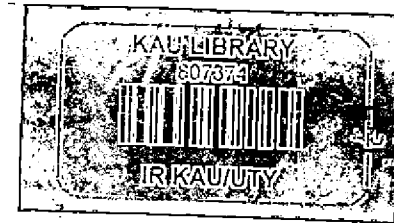


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KERALA AGRICULTURAL UNIVERSITY

VISION-2030



KERALA AGRICULTURAL UNIVERSITY
KAU PO, THRISSUR, KERALA – 680 656

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FOREWORD

The Kerala Agricultural University (KAU), came into existence on February 24th 1971 by the Act 33 of 1971 of the Kerala State Legislature, entitled "The Agricultural University Act, 1971". However, the Kerala Agricultural University became operational only on February 1st 1972 when, the then existing two educational and 21 research institutions administered by the Departments of Agriculture and Animal Husbandry of the Government of Kerala, were brought under the umbrella of KAU for facilitating the sustainable and accelerated development of Agriculture in the State.

The KAU is the primary and the principal instrumentality of the Kerala State in providing human resources, and skills and technology, required for the sustainable development of its Agriculture, defined broadly encompassing all production activities based on land and water, including crop production, forestry and co-operatives by conducting, interfacing and integrating education, research and extension in these spheres of economic endeavour.

With the division of KAU to form new universities of Kerala Veterinary and Animal Sciences University and Kerala University of Fisheries and Ocean Studies during 2010-11, the number of institutions under KAU was reduced to six Colleges, six Regional Agricultural Research Stations (RARS), 15 Research Stations, seven Krishi Vigyan Kendras (KVK) and 16 other units. The University offers diploma, graduate, post-graduate and doctoral programmes in almost all disciplines and specialities related to Agriculture, Horticulture, Forestry, Co-operation, Banking, Management, Agricultural Engineering, Food Engineering and allied sciences through its three faculties (Agriculture, Agricultural Engineering and Forestry), six constituent colleges and 31 departments.

The vision of KAU towards 2030 is to create an enabling environment and institutions of excellence to impart quality higher education in Agriculture and to institute better agricultural research and out reach programmes so as to improve the livelihoods and welfare of the farmers, consumers and other stake holders through growth and sustainability inclusive of social development. The mission mode activities envisaged by KAU are to transform States' agricultural education into a demand-driven efficient system, to provide academic services and high quality output in education, research and extension, to promote centres of excellence, and to provide skilled, analytical and globally competitive human resources to meet the national needs for sustainable and inclusive growth.

This present document is a reflection of the activities envisaged by Kerala Agricultural University towards 2030 which was drafted, edited and documented by Prof. (Dr.) E.V. Nybe, Director (Academic and Post-graduate Studies), who was supported by Dr. P.K. Ashokan, former Director (Acad & PG Studies), Prof. K. Madhavan Nair, Director, Centre for Instrumentation and Information Technology, Director of Research, Director of Extension, Deans and Associate Deans.

I do express my deep sense of appreciation to all those who were instrumental in bringing out this document.

Vellanikkara,
30.04.2013.

Prof. (Dr.) P. Rajendran
Vice-Chancellor
Kerala Agricultural University

PREFACE

The Agriculture in Kerala which is dominated by small and marginal farmers is facing various challenges such as climate change, globalization of trade and economy, etc. The education, research and extension programmes of the university need to be re-oriented to develop technologies that raise the agricultural income and also create employment opportunities in agriculture and allied enterprises. The strategies planned for achieving the goals set up for 2030 by the Kerala Agricultural University are to attract talented students to agricultural education, curriculum improvement, enhancement and strengthening of graduate education, customized learning, non-collegiate education, faculty and employee development, empowerment of outreach programmes and institutional development.

The document “Kerala Agricultural University – Vision 2030” contains the vision and mission of KAU and the strategies to achieve the same. The Vision 2030 of constitutional colleges, Directorate of Research and Directorate of Extension are also furnished separately in this document.

I take this opportunity to place on record by deep sense of gratitude and thanks to the Hon’ble Vice – Chancellor Prof. (Dr.) P. Rajendran for the valuable guidance, advice and suggestions in the preparation of this document. The immense help and support rendered by Dr. P.K. Ashokan, former Director (Acad & PG Studies) in the preparation of the draft of this document is greatly and gratefully acknowledged. My profuse thanks are due to Prof. K. Madhavan Nair who wholeheartedly extended all support and help in editing the document. The timely help and co-operation, by way of valuable inputs received from the Director of Research, Director of Extension, Deans of faculties of Agriculture, Agricultural Engineering and Forestry, Associate Deans of College of Horticulture, College of Agriculture and College of Co-operation, Banking and Management are highly appreciated and acknowledged with gratitude. The secretarial assistance received from Ms. P.K. Babitha, PA to Director (Acad & PG Studies) is also acknowledged.

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KERALA AGRICULTURAL UNIVERSITY – VISION 2030

Introduction

Contribution of agriculture to GDP decreased drastically (from 30% to 14.5%) during the last two decades. So is the case with Kerala. During the last two decades, the average annual growth of agriculture also declined from 6-7% to 3%. However, the population engaged in agriculture has not decreased in commensuration with the decrease in rate of growth. Now also agriculture provides employment to about 52% of the workforce as compared to 61% during 1990-91.

The education, research and extension programmes of the University need to be reoriented to develop technologies that raise the agricultural income and also create employment opportunities in agriculture and allied enterprises.

Agriculture in Kerala is dominated by small and marginal farmers. The average size of land holding is around 0.27 ha. The population density is very high. More and more agricultural lands are converted due to population pressure. Homesteads with 3 -10 cents of land and multistoried flats are coming up in many parts of the state, even in villages. Technology to grow crops in these special situations need to be developed. Precision farming is one of the solutions to this.

The demand for high value foods and processed commodities like fruits and vegetables, other horticultural products, fish, livestock and dairy products is increasing due to the growing population and rising per capita income. The demand of these products, which is growing faster than the demand for food grains, is expected to grow at the rate of 100%.

Challenges

Climate change adaptations

Inter-Governmental Panel on Climate Change (IPCC) has projected that the global temperature is likely to increase by 1.8 to 4.0°C by the end of this century. This may lead to change in pattern of monsoons, floods, droughts, cyclones, dynamics of pests and diseases etc. Producing enough food to meet the increasing demand against the background of changing climate scenario is a challenging task before the agricultural scientist. Agricultural technologies need to be developed to sustain agricultural production adapting to the climate change. This would require increased adaptation, mitigation research, capacity-building, changes in policies and regional as well as global co-operation.

Emerging technologies

Developments in molecular biology, biotechnology, nanotechnology, information & communications technology, geo-spatial technology, etc. are expected to bring new opportunities in productivity enhancement, capacity building and human resource development.

Emergence of agri-business

Conventionally, agri-marketing in India has been unorganized and inefficient, showing 18-25% losses in the entire supply-chain. The corporate sector is entering and investing at different levels in the supply chain, linking production eco-regions with consumers in domestic as well as global markets. Globalization is opening up enormous opportunities for food and processed commodities. The critical issue for agriculture in Kerala is to increase the income of the farmers by avoiding middle – men, by evolving a system to link

front-end activities of agricultural supply – chain with its back – end activities of farm production. There are plenty of opportunities for strong public-private partnership in agricultural research and development as well as for fostering relevant agro-enterprises and technology incubation.

With the globalization of trade and economy, Indian agriculture is facing a number of challenges. Despite the contribution of agriculture to GDP declining from 55% (1950) to 14.5% (2012), it still has an important role in driving national economy as 55% of the population is still dependent on agriculture and it provides raw material to many industries. Agriculture is becoming non-remunerative in many areas and farmers are losing interest in agriculture. With the opening up of world economy, our farmers have to be globally competitive in terms of quality and cost of agricultural produce. The sustainability and profitability of agriculture continues to be our major concern.

Education and human-resource development

With the coming in of IPR, knowledge sharing among different nations has shrunk, necessitating technology development by the scientists within the country itself. This puts enormous responsibility on the National Agricultural Education and Research System to develop technologies indigenously. The technology-led agricultural growth can be possible only by strengthening institutions of higher agricultural education. The ICAR is the apex body of the National Agricultural Research and Education System of the country. It provides professional and partial financial support for enhancing the quality, relevance and uniformity of higher agricultural education in the country. The National Agricultural Education System presently comprises 56 State Agricultural Universities, one Central Agricultural University and four ICAR Research Institutes with deemed-to-be university status. These universities together have 360 constituent colleges and 163 affiliated colleges with an annual intake capacity of about 39,000 and out-turn of about 24,000 students. Besides, there are 103 colleges attached to conventional universities. In order to ensure uniform structure and effective governance in agricultural universities through regulations, ICAR developed a Model Act in 1964 which is revised from time to time. For quality assurance in agricultural education, ICAR established an Accreditation Board in 1996, for a comprehensive process of accreditation of SAUs. ICAR also undertakes periodic revision of course curriculum and academic regulations.

There exists vast scope for improving the standards in academics, university's governance, financial health and policies on human resource development. Several new initiatives have to be taken both at the system level as well as at the individual university/institution level in thrust areas like creating an enabling environment for innovation and creativity, developing systems capacity for educational planning and quality assurance, and developing institutional partnership and networks.

Shifting paradigms

Indian agriculture is presently at the cross-roads. During the 10th and 11th Plans, agriculture growth had been about 2.8% which was below the targeted 4%. Since agriculture growth is a driver of economic growth, it is of paramount importance to propel agriculture growth by use of new technology and strategies. Skilled human resource is a key to addressing new challenges. Globally, technology is changing very fast and in view of the IPR and other trade-related issues coming up-front, it is necessary that a new innovative approach is put in place for producing globally competitive skilled human resources. The skilled manpower should not only develop cutting edge technologies but must also bring about major transformation in agriculture for getting higher economic returns to the farming community with relatively much less investment. Application of new knowledge in science and technology will become prime infuser of sustainable surge in agricultural production and productivity across diverse agro-ecologies of the country. Additionally, regional inequalities in development coupled with rise in natural resource degradation, climate

change, increasing population, opening of global economy have brought affront new daunting challenges. Therefore, these circumstances make it imperative to restructure agricultural education in a manner that it meets the expectations of all stakeholders: employability for students; livelihood security, new knowledge and skills for farmers; and economic growth, meeting international obligations, concerns of sustainability and profitability in agriculture for the country.

Various initiatives taken in the recent past have led to substantial improvement in the quality of agricultural education but the situation is still much below the expectations of the stake holders in many institutions. The pace and quality of technology generation and human capacity building in most of the SAUs have not matched with global change mainly due to lack of a defined vision, inadequate state funding, depleted faculty strength, extensive inbreeding, poor governance, lack of autonomy and environment for nurturing and retaining talent, and dearth of infrastructure for quality education and research. Establishment of new and / or sectoral agricultural universities and colleges without matching resources has compounded the problem. The new challenges faced by Indian Agriculture are formidable and call for development, of a new class of human resource equipped with new skills and knowledge to propel agricultural growth..

Policy interventions

The present day education policy does not address the issue of social relevance in totality. Issues like poverty, gender inequality, malnutrition, sustainability, regional imbalances and focus in economic equity, agri-business, agriculture marketing, value addition, international trade and other related disciplines are not addressed adequately. Agricultural education will have to come out of its past mould of a rigid framework in order to successfully take over the role of continuing education when the education process is adjusted to the needs of landless, marginal and small holder farmers who are generally illiterate and unskilled. Along with sustainable development, the education system needs to be harmonized with existing and emerging issues related to World Trade Agreement, free market economics and new agriculture. The new agriculture is poised to become price competitive and its produce acceptable quality-wise, meet stakeholders needs, peer concerns and market vibes. Greater infusion of frontier science subjects, legal aspects and good practices of trade, ethics of IPR and GMO, and modern information and communication techniques will become more important to promote efficiency, awareness, equity and competitiveness in agriculture. In pursuance of that, development and institutionalization of easily accessible and user friendly knowledge systems to support decision making by various client groups will become necessary.

Universities are starved of operational funds, which affects the quality of academics and the research and development. This situation is further aggravated with the creation of multiple universities in the states, bifurcation or sectoral division of universities and implementation of V and VI pay commission recommendations. Declining quality of students admitted to Agricultural Universities is an alarming trend. Only about 4.5% of students opt for agricultural education and that too not by specific choice. School education does not create orientation or liking for higher agricultural education with the result that quality intake of students to agricultural universities has deteriorated considerably. It is imperative to bring agri-education into the mainstream of education and strictly scrutinize the quality of students admitted to UG programmes in agri-education. The old concept of rural background as a statutory requirement for student's admission is long forgotten. The enforcement of Common Entrance Tests along with medical and engineering sciences has only allowed a large number of urban and sub-urban students with little knowledge or genuine liking of agricultural sciences get admitted to the SAUs.

KERALA AGRICULTURAL UNIVERSITY 2030

Vision

To create an enabling environment and institutions of excellence to impart quality higher education in agriculture; to institute better agricultural research and outreach programmes so as to improve the livelihoods and welfare of the farmers, consumers and other stake holders through growth and sustainability inclusive of social development.

Mission

To transform the State's agricultural education into a demand-driven efficient system, to provide academic services and high quality output in education, research and extension, to promote centers of excellence, and to provide skilled, analytical and globally competitive human resources to meet the national needs for sustainable and inclusive growth.

Strategy

1. Attracting talented students to agricultural education

Students choosing higher education place agriculture as their second, third or even later options. Highly motivated and talented young people from low income families and from remote and / or rural areas are not sufficiently encouraged to get into agriculture. To attract young talented students to agriculture and allied streams, the image and brand value of agriculture must undergo a sea-change. The admission process has to be modified with the introduction of better incentives to those opting agriculture as a career.

The admission process should not rely solely on test scores and school grades but also include the candidate's background of agriculture, values and ethics of vocation. The image of agriculture can further be improved by focusing on developing professional opportunities in production, processing, marketing and supply. Also, vast scope of research and service to mankind can be made as an attractive proposal at +2 levels. Simultaneously, incentives such as specialized scholarships, awards, rewards and future incentives/job security could be introduced to attract talented students to agriculture.

2. Academic reforms & curriculum improvement

Higher education has thus far been largely examination-centered. The end-of-term examination, to a great extent, insulates students from the quest of knowledge, excitement of discovery and joy of learning, and often leads to insensitive cramming up of superficial information. It may hence be more prudent that the assessment of student performance be carried out through a combination of internal and external evaluation where the internal assessment should be a continuous one.

A curriculum reorientation is necessary to enable the future graduates and post-graduates to acquire knowledge, skills, entrepreneurship ability and self confidence. To achieve this, basic reforms in the system are needed which bring in lot of flexibility and new thoughts. Enhancing the practical work and programmes like experiential learning, freedom in PG studies to cross over from one discipline to another to accommodate the new demands put on graduates about complexity of knowledge and skill combination that will require unique subject combinations, free inter-collegiate and inter-university movement, permitting basic science students to enter post-graduate courses of agriculture and allied sciences and altering the focus of curriculum from primary to secondary agriculture.

To achieve the above, the basic model of the current system will have to be altered suitably. For example, the entire degree program can be divided into three segments. The first segment will have to be of two years of common courses imparted to all agricultural and allied sciences students. During the next two years, students will have the flexibility to choose from a basket of degree courses from different streams. Further one year specialization in a specific subject may be introduced to earn a post-graduate degree as an integrated five year post-graduate course.

The system of course work after post-graduation that leads to doctoral degree also needs further improvement with exit options. It is possible to do so by combining the NET system and course work system by offering a M.Phil. degree. The M.Phil degree should also be considered as a part of Ph.D. course work for those wishing to pursue Ph.D. course.

There is need to change the delivery of curriculum and the system of examinations to evaluate the students. The focus in classes and laboratories and other curriculum activities must be student-centered learning through active student participation, in work groups and discussions.

Curricular revision should be a dynamic process where updation or revision to a limited extent should be done every academic year. This should be carried out in terms of current knowledge, national and international developments, and relevance of new ideas, concepts and knowledge to the concerned discipline. Curriculum review at University level shall be done at five yearly intervals at national level with built-in mechanism for frequent updating to meet the challenges of advancing technology or local economic or industrial compulsions.

Short term topical courses for limited semesters may be developed by the faculty within their academic interests and in keeping with the thrust of the programme.

The course curriculum should give emphasis on skills in demand for private sector employment, particularly in areas of value addition, packaging, biotechnology, agro and social forestry, horticulture, animal husbandry and fisheries, scientific storage and transportation of perishable products and on global marketing.

Disciplines of social sciences like economics, agri-business management, marketing and rural sociology, and agricultural ethics and policies need to be emphasized for promoting market driven agriculture.

Agricultural education has not received technological boost due to lack of research in education *per se*. Therefore, an institution should be established to carry out exclusive research to develop educational technologies in agriculture under Indian conditions by studying various models in this regard.

3. Enhancing graduate education

A recent study shows that the existing national agricultural education system produces about 24000 graduates every year while projections indicate that nearly 54000 manpower will be required every year by 2020. The shortfall will be higher in case of rapidly growing sectors such as horticulture, dairy, veterinary, fisheries and agricultural engineering. Student intake has to be appropriately modified to meet this increased demand. So graduate student enrollment has to be enhanced by increasing the size and number of programs for bachelor's/master's degrees. New interdisciplinary programs, departments, and schools (with new faculty, space, and support) can be started to foster enrollment growth. Self-supporting courses should be started so that their economic viability is ensured. Student intake quality can be ensured through providing more stipendiary support, assistantships and fellowships and making more multiyear offers. Returning

part of the income generated to the departments will help overcome resistance to growth. Steps should be taken to further enlarge national and international recruitment.

4. Customized learning

Diversified credit-based degree system should be introduced instead of fixed duration system and credit transferability so as to enhance opportunities of students from rural areas to pursue their academic interests.

The choice-based credit system will provide opportunities for the students to pursue courses according to their needs and aspirations. Inter-institution transferability of students (following completion of a semester), part completion of an academic programme in the institution of enrolment and part completion in a specialized (and recognized) institution, improvement in educational quality and excellence, flexibility for working students to complete the programme over an extended period of time, standardization and comparability of educational programmes across the country, etc. will usher in better student satisfaction.

Initiatives have to be put in place to foster innovative learning methods and customized learning experiences. It is necessary to provide mentoring, individualized advising, and career counseling, so that the best qualified students are attracted to agriculture and the KAU in particular. Customized and experiential curricular models and pathways along which a student can proceed to earn a bachelor's degree have to be expanded. Inquiry based methods which directly connect course concepts but demand active student participation should be expanded.

The Honors Program should be expanded significantly in order to more effectively serve students who now qualify for participation. The emphasis on inter disciplinary and multi disciplinary education has to be increased through the development of inter departmental certificate programs. The certificate programs should roughly follow the requirements for a minor where individual courses may meet more than one requirement.

Experiential learning programs have to be included more broadly in student education. These experiences may include research or creative projects with a professor where refereed publications result; study abroad projects; faculty approved, supervised and evaluated honors or senior thesis projects; internships which have adequate academic content and supervision; Teaching Assistant positions; entrepreneurial initiatives, portfolios of creative work, civic engagement & community service projects or internships with adequate academic focus and supervision, etc. Substantive student engagement in 'hands on' opportunities should be recognized in such a way as to count toward earned degrees, by meeting some major requirements, critical thinking requirement or some elective or ancillary requirements, etc.

5. Non- collegiate education

Education is universally recognized as an important investment in building human capital, which is a driver for technological innovation and economic growth. Human resource development is critical for sustaining, diversifying and realizing the potentials of agriculture. Till recently, the emphasis in the system has been largely on formal education leading to the production of graduates, post-graduates and doctorates. Very little effort has been, thus far, put on generation of intermediary skills at diploma and certificate levels, by promoting diploma level education on the lines of engineering education. This needs urgent attention in view of the expressed preference and requirement of many states and other stakeholders for para-professionals in agriculture. Future demand-driven non-formal education can also be considered in a public-private partnership mode by setting up agricultural training centres. The KAU has already addressed this issue by starting a Diploma in Agricultural Sciences at the Regional Agricultural Research Station,

Pattambi. Starting of agricultural polytechnics at two places in the State is also on the anvil.

India is fast becoming a preferred destination of foreign students for agricultural education because of improved infrastructure and enhanced skills and competencies for meeting new challenges. This is all the more true in the case of Kerala, famous as the God's Own Country with its history of hospitality. Given the right inputs, Kerala has all the potential for becoming an international destination for educational tourism, just as it has become for health tourism.

Raising the financial and other resources required for this cannot be left to be the state's responsibility alone. Recently a policy decision has been taken permitting large business and technology corporates to start technical education institutions. This should be extended to the agricultural scenario also so that there will be greater attraction for private sector to fund S&T and educational initiatives.

6. Faculty and employee development

Improving faculty in terms of strength and competence must be recognized as the key factor for reinforcing the quality in the current education system. Universities should have autonomy for recruitment of the faculty and re-employment of superannuating faculty based on a long term recruitment policy of academic and non-academic staff. The number of Emeritus Scientists/Professors should be increased across the system by the ICAR. Schemes like postdoctoral fellowship, visiting faculty, adjunct faculty and sabbatical leave to supplement the faculty should be introduced. In addition, opportunities for physical exchange of faculty/specialists, creation of necessary infrastructure like video-conferencing facilities that will benefit both the teachers and students, should be created. The concept of "Rolling Faculty" may be adopted by making use of the eminent superannuated scientists/professors. In addition, provision can be made for engaging accomplished professionals from the private sector in academics. Inviting overseas accomplished professors and researchers to Indian AUs and research institutes for varying periods of time for imparting training in frontal areas, interaction on curriculum development, education technology would lead to capacity development of a large number of faculty and students. This will also result in formulation and initiation of research programmes in frontier areas.

Sufficient recognition and incentive schemes should be introduced to augment employee-friendliness. Career advancement policy may be redesigned with realistic performance-based personal and promotional policy. Staff recognition programs should be developed and implemented in order to create a culture of recognition. Programmes aimed at enhancing the quality of life of the employee through work life balance by enhancing child care and schooling services and eldercare support services for dependents of employees should be implemented. Learning support services to expand tuition benefits to employee's family members should be introduced. Housing assistance programs for faculty and staff should be made available more widely and on a meaningful basis.

Campus initiatives related to employee engagement should be furthered. Flexible work options and telecommuting options can be envisioned for potential future use. Succession planning and mentoring programs to assist with retention and professional development of existing staff and to prepare for future workforce challenges should be implemented.

Recognizing that our faculty strengths are low compared to peer institutions and by ICAR norms, budget and resources necessary to increase student-to-faculty ratios where needed should be identified. Staffing requirements should be evaluated and prioritized.

7. Inclusive growth

In spite of the many-fold increase in institutional capacity since independence, the enrolment ratio in agriculture and allied sciences is even now less than 1% of the total enrolment at national level. There is heavy shortfall of availability of qualified agricultural technical human resources in select rapidly growing sectors. These sectors are seen as the future engines of growth that would require substantial manpower to achieve the growth potential. Besides the problem of enrollment in agriculture, there exist a serious regional imbalance, interstate disparity, inter social group imbalances in terms of gender, caste, religion and occupational disparities.

In order to strengthen degree programmes in the emerging and frontier areas of science and technology, fellowships need be earmarked in cutting edge areas. A separate provision of special research grants should be extended for innovative PG research.

Farm graduates need to be empowered by linking production and post harvest technologies in a mutually reinforcing manner. For this, Agricultural Technology Parks can be set up. These Parks will promote technology incubation and dissemination. It will also establish economic viability of new technologies. Such Parks, linked to appropriate public and private sector enterprises from the point of view of marketing arrangements, will help to enhance self-confidence of farm graduates and stimulate them to take up a career of self-employment.

8. Empowering outreach and access

Extension and outreach programmes are the front-end of any institution. They are the images that the public perceive and use to assess the competence and social & public relevance of the institution. They also reflect the brand-image of the institution. So it is necessary to institute appropriate strategies to raise the public image of KAU and maintain its social relevance in focus.

It is proposed to setup an Agricultural Hypermart (Agricultural Mall) so as to act as a Welcome Centre for the public to the KAU. This will provide sufficient U2P (University to Public) interaction. A Central Technology Museum can be setup to serve as a one-stop-shop demonstrating the activities and achievements of the University under one roof. Additional Krishi Vigyan Kendras can be started so as to enhance the technology interfacing with the farmers and the public in general. Setting up an International Research and Development Institute for Human Resources in Farm Sciences is proposed to develop human resources in agricultural technology.

Programs involving the university, alumni, business and the community should be developed so that collaborative interactions increase. Faculty and external constituent groups should partner to develop online learning opportunities for professional development and lifelong learning. The University staff should review local demographic and market trends relevant to providing lifelong learning and non-credit personal enrichment programs. Professional development programs that serve both local and global workforce needs can be developed in consultation with faculty, students, parents, community members and staff. We should work with the Alumni Associations to provide professional development programs to KAU alumni. Solutions for adult learners who wish to undertake non-collegiate learning can be implemented for an online certification program. A Centre for Continuing Education & Lifelong Learning can be instituted to cater to this. New technologies and media have to be developed to enhance lifelong learning. Activities targeted at acquisition, discovery and application of knowledge should be encouraged.

Support to high school students should be enhanced so as to foster 'continuity to college' by exposing

middle and high school students to agricultural higher education through focused learning experiences. Finishing schools for VHSE students should be taken up on a large scale so as to broad-base agriculture among the school-student community. Programmes aimed at enhancing teacher competency at school levels should be taken up. These will help attract better students to agriculture through a catch-them-young approach.

9. Institutional development

In order to make the University globally competitive in terms of availability of state-of-the-art infrastructure and highly qualified trained faculty, excellent research, teaching and learning facilities, student amenities and adequate financial support have to be provided.

A comprehensive space planning and strategic capital planning has to be implemented at the institutional level. With the increasing pressure on land availability, space allocation and utilization planning assumes top-most priority. Capital planning should be continuously integrated with strategic planning, master planning, academic planning and staffing plans.

Space planning should encompass lecture halls, classrooms, laboratories, office space for faculty, students and staff, transportation & parking and common areas. Architectural designs should be capable of making denser and more optimal use of space possible and student housing should be constructed on a denser scale.

Environmental sustainability should be established as a central value of the University regarding infrastructure facilities, transportation, etc. Principles of sustainability should be incorporated into the Campus Master Plans and all building and renovation projects. All institutional infrastructures should comply with energy efficiency standards and carbon footprint reduction. Automobile congestion in the campuses, which is bound to grow, should be dealt with through adequate planning of consolidated parking and transportation programs and services. Water availability sustainability, which is going to be the biggest problem of the immediate future, has to be very systematically dealt with and tackled properly.

The feasibility of constructing studio and/or video conferencing spaces to facilitate distance learning, teleconferencing, and streaming of academic content has to be explored. A capital fund for needed investments in information and communication technologies has to be setup. Library facilities and collections reflecting best practices appropriate to a premier, flagship University have to setup.

University employment and business advisory services and promotion centers with a single window concept for generating awareness for self employment opportunities in agriculture and allied sciences have to be started. Centers of Excellence need to be established in new and cutting edge areas at selected locations. Three pronged strategy i.e. transformation of existing institutions, creation of new institutions and networking of all institutions must be done ensuring a regional balance.

KERALA AGRICULTURAL UNIVERSITY AT A GLANCE

Academic Programmes

Among the three faculties (Agriculture, Agricultural Engineering and Forestry), six constituent colleges (three for Agriculture, one each for Agricultural Engineering, Forestry, and Cooperation, Banking & Management), one Academy of Climate Change Education and Research and 31 departments, the University offers graduate and post-graduate programmes at Masters as well as Doctoral levels, in almost all the disciplines and specialties related to agriculture, horticulture, forestry, co-operation & banking, agricultural engineering and allied sciences. The new faculty of Forestry was established during 2012.

The five undergraduate programmes offered are,

- B.Sc. (Hons) Agriculture
- B.Sc. (Hons) Forestry
- B.Sc. (Hons) Co-operation & Banking
- B.Tech. Agricultural Engineering and Technology
- B.Tech. Food Engineering

In 27 disciplines, the University offers seven post-graduate programmes leading to Masters' degree in,

- Agriculture
- Horticulture
- Forestry
- Agricultural Statistics
- Co-operation and Banking
- Home Science (Food and Nutrition)
- Agricultural Engineering and Technology

The University also offers M.Sc. Integrated programme of five year duration in,

- Biotechnology
- Climate Change Adaptations

and MBA programme is offered in,

- Agribusiness management

Doctoral programmes are offered in 25 disciplines leading to Ph. D degree in,

- Agriculture
- Horticulture
- Forestry
- Home Science (Food and Nutrition)
- Co-operation and Banking
- Agricultural Engineering and Technology

The University also supports NCC and NSS programmes as part of its obligation to instill discipline, sense of patriotism and social sensitivity and commitment in students. The NCC unit in the Forestry faculty is unique, as it is a part of the curriculum. In all colleges, the NSS units are functioning actively doing commendable social work.

The various degree programmes offered by the University are given below:

Under graduate and Post graduate programmes offered by different faculties

Name of the College	Degree programmes offered	
	Under graduate	Post graduate
Faculty of Agriculture College of Agriculture (COA), Vellayani	B.Sc. (Hons.) Ag.	M.Sc.(Ag), M.Sc.(Hort), M.Sc. (FS & N) and Ph.D M.Sc. (Integrated) Biotechnology
College of Horticulture (COH), Vellanikkara	B.Sc. (Hons.) Ag.	M.Sc.(Ag), M.Sc.(Hort), M.Sc. (FS & N), M.Sc. (Ag. Stat) and Ph. D
College of Agriculture (COA), Padannakkad	B.Sc. (Hons.) Ag.	M.Sc.(Ag)
College of Forestry (COF)* Vellanikkara	B.Sc. (Hons.) Forestry	M.Sc. (Forestry) and Ph. D
College of Cooperation, Banking and Management (CCBM), Vellanikkara	B.Sc. (Hons.) C&B	M.Sc. (C&B), Ph. D and MBA (Agri-business Management)
Academy of Climate Change Education and Research (ACCER), Main Campus, Vellanikkara	Nil	M.Sc. (Integrated) Climate Change Adaptations
Faculty of Agricultural Engineering		
Kelappaji College of Agricultural Engineering & Technology (KCAET), Tavanur	B.Tech. (Ag. Engg.) B.Tech. (Food Engg.)	M.Tech. (Ag. Engg.) and Ph.D.

*New Faculty from 2012

Student enrolment

Every year the University admits, a maximum of 657 students: 355 under- graduates, 154 Masters and 58 Doctorates (Ph D). On an average, the University has around 2000 students on its rolls, of which girl students constitute nearly 75 percent. The intake capacity of the students to the various degree programmes at the time of inception of the programme in the different faculties and the current year are given hereunder:

Intake capacities for the different degree programmes

Faculty	Degree programme	Annual intake capacity	At the time of inception During 2011-2012
Agriculture	B.Sc. (Ag.) / B.Sc. (Hons) (Ag.)	50	209
	B.Sc. (Hort)*	20	Discontinued
	B.Sc. (Forestry) / B.Sc. (Hons) (Forestry)	15	30
	B.Sc. (C & B) / B. Sc. (Hons) (C&B)	40	46
	M.Sc. (Ag)	30	100
	M.Sc. (Hort)	16	20
	M.Sc. (Ag. Stat.)	8	4
	M.Sc. (F.S. & N)	4	8
	M.Sc. (Forestry)	5	13
	M.Sc. (C & B)	4	6
	M.Sc. (Integrated) Biotechnology	20	20
	M.Sc. (Integrated) Climate change adaptation	20	20
	Ph.D Ag	2	30
	Ph.D Hort	8	8
	Ph.D Forestry	5	5
	Ph.D Rural marketing	2	2
	Diploma in Agriculture	30	50
PG Diploma in solid waste management	10	10	
Agricultural Engineering	B.Tech. (Agrl.Engg.)	34	46
	B.Tech. (Food.Engg.)	30	30
	M.Tech. (Agrl.Engg.)	10	15
	Ph.D Agrl. Engg.	3	3

* Course discontinued from 1980-81

Out-turn of students from 2002-2011

Degrees	2002	'03	'04	'05	'06	'07	'08	'09	'10	2011
Faculty of Agriculture										
B.Sc. (Ag)	163	171	173	127	67	129	219	185	113	126
B.Sc. (Forestry)	11	17	16	11	11	17	16	19	20	19
B.Sc. (C&B)	46	31	30	11	11	39	43	55	35	31
M.Sc. (Ag)	78	50	48	39	44	23	44	38	17	39
M.Sc. (Hort)	40	17	16	17	18	7	20	4	5	8
M.Sc. (FS&N)	19	11	5	7	7	4	11	4	4	10
M.Sc. (Forestry)	2	3	2	2	2	2	2	3	3	3
M.Sc. (C&B)	2	3	2	2	5	1	4	2	2	-
M.Sc. (Ag. Stat.)	3	1	-	-	1	1	-	2	-	-
MBA (ABM)	-	-	-	-	-	-	-	2	30	27
Ph.D. (Agriculture)	22	23	18	19	9	5	15	6	9	8
Ph. D. (Horticulture)	2	3	5	9	9	2	2	4	-	3
Ph. D. (FS & N)	-	1	-	1	3	-	1	1	1	-
Faculty of Agricultural Engineering										
B. Tech. (Ag. Engg.)	30	35	26	40	38	39	32	41	43	39
M.Tech.	-	-	-	-	2	-	-	2	11	-

Present status of the institution

The Kerala Agricultural University is a State Agricultural University, recognized by the UGC and accredited by the ICAR since 2007. The accreditation expired on 12.07.2012.

Accomplishments and laurels

- Performance Award of ICAR: Continuously for six years (2006, 2007, 2008, 2009, 2010 and 2011) of which the last five are national first places
- “Sardar Patel Outstanding Institution Award of the ICAR” during 2004
- Best teacher award of ICAR
- More than 25 achievement awards
- Many Jawaharlal Nehru Awards of ICAR for best Ph D theses
- Over the last five years , KAU scientists won more than 20 best paper awards and many Young Scientist Awards

Every year the University admits, a maximum of 657 students: 355 under- graduates, 154 graduates (Masters) and 58 Doctorates (Ph D). On an average, the University has around 2000 students on its rolls, of which girl students constitute nearly 75 percent.

The University admits the students to UG programmes through the Commissioner of Entrance Examinations, Government of Kerala, based on the rank obtained in common entrance examination, their option and rules of communal and special reservations

There are two non-degree granting programmes viz, Diploma in Agricultural Sciences (DASc), offered at the Institute of Agricultural Technology & Regional Agricultural Research Station, Pattambi and PG Diploma in Solid Waste Management, offered at the College of Agriculture, Vellayani, Thiruvananthapuram.

ACADEMIC INSTITUTIONS

1. COLLEGE OF AGRICULTURE, VELLAYANI, THIRUVANANTHAPURAM

The college has a total area of 215.68 ha of which 79.23 ha portion is upland and the remaining 136.45,ha lowland. The tract is blessed with the fresh water lake of "Vellayani" which serves as the major source of water for domestic as well as irrigation purposes. The college had initially only seven departments viz. Agronomy, Agricultural Botany, Agricultural Chemistry, Agricultural Entomology, Plant Pathology, Agricultural Engineering and Animal Husbandry. Now there are 20 departments functioning in the College.

Other establishments functioning in the college are the Regional Agricultural Research Station (Southern Region), Instructional Farm and Training Service Scheme. For the smooth and effective conduct of teaching, research and extension activities, several academic bodies like College council, Academic cell, Technical cell, Placement cell etc. are also constituted. The other academic facilities available in the institution are college library with internet and e-resource facility, and the soil, crop, fodder and medicinal plants museums. The institution is also equipped with a central instrumentation laboratory, bio-control laboratory, pesticide residue laboratory, plant virus indexing laboratory, micro-herbicide laboratory, nematology laboratory, molecular biology laboratory and an agro-meteorology unit.

Academic infrastructure facilities (existing)

- 1. Soil museum & documentation centre:** Sixteen reference soils from different locations representing various agro ecological zones of the state have been collected and their macro-monoliths are exhibited in the museum.
- 2. Crop museum:** The crops raised in the crop museums include Cereals and millets, Pulses, Oil seeds, Tuber crops, Spices and condiments, Narcotics & Beverages, Vegetables including cool season vegetable crops like cabbage, cauliflower, carrot, green peas etc, Fruit crops, Green manure crops & cover crops, Fibre crops like cotton, jute, Sugar cane and Medicinal plants including tulsi, thippali, kacholam, panikoorka, neelayamari, chittaratha, adalodakom, kashurivenda, malavazha, kalluvazha, kattarvazha and ornamental crops.
- 3. Medicinal plants museum:** The Department of Horticulture is maintaining a museum of medicinal plants which serves as teaching cum demonstration unit for academic as well as for extension purpose.
- 4. Central Instrumentation Laboratory:** The laboratory possesses sophisticated instruments like UV-VIS spectrophotometer, Atomic absorption spectrophotometer, refrigerated centrifuge, microcontroller based flame photometer, Deep freezer, Ion Trace Analyzer, Petrological microscope, Microwave digestion system etc.
- 5. Pesticide residue laboratory:** The laboratory is equipped with instruments like Gas chromatography (GC), High Performance Liquid Chromatography, GCMS for detecting pesticide residues at nano level.
- 6. Plant virus indexing laboratory:** A plant virus indexing laboratory is effectively functioning to cater to the needs of students, faculty and public.
- 7. Nematology laboratory:** Laboratory is functioning to formulate effective nematode management strategy mainly in rice, banana, vegetables pulses, oil seeds, spices and aromatic and medicinal plants.
- 8. Molecular biology laboratory:** The laboratory is well equipped with sophisticated equipments for facilitating successful conduct of research in the field of molecular biology.
- 9. Livestock and Poultry farm:** The major purpose of the farm is to impart training to B.Sc. (Hons) Ag. students. It is also used for giving practical training to the trainees from College of Veterinary and

Animal Sciences and farmers undergoing training programmes organized by the College. The farm maintains on an average 60 crossbred animals which include calves, heifers, milch animals and breeding bulls. The average annual milk production comes to 40,000 litres. About 300 to 350 birds are maintained in the poultry unit.

10. Biocontrol unit: This unit has commercialized the microbial cultures developed in the unit.

11. Agromet unit: As part of the national programme on Agro-meteorological Advisory Services, Agrometeorological Advisory Bulletins are issued.

Education

The college offers B.Sc (Hons) Ag., M.Sc and Ph.D degrees in agriculture and allied subjects. Apart from the students of Kerala, students from other parts of India also seek admission here through ICAR quota.

Degree programmes:

Sl. No.	Title of the programme
1	B.Sc. (Hons) (Ag.)
2	M.Sc.(Ag.)
3	M.Sc. (Hort.)
4	M.Sc. Home Science (FS & N)
5	M.Sc. (Integrated) Biotechnology

Students strength:

Programme /Courses	Intake capacity
Bachelor's Degree	
B.Sc. (Ag.)	59
B.Sc. (Hons) Ag.	59
Masters' Programme	
Agronomy	6
Agricultural Entomology	6
Agricultural Extension	6
Agricultural Microbiology	2
Home Science	4
Horticulture	8
Plant Breeding and Genetics	5
Plant Biotechnology	4
Plant Pathology	6
Plant Physiology	2
Soil Science and Agriculture Chemistry	4
Ph. D Programme	
Agronomy	2
Agricultural Entomology	2
Agricultural Extension	2
Home Science	2
Horticulture	4
Plant Breeding and Genetics	3
Plant Pathology	2
Soil Science and Agriculture Chemistry	2

Student's achievements:

Year	JRF	Management studies	Higher studies	Bank/ LIC/ NGO's	ARS/IFS	Fellowships
2004	4	4	4	6	1	2
2005	4	3	4	10		3
2006	3	3	4	5	1	1
2007	4	6	10	7	2	2
2008	4	5	12	6	4	5
2009	30	4	26	5	1	7

Library resources:

Internet facility is available through BSNL connection from 1998 onwards. A KU Band Very Small Aperture Terminal (VSAT) connection was established under the Agricultural Research Information Service (ARIS) project of the ICAR. Later on this was replaced with the high speed connectivity under the NMEICT programme of the MHRD. The campus network for the Internet has been established. The library offers a LAN facility for accessing in-house databases and CD-ROMs of major agricultural databases. Photocopying facility is also available in the library. .Book bank scheme

Services:

- Current Awareness Service (CAS) & Selective Dissemination of Information Service (SDI)
- Full text journal article services: Full text articles from 148 foreign journals (e- journals) in Biological and Agricultural sciences are made available through *sciencedirect.com*.
- Broadband Internet connectivity and LAN: Internet connectivity in the entire campus through LAN at a bandwidth speed of 20 mbps is provided from the Library
- Internet facility for students / Access to e-resources: Eight terminals are available solely for students for Internet browsing in the ARIS room of the Library.
- Video Conferencing Facility: A video conferencing room with video conferencing facility started during 2008. At a time 30 participants can be accommodated in this room. This room is also furnished with LCD for presentation.
- Scanning facility:
- CD ROM database searching services: Agricultural databases like CABI, ARICOLA, and Plant Gene are available in CD ROM
- OPAC services: A) OPAC service available through SOUL software B) inhouse databases of books (AGLIB), bound volumes of journals (AGLIP) and theses (AGLIT) are available in CDS/ ISIS software.
- Assistance to Teaching
- As part of PG academic programme, classes for PG students covering IT and Library & Information Science is conducted by Library professionals under- 601 Research Methodology.
- IT @ Agri- Campus
- Computer literacy programme (CLP) and computer awareness programme (CAP) for labourers and non teaching staff respectively for the entire campus was successfully implemented during 2007 in the library.
- Book Bank Scheme (General), Book Bank Scheme SC and ST

Learning resource	Number
Books	27268
Current Indian journals	42
Bound volumes	5062
Theses	1437
Annual Reports	150
CD ROMs	230

Campus selection

Year	Firm	Placement
2005	SBI, Asst. manager	11
2006	HDFC Bank	5
	IITM-K	3
2007	IITM-K	4
2008	IITM-K	3
	Horticulture Mission	10
	KILA	3
	COIR Res. Institute of India	1
2009	Union Bank of India	7

Vision 2030

The major vision of this institution is to reorient education, research and extension activities to meet the challenges of sustainable agriculture and food security of the State and to transform agricultural graduates from the present status of job seekers to job providers. It also envisages to inculcate creative leadership in students to equip them to take up newer challenges in the next decades in order to make India a powerhouse of knowledge based economy. To fulfill this vision the programme in following fields need more thrust, new dimensions and revamping. Out-sourced research projects can also be taken up, for which we have to think globally.

Education

The science and technical education through the empowerment of human resources brings direct impact on development of nation. Educational programmes need modification by starting distant education courses by harnessing tools of information technology, non degree training programmes based on market preferences and job oriented courses on self financing mode. Under graduate and post graduate curricula will have a shift in priority with more thrust to following aspects.

- Agri business management
- Agro-based industries
- Applied Microbiology and microbial inoculant technology

- Apiculture
- Biotechnology for crop disease management
- Biotic stress management
- Crop management for reducing pollution hazard
- Concepts in crop production
- Eco-friendly management of plant diseases and pests.
- Extension plant pathology
- Farm planning and budgeting
- Homestead farming and integrated farming system
- International agriculture with reference to the World Trade Agreement, Trade Related Intellectual Property Rights and Global conventions on climate , biodiversity and desertification
- Income generation ventures in Animal Husbandry
- Land and Water use planning
- Market Management (Agricultural Import Export Policy of Govt. of India)
- Micro-irrigation
- Modern techniques for improving crop production
- Natural Resource Economics
- Natural resource management
- On- farm water management
- Post harvest pathology of fruits and vegetables
- Precision Farming
- Production of export oriented crops
- Quality seed production
- Renewable Energy management
- Seed technology
- Sericulture
- Nematology
- Veterinary hospital management and farm assistance
- Water harvesting techniques for sustainable crop production
- Watershed management
- Women technological Empowerment
- Bio- Statistics in Agricultural science

Research

Crop Improvement

- Strengthening collection, conservation and utilization of germplasm of important crops of Kerala
- Intensification of breeding programmes in rice, plantation crops, vegetables, fruits, pulses, oilseeds, tuber crops, spices, medicinal and aromatic plants and flower crops at the regional level
- Strengthening of research to develop new crop varieties suited for organic farming
- Development of transgenic crops with resistance to biotic and abiotic stresses, quality improvement and shelf-life enhancement.
- Establishment and maintenance of a gene sanctuary with identified useful genes and promoters for use in plant breeding programmes.
- Breeding better varieties for improved value addition in pepper, ginger, mango ginger, turmeric and other annual spice crops for both dehydrated and fresh products

- Group management approach for assuring timely availability of quality seeds/planting material of improved varieties of major crops of Kerala
- Producing quality breeder seeds, foundation seeds, certified seeds and labeled seeds of major crops of Kerala

Crop Production

- Boosting rice, vegetable, fruits, tuber and fodder production under the food and nutritional security programme and bridging yield gaps.
- Eco-friendly natural resource optimization in the homesteads of Kerala.
- Precision farming in varying resource potential and constraint situations for sustaining land quality and crop productivity.
- Scientific exploitation of organic amendments for sustaining crop productivity.
- Organic carbon sequestration to sustain soil health and crop production.
- Cataloguing, phyto-chemical characterization, digitization and conservation of indigenous medicinal plants of Western Ghats of Kerala
- Introducing hi-Tech farming techniques including high-density/close-spacing plantation, canopy management, protected cultivation, integrated nutrient and water management (INWM) and Integrated Pest Management (IPM) for improving productivity of major crops of Kerala.
- Exploiting the potentials of under-utilized and unexploited species and types particularly in the case of tuber crops tropical herbal spices, medicinal and aromatic plants.
- Exploiting Cyberspace and Use of information technology for developing commercially viable computer programming on geographical information system (GIS), remote sensing, crop modeling, expert system and precision farming to optimize crop management strategies in accordance with weather parameters, forecasting occurrence of diseases and insect/pest incidences, genetic diversity, etc in major crops.
- Developing organic farming package for major crops of Kerala.
- Standardization of Good Agricultural Practices (GAP) for important crops, especially medicinal plants.
- Rain water management under different agro ecosystems with emphasis on rainfed situation.
- Wetland conservation programmes
- Developing fertigation techniques to save water and nutrients in plantation and other crops.
- Exploring the possibilities of protected cultivation in export oriented crops such as vegetables and cut flowers.
- Value addition of agricultural products and byproducts through post harvest management (PHM) and processing
- Initiating and strengthening research on fermentation technology, solid waste management, bioremediation and developing microbial consortium for crop nutrition and protection.
- Disaster management
- Development of production models for various agro ecological regimes
- Development and use of farm machinery for crop production, protection, harvesting both under upland and wetland conditions

Crop Protection

- Basic and applied research in the field of pest and disease management of crops with emphasis for eco friendly techniques

- Establishment of a plant disease museum and herbarium
- Establishment of fungal culture collection centre
- Maintenance of Audio visual/electronic database of important plant diseases
- Strengthening of the Virus indexing lab
- Using gene-pyramiding technologies for developing resistant varieties against biotic stresses in plantation, spices, medicinal and aromatic crops, particularly perennial plantation and spice crops
- Strengthening the existing research programmes of bio control development of consortia of microbial inoculants for crop protection
- Development of technology for new formulations of microbial inoculants with higher shelf life and efficacy.
- Agro diagnostic centre for effective transfer of plant protection technology
- Establishment of a museum for important crop pests
- Establishment of a unit for mass production, quality evaluation and distribution of biocontrol agents, traps and botanical pesticides for the benefit of farming community

Veterinary Science

- Establishment of a Southern zone training centre for Field Veterinarians, Para – veterinarians, farmers, NGOs, entrepreneurs etc.
- Establishment of a centre for ethno veterinary medicine
- Establishment of a data base for animal disease control.
- Establishment of a unit for value addition of livestock products

Extension

- Develop “knowledge partnerships” with government agencies, private industries and public to make research findings and teaching available to the state.
- Programmes to improve standards of excellence in teaching, research and praxis of extension science
- Conduct of extension research programmes that would facilitate local agricultural development in line with emerging global changes
- Formulation of new paradigms of extension science for local communities
- Organizing training programmes with emphasis on TOT for the benefit of officers of Department of Agriculture, NGO's, Self help groups, educated and unemployed youth etc.
- Establishing linkage with research, development, educational and entrepreneurial agencies and institutions for better extension networking.
- Human resource development for increasing productivity of small holders

Development of Centres of Excellence for Promoting Teaching, Research and Extension

- Crop production
- Crop Improvement
- Crop protection
- Transfer of technology
- Agricultural biotechnology centre
- Environmental science
- Processing and product diversification of major crops.
- Organic farming and green technology

- Natural resource management
- Apiculture

Development of Infrastructure Facilities

- Historical Agricultural Museum
- International Convention Centre
- Modernization of existing hostels and classrooms and laboratories
- Crop pest and disease herbarium and fungal culture collection unit
- International hostel
- Training complex
- Regional centre for engineering service for farm machinery and implements
- Strengthening existing crop and soil museums
- Water productivity museum

2. COLLEGE OF HORTICULTURE, VELLANIKKARA, THIRISSUR

The College of Horticulture was established in 1972 with the mandate of teaching at undergraduate and postgraduate levels in different disciplines under the Faculty of Agriculture, to carry out research work of both basic and applied nature, and to take up extension activities for the benefit of the farming community. The college consists of 20 teaching and research departments, a Radio Tracer Laboratory, Centre for Plant Biotechnology and Molecular Biology, Bio Information Centre, Centre for e-learning, Cocoa Research Centre and the Instructional Farm.

The total area under the College is about 72.24 ha, in addition to the area of 95.35 ha under the instructional farm. The B.Sc (Ag) programme of the college has an intake of 60 students. The M.Sc (Ag) and M.Sc (Hort) programmes are also being offered, in addition to Ph.D programmes in almost all disciplines.

The present faculty position is 104. The college is at present running eight All India Co-ordinated projects covering thrust areas like crop improvement, crop management and plant protection in addition to projects coming under basic research. The Radio Tracer Lab attached to the college offers excellent research opportunities in the field of nuclear agriculture. The Centre for Plant Biotechnology and Molecular Biology received the Biotech Product and Process Development and Commercialization Award of the DBY in 2003.

Future Perspectives

Academic perspectives

The academic programme is to be strengthened with revision of the syllabi of both UG and PG programmes in tune with the existing needs and challenges. Focus is to be given to environmental sustainability along with food security. Degree, diploma and certificate courses in areas of topical relevance can be started, even on self financing basis.

Research perspectives

Location specific problems are to be given importance while formulating research programmes. Development of low input sustainable technologies shall receive more priority. The panel of research co-ordination group shall also be reconstituted after a reasonable time period to revitalise and update the research co-ordination group.

There shall be provision of strong incentives to scientists bringing in externally aided research projects to attract more funds from outside.

Extension perspectives

In accordance with the emerging role of mass media in transfer of farm technology, the establishment of a farm media research centre to take up comprehensive studies is to be recognised. Similarly, a video documentation unit is to be developed for effectively utilising the potential of information technology in the dissemination of the research achievements and major contributions of the university and also to make use of video systems in student instruction.

Conduct of Farmers' Day and other interactive sessions with the farmers utilising the student's strength will provide better opportunities for the students to understand the field problems.

Administrative perspectives

Decentralization of powers and simplification of procedures are necessary for the progress of the college and University. Rules followed in various IITs and IIMs or some well run autonomous academic institutions may be adopted and the existing rules may be modified. University has to formulate its own rules for the speedy implementation of the activities. The accounting procedure at present followed by the university is quite tedious. The procedure needs simplification. The available administrative staff could be more efficiently utilized if the accounts are computerized.

Personnel perspectives

The action for filling vacancies is to be taken up with utmost priority. In many departments the staff strength is so low that they find it difficult to run the programmes. While selecting and filling vacancies, only those with proven competence in the field may be given priority. At the time of transfers, a scientist may be given a chance to work in area of interest. The present system of transferring and posting without considering area of specialization of the scientists is to be discouraged. Frequent transfer and posting of scientific personnel without considering the area of specialization and field of interests is detrimental in harnessing their full potential. It also results in the non-completion of various projects handled by the earlier scientists. Hence, a proper personnel perspective need be developed by the university in this regard.

Revenue generation perspectives

The college derives income by way of sale of farm produce, processed fruits and vegetable products and planting materials. Large scale multiplication of planting materials of fruit plants and ornamentals, tuber crops and fodder, vegetable seeds is being taken up by various departments. Due to acute shortage of labour and farm staff and financial constraints, most of the operations cannot be carried out at the right time. If work can be executed on contract basis, and sufficient farm staff is provided, and also if mother plants for collection of seeds / bud woods are established, this item of work can be made economic.

Institutional linkages

Constant contacts are being made with the employers in sorting out the administrative problems and for the smooth functioning of the college. Technical as well as administrative sanctions are being received from the officials of the University for research and administrative policies. Healthy relationships with other faculties are being maintained for technical as well as other supports. Contacts with other institutions such as ICAR institutes, commodity boards, universities, KFRI, government institutions and other private agencies are being maintained to keep abreast with the progress in technical and technological achievements and for updating the capabilities.

Against this background, the perspective plan of the various departments / units of the college are being discussed in detail below.

Department of Agronomy

Food security will be critical issue in the years to come. Improved and sustainable management decisions and diversification of our cropping systems are needed to create a more nutritious and resilient food supply. At the same time, agriculture must be able to mitigate climate change and promote good land, air, and water uses. An integration of ecology, physiology, and genetics to develop new technologies, crop cultivars, and cropping systems that can achieve the required productivity and stability is needed.

Ecosystem service roles of agriculture including clean air, water, soil, diverse plant and animal species, and wildlife habitat have to be sustained and increased. Improving and maintaining soil quality through proper management and care of soil is critical for the production of food, feed, fibre, and fuel, but also for carbon storage, erosion control, plant growth, nutrient cycling, and water filtration and storage. The following proposals are made:

Revision of the syllabus of Agronomy for both UG and PG courses, giving more importance to crop ecology and sustainable use of resources such as soil and water.

Establishment of a Centre of Excellence in "Land and Water Management for the Humid Tropics" is proposed, which would be able to address soil and water conservation, water management, conservation of wet lands and related ecological issues. The Centre would also be able to start PG courses in natural resource management and beginning a PG programme in Agrostology.

Department of Plant Breeding & Genetics

Department of Plant Breeding & Genetics approaches 2030 visualizing development via innovative achievements in the field of Genetics, Cytogenetics, Plant Breeding & Molecular Breeding. Division envisages strategic achievements in infrastructure development, academic excellence, faculty improvement through technical advancement in the field of Plant Science and innovative research projects to meet the challenges ahead.

- I. **Infrastructure development:**
 - a) Establishment of Marker Assisted Breeding laboratory
 - b) Establishment of Crop Museum & strengthening Field Laboratory/infrastructure
 - c) Grain & Seed Quality analysis Laboratory
- II. **Academic Excellence:** Post-graduate class and laboratory will be equipped with the latest technological advancement viz., internet connectivity to enable Distance learning programme. The faculty will facilitate and equip the Post-graduate students of the Department to secure Fellowships and pave way for their placement in reputed private / public organizations.
- III. **Faculty Improvement:** Teaching faculty of the Department will be motivated to obtain training National & International Organizations to keep abreast with the latest developments. Collaborative research programmes with various National & International Institutes will be given renewed thrust.
- IV. **Research Vision:**
 - a) Developing varieties that can withstand stress created as fallout of climate change.
 - b) Plant breeding approaches such as Marker Assisted Breeding will also be utilized to quicken the process of breeding crop varieties for biotic & abiotic stress tolerance.

- c) Thrust will be laid upon mapping of genes from germplasm accessions to harness the wealth of native biodiversity.
- d) Establishment of a Seed technology Unit is visualized to undertake study on various aspects and problems pertaining to seed production, processing and storage in the State.

Department of Plant Physiology

The Department of Plant physiology was started in this College on 1.05.2008 In order to address the challenges brought about by climate change in terms of water scarcity, high temperature, salinity, and UV B radiation it is essential to increase the sustainable productivity of major cultivated crops of Kerala, identifying and improving the physiological traits for trait based breeding is essential. So the department will focus on the following thrust areas:

- Identifying the mechanism /processes related to high temperature, UV-B and drought and developing tolerant varieties in rice and vegetables for sustainable production.
- Bioprospecting for new molecules from medicinal plants.
- Phytoremediation technologies for the plant based clean –up of contaminated soils.
- Developing phytotonics to tackle field problems and also to increase productivity under adverse conditions.
- Diagnostic physiology facility will be developed to address nutritional as well as abiotic stress disorders.
- Research will focus on shift in weed flora due to climate change under different cropping system.

Department of Plantation Crops and Spices

Teaching

- Institute- industry linkage to equip students for initiating agri based enterprises and efficient management of the system
- Self financing courses in priority areas and developing e- learning facilities
- Students exchange programme with other SAUs and Universities abroad

Research

- Centre of Excellence in Spices, Medicinal and Aromatic plants and climate change strategies and adaptations in Plantation Crops & Spices
- Development of infra structure (Building and modern equipment) for Centre of Excellence units
- Collaborative research with foreign universities in frontier areas
- Precision farming and protected cultivation in herbal spices
- Development of basic science Department and integrating basic and applied research for improving quality of research
- Overseas training on frontier areas

Department of Olericulture

- Establishment of a Centre of Excellence for Vegetable Crops at the Department of Olericulture, College of Horticulture, Vellanikkara with following functions:

- Research - Focus Areas
- Hi-tech vegetable production: Precision farming in vegetables; Protected cultivation; Off-season production; High value vegetable production; Production of non-conventional vegetables.
- Sustainable organic vegetable production
- Development of high yielding, high quality, export oriented, biotic and abiotic resistant vegetable varieties and hybrids
- Vegetable biotechnology: Marker assisted breeding; Transgenic vegetables; Molecular profiling of released varieties
- Commercial exploitation of under-utilized vegetables
- Homestead vegetable production: Nutrition garden; Terrace vegetable production
- Seed quality enhancement in vegetables : Conventional as well as molecular approaches
- Development of good agricultural practices (GAP) for vegetable crops
- Management of genetic resources in tropical vegetable crops
- Extension
- A training centre with hi-tech facilities for conducting multi-tier training programmes.
- Large scale production of vegetable seeds and seedlings
- Multimedia inter-active Extension and Educational Modules
- Cyber extension in vegetable production

Education

Apart from the UG and PG programmes short term courses are envisaged in Vegetable seed production, Organic Vegetable Production, Protected Vegetable Cultivation and Precision Farming in Vegetables.

Department of Pomology and Floriculture

Fruit Science

- Establishment of a separate department of Fruit Crops.
- Establishment of a Centre for Excellence in humid tropical fruits for strengthening research in mango, jack etc. so as to evolve varieties and strategies for climate changes, salinity problems and drought situation.
- Establishment of a Mango Research Centre (The main campus alone has 20 ha. under mango).
- Research on tree geometry and tree architecture of major and underexploited fruit crops for evolving types suited to homesteads.

Floriculture

- Establishment of a separate department for Floriculture and Landscape Horticulture.
- Establishment of a Centre for Excellence in Floriculture and Landscaping.
- Postgraduate programme in landscape horticulture.
- M. Tech course on protected cultivation and post harvest management (location specific green house structures and crops, value addition, marketing, etc.) of high value horticultural crops.
- Research on bioremediation (Horticulture therapy, pollution control, bioaesthetic planning, human issues).

Department of Processing Technology

- Establishment of Centre of Excellence in Post Harvest Technology of horticultural crops
- Strengthening of existing fruits and vegetable processing unit to a small scale unit with all model equipment amenities and technology.
- Establishment of an analytical quality control laboratory for quality testing of food products following ISO, HACCP standards
- Establishment of a college of Post Harvest Technology for offering UG and PG programmes of Post Harvest Technology of horticultural crops

Department of Soil Science & Agricultural Chemistry

Kerala with its unique combination of climate, physiography and vegetation provides a wide diversity in the soil and so it is necessary to formulate, location specific studies so as to meet not only the problems related to soil fertility but also to conserve the valuable natural resources of our state. So our problems are very challenging and the following strategies are outlined.

Soil Test Crop Response studies

- Time saving devices for chemical analysis and interpretation of data
- Tackling of Pollution problems by Isotopic studies
- Reducing the toxicity of agro chemicals on soil organisms
- Meeting the physical and chemical constraints of the soil with the use of GIS

Department of Agricultural Entomology

I. Establishment of a Directorate for Crop Health (DCH) with the following centres:

1. Agricultural Entomology
2. Plant Pathology
3. Weed Management
4. Soil Health
5. Ornithology
6. Acarology
7. Rodentology
8. Microbiology
9. Vertebrate pests.

II Strengthening of the Division of Entomology by establishing the following Departments.

1. Insect Toxicology
2. Insect Taxonomy
3. IPM
4. HPR
5. Physiology
6. Biocontrol
7. Insect Pathology
8. Storage Pests

Department of Plant Pathology

The following aspects can be taken up by 2030 in the field of plant pathology:-

- Impact of climate changes on crop diseases of Kerala.
- Integration of Information Technology in disease forecasting models for prediction of diseases.
- Development of stress tolerant biocontrol agents and bioagent consortia for crop diseases management.
- Development of transgenic crops against diseases in major crops of Kerala.
- Molecular characterization of important plant viruses of Kerala.
- Exploration of medicinal mushrooms of Kerala.
- Integrated disease management programmes for major /important crops of Kerala.

Department of Agricultural Economics

Formation of four Advanced Centres in Agricultural Economics :

It is proposed to start four Advanced Centres in Farm Management and Production Economics, Agricultural Financial Management, Natural Resource and Environmental Economics, and Agricultural Marketing Management with an intake capacity of 2 PG students in each area.

Establishment of an Agricultural Market Intelligence Centre for collection, dissemination and analysis of market information and forecasting of prices with respect to the major crops of Kerala.

Setting up of a Centre of Excellence in Natural Resource Management evaluation studies on Watershed and research studies on natural resource management.

School of Agribusiness Management:

Department of Agricultural Extension

The Department of Agrl. Extension has led all the extension activities of the college. It has currently 4 M. Sc. seats and one Ph.D. seat under it. Apart from this the department envisions an advanced study centre for Market led extension under it, which will run self financed courses in Market led extension. It is in the process of designing and installing an advanced media lab, which will enable the department to take up short training programs in farm journalism, development communication, ICT in communication and expert systems in agriculture. It will also help the department deliver much better to the undergraduate and postgraduate departments. Apart from this the department proposes to establish a centre for society – innovation interface in collaboration with other social science departments too, which will ultimately serve as a single window system for farmer- research system linkages and research.

Department of Agricultural Engineering

- Establishment of a water technology centre for multi disciplinary research in water and its allied
- Establishment of a training centre on precision farming and protected cultivation at the main campus
- Setting up of a soil and water engineering lab with all modern equipments and a post harvest technology lab
- Starting a PG diploma course on rain water harvesting, watershed management and groundwater conservation

- Setting up a repository of farm machinery and equipments for providing practical training to students and farmers and a farm machinery research and development centre to facilitate active R&D and testing in field situations
- Setting up an energy centre to undertake multidisciplinary research in the area of renewable energy sources

Department of Agricultural Statistics

1. The concept of e-class rooms which will be put into practice
2. Periodic training programme will be arranged to the Professional Statisticians/Lectures in the colleges/Scientists in research stations on the topic “Latest developments in Statistics”
3. New courses viz., M.Sc. (Statistics and Computer applications), one year Diploma course in applied statistics and a basic level course in Applied Statistics for Statistical Investigators will be started.

Centre for Plant Biotechnology and Molecular Biology

Infrastructure development: It is proposed to establish independent laboratories working on gene expression studies, Molecular Diagnostics, Environmental Biotechnology and industrial applications of biotechnology.

Academics: Participation in student and faculty exchange programmes with world class Universities and Institution is envisaged.

Training Centre: It is proposed to develop a Centre for imparting quality training to farmers, students, entrepreneurs and unemployed youth on various aspects of Biotechnology with industrial links.

Research: Thrust will be to work on research problem in collaboration with the industry and on areas such as Biotechnological tools to mitigate the effect of climate change, waste management, production of quality, disease free planting material etc.

3. COLLEGE OF AGRICULTURE, PADANNAKKAD, KASARAGOD

The College of Agriculture, Padannakkad was established in 1994 as third agricultural college under Kerala Agricultural University. The decision to establish the College of Agriculture at Padannakkad was taken after detailed discussions and considerations of its necessity at the Government and University levels.

Presently, the college offers Bachelor and Post graduate degree programmes in Agriculture. The students are selected based on a common entrance test conducted by the Government of Kerala for admission to Professional courses. The College offers both Under Graduate and Post Graduate programme

Mission

Primary mission of the College of Agriculture Padannakkad are imparting of education, advancement of learning, promoting research and undertaking extension education programmes in agriculture and allied subjects. The college has the additional mission of removing the backwardness and advancement of the farming sector in the northern zone of the state of Kerala. The main factors were the backwardness of the area, its peculiar agro-climatic conditions like highly skewed distribution of rainfall leading to prolonged drought, the existence of vast stretches of marginal lands and wastelands and peculiarities of cropping systems followed in the zone.

Goals

Keeping the mission in view the college has set the following goals:

- The goal of the college is to provide human resources, skills and technology required for the sustained development of agriculture, encompassing all production activities based on land water.
- Impart quality education to the young generation and equip them in meeting future challenges in agricultural sector
- Remove the backwardness and solve the field problems associated with the agricultural sector in the northern zone of the state of Kerala.
- Conducting problem-based research
- Generating technologies for improving the production and productivity of crops grown in the northern zone of the state
- Implementing location specific and need based extension programme

Institutional Accomplishments

The highlights of achievements of the institution include advances made in the areas of research, teaching and extension.

- The students of the college excel in All India Competitive Examinations and many are recipients of JRF's. Three of the alumni secured coveted positions in IAS cadre, one in IPS and two in IFS. Six of the Alumni got positions in Central Revenue and Railway services.
- Established the Placement Cell

Research

Five coconut hybrids were released from this institution.

- The antifungal effect of cashew shell on polypathogenic fungi was validated.
- Entamopathogenic fungi (EPF) such as a new strain of *Mectarrhizium anisopliae* isolated from the college campus and two new pathogens viz, Protozoan and *Fusarium* spp were found to cause mortality of coconut root grub.
- Zone wise review and documentation of nutrient management and soil fertility, assessment of the crop production potential, nutrient advisory card preparation were done.
- Three local varieties of brinjal were evolved by selection under the RKVY Project on Women empowerment in organic cultivation of vegetables.
- ‘Sugandhi’ Integrated Pepper Research and Development Project for Wayanad District was implemented to rehabilitate pepper gardens in Wayanad district. Low cost traps of pheromones along with methyl eugenol were designed, tested and distributed to the farming community for fruit fly control.
- Saline tolerant Kaipad varieties christened as ‘Ezhome -1’ and ‘Ezhome -2’ – The first high yielding varieties of saline prone Kaipad ecosystem of North Kerala was released for commercial farming in 2010.
- ‘One saline tolerant high yielding rice culture (Culture MK 22) christened as ‘Ezhome -3’ for Kaipad tract, and one wetland rice culture, Culture MK 157 christened as ‘Jaiva’ developed for organic farming and conventional farming got approval of KAU variety release committee in 2012

Extension

- Established Agro clinic and Agro-Diagnostic team for the benefit of the farming community
- Commercialization of microbial inoculants: The microbial inoculant, *Pseudomonads* have been successfully commercialized and are available to farmers.,
- Cultivation methods for growing strains of edible mushrooms suited for cultivation under Kerala conditions like *Pleurotus*, *Volvariella*, *Calocybe* etc. have been standardized and the know how and spawn material are being distributed to the general public.

Awards and Recognition

The college has bagged several awards. In 2010-11 College of Agriculture, Padannakad has won the award for the Best Educational Institution under the ‘Harithayoram Programme’ of the Department of Agriculture and First prize in the ‘Malinyamuktha Keralam’ for institutional sanitation.

Vision - 2030

Agriculture sector being the backbone of Kerala’s economy continues to be the dominant driving force for growth and development of the State’s economy. In the present scenario, the vision of this institution is to focus on agro-ecological situation based research, education and extension and to serve as a knowledge centre for achieving food security, water security and environmental safety. Concerted efforts will be made to transform the education, research and extension activities more sensitive to the needs of the farming community, especially the small holders and the poor, living in the fragile and marginal areas. It also envisages to inculcate creative leadership in students to equip them to take up newer challenges in the next decades.

Education

In line with the National Farmer Policy of India (2007) the motto of College of Agriculture, Padannakkad, is to groom “every scholar/student as an entrepreneur”. The institution envisages modification and restructuring of the existing curricula, with emphasis on entrepreneurship and capacity building. PG diploma courses, distance education courses, e – courses, etc. will become a part of the educational activities of the department in the decades to come. Some of the new courses suggested are:

- Bio- Statistics in Agricultural science
- Biotic stress management
- Crop management for reducing pollution hazard
- Disaster management
- Natural resource management
- Post harvest pathology of fruits and vegetables
- Precision Farming
- Resource optimization in fragile environment
- Veterinary hospital management and farm assistance
- Women Empowerment
- Software development for agriculture
- Carbon finance and trading in agriculture
- Peri urban agriculture and Vertical farming
- Design science
- Agro-tourism
- Intellectual property rights and biosafety

Research

Kasargod has been declared as an organic district. In line with this concept, large scale production of organic inputs required by the farming community need to be taken up. An Organic Input production and technology support centre has been established at COA and has started functioning.

- The activities of the centre will be strengthened to meet the ever increase demand for organic inputs.

Several opportunities have emerged in the recent years which are to be harnessed to strengthen the overall technology development capability of the Institute. These include advancements in the fields of molecular biology and biotechnology, geographic information system, simulation modeling, and ecological and environmental sciences. Basic and strategic researches will be strengthened or established in these fields in future.

- Hightech Agriculture- for promoting hitech agriculture, a demonstration-cum-technology centre will be established.
- Breeding for organic crop varieties- stress will be given for developing varieties suitable for farming.

Considering the strategic importance of the Integrated Farming and Homesteads peculiar of Kerala, the restructuring of research in these lines is also warranted. Some of the research areas identified are:

- Natural resource management
- Geographical information system
- Remote sensing
- Crop modeling
- Development of new cropping systems and crop diversification

- Development of integrated plant-soil-water-nutrient management systems.
- Climate change adaptation
- Impact of CO₂ enrichment on crop productivity
- Methane emission from rice paddies
- Application of nanoscience in diagnostics, formulation of agrochemicals and waste water management;
- Agro-biodiversity conservation

Extension

For more efficient diffusion of modern technologies and generation of high quality manpower to improve the overall efficiency of agriculture new extension methods and technology transfer procedures need to be developed. Some of the future programmes envisaged are:

- Develop “knowledge partnerships” with government agencies, private industries and public to make research findings and teaching available to the state.
- Conduct of extension research programmes that would facilitate local agricultural development in line with emerging global changes
- Formulation of new paradigms of extension science for local communities
- Organizing training programmes with emphasis on TOT for the benefit of officers of Department of Agriculture, NGO’s, Self help groups, educated and unemployed youth etc.
- Establishing linkage with research, development, educational and entrepreneurial agencies and institutions for better extension networking
- Establishment of a Southern zone training centre for Field Veterinarians, Para – veterinarians, farmers, NGOs, entrepreneurs etc.
- Establishment of a unit for value addition of livestock products,

Establishment of Centre of Excellence

Centres of excellence modes will be adopted to ensure interdisciplinary, excellence and efficiency in research.

Priority areas are:

1. Agro economics
2. Agricultural Information and Data Analysis
3. Micronutrient research
4. Organic farming and green technology
5. Agricultural Microbiology
6. Natural resource management
7. Apiculture
8. Pesticide residue analysis and management

Critical Areas of Faculty Training

Basic and strategic researches as well as agro-ecological situation based research, education and extension another area has to be strengthened and the faculty members need to be trained in such new areas of global significance.

- Molecular Techniques for Crop Improvement
- Plant Genetic Resource Management

- Information communication technology
- 'E' course – designing and conduct.
- Handling of modern communication gadgets and equipments
- Web design and graphic communication
- Econometrics and using software packages in economic analysis.
- Natural resource and environmental economics
- GIS and remote sensing
- Precision farming

Critical areas of Infrastructure Development

- Considering the percentage increase of girl students, a hostel cum facility centre will be constructed
- Establishing state of the art facilities in the class rooms and laboratories
- Modernization of Staff rooms, Examination Hall, Seminar Hall
- Repair and renovation of Administrative wing
- Modernization of Canteens (Two nos)
- Modernization of Placement Cell, Technical Cell, Academic Cell
- Modernization of Central instrumentation facility
- Construction of guest house

Developmental Activities

- Large scale production of planting materials will be taken in order to meet expanding demand for quality planting materials throughout the State.
- Natural resource conservation- Survey and conservation of endangered mango ecotypes is in progress. More stress will be given to other crops also.

4. COLLEGE OF FORESTRY, VELLANIKKARA, THRISSUR

Mission

Excellence in forestry education, research, and extension for sustainable management of natural and managed ecosystems.

Goal

To provide human resources, skills and technology required for sustainable development of forestry and other allied disciplines by integrating education, research and extension.

Strategy

The college focuses its strategy on synergizing trans-disciplinary education and research relevant to the state and help building innovative extension systems for sustainable management of natural resources and overall improvement of rural livelihoods.

Forestry colleges in various State Agricultural Universities in India were started to provide the much-needed impetus to forestry education and research. Within that overall objective, the mandate of the College of Forestry, Kerala Agricultural University (KAU) has been defined as developing human resources for the stewardship and sustainable use of forests. In particular, academic and research programme in conservation and sustainable use of natural resources, social forestry, agroforestry, silviculture, and wildlife management are being focused at the college.

The specific goals are: (1) excellence in teaching and research, (2) provide technically qualified manpower conservation and sustainable management of natural resources, (3) provide scientific and practical advice to the various end users in forestry with the objective of making forestry an attractive and economic enterprise.

The specific objectives of the College of Forestry are:

- To offer B.Sc. Hons. (Forestry), M.Sc. (Forestry) and PhD in forestry
- Carry out research in basic and applied aspects of forestry to solve location-specific problems and also to make forestry a viable commercial enterprise. Also to carry out research that will enable the effective management and conservation of the protected areas and other natural habitats.
- Take up extension activities in forestry and to cater to the needs of the end-users and give technical professional support to social forestry, agroforestry and wildlife management programmes of state and central governments.

Vision 2030

Activities planned for the next 20 years.

1. Establishment of an International Centre of Tropical Forest Sciences

Background and objectives

The College of Forestry at Kerala Agricultural University (KAU), Thrissur is a unique academic institution in the state of Kerala. It is the sole educational institution in the forestry sector of the state accredited by national agencies such as ICAR (2003) and ICFRE (2008). The college was established in 1986 as part of the national efforts to impart forestry education through academic institutions, as per the recommendations of the National Commission on Agriculture (1976). The National Forest Policy of 1988 also recognized this fact, for it stated: "Agricultural Universities and institutions, dedicated to the development of forestry education should formulate curricula and courses for imparting academic education and promoting postgraduate research and professional excellence, keeping in view the manpower needs of the country" [Clause 4.11 of Notification No. 3-1/86-FP, MOEF dated 7 Dec 1988].

Developing manpower resources required for the state's forestry, agroforestry, non-wood forest products, wildlife sciences, wood science, and social forestry sectors, is the principal mandate of the college. The college is now poised to celebrate the silver jubilee of its founding, in 2010-11. As part of Silver Jubilee activities, we propose to establish an international centre of excellence in tropical forest sciences. The objectives of the centre shall be: (1) to act as a think tank on all matters of relevance to forestry and environment in a regional and national context, (2) augment research, education, and extension efforts on all aspects of forestry, (3) attract international students and researchers desirous of pursuing studies on tropical forestry and (4) forge national and international partnerships in tropical forest conservation and sustainable land use practices.

Justification

In the light of continuing environmental deterioration, there is a growing consensus about the need for sustainability of land use practices. Adaptation and mitigation of climate change is a major agenda of many international treaties. The research envisaged under the aegis of the centre will broadly fall under three areas such as **ecosystem transformation, biodiversity and Sustainable ecological systems**. In particular, efforts would be made to optimise the combined production of trees, field crops and animals on the same land management unit, besides focussing on climate change mitigation. Typically, the small and medium farmers tend to practice agroforestry in a bid to meet their food, fuel, fodder, timber requirements and/or generate cash returns. But they have trouble in choice of species, tree management, value addition and so on. Therefore, quick growing species/provenances suitable for fuelwood, fodder and timber production will be selected and techniques evolved for their mass multiplication. As tropical trees exhibit wide variability in their carbon sequestration potential, choice of species with high carbon sequestration potential assumes great significance, which may have special relevance to degraded sites and/or erosion prone areas especially along the coastline.

Strengths

The main thrust in our undergraduate and postgraduate programmes is on imparting theoretical and practical

knowledge in forestry and allied aspects of natural resource management. Since its inception, the college has also received considerable financial support from national agencies such as ICAR and ICFRE. The latter, in particular, has been providing financial assistance to the college on a sustained basis.

The college, over the years, has also made steady progress on the academic and research fronts and has emerged as one of the leading forestry colleges in India. It has won several national level recognitions. Examples include the many ICAR-junior research fellowships awarded to the students of this college and a total of 21 of our alumni becoming successful in the UPSC examination for selection to the Indian Forest Service/Indian Administrative service. Several of our alumni also have been awarded prestigious international scholarships (e.g. the Erasmus Mundus fellowship of the European Union). Our faculty also have been getting many national and international awards and recognitions. In view of its accomplishments in the field of forestry, the college is a prominent destination for students interested in pursuing studies on nature conservation and natural resources management, not only from the state of Kerala, but also from the rest of India and other countries. For instance, two US Fulbrighters and a Nepali student have been trained recently at the college. The ICFRE accreditation team (2009) rated our college as the best Forestry College in the country. KAU, incidentally, has been adjudged as the best state agricultural university in India; during 2004, i.e., winner of Sardar Patel Outstanding Institution Award instituted by the Indian Council of Agricultural Research, New Delhi.

The college has been working in close collaboration with other institutions under the Kerala Agricultural University such as the College of Horticulture, College of Veterinary and Animal Sciences and other nearby state government institutions like the Kerala Forest Research Institute and the Kerala Institute of Local Administration, situated within a radius of about 10 km.

Weaknesses

Major limitations are shortages of faculty and laboratory and office space. The state government has been approached to rectify the problem non-availability of faculty positions.

Opportunities

If an international centre of tropical forest science is established, it will certainly attract students and researchers from other parts of the world, especially North America, Africa, and countries in South and East Asia, with which we already have certain engagements and collaborative programmes. Examples of such recent partnerships include: KAU- University of Florida Workshop on Scientific Writing (Thrissur, 2008), USIEF Workshop on Biodiversity Conservation through stakeholder participation (Cochin, 2009), and the proposed KAU-University of Tokyo workshop (Cochin, 2010).

Expected outputs

Perhaps much is changing in the philosophy and methods of forestry in India and the world. A principal thrust of our academic programmes of the proposed centre for excellence will be to produce professionally competent manpower for the state and the country as a whole. People trained in subject matter areas such as forestry, agroforestry, non-wood forest products, wildlife sciences, wood science, and social forestry are best equipped to meet the challenge of solving today's environmental problems and of working for the continual future supply of goods and services from our forest resources. Every year the college/centre is expected to produce 50 to 75 well trained undergraduates, 10-15 master's degree holders, and 5 to 10

doctorate degree holders, besides a number of researchers at the post-doctoral level. In addition, the college will be able to function as a centre for providing inservice training to the officials of state Forest Departments in India.

A number of technical bulletins, doctoral and master's dissertations, besides scientific publications, could be produced, which may empower the transfer of technology. To ensure distribution of quality planting stock and act as a nucleus for dissemination of improved seed and nursery technology practices, we propose to establish a model tree nursery. Socio-economic aspects of integrated tree-crop production systems such as factors affecting choice of species/planting behaviour in agricultural lands will be assessed. Overall, it will help to maintain ecological security, besides generating of income and employment in the rural areas.

2. Establishment of an Advanced Centre for Biodiversity Conservation and Wildlife Forensic Testing

Rapid depletion of the world's biodiversity is one of the vital issues of our time. There is currently enormous concern over the increasing threats to global biodiversity. The intrinsic potential of biodiversity as a key resource for evolving new kinds of food, medicine, cosmetics and several other value added products of industrial importance have now been increasingly realized, thanks to the recent advancements in biotechnology/genetic engineering. Bioprospecting has considerable potential to those located in the biodiversity rich areas of the tropics and subtropics. Hence it is important to initiate multidisciplinary scientific researches aimed at long-term protection, maintenance, evaluation, conservation and sustainable utilization of biological diversity. Being situated within the biogeographic region of Western Ghats, a "biodiversity hot spot", Kerala state has unique advantages in this respect.

Wildlife poaching and other crimes are rampant in recent times. Proper identification of the specimens is extremely important in convicting the culprits. We propose to strengthen the existing wildlife crime laboratory, where we examine, identify, and compare evidence using a wide range of scientific procedures and instruments, in the attempt to link suspect, victim, and crime scene with physical evidence.

5. COLLEGE OF CO-OPERATION, BANKING AND MANAGEMENT, VELLANIKKARA, THIRISSUR

Mission and goals

The original mission of the College was to grow up as a premier national institution in the domain of agricultural support systems management.

As the application of management sciences gained greater acceptance in the arena of agriculture production and supply chains, the mission of the College was broadened to include agribusiness also. Accordingly the College was rechristened as College of Co-operation, Banking and Management in 1996.

The current mission of the College is to grow into a premier management institute of national eminence to foster the managerial and entrepreneurial manpower and management technology needs of the rural community and ecosystem.

The goals which emerge from the mission statement are:

- Facilitating professionalisation of the management of formal and informal co-operatives, financial institutions, agri-business enterprises and various other rural development organisations.
- To build up additional academic programmes to fulfill the mission of the College.
- To Play a pro-active role in the promotion and strengthening of farmer friendly support system institutions to remove resource constraints confronted by the farming community.

Accomplishments

Since its inception the College made steady strides in the area of teaching, research, extension and community outreach programmes. National and International recognitions received during the past 30 years adds to the glory of this institution. Many of our students are recipients of ICAR- JRF, UGC-NET and JRF. Our graduates hold coveted managerial positions in Reserve Bank of India, SEBI, IDBI, SIDBI, National Co-operative Federations, Banking and Insurance Companies, National Commodity Boards, and eminent faculty positions in National Management Institutions like XLRI, IRMA and ICA. The excellent placement record of our students is a reflection of excellence in teaching and all out effort in moulding the personality of our students through curricular and co-curricular activities.

The national and international seminars organised by the college provided ample avenues to the students to have interactions with luminaries of respective disciplines. The research findings of the faculty had been found very useful for enhancing the organisational and managerial effectiveness of the support services and beneficial to the farming community. The faculty of the College have served as members of various state level and national level Committees and Commissions. Therefore, the College is matured and deserved to be elevated to the status of a full fledged faculty christened as 'Faculty of Agribusiness Management'.

Vision 2030

Establishment of Faculty for Agribusiness Management

Royal Commission on Agriculture (1925) laid the foundation for agriculture development in India. But agriculture got the real big push only in the Third Five Year Plan (1961-66). The plan set the objective of

attaining self-sufficiency in food grain production through productivity enhancement and capacity building programmes in agriculture. The ensuing green revolution anchored on hybrid seeds, modern crop production technology and application of chemical fertilisers and pesticides pushed India to the orbit of self-sufficiency in food grains production. However, we failed to carry forward green revolution to the next stage of establishing an efficient agricultural value chain system. As a result, the quantum jump in food grains production had little impact on the fortunes of the farmers, the real authors of green revolution. It is appropriate to recall the monumental observation of National Commission on Farmers headed by Dr. M.S. Swaminathan “ It is clear that the human dimension must be the principal determinant of agricultural policies and not just production in physical terms. The aim of this policy is to stimulate attitudes and actions which will result in assessing agricultural progress in terms of the net income of farm families rather than just in million tonnes of farm commodities produced and which will help to place faces before figures”.

The declining or stagnant agricultural growth rate caused by technology fatigue, soil fatigue and farmer fatigue and the spiralling food inflation witnessed today call for a Second Green Revolution. The thrust of the new green revolution should naturally be on enhancing the net income of the farmers through the creation and efficient management of value chain systems. The value chain encompasses application of transgenic seeds, production of efficient and eco friendly growth promoters and plant protection materials, contract and group farming, supply chains (back end and front end), food processing, agro processing, access to domestic and global markets, risk management tools, efficient trading platforms (spot exchanges, e-auctioning, futures and options), responsive market intelligence and information systems, agro services and organised retailing. The agricultural value chain is on the move. These verticals are attracting substantial foreign and domestic direct investment. The emerging agribusiness sector is on the lookout for a battery of professionally trained agripreneurs and agribusiness managers to propel the various verticals of the value chain system. The creation of a Faculty for Agribusiness Management will provide the necessary research, extension and human capital foundation for the healthy growth of the emerging agribusiness sector in the state and the country.

Vision of Faculty of Agribusiness Management

Develop and disseminate best-in-class management technology to raise the socio-economic status of the farming community by the creation of economically viable, ecologically sustainable and globally competitive agricultural value chains integrated with global markets.

Mission

1. Improve farmers, farm centred organizations and agro industries with time and field tested management knowledge and skills to enhance their efficiency, effectiveness and competitiveness,
2. Provide professionally trained human capital required to manage the agriculture value chain and agro industries,
3. Catalise entrepreneurship and break through innovation at the farm and industry level to achieve higher productivity, profitability and global quality standards,
4. Undertake research related to-
 - a. Organisational and operational problems of farms, farmer centered organizations, agro industries, rural development organization and financial institutions,
 - b. Macro and Micro ecosystem encompassing the agricultural value chain,
 - c. Policy issues related to agriculture development, rural development, agro industries, agricultural financing, food retailing, agricultural marketing etc,

- d. Socio- economic impact of food security, food safety and health standards, quality standards etc.,
5. Action oriented research programme under the PPP mode in domain areas,
6. Dissemination of time tested research findings to the farmers, farmer collectives and food Ad agro processing industries in the public, private and co-operative sectors,
7. Consulting services to various stakeholders,
8. Development of ICT enabled information system for farms and agro industries.

Proposal for Colleges and Centres Under Faculty of Agribusiness Management

The Faculty of Agribusiness Management proposes to create a new College and Seven Centres of Excellence apart from the existing College of Co-operation, Banking and Management. The newly envisaged College shall be named as College of Agribusiness Management. The seven centres proposed are:

1. Centre for Agri- Entrepreneurship Development and Innovation(CEDI) ,
2. Centre for Agricultural Commodity Markets and Markets Intelligence(CAMI),
3. Centre for Plantation Management(CPM),
4. Centre for Faculty & Management Development(CFMD),
5. Centre for Rural Management (CRM),
6. Centre for Micro and Agrifinance (CMA).
7. Centre for Banking & Financial services(CBFS)

6. KELAPPAJI COLLEGE OF AGRICULTURAL ENGINEERING AND TECHNOLOGY, TAVANUR, MALAPPURAM

Kelappaji College of Agricultural Engineering & Technology (KCAET) is the only one Agricultural Engineering College in Kerala which is affiliated to Kerala Agricultural University. B Tech and M Tech courses were started during 1985. The intake capacity of B. Tech. (Ag. Engg) is 46 nos. M Tech (Ag. Engg) is offered in the disciplines of soil & water conservation engineering, farm power machinery & post harvest technology each having an intake capacity of 5 nos. The 40 ha consisting of academic block, library, well equipped laboratories, instruction farm, Krishi Vigyan Kendra, AICRP centre's for post harvest technology and AICRP centre's farm implements and machinery, guest houses, trainees hostels, veterinary clinic etc. The mission of the college are to impart education in agricultural engineering to the young men and women, guide them in research and extension programmes, collaborate with reputed R & D institutions in agricultural technologies etc.

B. Tech. in Food Engineering and Technology

Due to liberalization of Indian economy industrial growth has been witnessed in all sectors with improvements in social and economic conditions of our people. This has created demand for more and better quality foods. Food technology, which is the application of food science, has gone through its own development process. From the simple traditional methods of food production, processing, preservation and even storage to the more sophisticated and well advanced technologies that we witness today in the 21st century, the growth has been tremendous. Scientists are putting their intellectual resources together to address the many food problems and facilitating convenience as well as trade within and beyond borders. This has created jobs for the food and allied professions and promoted food business to great levels, contributing to national development in our country. The B Tech course in food technology is designed to meet the growing demands of the food industry. It comprises mainly food technology, microbiology, food preservation techniques, food packaging and food process equipments design.

The course deals with diversified aspects of formulation, processing and preservation of foods. It also enables students to effectively design and fabricate food processing machineries. This course provide adequate training and knowledge to candidates regarding analyzing the quality of raw materials, packing standards and methodology, processing technologies, storage and food values.

The objective of this course is to train the best talents of the nation in order to provide a support base for the country food security. The syllabus is framed to enable the students to comprehend the whole gamut of the fast changing food scenario of the world.

Some of the industries are: ICAR institutes, CFTRI, IARI, food engineering institutes, DRDL, etc. There is immense scope for the candidates coming out of this course.

B. Tech in Mechanical Engineering

Mechanical engineering is the one of the broadest of all engineering disciplines deal with design and production of tools, machines and all other mechanical equipments to be needed in the industries. The industry offers a wide choice of options extending across many inter disciplinary interdependent specialties. It is concern with all type of machineries in industries and all aspects of there mechanism and functioning the design, development, construction, production installation , operation and maintenance such an steam

and gas turbines, thermal power stations, IC engines , machine tools, A/C & heating machines refrigerators etc. Mechanical engineers are the driving force behind many of our technologies and industrial process including innovative products like mobiles, PC, DVDs etc .The work of a mechanical engineer can be extremely challenging and fulfilling, requiring IT, Design and analytical skills together with an ability to work. They are also responsible .The specialization include in areas like Thermal engineering, Design and production engineering, etc. They can find work in administrative and managerial position in government departments and private sector industries or do research and teaching institutes. They could also opt for technical sales cum marketing or work as independent consultant.

B. Tech in Civil Engineering

Civil engineering has staged a vigorous comeback in terms of its popularity as a branch of study at the under graduate level. This gain popularity in large measure can be attributed to the boom in construction across the country. The B.Tech (Civil) students are much sought after by construction companies during placement

The number of B.Tech (Civil Engineering) students passing out of engineering college is not sufficient to meet the local demands. The construction companies in the state are feeling in pinch as they are not getting qualified hands.

The scarcity started with IT boom and the boom in the construction industry. The scarcity is also due to the fact only few of the new generation engineering college in the state are offering civil engineering courses. Only 20% of the new colleges are starting civil engineering courses, leading to a shortage of B.Tech. Graduates in Civil Engineering. The opportunities are plenty for higher studies also. Entrepreneurship is another area where civil engineer could try their hand. The boom would continue for the coming years. The salary levels of civil engineering are also increasing and are becoming comparable with that of the IT personal.

Doctoral Programmes in Agricultural Engineering

Ph.D. (Ag.Engg.)

Highly qualified Agricultural Engineering teachers are not available in the state. To improve the quality of teaching of B.Tech. and M.Tech. in Agricultural Engineering as well as to carry out research programmes efficiently, we should have teachers with Ph.D. in the major fields of Agriculture Engineering. At present the candidates from Kerala are moving to other Universities for the purpose of obtaining Ph.D. The research programmes for their works in other states are not relevant for Kerala in most of the cases. The Ph.D. programmes to be undertaken in Kerala will also generate factual information on the problems faced in Kerala in the frontiers Agricultural Engineering.

The Ph. D. in the following disciplines are proposed to be started at KCAET, Tavanur

Ph. D. in Farm Power Machinery

Ph. D. in Soil & Water Engineering

Ph. D. in Post Harvest Technology

Diploma in Agricultural and Rural Engineering (D.A.R.E) Course

Introduction

When the Kelappaji College of Agricultural Engineering and Technology (KCAET) was established in the year 1985 as a constituent college of Kerala Agricultural University, the Diploma programmes in Agricultural Science (D.A.Sc) and Agricultural and Rural Engineering (D.A.R.E) which were offered here were discontinued in 1988. It is now proposed that the Diploma in Agricultural and Rural Engineering (D.A.R.E) be offered again under a separate School of Agricultural Technology (SAT), without hampering the ongoing academic and research activities, under the Faculty of Agricultural Engineering and Technology at KCAET Tavanur.

Scope

Indian agriculture is in its way for modernization in tune with the developed countries of the world. The need for technically qualified personnel to serve as a link between the scientists and agriculturists will be an immediate necessity. The need for development, popularization, marketing and service providing of machineries is becoming immediate demand. Kerala agriculture is also becoming machinery oriented and high-tech cultivation practices using precision farming technology and protected cultivation technologies are also getting popular. Dearth of technically qualified personnel will stall the progress of development in the agricultural sector. The DARE course is now an accepted qualification for posting as Overseers/ Technicians in the Department of Agriculture and in Department of Soil Conservation. The diploma holders can find jobs in the government sector in these departments. Diploma holders can be utilized in the agricultural development in watershed oriented development schemes, farm machinery service centres, agro processing and post harvest technology centres. and can also be self employed in similar programs.

Course Detail

Course duration	: Six semesters spread over three years.
Medium of instruction	: English
Qualification for admission	: Same as for Poly technique admission
Intake capacity	: 30 nos.

Divisions

The academic programmes will be covered under five divisions.

1. Farm power and machinery
2. Soil and water engineering
3. Post harvest technology
4. Basic engineering
5. Basic science and humanities

Certificate course in Farm Machinery

Compared to the other states the problem of unavailability of agricultural labourers in Kerala is severe. The high wage rate for the labourers along with their unavailability make farming a difficult task in Kerala. The most affected crop is paddy which needs maximum labour for its cultivation. Due to this Kerala has become the first state to use maximum number of tractors, tiller, transplanters, reapers, combine harvesters for paddy cultivation. Even for operating these machinery drivers are not available. Moreover trained

mechanics are not available for the service and maintenance of these advanced machinery. The conventional technicians coming out of the ITI and other institutions are having only the basic practical knowledge of different branches of mechanical engineering. But as such they are unable to take up the maintenance of farm machinery.

It is proposed to give an intensive six months certificate course in Farm Machinery to the candidates having certificate in any mechanical course or agricultural mechanic course from ITI. The self supporting, non-residential course will have as 200 hr theory and 400 hr practical classes. The existing facilities at KCAET, Tavanur will be utilized. Additionally one Technical Assistant with B.Tech. (Ag.Engg.) and two experienced Technicians with ITI in Mechanical/ Agricultural Mechanic qualification are needed exclusively for the course.

The fee proposed is Rs.5000/student/semester for the self supporting course.

The technicians with the farm machinery certificate will undertake all types of repair and maintenance of agriculture machinery. They will help the farmers having agricultural machinery having liaison with padasekhara committees. The trained mechanics can also be employed in the government/ institutional farms.

Research and Development activities proposed

6. Integrated Land and Water Resource Management Project for Kari lands of Kuttanad
7. Development of Agrotechnology for the Utilisation of Hardened Laterites of Kerala
8. Rejuvenation of KCAET campus with water harvesting, garden structures and landscaping- a model
9. Water harvesting technology and natural resource management through remote sensing
10. Income generating technologies through value addition and product diversification
11. Establishment of Agro Processing Centre
12. Establishment of a Seed Processing Plant in KCAET Farm
13. Agricultural Empowerment through Sustainable farming - An Ecological, Economical and Social Approach
14. Proposal for Establishing Renewable Energy Technology
15. Dissemination Centre (RETDC)
16. Establishment of an anaerobic bioreactor for treatment of agricultural waste in KCAET campus to generate electricity
17. Establishing Centre for Farm Machinery Research, Testing and Training
18. Establishment of an Agricultural Machinery Bank
19. Central Instrumentation Lab and Testing Centre
20. Advanced learning and Supporting Centre (Library & Information Centre)
21. Improving Drinking Water Supply of the Campus
22. Establishment of a Precision Farming Centre for Kerala to Augment the Horticultural production through Technological Interventions

RESEARCH

Constraints in Kerala's agriculture

- Low productivity in major crops of Kerala
- High cost of production and lack of remunerative prices for the produce
- High variation in productivity status of crops in different ecologies.
- Acute labour shortage and high wage rate of labourers
- High rainfall, undulating topography and intensive agriculture leading to depletion of soil organic matter

The Kerala Agricultural University with its network of 6 colleges, one academy for climate change education and research, 6 regional research stations, 16 research stations and 7 KVKs' spread across the State has been in the forefront of agriculture education, research and extension to solve the problems of the farming community ever since its inception in 1972. The major contributions of the University include:

- Released 222 varieties in different crops including 106 varieties in rice of which "Jyothi (PTB 39)" and "Uma (MO 16)" occupy more than 80% of the cropped area in the State.
- Out of 56 vegetable varieties released by the University, 7 have been notified and recommended at national level.
- Panniyoor varieties 1 to 8 from Pepper Research Station,
- World's first hybrid of coconut from RARS, Pilicode
- Standardised Package of Practices for 125 crops grown in the State.
- Developed biocontrol measures for control of *Salvinia molesta*, the vicious water weed
- Developed crop protection technologies against insects and diseases affecting rice, vegetables and fruits and spices.

The contributions of the University have been recognised at State, national and global levels, which include,

- Sardar Patel outstanding ICAR Institution award during 2003
- Performance award of ICAR consecutively for the last six years from 2006-2010.
- Best KVK award during 2010 for Kannur KVK
- Several State and National awards for scientists
- The Food Security Army concept in farm mechanisation has become a national model

A convergence of traditional knowledge with innovative science is needed to bring in the much needed breakthrough in agriculture of the State. However, Kerala Agricultural University, which is instrumental in bringing in the change has been crippled due to financial stress that hinders the University from taking up modern research in areas like biotechnology, molecular biology, nanotechnology, information technology etc. old buildings, lack of modern instruments, equipments and infrastructural facilities etc., are the weaknesses which need be strengthened so as to intensify the University's efforts to find solutions to the challenges facing State's agriculture.

Approach

1. Strengthening research capabilities of Kerala Agricultural University by upgradation of existing laboratories, faculties and infrastructure and facilitating transfer of technology.

2. Intensification of research on enhancing productivity of rice and vegetables by developing superior

varieties and hybrids with targeted yield and quality, developing resource conservation technologies for improving soil and plant health management , developing eco-friendly crop protection technologies, addressing the mechanization needs and strengthening linkages between different stakeholders in agriculture.

Technical Programme

1. Intensification of research on enhancing productivity

- The University has already developed many varieties in rice and vegetables which are very popular in the State. However, efforts will be intensified for breeding superior varieties with targeted yield under different ecosystems and hybrids with good quality in rice, brinjal, bhindi, bittergourd and cucumber. The germplasm conservation and marker assisted selection programmes of the University will be strengthened.
- Initial works carried out on zero/minimum tillage technologies in rice will be intensified and techniques for improving soil and plant health in different crops will be refined.
- Research will be intensified for developing eco-friendly crop protection technologies including green chemicals and biocontrol agents in rice, vegetables, coconut and spices.
- Research for developing /modifying existing tools, implements and farm machineries used for different operations will be strengthened to make them user friendly and suited to different farming systems in Kerala.
- Research on “Below Mean Sea Level farming” and that in Kole lands will be intensified.

2. Strengthening academic and research capabilities of Kerala Agricultural University

- Research on Seed technology, protected agriculture, precision farming, post harvest technology and value addition etc., will be strengthened.
- Biotechnology research including bioinformatics and nano technology will be strengthened
- The existing pesticide residue laboratory and Radio Tracer laboratory will be upgraded.
- A new centre each for Refinement of Agricultural Technology and Transfer and Peri- urban Agricultural Training Centre for errace and home gardening will be established.
- Specialised training modules will be designed for women empowerment.
- Capacity building programmes for scientists and other officials of the University will be taken up.
- The water availability in the different campuses under Kerala Agricultural University will be assured by renovation of existing ponds and wells and suitable irrigation system will be established.

Expected Outputs

1. Intensification of research on enhancing productivity of major crops of Kerala

- Superior varieties and F1 hybrids in rice, brinjal, bhindi, bittergourd and cucumber
- Technologies for improving soil and plant health management such as building up of organic matter content of soils, amelioration of soil acidity, identifying critical levels of secondary and micro nutrients and concomitant recommendations.
- New eco-friendly crop protection technologies including green chemicals and biocontrol agents for rice, vegetables and spices

2. Strengthening academic and research capabilities of Kerala Agricultural University

- a) Research and academic management building complex
- b) Two hostels for UG, PG and Research scholars

- c) Placement centre for students and a visiting scientist's hostel
- d) Renovated ponds, wells and well established irrigation systems in major campuses of KAU
- e) Standardised technologies for protected agriculture and precision farming, seed science, post harvest technology and value addition.
- f) Women empowerment through specialized training modules
- g) Technologies for solid waste management and mass multiplication of quality planting materials
- h) Upgraded labs for pesticide residue analysis, soil and plant health monitoring
- i) Bioactive compounds from Medicinal and Aromatic plants to assist crop improvement
- j) Trained manpower in emerging areas
- k) Refined and user friendly tools for small sized holdings and cropping systems
- l) New Agricultural Technology and Information Centre, Peri-urban Agricultural Training Centre and e-governance cell in KAU.

Expected outcome of the project

- a) Enhanced productivity in rice (from 2671 kg/ha to 3000 kg/ha) and vegetables (from 10 t/ha to 12 t/ha) with resultant increase in total production of the State.
- b) Partial self sufficiency in rice and vegetables.
- c) Optimised use of major and micronutrients in the State.
- d) Minimised pollution in agriculture in Kerala
- e) Enhanced water use efficiency of farms in KAU
- f) Improved delivery systems in agricultural education, research and extension.

EXTENSION EDUCATION

Outreach Activities

1. Establishment of “Agricultural Mall” named ‘BUD’

A multi-storeyed mall called the ‘Bud’ is to be established in Mannuthy Thrissur district in Kerala. This Mall will be a unique green building of architectural beauty. The Directorate of Extension and major centres under the Director of Extension can be housed inside the mall.

Objectives

1. Establishing an agricultural mall to be managed by the Kerala Agricultural University
2. Management of the mall co-ordinating the various public institutions and private entrepreneurs

Area of the mall – 2.5 Lakh sq.ft

Agricultural mall of this scale will be the first of its kind in the country which will cater to the needs of the farmers and consumers of the state. This will be a one shop stop for all agricultural activities, inputs, information, entertainment and ethnic food.

Facilities for sale of products, planting materials, seed, organic products, agricultural implements, inputs, manure, farm machinery, entertainment and other consumer stores will be provided. Auditorium and seminar halls will also be housed inside the mall.

Anticipated Revenue

- Sale of seeds, planting materials, implements, books, Value added products, egg, meat etc.
- Rent from Food court, aquarium, Kids recreation zone
- Rent from Auditoriums, private entrepreneurs
- Rent from Commodity boards, Banks, Insurance agencies

2. Establishing Second KVKs in the districts of Palakkad, Ernakulam, Idukki and Kannur of Kerala

Krishi Vigyan Kendras (KVK) are innovative science based institutions that perform as district nodal agency for agriculture development in the country. Currently we have around 589 KVKs covering all most all the districts of the country. They operate under public and private host institutes under ICAR, SAUs, and NGOs. In Kerala we have KVKs in all the 14 districts with eleven under public institutions and three under NGOs. These KVKs by design operate in an appropriate mix of multidisciplinary expertise and provide a platform for integrated technology application for sustainable development and livelihood security. However, the potential of these centres to function as knowledge and resource centres for the promotion of farm innovations at field level and generation of need based agricultural technologies could be better realised by reducing the operational area especially in large districts with inaccessible terrains. It is in this context a second KVK is proposed for the four agriculturally significant districts of Kerala viz. Palakkad, Ernakulam, Idukki and Kannur. The agricultural and geographical significance of these districts for the establishment of a second KVK under the public domain of Kerala agricultural University is detailed.

KVK Palakkad

The large area and presence of agro-ecologically different zones in the district has posed tremendous difficulty for the outreach functions of the KVK, Palakkad. Establishment of a second KVK in Muthalamada region can specifically cater to the need of horticultural farmers especially mango growers of this region in this eastern tract of the district.

Location : Muthalamada farm under the government of Kerala can be taken up by Kerala Agricultural University for the establishment of the new KVK.

KVK Ernakulam

The KVK, though conceptually mandated to cover the whole Ernakulam district its activities are confined to the coastal belts and largely caters to fishing and related activities. The agriculturally significant areas of the district lie in the eastern highland tract. So establishment of KVK in this area can cater to the need of the farming communities especially the farmers involved in the cultivation of cash crops like rubber, pineapple, banana and vegetables.

Location: It can be established under the Pineapple Research Station, Vazhakulam by acquiring more land.

KVK Idukki

The diverse agriculture scenario of the district poses high challenge to the technology dissemination activities of the KVK. Moreover, geographical constraints also limit the access and utilization of the services by the farmers of the lower reaches of the district. Hence establishment of a new KVK for the lower ranges of the district in Thodupuzha region will be highly beneficial.

Location: Arikuzha farm under the Department of Agriculture, Government of Kerala can be considered for the establishment of the new KVK.

KVK Kannur

Geographical spread of the district and its uneven terrain limits outreach of the KVK to farmers of southern parts of the district. Hence the establishment of a new KVK in Panoor region will help the farmers from these areas also to benefit from KVK services.

Location: A suitable site in the area under the government sector would be identified for the purpose.

3. Establishing Central Technology Museum

Kerala Agricultural University proposes a Central Technological Museum with the following:

Objectives

To provide all the facilities of having an exposure on the activities and achievements of the Kerala Agricultural University under one roof.

1. To demonstrate the performance of the technologies in the field with the crops to offer first hand

information to the visitors.

2. To display the samples, models, photographs, specimens and publications of the developed technologies with detailed information.
3. To exhibit the historical development of Kerala's agriculture with scientific back ground.
4. To offer a complete knowledge on the important milestones of the Kerala Agricultural University to the visitors.

Expected benefits

The visitors will be exposed to different activities and achievements of the Kerala Agricultural University by providing a comprehensive exposure on the demonstrated technologies within a short period of time without much tediousness and monotony on the part of visitors. All categories of the visitors will be able to understand the technologies easily and have direct experience from the technological museum. Upto date information will orient the visitors abreast of latest technologies. The museum will provide all the information regarding the historical development of Kerala's agriculture with scientific back ground. Specifically it will offer a complete knowledge on the important milestones of the Kerala Agricultural University to the visitors. Kerala has only archaeological, historical, art museum and planetarium. Technological museum will be the first of its kind to educate the visitors on the technological issues of the farming sector blended with entertainment values.

4. Setting up an International Research and Development Institute for Human Resources in Farm Sciences

Introduction

The depth and spread of Kerala Agricultural University's intellectual and technological resources are unparalleled but largely unutilized in terms of equipping the on job work force in terms of human resource development. The present proposal marks the embarking on an ambitious programme of strengthening Kerala Agricultural University's infrastructural capability to cater to the growing need to impart on job training to manpower in the agriculture sector within India and abroad.

Objectives

The proposed institute will serve four core areas:

1. Training
2. Research
3. Consultancy
4. Documentation

The mandate of the Institute will be:

1. To serve as a think-tank for agricultural development in the State
2. To provide training in technical, managerial and entrepreneurial skills
3. To undertake adaptive/action research for agricultural development
4. To serve as a resource centre and clearing house on agriculture related entrepreneurial projects

Funding

The entire funds for this project be met from the Central Government funds for the development of agriculture in the nation.

Merits of the Project

1. The project promotes the national objectives of development in agriculture

2. The project draws on the comparative advantage of the state university
3. The project will have a significant impact in the overall development of human resources in the state
4. The project will encourage inclusiveness of all stakeholders involved in horticulture and provide a convergence platform for scaling up their activities to national and international standards
5. The project will enhance gender equality
6. The project has strong prospects for successful implementation
7. The applicant organization has a strong track record
8. The project is technically sound in conception and presentation
9. The project represents good value for money
10. The project has strong prospects of sustainability beyond the project duration.

Vision

It is the International Research and Development Institute for Human Resources in Farm Sciences vision to be counted among the nation's most pioneering, innovative, user friendly and self-supporting training institutions. We shall strive to facilitate the acquisition of managerial and technical skills by extension workers, managers, scientists and administrators in all sectors of agricultural economy to enable them to provide the most effective support and service to the farming community for practicing sustainable agriculture.

5. Food Security Army Training College

Agricultural Research Station, Mannuthy has already conceptualized and instituted "Food Security Army" to attract and motivate 'youth' to take up agriculture as a noble profession. This is to establish that farming operational service is a "Service Provider" sector which has got tremendous potential in the Country. This is the self created opportunity to serve the Country with esteem, pride and respect. This is the basic approach to develop Agricultural Human Resource of the Country to achieve the envisaged growth in agricultural sector in 12th Plan. Unless human resource base of the Country is not developed especially to bring a second green revolution through effective farm mechanization, the real targeted growth cannot be achieved.

The KAU model of "Food Security Army" for food security through agricultural mechanization has been highly successful. Youth and farm workers could be organized as also army through appropriate training to take up agricultural operation services as a service provider. Several Agro Machinery Operation Service Centers are established and functioning in the State. This "Food Security Army" trainings are spreading villages to villages and more and more youth are attracted to this programme. Agricultural Research Station, Mannuthy has already trained 2200 people as Food Security Army and another 1000 are being trained during current year. This programme is to be adopted as a national model and spread all over the Country as a Central Government assisted National Programme.

Kerala Agricultural University needs sustained support from Central Government to strengthen the base and spread of the programme. At present the centre of this activity is at Agricultural Research Station, Mannuthy. Central Government may develop this as a National Training Centre for Food Security Army and may develop it as a Food Security Army Training College, similar to NDA/ IMA/ AFA. This will appreciate more and more youth to join Food Security Army service sector through mechanization.

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5. Food Security Army Training College

Agricultural Research Station, Mannuthy has already conceptualized and instituted "Food Security Army" to attract and motivate 'youth' to take up agriculture as a noble profession. This is to establish that farming operational service is a "Service Provider" sector which has got tremendous potential in the Country. This is the self created opportunity to serve the Country with esteem, pride and respect. This is the basic approach to develop Agricultural Human Resource of the Country to achieve the envisaged growth in agricultural sector in 12th Plan. Unless human resource base of the Country is not developed especially to bring a second green revolution through effective farm mechanization, the real targeted growth cannot be achieved.

The KAU model of "Food Security Army" for food security through agricultural mechanization has been highly successful. Youth and farm workers could be organized as also army through appropriate training to take up agricultural operation services as a service provider. Several Agro Machinery Operation Service Centers are established and functioning in the State. This "Food Security Army" trainings are spreading villages to villages and more and more youth are attracted to this programme. Agricultural Research Station, Mannuthy has already trained 2200 people as Food Security Army and another 1000 are being trained during current year. This programme is to be adopted as a national model and spread all over the Country as a Central Government assisted National Programme.

Kerala Agricultural University needs sustained support from Central Government to strengthen the base and spread of the programme. At present, the centre of this activity is at Agricultural Research Station, Mannuthy. Central Government may develop this as a National Training Centre for Food Security Army and may develop it as a Food Security Army Training College, similar to NDA/ IMA/ AFA. This will appreciate more and more youth to join Food Security Army service sector through mechanization.

Modus Operandi

The centre will provide 6 months training to the selected youths (10th Dropout / +2 students with VHSE, ITC / ITI background) on mechanized agriculture. Two streams of training will be there. Plus two, 10th dropout boys will be trained basically as service providers of mechanized agriculture. Plus Two VHSE, ITC / ITI 2 year certificate holders will be trained basically as master trainers cum service providers. Vocational work experiential training will be imparted both on the technology of crop production as well as operation, repair and service of agro machinery. The training module will include apart from subject syllabus, compulsory physical training in the morning session and compulsory games and physical fitness session in the afternoon. As in military academy, discipline and punctuality, dress code, etc. will be maintained in the campus. The training cost will be borne by the Centre Selection of candidates will be through physical endurance, general comprehension and medical fitness test. The selected candidates may have to sign an agreement with the centre that they will offer their service in selected villages through approved Agro Machinery Service Centers as and when needed.

The initial capacity will be 200 candidates at a time. Two streams will be offered in one year. 1st stream (January – June) for “Food Security Army” Master Trainer cum Service Provider and 2nd stream (July to December) will be for Food Security Army Service Provider. If the trained leaves the course in between he has to remit the entire course expenditure to the college.

There will be dress code, code of conduct and behavior and code for duties and responsibilities prescribed for the trainee during training session.

The “Food Security Army” National Training College will be established and managed in similar manner as that of Indian Military Academy.

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