Constraint Analysis in Coconut Cultivation

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Central Plantation Crops Research Institute (CPCRI) and the State Agricultural Universities have a number of technologies as well as coconut based different cropping system models for improved productivity and returns. Integrated plant protection measures against pests of coconut giving emphasis to biological control measures and against diseases of coconut have been evolved and the feasibility has been demonstrated in farmers fields also. Eventhough the technologies have great production potential, there is still a wide gap between what is possible and what is realised. Timely and sustained transfer of technologies and extend of field adoption of the recommended practice play a critical role in improving the productivity of the crop. Prakash (1989) reported incidence of pests and diseases fragmented holdings, unproductive and senile palms, low use of production inputs, erratic price of coconut, lack of irrigation, lack of knowledge and unfavourable attitude towards improved practices etc, as constraints faced by coconut farmers.

As constraint analysis in coconut cultivation would help in hastening the process of transfer of technology, a study was undertaken at CPCRI (RS) Kayamkulam on this aspect during 1999-2000. Agricultural Officers (293 nos.) from the State Department of Agriculture representing all the districts of Kerala State were the respondents of this study. Pre-tested questionnaire was used to collect the required information. The problems were classified as pest problems, disease problems, socio-economic problems, technical problems, management problems and infrastructural problems in coconut.

1. Pest Problems

Various pests of major and minor status infect coconut palms. The most important pests reported are listed here:

Pest	Location	Problems
Red Palm Weevil	Mostly in southern districts and Idukki, Malappuram, Palakkad Kozhikode, Trichur and Kannur	Very difficult to identify the attack in the early stage and especially when the attack is through bole region. Regular field problem reported by farmers. Incidence widely prevalent.
Eriophyid Mite	All districts	Outbreak nature restricts efficient chemical control. Needed an IPM with emphasis on biological control
Rhinoceros Beetle	All districts	Indirect yield loss and favours budrot and red weevil attack
Coried Bug	Trivandrum, Eranakulam, Alappuzha, Malappuram	Yield loss and very severe in certain pockets.
Mealy bug	Trivandrum	Yield loss observed
Root grub	Sandy areas of Kasaragod district	Reduces the health of palms

2. Disease Problems

Coconut crop faces yield loss and health reduction in palms due to many diseases. The plant protection efforts demand correct identification of disease symptoms and timely adoption of control measures.

Pest	Location	Problems
Root (wilt) disease and leaf rot	Severe in southern districts. sparsely in northern districts	Identification in early stages and management
Deficiency disorders	Trivandrum, Idukki, Alappuzha, Kollam, Kasaragod	Identification difficult, lack of precise knowledge about various symptoms and corrective measures
Bud Rot	Trivandrum, Kollam, Malappuram, Pathanamthitta, Idukki, Kottayam, Palakkad, Kozhikode, Trichur, Kannur, (Severe in northern districts)	Early identification is difficult and succumbs the palm
Stem bleeding	Pathanamthitta, Alappuzha, Kozhikode, Trichur, Kasaragod, Kannur. (Severe in northern districts)	Lack of knowledge on latest recommendations
Other symptoms like mid whorl yellowing, yellowing of palms, nut fall, button shedding and production of barren nuts were reported at various locations.		

3. Socio-Economic Problems

Coconut is a small and marginal farmer's crop and grown in almost all homesteads in Kerala. Hence managing the palms efficiently and economically in the small holdings and homesteads requires socio economic technical support in a different manner. The situation calls for a holistic approach to tackle the problems effectively. Socio-economic problems faced by the farmers may slow down transfer of technology efforts as well as extent of adoption. The socio-economic problems reported are listed below :

- Lack of skilled labour for plant protection and harvest.
- Low and fluctuating price of coconut.
- High labour cost.
- High cost of inputs (fertilisers and plant protection chemicals).
- Marketing problem.
- Attitude of farmers towards coconut cultivation in general is depressive/ negative.
- Lack of processing facilities.
- High cost of organic manures, transportation charges and application costs.
- Uneconomic holding size.
- Conversion of paddy lands and planting coconut in unsuitable locations.
- Poor spacing due to fragmented holdings.

4. Management Problems

Several studies on extent of adoption among coconut cultivators indicated poor management of the crop due to various constraints. This factor limits production, productivity and economic benefits.

- Lack of eco-friendly integrated pests and disease management measures.
- Poor yield due to low quality planting material and existence of senile and unproductive palms in fields.
- Reduction in yield due to absentee landlordism.
- Poor yield due to incidence of pests and diseases.
- Farmers perceive adoption of plant protection as uneconomical, costly and risky investment. Hence low adoption.
- Lack of irrigation facility/water shortage.
- Delayed flowering / non-bearing of palms in field situations.
- Poor management and low adoption of recommended cultivation practices.
- Nature of the crop such as its stature, observability of practices adopted after a considerable period due to its physiology and as homestead base crop.
- Low availability and utilisation of organic manure due to reduced adoption of livestock integrated farming
- Practical difficulty like dependency of skilled labour for the adoption of improved farming practices.
- Improper adoption of control measures for pest and diseases.
- Lack of interest in farming and reduced intensity of intercropping / mixed cropping in homesteads.

5. Technical Problems

Heavy load of administration and other functions for extension officials restricting them from devoting required time for transfer of technology programmes. Feasibility / practicability of technologies causes problems in certain locations at times as location specific technologies are not available.

- Lack of up-to-date information build up / exchange. (TOT & feedback)
- Problems in the duration and efficiency of transfer of technology network.
- Easy and simple techniques for the early identification of certain pests and disease attacks are yet to be evolved. (eg. red palm weevil, budrot, etc)
- Lack of sufficient human resource development programmes.
- Absence of training on processing technologies/byproduct utilization.
- Lack of low cost harvesting techniques, lack of simple chemical administration methods for plant protection.
- Technology for low input organic farming of coconut is needed.

6. Infrastructural Problems

- Infrastructure facilities are essentially the accelerators of adoption of technologies. Even if recommendations are feasible and transfer of technology is efficient, the adoption process can be hindered by the infrastructure constraints like availability of seeds, fertiliser/manures, chemicals, credit, labour and extension support in time.
- Non availability of skilled labourers and high labour cost.
- Non-availability of good quality planting materials (variety/hybrid)
- Lack of irrigation / drainage facility.
- Poor training facilities.
- Lack of awareness / knowledge about processing technologies.
- Lack of availability of the required infrastructures at a single point.

The field problems faced by extension officers are also indicators of their training needs, research needs and policy options.

Solving Field Problems - Scope and Limitations

The research system has developed efficient crop management technologies to improve the production potential of coconut. Regarding the pest problems integrated pest management practices have been evolved at CPCRI against all major and minor pests like red palm weevil, rhinoceros beetle, coried bug, leaf

eating caterpillar, eriophyid mite, mealy bug, termites, root grub, etc. Effective biological control measures against rhinoceros beetle (metarhizium fungus, baculovirus, and clerodendron incorporation in dung pits) and parasites / predators against leaf eating caterpillar are widely appreciated and practised in coconut growing states.

Effective control measures against diseases like leaf rot, stem bleeding, bud rot and disorders like boron deficiency have also been recommended by CPCRI. Nutrient management, irrigation techniques, different cropping systems, vermicomposting using palm wastes, etc are also recommended. An integrated management package is recommended and widely demonstrated by CPCRI against root (wilt) disease. The efforts in breeding for resistance/tolerance against root (wilt) disease is a case in point.

The first line transfer of technology involves training programmes for researchers and extension personnel at research stations, Agricultural officers serving in Krishibhavans are getting requisite know-how on research activities and recommendations through publications, expert system like CD ROM, video, audio, ATIC (Agricultural Technology Information Centres) at CPCRI Kasaragod, information and extension services of Krishi Vigyan Kendra (KVK), field demonstration of technologies, mass media and mass contact programmes. Extension officials may also utilise these facilities for information exchange. It would be meaningful and sustainable only if the technologies are transferred and feedback provided to the research system in time. This would help the research system to develop client driven or demand driven technologies. Hence it is suggested that

- First line transfer of technologies developed in research institutions is to be strengthened and linkages between extension system, research system and farmers' systems are to be activated in a sustainable manner.
- Mechanism of information updating through training programmes, demonstrations, contact/interactive programmes may be made as a regular function.
- Farmer participatory approach should be streamlined and strengthened along with the programmes of the existing research system to develop and implement location specific technologies. The extension officials suggested that more information dissemination and training are needed in areas like moisture conservation, low cost sustainable production technologies and organic farming in coconut, use of bio fertilisers, low cost tender coconut storage measures, mechanisation/simplification of harvest / plant protection operations, alternative application methods like root feeding, stem injection, etc. identification tools for early detection of red palm weevil, budrot infestation in palms besides more farmer oriented research and transfer of technology. Implementation of the suggestions given above could play a significant role in the improvement of coconut productivity in the country along with a steady price policy.

References

Prakash R. (1989) Sequential analysis of constraints in increasing production of rice and coconut in Kerala. Ph.D. Thesis (unpub) College of Agriculture, Vellayani.

STATISTICS

World Production of Coconut in Copra Equivalent, 1997-2003 (MT)

Country	1997	1998	1999	2000	2001	2002	2003[f]
A APCC Countries	8,824,076	8,579,916	7,861,320	8,924,373	9,147,628	8,541,700	8,520,700
F S Micronesia	6,500	6,500	6,500	6,500	6,500	6,500	6,500
Fiji	27,226	27,228	27,228	27,228	27,228	28,000	29,000
India	1,866,000	1,817,000	2,132,000	1,750,000	1,785,000	1,821,000	1,850,000
Indonesia	2,703,938	2,778,127	2,789,212	3,023,900	3,032,000	3,032,00	3,050,000
Kiribati	20,000	21,200	21,250	19,200	19,200	19,200	19,200
Malaysia	165,000	140,000	138,000	136,000	134,000	132,000	130,000
Papua New Guinea	163,000	143,000	170,000	172,000	112,000	140,000	150,000
Philippines	2,618,000	2,405,000	1,374,000	2,544,000	2,843,000	2,303,000	2,111,000
Samoa	41,000	54,000	54,000	55,000	56,000	56,000	56,000
Solomon Islands	29,524	37,281	32,242	29,545	25,000	27,000	29,000
Sri Lanka	534,000	515,500	490,000	536,000	479,000	346,000	450,000
Thailand	339,000	340,000	332,000	329,000	332,700	333,000	340,000
Vanuatu	48,000	48,000	48,888	50,000	49,000	50,000	51,000
Vietnam	248,888	233,080	232,000	232,000	233,000	234,000	235,000
Palau	14,000	14,000	14,000	14,000	14,000	14,000	14,000
B. Other Countries	1,328,712	1,362,560	1,618,624	1,659,514	1,700,853	1,720,000	1,750,000
Total	**10,152,788**	**9,942,476**	**9,479,944**	**10,583,887**	**10,848,481**	**10,261,700**	**10,270,700**

Note : - Data refer to total production of coconut, whether consumed fresh, processed into copra or desiccated coconut [f]Forecast