

CPCRI RESEARCH CENTRE, KIDU

*Conserving Genetic Resources for
Livelihood Security*



ICAR-Central Plantation Crops Research Institute

Kasaragod 671124

<http://www.cpcri.gov.in/>



Chowghat Orange Dwarf



Kalpa Jyothi



Kalpasree



Chandra Laksha



Chandra Sankara



Kalpa Shatabdi



Kalpa Dhenu



Chandra Kalpa



Kalpa Sankara

ICAR-CPCRI, Research Centre, Kidu

Conserving Genetic Resources for Livelihood Security

India is currently the global leader in coconut and arecanut, in terms of production and productivity. The development of a large number of high yielding varieties and hybrids, large scale production of quality planting material of these varieties and ensuring their availability to farmers across the coconut/ arecanut growing tracts of the country have immensely contributed towards this achievement. Coconut, arecanut and cocoa sectors together contribute significantly, through direct and indirect employment, to the livelihood security of more than 25 million people in the country.

ICAR-Central Plantation Crops Research Institute established the Seed Farm at Kidu, Karnataka in the year 1972, with the aim of generating genetically superior planting material of coconut, arecanut, cocoa and cashew. In keeping with the objective of production of quality planting material, the most promising germplasm collections have been planted and are being maintained in the farm and many research projects

have been undertaken on the genetic evaluation of promising cultivars/ hybrids and intercropping systems. The Seed Farm received due recognition, when it was identified as the ideal location for the establishment of the International Coconut Gene Bank for South Asia under Coconut Genetic Resource Network (COGENT) in 1998. The infrastructural facilities have since been enhanced and the Seed Farm was upgraded to a Research Centre in 2001.

Mandate

1. Conserve coconut, arecanut and cocoa germplasm in the field gene bank.
2. Produce genetically superior planting material of released varieties and promising cultivars of coconut, arecanut and cocoa.
3. Function as experimental farm for plantation based multidisciplinary research programme.



Location

This Centre is located at Kidu, Bilinele Village, Puttur Taluk, Dakshina Kannada District of Karnataka State. It lies at a latitude of 12.30° N and a longitude of 75.20° E. It is situated at an altitude of 291 m above the MSL. The centre is located at the 9th km from Subramanya, on Subramanya-Uppinangadi road, that connects NH-48 at Uppinangadi and the temple town Kukke Subrahmanya. The nearest railway station is Subrahmanya Road, located at a distance of 2.5 kms from the Centre. It is 104 kms from Mangaluru, the nearest airport.

CPCRI Research Centre Kidu

CPCRI Research Centre

Kadaba-Subrahmanya Rd

Kumaradhara River

Kumaradhara River

KARNATAKA

MANGALORE

VITTAL

KASARAGOD

KIDU

2

KERALA

Climate and Soil

The average maximum temperature is 40°C in summer and 33°C in winter, while the average minimum temperature is 24°C in summer and 18°C in winter. The annual rainfall varies between 2800 mm and 4200 mm. The soil is lateritic with high organic matter content.

Area

The centre has total area of 120 hectares, of which 112 hectares are under cultivation and 18 hectares used for other

infrastructural facilities. Coconut is grown in 104.5 hectares, arecanut in 7.5 hectares and cocoa (under planted in coconut and arecanut plantations) in 2.5 hectares.

The Research Centre has a large contiguous area nestled in the Western Ghats, blessed with all natural resources like fertile soil and abundant availability of river water throughout the year for irrigation, ideal climatic conditions and at the minimum risk of natural calamities like cyclones and drought, excellent infrastructural facilities built-up over the years, good road/ rail/ air connectivity, etc.



International Coconut Gene Bank for South Asia and Middle East

The Centre has irreplaceable genetic resources and elite parental lines of coconut, arecanut and cocoa, including the world's largest collection of coconut genetic resources. International Coconut Gene Bank for South Asia and Middle East (ICG-SAME), hosted at this Centre, was established in the year 1998, based on a tripartite agreement between Government of India (signed by the then Director General, ICAR), FAO (on behalf of the ITPGRFA) and IPGRI (Bioversity International). Coconut accessions from Mauritius, Madagascar, Seychelles, Maldives, Comoros, Reunion, Sri Lanka, Bangladesh, South and South East Asia, Africa, Central & South America, Atlantic, Indian Ocean and Pacific Ocean regions are being maintained. in the Genebank. Globally,

around 1,500 coconut accessions are conserved in 24 field genebanks including five International genebanks in various parts of the world. Today, three out of the five ICGs (ICG - Southeast and East Asia in Indonesia, ICG - South Pacific in Papua New Guinea and ICG - Africa and Indian Ocean at Côte d'Ivoire) are being threatened by urbanization and lethal yellowing diseases, while ICG - Latin America and the Caribbean in Brazil is being threatened by leaf blight disease. ICG-SAME at Kidu has been well maintained and it is necessary to continue maintaining it to cater to the needs of global coconut community and to establish a cryobank for safe complementary conservation of coconut genetic resources.



National Active Germplasm Site

The Centre also serves as National Active Germplasm Site with 158 accessions of coconut collected from different States of India and about 61 accessions of cocoa from Nigeria, Malaysia, Indonesia, Costa Rica and Amazon regions. These include rare and unique germplasm, including collections from Andaman and Nicobar Islands (now destroyed by tsunami), as well as populations destroyed due to industrialization/ crop diversification.



Mother Blocks

This Research Centre has mother blocks of released varieties of coconut, arecanut and cocoa to produce quality planting material. A large number of high yielding varieties/ hybrids have been developed and most of these varieties/ hybrids draw their lineage to the germplasm assemblage maintained at the Institute. Further, the ongoing evaluation of precious germplasm, conserved at the ICG-SAME/ National Genebanks, has indicated very exciting possibilities and a host of potential varieties/ hybrids emanating from this repository are under field evaluation. Dwarf arecanut mother block is the only one of its kind in the world.



Planting Material Production

Approximately 44 lakh seed nuts/ seedlings of quality planting material of improved varieties and parental lines have been produced during the last 10 years, which generated a revenue of Rs. 2.95 crores through their sale. Revenue of Rs. 4.03 crores has also been generated in the last 10 years by the sale of farm produce.



Notable Achievements

Coconut

Spacing trial experiment with 2,359 WCT palms, planted in 1972, resulted in identifying the optimum spacing of 7.5 x 7.5 m for planting coconut. About 820 elite mother palms of West Coast Tall have been identified for production of quality planting material. Eight different coconut varieties planted in 1972-73 are being utilized for seed production, including hybrid seednuts and breeders stock, for distribution to growers and also for establishing nucleus seed gardens of released varieties in various parts of the country. A compact block of Gudanjali Dwarf Green has been planted in July 1993 for evaluation and use in breeding programmes.

Arecanut

Two compact blocks each of Mohitnagar, Mangala, Sreemangala and Sumangala varieties have been established. A parental block with 110 *inter se* seedlings of Hirehalli Dwarf was also established during September 2006

for production of dwarf hybrids. During September 2007, a compact block of the variety Swarnamangala has been established for seed production. A compact block of Shatamangala variety, with 848 seedlings, has been planted in 2018.

Cocoa

In order to study moisture deficit tolerance in cocoa, a progeny trial comprising of 18 hybrid combinations involving high yielding clones and moisture tolerant lines has been established. Nine hybrids and seven parents are under evaluation for high yield and drought tolerance. One polyclonal and six-biclinal orchards have been established with high yielding clones in order to produce seeds of known parentage and proven performance. An alternate cocoa gene bank with 61 accessions, including both indigenous and exotic accessions, has also been set up.



Effective Utilization of Forest Land for Public purpose

The present diverted forest land is providing the same kind of services as forests provide at the same location. The user agency, ICAR-CPCRI, is a public good provider and producer; and the diverted land is used for bonafide research purpose catering to the needs of farming community in the country, engaged in activities of carbon sequestration, soil and water conservation and conservation of biodiversity in the land.

Carbon Sequestration Potential

The C-sequestration potential of coconut is high viz., 16 to 20 ton C ha⁻¹ y⁻¹ followed by arecanut with 5 to 7.11 ton C ha⁻¹ y⁻¹ and cocoa with another 4 to 6 ton C ha⁻¹ y⁻¹. Coconut + cocoa cropping system produces approximately 20 to 26 ton C ha⁻¹ y⁻¹, which is either on par or more than the C fixation capacity of tropical rainforests (20 ton C ha⁻¹ y⁻¹). Areca-cocoa system on the other hand can fix 9 to 13 ton C ha⁻¹ y⁻¹. Thus, from 120 ha coconut and cocoa cropping system at Kidu, approximately 2400 to 3120 ton C ha⁻¹ y⁻¹ could be fixed. Moreover, Kidu farm with germplasm accessions from different countries of origin, are utilized in breeding programmes to evolve new varieties. These varieties, on an average fix two million tons C per year from 1,00,000 ha area, which is equivalent to otherwise raising one lakh ha of forest area to sequester C.



Strategic Importance of the Centre

Considering the strategic importance of the national and international germplasm holdings and binding legal obligations of the international treaty governing establishment of the ICG-SAME in India, and possible setbacks on the varietal

development front in plantation crops and planting material production, the Research Centre is vital for the all round development of the plantation sector.



Impact

The Institute has been catering to the requirements of coconut, arecanut and cocoa germplasm of AICRP Centres and State Agricultural Universities for generation of new varieties/hybrids. The quality planting material distributed from the Centre has benefitted stakeholders of all coconut, arecanut and cocoa growing regions of the country. By cultivating improved varieties, farmers can realise an additional 6000 kg/ha of husked nuts or an additional 10 kg of copra/ palm/ year. The Research Centre has distributed more than 5 lakh seedlings of improved coconut varieties during the last 10 years, that can cover 2850 ha of land. In arecanut, 50 lakh planting material of improved varieties have been distributed during the last 10 years that can cover 3300 ha of land and equivalent of realising 15,000 tons of chali/ year.



Germplasm Accessions Conserved

Designated germplasm from India

Andaman Giant Tall, Andaman Ordinary Tall, Andaman Ranguchan Tall, Auckchung Tall, Ayiramkachi Tall, Benaullim Tall, Blanchissuse Tall, Borneo Tall, British Solomon Islands Tall, Calangute Tall, Cameroon Red Dwarf, Campbell Bay Tall, Car Nicobar Tall, Ceylon Tall, Chowghat Green Dwarf, Cochin China Tall, East Coast Tall, Federated Malay States Tall, Jamaica San Blas Tall, Java Tall, Kappadam Tall, Katchal Tall, Kenya Tall, Kimmai Tall, Kimios Tall, King Coconut, Kulasekharam Green Dwarf, Kulasekharam Orange Dwarf, Kulasekharam Yellow Dwarf, Lakshadweep Micro Tall, Lifou Tall, Malayan Green Dwarf, Malayan Orange Dwarf, Malayan Yellow Dwarf, MAWA, Nadora Tall, Philippines Lono Tall, Philippines Ordinary Tall, San Ramon Tall, Spicata Tall, St. Vincent Tall, Standard Kudat Tall, Straight Settlement Apricot Tall, Straight Settlement Green Tall, Tamaloo Tall, Tiptur Tall, West African Tall, West Coast Tall and Zanzibar Tall.

Germplasm collection from regional countries

Sri Lanka: Sri Lankan Red Dwarf, Sri Lankan Yellow Dwarf, Sri Lankan Green Dwarf, Gonthebili Tall;

Bangladesh: Chinashukania Tall, Pubail Tall, Kayemkola Tall, Bagharpara Tall, Rupdia Tall, Khairtala Tall, BARI Narikel-I, BARI Narikel-II, Uzirpur Tall and Agailjhara Tall.

Germplasm collection from Indian Ocean Islands

Mauritius: Pemba Red Dwarf Mauritius, Pemba Green Dwarf, Pemba Red Tall, Guelle Rose Tall;

Seychelles: Coco LeRein Tall, Coco LeHaut Tall, Coco Bleu Tall, Coco Raisin Tall, Coco Gra Tall;

Madagascar: Sambava Tall, West African Tall Madagascar, Sambava Green Tall, Comoros Tall Madagascar;

Reunion: De La Reunion Tall, Coco Fesse Tall;

Comoros: Comoros Tall, Comoros Yellow Dwarf, Comoros Green Tall, Comoros Red Tall, Comoros Brown Tall;

Maldives: Kaadedhdhoo Oblong Tall, Kaadedhdhoo Yellowish Green Tall, King Kumbra Tall, Hanimaadhoo Green Tall, Hanimaadhoo Medium Round Tall, Hanimaadhoo Yellow Tall and Hanimaadhoo Oblong Semi Tall.

Germplasm in National Coconut Gene Bank

Achamthuruthy Tall I, Achamthuruthy Tall II, Aliyar Nagar Tall, Aminidweep Micro Tall, Mongrol Tall, Aminidweep Ordinary Brown Tall, Mahua Tall, Aminidweep Ordinary Green Tall, Aminidweep Round Small Tall, Aminidweep Small Tall, Andaman Giant Tall, Burmanalla Tall, Andaman Yellow Dwarf, Andaman Yellow Tall I, Andaman Yellow Tall II, Annamalai Tall, Arasampatti Tall, Auckchung Micro Tall, Auckchung Tall II, Barajaguli Tall, Beachdera Ordinary Tall, Beachdera Round Tall, Bhatye Tall, Bionliton Green Tall, Burmanalla Brown Tall, Burmanalla Giant Tall, Campbell Bay Tall, Carbin Brown Tall, Carbin Tall, Chandan Nagar Tall, Chowghat Orange Dwarf, Chowghat Green Dwarf, Chappadan Tall, Chenga Tall, Chengara Tall, Chennangi Tall, Chinnakombu Brown Tall, Chinnakombu Tall, Chitrakut Brown Tall, Chunnabatta Brown Tall, Dattapukur Tall, Dugong Creek Tall, East Coast Tall, Engandiyoor Tall, Erthinabad Tall, Ganapathy Pule Tall, Ganesh Tola Tall, Gowkhadi Tall, Harminder Bay Giant Tall, Harminder Bay Tall,

Harminder Giant Tall, Horned Cocos Tall,
Kadamath Kaithathali Tall, Kadamath Micro Round Tall,
Kadamath Micro Tall, Kadamath Ordinary Brown Tall,
Kadamath Ordinary Green Tall, Kaithathali Tall Agathi,
Kaithathali Tall Kalpeni, Kakkadipuram Tall,
Kallippatty Medium Tall, Kallippatty Tall, Kamrup Tall,
Kanhangad Tall, Kappad Small Tall, Kappad Tall,
Katchal Green Dwarf, Katchal Micro Tall, Katchal Tall II,
Khandeper Tall, Kodiaghat Tall, Koothali Tall,
Kothovade Brown Tall, Kothovade Tall, Kurmadera Brown Tall,
Kurmadera Green Tall, Kurmadera Orange Tall,
Kurmadera Tall, Kurti Tall, Kutyadi Tall, Laccadive Brown Tall,
Laccadive Giant Tall, Laccadive Green Dwarf,
Laccadive Green Dwarf Kalpeni, Laccadive Green Tall,
Laccadive Micro Tall Agathi, Laccadive Micro Tall II,
Laccadive Orange Dwarf II, Laccadive Ordinary Tall Kavarathy,
Laccadive Ordinary Tall Agathi, Laccadive Tall Yellow Kalpeni,
Laccadive Yellow Dwarf Kavarathy, Mahi Tall,
Malaca Giant Tall, Malaca Tall, Manjeri Tall,
Mardol Brown Tall, Mayipadi Tall I, Mayipadi Tall II,

Mullasserri Tall, Mundouri Tall, Nadia Tall, Nadora Tall,
Nicobar Micro Tall, Nicobar Orange Dwarf,
Nicobar Orange Tall, Nicobar Beak Tall, Nicobar Tall I,
Nicobar Tall II, Ograbraj Brown Tall, Pallissery Tall,
Panetima Tall, Panighat Green Tall, Pavarratty Tall,
Pazhuvil Tall, Perka Green Tall, Pinarai Tall,
Pokkadera Brown Tall, Pokkadera Yellow Tall, Ponnani Tall,
Ponnani Tall Yellow, Quilandi Tall, Rangat Green Tall,
South Bay Tall I, South Bay Tall II, South Bay Tall III,
Surinam Brown Dwarf, Tamsuli Tall, Solomon Island Tall,
Rennell Island Tall, Niu Hako Tall, Niu Balavu Tall,
Niu Drau Tall, Samoan Tall, Tutiala Tall, Niu Ui Tall,
Rangiroa Tall, Haapiti Tall, Nikkore Dwarf, Hari Papua Dwarf,
Kiriwana Tall, Bora Bora Tall, Fijian Tall Wanigata,
Tahitian Tall, Natava Tall, Muwa Tall, Kavieng Tall,
Thathoor Green Tall, Trinket Tall, Uthroda Tall,
West Bengal Giant Tall, West Coast Tall, Fiji Tall, Panama Tall,
Laguna Tall, Borneo Tall, Fiji Rotuma Tall, Benaulim Tall,
Guam Tall, Sakhigopal Tall, Sendagan Tall, Tinisera Tall and
Pao Pao Tall.





Mangala



Sumangala



Sreemangala



Mohitnagar



Shatamangala



VTLAH-2



Swarnamangala



Madhuramangala



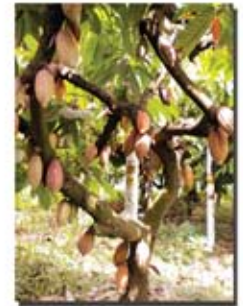
VTLCH-1



VTLCH-2



VTLCH-3



VTLCH-4



Nethra Centura



VTLCS-1



VTLCS-2



VTLCC-1



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Layout Design: Shri H. Muralikrishna, Photo Credits and Cover Design: Shri K. Shyama Prasad

Printed at M/s St. Francis Press, Kochi - 682016; November 2018