by opening the mouth or bottom portion of the bag and making a slit in the inner ply. After removal of the sample the inner ply must be heat sealed or reclosed with 1/2 inch wide plastic Ireavier tape and the jute sack must be restitched.

## MULTIWALL PAPER SACKS

IS 15576 : 2005

Indian Standard

### MULTIWALL PAPER SACKS FOR TEA FOR EXPORT—SPECIFICATION

#### 1. SCOPE

This standard prescribes requirements for materials, dimensions and construction of multiwall (multi-ply) paper sacks to hold about 25 kg to 50 kg of tea depending on the practice of the importing countries. These are to be designated as full size to hold about 50 kg of tea, medium size to hold about 35 kg of tea and half size to hold about 28 kg of tea.

#### 2. REFERENCES

The following standards listed below contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	Title
1060 (Part 1) : 1966	Methods of sampling and test for paper and allied products: Part 1 (revised)
1260 (Part 2) : 1999	Packaging—Pictorial marking for handling and labelling of goods: Part 2 General goods (third revision)
9028 : 1978	Glossary of terms relating to paper sacks
10528 : 1983	Method of sampling empty paper sacks for Testing
13012 : 1990	Sack kraft paper and extensible sack kraft Paper



#### 3. TERMINOLOGY

For the purpose of this standard the definitions given in IS 9028 shall apply.

#### 4. MATERIAL

4.1 The sacks shall be made of natural sack kraft paper or extensible sack kraft paper conforming to IS 13012.

##### 4.2 Adhesives

Adhesives commonly used are of the starch or dextrans type but if a fungicide/bactericide is required as an additive, chlorophenols shall not be used.

#### 5. CONSTRUCTION AND STYLE

5.1 The sack shall of the pasted-valve type with flat hexagonal ends of stepped end construction formed from a stepped end tube. The valve shall be fitted with an external tuck-in sleeve and shall be made of the same material as the barrier of the innermost ply.

5.2 The sack shall comprise of 5 plies of natural sack kraft paper each of 70 gsm or 4 plies of extensible kraft paper each of 80 gsm. The innermost ply shall be laminated with aluminium foil of 0.007 mm to 0.009 mm thickness by 20 gsm of polyethylene. However, by mutual agreement with the purchaser, number of plies and/or substance of the paper may be altered by using paper of higher strength and also alternative barriers like metallised film, etc, may be used so long as the desired properties of tea packaging is ensured.

5.2.1 All materials used in the construction of the sack (paper, adhesive, polyethylene and aluminium foil) shall be free from taint and odour.

5.2.2 No materials or substances containing chlorophenols or their derivatives shall be used.

##### 5.3 Lay Flat Dimensions

The empty sack dimensions shall be as given below:

##### Full Size

Sack length	1120 ± 10 mm
Sack width	720 ± 10 mm
Width of bottom	180 ± 5 mm
Valve sleeve width	180 ± 5 mm





### Medium Size

Sack length	760 ± 10 mm
Sack width	610 ± 10 mm
Width of bottom	200 ± 5 mm
Valve sleeve width	200 ± 5 mm

### Half Size

Sack length	660 ± 10 mm
Sack width	610 ± 10 mm
Width of bottom	190 ± 5 mm
Valve sleeve width	190 ± 5 mm

## 5.4 Drop Test

Multiwall paper sacks for tea for export with full content shall pass the drop test with following criteria:

Drop height	: 1.2 m
Number of drops	: 4

First and second drop shall be on either surface (front or rear) of the sack. Third and fourth drop shall be on top end and bottom end, where valve is fitted or pasted.

## 6. WORKMANSHIP

6.1 The plies shall be properly but not excessively creased. In the construction of a multiwall paper sack tube, the outer ply fit shall be such that at the point of manufacture, each ply shall be smaller in circumference than the next outer ply within the elongation limits of the material in order to ensure even load distribution between plies. Care shall be taken to ensure for adequate longitudinal overlap, equal gusset formation and spot gluing quantity and line of gluing.

### 6.2 Conditioning

The paper sack sample from the lot for testing shall be conditioned as per IS 1060 (Part 1).

## 7. PACKING AND MARKING

### 7.1 Packing

Paper sacks shall be securely packed as agreed to between the purchaser and the supplier.

### 7.2 Marking

7.2.1 Each package shall be marked with the following information:

- Relevant product details including sack size,
- Name of the manufacturer.



- Number of sacks in the package.
- Batch number/Lot number, and
- Net mass of the contents.

7.2.2 Each sack shall be marked with 'USE NOT HAND HOOKS', preferably showing the corresponding pictorial illustration as per IS 1260 (Part 2).

### 7.2.3 BIS Certification Marking

The sacks may also be marked with the Standard Mark.

7.2.3.1 The use of the Standard Mark is governed by the provisions of Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of the Standard Mark may be granted to manufacturers of producers may be obtained from the Bureau of Indian Standards.

## 8. SAMPLING

Sampling shall be done as per procedure laid down in IS 10528.

### MULTI-WALL PAPER SACKS: SIZES

#### Particulars

Size  
Sack type  
Construction

Tare weight

#### Large Size Paper Sack

720 mm x 1120 mm x 180 mm  
Pasted valve stepped end  
3 plies of 80 gsm kraft + a  
Laminate of kraft, LDPE &  
Al-foil  
700 gm

Particulars  
Size  
Sack type  
Construction

Tare weight

#### Medium Size Paper Sack

610 mm x 790 mm x 180 mm  
Pasted valve stepped end  
3 plies of 80 gsm kraft + a laminate  
of kraft, LDPE & Al-foil  
425 gm

#### Half Size Paper Sack

610 mm x 660 mm x 190 mm  
Pasted valve stepped end  
3 plies of 75 gsm kraft + a  
Laminate of kraft, LDPE &  
Al-foil  
400 gm

Medium Size Paper Sack  
610 mm x 790 mm x 180 mm  
Pasted valve stepped end  
3 plies of 90 gsm kraft + a laminate  
of kraft, LDPE & Metallised film  
375 gm





## DETAILS OF AUCTION ORGANISERS

## Tea Auction Centres Operating in India

Auction Centres	Operating Since	Sale Day(s)
<b>Kolkata</b> (Calcutta Tea Traders Association)	27th December 1861	Monday & Tuesday (or Wednesday)
<b>Guwahati</b> (Guwahati Tea Auction Committee)	25 September 1970	Tuesday & Wednesday (or Thursday)
<b>Siliguri</b> Siliguri Tea Auction Committee	29th October 1976	Thursday & Friday (or Friday & Saturday)
<b>Amritsar</b> The Kangra Tea Planters Supply & Marketing Co-operative Industrial Society Ltd	30th April 1964	Fortnightly or based on arrivals
<b>Jalpaiguri</b> North Bengal Tea Auction Committee	27th February 2005	Tuesday
<b>Kochi</b> The Tea Trade Association of Cochin	4th July 1947	Tuesday & Wednesday
<b>Coonoor</b> Coonoor Tea Trade Association	23rd March 1963	Thursday & Friday
<b>Coimbatore</b> The Tea Trade Association of Coimbatore	22nd November 1980	Friday
<b>Tea Serve</b> Coonoor	1st October 2003	Wednesday



## ADDRESSES OF AUCTION ORGANISERS

- Calcutta Tea Traders Association (CTTA)**  
6, Netaji Subhas Road  
Kolkata - 700 001  
Ph : 033-22301574, 22300601  
Fax : 033-22301289  
e-mail : cttat@cal3.vsnl.net.in
- Guwahati Tea Auction Committee (GTAC)**  
G S Road, Dispur  
Guwahati - 781 006  
Ph : 0361-2261832  
Fax : 0361-2266195  
e-mail : gtac@assamteaxchange.com
- Siliguri Tea Auction Committee (STAC)**  
P O Pradhan Nagar, Mallaguri  
Siliguri - 734 403  
Ph : 0353-2511101, 2520353  
Fax : 0353-2512689  
e-mail : staauction@sify.com,  
stac@sancharnet.in
- Tea Trade Association of Cochin (TTAC)**  
Tea Trade Centre  
Indira Gandhi Road  
Willingdon Island Kochi - 682 003  
Ph : 0484-3018089, 3018088  
Fax : 0484-2669447  
e-mail : ttacochin@vsnl.net
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- North Bengal Tea Auction Committee**  
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e-mail : nbtac@sancharnet.in
- TEA SERVE**  
No. 35 - Church Road  
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Fax : 0423-2230429  
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- The Kangra Tea Planters Supply & Marketing Co-operative Industrial Society Ltd**  
(Auction House for Green & Black Teas of Kangra Valley)  
Mahna Singh Road  
P O Golden Temple  
Amritsar - 143 006  
Tele Fax : 0183-547524





District-wise / State-wise Area Under Tea in India (in hectares)

North India					
District/States	2001	2002	2003	2004	2005(E)
Darrang	41367	41693	41158	41300	41350
Goalpara	3471	3523	3635	3643	3643
Kamrup	3436	3454	3466	3460	3460
Lakhimpur	4763	4793	4839	4873	4875
Dibrugarh	93484	93698	95118	95118	95200
Nowgong	8004	8041	8114	8135	8135
Sibsagar	76113	76762	77135	77135	77230
Cachar	32703	32775	32137	32149	32149
Karbi Anglong	1748	1873	1923	1923	1923
North Cachar	4065	4071	4064	4032	4035
<b>Total Assam</b>	<b>269154</b>	<b>270683</b>	<b>271589</b>	<b>271768</b>	<b>272000</b>
Darjeeling	17453	17463	17580	17522	17500
Terai (a)	21258	22858	22971	23598	24000
Dooars (b)	72109	72792	72800	72883	73000
<b>Total West Bengal</b>	<b>110820</b>	<b>113113</b>	<b>113351</b>	<b>114003</b>	<b>114500</b>
Tripura	7200	7591	8268	8268	21000
					@
Bihar	1445	1877	2000	2000	
Uttaranchal	1068	1068	1471	1446	
Himachal Pradesh	2312	2312	2348	2348	
Manipur	450	450	1319	1319	
Sikkim	300	300	195	195	
Arunachal Pradesh	1067	1067	1229	1729	
Nagaland	580	1878	1898	1898	
Meghalaya	103	117	252	252	
Mizoram	400	448	750	750	
Orissa	214	214	214	214	
<b>Total Other North India</b>	<b>15139</b>	<b>17322</b>	<b>19944</b>	<b>20419</b>	<b>21000</b>
<b>Total North India</b>	<b>395113</b>	<b>401118</b>	<b>404884</b>	<b>406190</b>	<b>407500</b>
(a) Including West Dinajpur					
(b) Including Cooch Behar.					
(E) Estimated and subject to revision					
@ Break-up not available.					
(E) -- Estimated and subject to revision					
Source : Tea Board of India					

District-wise / State-wise Area Under Tea in India (in hectares)

South India					
District/States	2001	2002	2003	2004	2005(E)
Kanyakumari	434	433	433	433	433
Tirunelveli	800	800	800	800	800
Madurai	973	973	973	972	972
Coimbatore	11784	11734	11734	11734	11734
Nilgiris	61634	61679	61679	62039	62313
<b>Total Tamil Nadu</b>	<b>75625</b>	<b>75619</b>	<b>75619</b>	<b>75978</b>	<b>76252</b>
Cannanore	—	—	—	—	—
Palghat	850	852	852	852	853
Kozhikode	—	—	—	—	—
Malapuram	174	174	174	174	174
Trichur	530	529	529	529	529
Trivandrum	965	965	965	965	965
Quilon	1348	1348	1348	1348	1348
Kottayam	840	840	840	840	840
Ernakulam	2	2	2	2	2
Idukki	26748	26753	26753	26893	26905
Wynaad	5483	5504	5504	5504	5504
<b>Total Kerala</b>	<b>36940</b>	<b>36967</b>	<b>36967</b>	<b>37107</b>	<b>37120</b>
Chikmagalur	1434	1434	1434	1434	1434
Coorg	299	299	299	299	299
Hassan	395	395	395	395	395
<b>Total Karnataka</b>	<b>2128</b>	<b>2128</b>	<b>2128</b>	<b>2128</b>	<b>2128</b>
<b>Total South India</b>	<b>114693</b>	<b>114714</b>	<b>114714</b>	<b>115213</b>	<b>115500</b>
<b>Total All India</b>	<b>509806</b>	<b>515832</b>	<b>519598</b>	<b>521403</b>	<b>523000</b>
(E) -- Estimated and subject to revision					
Source : Tea Board of India					





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Teekanne

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- |  |                               |
|--|-------------------------------|
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| 2. Editorial                           | Sangeeta Kichlu               |
| 3. Calcutta Tea Traders Association    | Kalyan Sundaram               |
| 4. The Auction System                  | Krishan Katyal                |
| 5. Grading and Tasting                 | Krishan Katyal                |
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| 8. Channel of Sales                    | Sangeeta Kichlu               |
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| 10. Packaging                          | Carritt Moran & Co. Pvt. Ltd. |
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| 19. Appendix                           | Kalyan Sundaram               |