

**UNIVERSITY OF HORTICULTURAL SCIENCES,
BAGALKOT, KARNATAKA**



**SELF STUDY REPORT FOR THE
Ph.D. IN PLANTATION, SPICES, MEDICINAL AND
AROMATIC CROPS, KRCCH, ARABHAVI
2014-15 to 2018-19**

SUBMITTED TO
Indian Council of Agricultural Research,
Krishi Bhavan, New Delhi.

SUBMITTED BY
University of Horticultural Sciences,
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Karnataka

PREFACE

India faced the challenge of providing food security to millions of its people soon after independence. The Research and Development initiatives taken by the Government of India resulted in the 'Green revolution' in the late 60s and early 70s. As a result of 'Green revolution', India has made significant achievement through production of 228 million tonnes of food grains and gained self-sufficiency. But considering the nutritional security, economic sustainability and high generation of employment, Horticulture sector plays an important role. Hence, it was only in mid-80s that the Government of India recognized the importance of Horticulture sector and thus greater emphasis was given on this. It is a means of diversification for making agriculture more profitable through efficient land use, optimum utilization of natural resources and creating skilled employment for rural masses. Horticulture has invariably improved the economic status of our farmers. It has also played a significant role in improving floriculture, plantation, spices, medicinal, aromatic industry, fruit and vegetable production and processing, production of quality seed and planting materials, encouraging hi-tech horticulture, contract farming, cooperative farming, participatory approach of production and marketing, etc. Thus, there is a growing awareness about the advantages of the horticultural crop production and this is bound to go up with the increase in socio-economic status of the people.

The R & D programmes in horticulture have received an impressive support from the Eighth Five Year Plan onwards. As a result, the research infrastructure has increased manifold with the setting up of a number of new institutes, national research centres in several crops, important both from domestic as well as export point of view. The establishment of educational institutions in the field of horticulture plays a pivotal role in developing human resource, which would cater to the needs of horticulture industry.

To cater the horticulture needs of the farmers of northern Karnataka and to develop the quality human resource in the field of horticulture, the **Kittur Rani Channamma College of Horticulture, Arabhavi** was established at Arabhavi on **31.08.1994** under the University of Agricultural Sciences, Dharwad, and is presently functioning under the University of Horticultural Sciences, Bagalkot. The college offers undergraduate, postgraduate and Ph.D. courses and has the admission capacity of 50 students for undergraduate, 30 students for Masters and 8 students for Ph.D. degree

programme annually excluding ICAR quota students. Students of this college have excelled not only in curriculum but also in extracurricular activities and national level competitive examinations and the college is making continuous efforts to improve the quality of education offered here. The ICAR has introduced the procedure of accreditation, which help in assessing facilities available to impart the quality education offered by the college. The college was accredited by ICAR Peer Review committee for a period of **five years**. After accreditation, the financial support of ICAR and State Government has greatly facilitated the growth and developmental activities of the college to a greater extent, as a result the quality of education has improved. Since the college is due for further accreditation, the present report provides all the necessary information about the college activities performed during **last eight years**.

The University Level Task Force and Steering Committee has been gratefully acknowledged for their help, guidance and suggestions given in preparing the report.

The college level Steering Committee and Task Force have done a great job in compiling information and bringing out this report to be submitted to Accreditation Board of ICAR. My heartfelt thanks to all those who are involved in preparation of this report.

**K.R.C. College of Horticulture, Arabhavi
September-2018**


Dean
(Nagesh H. Naik)

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6.4 SELF STUDY REPORT FOR Ph.D. IN PLANTATION, SPICES, MEDICINAL AND AROMATIC CROPS AT KRCCH, ARABHAVI

6.4.1. Brief history of the degree programme

The department of Spices and Plantation crops was established in 1998 under the jurisdiction UAS, Dharwad to met out the teaching, research and extension on plantation and spices crops. Further a separate department of Medicinal and Aromatic plants was established in 2004. Both the departments were merged and renamed as Department plantation, spices, medicinal and aromatic crops in 2008. During 2011 to 2015 Ph.D (Horticulture) students were attached to department for their research work on different aspects of spices, medicinal and aromatic crops. From the academic year 2016-17 the department is offering Ph.D in Plantation, Spices, Medicinal and Aromatic crops (combined course work is conducting at COH, Bangalore). The department has specialized staff to carry out different activities with following mandates.

Mandates

- Imparting quality education at graduate, post graduate and Ph. D. level and imparting research skills to post graduate and Ph. D. students.
- Undertake basic, applied and adaptive research to address current and future challenges of farming community in cultivation of Plantation, Spices, Medicinal and Aromatic crops.
- Developing improved production technology including organic farming in plantation, spices, medicinal and aromatic crops and Undertaking an extension education programme.
- Collection, conservation & evaluation of spices, medicinal and aromatic crops viz., coriander, garlic, fennel, ginger, turmeric, fenugreek, citronella, ashwagandha, Japanese mint etc.,
- Popularization and promotion of high valued medicinal and aromatic crops.
- Production of guanine planting materials.
- Introduction and promotion of high yielding varieties as well as adaption of improved technologies among the farmers.
- Training and entrepreneurial development, advisory consultancy to farmers, extension functionaries.

Statistics of Ph.D. programme (2013-14 to 2017-18)

Department was involved in offering courses to the Ph.D. (Hort.) students from 2010 and also based on their research problem they were guided by the department faculty till 2015-16. The department is offering Ph.D in Plantation, Spices, Medicinal and Aromatic crops from the academic year 2016-17.

Year of Admission	Admitted			Dropped			Passed			Degree awarded during the year
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	
2012-13*	2	0	2	1	0	1	1	0	1	2017-18
2013-14*	0	1	1	0	0	0	0	0	0	Yet to complete
2014-15*	3	1	4	2	0	2	1	1	2	2017-18 2018-19
2015-16*	4	0	4	3	0	3	0	0	0	Yet to complete
2016-17**	3	0	3	0	0	0	-	-	-	Yet to complete
2017-18**	1	0	1	0	0	0	-	-	-	Yet to complete
Total	21	13	34	1	0	1	20	13	33	-

* Students admitted for Ph.D. (Hort.) and conducted research work on Plantation, Spices, Medicinal and Aromatic crops

**Students admitted to KRCCH, Arabhavi, course work at CoH Bengaluru

Gold Medals received by the Ph.D (PMA) students

Year	Ph.D. (PMA)
2013-14	-
2014-15	-
2015-16	-
2016-17	-
2017-18	-

Fellowships/ Scholarships Ph.D (Hort.) PMA students

Scholarship Type	2013-14	2014-15	2015-16	2016-17	2017-18
Merit Scholarship	-	-	-	1	-
Students Aid fund	-	-	-	-	-
Category I EBL Scholarship	-	-	-	-	-
SC/ST Fellow Ship	-	-	-	-	-
GOI Scholarship (SC+ST)	-	-	-	-	-
Vidyasiri food & Accommodation	-	-	-	1	1
Muslim Minority	-	-	-	-	-
Total	0	0	0	2	1

6.4.2 FACULTY STRENGTH

Faculty strength (cadre wise)

Designation / Cadre	2014			2015			2016			2017			2018		
	S	F	V	S	F	V	S	F	V	S	F	V	S	F	V
Professor	1	1	0	1	1	0	1	0	1	1	0	1	1	0	1
Associate Professor	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1
Assistant Professor	2	3	-1	2	3	-1	2	3	-1	2	3*	-1	2	3	-
Total	4	4	1	4	4	1	4	3	2	4	3	2	4	3	2

S- Sanctioned, F- Filled V-Vacant

Faculty Strength (2017-18)

Department	Sanctioned Faculty			Faculty in place			Vacant position			Recommended by ICAR			Deviation from ICAR recommendation		
	Prof.	Assoc Prof.	Asst. Prof.	Prof	Assoc Prof.	Asst. Prof.	Prof	Assoc. Prof.	Asst. Prof.	Prof.	Assoc. Prof.	Asst. Prof.	Prof	Assoc. Prof.	Asst. Prof.
Plantation, Spices, Medicinal and Aromatic Crops	1	1	2	0	0	3	1	1	-1	1	1	2	1	0	0

*Faculty Assistant Professor 1: In-charge HOD Dept of PMA,

*Assistant Professor 2: Associate professor (Farms)

*Assistant Professor 3: Warden (Ladies hostel)

**Assistant professor shown against the post of Associate Professor

6.4.3 TECHNICAL AND SUPPORTING STAFF

Sl. No.	Post	2018						
		Sanctioned	Filled	Vacant	Contractual service	Recommended by UHS	Diversion from recommendation (Sanctioned)	Remarks
1.	Field Assistant	1	1	0	-	1	0	-
2.	Lab Assistant	1	-	1	-	1	1	-
3.	Messenger	1	-	1	1	1	0	-
4.	Farm labour	2	1	1	1	2	0	-
	Total	5	2	3	-	5	1	-

*Messenger and farm labour filled in contractual bases

6.4.4. CLASS ROOMS AND LABORATORIES**Class room**

Sl.No.	Class room No.	Area (M ²)	Seating capacity	Other facilities (LCD projector, Computer etc.)
1.	Class room	120.00	50	Smart board + LCD projector
2.	Seminar hall*	120.00	80	LCD, Projectors, Computers

* Common seminar hall for all the departments.

Laboratories

Sl.No.	Name of the laboratory	Area (M ²)	Seating capacity (No.)
1.	Lab	100.00	30
2.	Medicinal and aromatic plants Analytical lab	18.00	4
3.	Central lab*	80.00	15

* Common lab for all the departments.

Major functional equipments

Sl.No.	Name of the equipment	Quantity
1.	Gas chromatography	1
2.	Essential oil Distillation Unit (SS) 10 kg cap	1

Sl.No.	Name of the equipment	Quantity
3.	Essential oil Distillation Unit (SS) 1 ton cap	1
4.	Soxhlet's extraction apparatus	1
5.	Sox-rap solvent extractor	1
6.	Abbe's bench refractometer	1
7.	Polarimeter	1
8.	High speed homogenizer	1
9.	Research microscope	1
10.	Rotary flash evaporator with vacuum pump	1
11.	Seed germinator	1
12.	Water bath	2
13.	Sand bath	1
14.	Deep freezer	1
15.	Clevenger's apparatus	6
16.	Magnetic stirrer	2
17.	Water double distillation unit glass (4lph)	1
18.	Water single distillation unit glass (6lph)	1
19.	Willey mill	1
20.	Turmeric polisher	2
21.	High precision weighing balance	1
22.	Hot air oven	3
23.	Table top centrifuge	1
24.	Fractionation unit	1

Farm facilities

Being a major department of the college, provided with sufficient area well connected with approach roads and internal roads and irrigated by Ghataprabha left bank canal apart open wells. Drip irrigation is also installed in a part of field to met out experimental requirement. The details of all the farm facilities are given below.

Total cultivable area

Sl.No.	Farm Area (ha)	Irrigated/ Non-Irrigated	Crops grown
1.	4.15	Irrigated	Medicinal and Aromatic Plants, Coconut, Areca nut, Tamarind, Curry Leaf etc.,

Poly house and Shade nets

Sl. No	Particulars	No.	Area (M ²)	Details
1.	Shade nets	3	752.00	Medicinal and aromatic plant nursery
2.	Poly tunnel	1	22.94	Medicinal and aromatic plant nursery

Instructional farms

Sl. No	Particulars	Area (ha)	Details
1.	Plantation, Spices Medicinal and Aromatic crops	1.25	Medicinal and Aromatic Plants, Coconut, Tamarind, Curry Leaf etc.,

Farm structure, equipments and meteorological units

Sl.No.	Particulars	Details	Area/No	Remark
I. Farm structure				
1	ZECC	8' x3' x2'	1	Recalcitrant seed storage
II. Farm equipments				
1		Weed cutter (petrol operated)	2	
		Tractor (45 hp)*	1	
2		Tractor (18hp)*	1	
3		Trailer*	2	
4		Rotavator*	2	
5		Double mould board reversible plough*	2	
6		Single mould board reversible plough*	3	
7		Rigid tyne cultivator*	1	
8		Flexible tyne cultivator*	2	
		Blade harrow*	3	
9		Disc plough*	1	
10		Plough*	2	
11		Blade harrow cum leveler*	2	
12		Forward and reverse blade*	1	
13		Boomer*	1	
14		Weed cutter*	5	
15		Telescopic tree pruner*	1	
16		Chain saw*	2	
17		Battery operated knapsack sprayer*	5	
18		Pressure washer*	1	
19		Water lifting device*	1	
20				
21				
22				
III. Irrigation sources				
	Open well	50ft x 20 ft 60ft x 45ft	2	
IV. Meteorological units*				
1		Sun shine Recorder	1 each	
2		Wind vane		
3		Wet bulb thermometer		
4		Dry bulb thermometer		
5		Rain Gauge		
6		Soil thermometer		
7		Hygrometer		
8		Anemometer		
9		Thermometer		
10		Digital Observatory	2 unit	

*common facilities are available in the college

Adequate number of class rooms, laboratories and farm/field facilities have been established in the college that are facilitating to carry out post-graduate degree programme most effectively.

Average Number of Students in Theory and Practical Classes

At present course work for Ph.D in Plantation, Medicinal and Aromatic Crops is being carried out at College of Horticulture, Bangalore, where the students are grouped into one theory and one practical batch

Sl. No.	Name of the department	Theory Batch	Practical Batch
1.	Plantation, Medicinal and Aromatic Crops	Full strength	Full strength

6.4.5. CONDUCT OF PRACTICAL AND RESEARCH METHODOLOGY

Sl. No.	Department	Practical and Research methodology
1.	Plantation, Spices, Medicinal and Aromatic crops	<p>Advances in propagation of various plantation, spices, medicinal and aromatic corps</p> <p>Advances in essential oil distillation technologies in aromatic crops.</p> <p>Quality analysis of medicinal plants and aromatic crops by HPLC and Gas chromatography respectively.</p> <p>Extraction of curcumin, oleoresin, concrete by traditional and modern methods</p> <p>Visit to public and private sectors involved in research in plantation, spices, medicinal and aromatic crop</p> <p>Exposure visit to analytical laboratories and industries involved in procurement of M&AP</p>

6.4.6 SUPERVISION OF STUDENTS IN PG PROGRAMMES

Every student shall have Advisory Committee with a Major Advisor and at least four members among whom two members shall be from outside the major field of specialization. Programme of Research proposed by the Advisory Committee and approved by the Dean (Post Graduate Studies) will be carried out by the student under the supervision of Advisory Committee. Totally Ph.D students have passed out from the Department of PMA, KRC, College of Horticulture, Arabhavi from 2013 to 2018. Major research works on fennel, turmeric, safed musli, isabgol etc and research related to evaluation, organic production, cropping systems, post-harvest handling etc. are being in progress.

With respect to the allotment of the students to the PG teacher the major advisor shall not take more than 6 PG students (not more than 04 Ph.D. students) and also the PG teacher shall not be a member of the advisory committee for more than 15 PG students.

PG recognized teachers in the department

Sl. No.	No. of PG recognized teachers	Academic year	Intake of Students	students to Teachers
			Ph.D.	
1.	04+2*	2013-14	1**	1:4
2.	3+1*	2014-15	4**	1.3:1
3.	4+2*	2015-16	3**	1:1.3
4.	2+3*	2016-17	3	1:1
5.	3+4*	2017-18	1	1:3

** Admitted under General Horticulture discipline but, specialized in Plantation, Spices, Medicinal and Aromatic Crop subject *Faculty working in nearest stations available to guide the students

Short Note on Sufficiency of staff and how the shortage of faculty is taken care

For post-graduation degree programme every semester five M.Sc. courses are being offered. The faculty present in Department (03 Asst. Professors) are handling courses along with under graduate and diploma courses. If any shortage of faculty for handling the courses the PG recognized teachers from nearest stations will be deputed for the handling the courses.

6.4.7. FEEDBACK OF STAKEHOLDERS**(STUDENTS, PARENTS, INDUSTRIES, EMPLOYERS, FARMERS ETC.)**

Sl.No.	Particulars	Year	Important remarks/feed back
1.	Ph.D students	2013-2015	1. To conducting research filed and lab facilities are excellent. 2. Lab in equipped with GC, HPLC and other good number of equipments which will be helpful to research. 3. to conduct research need more financial support from the college
2.	Farmers	2013- 2018	Good collection and availability of genuine planting materials of Medicinal and Aromatic crops, Updated Knowledge on Plantation and Spice crops. Good extension work in terms of field days, technology demonstrations, seed treatment campaigns and training programmes. Good facility for pilot scale works like distillation of essential oil, curcumin extraction, but need to establish commercial scale units to bring in more farmers for these crops.

6.4.8. STUDENT INTAKE AND ATTRITION

Academic year	Sanctioned seats	Actual intake	Attrition (No)	Attrition Percentage
2013-14	-	-	-	-
2014-15	-	-	-	-
2015-16	-	-	-	-
2016-17	3	2	-	-
2017-18	2	1	-	-
2018-19	2	2	-	-

6.4.9. ICT APPLICATION AND CURRICULA

ICT enabled teaching-learning encompasses a variety of techniques, tools, content and resources aimed at improving the quality and efficiency of the teaching-learning process. At KRCCH Arabhavi for effective teaching and learning, teachers participate in selection and critical evaluation of digital content and resources. For this each individual staff allotted with high configured computer system and connected with high speed Internet facilities for sharing digital contents.

Below mentioned ICT facilities established in the college are being utilized for PG programme at Department of Plantation, Spices, Medicinal and Aromatic crops

S.No.	Name of Lab	Equipment	Usage
1.	ICT Enabled Lab + Class Room	Smart board with LCD projector-1	For educational video, PPT, conferencing , teaching and learning
2.	PG -Computer	Computer with printer -1	For research work
3.	Analytical lab	GC equipped with other physical analysis equipments	Essential oil quality analysis
4.	Essential oil Distillation lab	Hydro-distillation, hydro-steam distillation, steam distillation and solvent extraction.	Extraction of various aromatic plants
5.	Lab (both UG & PG)	Seed, crude drugs and other samples of PMA	Exhibits of various practical samples of the PMA crops

Library:- Digitalized college library

KOHA, CeRA, e- books, e-Journals, Krishikosh

The KOHA (library management)

Open wear software is implemented to automate the library activities. The charging and discharging of documents is automated and e-mail reminder facility has been introduced.

CeRA and other online e-resources

CeRA is the ICAR Consortium of e-resources in Agriculture. This covers more than 3500 scholarly journals pertaining to the Agriculture and allied sciences which are available in full text.

e - books & e – journals

Library is having access to Springer e-books for the copy right years 2014-16, which covers nearly 1900 books in virtual format with full text availability and at a time 25 users can open an e-book. In addition library has access to 200 Indian e-books and also library having excess to e-journals for Hortsci and Journal of American society for Horticulture Science.

Krishikosh

Krishikosh is database of thesis submitted to the Agriculture universities and ICAR institutions. The UHS Library is a member for Krishikosh and all the thesis submitted to the UHS are being uploaded regularly.

Internet

The library is provided with separate internet link line with speed of 100mbps. There is a separate digital library section made in the library which is equipped with 05 computers with facility of internet connected to all computers. Web OPAC of Kittur Rani Channamma College of Horticulture, Arabhavi library is available in the net. EZ-proxy remote access server is installed in main campus library through which we are accessing the e-resources, CeRA, and Agristat.

Wi-Fi facility

Wi-Fi is available in the library premises. One can have net facility in the campus through IP based network. Through which students and faculty members can browse CeRA and e-resources of the library and college premises.

Different ICT Software's used by PG students at KRCCH Arabhavi


S. No	ICT Application	Usage
1.	Academic Management System Software	Online PG Student Admission, POW, POR, Thesis Submission, Qualifying Examination etc. Complete activities of Student, Staff, Academic section activities, automated in this software
2.	Horti App	Provide information about the horticulture trends, technologies and methods being used. Horti App is a useful app in cultivation of all kinds of crops, where it gives detailed information of each crop.
3.	SYSTAT	Statistical Software for analysis of Statistical Data
4.	Window STAT	Statistical Software for analysis of Statistical Data
5.	HERBIQ	Windows Form Application that stores data in encrypted XML files to track the progress of plants, nutrient levels, environment, smoke effects, strain characteristics for breeding, etc. Output to single file with embedded images like a pdf file or some open format to show others
6.	English Digital Laboratory	16 HP P-IV Computer Systems for English Learning

6.4.12.

CERTIFICATE

I the Dean, Kitturu Rani Channamma College of Horticulture, Arabavi hereby certify that the information contained in the Section 6.4.1 to 6.4.9 are furnished as per the records available in the college and degree awarding university.

Date: March, 2019



Dean
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