Chapter - 5

THE COFFEE CULTURAL PRACTICES AND PROMOTIONAL SCHEMES
Coffee Cultural Practices and Coffee Cultivation in Chikmagalur

Chikmagalur district was the first to grow coffee in India. The cultivation of coffee has an eventful back-ground. It is said that arabica coffee was introduced about 1670 A.D. by Baba-Budan. He is reported to have brought seven seeds from Yemen, presumably mocha coffee, and raised seedlings on the hills near the Dattatreya Peeta village in Chikmagalur taluk. It was from this garden that seedlings were supplied to Coorg district of Karnataka and to the neighbouring state of Kerala. It was only in the late 1820s that commercial plantations were opened in south India by British enterprise.

The climate of the district, which is situated in the hilly terrain where coffee, tea and other plantation crops are grown, is very agreeable and cool. The temperature varies from 8.3 to 35.6° C. The humidity is very high in the monsoon generally exceeding 90%. Fog occurs on many days in the cold season in the western parts of the district even in the monsoon and post monsoon season. The hilly areas are often enveloped in cloud or mist. The rainfall in the district varies from 2000mm to 3500 mm. About 79% of the annual rainfall in the district is received during the northeast monsoon months i.e. from June to September.

Soil of Chikmagalur district coffee zones is red loamy in nature. Soil occurring in the valley or ghats is texturally loamy or silt loams. These are generally deep to very deep and clay content increases down the profile. Occasionally shallow gravelly red soil is also seen. These soils are fairy well drained in the uplands and water logged in low lying areas. Coffee soils of Chikmagalur district are subjected to intense leaching. In Chikmagalur acidic soils are distributed in about 4,87,850 hectares of land. However, only 40% of area is being cultivated. These soils are lateritic in nature. Coffee soils in Chikmagalur district suffer from deficiencies of Magnesium, Sulphur, Phosphorus,
Molybdenum, Zinc and Boron. The soil in this area is rich in organic matter. The main crops grown in this area are coffee, tea, pepper, areca, coconut, sugarcane, paddy and fruit crops (Karnataka State Gazetteer Chikmagalur District, 1981).

The coffee plant

Coffee of commerce includes two species *Coffea arabica* L. and *Coffea canephora* pierrie. Other species are *Coffea liberica* and *Coffea excelsa*, which are planted on borders or along boundaries of coffee estates.

Arabica Coffee (*Coffea arabica* L.)

Coffee arabica is a tetraploid species (*2n=44*). Under natural condition, it grows into a small tree about 10 metre. It comes to bearing at 2 or 3 years. The number of seeds in a kolo gram of berries is 2636. Caffeine content of processed berries is 1.47%. The problem with arabica coffee is dropping of ripe berries.

Arabica varieties

Selection 1(Sel-1)

During 1936-37, the institute released S-288 which was superior to earlier varieties because of its resistance to leaf rust (*Hemeleia vastatrix*) race I and II. This variety is a tetraploid hybrid derived from S-26 which is supposed to be a progeny of natural cross between *Coffea liberica* and *C. arabica*. Though the variety is a high yielder with quality similar to arabica, seed abnormalities are very frequent. However, because of its wide adaptability to varied agro climatic conditions, this variety is still being cultivated in some estates.

Selection 3(Sel-3 ir S-795)

It is a cross-bred line of S-228 x Kent variety. Kents is a selection made by Mr. Kent, a planter. It is resistant to race II of leaf rust and has bold fruits and seeds of good quality (Narasimhaswamy, 1960).
Selection 5 (Sel-5)

It is derived from the cross Devamachy x S-881 (wild arabica from Rume, Sudan). Devamachy is a spontaneous hybrid of robusta x arabica, spotted in a private estate in Coorg. It has small oblong leathery leaves, oblong fruits and seeds. It shows field resistance to leaf rust.

Selection 6 (Sel-6)

A hybrid between robusta and Kent arabica. Larger plants with robusta type of branching. Fruit is medium to bold. ‘B’ grade and elephant beans are low. A spacing of 2.7 x 2.1 m is sufficient. Bean and cup quality is similar to arabica.

Selection 7 (Sel-7)

Derived from San Ramon (a dwarf arabica variety) crosses. Selection 7.2 is a cross between dwarfs of 7.1 and Agaro. This hybrid was obtained when it was crossed with hybido-de-Timor, Selection 7.3. Cup of quality is as in arabica; 1.2 x 1.2 m spacing can be adopted. This hybrid can be grown as an intercrop with robusta, till the later fully spread.

Selection 8 (Sel-8)

It is a pure line selection of hybrid-de-Timor (HDT). HDT is a spontaneous robusta x arabica hybrid from Timor Islands. Its phenotype closely resembles arabica types, and has highest resistance to leaf rust. It is suitable for all localities.

Selection 9 (Sel-9)

Cross-bred line of hybido-de-Timor with other arabica varieties. Hybido-de-Timor x Tafarikala line is drought hardy. Bean is medium to bold. About 70% of plants in the progeny are resistant to rust.
Selection 10 (Sel-10)

Progenies of Caturra x S-795 and Agaro. Vigorous plants with good spread. Resistant to many of the races of rust. Good yielder and early bearer. Spacing required is 1.8 x 1.8 m.

Kaveri

This hybrid variety is the result of collaborative research work carried out by the CCRI, India and Coffee Rust Research Centre, Portugal. Kaveri is a cross between Caturra and Hybrido-de-Timor. It is capable of producing more percentage of ‘A’ grade coffee which is also superior in cup quality.

San Ramon

San Ramon is a variety in arabica isolated in plantations in Colombia. The variety is characterized by small compact size and growth (Farooqi and, A.A. and Sreeramu, B.S).

Root system

Root system of arabica consists of a thick and short tap root extend 45 cm below the soil surface, axial roots growing vertically downward to a depth of 2.5 to 3.0 m and branching out in several directions and lateral roots usually confined to layers parallel to soil surface to a distance of 1.3 to 2.0 m from the trunk. Major part of the root system is concentrated in the top 30 cm layer and distributed in a circle of diameter 1.5 m around the trunk. In arabica, 94% of coffee roots are present in the top 30 cm of soil.

Flowering and fruit set

Flower buds and their dormancy

Initiation and growth of flower buds take place from the month of September to March. Bud dormancy apparently constitutes a strategy to ensure
uniform blossoming. A period of dormancy is associated with a drought period to complete some subtle physiological or morphological events that make the flower bud ready to respond to external stimulus to resume growth and react quickly to water.

**Uniform blossoming mechanism**

Place of blossoming is restricted to new wood only. Blossoming of arabica coffee occurred only when there was a temperature drop of 3°C or more within a period of not more than 45 minutes. Arabica coffee is self-compatible. In arabica, flowers open in the early morning and pollination occurs in the morning.

**Fruit dormancy, size of beans and rainfall requirement**

The fruit will remain as pinheads for a period of 6-8 weeks, due to dormancy offered by high levels of endogenous abscissic acid and low levels of active gibberellic acid. The size of bean is determined by the swelling of beans triggered by amount of rainfall during the 6-16 weeks long expansion stage. The heavy seed endosperms are formed between 12 and 18 weeks after blossoming with a marked increase in endogenic gibberellic acid levels.

**Fruit growth**

Fruit growth pattern in arabica coffee follows a double sigmoid type. Five development stages of coffee fruits are recognized as pin head stage, rapid growth stage, endosperm-filling stage, pericarp development stage and ripening stage. It takes 34 weeks from blossoming to ripening of fruits. After 30.35 weeks from blossoming, chlorophyll is lost and ethylene is produced making the berries red in colour. Large sink strength of coffee seed endosperm ensures maximum storage of assimilates.
Critical period of water requirement is at rapid fruit expansion stage. Reddy and Srinivasan (1979) reported that number of fruits per node is an important yield component. Vasudeva and Rathageri (1981) reported that 20 cm² of leaf area is needed to support each fruit in arabica coffee, though coffee is able to set more fruits than it can sustain (Chokkanna, N.G., 1962).

**Robusta coffee (Coffea canephora Pierrie.)**

*Coffea canephora* Pierrie is a diploid species (2n = 22). It forms a bigger bush than arabica (upto 8-9 m) with robusta growth under natural conditions. Flowers are fragrant and self-sterile and leaves are broad, large and pale green. Bearing age is 3-4 years. Plants can hold berries after ripening also. It takes 40-44 weeks from blossoming to ripening of fruits. Hence, the harvest season occurs two months later than for arabica. Seed size is small and for making 1 kg, 3500 berries are needed. Caffeine content is 2.2% and hence, this species is useful in making instant coffee.

**Robusta varieties**

*Coffea canephora* (Robusta) was introduced in India, after the appearance of leaf rust on arabica. Robusta coffee is highly cross-pollinated. Twelve high-yielding mother plants were selected from private estates and their seedling progenies were established at CCRI in 1932. Study on their yield pattern gave way to the progenies viz., S-274 and S-270.

**Sel-1 R (Sel-274)**

This is a single plant progeny giving high yield. It can come up well even at lower elevations and high percentage of plants are resistant to leaf rust. Growth is vigorous but with shallow root system. S-274 is bold-fruited and has recorded 960 kg green coffee per hectare. Growth floral initiation, development and blossoming in this selection are similar to other robustas.
Sel-2R (Sel-270)

This is also a single plant progeny selection of robusta giving high yield, but fruits are not so bold as Sel-1 R.

Sel-3 R

This is an inter-specific hybrid having compact growth, yielding bolder fruits. In addition to above cultivars described, Sel-4, 8 and 11 were also released for commercial cultivation depending on the local adaptability in different coffee-growing areas.

BR (Balehonnur Robusta) series: Clonal progenies established from high-yielding individual plants of S-267 to S-278 robusta selections have been released under the BR series. These are designated as BR-1 to 17 among which seeds from high yielding clones, viz., BR-9, BR-10 and BR-11 are being distributed for commercial cultivation.

Root system

Robusta coffee is shallow-rooted than arabica. Nutman (1933) reported that the top 15 cm of soil has maximum root concentration. Roots spread largely in upper soil layers and there is a distinct taproot. Thomas (1944) reported from Uganda that when robusta trees were mulched they responded readily and produced extraordinary root growth in the surface layer as well as in the mulch.

Shoot system

In robusta, head of the series buds does not exist in all leaf axils. A trend toward regrouping of secondary branches from certain first order branches and floral axils is seen. Raju (1975) observed that plagiotropic cutting give rise to orthotropic sprouting. A successful technique in inducing orthotropic shoot emission is beheading of the plants in robusta coffee.
Flowering and fruit set

Flower bud dormancy and blossoming mechanism

Robusta coffee has the habit of irregular flowering and formation of flowers in clusters. November to February is the period of flower bud initiation. Precipitation during February-March is ideal for blossoming. Blossoming occurs on the 7th or 8th day after rains and site of blossoming is new wood.

Fruit set and fruit growth

Robusta coffee is self-sterile. In robusta coffee, fruit setting ranges from 20 to 25%. Setting of fruits in coffee depends on number of flowers, number of leaves on the plant, flower atrophy and environmental factors such as heavy rains on the day of blossom and/or at anthesis. Fruit set also varies with flower position, the higher the position in the bush, the larger be the percentage of fruits. Growth pattern of fruits of robusta is reported to be linear or sigmoid type of increase in fresh and dry weights.

Cultural practices for coffee

Care has to be taken in the selection of fields for coffee cultivation in order to obtain a tract well sheltered by nature from undue exposure either to the southwest or the east wind. The area should be in the zone that is favoured with as large a share as possible of the March and April showers and yet not visited by two heavy rains of the south-west monsoon. The coffee plant rejoices in a damp, warm temperature at elevations from 2,500 to 3500 ft. above the sea level. But it can grow under certain circumstances at elevation both below and above those elevations also. A good loamy soil of any colour, with a good deposit of vegetable matter on the surface and not much rock underlying it, is required.
There are varieties of land in Chikmagalur district in which coffee has been planted, such as the ordinary forests, the heavy ghat-forests and village jungles or land, the original timber of which was cut and then followed by a secondary growth of trees of a smaller type. Some of the finest coffee estates have been formed on lands of the first and third varieties of forests mentioned above which have the decided advantage. Over all other descriptions of possessing a rich deposit of decayed vegetable mould that has not been exposed to atmospheric influences and hence contains an almost in exhaustible store of organic and inorganic constituents available as food for coffee plant.

Large trees that have a thick foliage in the hot weather and little or none in the monsoon are kept as shade at regular distances, attention being paid to leave fewer trees on portions with a Northern aspect than on those facing the south, all quarters exposed to the wind especially requiring protection. Lines of pegs generally 1½*1½ * 1½. This is done to remove obstacles to the roots of the young plants, and to make a nice loose bed for their reception. For nurseries, convenient situations with facilities for irrigation or with river or tank frontage are selected and entirely cleared of trees, the soil being dug to the depth of two feet or more and every root and stone removed. This is then laid out into beds, generally about four feet wide, separated by paths and the whole field well drained and put in order with the same care as needed for a flower garden. Manure is applied and the beds are then cut up into furrows six inches apart in to which the seeds are placed about one inch apart. The whole bed is then covered up with dry leaves or straw and watered by hand, care being taken to maintain a uniform rate of moisture which must not be excessive. The seed germinates in six weeks and from the bean which is raised on a slender green stem of about eight inches in height, burst forth in to two small oval leaves. These two-leaved seedlings are pricked out in to beds at either 4 * 4 or 6 * 6 inches. They require at least eight to fourteen months, with constant attention and watering, forming into good plants.
Coffee beans are generally used as seed material. Carefully prepared seeds are germinated in seedbeds and after four to six weeks seedlings are transplanted into polythene bags. Seedlings of about seven to eight months old are selected for planting in the field. The main season for planting extends from June to August in south-west monsoon zones. Disease free and healthy seedlings are selected for planting.

**Planting Distance**

The distance at which the plants are planted in coffee clearings plays a great part in determining yield. It has noted that too close planting may give large crops in the earlier years, whereas greater spacing provides better scope for growth and thus a better yield in later years. The best planting distance for each locality has to be found by experiment.

**Planting**

Planting is done in the months of June, July and August. The plants, being carefully removed from the beds and the roots trimmed, are planted with a spade or planting staff by a regular team of experienced men. Under favourable conditions, the plants are ready for topping in the second year. A topping staff duly marked to the proper height, is placed along side of the young tree and the top or head and one primary branch are removed, for directing the sap into the primary branches and making them throw out secondary shoots which comes from each eye along the branch. An abundance of vigor has the effect of forcing out a number of shoots under the junction of the upper primaries with the stem and also from the stem at various places. The first crop generally appears in the third year, and consists merely of a few berries on the primary branches aggregating about one mound per acre. In the fourth year, a return of one cwt per acre may be expected. It is not until the seventh or eighth year that the planter is rewarded by a full crop exceeding five or six cwt per acre.
Irrigation

In most coffee growing countries, there is a dry period; if this is prolonged or if the precipitation in the previous rainy season has not been sufficient, coffee growth is adversely affected. Serious drought causes loss not only of current crops but also of those expected during the next few years. Irrigation by ditch or flooding or by overhead sprinkling helps to tide over these difficulties. Inadequate blossom showers or backing showers can be compensated by irrigation and make all the difference between success and failure.

Sprinkler irrigation is the most versatile method of irrigation to supplement natural rainfall for growth and blossoming of coffee. Robusta coffee being sensitive to drought will respond well to sprinkler irrigation. Sprinkler irrigation increases the length of laterals and number of nodes and internodal length. It also increases leaf area by 45%. If irrigation is restricted to blossom and backing 48 to 57% yield increase is assured, whereas irrigation throughout drought period increases yield by 80 to 90% in robusta.

Fertilizer application

The nutrient requirement to produce one ton of clean coffee (6000 kg fruits of arabica or 5000 kg of robusta) is roughly 40, 3 and 40 kg of N, P$_2$O$_5$ and K$_2$O, respectively and the fertilizer needs are 3 to 4 times more.

For coffee plantations having yield range of 500, 750, 1000 and 1250 kg ha$^{-1}$, different quantities of 60:45:65, 90:60:90, 120:90:120 and 130:100:130 kg ha$^{-1}$. Of N, P$_2$O$_5$ and K$_2$O respectively are recommended by CCRI. Optimum dose to get 1000 kg of clean coffee was recorded as 90-160, 80-120 and 160 kg of N, P$_2$O$_5$ and K$_2$O by Jayarama and Ramaiah, 1988. They reported that fertilizers requirements are lower for coffee under shade than with no shade or little shade as flowering and production are limited by shade and due to contribution of nitrogen.
by leguminous shade trees and by keeping other nutrients in circulation. Dose of fertilizer for economic optimum and maximum yield also have been arrived at by them as 154:117:154 kg and 271:204:271 kg of N, P$_2$O$_5$ and K$_2$O, respectively. For arabica coffee yielding more than 1 t ha$^{-1}$ and less than 1 t ha$^{-1}$ the dose are 160:120:160 kg and 140:90:140 kg of N, P$_2$O$_5$ and K$_2$O, respectively. The same for Robusta coffee is 120:90:120 kg and 80:60:80 kg N, P$_2$O$_5$ and K$_2$O, respectively (Anil Kumar, 2002).

**Harvesting**

The coffee fruits should be picked as and when they become ripe. Coffee is just ripe when on gently squeezing the fruit between the thumb and fore finger, the bean inside with the parchment skin pops out easily. Under-rope and over-ripe fruits cause deterioration in quality, the former producing immature beans which are usually coated and the latter ‘foxy’ coffee. If for many reason, it is not possible to pick the coffee as and when it ripens, the un-ripe and over-ripe fruits should be sorted out and only the just ripe fruits used for pulping. Coffee fruits dried on the trees and the over-ripe fruits may be dried together to produce whole-crop cherry. The green and under-ripe should be separately dried and mixed with stripping.

**Drying Process**

*C. arabica* has to be dried differently from *C. robusta* as the results desired in the two cases are not the same and the two react differently at any given temperature. Robusta can be dried rapidly, the final moisture content being about 8%. Arabica on the other hand should be dried more slowly, the final moisture content being about 10%.

The berries are passed through the pulper with a stream of water either the same day or early next morning. The outer skin being thus removed the beans are allowed to ferment for twenty or twenty four hours, with out water to facilitate the
removal of saccharin matter which surrounds them. After the mass has been washed and well stamped out, all light beans and skins being carefully separated, the beans are removed to the draining mats where they are constantly turned over and allowed to dry for a day or more until all water gets drained off. They are then spread out thickly on the drying ground in order to dry slowly. This is an operation requiring constant attention for six or eight days.

The beans should not be dried too thinly spread or too suddenly exposed to the rays of the sun as they are apt to become bleached and bent. A drying ground protected by large trees is considered the best one as shade and sun are available. When the beans are sufficiently dried, they are put in to bags and dispatched outside. The yield of an estate that has been well maintained in cultivation may be put a six to ten cwts per acre. An accurately calculated estimate shows that in a series of years, the crop is more frequently below six cwts. But the yield varies in different places (Chokkanna, N.G., 1965).

Coffee Board

Before the constitution of the Coffee Board, marketing activities in regard to coffee were looked after by an organization which was known as Coffee Cess Committee which was formed to safeguard the interests of coffee growers and to regularize the supply of coffee to the markets in India with a view to helping the Coffee industry and to develop it further, the Coffee Board has representatives of several interests comprising coffee growers, plantation workers, coffee curing workers, traders, consumers, three members of the parliament and member representing the governments of coffee-growing states of Karnataka, Kerala, Tamil Nadu and Andhra Pradesh. The latest reconstitution of the board was done in 1978 and it consists of 32 members. The Coffee Board has its headquarters at Bangalore. The chief functions of the Board include promotion of sale and consumption of coffee within and outside the country, promotion of agricultural
and technological research in the cultivation of coffee and assistance of coffee estates for their development. The Board also aims at securing better working conditions, amenities, incentives and remunerations for the Workers; the Board is empowered to appoint several committees to carry out the programmes effectively.

Under the coffee development plan launched by the Board in 1956, the Board offers several categories of loan assistance to coffee growers to enable them to adopt improved methods of cultivation on scientific lines. The loan schemes of board include long-term loans, special purpose loans, working capital loans and loans for equipment and machinery, replanting loan-cum-subsidy and extensive cultivation. The present system adopted by the board in marketing of coffee is known as the pool system under which all coffee-growers, irrespective of their sizes of holdings, are under a statutory obligation to register their estates and to deliver their entire crop to the pool, except such quantities as may be permitted by the board for growers domestic consumption and seed purpose. Payment to the growers, on the coffee pooled, is made on the basis of their values as determined by the prose differential scale fixed by the board for the crop season. The pooled coffee is sold in the internal market, and export is made through convenient channels in regulated quantities and at convenient intervals. Under the above system of marketing, all coffee curing establishments are licensed by the board only. A number of pool-collecting depots at convenient center in all coffee growing areas have been opened by the board, in addition to appointing a number of pool-agents who receive, cure and prescribe standards and arrange to deliver the pooled coffee to the parties to whom the board has sold. The agents also collect the values from the buyers on behalf of the board and carry out all instructions issued by the board. The agents are paid remuneration for their services. The sale proceeds of the pooled-coffee forms a part of the pool-found which is utilized for making payments to the growers in accordance with the quality and quantity of
coffee delivered by the growers to the pool and also for meeting the costs of pool administration. Generally, the price policy adopted by the board is principally based on the cost of production of coffee worked out by its statistical department every year and taking into account pool expenses, excise duty, etc. is to be approved by the Central Government. Normally, coffee is not sold in auctions at prices below this price.

Central Coffee Research Institute

The Central Coffee Research Institute, formerly known as the coffee experimental station, Balehonnur, was started in 1925 under the stewardship of the late Dr. Leslie C. Coleman. It had in the beginning 19 acres at land and had the primary objective of breeding rust resistant selections and of conducting research on control of pests and diseases. Later the Coffee Board was providing periodical grants to the station for research relating to quality of coffee, till 1945 then the board decided that it should set up a research station in the state and took over the station in 1946 and started developing it as the Central Coffee Research Institute, with a separate research department under the Director of Research.

The Institute conducts research in increased production of quality of coffee. The objectives of the institute are to investigate into the influences of several cultural and soil management practices as well as nutrition on the yield of coffee; the improve of coffee plants in vigour, resistance to leaf-disease: to investigate on nutrition of coffee plants as regards both major and minor nutrients, soil and moisture conservation and coffee processing technology; to undertake research of the various pests and diseases of coffee including their control measures; and to render advisory services to the coffee-planters. The work of the Institute is divided into two wings: (1) Research and (2) Extension. The institute carried out experiments on various agronomical problems during several years and made practical recommendations on sprinkler irrigation, pruning spacing and proper
methods of raising healthy plants. Section and breeding work carried out at the institute for year have resulted in evolving three high-yielding strains resistant to leaf rust, a disease common to coffee. The extension wing of the research Department was started in 1949 to disseminate and demonstrate technical know-how to planters and transmit their problems to the Research Department. Its main functions are an advisory nature. High-yielding disease resistant selections are also demonstrated and popularized.

Indian Planters Association

A voluntary association of planters was originally started as early as 1893 at Chikmagalur to put forward the grievances of the Indian planters. In the beginning, the name of the association was North Indian Planters Association of Mysore. The main objectives of the association are to promote planters' interests in general and to represent grievances of the planting commodity to the government to maintain co-ordination with other planting associations, chambers of commerce mercantile bodies, trade unions etc. The membership of the organization is open to all planters who own plantations of coffee, tea, rubber and cardamom in the districts of Chikmagalur, Dakshina Kannada and Shimoga. This association is affiliated to the Karnataka Planters Association Chikmagalur, and the Coonoor, Nilgiris districts.

Karnataka Planters Association

The Karnataka Planters Association was started in 1958 with the object of protecting plantation interests in Karnataka and to educate its members about the internal and external problems faced by them, and to find out solutions for them. The membership of the Association is open to owner of coffee, tea, pepper and cardamom estates in Karnataka. The affairs of the Association are managed by an Executive Committee elected each year. The committee headed by a chairman, is elected by the General Body every year.
Establishment of Coffee Board

1. Support to Small Growers Scheme in Xth Plan (2002-2007)

In the Xth plan (2002-2007) for coffee development, the board has formulated a scheme entitled Support to Small Growers Sector (SSGS), to provide incentives to small growers with holdings of 10 ha and below to augment production of arabica crop through replanting old arabica blocks with new arabica and replantation of robusta blocks with arabica material in suitable areas/locations; to enhance farm productivity in robusta holdings through irrigation by augmenting water resources, to improve quality of coffee by establishing suitable infrastructure at the farm level; to encourage use of pollution abatement measures in farm where coffee is wet processed.

The benefits under the modified scheme would be available to the small grower’s w.e.f.1st of April 2002. As many elements of the SSGS scheme are, also a continuation of the IXth plan scheme, the benefits will flow in respect of such components only, in respect of pending loan linked cases of IXth plan.

Objectives and Scope of the Scheme

The basic objectives of providing incentive in critical areas of developments is to bridge the yield gap estimated to be at 200kg/acre between the small holders and the large holders sectors as also improve the product (coffee) quality.

Further, under the present environment of global surplus in coffee and low prices it is only through improvement of farm productivity and lowering unit costs and producing value added products that farmer can become globally competitive. This is necessary as coffee is primarily an exportable commodity in India.
The components of the SSGS scheme are:

i. Incentive for replanting;
ii. Incentive for water augmentation;
iii. Incentive for quality upgradation at farm level.
iv. Incentives for implementation of pollution abatement measures on the basis of recommended technologies of the board.

The Govt. of India vide letter No.4/1/2002-plant (B) (vol. II) dated 11th July 2003 has approved the coffee board’s plan proposal viz., support to small grower sector for implementation during the 10th plan period with an outlay of Rs. 36.20 crores on the following conditions.

1. The board will extend 20% subsidy for (a) Replantation (b) Quality upgradation; (c) pollution abatement and 25% subsidy for water augmentation activities as proposed in the EFC format. The ceiling limit for water augmentation will be Rs.50,000.

2. The board will maintain a ratio of 75:25 in favour of robusta while extending subsidy support for quality up-gradation with regard to regional spread. Also, extending support to quality up-gradation in arabica will be restricted for a period of two years only and the same may be reviewed there after.

3. The assistance shall be generally credit linked. However the board may extend such assistance to select cases where funds are raised from other authorized sources as well.

4. No new post will be created and the scheme will be implemented with the existing man power available with the board.

5. A reviewed, evaluation and monitoring mechanism shall be put in place for this scheme.
6. The expenditure for implementing the scheme will be met by the board of the approved plan funds of the board during the 10th plan period and no additional separate funds would be provided to the board for this purpose.

7. The Coffee Board will send the status of implementation of the scheme to this department from time to time.

Physical and Financial targets of SSGS Scheme in X plan:

1. Replantation: The Board has set a target of new planting/replanting of 10000 ha with arabica variety. This will include replantation of existing arabica tracts by removal of old/moribund plants and also substituting ofrobusta with arabica in locations suitable for arabica cultivation.

2. Water augmentation: The Board proposes to provide incentives for establishing 1400 units to facilitate water augmentation by development of tanks, wells, storage dams, bore wells etc. water harvesting and provision of protective irrigation that will improve production/productivity to stabilize and increase production.

3. Quality Upgradation: The Board proposes to provide incentives to improve quality by encouraging preparation of washed coffee (a value added product) wherever water sources are available by setting up washing stations using pulpers. Further, under this component incentives to develop hygienic drying and storage facilities by construction of proper drying yards and storage godowns, at the farm level will be given. The numbers of units envisaged are 750 during the X plan.

4. Pollution Abatement Measures: Combating the pollutants arising out of the coffee effluents by use of Bioreactor (developed by ASTRA 11 Sc.,) will be incentivised through a subsidy of 20%. Other technologies recommended by the respective pollution control Board of thr state will also be considered provided its efficacy is accepted by the Board. The total numbers of units proposed are 440 during X plan.
While the subsidy support is generally credit linked at levels cited in the foregoing paras, the Board will be open to extending such assistance when funds for investment are raised from authorized sources on a proper case by case appraisal. The Board with the involvement of nationalized Bank/authorized financial institutions will implement the scheme.

The overall physical and financial targets envisaged in the X plan under this scheme are as follows

<table>
<thead>
<tr>
<th>Item</th>
<th>Phy. Target (in Units)</th>
<th>Financial Target (Subsidy) (in Lakhs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replantation</td>
<td>10,000 ha</td>
<td>1800</td>
</tr>
<tr>
<td>Water Augmentation</td>
<td>1400 units</td>
<td>700</td>
</tr>
<tr>
<td>Quality upgradation</td>
<td>650 units</td>
<td>750</td>
</tr>
<tr>
<td>Pollution Abatement</td>
<td>440 units</td>
<td>220</td>
</tr>
</tbody>
</table>

**A. Procedures Prescribed for implementation of SSGS Scheme**

The critical parameters required for the implementation the SSGS scheme such as (a) Eligibility criteria (b) Source of finance for the scheme (c) Modalities for applying for grant of subsidy (d) procedures for processing the subsidy claims and (e) Flow charts & time limits for implementation of the SSGS scheme. As it is necessary that all extension officers/officials of the board as well as the officers of the SSGS scheme are fully aware of the various steps/modalities prescribed for the smooth implementation of the scheme.

**B. Eligibility criteria to apply for the subsidy under the SSGS**

1. All the legitimate coffee growers owning not more than 10 ha are eligible to avail the entitled subsidy (Per limits prescribed in the sanction order), under various components of the scheme. This will be calculated on the basis of the total investment, which is normally expected to be financed either wholly or partially with bank finance or in select cases, other authorized sources.
2. Individual/joint applications (family member/growers) are eligible to avail the benefits of the scheme provided the coffee holding are contiguous under common management and does not exceed 25 acre or 10 hectares.

3. Applicants shall produce revenue records as proof of area/ownership.

4. An applicant can avail subsidy benefit for one or more than one component of the scheme provided the grower is eligible to satisfy the Board on the sources of finance.

C. Sources for Financing for SSGS schemes:

a. Those applying for the benefits under the scheme will have to give a declaration on the sources of finance which normally will be a combination of:
   i. Own investment and
   ii. Loans from authorized financial institutions, which include commercial banks, RRB's and co-operative banks etc.

b. Scheme may also be 100% financed by authorized financial institutions.

c. In exceptional cases, the board will consider advising of subsidy for schemes not financed by bank credit provided the applicant is able to provide creditable sources of finance such as,
   i. Own savings
   ii. Hand loans from relatives
   iii. Buyers credits etc.

D. Modalities of application for grant of subsidy

   All applicants desirous of applying for assistance under this scheme shall apply to the nearest local office of the Coffee Board (includes O/o. JLO, SLO< DDE, JDE as the case may be).
E. Documents / information required to avail SSGS scheme

1. A project outlining the scope of re-plantation / water augmentation / quality upgradation pollution control activities proposed to be taken up. The format and length of the project report is left to the applicant but it shall contain information on the following:

   • Area proposed to be covered (re-plantation)
   • Area proposed for irrigation (for water augmentation)
   • Benefits anticipated in respect of yield / value addition / pollution abatement as the case may be.
   • Brand and type of irrigation system / quality equipment proposed to be procured (for sprinklers, pulper etc) and the capacity there of.
   • Photos of area where facility of water augmentation / quality upgradation is to be installed and a sketch map showing the boundaries in situ for facilitating proper identification.

2. Copy of application to bank for loan (applicable only in bank finance cases)

3. Proof of land ownership-CRC, Pahani, Khata extract.

4. Three photographs of the applicants.

5. The growers investing their own funds or investing from authorized source of finance (Non Bank Credit) should furnish a self-declaration as a document towards financing of the scheme as prescribed.

6. Statement of expenditure with vouchers towards the materials equipments acquired along with the completion report (to be submitted by the applicants after completion of works and while claiming for release of subsidy).
Special instructions with respect to replantation component under SSGS scheme of X plan

Although the government order sanctions the Scheme for the X plan effectively from 11th July 2003, the Board has decided to consider the cases of replantation effected during the entire X plan which commenced from 1.04.2002 and will end in March 2007. In effecting this would mean that cases of eligible growers who have taken up the replantation activities during the season 2002 and 2003 should be encouraged to apply for the subsidy. Wide publicity will therefore be given to eligible growers to apply who will give the particulars of replanting activities taken up during the said period and specify the sources of finance and submit the claim for subsidy either by themselves or through the banks. On receipt of such claims post facto, the competent officer shall proceed to the spot and submit a factual report of the replantation activities basically covering all the required information that are listed in the prescribed proforma for the technical feasibility report of replanting activities. Only exception here will be accompanied with the actual photographs of the replanted area together with the details of actual plant population per acre, type and variety planted and the condition / age of the plants. It is important that the age of the plants should not indicate re-planting activities before 1.04.2002 as the said scheme is effective from 1.04.2002 only. In case of doubt regarding the maturity of the newly planted trees help from the Research Department may be taken to assess the age of the plants in the replanted area.

2. Price Stabilization Fund Scheme

The Government of India has established a Price Stabilization Fund (PSF) scheme for the benefit of coffee growers with effect from the year 2003-04 to bring in stability in terms of income for the small growers. The Govt. of India
will create a corpus of Rs. 500 crores and the interest from the corpus would be used for implementing the PSF scheme.

**Eligibility of participation for coffee growers**

a. The scheme will be applicable only to small growers having holding up to an extent of 4.00 ha.

b. A total number of 72,000 coffee growers in the coffee growing states will be admitted to the scheme. The board will select the beneficiaries for the scheme on the basis of a predetermined criteria giving priority to smallest holders and ensuring equitable principles for distribution across states.

The prescribed application for registration to subscribe to PSF account will be made available by coffee board extension units. The growers should fill in the form in all respects along with a demand draft for Rs. 500 (non-refundable) favoring “Coffee Board, PSF account” payable at Bangalore.

Eligible / successful applicants will be notified by the coffee board after verification of the registration forms. The select / eligible subscribers notified by coffee board will subsequently contact the commercial / designated banks to open the dedicated PSF account with a letter of authority from coffee board. No other introduction letter for opening bank account is required. However at the time of opening the account the grower has to deposit the minimum balance requirements of the bank as decided for the purpose of the scheme.

The entry fee made by the ineligible growers will be returned to their postal address mentioned in the application form with out any interest within the stipulated period and in any case not later than 1. 1. 2004. The entire account in respect of contribution received / compensation paid will be maintained by he designated banks in the name of the growers themselves. The account so opened will be exclusively operated for PSF purpose only and will not be clubbed with any other accounts.
How does the scheme work?

At the beginning of each crop season price limits (lower and upper) will be determined based on a seven year average (international) price for arabica and robusta. Let us assume that, the average price up to December 2003 for arabica (International Price Equivalent) is Rs. 90 and the upper and lower limits are fixed at Rs. 72 and Rs. 108 respectively. If the 2003 average price is below the lower limit say, only Rs. 65, and then the eligible arabica growers are entitled for payment of Rs. 1000/- from the government. If the price is in between the upper and lower limits, say Rs. 80, then growers have to contribute Rs. 500 to the fund and government will make an equal contribution of Rs. 500 to the growers account. If the crop year price is above the upper limit (say Rs. 110), then the grower is required to contribute Rs. 1000/- to his account and no payment from the government shall be made. In a similar manner robusta growers will also benefit based on the reference price of robusta.

The contribution of the government would be made only after the grower has contributed to his account. If the grower defaults in payment of his contribution by the due date, his account would be closed. At the request of the grower member, the balance in the defaulters account, to the extent of his contributions with interest there of, will be paid to him. No part of government’s contributions or interest these on shall be paid to the defaulted grower members and after payment of the dues to the defaulter, the balance representing governments contributions and interest there of in such account shall be remitted back to the price stabilization fund.

The coffee board is not liable for any payment / compensation to the grower in respect of transactions under the PSF scheme. The scheme will be in operation between the crop seasons 2003-04 to 2013-14.
3. Modalities for implementing the nursery programme / supply of planting materials through SHGs, FPM groups and any group of growers during 2002-03

As envisaged under Xth plan, arrangements are already made to supply of planting material by estimating the nurseries in the board’s farms during 2002-03 itself. Considering the cumulative loss of arabica plant population in small holdings caused by WSB in all arabica zones and imperative need for augmenting the plant population in the coming season itself, it is felt that SHGs / FPM groups or any other group of growers are to be encouraged to establish nurseries to fulfill their own needs.

Component of the scheme

The SHGs /groups who come forward for raising nursery are eligible for free coffee seeds and poly bags and maintenance cost of Rs. 1-00 per seedlings in addition to amount required for nursery – infrastructure not exceeding Rs. 10,000 (depending on the number of seedlings proposed to be raised).

Modalities

1. SHGs, FPM groups and any other groups (whose estates are located at a contiguous stretch as far as possible) shall be motivated to raise nursery to fulfill their own needs as well as other growers in the locality.

2. The groups, consisting of 10-20 members, have the option to raise the nursery in one location convenient to all the members of the group or in different locations depending on the availability of water and other essential resources required for raising good nursery.

3. The groups shall nominate their leader who has the ability to submit the proposal for raising nursery and to receive nursery-inputs supplied by the board and in turn distribute the seedlings to needy growers as per specified norms.
4. One group would be eligible to raise minimum of 5000 seedlings and maximum of 10,000 seedlings. A maximum of Rs. 25,000-00 will be extended, inclusive of amount required for infrastructure, and it depends on total number of seedlings raised and finally distributed.

5. If the group is given a target of 10,000 seedlings, they will have to raise 12,000 seedlings giving provision for rejection of 2000 weaklings at the time of distribution. The break up of Rs. 25,000-00 is shown below.

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>For infrastructure</td>
<td>Rs. 10,000-00</td>
</tr>
<tr>
<td>For maintenance</td>
<td>Rs. 10,000-00</td>
</tr>
<tr>
<td>Towards the cost of coffee seed &amp; poly bags</td>
<td>Rs. 5,000-00</td>
</tr>
</tbody>
</table>

6. The size of the nursery shall be determined on the basis of the total acreage owned by the group (as well as non-members) Under arabica and taking in to account those 100 seedlings per acre only will be supplied from this nursery for filling existing vacancies and for replacement of moribund plants.

7. The groups, if not already registered as envisaged under SHGs scheme in vogue, shall be encouraged to register under Societies act to become eligible for other benefits under SHG scheme and group IPM scheme which is under consideration for implementation in the coming season.

The following steps are to be adopted for formation of group and for building up the proposal.

1. The Sr. & Jr. Liaison officers shall contact SHG / FPM groups and also identify new groups in their jurisdiction forthwith as they are in regular contact with prospective SHGS and FPM groups. The data collected on sustainable cultivation and IPM data from many estates situated in different locations / villages and mass contact programmes conducted during this year will be handy for the formation of any other group.
2. The proforma data of individual estates are to be collected as per the enclosed proforma to ascertain the number of seedlings required and fix the nursery target for the whole group.

3. The seed coffee and poly bag requirement of the group to be prepared and handed over personally to the DDE who would in turn prepare consolidated indent for seed coffee and poly bag in consultation with Liaison officers, if necessary, for finalizing the proposal in time and forward the same for further consolidation by the respective JDEs.

4. The DDEs along with concerned Liaison officer shall conduct inspection of germination beds within 15 days of distributing the seeds and second inspection of basket nursery in March and third inspection during June and final inspection in August i.e., just before distribution of seedlings.

5. The amount earmarked for maintenance and infrastructure will be released on the basis of inspection reports and recommendations of the respective DDEs.

6. The respective JDEs will accord approval and necessary sanctions for successful implementation of the group-nursery programme under intimation to secretary, Coffee Board and DDE, Mysore.

7. Following target is fixed for the year 2002-03.

   DDE, Chikmagalur -------- 10 Nos group nurseries
   DDE, Hassan-------------- 5 Nos
   DDE, Madikeri------------ 10 Nos
   DDE, Coimbator---------- 10 Nos
Necessary proforma for submission of inspection reports at various states of nursery will be supplied in due course. The DDEs are to take lead at this juncture to submit the proposal in time considering that the group will have to raise germination beds within 154th January, 2003. They may also send provisional indent for seed coffee to the JDR, CRSS, chettalli on the basis of proposals received at their end. It may be noted that no time shall be wasted in seeking clarifications, if any.

4. Raising of Coffee Seedlings / Clones for Supply to the Small Coffee Growers

The programme / scheme for raising of coffee seedlings as well as clones has to be implemented well in time during the year 2002-03 in all the coffee growing district / zones.

The particulars of nurseries identified, number of seedlings / clones proposed to be raised and supplied at the selling rate that may be fixed by the board, number of SHGs. / participatory groups and private nurseries, departmental nurseries etc., selected for the purpose are furnished in annexure for your ready reference and needful. In view of this, you are here by advised to take up / initiate the following steps on a war footing at your respective region and report compliance from time to time.

I. Preparation of primary / germination beds sowing of seeds:

1. The required quantities of seed material / coffee have to be procured and supplied to all the types of nurseries viz. departmental, nurseries tied up with SHGs./participatory groups and private nurseries identified for the purpose of raising seedlings as well as clones.
2. The identity of each nursery as well as seed materials/coffee thus sown has to be maintained with proper documentation/labeling like name of station selection/cultivation, date of sowing, quantity of seeds sown etc.

3. The required provision has to be made to raise additional 20% of seedlings against the targets assigned to obtain exact no. of seedlings after germination/transplanting etc., as per the modalities communicated vide the office order no. EXT/BAN/SLP-127/2002-03/882 dtd. 23.12.2002 of the secretary, coffee Board, Bangalore.

4. All the official formalities have to be observed in regard to getting into MOU in the prescribed manner, where necessary except in the case of Department of nurseries.

5. Indents have to be placed for the requirements of funds with H.O., Bangalore as agreed upon to ensure smooth progress.

6. Sanction and disbursement of funds have to be attended to, after concurring with the H.O., Bangalore.

II. Infrastructure requirements and preliminaries connected with the secondary beds

1. Infrastructure requirements for secondary beds have to be got met in consultants with the H.O., Bangalore/Engineering Division of the board since arrangements are centralized.

2. Supply of poly bags of the required specifications and qualities to the nurseries identified in your respective region has to be also attended to in consultation with the H.O., Bangalore/ engineering Division since arrangements are centralized.
3. Preliminaries in regard to secondary nursery beds with all the required infrastructure have to be attended to well in time by the respective units/nurseries (i.e., nursery mixture preparation, secondary bed preparation, pandal erection, poly bag filling and arranging in the secondary beds into convenient sizes, fixing of water resources to ensure regular water supply to the nursery works as well as nurseries and protection by way of fencing to avoid trespass of cattles and others).

The entire process of preparation of germination beds and sowing of seeds as at item no. I and infrastructure and preliminaries connected with the secondary beds as at item no. II respectively has to be attended to well with in the time stipulated with effective monitoring/supervision by the respective offices (i.e., SLO's and JLO's) to ensure success of programme/scheme by and large.

Identification of small coffee growers has to be attended to where necessary to arrange smooth disposal of seedlings, particularly with respect to private and departmental nurseries.

5. Self Help Groups in Coffee

With the liberalization of coffee marketing in 1990s, the board had given shape to a very innovative organizational concept aimed to bring together the small coffee growers through self help groups. Admittedly, the post-liberalization era in coffee has thrown several challenges ahead on production as well as marketing fronts of coffee for the very sustenance of the coffee industry itself, particularly the small grower's point of view that constitute for 98% of the holdings, 60% of the area and 40% of the total crop production in India.

Keeping in view the challenges ahead of the coffee industry it is imperative to focus upon a group or collective approach that can facilitate quicker and wider adoption of coffee technologies to augment the process of capacity building amongst small growers.
The Self Help Groups are small and informal voluntary groups of people/growers who come together to meet their common needs. On the other hand the self help groups are group of people/growers processing a common perception, experience, problems and condition or situation who come together to share their experience/knowledge/ideas and to give and receive support from others with the same experience. Self help groups focus largely on community approach by channeling energies on contiguous and harmonious groups of the small coffee growers/farmers into various activities related to coffee cultivation that would eventually be of economic benefits to them. Self help groups are promoted in a way that facilitates the development of participatory approach and empowering culture to decision making.

Of late, the Self Help Groups in coffee are being used as a mechanism for improving productivity on the coffee farms through rejuvenation/ revitalization measures. The self help groups are also visualized as a powerful tool evolves organized marketing for the benefit of the planting community at grass root level.

The concept of self help groups is largely oriented towards a group approach in order to encourage collective learning, promote leadership, address common constraint to create awareness among the growers, linkages with the Financial Institutions / NGOs / Government Agencies to mobilize the required technical and financial resources and encourage on-farm and off-farm micro enterprise activities among the members of the group and constituted / formed on the principle “self help is the best help”, self help groups have evidently the potential to be very powerful engine of growth amongst the small coffee growers to better their socio economic status by and large.
Genesis of self help groups in coffee and their present status

The Coffee Board evolved the self help group scheme and launched it during the IXth Five Year Plan and encouraged by its success, it is being carried over to the X Five Year Plan also.

During the IX Five Year Plan period of the board, the concept of constitution of self help groups was largely focused upon by way of identification of groups with like minded small coffee growers in potential areas, registering such groups under Karnataka Society Act / Co-operative Act. The establishment of self help groups has been done by enrolling a maximum of 50 small growers belonging to the same contiguous village after drawing the required bye-laws and formation of administrative

Committees from among the members, the self help groups will follow all the formalities as stipulated under the co-operated society act. The general body of the self help groups will be empowered to take policy decisions and vested with overall powers. The self help groups constituted by the coffee board are totally distinct from other self help groups and have the following activities envisaged carrying on the coffee industry.

1. Production improvement programmes like construction of water storage structures, procurement of sprinkler units, diesel Generator / electric motor, raising of nurseries of planting materials, construction of poly houses etc., apart from procurement of Hi-tech (improved) sprayers, weed cutter and micro pruner, chain saw etc.,

2. Quality improvement programmes required for community pulping, establishment of ETPs., construction of store room/ Godown and establishment of mini coffee curing works as well as cupping centers
3. Encouraging promoting of organic coffee, special and specialty coffees production of compost and other forms of organic manures i.e., vermi compost and Bio-dynamic manure inclusive.

4. Integrated pest and disease management.

5. Value addition (a) Establishment of R & G units.

6. Raising and supply of planting materials (location specific).

The required technical +supports as well as liaison support or provided by the extensions of coffee board in all the above cases with their expertise to create awareness and necessity to constitute self help groups for the betterment of the planting community in particular and the coffee industry in general.

Objectives of self help groups

1. Act as nuclei for transfer of technology.

2. Encourage group/community approach or collective action to tackle multifarious problems connected with the agriculture irrespective of whether agricultural or commercial crops. Group approach or collective action is essential for adoption of post harvest technology, promotion of infrastructural development and multi-institutional approaches / linkage and co-ordination with Govt. agencies / private agencies (NGOs), pest and diseases control, promotion of value added and high quality produces, marketing integrated farming and sustainable agriculture.

3. Act as training centers to upgrade the skills of members in agriculture relating to agricultural as well as commercial crops.

4. Promote and extend scope for gender participation (i.e. women empowerment) in decision making on vital issues connected with self sustainability / reliance.
5. Promote common action programmes interacting with other groups, government and private institutions / agencies for technical expertise / support as well as financial requirements.

6. Promote viable investment package for optimum returns per unit area.

7. Promote a cost effective delivery system.

8. Promote a cost effective technology for viable cultivation of crops as well as betterment of socio economic status.

9. Promote team building and problem solving skills.

There is definitely a vast scope for linkage of SHGs with banks in promoting the concept of SHGs to meet the challenges in the areas of reliance, accountability and sustainability giving due consideration to the various factors at present in coffee, particularly in the back drop of liberalization and globalization.
References


5. Gazetteer of India, Government of Karnataka, Karnataka State Gazetteer Chikmaglur District 1981, pp. 2-300.


Map 1. Major coffee growing States in India
Map 2. Major coffee growing Districts in Karnataka
Map 3. Major coffee growing Taluks of Chikmagalur District