

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



**SELF STUDY REPORT FOR THE  
M. Sc. HORTICULTURE IN BIOTECHNOLOGY AND  
CROP IMPROVEMENT, KRCCH, ARABHAVI  
2014-15 to 2018-19**

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

**SUBMITTED BY**  
**University of Horticultural Sciences,**  
**Udyanagiri, Bagalkot – 587 104**  
**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 M.Sc. HORTICULTURE IN BIOTECHNOLOGY AND CROP IMPROVEMENT AT KRCCH, ARABHAVI

### 6.4.1 Brief history of the degree programme

The Belgaum district with rich biodiversity, good climatic and irrigation facilities is considered as hub of horticultural crops. Fruits, vegetables, flower crops and medicinal and aromatic crops are extensively cultivated. In order to increase the crop production and productivity, there is need for development and introduction of high yielding varieties and hybrids in different horticultural crops. Many land races and germplasm of different horticultural crops are available in this area. There is an urgent need to conserve the existing diversity and germplasm of different horticultural crops for future needs.

For providing nutrition security to the rapidly growing population of our country, there is an urgent need to develop new varieties and hybrids in horticultural crops. An application of modern science such as Crop Improvement and Biotechnology is one of the potential avenues to address the nutritional and food security challenges. Traditional Plant Breeding programmes coupled with biotechnological tools shorten the breeding cycle leading to development of varieties and hybrids with desirable traits viz., tolerance to biotic and abiotic stresses.

In order to strengthen the human resource development in these areas university started post graduation programme in Biotechnology and Crop Improvement during 2010. This comprises of Plant Breeding, Biotechnology and Seeds Technology. This has helped in developing novel varieties/hybrids and create employment opportunities besides ensuring the food and nutrition security. The syllabus and research programme is designed to suit to both private and public crop improvement and seed technology institutions.

**Vision :** Address food and nutritional security challenges.

#### **Mandate**

- Collection, conservation and documentation of genetic diversity existing in different horticultural crops
- Strengthening of tissue culture research and development
- Research, production and supply of high quality seeds and planting material of different horticultural crops
- Marker assisted breeding in horticultural crops
- Development of skilled plant breeders and biotechnologist at master level to meet the public and provide sector demand

- Training and entrepreneurial development, advisory consultancy to farmers, extension functionaries.

### Objectives

- Development and introduction of high yielding varieties and hybrids in different horticultural crops.
- Establishment of gene banks and mother blocks of different fruit crops.
- Identification and development of traits specific markers for different crops.
- Finger printing of the varieties and hybrids
- Development of tissue culture protocol for different horticultural crops
- Characterization and registration of different land races of horticultural crops at PPV& FRA ,New Delhi
- Skill oriented hands on training programme to master's students.
- Consultancy services to farmers in person, phone and field visits.

### Statistics of student profile of master degree programme

Year of Admission	Admitted			Dropped			Passed			Degree award during the year
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	
2012-13	3	2	5	-	-	-	3	2	5	2013-14
2013-14	2	1	3	-	-	-	2	1	3	2014-15
2014-15	2	2	4	-	-	-	2	2	4	2015-16
2015-16	3	1	4	-	-	-	3	1	4	2016-17
2016-17	2	3	5	1	-	1	1	3	4	2017-18
2017-18*							-	-	-	2018-19
Grand Total:	12	9	21	1	-	-	11	9	20	

\*During 2017-18, Dept of Biotechnology and crop improvement was separated into Genetics and Plant Breeding and Plant biotechnology. Hence separate Masters degree programmes were planned only at Bagalkot and Bangalore colleges. However, realizing the importance and necessity, these PG programmes have been started against KRCCH Arabhavi from 2018-19.

### Details of Fellowships/ Scholarships to PG students (2013- 14 to 2017-18)

Scholarship Type	M.Sc.(Hort.)				
	2013-14	2014-15	2015-16	2016-17	2017-18
Merit Scholarship	2	2	2	2	1
Students Aid fund	-	-	-	-	-
Category I EBL Scholarship	-	-	-	-	-

SC/ST Fellow Ship	1	-	-	1	1
GOI Scholarship (SC+ST)	-	-	-	1	1
Vidyasiri food & Accommodation	-	4	5	6	-
Muslim Minority	1	1	-	-	-
<b>TOTAL</b>	<b>4</b>	<b>7</b>	<b>7</b>	<b>10</b>	<b>3</b>

## 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	-	2	-	-	1	-	-	-	-	-	-	-	-	-	-
Associate Professor	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-
Assistant Professor	5	4	1	5	4	1	5	5	-	5	5	-	5	5	-
<b>Total</b>	<b>5</b>	<b>7</b>	<b>1</b>	<b>5</b>	<b>6</b>	<b>1</b>	<b>5</b>	<b>5</b>		<b>5</b>	<b>5</b>	<b>-</b>	<b>5</b>	<b>5</b>	<b>-</b>

S-Sanctioned, F-Filled, V-Vacant

### Faculty Strength (Department wise, 2017-18)

Department of Biotechnology and Crop Improvement.	Sanctioned Faculty			Faculty in place			Vacant position			Recommended by ICAR			Diversion 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.
Biotechnology and Molecular biology	0	0	1	0	0	2	0	0	0			1	0	0	-1
Genetics and Plant Breeding	0	0	1	0	0	2	0	0	0			1	0	0	-1
Seed Science and Technology	0	0	1	0	0	1	0	0	0			1	0	0	0
Crop Physiology	0	0	1	0	0	1*	0	0	0			1	0	0	0
Biochemistry	0	0	1	0	0	0	0	0	0			1	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>0</b>			<b>5</b>	<b>0</b>	<b>0</b>	

Negative Value in Diversion from ICAR=Excess staff, Vacant positions in Asst. Professor are filled on Contractual service/Adjunct/Working arrangement

- Crop physiology courses are offered by the faculty from UHS, Bagalkot on working arrangement.
- Biochemistry courses are also offered by faculty from Biotechnology and molecular biology of KRCCH, Arabhavi.

### Faculty from other colleges/ stations

SI No	Faculty	Number	Source College/station/unit
1.	Assistant Professor of Crop physiology	1	Central examination Unit ,UHS Bagalkot

### 6.4.3 TECHNICAL AND SUPPORTING STAFF

Sl. No.	Designation	Sanctioned	Filled	Vacant	Recommended by ICAR	Deviation from ICAR recommendation
1.	Lab Assistant	01	01	-	01	-
2.	Field Assistant	01	-	01	01	-
3.	Messenger	01	01*	-	01	
4.	Farm labour	01	01*		01	
	Total	04	03	01	04	

\*on contractual basis

### 6.4.4 CLASSROOMS AND LABORATORIES:

Department has one PG class room and five laboratories as detailed below. Seminars are conducted in common seminar Hall.

#### Classroom

Sl. No.	Class room No.	Area (M <sup>2</sup> )	Seating capacity	Other facilities (LED, Projectors, Computers, Smart board etc.)
1.	Biotechnology and Crop Improvement	32	25	LED, Projectors, Computers ,
2.	Seminar Hall*	120	80	LED, Projectors, Computers, Digital podium

\*Common seminar hall to all the PG departments

#### PG Laboratory

Sl. No.	Name f the laboratory	Area (M <sup>2</sup> )	Seating capacity
1.	Biochemistry	257.25	50
2.	Crop physiology and Seed Technology	112.50	50
3.	Genetics and plant breeding	105.30	45
4.	Biotechnology	108.00	50
5.	Central Lab*	80.00	15

\*Common central to all the PG departments

#### Common laboratory/ facilities

Sl. No.	Name f the laboratory	Area (M <sup>2</sup> )	Seating capacity
1.	English digital lab	72.80	30
2.	Computer Science	72.80	30

#### Major equipments

Sl.No.	Particulars	Quantity
1.	PCR machine SC 300 G	1
2.	Digital vernier caliper 150mm	1
3.	Sukam Battery	1
4.	Chemical racks with plugs	2
5.	Deep freezer blue star	1
6.	Krishimitra trolley	1



Sl.No.	Particulars	Quantity
7.	Horizontal Electrophoresis maxi	1
8.	Horizontal Electrophoresis mini	1
9.	All glasses double distillation unit	1
10.	Power supply for double distillation unit	1
11.	Binocular microscope	2

### Farm facilities

The college has total area of 50.40 hectares, out of which 28.82 hectares are available for cultivation, which is distributed among different departments. All the fields are well connected with approach roads and internal roads. Entire farm is irrigated by Ghataprabha left bank canal apart from number of open wells. The detail of farm facilities available in the department are given below.

Sl. No.	Name of the Department	Farm Area (ha)	Irrigated / Non-irrigated (ha)	Crops grown
1.	Biotechnology and Crop Improvement	3.00	3.00	Onion, chilli, tomato amaranthus, methi, garlic, turmeric, cluster bean brinjal, banana, chrysanthemum

### Poly house and Shade nets

Sl. No	Particulars	No.	Area (M <sup>2</sup> )	Details	Remarks
1.	Biotechnology and crop improvement				
	Poly houses	3	580.00	Hardening of tissue culture plants	
	Shade nets	3	668.00	Population development and maintenance of gemplasm	

Department has adequate class rooms, laboratories and farm/field facilities to plant plan and implement PG research and to carry out postgraduate degree programme most effectively.

### Average Number of Students in Theory and Practical Classes

Postgraduate students as they are less in number are grouped into one theory batch and one practical batch.

Sl. No.	Name of the department	Theory Batch	Practical Batch
1.	Biotechnology and Crop Improvement	Full strength	Full strength

### 6.4.5. CONDUCT OF PRACTICAL AND HANDS-ON-TRAINING

Course curriculum for PG has been designed with special emphasis on specialized horticultural techniques. The students are specifically guided in relevant fields of knowledge. The courses in PG have been framed to include more of research oriented lab and field

experiments. PG students are thoroughly exposed to specific and need based hands-on trainings and they are trained to review, plan and formulate the research programmes under the guidance of advisory committee.

### Practical Credit details

Sl.No.	Discipline	Number of credits for practical	Per cent of time spent	
			In laboratory	In field*
1.	Biotechnology and Crop Improvement	10	50	50

### Glimpses of Practical's and hands-on training

Sl.No.	Department	Hands on Training and Methodology
1.	Biotechnology and Crop Improvement	Emasculation and crossing techniques in different horticultural crops Establishment of Crossing blocks for different crops Determination of mode of pollination Floral biology of horticultural crops Varietal and Hybrid development techniques Field layout and maintenance of experimental records in self and cross pollinated crops. Variation in segregating generations Mutagen treatment and Mutational studies Mitosis and Meiotic slide preparation and observation Micro propagation of important crops Exposure to Marker assisted breeding techniques Bimolecular analysis- nutrient analysis Hands on training on tissue culture and hardening of TC plants Seed viability test, vigor test, seed dormancy and breaking methods, seed priming methods Use of growth regulators Preparation of charts Visit to the certified seed production plots, processing unit, storage unit, KSSC, KSSOCA, STL and private seed company. Visit to tissue culture and seed production units. Visit to horticultural research stations.

Further as a part of course curriculum, the PG students are taken to exposure visits to different research institutes, progressive farmers' field and private industries. A study tour of seven days to different research institutes and commercial hubs specifically engaged in particular research field is arranged every year which is contributing for better understanding of the subject and to enrich their practical knowledge.

### 6.4.6. SUPERVISION OF STUDENTS IN PG/PHD PROGRAMME

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 20 M.Sc. students have passed out from the Department of Biotechnology and Crop Improvement, KRC College of Horticulture, Arabhavi from 2013 to 2018. Research work was carried out by students on the major crops which are grown in this area.

Sl. No.	Year	No. of PG recognized teachers			Intake of students			Student to teacher ratio
		KRCCH, Arabhavi	Off Campus	Total	M.Sc.	Ph.D	Total	
1.	2013-14	02	01	03	03	02	03	1:1
2.	2014-15	04	00	04	04	00	04	1:1
3.	2015-16	00	03	03	04	00	04	1:1
4.	2016-17	03	01	04	04	01	05	1:1
5.	2017-18	05	01	06	00	00	00	1:0

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

Sl.No	Feed back	Action taken
<b>Students</b>		
1.	Felt the need for more advanced software's / programmes for research data analysis	Advanced statistical programs like Windowstat, Design, Spar1, SPSS have been installed for the benefit of the PG students.
2.	PG Research along with financial assistance	University is providing Rs 2000 financial assistance to all admitted PG students along with 20000 research grant. Most of the students are getting vidyashree scholarship from state government. Some of the staff research projects are given as PG research along with assistance.
3.	More exposure of Marker assisted selection	Established separate molecular biology lab and central laboratory facilities are being used to give more exposure.
4.	Exposure visit to PG students to progressive/ awardee farmers fields to enrich the practical knowledge on implementation of SAU's/ ICAR Institutes / farmers innovative technologies.	Exposure visits PG students are being made to Progressive and award winner farmers, Rohin Biotech, Mahalingapur
5.	Dress code for PG students	Dress Code for PG students has been implemented from 2017-18
<b>Students and Parents</b>		
1.	Personality development programmes to students	The personality development programmes conducted for PG students are as follows : Workshop on preparation to competitive examination on 16.02.2016. Sri. Nirbayanand Saraswathi Swamiji, Ramakrishnashrama, Gadag delivered guest lecture on Role of youths for retaining Indian Culture
<b>Employer</b>		

Hon. Vice-Chancellor, UHS, Bagalkot		
1.	Implementation of Interactive PG seminar for PG students	Interactive PG seminars for PG students were organized at University of Horticultural Sciences, Bagalkot in 2016 and 2017
Farmers		
1.	Farmers demand for tissue culture banana plants	Mass multiplication lab has been established and plants are being distributed to needy farmers at reasonable price.

#### 6.4.8. STUDENTS INTAKE AND ATTRITION IN THE PROGRAMME FOR THE LAST FIVE YEARS

Year wise information on sanctioned strength, actual intake and attrition during the last five years of the Degree Programme are furnished in the tabular form. This attrition is due to appointment in State govt. jobs and also in banking and other sectors.

SI No	Year	Sanctioned seats	Actual intake	Attrition	Attrition Percentage
1.	2012-13	5	5	0	0
2.	2013-14	3	3	0	0
3.	2014-15	4	4	0	0
4.	2015-16	4	4	0	0
5.	2016-17	5	5	1	20
6.	2017-18	-	-	-	-

#### 6.4.9. ICT APPLICATION IN CURRICULA DELIVERY

- 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.
- 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 Biotechnology and crop improvement

S.No.	Name of Lab	Equipment	Usage
1.	ICT Enabled Class Room	1 PG Class room with Computer System and LCD Projector	For educational video, PPT, conferencing, teaching and learning
2.	PG -Computer Lab	16 HP Computers Systems	Statistical software programmes for research data analysis
3.	ICT Enabled Smart Boards	One Smart Board installed in PG class room	Teaching, Learning
4.	ICT Enabled	High Definition CISCO	For online interaction with

S.No.	Name of Lab	Equipment	Usage
	Conference Hall	Camera System with High Speed Internet of 4 Mbps lease Line connectivity	University key officials by students and staff, online interaction with different subject experts in different streams

### **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**


<b>S. No</b>	<b>ICT Application</b>	<b>Usage</b>
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. HortiApp 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, Arabhavi 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

  
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