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AGRICUTURAL TECHNOLOGY INFORMATION CENTRE



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Indian Institute of Spices Research
(Indian Council of Agricultural Research)

Calicut - 673012, Kerala, India.

AGRICULTURAL TECHNOLOGY INFORMATION CENTRE



INDIAN INSTITUTE OF SPICES RESEARCH
(Indian Council of Agricultural Research)
Calicut - 673 012, Kerala, India

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FOREWORD

Agriculture is backbone of Indian economy. India is blessed with rich biodiversity and varied agro climatic situations suited for different crops. India is known as 'Land of Spices'; Spice crops are extensively grown in humid tropics of South India, besides seed spices grown in North India. In general the research support given to spices crops right from 1971 by the Indian Council of Agricultural Research (ICAR) is considerable. The production and productivity of these crops remain stagnant, in spite of several agrotechnologies developed. One of the main reasons for this is non accessibility and non availability of the new technologies developed to the needy farming community. Thus the transfer of technology (TOT) assumes greater relevance in agriculture and spice crops are no exception. The extension efforts are highly inadequate compared to the magnitude of the problems that spice farmers are facing in India. The World Bank aided National Agricultural Technology Project (NATP) has taken up this task by setting up about 40 Agricultural Technology Information Centres (ATIC) throughout the country. This ATIC at IISR serves a single window delivery system for information on crop improvement, production, protection, post harvest and marketing on spices for all the clientele. During the short span of 3 years, the ATIC at IISR has brought out about 7 pamphlets on package of practices of spices and two manuals, one on the production technologies and another on the nursery management. However there is a long way to go, I am sure the ATIC serves the farming community as well as other clients in dissemination of information on spices on all aspects to make spices globally competitive and thus boosting up the glory of Indian spices.



Calicut
02.04.2002

(Y.R. SARMA)
Director, IISR, Calicut

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PROJECT AT A GLANCE

Title of the Project	: Agricultural Technology Information Centre (ATIC)
Code No.	: S no.20
Name of the centre	: Indian Institute of Spices Research, Marikunnu PO, Calicut, Kerala, India. PIN - 673 012
Sanction order No. and date	: 18(2)99 NATP dated 11-01-99
Sanctioned Budget	: Rs. 39.4125 lakhs
Name of ATIC Manager	: Mr.K.N.Kurup, Principal Scientist, (Agricultural Statistics).
Name of Collaborating Scientist	: Dr.Rajeev.P., Scientist (Sr.Scale) Agricultural Extension.
Contact Address	: Director, Indian Institute of Spices Research, Marikunnu PO, Calicut, Kerala, India. PIN -673 012 Phone. 0495 -730 294.Fax. 0495 -730294 ATIC- Phone. 0495 -730704 E mail : mail@ iisr.org web : www.iisr.org

VISION

India, known as the land of spices, is the largest producer, exporter and consumer of all varieties of spices. There are 52 identified species of spice crops which are cultivated in the country. Commercial operations are quite strong in 25 species. Indian Institute of Spices Research (IISR) under the Indian Council of Agricultural Research (ICAR) is a premier institute engaged in research and development activities on multidimensional aspects of spices including crop improvement and biotechnology, crop production, crop protection, post harvest technology and transfer of technology. The institute is located in Calicut - Mysore high way, NH 212, 12 KM from Calicut city in the Malabar coast of Kerala.

Though India enjoys an enviable position being the largest producer of many spices, improved technologies generated have not percolated down to the field. Systematic upgradation of spices cultivation technologies and post harvest operations for producing spices/spice products to meet the international standards is the need of the hour. The major reasons for

low productivity, wide yield gaps and low profit in Indian spice sector are poor production potential of existing cultivated varieties, conventional cultivation practices and alarming crop losses due to pests and diseases and, above all, high cost of production. The exigent need of the hour is to ensure effective transfer of technology related to scientific cultivation practices to the needy farmers, thus enabling their socio economic upliftment and also to recapture the declining heritage of Indian spices sector. National Agricultural Technology Project (NATP) aided by The World Bank is an ambitious project implemented by ICAR to strengthen the research and extension capabilities of all stakeholder organizations. The Agricultural Technology Information Centre (ATIC) under NATP was proposed in order to revitalize technology delivery mechanism of the ICAR research institutes and state Agricultural Universities. Out of the 40 centres established all over the country, the centre at IISR Calicut has a pivotal role to play in disseminating the agro-technologies in spices for achieving increased production, productivity and quality in spices.

MISSION

The motto of ATIC is to facilitate services that provide timely access for all stakeholders to information, inputs and products with the ultimate objective of field application to achieve enhanced productivity and quality of cultivated spice crops. The specific objectives of the centre are:

- ❖ To provide a single window delivery system for services, information, inputs and products to farmers and spice industry
- ❖ To facilitate direct access to the farmers to the institutional facilities and resources available in terms of high production technology, nursery management for production of quality planting material, crop diagnosis and management of pests and diseases and post harvest technology on spices.
- ❖ Monitoring and evaluation of information disseminated from the feed back obtained from farmers as a means of technology assessment and to serve as a link between the research institute and the farmers

FUNCTIONS

The ATIC at IISR started functioning in the year 1999. As per mandate, the centre is involved in technology dissemination functions through various divisions of IISR. The major activities of centre are summarized below.

PRODUCTION OF QUALITY PLANTING MATERIAL

There is a high demand for quality planting material of improved varieties of spices released by the research institutes especially for rooted cuttings of black pepper and seed rhizomes of ginger and turmeric. The projected demand for seed or planting material during the 10th five year plan is furnished in table 1. A nursery for the production of rooted pepper cuttings using rapid multiplication method with an



Pepper nursery of ATIC

Table 1. Estimated planting material requirements during the 10th Plan

Planting material	2002-03	2003-04	2004-05	2005-06	2006-07	10 th Plan
Pepper rooted cuttings (@ 1100/ha)	11,795,300	12,267,200	12,757,800	13,268,200	13,799,500	63,888,000
Ginger (@ 1400 kg/ha)	4,888,800	5,084,800	5,287,800	5,499,200	5,719,000	26,479,000
Chillies (@ 2 kg/ha)	80,288	83,500	86,840	90,314	93,926	434,868
Turmeric (@ 2000kg/ha)	14,020,000	14,582,000	15,164,000	15,770,000	16,402,000	75,938,000
Coriander (@ 20 kg/ha)	491,800	511,460	531,920	553,200	575,320	26,637,000
Garlic (@ 500 kg/ha)	2,573,500	2,676,500	2,783,500	2,895,000	3,011,000	13,939,500
Cumin (@ 15 kg/ha)	178,185	185,325	192,735	200,445	208,455	965,145
Fennel (@ 10 kg/ha)	8,240	8,570	8,920	9,270	9,640	44,640
Fenugreek (@ 25 kg/ha)	93,000	96,700	100,575	104,600	108,800	503,675
Celery (@ 5 kg/ha)	1,035	1,075	1,120	1,165	1,210	5605
Clove seedlings (@ 200/ha)	28,600	29,600	30,800	32,000	33,400	154,400
Nutmeg seedlings (@ 150/ha)	43,650	45,450	47,250	49,050	51,150	236,550
Cinnamon seedlings @ 275/ha	9,075	9350	9,900	10,175	10,450	48,750

annual target of 20000 rooted cuttings has been established in IISR main campus at Chelavoor, in addition to nurseries at IISR farm, Pruvannamuzhi. This unit is set up with the twin objectives of demonstrating the cost effective method to the visiting farmers and field extension officials and also for hygienic production of nuclear planting materials of improved varieties to be distributed to extension agencies and farmers. Besides, the sale of seed rhizomes of ginger and turmeric, nutmeg grafts, seedlings of cinnamon and clove, garcinia grafts, vanilla cuttings and bush pepper produced at experimental farm at Peruvannamuzhi is being facilitated through ATIC as per demand received at the centre.

FARM ADVISORY SERVICES

The queries of farmers in person or through post and also farmers' visits are being systematically monitored by ATIC. There is an increased demand from the farming community for diagnosis of various pests and diseases affecting the crops. Farmers often visit the centre with samples to get quick identification to take appropriate control measures. Scientists from various divisions render advisory services by providing appropriate technology packages for pests and disease control. Consultancy services are also provided on various aspects of crop varieties, nursery management, integrated nutrient management and post harvest tech-

nology. ATIC also arranges field visits of subject matter specialists whenever needed.

INFORMATION TECHNOLOGY

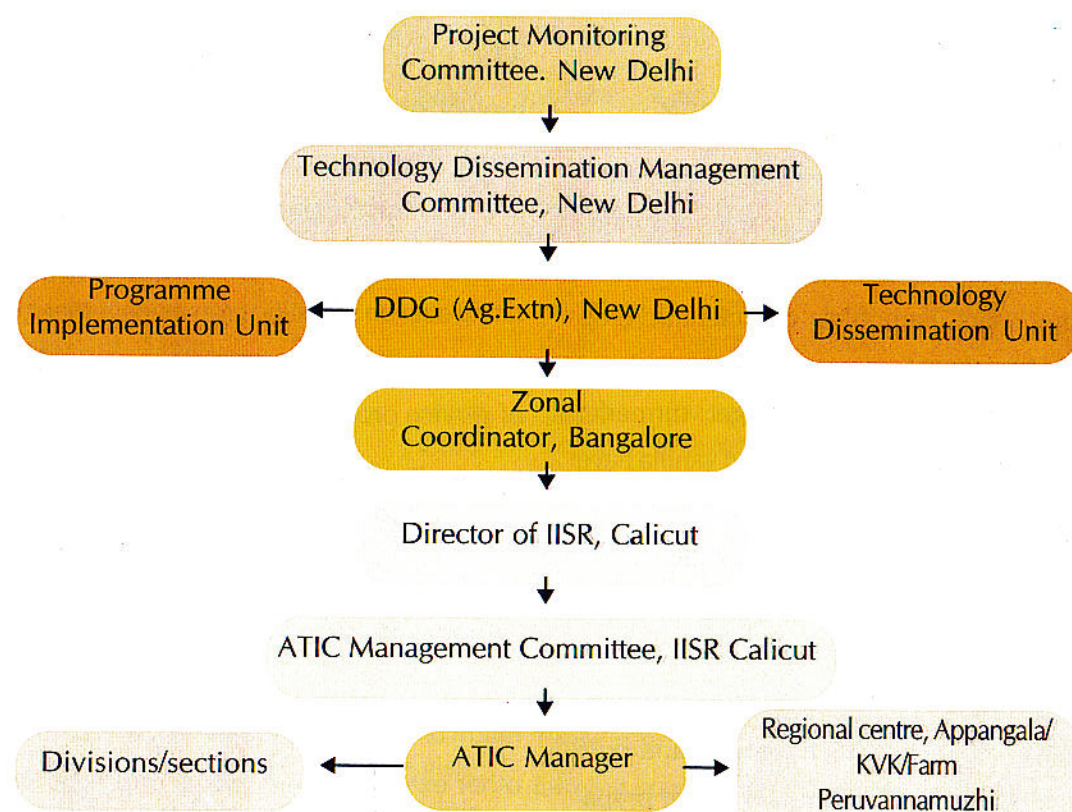
Print literature plays a dominant role in timely dissemination of scientific information to a broad spectrum of technology users. Pamphlets on scientific crop management of seven major spices, namely, black pepper, ginger, turmeric, cinnamon, nutmeg, clove and vanilla have been brought out by ATIC and are available at low price. These pamphlets are aimed at disseminating the package of practices of high production technology evolved by the institute. Eleven folders covering specific technologies and crop management problems are under preparation. A technical bulletin on spices production technology detailing all aspects of spices crop improvement, crop production, crop protection and post harvest processing is also available at ATIC. Besides, institute publications and publications of Indian Society of Spices are also sold at this centre.

In view of ever increasing volume of scientific information, preparation and use

of database, information and expert systems is in progress as a key function of ATIC. The centre is collaborating with project on Integrated National Agricultural Resource Information system (INARIS) for the preparation of digitized database and information system incorporating data on scientific crop management, economic and market statistics and details of service providers for farmers.

Audio visual aids are indispensable for facilitating effective communication of information. ATIC plays a lead role in providing audio visual aid support to the educational activities of the institute. Preparation of video films for use in training and other extension functions is in progress. The centre also coordinates the extension activities like exhibitions, kisanmelas and field days in collaboration with various divisions, experimental farms and the Krishi Vigyan Kendra. Facilities are available for photography and art works like preparation of posters, design of cover pages for publications and preparation of other aids making use of computer software.

ORGANISATIONAL SET UP



As per the guidelines of the ICAR the ATIC management committee functioning at the institute level is vested with the responsibility of providing policy guidelines for day-to-day functioning of ATIC. The committee was constituted at IISR with representatives of all the divisions, experimental farm, KVK and administrative section. The committee met thrice since the inception of the project and took impor-

tant decisions related to infrastructure development including building, equipments, norms of expenditure, sales proceedings and information service. For effective working of the centre, functional liaison is established with other ICAR research institutes, State Agricultural Universities, State Departments of Agriculture, Non Governmental Organizations and entrepreneur farmers.

BUDGET (As on April 2002)

Head	Amount released (Rs.Lakhs)	Expenditure (Rs.Lakhs)
Recurring		
Training	0.0500	Nil
Operational expense	6.9025	3.50403
Non-Recurring		
Equipment	1.4500	1.41420
Furniture	1.0000	Nil
Works	30.000	27.000
Total	39.4825	31.91823

ACHIEVEMENTS

Within two years of its inception, the centre has achieved rapid progress in delivering services to the farming community, field extension functionaries, NGOs and research personnel.

SALE OF PLANTING MATERIAL

Planting material of black pepper and *Piper chaba* were raised in ATIC demonstration nursery at IISR main campus. Ten thousand rooted cuttings of *Piper chaba* were produced and supplied to M/S Dabur Research Foundation, New Delhi on contract basis. Five thousand rooted pepper cuttings were supplied to the Directorate of Research, Bidan Chandra Krishi Viswa Vidyalaya, West Bengal during 2001.

Year wise income from sale of planting material for the three year period is given below.

Year	Amount realized(Rs.)
1999-2000	17,668.00
2000-2001	41,241.00
2001-2002	50,000.00
TOTAL	1,08,909.00

In addition, the demand for planting material received at the centre was also met from the experimental farm of IISR and KVK at Peruvannamuzhi.

SALE OF LITERATURE (1999-2002)

The details of sale of institute publications during the three year period 1999-2002 is given below

Name of publication	Quantity	Amount (Rs.)
Diseases of Black Pepper	92	27600
Spices Varieties	94	11750
Biological Control in Spices	108	16200
Protocols for Micro Propagation of Spices and Aromatic crops	49	8820
Bio diversity Conservation & Utilization of Spices, Medicinal and Aromatic Plants	18	5400
Spices Production Technology	138	17940
Pamphlets	350	3500
Total		91,210.00

DATABASE DEVELOPMENT

A software incorporating an integrated database on spices production technology, marketing and trade statistics of spices is being developed.

The database provides following information.

- ❖ Agronomic practices and production technology for spices .
- ❖ Varieties of spices released with location, yield and quality parameters.

- ❖ Crop specific post harvest technology and value added products.
- ❖ Crop protection including pest, disease and nematode management.
- ❖ Statistics on market including products, arrivals and processes
- ❖ Secondary data on production, yield, export and import - period and location wise.

AUDIO-VISUAL AID SUPPORT

A video film highlighting the achievements of the institute on completion of 25 years of service has been released in connection with the Silver Jubilee celebration on 8th October 2001. Filming is in progress for two more short documentaries on pepper and ginger cultivation, as aid for training and other extension activities. Preparation of Audio-visual aids for scientific presentations is done by using the available computer facilities at the centre. An exhibition hall (Technology Park) depicting the research



ATIC Exhibition Hall

and development achievements of the institute using photographs and posters has also been setup.

EXTENSION FUNCTIONS

During the period 2001-2002, the centre participated in three major exhibitions in connection with the National Science Congress organised by the National Academy of Agricultural Sciences at Delhi, Swadeshi Vigyan

mela organised by Swadeshi Science Movement at Cochin and Calicut flower show organised by the Calicut Agri-Horti society. A farmer- scientist interface was organised at IISR main campus in connection with the Silver Jubilee year celebrations on 8th October 2001. A kisan mela was also organised at KVK, Peruvannamuzhi, marking the closing of the silver jubilee year.



Kissan mela- Closing ceremony of Silver Jubilee year

APPENDIX -1

INVENTORY OF SERVICES

INFORMATION SERVICES

1. Rapid multiplication method in black pepper
2. Nursery management techniques for major spices like cardamom, ginger, turmeric and tree spices.
3. Agronomic cultivation practices (High production Technology) for major spices like pepper, cardamom, ginger, turmeric and tree spices
4. Irrigation management in major spices
5. Eco-friendly technologies for organic farming in spices (Vermicompost, coir pith compost)
6. Integrated nutrient management package for major spices
7. Fertilizer recommendations for major spices
8. Nutrient deficiency management based on soil and foliar diagnostic norms
9. Production, management and protected cultivation of bush pepper in potted and field conditions
10. Post harvest drying of major spices including tree spices
11. Value added products like white pepper, salted ginger and ginger in brine
12. Disease and pest diagnosis in major spices
13. Integrated disease, pest and nematode management in major spices

TECHNOLOGY SERVICES

1. Tissue culture Protocols with training
2. Development of new tissue culture protocols on mandate crops
3. Extraction of oils, oleoresins and pungent principles of major spices
4. Gas chromatographic profile for major spice oils
5. Culturing and mass multiplication of bio control agents
6. Chemical analysis of soil, manures, fertilizers, water and plant samples for their nutrition status
7. Microbial analysis of commercial samples

INPUT SERVICES

1. Planting material of released varieties of major spices including pepper, ginger and turmeric
2. Planting material of nutmeg, clove, cinnamon, garcinia, vanilla, *Piper cahaba*, *Curcuma aromatica*, allspice and bush pepper
3. Planting material of arecanut, cashew and anthurium produced at Krishi Vigyan Kendra.
4. Culture of bio control agents for disease control in spices.



Micro propagation in Cardamom



Micro Rhizomes in Ginger



Variety of Pepper - Sreekara



Variety of Ginger - Varada



A9/4 - A pre release high yielding line of nutmeg

ABOUT IISR VARIETIES

PEPPER

Name	Pedigree	Average yield (kg/ha) dry	Oleoresin %	Piperine %	Essential oil %
Subhakara	Clonal Selection on Karimunda	2352	12.42	3.4	5.0
Sreekara	Clonal Selection of Karimunda	2677	13.0	5.1	7.0
Panchami	Clonal Selection of Aimperiyar	2828	12.5	4.7	3.4
Pournami	Clonal Selection of Ottaplackal	233	13.8	4.1	3.4

CARDAMOM

Name	Average yield (kg/ha) fresh	Essential oil %	Dry Recovery %	+ - terpenyl acetate %	1.8 cineole %
CCS-1	745	8.7	22	37	42
RR-1	848	6.7	20.8	34.6	30.4

GINGER

Name	Average yield (T/ha) fresh	Duration days	Dry recovery	Fibre %	Oleoresin %	Essential oil %
Varada	22.2	200	20.70	3.29	6.70	1.75

TURMERIC

Name (Duration)	Average yield (T/ha) fresh	Dry recovery %	Curcumin %	Oleoresin %	Essential oil %
Suvarna (200)	17.40	20.00	4.30	13.50	7.00
Suguna (190)	29.30	12.00	7.30	13.50	6.00
Sudarsana (190)	28.30	12.00	5.30	15.00	7.00
Prabha (200)	37.47	19.50	6.52	15.00	6.50
Prathibha (225)	39.12	18.50	6.52	16.20	6.20

CINNAMON

Name	Average yield (kg/ha) dry	Duration For 1st yield	Bark recovery %	Bark oil %	Leaf Oil %	Oleoresin %
Nityashree	200	3 years	30.7	2.7	3.0	10.0
Navashree	250	3 years	40.6	2.7	2.8	8.0

APPENDIX- 2

CHARGES FOR TECHNOLOGY SERVICES

- Transfer of Protocols (TC) (Existing protocols including training of two persons for a period of one month) Rs 6 lakhs
- Developing new tissue culture protocols on mandatory crops Rs. 10 lakhs
- Training on tissue culture (one month) Rs. 25,000
- Training on tissue culture (7-10 days) Rs. 10,000
- On farm training Rs. 200 per head per day
- Training on specific lab techniques 200 per day + cost of chemicals involved
- Chemical analysis of oleoresins oil and piperine Rs.500 per sample
- Chemical analysis of curcumin Rs. 250 per sample
- Analysis of amino acids Rs. 250 per sample
- HPLC/GLC analysis Rs.500 per sample
- Micro nutrient analysis
Fe, Mn, Zn, Cu Rs. 150 per element
Heavy metals Rs. 250 per element
- Field testing of fungicides and insecticides Rs. 25000 per chemical plus actual expenditure involved in maintenance of crop
- Project work for post graduate students
For a period of 3 months and above Rs. 5000 for three months + 1500 for every months there after
For a period of less than 3 months Rs.1500

APPENDIX-3

LIST OF PUBLICATIONS

INSTITUTE PUBLICATIONS

Title	Price(Rs.)
1 Diseases of Black Pepper	300 (\$60)*
2 Spices Varieties	125 (\$ 25)
3 Biological control in Spices	150 (\$ 30)
4 Protocols for Micro Propagation of Spices & Aromatic crops	180(\$35)
5 Bio diversity Conservation and Utilization of Spices, Medicinal and Aromatic plants	60 (\$30)
6 Agri Science Tit-bits (Quarterly)	200 per year

ATIC PUBLICATIONS

7 Spices Production Technology	130
8 Pamphlets on High Production Technology in major Spices	10

PUBLICATIONS OF INDIAN SOCIETY OF SPICES

9 Bio technology of Spices, Medicinal and Aromatic plants	250 (\$ 30)
10 Water and Nutrient Management For Sustainable Production and Quality of Spices	200 (\$ 30)
11 Black Pepper and Cardamom-Problems and Prospects	60 (\$ 10)
12 Journal of Spices and Aromatic Crops	300 (\$ 50) per year

* Out side India

To obtain institute publications by post, send DD in favour of "ICAR unit, IISR, Calicut" payable at any Nationalised Bank at Kozhikode (Calicut). to Director, Indian Institute of Spices Research, Kozhikode (Calicut). 673 012.

To obtain the society's publication by post, send DD in favour of Secretary, Indian Society for Spices, Indian Institute of Spices Research, Kozhikode (Calicut)-673012, Kerala

Pamphlets on Package of Practices

Black Pepper



Agricultural Technology Information Centre
Indian Institute of Spices Research
Calicut, Kerala.

Turmeric



Agricultural Technology Information Centre
Indian Institute of Spices Research
Calicut, Kerala.

Ginger



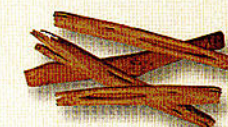
Agricultural Technology Information Centre
Indian Institute of Spices Research
Calicut, Kerala.

Clove



Agricultural Technology Information Centre
Indian Institute of Spices Research
Calicut, Kerala.

Cinnamon



Agricultural Technology Information Centre
Indian Institute of Spices Research
Calicut, Kerala.

Nutmeg



Agricultural Technology Information Centre
Indian Institute of Spices Research
Calicut, Kerala.

Vanilla



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