COCOA DEVELOPMENT IN INDIA

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Cocoa (Theobroma cacao L.) a native of Amazon base of South America got its entry into India in the early half of the 20th century. There are over 20 species in the genus but the cocoa tree Theobroma cacao is the only one cultivated widely. Even though Cocoa is conferred plantation status like Tea, Coffee and Rubber, but rarely recognized as a plantation crop under the Indian agrarian sector. It is also one of the supporters of Agro-based industry in India. Cocoa beans are the primary raw material for confectioneries, beverages, chocolates and other edible products. The commercial sector of cocoa in India hardly takes place in a major way in the international export trade. Majority of the processed cocoa products are consumed within India. The tropical diversified congenial climate available in India provides immense scope for its cultivation.

Cocoa is hardly grown as a mono crop. Its imminent capacity to share the alley spaces of tall growing Coconut and Arecanut palms and its combining ability with the microclimatic conditions available in such perennial gardens helps its cultivation in utilizing such areas without exacting for an independent growing climate of its own. In any groves of tall growing palms where 40-50% sunlight penetration is possible, cocoa stands first to absorb solar energy, remaining symbiotic to the main crop and generating additional income as well, besides helping the amelioration of the soil conditions making beneficial not only for its own growth, but also for the benefit of the main crop under which it takes its shelter. It is now mainly grown as intercrop either with Coconut or Arecanut.

Cocoa grows well in regions where temperature ranges from 15 - 32°C. Under conditions of well distributed rainfall, cocoa grows up well as a rain fed crop. If the rainfall is not well distributed, cocoa needs irrigation regularly. It is an ideal intercrop for getting more returns from coconut and arecanut gardens. Nearly 18.95 lakh ha of coconut and 4.00 lakh ha of arecanut gardens are available in India of which 35% is under irrigation. Availability of such areas in the states like Kerala, Karnataka, Maharashtra, Pondicherry, Tamil Nadu, Andhra Pradesh, Orissa and West Bengal will therefore offer very good scope for its cultivation, where coconut and arecanut is being cultivated under irrigated conditions. Therefore emphasis will have to be given on new area development.

Cocoa with Arecanut

Cocoa with Coconut

Global scenario:

The major area of cocoa production in the world is in West Africa where 60% of world cocoa is been grown. The four major African producers are the Ivory Coast, Ghana, Nigeria & Cameroon. Ivory Coast is the largest producer of cocoa in the world followed by Indonesia and Ghana. The world production is estimated at 46.03 lakh MT from a total area of 100.176 lakh ha. Comparing to this, the Indian production of 16,050 MT being obtained from 78000 ha is only 0.3% which is nowhere nearer to the global situation as shown in the following table .

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World Area and Production of Cocoa -2013

Country	Area (Ha)	Production(MT)	Prodty.(Kg/Ha)
Brazil	689276	256186	372
Bolivia	8856	4949	559
Cameroon	670000	275000	410
Colombia	107728	46739	434
Cote d Ivoire	2500000	1448992	580
Dominican Rep	150943	68021	451
Ecuador	402434	128446	319
Ghana	1600300	835466	522
Guatemala	4340	13127	3025
Guinea	7500	4000	533
Haiti	22000	10000	455
India	71365	15133	450
Indonesia	1774500	777500	438
Liberia	60000	8400	140
Malasia	13728	2809	205
Mexico	117000	82000	701
Madagascar	10500	9000	857
Nigeria	1200000	367000	306
Papua New Guinea	135000	41200	305
Peru	97658	71175	729
Philippines	9431	4876	517
Sierra Leone	42000	14850	354
Sao Tome and Princi	24500	2617	107
Togo	80000	15000	188
Uganda	48000	20000	417
Venezuela	59757	31236	523
Solomon Islands	12000	4700	392
Congo	10000	5000	500
United Rep. of Tanzania	11000	6000	545
Dem. Rep. of Congo	20000	2000	100
Others	57882	31396	542
Total	**10017698**	**4602818**	**459**

Source: FAOSTAT

Indian Scenario:

The promotion of cocoa was significantly achieved up to the year of 1980, developmental activities mainly concentrating in the states like Kerela, Karnataka, Tamilnadu and Andhra Pradesh. Kerala was the leading State in promoting cocoa cultivation. Massive area coverage was possible through distribution of cocoa seedlings. Perhaps Cadbury India Ltd., was the only industrial unit during the period of massive expansion of area under cocoa. There was an attractive price for cocoa pods and beans prevalent till 1980's. This favourable situation, coupled with large-scale distribution of planting materials, could bring about an enviable area coverage recording 29,000 ha under cocoa by 1980-81. Being a crop subjected to the monopolistic exploitation of the available industrial unit, however paved ways for fall in price in 1981-82 and 1982-83. Inadequate marketing network and the fall in price developed a sense of insecurity among the planting communities, which detrimentally affected its expansion besides attributing to a neglectful approach by the plantation community.

During the period of 1981-83, when there was no guaranteed procurement by the processing industries and great deal of price fluctuation of prices for cocoa beans resulted in dwindling of cocoa cultivation in these major southern states of the country. Thus , farming community started felling their, cocoa plantation and the problem originated affected for cocoa cultivation in India. The entry of CAMPCO towards the marketing scenario from 1990's, though created a favourable atmosphere, the services rendered towards procurement of cocoa was far below the requirement. As a result, expansion of cocoa came to a standstill in spite of favouring the growers with a better price. The continuous dwindling in the state of Kerala and Karnataka lead to decreasing area and reached to 15,000 hectares in the year 1995. From 1997-98 onwards, the non-traditional tracts of Karnataka and other States like Andhra Pradesh and Tamil „ Nadu started developing cocoa.

Developmental efforts of DCCD:

With the implementation of 8th Five Year Plan programmes through distribution of high yielding varieties in the form of clones and hybrid seedlings, the area under cocoa increased to 25,160 Ha. with a meager production of 9,200 MT. Now the momentum has been changed a lot since from the year 2001, Government of India's intervention and the positive approach from industries again revitalized the promotion of cocoa in India . Now it has become one of the important commercial plantation crops in India and mainly cultivated in the four southern states of Kerala, Karnataka, Tamil Nadu and Andhra Pradesh. Research findings and commercial adoption has amply proved cocoa as a best companion with coconut. Cocoa not only provides additional income per unit area but it also enhances productivity of soil as well enhances productivity of coconut and arecanut.

Considering the scope of area expansion to the tune of 3.00 lakh hectares in the interspaces of Coconut grooves especially in the states of Karnataka- Tamilnadu. Andhra Pradesh and Pondicherry under irrigated condition and in the best interest of farming community, cocoa has a vast scope in improving economic condition of the cocoa farmers and in providing sustainable employment generation to needy people as **well** as to contribute to better share in the national GDP. The Ministry of Agriculture. Government of India has also given special thrust status for Cocoa development in India under Mission for Integrated Development of Horticulture programme and initiated many innovative programmes.

With the commencement of National Horticulture Mission in 2005-06 for the overall development of Horticulture in India, the

development programmes of cocoa are being implemented by the States under State Horticulture Mission antfthe DCCD has been authorized to monitor the status of execution of those programmes. In addition to this, the programmes such as Front line technology demonstrations in public areas, publicity measures on cocoa promotion and pest and disease management have also been implemented under the direct control of DCCD.

Area expansion is the major component implemented for the development of cocoa. The States of Kerala, Karnataka, and Andhra Pradesh are the main States involved in the development programmes of cocoa under NHM since 2005-06 while Tamil Nadu has provided provision under NHM for the development of cocoa during the year 2007-08 onwards.

Cocoa Nursery

High yielding hybrid varieties released by CPCRI, Vittal and Kerala Agriculture University, potentiality for the expansion of the crop under irrigated coconut and arecanut gardens in the major states of India, availability of scientific technologies for improving the production of cocoa beans and industrial demand for cocoa beans, adequate marketing facilities now provided by both private ad cooperative firms with affordable price are the strength now available for the development of cocoa in India. With the implementation of the above programmes through distribution of high yielding varieties in the form of clones and hybrid seedlings, a total area of 46500 hectares of coconut/areca nut gardens have been additionally brought under cocoa cultivation by 2014-15 with financial assistance under NHM in the state of Tamilnadu, Andhra Pradesh, Karnataka and Kerala and 1163 hectares of cocoa gardens were rejuvenated in these states. The area under cocoa has been increased from 27811 ha. in 2004-05 to 78000 ha in 2014-15 and production from 9250 MT to 16050 MT in 2014-15. The present area and production of cocoa in India are as under.

Production scenario of cocoa (2014-15)

State	Area (ha)	Productl (MT)	Productivit (Kg/ha)
Kerala	14650	6000	785
Karnataka	12906	2000	525
Tamil Nadu	26959	1750	265
Andhra Pradesh	23485	6300	550
Total	**78000**	**16,050**	**475**

Even though area under Cocoa is 78,000 ha, the production is only 16050 MT and the productivity is only 475 Kg per ha. Since the plantations raised in the states of Tamil Nadu are in the pre bearing stage and the productivity is low compared to other states. The momentum of Cocoa development programmes in the state of Karnataka and Kerala is needed to be accelerated.

Technology transfer programmes:

Intensive technology transfer is one of the major activities implemented by the DCCD in promoting Cocoa cultivation. Some of the promising technologies developed by research are high yielding hybrid/clones for cocoa, pruning and training technology for seedlings and grafts, vermi composting with cocoa waste, integrated nutrient management, integrated pest and disease management and post harvest processing. Under NHM. technology transfer programmes have been envisaged for cocoa and the DCCD has been implementing intensive publicity measures for promotion of cocoa in association with various stake holders.

The technologies are transferred through various extension methods in association with the research institutes, KVKs and NGOs. The major TOT programmes implemented under NHM are Establishment of demonstration plots with the supenision of research institutes in the farmer's field with the active participation of the farmers to show the benefit of the technology. Demonstrations include high yielding varieties along with best package of practices, INM,

Pruning and training, IPM etc. So far 213demonstiation plots established in various cocoa growing states with the financial Jtwwtann» tmder NHM. Farmers training programmes conducted in association with the research institutes, KVKs and NGOs with the financial assistance from NHM. Organizing field days, seminars, workshops etc. are other technology transfer activities conducted by the Directorate in association with various stake holders in the cocoa sector.

Export and Import:

Cocoa is also an export oriented commodity. The various cocoa products are confectionery in nature and highly palatable. It is a good balanced health. Its rich sources of fat, gained its importance in circles of navigation and army expeditions. The global market for cocoa and cocoa products is growing steadily at an average growth rate of 7% annually. Domestic demand of cocoa beans also grows steadily at an average of 15% per annum. Chocolate is widely consumed in India, and domestic consumption has been growing along with per capita income India exports products like Beans, chocolates, cocoa butter, cocoa powder and cocoa based products to other countries. The export which began at around 2535 tons valued Rs.24.8 crores in 2005-06, has been increased to 20877 MT valued Rs.848.65 crores in 2014-15 as shown below.

Export of Cocoa/Cocoa Products from India

QT- in thousand kgs
Value – Rs. Lakhs.

Description	2014-15	
	Qty	Value
Cocoa beans whole/broken/ raw/roasted	173.42	322.48
Cocoa paste Wholly or Partially defatted /N defatted	162.07	389.72
Cocoa butter, fat & Oil	6771.79	28559.95
Cocoa powder containing sugar/sweetening material	415.77	1932.06
Cocoa powder not containing sugar/sweetening material	111.97	207.75
Chocolates & chocolates products	1179.35	6199.68
Other food preparations containing cocoa	12062.48	47254.03
Total	20876.85	84865.67

India is importing a lion's share of cocoa requirements from other countries. At present there are 10 major multinational companies engaged in the field of cocoa industry under organized sector with a capacity of 40,000MT. The current domestic production of cocoa beans is not sufficient to meet the demand of the industry. The industry, therefore, imports nearly 60 percent of requirement through imports from other countries, especially from Africa to meet the demand. Hence India had to import nearly 65311.33 MT of cocoa beans along with cocoa products valued at Rs. 1551.089 crores to make up the shortfall, as shown below.

Import of Cocoa/Cocoa products

(Qty in thousand KGS)
(Rs. In Lakhs)

Item	2014-15	
	Qty	Value
Cocoa beans whole/broken/ raw/roasted	26157.62	52598.15
Cocoa paste Wholly or Partially defatted/N defatted	5755.13	14204.95
Cocoa butter, fat & Oil	4594.13	19895.85
Cocoa powder containing sugar/sweetening material	10769.33	13407.40
Cocoa powder not containing sugar/sweetening material	10.70	30.96
Chocolates & chocolates products	3727.35	14005.04
Other food preparations containing cocoa	14297.07	40966.58
Total	65311.33	155108.93

The dependency on imports could be reduced by increasing the domestic production and trend in increase the export should be continued to earn more foreign exchange to our country.

Technological supports available:

The research aspects on cocoa were initiated in India two decades back under CPCRI and KAU. Cocoa is affected by a number of insects and pests in different cocoa growing States. Among them,

major pests are Mealy bugs, Tea Mosquito, Red borer, Grey weevil, cock chaffer beetle. These pests cause serious damage to the young plant as well as the yielding tree.

Rats and squirrels cause considerable damage to ripening pods. Cocoa is also susceptible to various diseases and causes crop loss. Among them, diseases affecting mature plants are Black pod and Vascular Streak die back. Research has recommended control measures for effective control of the above pest and diseases. These institutes together have contributed nearly 10 high yielding varieties with tolerance to Vascular Streak Dieback disease and are also capable of providing nearly 3 Kg of dry beans per tree. The features of these varieties are as follows;

Varieties released by KAU, Trissur

Varieties	Pod/tree	Yield kg/tree	
		Wet beans	Dry beans
CCRP- 1(M 16.9)	56.2	6.2	2.5
CCRP-2(M 13.12)	53.9	5.2	2.4
CCRP-3 (Gl 5.9)	68.5	6.5	2.9
CCRP-4(G11 19.5)	66.2	8.3	3.9
CCRP-5(GIV18.5)	37.9	4.3	1.7
CCRP-6 (G VI.55)	50.1	11.3	3.1
CCRP-7 (GVI56)	78.1	9.7	4.0

Varieties released by CPCRI. Vittal

Varieties	Pod/tree	Yield kg/tree	
		Wet beans	Dry beans
VTLCH 1(1-56x11-67)	46.93	6.24	2.08
VTLCH 2 (ICS 6xSCA 6)	70.00	4.80	1.60
VTLCH 3(II-67xNC29/66)	38.21	6.30	2.01
VTLCH 4(II-67xNC 42/94)	34.31	5.07	1.69
VTLCC 1(NC 45/53)	75.00	5.40	1.80
Selection 1	55.00	7.56	2.52
Selection 2	54.5	8.10	2.70

These varieties started percolating into the field during 9th Plan and these plantations when attains full yielding stage will be manifesting 3 times productivity over the level of production from the existing plantation. Agronomical and horticultural management practices also have been standardized which are getting demonstrated to the farmers as a part of transfer of technology.

Price of cocoa beans:

Earlier the price of cocoa beans was fluctuated widely. But the position has now changed and the price is ruling between Rs. 200 to Rs. 220 per Kg of dry beans depending upon the quality of the produce. This increasing trend in price necessitates the development of cocoa as an intercrop under irrigated coconut gardens to supplement the income of coconut growers who are reeling under financial crisis due to the un-remunerative prices of coconut. Considering many constraints noticed in the coconut and arecanut industry in India, cocoa can overcome the problem and enhances the economic condition of the farming community, provided Government machineries takes care of the guaranteed procurement and remunerative price for the cocoa beans.

Future potential for cocoa development in India:

As cocoa is mainly cultivated under irrigated coconut and arecanut gardens, availability of such areas in the states like Kerala, Karnataka some parts of Maharashtra, Pondicherry, Tamil Nadu, Andhra Pradesh, Orissa and West Bengal will therefore offer considerable scope for its development as these areas are coastal belts where coconut is grown. Of the 15 lakh ha of coconut gardens in India, the coconut areas in Karnataka, Pondicherry, Tamil Nadu and Andra Pradesh are mostly irrigated in nature. In respect of other states, nearly 30-40% is under irrigation. Therefore not less than 3 lakh ha will definitely be suitable for cocoa as an intercrop, beside the vast land potential available in North East region.

Industrial Demand:

Quite contrary to the situation existed in the later part of the 20th Century, where hardly few industrial establishments were available in India, there are at present more than 10 industrial entrepreneurs and companies existing in the field demanding nearly 40,000 M.T. of cocoa beans of which the present production is hardly 33%. The cocoa growers were quite apprehensive about the price trends prevailed during the later part of 20th Century. This was almost a deterring factor for them to adopt cocoa cultivation. In the light of the increasing competition exerted by several companies, the domestic price of cocoa beans is now around Rs.190-210 per kg. of dry beans depending upon the area of production, quality and quantity. This has evinced an encouraging incentive to the farmers.

Guaranteed procurement of remunerative price :

The main critical component noticed in the promotion of cocoa is guaranteed procurement and remunerative price for cocoa beans. The growth of production must be supplemented with guaranteed procurement and remunerative price for the farmers produce. It is also quite evident that seasonal variation in prices of cocoa beans occurs. The prices for cocoa beans are peak in the month of March to May and low in post monsoon months.

It is suggested that multinational companies must be brought under tripartite agreement with State Govt. Departments and Central agency and also involving farming communities for guaranteed procurement and remunerative price. Accordingly Memorandum of understanding should be signed in between cocoa processing industries, central agencies and State Govt. with relevant terms and conditions keeping in view, the interest of cocoa fanning community in India.

Future Strategies

Cocoa is generally taken as intercrop under irrigated coconut and arecanut gardens. To some extend it is grown under rainfed conditions in some parts of Kerala. The production of cocoa beans hardly meets 40% of the demand projected by the processing industry in India. As assessed, the demand of cocoa beans is 60000MT by 2025. To step up the production to the projections, at least 2.201akh ha to be covered within a span of 10 years.