



## TRANSFER OF TECHNOLOGY

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Cocoa is mainly cultivated as a mixed crop in arecanut, coconut and oil palm gardens and is a source of additional income for the farmers. Different agencies *viz.*, ICAR-Central Plantation Crops Research Institute (CPCRI), State Agricultural Universities (SAUs), Directorate of Cashewnut and Cocoa Development (DCCD), Central Arecanut and Cocoa Marketing and Processing Cooperative Ltd. (CAMPCO), Mondelez India Pvt. Ltd., Departments of Horticulture, Farmers Organizations and Self Help Groups (SHG's) are doing research and extension activities for cocoa development. A substantial number of technologies relating to improved varieties, agro-techniques, pest and disease management and post-harvest processing have been evolved by research institutes for higher return from cocoa. However, still there exists a gap between the technologies generated and their utilization by the growers, especially in small holdings. Timely and sustainable transfer of technologies and extent of adoption play a critical role in improving the productivity and realizing a higher return.

### Transfer of technology programmes

Technology transfer is a system under which various inter related components of technology, namely, "hardware" (materials such as a variety), "software" (technique, know-how, information), humanware (human ability), "orgaware" (organizational, management aspects) and the final product (including marketing) are rendered accessible to the end-users, that is farmers (FAO,

1994). The system also includes institutional capacity for technology adoption, adaptation or rejection, constituting a matrix of technology component and institutional capacities for absorbing technologies. A technology transfer programme would be considered effective when there is minimal or no gap between the potential and realized impacts of the technology. It means that monitoring of the adoption or adaptation of technologies is an integral part of the technology transfer system. Transfer of technology must therefore be preceded and succeeded by technology assessment, reasserting that technology transfer and assessment are complementary processes.

The ICAR-Central Plantation Crops Research Institute (CPCRI) adopted a multi-dimensional extension strategy for transfer of technology for the improvement of cocoa farming community which includes i) training of farmers and extension personnel, ii) refinement and demonstration of technology/products, iii) single window delivery system for technology products, diagnostic services and information through Agricultural Technology Information Centre, iv) Cyber extension, v) creating awareness of improved agricultural technologies among the farmers through mass media, extension publications, field demonstrations, Kisan Melas, Interface/ group meetings, seminars, exhibitions etc.

**1. Trainings:** The term training refers to the acquisition of knowledge, skills, and competencies as a result of the teaching of

vocational or practical skills related to crop cultivation. Training is conducted either at the institute or at the farmer's field. Training programmes for the farmers and officers are conducted regularly with the financial assistance from Directorate of Cashew and Cocoa Development, Cochin, Ministry of Agriculture and Farmers Welfare, Government of India.



Fig.1. Training program on cocoa at Vittal in collaboration with DCCD, Kochi.

2. **Front Line Demonstrations (FLD):** ICAR-CPCRI has been organizing front line demonstrations in farmers' field on different technologies in cocoa. Such demonstration programmes have proved to be effective in convincing the farmers about the technical feasibility and economic viability of the technologies. Further, these demonstration programmes have multiplier effects in the dissemination of recommended technologies among cultivators at large. ICAR-CPCRI has established 96 FLDs on cocoa in farmers' gardens (1 ha each) in 8 taluks during 2003-04 with the financial assistance from DCCD, to convince the farmers about the technical feasibility and economic viability of cocoa cultivation. Grafts of high yielding cocoa

clones were distributed and the farmers were trained on scientific cultivation practices including pruning, training and balanced application of manures and fertilizers. These plots serve as model plots for other farmers to follow this system.

3. **Information communication through mass media:** Effective utilization of mass media like Radio, TV, Newspapers and Farm Magazines is made to create awareness among cultivators about various production technologies. Further, extension pamphlets, CD ROMs, video cassettes etc. are also prepared by the ICAR-CPCRI for effective dissemination and popularization of the available cultivation technologies.
4. **Exhibitions, Seminars, Kisan Melas and Group Meetings:** ICAR-CPCRI regularly organizes exhibitions, seminars, kisan melas and group meetings with the co-operation and involvement of various agencies. Such programmes strengthen the efforts for the dissemination of information on cultivation of arecanut and also provides opportunities for interaction between farmers, scientists and extension personnel.
5. **Consultancy - Field visits:** Scientists of ICAR-CPCRI regularly visit farmers' fields for identifying field problems, providing technical guidance and suggesting solutions to field problems. This also provides opportunity for assessing constraints in field implementation of the recommended production technologies and in turn in the refinement of the technologies.
6. **Video conferencing:** ICAR-CPCRI has launched cyber extension activities utilizing



the video conferencing facility covering Kerala, Tamil Nadu, Karnataka, Andhra Pradesh, Assam, Orissa, Bihar and West Bengal as part of strengthening the technology transfer programmes of the Institute in mandate crops *viz.*, coconut, arecanut and cocoa. A group video conferencing system through ISDN was installed at the ATIC, ICAR-CPCRI, Kasaragod to facilitate interaction between various stakeholders for enhancing technology utilization. The video conferencing facility is effectively utilized for scheduling and implementing interface programmes at regular intervals involving various stakeholders including researchers, extension personnel, farmers and entrepreneurs. It enables interaction of farmers at remote villages with the subject matter specialists of the institute and other centres thereby reducing the time, effort and cost in transfer of know-how from lab to land.

7. **ICAR-CPCRI web site:** ICAR-CPCRI has implemented many of the Information and Communication Technology (ICT) initiatives in the lines of Web-based systems, interactive software and cyber extension. To place ICAR-CPCRI in the arena of internet to communicate research results to the end users, a website was developed and hosted under the URL [www.cpcri.gov.in](http://www.cpcri.gov.in). Arrangements are made for answering queries on different aspects of production, protection and processing technologies of palms and cocoa through e-mail.

8. **MERA GAON MERA GAURAV (MGMG) - MY VILLAGE MY PRIDE:** An unique program formulated by Govt. of India in 2015 is the adoption of villages by scientists for

effective implementation of agricultural programs as an outreach measure. It enhances lab to land and land to lab research and development opportunities. Scientists regularly visiting the village, conducting programs, giving consultancy services on crop cultivation, sending mobile based advisory and organizing community based meetings and established FLD plots.



Fig. 2. Demonstration on post harvest processing

9. **Publications:** Technical bulletins, extension folders, pamphlets, books, CD ROMs etc. are also prepared for effective dissemination and popularization of the technologies in cocoa among the farmers and extension personnel in official and local languages.

#### Publications on cocoa from ICAR-CPCRI

##### a. Extension Folders

- Soft wood grafting in Cocoa (English, Kannada)
- Pruning and canopy management in Cocoa (English, Kannada)
- Soil sampling methods in arecanut and cocoa gardens (English, Kannada)- DCCD fund
- Cocoa varieties of ICAR-CPCRI (English, Kannada)- DCCD fund

- Pests of cocoa and their management (English, Kannada)- DCCD fund
- Diseases of cocoa and their management (English, Kannada)- DCCD fund
- Preparation of Bordeaux mixture (English, Kannada)- DCCD fund

#### *b. Technical Bulletins*

- Cocoa cultivation practices (English, Kannada, Malayalam, Tamil, Telugu, Assamese, Bengali)
- Calendar for Cocoa (English, Kannada, Malayalam, Tamil, Telugu and Hindi)- DCCD fund
- Cocoa planting material production (English)- DCCD fund

#### *c. Training Manuals*

- Market-led production strategies for cocoa
- Cocoa production technology
- Cocoa to chocolate- DCCD fund
- Advances in cocoa production and processing technologies

#### *d. Books*

- Cocoa
- Cocoa towards sustainability- DCCD fund
- Proceedings of seminar on strategies for enhancing productivity of cocoa- DCCD fund
- Profile of cocoa collections at ICAR-CPCRI, Research Center, Kannara

#### *e. E-media*

- CDs
- Website: [www.cpcri.gov.in](http://www.cpcri.gov.in)

#### *f. Magazines/ Journals*

- ICAR-CPCRI Newsletter (Quarterly)
- Indian Journal of Plantation Crops - ICAR-CPCRI, Kasaragod
- Annual Report of ICAR-CPCRI
- The Cashew and Cocoa Journal
- Indian Journal of Arecanut, Spices and Medicinal plants

#### **10. Programs on cocoa organized in connection with the centenary year celebration:**

Many programs on TOT of cocoa have been organized in connection with the centenary year celebration at ICAR-CPCRI with institute funding and also sponsorship from Directorate of Cashewnut and Cocoa Development (DCCD), Cochin, Directorate of Arecanut and Spices Development (DASD), Calicut and cocoa manufacturers.

#### **Way Forward**

- Various proven technologies are available for cocoa for improving its productivity and profitability which has to be disseminated appropriately.
- Knowledge, perception and adoption of technologies by farmers and impact analysis are very important.
- For successful adoption of technologies coordination between various research, extension/ development agencies and farmers groups is highly indispensable. ●