# Extension approaches for reaching the farmers and other stakeholders

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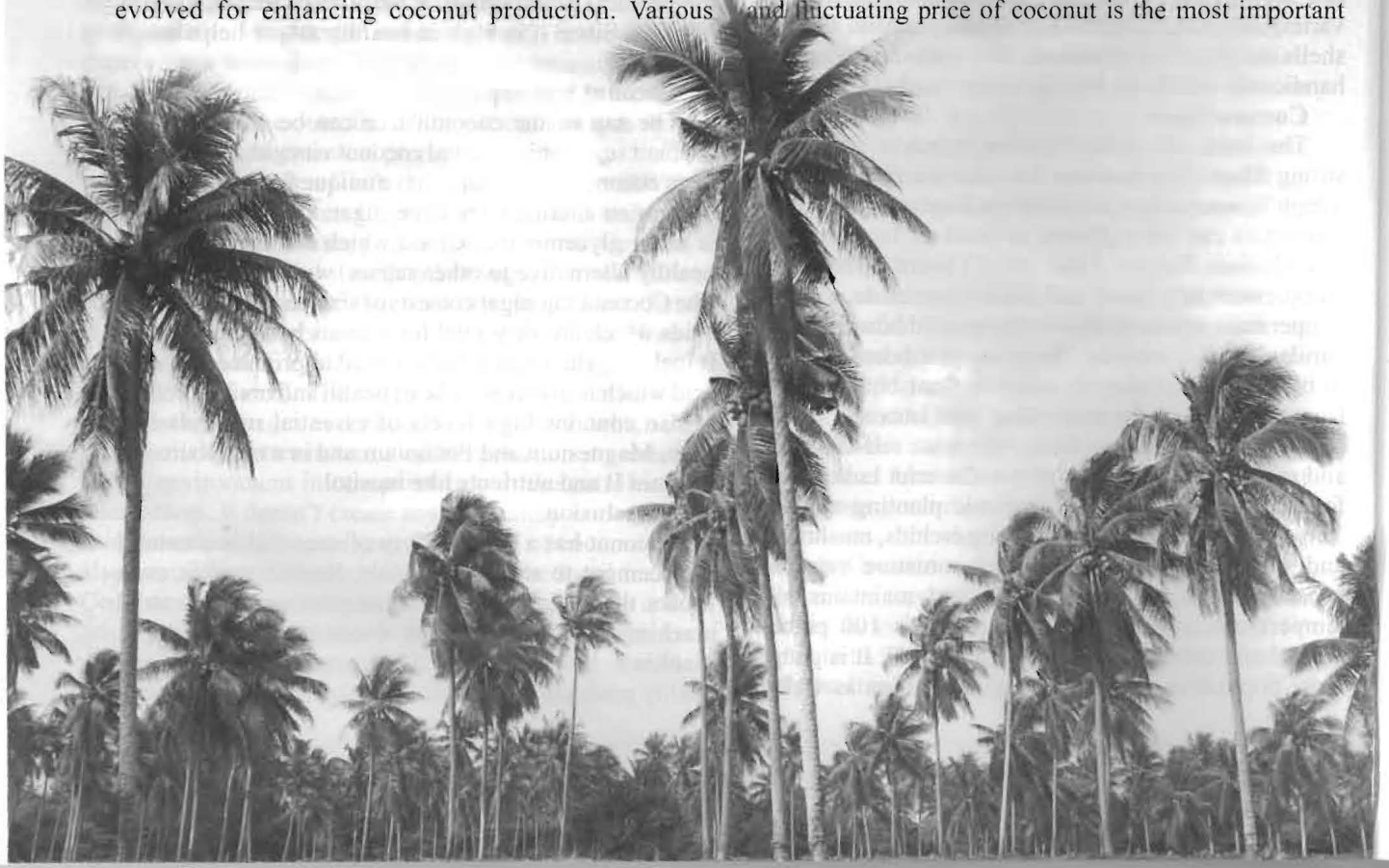
## 1. Introduction

India is one of the major producers of coconut in the world and about 12 million people are dependent on coconut farming and its allied activities. The average productivity of coconut from the importnat producting states viz.,Kerala, Tamil Nadu, Karnataka and Andhra Pradesh is 11,775 nuts/ha which is lower in comparison to research station yield of 3,0625 nuts/ha. In the recent past, coconut sector suffered from problems such as price flucutations, pests and diseases, moisture stress, lack of value addition etc. Hence, technological innovations and diffusion of new technologies are the key drivers to enhance the productivity and profitability of coconut farming. Through the systematic research conducted at Central Plantation Crops Research Institute (ICAR-CPCRI) and State Agricultural Universities (SAUs) during the last few decades, a substantial number of viable technologies related to crop improvement, production, protection and processing have been evolved for enhancing coconut production. Various programmes are being implemented by R & D agencies on a regular basis as part of the efforts to disseminate the research results among the coconut cultivators. Front line extension activities are also being organized by ICAR-CPCRI and SAUs. On farm testing of these technologies and front line demonstration and extension activities are carried out by Krishi Vigyan Kendras (KVKs). Mainstream extension programmes in coconut are mostly organized by Coconut Development Board (CDB), State Department of Agriculture/Horticulture and farmers organizations.

In spite of the efforts made by coconut R & D/ extension agencies, farmers are not able to exploit the production potential from the improved technologies to the extent desirable. The extent of adoption of technologies recommended for higher yield and income from coconut farming is comparatively low due to various constraints including socio-economic, technological, management or infrastructure. Low and fluctuating price of coconut is the most important



problem faced by coconut growers. Lack of sufficient labour for climbing palms and high wage rate also create much problem to farmers. Incidence of pests and diseases is another important problem experienced by coconut farmers. Predominance of senile and unproductive palms, high cost of inputs, lack of availability of quality planting materials, low availability and utilization of organic manure due to reduced adoption of livestock integrated farming, lack of irrigation/drainage facilities etc. are also often reported as constraints in adopting the recommended practices of coconut cultivation. Majority of the coconut growers belong to small and marginal holding categories and the uneconomic holding size limits the adoption of recommended technologies for higher productivity and income from coconut farming.

The low level of technology utilization at farmers' fields calls for formulating effective extension strategies suitable to the heterogeneous farming situations in coconut cultivation. The important technology dissemination activities in coconut implemented by ICAR-CPCRI include training programmes, front line demonstrations, information communication through mass media like radio, television, newspapers and farm magazines, extension pamphlets, CD ROMs, video cassettes etc., arranging exhibitions, seminars, Krishi Melas and group meetings, providing consultancy through field visits and replying postal, e-mail queries etc. Besides, a few innovative extension approaches have also been pilot tested through action research with farmers' participation by ICAR-CPCRI for improving technology utilization by coconut farmers.

**2.Training Programmes**

On campus/off-campus training programmes for farmers and extension personnel on specific topics on coconut such as agrotechniques, integrated pest and disease management, nursery management, organic farming technologies for coconut based cropping systems and post harvest technology form an important component of TOT programmes to enhance their knowledge and skill for better technology utilization. The study conducted among extension personnel who had participated in the Model Training Course (MTC) programmes conducted at ICAR-CPCRI indicated that the efforts for organizing such training programmes were highly successful in achieving the objectives as reflected by the high Training Effectiveness Index (TEI) values.

Impact analysis of capacity building programme among SMSs of KVKs during 2016 revealed that training had significant impact on enhancing the knowledge level of the respondents in all subjects of coconut technologies. Average gain in knowledge was estimated to be 18.36 per cent. There was a difference in knowledge levels in pre- evaluation and in knowledge gain among age groups wherein, youngsters were having high knowledge gain. Similarly, knowledge gain was higher among respondents who had undergone training earlier. Majority (79 %) of the respondents were highly satisfied with the course contents and training delivery methods. Sixty one per cent of the respondents graded training course as excellent. After the training, about 38 per cent of KVKs initiated OFTs and FLDs on coconut technologies for better technology integration.

Lack of availability of labour, especially skilled labour for coconut climbing, and high wage rate are important problems faced by growers in adopting timely crop management practices. To tackle this problem, the Coconut Development Board has initiated an innovative training programme, 'Friends of Coconut Trees (FoCT)' to develop a professional group of youth for harvesting and plant protection operations in coconut. The training targeted the group of unemployed youth in developing technical skills, entrepreneurship capacity, leadership qualities and communication skills to address the needs of the coconut growers.

*Training on Friends of Coconut Trees (FoCT)*

**Activities taken up in different FLD programmes**

*FLD on Soil and water conservation*

*FLD on cocoa as an intercrop in coconut*

*FLD on Soil and water conservation*

*FLD on management of coconut root (wilt) disease*

**3. Front Line Demonstrations (FLD)**

ICAR-CPCRI has been organizing front line demonstrations in farmers' fields on different coconut cultivation technologies such as coconut based farming systems, soil and water conservation, management of root (wilt) affected coconut gardens, cocoa as a profitable intercrop in coconut gardens etc. Such demonstration programmes have proved to be effective in convincing the farmers about the technical feasibility and economic viability of the technologies. The adoption of the integrated root (wilt) management practice was effective in improving the average yield of root (wilt) affected palms in farmers' fields from about 24 to 46 nuts/palm/year after three years, recording an improvement of around 92 per cent. Observations on yield of coconut revealed an increase in productivity of palms from a pre-demonstration yield of 95 nuts per palm per year under mono crop situation to 122 nuts per palm per year in coconut based high density multi species cropping system. Farmers' participatory research-cum-demonstration plots on cocoa as an intercrop in coconut gardens in five districts of Andhra Pradesh have been initiated to know the technical feasibility and economic viability of the technology. Farmers have taken up this programme whole heartedly. Some of the activities taken up in FLDs are depicted in above.

**4. Paradigm Shift in Reaching out to Stakeholders**

Refinement of extension approaches pave way for reaching out to the relevant stakeholders more efficiently and effectively. Farming is not an isolated activity by any means and it has the foundations in culture, heritage, experiences, tacit knowledge, knowledge innovations, innovation systems and social process.

• Participatory Technology Transfer Approach (PTTA) for coconut root (wilt) disease management • Clustering coconut farmers – A successful extension approach for enhancing adoption and income from marginal and small holdings of root (wilt) disease affected areas • Area Wide Community Extension Approaches (AWCA) in Bio-management of Rhinoceros Beetle of coconut • Farmer Field Schools (FFS) in coconut • Participatory community approaches in area wide management of red palm weevil • Information communication technologies (ICT) as interactive platform for technology transfer and field problem solving for farming community

***Special features of the extension approaches evolved are:***

1. Interactive and participatory involving relevant stakeholders
2. Paradigm shift from individual farmers to farm family approach with gender concerns
3. Inclusiveness incorporated for reaching out to all sections of society

*FFS for IPM of coconut*

4. Area wide interventions to overcome the challenges of fragmented holdings and resource base variability of farming community

5. Appropriate integration of extension techniques and methods for awareness building, knowledge dissemination and skill upgradation

6. Technology specific and problem specific approaches for focused technology interventions and improving the impact of research

7. Utilizing the digital literacy and advances in taking technologies and information to different strata of the society.

***4.1. Community Based Organizations (CBOs) for sustainable income enhancement***

Livelihood of a substantial number of families in rural poor communities in India depends on coconut farming. Technology options for enhancing income from coconut farming in such poor rural communities do exist, but not fully realized in field situation. To augment the production and productivity of such small and marginal holdings, which are also fragmented, group management of resources to overcome the inherent weaknesses of such holdings was taken up through Community Based Organizations (CBO) by ICAR-CPCRI in selected localities. Such an approach helped efficient management of farmers' resources to reduce cost of cultivation and to increase productivity through integration of technologies.

**4.1.1.** A project sponsored by International Plant Genetic Resources Institute (IPGRI) for developing sustainable coconut based income generating technologies in poor rural communities was successfully implemented by the ICAR-CPCRI in two selected coconut communities, at Pallikkara in West Coast region and Ariyankuppam in East Coast region. The strategies for the project included i) growing suitable inter/mixed crops in coconut gardens and integrating animal husbandry and other subsidiary enterprises with coconut farming, ii) cultivating high yielding cultivars of coconut to enhance the yield and income and, iii) promoting diversification of coconut products. The implementation of the strategies envisaged in the project was routed through Community Based Organization of coconut growers in the selected communities. Micro-credit for introducing the interventions envisaged under the project was routed through the CBO.

**4.1.2.**Under the project on 'Cluster approach among coconut farming community' for improving productivity and income from small and marginal coconut based homesteads in the root (wilt) affected coconut area, the farm family members of 25 ha area clustered together for deciding the farm strategies; both individual and group ventures for improving productivity and income. The average yield of coconut was doubled after technology package implementation for three years. The cluster approach has been scaled up by other agencies like Coconut Development Board (CDB) among coconut farming communities through their development schemes. The Board has initiated the formation of Coconut Producer Societies (CPS) by associating 40-100 coconut growers in a contiguous area with a consolidated minimum of 4,000-5,000 palms.

**4.1.3.**Under the National Agricultural Innovation Project (NAIP) project on 'Value Chain in Coconut', implemented by ICAR-CPCRI, the methodology involved facilitating CBOs of farmers and women SHGs for effective integration of production and processing technologies in coconut holdings for higher income. Ten CBOs comprising of 534 farmers in clusters of 25 ha each were formed and technological interventions on soil and water conservation, soil health management, integrated nutrient management, inter/mixed cropping and integrated pest and disease management were implemented in farmers' gardens. Four women SHGs were facilitated to take up microenterprises on production and marketing of coconut value added products like coconut chips. The group approach in coconut farming for income enhancement in small holdings is being scaled up by other agencies like Coconut Development Board, State Department of Agriculture and Local Self Governments.

***4.1.4. Farm families of manageable contiguous area*** (50-100 ha) affected by coconut root (wilt) disease will be joining the Participatory Technology Transfer (PTT) approach wherein multidisciplinary team of scientists, extension officials, farmer representatives, local village representatives, women, youth etc. forms the stakeholders. The awareness, knowledge, attitude and adoption of farmers towards the technology package for the integrated root (wilt) disease management technologies were improved by 40-85 per cent over the pre-implementation level. The monitoring, appraisal and evaluation of the technology implementation and impact were done with the stakeholder participation and documented in 'farmer-scientist-extension dialogue session' for further scaling up by other agencies.

***4.1.5.Farmer Field Schools (FFS) for IPM of coconut:*** The innovative concept of FFS was implemented by ICAR-CPCRI Regional Station, Kayamkulam for the IPM of rhinoceros beetle in coconut in 15 locations. The awareness and knowledge of farmers were improved by 100 per cent over pre- FFS level.

***4.1.6.Promotion of Women's Self Help Groups:*** Entrepreneurship Development Programmes are organized for women to train them on the opportunities for value addition in coconut. Various topics including the concept and practices of Entrepreneurship Development, group approach for micro level interventions and product diversification in coconut are included in the programme. The experiences and impact of organizing such programmes clearly indicated the scope and importance for enhancing the income of resource-poor coconut farmers and socio-economically disadvantaged rural women through product diversification in coconut.

***4.1.7.Farmers' Participation in Coconut Research:*** This approach invariably enhances the extent of technology utilization at farm level. ICAR-CPCRI was one of the selected centres to implement the Institution-Village Linkage Programme (IVLP) under National Agricultural Technology Project (NATP). The TAR-IVLP project was implemented in three villages, viz., Pady, Edneer and Nekraje of Kasaragod, Kerala with coconut as one of the important crops in the production system of the villages. Implementation of the project revealed the effectiveness of participatory approach in the performance assessment of various technologies related to high yielding varieties, intercropping, nutrient management and crop protection in coconut.

**5. Strengthening Research-Extension-Farmer Linkage in Coconut Sector**

Various agencies both from research and extension systems strive for the development of coconut sector and for better impact, such extension activities are to be coordinated at different levels. Research-Farmer-Extension interface programme is an approach for strengthening the ToT efforts for the development of coconut sector and the experiences of ICAR-CPCRI in implementing such programme indicate the relevance of strengthening linkages at different levels. Researchers, extension personnel and farmers are brought together on a common platform and the activities for the sustainable development of coconut are streamlined. ICAR- CPCRI had organized research-farmer-extension interface programmes on coconut in 12 districts of Kerala during 2002-03 and 13 districts of Karnataka during August 2013-October 2013 as a collaborative effort with SAHUs, KVKs and Department of Horticulture.

The interface programmes could enhance the awareness and knowledge about the technologies for improving coconut productivity and income of farmers. The experiences gained from interface programmes revealed that the concept of research-extension-farmer interface is sure to enhance the adoption of technologies ultimately leading to coconut growers' own benefit.

**6. Area Wide Community Extension Approach (AWCA) for management of coconut pests**

Adoption of plant protection technologies in coconut was reported to be very low (below 5%). Alternative extension mechanisms for managing pest/disease problems of coconut needs special emphasis because coconut, a perennial plantation crop, is cultivated in

**Activities under AWCA**

*Identification of coconut pests (area wide community approach)*

*Interface with beneficiaries of AWCA*

**Research-Farmer-Extension interface programmes organized by ICAR-CPCRI**

*Interface programme at East Godavari, Andhra Pradesh*

*Interface programme at Kannur, Kerala*

*Interface programme at Coimbatore, Tamil Nadu*

contiguous area in small and marginal land holdings (average holding size of 0.2 ha) provides congenial conditions for pest and disease incidences throughout the year and it is a challenge for technology delivery among farming community with varied resource base, socio personal and psychological variables. Hence, extension approaches/ mechanisms need paradigm shift from individual farmers to area wide or groups/community based for improving efficiency.

ICAR - CPCRI took the initiative to evolve area wide community extension approach (AWCA) for management of coconut pests which was scaled up in several districts subsequently. The model community extension approach underscores the role of linkages with peoples' representatives, farmer organizations, farmer leaders, co-operative societies of farmers and co-ordination with various extension departments and research institutions. The critical component of the extension approach was the decentralized option for technology facilitation viz. capacity building of women farmer groups as master trainers and farm level producers of Green Muscardine Fungus (GMF) and targeting the 'potential and critical adopters' of the bio control technology against rhinoceros beetle, the major pest of coconut. Through this approach, more than 90 % of the potential adopters were reached within two months and post intervention data indicated 75.8% reduction of fresh pest infestation.

**7. Participatory Technology Assessment and Refinement for Evolving Climate–Smart Adaptations in the Management of Coconut Based Farming Systems under Coastal Sandy Soil Conditions of South Kerala**

Climate-smart adaptations evolved during the course of participatory demonstration coupled with assessment and refinement of technologies for management of Coconut Based Farming Systems (CBFS) in the Southern coastal tracts of Kerala during 2012-14 resulted in reducing crop loss due to climate vagaries, improvements in soil properties, identification of ideal crops and their varieties and income enhancement from coconut and intercrops. Pine apple was found to be the most ideal crop withstanding water logging, followed by fodder grass and Nendran variety of banana. Climate resilient refinements by farmers viz., modified method of husk burial for pine apple, shifting of planting time, planting of 4-5 months old suckers and earthing up with silt and coconut husk, green manure, coir pith compost and husk for banana, planting of short duration varieties and shifting of planting time for tuber crops were proved to be successful.

**8. IFAD project on Overcoming Poverty in Coconut Growing Communities: Coconut Genetic Resources for Sustaining Livelihoods in India**

Participatory planning and implementation of diverse interventions notably intercropping and off-farm activities in small and marginal coconut homesteads in Pathiyoor, Thodiyoor and Devikulangara panchayats through registered Community Based Organizations (CBOs) along with nutrition education brought out significant improvements in the food and nutritional security as well as the income of the family members. The project efforts could bring in tremendous increase in income from intercrops, livestock and household level




*Demonstration on management of coastal sandy soil*

processing and the total annual income per homestead enhanced from Rs.25,617 to Rs.59,017 over the project period.

**9.Integrated Model Coconut Clusters for Improving Livelihood Security in Root (wilt) affected areas**

Integrated model coconut cluster at the panchayat level by linking the ward level coconut clusters through a common support centre with continued government support for input use and marketing for effective functioning and sustenance was developed and tested in 25 ha area in Thekkekkara panchayat of Alappuzha District sponsored by NABARD. Technologies related to production, protection and processing of coconut were effectively transferred to the farmers which resulted in an increase in knowledge index to the tune of 153%. One coconut processing unit and a bio agent production unit were established under the project. The income from coconut recorded 2.4 folds improvement, while the area under intercrops increased to double than that of the pre-project period and the income from intercrops increased by 3.9 folds. The project efforts could also bring in increase in income from household level processing by 2.7 folds. The average farm income increased by 2.7 folds over the project period, thereby resulting in an increased in household level income by 26%.

**10.Community based Bio-resource Management for Sustaining Production and Livelihood security under Coconut Based Farming Systems**

Community based bioresource management through production and utilization of organic inputs ensured quality bio-inputs to the farmers along with efficient use of resources, thereby contributing to sustainable production and productivity. Awareness programmes, training- cum-demonstrations, small group discussions, farmer field schools and household level trainings resulted in an increase in knowledge level of 117% in case of bioresource management and 76% in case of integrated nutrient management. Soil test based site specific integrated nutrient management with emphasis to bioresource management was recommended to farmers through soil health cards. Significant improvement in income from coconut and other intercrops resulted in 89.7% improvement in farm income.

**11. Mera Gaon Mera Gaurav**

The innovative initiative 'Mera Gaon Mera Gaurav' by Ministry of Agriculture and Farmers' Welfare, Govt. of India has been planned to promote the direct interface of agricultural scientists with the farmers to hasten the lab to land process. ICAR- CPCRI, Kasaragod and its Regional Stations and Research Centres have started implementing the programme in 69 villages from


*Community based bioresource management*

**Mera Gaon Mera Gaurav initiatives**



*Videoconferencing facility at ICAR-CPCRI*

October, 2015 as per the guidelines (Fig.9). Training programmes, demonstration on improved practices, farm advisory visits and mobile advisory services are organized in the selected villages for the benefit of farming community. Cutting across all disciplines, farm problems are diagnosed and effective solutions are delivered and showcased in farmer's fields. National priorities such as secondary agriculture, climate change, good agricultural practices and soil and health management of crops are envisaged in this programme.

**12. Cyber Extension Programmes**

Cyber Extension includes effective use of information and communication technology (ICT), national and international information networks, internet expert systems, multimedia learning systems and computer based training systems to improve information access to the farmers, extension workers, researchers and extension managers. ICAR-CPCRI has been implementing various cyber extension activities as part of strengthening the technology transfer programmes of the institute in mandate crops viz., coconut, arecanut and cocoa. As part of the cyber extension activities, 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 in coconut. In the year 2010, the videoconferencing facility for organizing interface programmes was strengthened by procuring a mobile CODEC.

**13. Conclusion**

Coconut is one of the important plantation crops in India which support millions of farmers. Though large number of technologies has been generated for the improvement of coconut at various research institutes, they have not reached the beneficiaries to the desired level. The present scenario of technology adoption in coconut calls for the technology generation and dissemination programmes based on a viable extension strategy with the active participation of stakeholders. Further, effective linkage is to be established among different research, and extension agencies and coconut farming community through well co-ordinated participatory research/ extension programmes for ensuring a meaningful technology generation and transfer in coconut. ■

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