

TRFK Quarterly



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Tea Research Foundation of Kenya

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DIRECTOR'S COMMENTARY

By Dr. W. Ronno

Tea breeding in Kenya is relatively young as it was introduced in the country at the turn of the last century. Early settlers introduced seedling populations that comprised random seed collections from all over the world. From these, mass selections were initiated in plantations to identify high yielding pest and disease resistant varieties. Actual breeding however, began in the 1970s with more emphasis on attempts at recombining high yield and quality attributes with other useful agronomic traits. Plant improvement efforts of the 1960s – 1970s saw the development and release of 11 varieties with superior performance. In the last 25 years intensified and rationalized breeding efforts have resulted in the release of another 36 clones to tea farmers. Currently another 29 promising clones are still being tested in various sites in Kenyan tea growing regions.

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WEATHER REPORT

By J.K. Bore

The period July to September 2007 was relatively wet compared to the same period last year, recording a total of 820.1mm of rainfall compared to 552.2mm in 2006. This was higher than both the long-term total for this quarter by 40% and the previous quarter (798.5mm). Most of this rain fell in September (302.3mm) followed by the month of August (277.3mm) while the June recorded the least amount for the quarter (240.5mm). Mean air temperatures (15.9^oC) were cooler than that of the same period last year (16.5^oC). This drop in air temperature was due to the months of August and September recording cooler temperatures (15.6^oC and 16.0^oC respectively) as compared to the same months recording 16.5^oC and 16.7^oC respectively previous year. The month of July recorded 16.2^oC similar to temperature recorded in the same month last year. There was no soil water deficit recorded during the quarter just as was the case during the same period previous year. There was no hail incidence reported during the quarter as contrary to same quarter last year's 6 incidences with 85754.58kg green leaf crop loss. The quarter therefore was favorable for crop production although it was colder.

Summary of meteorological observations at Timbilil Estate

Month	Air Temp. (°C)	Soil Temp. (°C)	Rainfall (mm)	Deficit (mm)
Jul.	15.3	18.0	240.5	Nil
Aug.	15.6	17.6	277.3	Nil
Sep.	16.0	17.7	302.3	Nil

Efforts are being made to develop tea clones that meet the existing and emerging challenges in the tea industry like product diversification. A review of progress into the development of 'designer clones' to meet emerging challenges in the global and beverage market and climatic change is presented in this issue.

The Export Promotion Council (EPC) a Kenyan government institution under the Ministry of Trade has been promoting export market, business and capacity building for Kenyan tea and coffee in the United States of America. Workshops conducted by the council, revealed that opportunities for marketing both tea and coffee in the USA do exist. The opportunities products and procedures and presented this bulletin.

Performance in the public sector has introduced a number of challenges to employers and employees alike. Foremost the performance calls for employees to manage themselves as they face demands. Aspects to consider as one strives

to manage oneself for best performance are presented in this issue

Forensic accounting involves the combination of accounting, auditing and investigative skills. This is a term that is gaining popularity in the country as we move towards more accountability. The definition and application of forensic auditing are presented in this bulletin issue.



TOPICAL ISSUES



TEA IMPROVEMENT EFFORTS IN KENYA: WHERE ARE WE?

By S.M. Kamunya

Introduction

Tea improvement in Kenya may be relatively young considering that tea was introduced in the country at the turn of the last century. From the pioneer seedling populations that comprised random seed collections from all over the world introduced by early settlers, mass selection was initiated in plantations to produce high yielding, pest and disease resistant varieties. This effort was further enhanced when researchers demonstrated that tea could easily be propagated by cuttings, a method that subsequently became popular with farmers owing to ease of farm management and production of uniform product characteristics. Actual breeding, however, started in 1970s and 1980s, whereupon emphasis was placed more in attempts to recombine high yield and quality attributes as well as other useful agronomic traits in one clone. The plant improvement efforts of the early 1960s to the late 1970s saw the development of numerous new varieties although only 11 exhibited superior performance and so were released to farmers. Intensified and rationalized breeding efforts over

the last 25 years have resulted in the release of additional 36 clones to tea farmers. Another 29 promising clones are currently being tested in multilocal sites in Kenyan tea growing regions before they are released for commercial utilization. Current research efforts in tea improvement programme are geared towards meeting emerging challenges like inundation of the world market with black tea with corresponding stagnation or declining tea prices. Thus, initiatives to develop diversified tea products such as green varieties whose world market constitutes only 20%, specialty pharmacological teas with high levels of antioxidants and value-added processed teas are currently in top gear.

A detailed review of tea improvement being currently made in Kenya to hasten development of "designer clone" in the light of emerging challenges in the global tea/beverage market and changing weather patterns is presented.

Tea breeding strategies in TRFK

Tea breeding in TRFK essentially consists of four major phases; generation of genetic variability (through segregating/base populations), testing of the generated genotypes in progeny trials, selection of useful genotypes and comparative testing to demonstrate the superiority of the selected genotypes in clonal field trials, A fourth phase that involves exposing pre-released and promising clones to multiple sites (genotype-environment interaction) for stability and adaptability evaluation is always the final phase in a plant improvement programme.

Breeding and clonal selection

In the recent past, breeding programmes have been intensified and expanded to include improvement of more than one economic trait with fruits borne from such efforts expected to be harvested soon. Hybridization programmes take advantage of existence and/or creation of tremendous genetic variability for desirable traits involving choice and crossing of disparate clonal parents possessing desirable traits. Numerous crosses have been undertaken since inception of the rationalized breeding programme and seeds resulting from such crosses are collected alongside open pollinated ones upon maturity and used in formation of base populations for future selection. Majority of seedlings and clones that are at different stages of testing, either in progeny tests or replicated clonal field trials are either half-sibs (only female parent known) or full-sibs (both parents known). The response of the progenies in relation to yield and tea quality and other secondary traits as well as estimation of their parental combining abilities will additionally help in determining the best mating design for fruitful tea improvement.

Studies so far undertaken show that Kenya's tea germplasm that is predominantly of the Assam type (i.e. *Camellia sinensis* var. *assamica*) is highly diverse although many of the clones are genealogically related. The risks of having a population with narrow genetic base may be high, and huge losses can be encountered in event of onset of biotic and/or abiotic stresses. There has been a thrust in the breeding strategy to buffer the existing germplasm against emergence of such risk factors by deliberately crossing disparate parents through intra-specific or interspecific hybridization. This strategy is aimed at broadening the genetic base as well as introgressing new genes controlling

useful traits that were otherwise not present in the base population. There are numerous genotypes under different stages of investigation, which are a result of direct crosses among Chinese germplasm (*Camellia sinensis* var. *sinensis*), Cambod type (*Camellia sinensis* var. *assamica* spp. *lasiocalyx*) and Assam germplasm (*Camellia sinensis* var. *assamica*). Two Cambod cultivars, TRFK 301/4 and TRFK 301/5 have been released to the industry for on-farm diversification. Besides, at least two of the promising clones have combined optimum yield and black tea quality as the primary traits, and have been observed to tolerate moderate to harsh adverse abiotic and biotic stress factors. Plans are under way to pre-release the two clones to the industry immediately the registration process for Plant Breeders' Rights is finalised. It is worthwhile mentioning that tea germplasm enrichment and diversification efforts have resulted in introductions from China, Taiwan, Japan and Tanzania. Plans are in the pipeline to introduce superior germplasm from Malawi in the near future. In spite of the noted tremendous progress in development of black tea varieties, over-production has resulted in flooding of world market with black tea. Owing to stiff competition from other beverages, stagnation in tea consumption and increased cost of production, revenue accruing from black tea has taken a downward trend. This paints a gloomy picture on the future of the Kenyan tea industry, which currently almost exclusively produces black tea. In order to prepare the industry for the bleak future, breeding programmes have been shifted to focus more on product diversification and development of pharmacological tea varieties. Summarized below are the efforts being made in TRFK to meet these challenges.

Breeding for green tea varieties

As mentioned in foregoing, Kenyan tea is almost solely sold as black crush, tear and curl (CTC) tea. It is currently held that the global tea market is experiencing a glut with annual production outstripping demand by about 1%. Tea prices on the other hand have been gradually falling by an average of 6% annually over the last five years. Concomitantly, grower earnings have declined if not stagnated over the same period. Thus, there is a need to develop diversified tea products like orthodox and green teas. Green tea constitutes about 20% of total world tea production and is largely consumed in some Asian countries like Japan, China, Korea and the Middle East.

Accessing these markets would translate into huge earnings from the tea enterprise.

As development of adaptable green tea cultivars cannot be fruitful if suitable germplasm (raw material) is not available, initial germplasm was imported from Japan (Yutakamidori and Yabukita varieties) where cultivation of green tea varieties has been on-going. The germplasm was among other aims introduced to diversify the Kenyan germplasm and for use in the development of frost, drought and cold tolerant varieties. These germplasm are the most populous clonal cultivars in Japan constituting about 90% with Yabukita being the leading accounting for 85% of the proportion. The germplasm were introduced in our main polyclonal breeding garden and have been used in the hybridization programme since 2001. A non-fermenting clone (potential green tea variety) has been identified and introduced in the hybridization programme. It has moderately high levels of catechins although it is not a high yielder. Further introductions of green and black tea seed varieties were made from China in 2001.

Breeding for tea varieties with high levels of antioxidants

Emerging scientific data from pharmacological and physiological studies show that tea has beneficial effects on human health. Some of the most important chemicals in tea are the catechins, which are colourless, bitter-tasting substances that give the drink its astringency. Catechins are an important group of polyphenols in tea. When acted upon by an enzyme called polyphenol oxidase, polyphenols are formed which have a reddish colour and are the colouring compounds of the beverage. In dried green tea, catechins remain the same as they are in fresh tea shoots, unlike in black tea where they undergo chemical change during fermentation.

Polyphenols present in tea are mostly flavonoids. These polyphenols are potent antioxidants -substances that have the ability to counteract harmful free oxygen radicals produced in the body, which are believed to be responsible for many chronic diseases including heart diseases and cancer. Scientific studies have shown that tea has some potential to help reduce the incidence of several major diseases, especially when combined with healthy lifestyle. In particular, it has been found to have protective effects

against cardiac diseases/disorders and stroke (by reducing blood lipid levels and clot formation), possess some anti-viral, antibacterial and anti-mutagenic effects, and may promote oral health by reducing the formation of dental caries, and possibly inhibiting or slowing down the development of gum diseases. Other health benefits that tea polyphenols provides includes prevention of inflammatory conditions, arthritis, diabetes, asthma, liver disorders, cataracts, and muscular degeneration. Furthermore, certain tea catechins (i.e. EGCG) have been associated with boosting the body's immunity and to cure cancer. Other useful chemicals found in tea such as anthocyanins (purple pigment) also have antioxidant properties and so help in combating chronic diseases like cancer as well as cardiovascular diseases. Other prophylactic properties of tea are also attributed to caffeine and theobromine, which are found in young flush shoots of tea. As caffeine acts as stimulant to both the central nervous and cardiovascular systems, considerable consumer preferences in relation to caffeine contents have been noted. As different tea varieties have varying levels of caffeine, potential exists to have pharmacological tea formulations with predetermined levels of caffeine to satisfy different consumer needs. However, the state of research on tea regarding these aspects is limited and majority of work has been conducted on green tea and little on black tea.

Use of molecular markers in plant breeding

Many agriculturally important traits such as yield, quality and some form of biotic and abiotic stresses are controlled by many genes and are known as quantitative traits (also 'polygenic', 'multifactorial' or 'complex' traits). The regions within genomes that contain genes associated with a particular quantitative trait are known as quantitative trait loci (QTLs). The identification of QTLs based on conventional phenotypic evaluation is not possible. A major breakthrough in the characterization of quantitative traits that created opportunities to select for QTLs was initiated by the development of DNA (or molecular) markers in the 1980s.

One of the main uses of DNA markers in agricultural research has been in the construction of linkage maps for diverse crop species. Linkage maps have been utilized for identifying chromosomal regions that contain genes controlling simple traits (controlled by a single gene) and quantitative traits using QTL analysis (QTL mapping).

DNA markers that are tightly linked to agronomically important genes (called gene 'tagging') may be used as molecular tools for marker-assisted selection (MAS) in plant breeding. MAS involves using the presence/absence of a marker as a substitute for or to assist in phenotypic selection, in a way which may make it more efficient, effective, reliable and cost-effective compared to the more conventional plant breeding methodology. A base genetic linkage map for tea has already been constructed with preliminary results showing significant association between molecular markers and quantitative traits. Further intensified and more elaborate studies on QTL mapping is currently in progress.

MARKETING KENYAN TEA IN UNITED STATES OF AMERICA: IS THERE MARKET OPPORTUNITY?

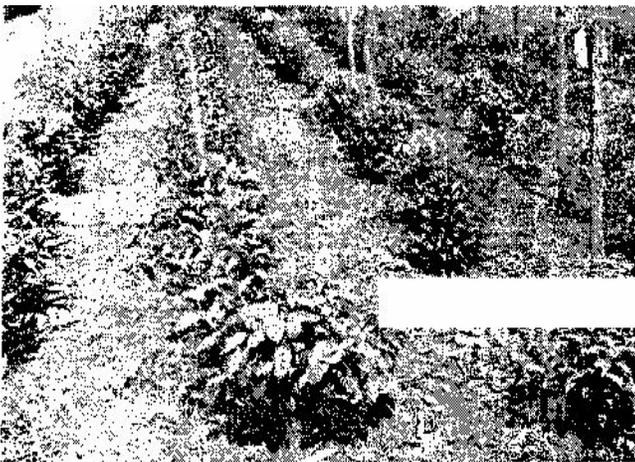
F Mwaura

Introduction:

Export Promotion Council (EPC), a Kenyan governmental institution under the Ministry of Trade and Industry has been promoting export market, business and trade information delivery and capacity building for exporters. The council has engaged a consultant to establish opportunities of marketing Kenyan tea and coffee in the United States of America (USA). The council wished stakeholders' in the tea and coffee more so entrepreneurs wishing to export these crops' products to USA to interact and share with the consultant. The EPC in collaboration with USAID has also been facilitating entrepreneurs with marketable products to attend coffee and tea exhibitions in the USA for promotion and marketing of their produce. The Council has been organizing workshops in the country to provide opportunity for entrepreneurs wishing to participate in American exhibition to understand the procedures of being facilitated and necessary preparations for the exhibitions.

In these workshops like one held on 8th March 2007, at Serene Hotel, where all interested tea and coffee stakeholders were invited, the consultant presented findings of the study on the current tea and coffee market situations and opportunity for entry into the market by Kenyan entrepreneurs. Every sub-sector was considered separately in the power point presentations. A question and answer session for the consultant followed every presentation. Requirement and procedures to be followed in selecting participants to be sponsored by USAID for this year coffee and tea exhibitions were described. A video show on a programme aired during the Americans tea forum week was played.

It was learnt that opportunity for marketing both Kenyan tea and coffee exist in the USA. Kenyan tea could fetch better market and prices with efforts to get the products to the USA and also targeting the right niche. Very little of the Kenyan teas is getting to USA due to failure by the marketers to see the opportunity. The little Kenyan tea getting to USA markets are bought from Europe, mostly Netherlands by small packers who blend and repackage it in



Plates 1 and 2: Some introduced Chinese green tea varieties undergoing adaptability to local conditions

the USA. Black tea market in USA has high profit margins and is largely dependent on Argentina and China. Efforts to make Kenyan tea accessible to the market and promotion of Kenyan teas as high quality teas will increase its demand. The main constraint facing Kenyan tea is its high production cost and the distance to the USA. For success in marketing, Kenya needs to target medium and small-scale packers and specialty teas sellers. Small and medium packers will be able to promote Kenyan tea, but they also require some accompaniment to aid promotion. Specialty teas market is expanding among a number of sellers and consumers. Quality aspects of Kenyan tea could feature more in this category of the market as it fetches higher price and the market segment is doing a lot of promotion to attract customers.

Valued added teas especially ready to drink (iced tea) too have a growing market in the USA and Kenyans need to position themselves in this market segment. Bottling Kenyan teas for sale as iced tea is faced with the problem of "clouding". While clouding is due to quality aspect of Kenyan tea, the market may perceive it as being of lower quality.

The video on the perception of Americans on tea as it was aired during the tea week forum showed that the population value tea due to its medicinal value including immune boosting, protection against cardiovascular diseases, diabetes, cancer and bone development. The programme aired by an American television station in 2005 had an estimated viewer audience of 661000. Information on tea medicine value is achieved through reading and friends.

Small and medium entrepreneurs involved in tea and coffee value-addition are being sponsored to attend exhibitions in USA. About 8 enterprises will be selected for partial sponsorship. Those with marketable products, and clear company profiles and who had not attended previous exhibitions had a better chance to qualify.

Conclusion:

EPC has provided a unique opportunity that requires to be tapped for improved profitability of tea and coffee sub-sectors. Accessing the USA market for Kenyan tea industry will be an advantage in that the country will reduce over-reliance on few traditional markets. Information on the opportunity needs to be disseminated

to large clients to increase the chance of successful entry in the USA market.

For more information on the marketing tea in the USA contact: -

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ADMINISTRATION AND ACCOUNTS FORENSIC ACCOUNTING DEMYSTIFIED

By F.K. Lang'at

Introduction

Forensic accounting is a term that originated from North America and now accepted in Europe. It is really synonymous with "fraud investigation and prevention". The field encompasses the amalgamation of accounting, auditing and investigative skills. The word "forensic" has unfortunate connotations of unpleasant medical examinations, whilst "accounting" infers that the discipline is mainly concerned with bookkeeping and sifting through financial records. However, there is very little accounting involved in major fraud investigation, the Goldenberg scam being a case in point. The word "Accounting" also denotes that fraud investigation lies within the realm and expertise of accountants, an assumption which is not always justified.

What is then forensic accounting?

Forensic accounting involves gathering interpretation and presentation of financial evidence in pursuit of a fraud. The evidence must be suitable to the court which will form the basis for discussion, debate and ultimate dispute resolution.

Fraud can be defined as "taking dishonest advantage of someone," be it a person or body corporate. It is important to note that not all frauds are criminal offences. Embezzlement and inventory theft are clearly criminal acts while breaches of director's fiduciary duty, may only have civil remedy. Forensic - accounting involves; forensic investigation and forensic audit. Forensic investigation is the utilization of specialized investigative skills in carrying out an inquiry conducted in such a

manner that the outcome will have application to a court of law. Forensic audit on the other hand entails examination of evidence regarding an assertion to determine its correspondence to established criteria carried out in a manner suitable to the court. Forensic accountants provide litigation support and investigative accounting to facilitate unraveling of quantities of economic damages or loss occasioned by breach of contract and investigations of criminal nature such as theft by servant.

MANAGING ONESELF

By Wilson K. Chirchir

Introduction

The introduction of the performance contracting in the public sector has come with a lot of challenges to its employees. More and more public sector employees and most knowledge workers will have to manage themselves. They have to place themselves where they can make the greatest contribution and have to develop themselves. They have to learn how and when to change what they do, how they do it and when they do it.

The introduction of the performance contracting has brought a lot of changes in the way the public sector employees relate to society, interpret economic, political and technological changes. In order to manage emerging turbulences created by such change in approach to working style, the employees have to change their attitude to work.

It is important to appreciate that the very great achievers known in history, a Napoleon, a Leonardo da Vinci, a Mozart, have always managed themselves. This, in large measure made them great achievers. But they were rarest of exceptions and they were so unusual both in their talents and in their achievements, so as to be considered outside the boundaries of normal human existence. Now even people of modest endowments that is, average mediocrities, will have to learn to manage themselves.

Public Sector employees, who are knowledge workers, therefore, face drastically new demands: - They have to:

- 1) Ask: Who am I? What are my strengths?
How do I work?
- 2) Ask: Where do I belong?

- 3) Ask: What is my contribution?
- 4) Take relationship responsibility
- 5) Plan for the second half of their lives.

Of all the above, I will only expound on the first one:

What are my Strengths?

Before the introduction of the Performance Contracting (PC) in the Public Sector most employees thought they knew what they were good at. They were usually wrong. Employees know what they are *not* good at more often and even there employees are more often wrong than right. And yet one can only perform with one's strengths. One can not build performance on weaknesses, let alone on something one cannot do at all.

For the great majority of public sector employees, to know their strengths was irrelevant only a few decades ago. One just got employed and all systems go. But now employees, have to sign PCs. They, therefore, have to know their strengths so that they can know where they belong in the organization. There is only one way to find out; ***The Feed back Analysis***. Whenever one makes a key decision, and whenever one does a key action, one writes down what one expects will happen. And 12 months later one then feeds back from results to expectation. It is expected that within a fairly short period of time, may be two or three years the P.C will tell people first where their strengths are - and this is probably the most important aspect of Performance Contracting. It will also show employees what they do or fail to do that derives them of the full yield from their strengths. And it will finally show them where they have no strengths. It will show them where they are not particularly competent. And it will finally show them where they have no strengths and cannot perform.

Several *action conclusions* follow from the feedback analysis.

- 1) Concentrate on you strengths. Place yourself where your strengths can produce performance and results
- 2) Work on improving your strengths. The feedback analysis rapidly shows where a person needs to improve skills or has to acquire new knowledge. It will show where skills and knowledge are no longer adequate and have to be updated. It will also show the gaps in ones knowledge.

3) Areas where intellectual arrogance causes **disabling ignorance** is soon identified. Far too many people/employees especially with high knowledge in one area are contemptuous of knowledge in other areas or believe that being "bright" is a substitute for knowing.

The feed back analysis soon shows that the main reason for poor performance is the result of simply not knowing enough or the result of being contemptuous of knowledge outside one's own specialties.

One important action conclusion from the feedback analysis is thus to overcome intellectual arrogance and work on acquiring the skills and knowledge needed to make one's strengths fully productive.

An equally important action conclusion is to remedy **one's bad habits** - things one does or fail to do that inhibit effectiveness and performance. They quickly show up in the feed back analysis.

The analysis may show for instance that a planner's beautiful plans, like a Strategic Plan, die because the implementers/employees do not follow through. Like some many brilliant people some employees believe that ideas move mountains, but bull dozers Move Mountains, ideas show where the bull dozers have to go to work. The most brilliant planners far too often stop when the plan is completed but that is when **work** begins. Then the planner needs to find the people to carry out the plan, explain the plan to them, teach them, adopt and charge the plan as it moves from planning to doing and finally, decide when to stop pushing the plan.

The analysis may also show that a person fails to obtain results because he or she lacks **manners**. Bright people, especially bright young people often do not understand that manners are the "lubricating oil" of an organization. It is a

Law of Nature that two moving bodies in contact with each other create friction. Two human beings in contact with each other therefore always create friction. And the manners are the lubricating oil, that enables these two moving bodies to work together, whether they like each other or not - simple things like saying "please" and "thank you" and knowing a person's birthday or name and remembering to ask after the person's family. If the analysis shows that brilliant work fails again and again as soon as it requires cooperation by others, it probably indicates a lack of courtesy, that is or manners. What not to do

Feed back from results to expectation soon shows where a person should not try to do anything at all. It shows the areas in which a person lacks the minimum endowment needed - and there are always many such areas for any person. Not enough people have even one first-rate skill or knowledge area, but all of us have an infinite number of areas which we have no talent, no skill and little chance to become even mediocre. And in these areas a person - and especially a knowledge worker/employee should not take on work, job, and assignments.

Waste as little area as possible on improving areas of low competence. Concentration should be an area of high competence and high skill. It takes far more energy and far more work to improve from incompetence to low mediocrity than it takes to improve from first rate performance to excellence. And yet most people and equally most teachers and most organizations try to concentrate on making an incompetent person into low mediocrity. The energy resources and time should instead go into making a competent person into a star performer.

TO

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