

UAS, DHARWAD – AT A GLANCE

INTRODUCTION

In pursuit of providing professional service to the farming community in the 12 northern districts of Karnataka State, India in modernising agriculture, the College of Agriculture was established in 1947 by the erstwhile Bombay State Government at the Agricultural Research Station, Dharwad about 8 km away from the present University campus. With the reorganisation of states of India during 1956, the college came under the administrative control of the Department of Agriculture, Mysore State (later named as Karnataka State). The College was affiliated to Bombay University soon after its formation and then to Karnatak University, Dharwad in 1950. It became the constituent college of the University of Agricultural Sciences, Bangalore in 1965 and then came under the purview of the University of Agricultural Sciences, Dharwad with effect from 1st October 1986, the day on which a separate University for the northern Karnataka region was formed. The University has multi-fold functions of teaching, research and extension in the field of agricultural and allied sciences.

MANDATE

- Making provision for imparting education in different branches of the study, particularly agriculture, horticulture, veterinary and animal sciences, forestry, fisheries, agricultural engineering, home economics and allied sciences
- The advancement of learning and research, particularly in agriculture and other allied sciences.
- Undertaking the extension of such sciences to the rural people of the state; and
- Such other purposes as the State Government may, by notification in the Official Gazette, specify.

MISSION

The mission of the University is to provide leadership in teaching, research and extension related to agriculture and allied sciences. The University has been making efforts to keep pace with new frontiers of science and contemporary developments to be socially, economically and technically relevant. The University is strongly committed to develop the needed excellent manpower and useful technologies and their dissemination to serve the farming community of the State, in general, and its jurisdiction, in particular.

GOALS

In keeping with the spirit of the mission and mandate of the University, the following goals have been projected for the University.

- To make agricultural education responsive to the growing and changing needs of the society, in general, and aspirations of the farming community, in particular.

- To establish a dynamic system of agricultural education to train highly skilled and competent manpower to address the challenging tasks in new emerging areas of research, extension and industry.
- To develop suitable end use technologies to solve farmers' problems vis-à-vis agricultural production including animal husbandry and fisheries and foster research aimed at conceptual advances in all disciplines for technology development in the long run.
- To establish state-of-the-art infrastructure including well equipped laboratories, extensive farm lands and an operational research management system that will ensure quick, efficient and cost effective implementation of research programmes.
- To attract qualified and talented personnel to undertake research in the University.
- To ensure that the research findings and innovations, after their proven demonstration, are communicated to the farmers on a logistically feasible scale. This mechanism acts as an interface between farmers and researchers and enables identification problems through a positive feedback.
- To disseminate knowledge and technology to farmers on a wider scale by training the grass root workers and officers of the State Departments of Agriculture, Horticulture and Sericulture on recent advances in the respective fields through subject matter specialists.

AWARDS AND RECONGNITIONS

- Owing to its outstanding achievements and yeomen services in fields of agricultural education, research and extension, the University has been adjudged as the Best Agricultural University in the country and has been conferred the prestigious "Sardar Patel Outstanding Agricultural Institution Award 2000" by the ICAR, Government of India.
- The scientists of the University have received more than 150 national/international awards.
- The University has been accredited for 5 years by the ICAR with "A" Grade.
- NSS Activities in the University are adjudged as the best in the state as well as country. UASD received the Indira Gandhi NSS Award at National level in the year 2000-01 from amongst 270 universities and the State NSS Best Award for the year 2000-01.

TEACHING

One of the missions of the University is to impart higher education in agriculture and allied sciences for creating and developing human resources in these fields necessary for overall agricultural development of the country, in general, and state, in particular.

Teaching activity is carried out through eight colleges in seven campuses. All the colleges have been accredited by ICAR with "A" Grade. Both undergraduate (UG) and postgraduate (PG) programmes are offered in different disciplines under Semester system.

UG programmes are offered in six fields, namely, Agriculture (at Dharwad, Raichur, Bijapur and Bheemarayanagudi), Agricultural Marketing and Cooperation and Agri-Business Management (at Dharwad), Rural Home Science (at Dharwad), Agricultural Engineering (at Raichur), Horticulture (at Arabhavi) and Forestry (at Sirsi).

PG programmes are offered at Dharwad, Raichur, Bidar, Arabhavi and Sirsi campuses in 31

disciplines for master's degree and in 17 disciplines for doctoral degree.

Presently, 1748 students are on roll for various UG programmes and 706 for various PG programmes, totalling to 2454.

Many outside funded adhoc research projects operating in the University have been benefiting the students with several fellowships and associateships. SC/ST students have been provided with UAS scholarships at PG level.

Undergraduate Degree Programmes:

Name of the College	Degree Programme	Year of Commencement	Annual Intake
College of Agriculture, Dharwad	B.Sc. (Agri)	1947	110
	B.Sc.(Ag.Maco.)	1976	33
College of Agriculture, Raichur	B.Sc. (Agri)	1984	60
College of Agriculture, Bijapur	B.Sc. (Agri)	1990	60
College of Agriculture, Bheemaranagudi	B.Sc. (Agri)	2001	44
College of Rural Home Science, Dharwad	B.H.Sc.	1974	50
College of Agril.Engg., Raichur	B.Tec (Ag.Engg)	1987	40
Kittur Rani Channamma College of Horticulture, Arabhavi	B.Sc. (Hort)	1994	50
College of Forestry, Sirsi	B.Sc. (For)	1997	25

Post-Graduate Degree Programmes:

The Post Graduate Degree programmes in the University consist of Master's Degree in 31 disciplines and Doctor of Philosophy (PhD) Degree in 17 disciplines, as given below:

Doctoral Degree Programmes (PhD):

Agricultural Economics	Agricultural Entomology
Agricultural Extension Education	Agricultural Microbiology
Agronomy	Agri-Business Management
Crop Physiology	Genetics and Plant Breeding
Horticulture	Plant Pathology
Plant Biotechnology	Soil Science & Agricultural Chemistry
Seed Science and Technology	Human Development
Food Science and Nutrition	Family Resource Management
Textiles and Apparel Designing	

Master Degree Programmes

M.Sc(Agri)

Agricultural Economics	Agricultural Entomology
Agricultural Extension Education	Agricultural Microbiology
Agronomy	Crop Physiology
Genetics and Plant Breeding	Horticulture
Plant Pathology	Soil Science & Agricultural Chemistry
Seed Science and Technology	Agricultural Statistics
Sericulture	Plant Bio-Technology

M.B.A .(Agribusiness)

Agribusiness Management

M.Sc.(Horticulture)

Floriculture and Land Scaping	Olericulture
Pomology	Post-Harvest Technology
Spices and Plantation Crops	Medicinal and Aromatic Plants

M.Tech. (Agricultural Engineering)

Irrigation & Drainage Engineering	Farm Machinery and Power
Soil and Water Engineering	Agricultural Processing and Food Engineering

M.Sc.(Forestry)

Forestry

M.H.Sc.

Textiles & Apparel Designing	Human Development
Family Resource Management	Extension and Communication Management
Food Science and Nutrition	

Institute of Agricultural Biotechnology [IABT]:

IABT, with state-of-the-art technologies has been established with the financial assistance of Rs.5 crores from the Govt. of Karnataka. With the ultra-modern laboratories, the institute aims to provide high quality education, training and R&D in plant and microbial biotechnology. Transgenic plants in pigeonpea, cotton, chillies, tomato, groundnut, transgenic microbes, functional genomics, new and novel genes, applications of marker technologies are in advanced stages of development. The Institute offers both M.Sc. and Ph.D. programmes in Plant Biotechnology.

Collaborative Education and Research Programmes:

MOU with more than 60 national and international organisations have been executed for mutual development through exchange of information/knowledge, manpower and/or facilities. Some such organisations, to quote, are ICRISAT, Hyderabad; Several ICAR Institutes; BARC, Mumbai; IISc, Bangalore; CFTRI, Mysore; KU, Dharwad; UAS, Bangalore; CSR&TI, Mysore; MAHYCO Research Foundation, Jalna; KRIBHCO; KJS Instt. of Applied Agril. Research, Sameerwadi; Wageningen University, Netherlands; McGill University, Canada; Cornell University, USA.

Campus Interviews and Placement of Graduates:

Campus interviews by banks, cooperatives and other private organizations are being regularly held at Dharwad for effective placement of agricultural graduates/postgraduates at attractive salaries.

Agri-Clinic and Agri-Business Centres Scheme:

UASD is recognized by Government of India as a center for training of agriculture and allied sciences graduates for self-employment. Under this scheme, annually about 50-100 graduates are being trained in various entrepreneurship programmes for self-employment with financial assistance from

NABARD/Commercial Banks.

Employment Prospects of UASD Graduates/Post-Graduates:

The graduates/postgraduates of this University are being widely absorbed in the Agricultural Research Service of the Indian Council of Agricultural Research, Banks and Cooperative Institutions, State Agricultural Universities, private organisations/NGOs in addition to Indian Administrative Service, Indian Forest Service, Defence Service, World Bank Projects as Consultants, among others. Above all, the graduates are capable of being self-employed as they are equipped with entrepreneurship qualities.

RESEARCH

The University of Agricultural Sciences, Dharwad covers 52% of the geographical, 63% of total cultivated and 32% of the irrigated area in the State, spreading across 12 districts of northern Karnataka.

A number of agricultural, horticultural and plantation crops represent the rich heritage of the area. There are five major irrigation projects, viz., Tungabhadra, Upper Krishna, Malaprabha, Ghataprabha and Karanja, which provide irrigation to about 15 lakh ha, accounting for 27 per cent of the total cultivated area.

The region is endowed with a variety of climate, soils and crops. The University covers six Agro-climatic Zones, viz., North Eastern Transitional Zone, North Eastern Dry Zone, Northern Dry Zone, Northern Transitional Zone, Hilly Zone and Coastal Zone.

Research needs of the farmers are catered through 36 Agricultural Research Stations spread across diverse agro-ecosystem, 46 AICRPs and nearly 250 Externally funded Adhoc Projects.

As a result of adhoc research projects funded by World Bank aided NATP, ICAR, DST, DBT, GOK and other national and international agencies, the financial outlay under research has increased from Rs. 10 crores to Rs. 50 crores within a period of last four years.

Some of the mega research projects include world Bank aided National Agricultural Technology project (consisting of 90 sub-projects), CIDA-McGill-UASD Collaborative Project on "Consolidation Food Security in South India", World Bank Funded project through GOK entitled "Community Based Tank Management Consultancy Project", Afforestation Project in and around Bellary Thermal Power Station, Transgenic Brinjal project in collaboration with Cornell University, USA and Wheat Project in Collaboration with Indonesian Government.

Research Stations with their Lead Functions

SN	Research Station (District)	Year of Estt.	Areas of Research
1.	MARS, Dharwad (Dharwad)	1947	Research on oilseeds, sorghum, soybean and wheat; Agroforestry; Research on horticultural crops; Animal science research; Home science research; post-graduate research
2.	RARS, Bijapur (Bijapur)	1933	Improvement in rabi sorghum, bajra and sunflower; soil and water conservation based on farming situation; Farming systems approach for sustainable production in dryland areas; areas; Dryland horticulture, agroforestry and cropping systems.

3.	RARS, Raichur (Raichur)	1932	Rainfed and irrigated cotton, groundnut, sunflower, castor, sesamum and niger, Horticultural crops; research on Agril. Engg.; Agroforestry; Inland Fisheries; Soil Science, Sericulture.
4.	ARS, Almel (Bijapur)	2002	Research on groundnut and Sunflower; Seed production of field crops.
5.	ARS, Annigeri (Gadag)	1947	Research on safflower, chickpea and rabi sorghum; Verification trials on cotton, wheat, soybean and greengram.
6.	ARS, Arabhavi (Belgaum)	1909	Development of high yielding maize hybrids/composites resistant to major diseases and pests; High yielding medium staple cottons suitable for GLBC command area; Cropping systems research, Improvement of Khillar cattle with major thrust on animal nutrition and management aspects.
7.	ARS, Bagalkot (Bagalkot)	1951	Rabi sorghum, wheat and cotton; Dry farming; and seed production.
8.	ARS, Bailhongal (Belgaum)	1947	Kharif sorghum, soybean, cotton and pigeonpea and seed production.
9.	ARS, Belavatagi (Gadag)	1974	Water management.
10.	ARS, Bheemarayanagudi (Gulbarga)	1981	Water management, drainage engineering and cropping systems in black soils.
11.	ARS, Devihosur (Haveri)	2000	Development of high yielding, disease resistant chilli varieties and hybrids; purification of byadgi chilli; standardization of agronomic techniques; IPM on chilli and chilli production.
12.	ARS, Dharwad (Hebbali Farm) (Dharwad)	1904	Breeding disease and pest tolerant varieties/hybrids in cotton for irrigated and rainfed situations : evaluating suitable agronomic practices for varieties/hybrids; Cotton seed production technology.
13.	ARS, Gadag (Gadag)		Horticultural nursery programme.
14.	ARS, Gangavati (Raichur)	1956	Research on saline water and improvement of salt affected soils; Sugarcane and paddy; oilpalm, agroforestry and horticulture crops; Cropping system and crop management.
15.	ARS, Gulbarga (Gulbarga)	1974	Research on redgram, bengalgram and greengram; rabi sorghum and minor millets; Dryland horticulture.
16.	ARS, Hagari (Bellary)	1906	Research on minor millets; Dryland farming; Agroforestry; Sericulture; Cotton, rabi sorghum and onion.
17.	ARS, Halladkere, Bidar (Bidar)	1963	Research on sugarcane, cropping systems, sericulture, vegetable crops.
18.	ARS, Hanumanamatti (Haveri)	1974	Watershed management; Dryland horticultural research; Research on small millets; soil and water conservation techniques; Seed Production.
19.	ARS, Janwada, Bidar (Bidar)	1982	Research on sorghum, sunflower, soybean, pulses and cropping system; Horticulture research.
20.	ARS, Kallolli (Belgaum)	1986	Research on maize, sunflower, soybean; Seed production programmes.
21.	ARS, Kanabargi (Belgaum)	1990	Improvement of vegetable crops
22.	ARS, Kavadamatti (Gulbarga)	1986	Irrigation water management for crops grown on red soils; Evaluation of suitable mango, ber, coconut varieties and cultural practices for horticulture and annual crops.
23.	ARS, Malnur (Gulbarga)	1991	Water management in medium black soils; Seed production; Land reclamation; Horticulture.

24.	ARS, Mudhol (Bagalkot)	2004	Research on sugarcane, soybean, wheat, maize; Seed production of major field crops.
25.	ARS, Mugad (Dharwad)	1923	Identification of high yielding varieties of drill sown rice for upland, midland and lowland situations; Disease management in rice; Rice based cropping systems.
26.	ARS, Mundagod (Uttar Kannada)	1987	Development suitable agronomic practices for drill sown rice and hybrid cotton under rainfed situations; Horticulture research.
27.	ARS, Nippani (Belgaum)	1938	Bidi tobacco; Tobacco based cropping systems.
28.	ARS, Prabhunagar (Dharwad)	1976	Agroforestry and silviculture.
29.	ARS, Sankeshwar (Belgaum)	1959	Research on sugarcane, chilli and soybean; Sugarcane based cropping systems; Breeder seed production of sugarcane.
30.	ARS, Sirsi (Paddy) (Uttar Kannada)	1955	Rice based cropping systems; evaluation of suitable rice varieties.
31.	ARS, Sirsi (Pepper) (Uttar Kannada)	1965	Research on high yielding varieties resistant to diseases and pests of arecanut and black pepper; Standardization of agro techniques for arecanut and pepper.
32.	ARS, Siruguppa (Bellary)	1937	Cropping systems research; Integrated nutrient management, weed control, irrigation management in transplanted rice; Evaluation and breeding in rice for transplanted condition; Evaluation and breeding in cotton for irrigated condition; Agronomic practices for irrigated cotton; and sugarcane.
33.	ARS, Tidagundi (Bijapur)	2002	Horticulture crops-Grapes, pomegranate, citrus.
34.	ARS, Raddiwadgi (Gulbarga)	1964	Research on pulses, chilli, cotton, vegetables; Seed production.
35.	ARS, Soundalaga (Belgaum)	1961	Research on soybean, groundnut, green manure crops; Seed production.
36.	ARS, Madarkandi (Bagalkot)	2005	Seed production of major field crops.

I. AGRICULTURE

A. Crop Improvement

Since the inception, the University has released a total of 119 crop varieties, which include cereals - 34, oilseeds - 16, pulses - 19, commercial crops - 20, fodder crops - 12 and horticultural and plantation crops - 17. While most of these varieties have spread in Karnataka, a few have also moved out of the subcontinent.

Cotton

Varalaxmi, first interspecific hybrid in the world was developed in 1971 at Agricultural Research Station, Dharwad, followed by release of Jayalaxmi (DCH-32). These two hybrids with extra long staple superiority in quality and unprecedented yield in quantity revolutionized the cotton cultivation in the entire country.

Other important varieties/hybrids developed by the University are **DHB-105** (interspecific), **DHH-11** (intraspecific), **DHB-543**, (interspecific long staple hybrid), **CPD-431** (hirsutum cultivar), **Abhadita** and **Sahana** (boll worm tolerant cotton varieties).

University has for the first time developed naturally coloured cotton variety (**DDCC-1**) with all the

commercial qualities. Long staple desi cotton (DLSA-17) has inherent qualities like resistance to biotic and abiotic stress. Development of Bt cotton resistant to bollworm is also in advanced stage. First public **transgenic Bt cotton** is expected shortly which will stand as a check to the monopoly of private sector.

Wheat

Karnataka is unique in cultivation of three species, namely, *Triticum aestivum* (Bread wheat), *Triticum durum* (Durum or soji wheat), and *Triticum dicoccum* (Dicocum or diabetics wheat). Totally nine varieties have been developed by the University. Important ones are: (1) **DWR-162** (bread wheat) which has occupied 80 per cent of wheat area in Karnataka and about 2.5 lakh ha in the entire Peninsular India; (2) **DWR-225** with an yield potential of 40 q/ha and resistance to all existing races of leaf rust.

In Durum wheat, the University has released (1) **DWR-185** for irrigated conditions (occupies an area of 30,000 ha) and (2) **DWR-2006** resistant to leaf blight for rainfed conditions.

Karnataka is the only State where Dicocum wheat is grown commercially. UASD is a pioneer Institute in the world to develop and release a semi dwarf dicocum wheat variety namely, **DDK-1001**. Another variety **DDK-1009** which is resistant to leaf blight has been released recently. Dicocum wheat have greater future due to their thearaputic value in diabetes management and higher profitability.

Groundnut

UASD has developed **DH-40**, DSG-1, **R 8808** (KRG-2), R 9251 (KRG-3). For coastal tract, DH-40 is the only recommended variety, which is early maturing, with high shelling out turn and high yielding under receding moisture conditions. As bud necrosis disease is a major constraint in the production of summer groundnut in the command areas, release of KRG-2, tolerant to bud necrosis, high yielding for sustainable production in Zone-1, 2 and 3 both for *kharif* and summer seasons has enhanced groundnut production. Similarly, another variety KRG-3 has also been identified as tolerant to bud necrosis suitable for summer cultivation. In the transitional zone, foliar diseases are the major constraints, which result in reduction of yield to a great extent. Recently developed varieties, namely, **GPBD-4**, resistant to leaf spot disease, hold a greater promise in Zone-8 during *kharif*. Another variety, **TAG-24**, is profitable under summer irrigated condition.

Sunflower

The University has developed downy mildew resistant early maturing hybrid **DSH-1** in 1996, which has been gaining popularity in North Karnataka. In addition, Morden, which was an early maturing variety cultivated in the entire country has been improved and released as renovated dwarf Morden to replace the original Morden variety. Recently RSFH-1 has been released for Zone- 1 and 2.

Safflower

Variety **A-300**, which was released long back, occupied the entire safflower cultivated area in Karnataka in the beginning and was replaced by **A-1**, highly adaptable to dry situation and high yielding. Recently an improved variety **A-2** has been released which is having high oil content (33 to 34%) compared to earlier varieties (28 to 30%). This variety is early maturing, semi compact and is suitable for intercropping with bengalgram.

Pigeonpea

During 1970's, scientists from Gulbarga improved the existing local cultivar and the university released the variety under the name **GS-1**. Since this variety was found to be susceptible to wilt, variety **Maruti** released in the year 1985 has occupied almost $\frac{3}{4}$ th of the tur growing area in the entire North Karnataka. Cultivation of this variety alone has generated additional revenue valued at more

than **Rs.100 crores** due to its wilt resistance.

To manage sterility mosaic disease, **ICPL-87119 (Asha)** has been released. In shallow medium black soils, a medium duration cultivar **WRP-1** that yields high due to escape mechanism from pod borer has been released.

Chickpea

Annigeri-1 is the popular variety covering the entire chickpea area not only in Karnataka, but also in the surrounding States. Since this variety has been showing susceptibility to wilt, two new varieties have been identified namely, **ICCV-2** and **ICCV-10**. Variety **ICCV-2** is a Kabuli type with bold sized grains. This variety is expanding in area since it fetches premium price in the market and thus makes it more profitable.

Sorghum

Variety **DSV-2**, a dual season sorghum variety suited for kharif and rabi, matures in about 115 to 120 days, resist several foliar diseases and tolerate insect pests damage. Owing to high yield potentiality of 45 q per ha, the variety has covered an area of about 20 per cent of kharif sorghum in Dharwad and Belgaum districts. Among the hybrids, University has identified CSH-14, an early maturity high yielding hybrid to replace 80 per cent of the area occupied by CSH-1.

Among rabi sorghum varieties, **M 35-1** has been the champion of all varieties covering almost 90 per cent of the rabi sorghum area. Charcoal rot resistant varieties, namely, **DSV-4** and **DSV-5**, have been released.

Maize

University developed a composite variety (Prabha), tolerant to leaf blight and downy mildew disease, which has a potentiality of producing 70 to 80 q per ha. Hybrid **DMH-1**, a triple cross hybrid released in 1995. **DMH-2**, a single cross hybrid developed for the first time in the country, has just been recommended for cultivation.

Soybean

Variety **JS-335** identified by the University in 1995 has occupied almost entire soybean cultivated area. The contribution of this crop to the State is about **Rs.100 crores** every year. In recent years, crop suffered heavily due to rust disease. Release of rust tolerant variety **PK-1029**, as practical remedy suggested by UAS, Dharwad, is becoming popular in Belgaum district along the Krishna river belt.

Sugarcane

Co-8014, a medium duration and 20 per cent higher yielder over Co-740, tolerant to smut and much responsive to fertilizer and irrigation was released in 1992-93. It has covered 30 per cent of the sugarcane growing area in the northern Karnataka and helped in increasing the state revenue to an extent of **Rs. 6 crores** annually.

Variety **Co-86032**, identified for spring planting and under protective irrigation is ready to replace Co-8014 because of yield superiority and higher sugar recovery.

Aerated steam therapy and single bud multiplication programme is launched at Agricultural Research Station, Sankeshwar and the seedlings are being distributed to the farmers in sugarcane growing areas of northern Karnataka. This practice of single bud seeding transplantation reduces the seed-sett cost and also reduces the duration of the crop, apart from getting disease free seed material. A notable achievement in recent past has been the development of three clones highly resistant to sugarcane woolly aphid. One clone that meets the sugar industry requirement is in the final stage of testing and

multiplication through tissue culture.

Chilli

Chilli is an important cash crop of Haveri, Dharwad and Belgaum districts. Byadgi variety is extensively grown in this area. Since this variety is highly susceptible to Murda (leaf curl), the UAS has developed resistant varieties, viz., **KDCC-6** and **GPC-82**. In addition, the UAS has recently developed a hybrid 9646 which is higher yielding and tolerant to leaf curl disease.

B. Crop Production

To enhance and sustain the productivity, integrated nutrient management practices have been developed in cotton, sugarcane, chilli, soybean, sorghum, rice and wheat. In these crops, application of crop residues, FYM and vermicompost enhanced the crop yield to an extent of 25 per cent and also resulted in **saving of inorganic fertilizers by 50 per cent**. This amounts to saving of **Rs. 225 crores** annually over investment on chemical fertilizer besides enrichment of fertility and soil properties.

Residue incorporation with "Rotovator" improved the physico-chemical and biological properties of soil, which helped in economising the chemical fertilizers. **Copper ore tailings (COT)** is a natural waste obtained after mining of copper from ore, which is rich in micronutrients, namely, Fe (10.3%), Mn (0.28%), Zn (0.11%) and Cu (0.08%). The pollution and disposal problems of COT can be reduced by using it in agriculture as micronutrient source.

Application of copper ore tailings (COT) @ 1 t per ha has increased the yield of groundnut, sunflower, soybean, bengalgram, wheat, cabbage and cauliflower by 11-27 per cent. This has not only helped to overcome the micro nutrient deficiencies for the crops and cost saving but also came as effective use and means of disposing of ore tailing.

Green manuring in rice, sugarcane, tobacco, maize and cotton helped in increasing the yield to an extent of 25 per cent and also improved the soil productivity.

The University has developed efficient 'N' fixing and 'P' solubilising - strains. These cultures are being produced on large scale and being used over an area of **20 lakh ha**.

The profitable cropping systems identified are: sorghum + pigeonpea, paddy + cotton, cotton + soybean, pigeonpea + soybean, sugarcane + soybean, chilli + cotton + onion, chickpea + safflower and maize+soybean. A relay sequence cropping of maize-chickpea developed for Ghataprabha and Malaprabha project areas has been widely adopted in the command area and enabled elevation of farm income to an extent of **Rs.100 crores**.

University feels proud of its research on dry farming and watershed management which has brought laurels at the national level. The integrated watershed development practices have enhanced the crop yield and helped in conserving the natural resources. These practices have been adopted over an area of **12 lakh ha**.

Soil Health Restoration

Improper use of irrigation water without proper drainage system in TBP and UKP command areas, has led about 80,000 ha and 27,600 ha to go out of cultivation due to salinity and water logging, respectively. Every year, these figures are escalated by about 3000 ha. The productivity of rice, sugarcane, cotton, sunflower and maize has gone from 81 to 32; 95 to 47, 3.5 to 1.7, 2.5 to 1.0 and 5.5 to 2.0 t/ha, respectively, resulting in a total loss of **Rs. 210 crores** to the state. The University has developed a dual package, a permanent and expensive practice of sub surface drains for economically sustainable farmers and a low cost open drains at 50 meter apart for poor farmers. With these techniques, it has been possible to restore cultivation of abandoned land for agriculture.

C. Crop Protection

IPM packages against major pests in important crops have been developed by the University to combat biotic stresses. Pod borer in pigeonpea has been successfully managed by eco-friendly IPM strategy employing bioagents such as Ha NPV, insectivorous birds, neem based products and use of selective chemicals. In Gulbarga and Bidar districts, this technology spread over an area of **50,000 ha** and led to reduction in **pesticide usage by 50 per cent** and saving cost on plant protection by **30 to 40%**.

In Dharwad and Raichur tracts, IPM modules have been developed to manage cotton sucking pests and bollworms. Large scale demonstration of IPM technology in these areas has created considerable awareness among farmers to adopt the technology successfully and this has been reflected in lowering pesticide usage to the tune of **40 to 50 per cent**. In sorghum, midge resistant variety, **DSV-3** has been developed and adopted by the farmers in midge endemic areas. Yet another success in the recent past has been identification and utilisation of least expensive mycoinsecticide (fungal pathogen - *Nomurea rileyi*) for the control of caterpillar pests in groundnut, soybean, cotton and pulses in humid tracts. Inoculation of a small area serves as nucleus for multiplication and spread of fungus in an area. Mass multiplication techniques for this fungus have been standardised.

UASD has developed economical and eco-friendly measures by developing bioagents like Trichoderma, etc. The bioagent is used as seed dressing to manage pod rot in groundnut, root rot in chickpea and sclerotium wilt in potato. Soil application of Trichoderma has also helped in combating the wilt of pepper.

Introduction of a **tolerant variety PK 1029** in Soybean and one spray with propiconazole has helped the farmers to continue cultivation of soybean profitably.

II. HORTICULTURE

Out of 17 varieties released in vegetables, fruits, ornamental and plantation crops, the University has for the first time released two hybrids in Sapota, namely, **DSH-1** and **DSH-2** which yield about 25 to 30 per cent more and possess higher TSS than the existing varieties Kalipatti and Cricket Ball.

Areca nut is the high value commercial plantation crop of Uttar Kannada district. **SAS-1** variety released in 1995 is high yielding, regular bearing, compact bunch with synchronised maturity. University is producing seeds and seedlings of this variety and distributing it to the farmers every year. This variety has already covered 10 per cent of the new plantations.

High yielding tamarind variety **DTS-1**, released in 1996 has a high yield potential and starts bearing within 5 to 6 years of planting. The demand for this variety is increasing every year. This variety is going to boost the economy of dry land farmers in the watershed areas and arid zones.

III. HOME SCIENCE

The standardization and optimization of production of dyes from natural resources such as Marigold, Acalyfa, Teak and Areca nut is a path breaking accomplishment, a boon for expelling with production of hazardous synthetic dyes by the Textile Industry. The non-edible products could be fully utilized and a break through for eco-friendly dyes for replacement of the hazardous synthetic dyes has been achieved. These dyes are tested for its colour fastness on silk and cotton and dyeing procedures are standardized.

Dicocum wheat varieties are proved to be nutritionally and therapeutically superior in protein and dietary fiber, low in carbohydrates digestibility and glycemic value, which are vital factors in the management of metabolic disorders, viz., diabetes mellitus and heart diseases. These varieties are very promising and a variety of pasta products and extrudates could be manufactured. The dicocum wheat is a boon for proper management of Diabetes Mellitus.

The contribution of percentile growth norms of rural children on a sample of 33,000 of six states in the country is an important reference tool for screening the children for nutritional intervention for promoting optimum development in children from birth to 18/20 years. A cost effective stimulation program for infants from birth to 36 months has proved to be effective in optimizing the psychomotor, mental, social and emotional development of infants thus bringing about qualitative and quantitative changes in human resources.

Improved **Saral Kurpi** is designed and tested which is women friendly and is proved to be effective to reduce drudgery while performing the weeding activity in all the crops of Zoe-8 of Karnataka.

IV. ANIMAL SCIENCE

The HF x Deoni cross bred cows by UAS, Dharwad have higher production capacity and adaptability to diversified local conditions in North Karnataka. The cross bred cows in a lactation period of 305 days, yield 1800 kg more and calve once in a year as against 18-24 months in local breeds.

Addition of 2% of subabul, stylosanthus and mulberry leaf meal in broiler diet increased the feed efficiency and dressing percentage. Similarly, rain tree pods can replace rice bran in the feed to the tune of 50% without any side effects on HF x Deoni heifers.

An improved surgical trevis/chute has been developed. This device facilitates conducting operations on large animals. The cost not only in less by 1/3 but also in more efficient.

Stocking density of tiger prawn at 40,000 PL/ha was found economically viable under improved extensive farming in the coastal areas. The mantisshrimp, a bycatch of trawlers, has been found to enhance prawn production when incorporated in the compounded feed. An yield of **1400 kg/ha** has been obtained in improved extensive farming. Composite fish culture in inland water bodies yield a net profit of Rs. 50,000/ha/year.

SEED PRODUCTION

The university is producing the nucleus and breeder seeds and substantial quantity of foundation and certified seeds of recently released varieties/hybrid. UAS, Dharwad is recognized as model centre for seed production. During the last five years, there has been quantum jump in the production of breeder, foundation and certified/truthful seeds of various crops. Seed production is taken up in 12 research stations identified for seed production. The quantum of seed produced under various classes during 2005-06 was about 45,239 quintals as against 4722 quintals during 2001-02.

Class of Seed	2001-02	2002-03	2003-04	2004-05	2005-06
Nucleus seed	46.61	324.80	421.00	449.00	842.80
Breeder seed	2138.15	4951.10	6119.00	6826.00	10137.00
Foundation seed	18.17	332.50	352.00	2860.00	7609.00
Certified/Truthful	2519.00	4162.00	8330.00	15970.00	26650.00
Total	4721.93	9770.40	15227.00	26105.00	45238.80

EXTENSION

The university has been providing yeoman services to the farming community of Northern Karnataka. The mandate of the Directorate of Extension is to undertake front line extension work that would complement and supplement the existing efforts of the line departments of the State. Government and other private as well as voluntary organizations, for this, the University has designed unique extension services through Transfer of Technology Centres, viz., Extension Education Units (9), Krishi Vigyan Kendras (10), Publication Centre, Staff Training Unit, Bakery Training Unit, Agriculture Technology Information Centre (ATIC) and Kisan Call Centre in addition to Institute Village Linkage Programme under NATP. The EEU's are: Dharwad (estd. In 1986), Bijapur (1987), Gulbarga (1996), Hoovinahadagali (1996), Sirsi (1996), Bagalkot (2001), Arabhavi (2002), Bheemaranagudi (2002), Gangavati (2004).

Krishi Vigyan Kendras: Location, Year of Establishment and Thrust Areas

SN	Name of the KVK (District)	Year of Estt.	Thrust Areas
1.	Hanumanamatti (Haveri)	1977	IPM technology in different crops; Integrated nutrient management in different crops; Use of biopesticides; Production technology on Horticulture crops; Seed treatment; Deficiency of micronutrients; Need based trainings to increase the productivity.
2.	Bidar (Bidar)	1986	Soil and water conservation; Sustainable crop production; Empowerment of Rural women through micro enterprises; Low cost production technologies; Processing, value addition & marketing of agricultural produce; Alternate land use system.
3.	Raichur (Raichur)	1995	IPM technology in paddy and cotton; integrated nutrient management in sunflower; Drudgery reduction, income-generating activities; Paddy based cropping system through SRI; Organic farming through vermicomposting; Popularization of nutritive cereals; Popularization of new varieties.
4.	Hagari (Bellary)	1995	IPM on cotton and paddy; Income generating activities both farm and non-farm sectors; Post harvest technology and value addition in agriculture, horticulture and animal husbandry produce; Awareness on nutrition education, health and hygiene; drudgery reducing activities for farm women; market facilities for products produced by women SHG.
5.	Gulbarga (Gulbarga)	2004	Dryland technologies; Soil conservation; Water harvesting; Proper utilization of agricultural residues by compost & vermicompost production; Proper usage of chemicals introduction of low cost pest management like preparation of Botanicals; Integrated Pest Management Module; Protected cultivation of flower & vegetable; Seed production of different crops; integrated nutrient management in different crops; value addition fruit crops; Postharvest handling of horticulture and agriculture crops.
6.	Bijapur (Bijapur)	2004	Soil and Moisture conservation; Use of organics, biofertilizers and biopesticides; INM and IPM; Inefficient and conventional cropping systems and crop management practices; Marketing and export of

			horticultural crops.
7.	Sirsi (Uttara Kannada)	2004	Paddy based cropping system (SRI method of paddy cultivation); ICM in cotton; Nutrient management for sustainable crop production; Promotion of bio-rational in integrated disease/pest management; Technical support to IGA and entrepreneurship development; Enrichment and preservation of fodder for livestock feeding.
8.	Gangabathi (Koppal)	2004	Yield gaps; Resource use efficiency; Crop productivity; IPM technology in cotton and paddy.
9.	Dharwad	2004	Introduction of new varieties/hybrids; integrated Nutrient Management; Soil test based fertilizer application; integrated pest management; integrated disease management; Storage structures and Integrated management of storage pests; Tree establishment and management; Supplementary nutrition to dairy animals and increasing availability of fodder; On hand experience and development of skills for IGAs.
10.	Bagalkot (Bagalkot)	2005	Runoff and soil erosion; soil and moisture conservation measures; Improved cropping systems and crop management practices; IPM technology under dry land conditions.

Publication Centre:

The center publishes a scientific periodical (Karnataka Journal of Agricultural Sciences) for the benefit of scientific community; brings out popular farm magazine (Krishi Munnade) for the benefit of farmers and extension workers; brings out a series of scientific literature – Package of Practices (Agriculture, Horticulture and Animal Husbandry), Technical bulletins, leaflets, folders, annual reports, etc.; facilitates the scientists of the University to prepare good quality posters, slides, display exhibits, etc.

Agricultural Technology Information Centre (ATIC):

ATIC was established for the first time in this area during 1996 for serving the needs of farmers of the State through “Single Window Delivery System”, It facilitates easy transfer of improved farm technology, sale and distribution of quality inputs produced in the University as well as outside. It extends consultancy services on problems faced by the farmers through analyses of soil, plant, water and animals. It showcases a museum for providing updated information on production technologies evolved by the University. It provides wider publicity of improved farm technology through literature and effective communication media.

Staff Training Unit:

The staff Training Unit is functioning since 1992 with the responsibility of professional competence in agriculture amongst the staff of various organizations within and outside the state. The unit organizes training programmes for various field personnel of government, quasi-government, private and non-governmental organizations, banks and farmers.

Bakery Training Unit:

Bakery Training Unit is functioning at the main campus of the University of impart training of different durations, both on-campus and off-campus, in making bakery products to men, women and youths for household consumption as well as to become professionals in bakery products. The main objectives of this unit are: to provide basic knowledge about bakery; to impart training in making different bakery products and to impart knowledge of bakery through the principle of learning by doing.

TOT is done through demonstrations on farmers fields, trainings, discussion meetings, farm visits, television, radio, print media, consultation, field days, exhibitions, campaigns, seminars, workshops etc. During last year alone TOT Centres have conducted 50 demonstrations, 30 field days, 11 whole farm demonstrations, 99 consultancy services by mail, 2,890 by phone, 1,205 by field visits, 1,304 trainings where in 55,164 farmers participated, 10 campaigns where in 2,560 farmers were participated, 5 exhibitions where in more than 1 lakh farmers participated and 45 field days where in 12,334 farmers participated. Scientists have given 58 Radio talks, 25 fortnightly radio tips through All India Radio, 65 T.V. Programmes through various T.V. Channels on Agriculture and Allied aspects. In all 141 popular article were published by Scientists through various print media.

Krishi Mela

University organizes KRISHI MELA as a mega event every year at the main campus of the University for the benefit of the farming community, Extension Personnel's, Students and allied agencies related to agriculture. The response has been very encouraging and inspiring year after year. Krishi Mela-2005 attracted all time record of over three lakh farmers, farm women, rural youth, extension workers/officers of Developmental Departments/NGOs, political leaders, experts, scientists, policy makers, manufacturers and representatives of various input dealing agencies/organizations, traders, agro-processors etc. from various parts of the country.

Under IVLP, sponsored under the World Bank aided National Agricultural Technology Project, identified different need based technologies suitable for different farming situations of more than 217 farm families and 16 technologies were transferred and refined.

A novel extension programme "One Scientist-One Farmer" has been launched wherein a teacher has to adopt/work with at least one farmer nearer to his place of work, in a selected village and pass on all the improved technologies and provide services for the overall development of farmers.

Large Scale Demonstrations:

To cut short the time lag of research, large scale demonstrations have been organized on farmers' fields to prove the superiority of the technologies in terms of various field level problems.

Innovative Farmers' Technologies:

The idea of identification and documentation of the farmers' outstanding achievements was launched in the year 1999. So far, 126 farmer's achievements have been documented in the form of video cassettes and CDs.

As a facilitator, UASD has initiated Vikas Vahini Clubs in all the districts of the Northern Karnataka, 100 tonne Sugarcane Growers' Club at Bidar, Organic Farmers' Club at Gulbarga and Bijapur.

Special activities undertaken:

Narrow casting through LPT, Bellary, establishment of F.M.Radio at Dharwad, contract farming, contractual extension services, special campaign on "Neem in Agriculture" was organized in Gulbarga owing to its multiple uses, organized Sujala "Integrated Farming System" demonstrations in Dharwad and Haveri district, special training programme on "Management of Sugarcane Woolly Aphid" was organized for Sugar Factory Officers of Tamil Nadu. Developed film on "Fresh Water Fish Farming", popularized importance of soybean in 'Daily Diet Nutritional Value' etc.

Publications brought out for the benefit of farmers:

Package of practices for Horticultural Crops, Field Crops and Animal Husbandry; Booklets on

various aspects, Folders/handouts covering different subjects; etc.

STUDENTS AMENITIES AND ACTIVITIES

- The University has provided hostel accommodation to both boys and girls in all the eight college campuses. Facilities such as multi-gym, canteen, sports, etc. are erected in all the campuses. Medical facilities too are made available to the students round the clock. Students are encouraged to compete in sports, cultural and literary competitions by conducting events at inter-collegiate level. Students have started Study Circles, which help them prepare for competitive examinations.
- The students of the University have bagged 40 ICAR Junior Fellowships, the second highest for any SAU in the country, during 2004-05. more than 12 students of doctoral degree programme have been awarded the prestigious “Jawaharlal Nehru Awards”. The University constantly has stood by the student to enhance their academic performance. A full-fledged International Hostel is established for housing foreign students.
- Our students have bagged first prizes and other awards at Inter-University meets. Some of the are first places in classical instrumental (1991-92), group dance (1992-93), tribal dance (1993-94), college and cartooning (1998-99), mono-acting (2002-03) and light music vocal (2005-06).
- A strong network of NSS operates in all the colleges of the University. The University was the first in the country to include NSS in the course-curriculum. National integration campus are held regularly and our volunteers have been adjudged as the best volunteers at the national level. The NSS unit of the University has also been adjudged as the best at the National level with Indira Gandhi National Award.
- Both Boy’s and Girls’ Divisions of NCC operate at Dharwad campus. Every year, several of our students pass the “B” and “C” Certificate examinations. Some have participated in the Republic Day parade also.
- Overall, the University provides a balanced admixture of curricular and co-curricular activities for the all round development of the students.

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