MAFSU Vision 2025

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EXECUTIVE SUMMARY

India is bestowed with unique, rich and diverse animal resources, which contribute significantly to the gross national product of the country. These animal resources are an integral component of the rural economy and to a greater extent essential for human survival and sustainable development. Unrealistic utilization of these resources to feed teeming population would jeopardize the fine balance between, land, animal and human. The state of Maharashtra is no exception to it. For sustained management, conservation and augmentation of our animal and fishery resources, a region-wise perspective plan for next 25 years has been drafted under the auspices of the Department of Animal Husbandry, Dairying and Fisheries, Govt. of Maharashtra and the Indian Council of Agricultural Research, New Delhi, the principal funding agencies.

The livestock sector has great potential to generate self-employment, especially for rural landless labours, marginal farmers and the farmers that are dependent on rain-fed agriculture. The sector, thus, can be used as an important tool to alleviate rural poverty. For this reason, the Government of Maharashtra took an epoch-making decision in 1998 to establish a distinct Animal and Fishery Sciences University (MAFSU) by carving out veterinary and dairy technology colleges and institutes from the state agricultural universities. The University started its formal functioning on 3rd December 2000. Although the University is in its infancy, the constituent colleges are quite old. The University therefore is in a unique position to review the failures and successes so far, and plan for future under the new dispensation. The University has ventured to undertake this modest exercise of planning the targets and goals to be achieved in future so as to exploit the fruits of development in biotechnology and information technology with an ultimate aim to help the nation in increasing the productivity of the livestock sector by

exploiting principles of conservation, manipulation and utilization of the rich animal resources to ensure quality and safe nourishment to our population.

The University now recognises that driven by the need to participate in global market, a more knowledge intensive agriculture, animal husbandry and fishing is emerging. Animal and allied industries are also because of some reasons, becoming more knowledge intensive. This new scenario has been considered under Mission and Target of the University.

The pursuit of science to achieve human development has always been mankind's unceasing quest. The document presented here represents an ambitious, but achievable plan to develop useful technologies, train and make available committed human resource that can transfer these technologies to field and extend helping hand to farmers to enable them to use the fruits of research to produce and satisfy the quality and quantity demands of the current millennium.

Institutional growth:

MAFSU formally notified on 17th November 2000 was established under the State Act No. 1998 (Mah XVII of 1998) on 3rd December 2000. The University has been carved out of the four Agricultural Universities in the State by transferring five Veterinary colleges, one postgraduate Institute and one dairy technology college, a dairy technology institute and a diploma institute.

It is envisioned that by year 2025, the MAFSU would be a globally recognized University of Excellence, specializing in animal, veterinary, dairying and fishery sciences and technologies.

Mission and Target:

The MAFSU has mission to produce (a) knowledge-bearing manpower so as to meet demand of self-employers, entrepreneurs, technology developers and professional regulators in the field of veterinary, animal and fishery sciences and dairy technology; (b) forecast technology needs of the livestock sector and the farmers and develop appropriate technologies to solve problems faced by livestock

sector farmers and industries and provide fillip to increase productivity and quality to enable export of animals and products; (c) develop extension methodologies modules and address policy issues in respect of animal health and productivity

service delivery in rural Maharashtra and (d) develop necessary IT-enabled infrastructure, hardware, software and delivery policies to enable the Department of Animal Husbandry of the State to reach out to the livestock farmers through e-learning schemes and (e) play role of ‘think-tank’ for the Department of Animal Husbandry Dairy Development and Fisheries (ADF) to assist in developing policies, monitoring and impact analysis.

The University's goals will, thus, be to :

(1) Enable Maharashtra to achieve more than 9% sustainable annual contribution to its GDP from animal and fisheries production and related industries by 2015 and maintain similar growth in the decade 2015-2025.

(2) Enable Maharashtra to reduce its rural poverty by 25% by supporting sustainable livelihoods through scientific animal production and fisheries by 2015 and contribute to eradication of rural poverty and elimination of hunger by 2025.

(3) Help establish in Maharashtra a robust regulatory system for regulation of veterinary practices in terms of WTO regulatory environment principally related to sanitary and phyto-sanitary (SPS) practices to be followed in food chains so as to produce safe foods.

(4) To make use of bio-technological means with multi-disciplinary approach in order to develop cutting edge-technologies for raising productivity of indigenous species of domestic animals and thereby to equip the livestock sector in state to meet the domestic demands besides capturing the expert market.

To accomplish the above mission, the following will be the University's specific goals:

i) Develop a dynamic system of education to train students and mould them into self-employers and entrepreneurs and to that extent develop its capacities both in terms of infrastructure and skills of faculties; with changing needs of society.

ii) Integration of veterinary, dairy and fishery education in line with global market requirements.

iii) Research to enhance quality, productivity and efficiency of livestock sector and to set up a system that continuously scans and forecasts the scientific and technological needs of animal and fisheries industries in Maharashtra to make the sector competitive possible.

iv) Research on development of regional animal production system and its integration with cropping pattern.

v) Research in animal health and production service delivery systems to make the services accessible, efficient and of acceptable quality.

vi) MAFSU as a dynamic core, to lead the enhancement of the state's animal production and fisheries information and knowledge system that supports innovation in animal and fisheries industries helping to make National Agriculture Research System an innovative one.

vii) With the advances in the sector of information technologies especially in bio-informatics, it will be the goal of the University to meet the futuristic needs of the emerging Indian knowledge society by developing the farmers, the animal owners, small rural and urban entrepreneurs as also the animal and fisheries industrial workers as knowledge workers through life long learning. The University will thus, focus on its alumni efforts and stakeholders as knowledge workers and make them competative internationally and contribute enabling Maharashtra to emerge as a major player in the knowledge economy by the year 2025.

Priorities:

(1) The University will give top priority to reform veterinary, dairy and fishery education with a target to make it more skill-learning-based, problem-solving and self-exploratory. Priority will also be given to inculcate in the students spirit of entrepreneurship and business-approach to services so that these can respond to emerging challenges of market forces.

(2) The University will give priority to faculty development to achieve the object of reforming education. The University will undertake programs to improve faculty competence and capacity building in the constituent colleges and the institutes by establishing linkages and collaboration with leading universities in Europe, USA and Australia.

(3) In order to exploit the opening of the education market, the University will open up its current undergraduate and post-graduate courses to foreign Nationals and NRIs on differential fee basis. The University would also start profit-making international-level short-term training courses and diploma courses in the area of dairy, sheep, goat, poultry, fishery production and dairy technology targeting SAARC, Middle East, Arabian and African students. The University will also offer Open Continuing Education in veterinary, animal and fishery sciences and dairy technology courses, using ICT technologies. This activity will not only help the University in mobilizing financial resources through earning foreign exchange but also will bring global visibility to MAFSU education. It will help the Country, in fulfilling its commitment for building strong bridges with the developing counries in their HRD efforts.

(4) The University will give utmost priority to research programs, exploiting the reproduction and breeding technologies to improve indigenous livestock and develop suitable cow, buffalo, goat and sheep breeds that are efficient producers and relatively disease-resistant.

(5) Priority will also be given to development of fodder varieties that can be grown in rain-fed, shallow and waste-land and methods of fodder preservation, crop-residue enrichment and related technologies and machine designs.

(6) Establishment of research centers in Herd Medicine, Veterinary Epidemiology-Economics and Planning so as to address the farmers issues related to health and productivity management, production system alternatives and planning policy research.

(7) Establishment of Centres of Excellence in immunology and vaccinology, zoonotic disease diagnostic laboratory, zonal laboratory for diagnosis of economically important diseases and veterinary research farm, central Laboratory Animal facilities, production of specific pathogen-free animals and research on animal behavior and production physiology.

(8) Expansion of the 'Veterinary Nuclear Medicine Center', as a national referral center by establishing a separate radio-synthesis laboratory and developing linkages with national institutes, pharmaceutical industries active in the area of new drug development.

(9) Establishment of Experimental Surgery Division to collaborate with medical scientists to develop new surgical techniques and implants.

(10) Development of improved diagnostics and animal-side tests for diagnosis of diseases and immunosensors, by using molecular virology and other biotechnological tools and fish disease diagnostic kits.

(11) Strengthening of food microbiology, veterinary public health programs to augment milk and meat production and novel value-added animal products.

(12) Strengthening Research extension linkages through trainers training, distance and virtual education and meeting farmers at their doorsteps and Integrated approach for transfer of technology and monitoring technology dissemination by creation of technology feed back bank.

(13) Conservation and management of fisheries resources and strengthening fish harvesting and processing technology.

(14) Establishment of high specialty and referral and teaching hospitals at Mumbai, Nagpur, Akola, Parbhani, Udgir and Shirval.

(15) Developing a state of the art animal and fisheries related information and knowledge system consisting of:

   a. Virtual animal and fisheries science and technology information centre that is universally accessible through the internet;

b. Animal and fishery science learning objective repository;
c. Virtual learning campus that is universally accessible through the internet.

University Organizational Reforms:

In order to achieve the objectives of excellence in education and research, it will be imperative to bring about radical changes in the University organization: Following changes would be necessary for which amendment to the current Act will be required:

(1) The faculty will have to be made responsive to changed scenario and will have to be explicitly responsible and accountable to achieve excellence in the given area of specialization, earn national and international recognition and to bring funds and schemes to the University. The present system of 'total service security' to 'tenure-track' service security will be implemented. System of attracting 'best brain' as faculty by giving 'salary incentives' will be developed in consultation with Government. The methodology to get rid of lower-than-bench-mark performance by external reviewing against specific set targets will be evolved and implemented.

(2) Instead the present Executive Council, the Board of Management be constituted on lines of ITTs and IIMs with the persons of high merit and excellence being its members to be appointed by the Chancellor being head of the University, as envisaged in ICAR MODEL ACT.

(3) The method of appointment of 'Vice-Chancellor' who is the 'Principal Executive' of the University also needs to be properly defined, made broad-based and attractive to the best suitable and available nationally.

Resource Generation, Linkages and Execution:

In order to implement the programs within the scheduled time frame from 2005 to 2025, the total span may be divided into three phases (a) Initial Phase of infrastructure development, (b) Execution phase and (c) Consolidation Phase. The first phase would be of 6 years whereas the other phases will be of 7 years, each.

Keeping in view the avowed objectives expressed in the University Act passed by both the Houses, for the first phase the state Government will be asked to provide one-time grants for specific infrastructure initiatives. Efforts will also be made to get funding from national and international agencies for specific projects. For generating funds, innovative schemes of utilizing available land on BOT or techno-commercial-basis would also be encouraged. Simultaneously efforts will be made to establish industry linkages for research and consultancy and alumni linkages for financial support. The exercise of the perspective plan document (VISION 2025) has been initiated and designed with foresight, keeping in view the ensuing opportunities of financial assistance under the World Bank-sponsored Agricultural Human Resource Development Programme (AHRD) and National Agricultural Technology Project (NATP) launched by the ICAR, New Delhi. During the subsequent phases, the efforts will be made to restrict the state government funds to 'salary grants' only and all operational needs will be met from the generated funds.

The effort will be that by next ten years the University should receive at least 5% of their contingency requirements from royalty, consultancy and transfer of technology, whereas 10 % of the required funds will be generated from 'training', and continuing education programs.

A separate cell in each constituent college will be established to institutionalize functional University-industry linkages.

1. PREAMBLE

Seed of the establishment of the Maharashtra Animal and Fishery Sciences University (MAFSU), was indeed, sown about 120 years ago when the Bombay Veterinary College, the first institute of its kind for animal sciences in India, was established in the year 1886. This college has been hailed as a flagship in efforts to develop animal food resources on scientific lines so as to ensure supplementary nutrition to human and business opportunities to the farmers. It initially started with a couple of clinical departments and now has branched out into 18 distinct disciplines. The Bombay Veterinary College continues to produce intelligent and skilled veterinarians who adopt with ease to the urban as well as rural needs. This is evident from the fact that a large number of graduates have spread to nearly all the major veterinary institutes globally and have helped to realize the dream of white revolution in the country.

In earlier days, the veterinary 'doctoring' was perceived out with primary objective of animal welfare in mind whereas the art of healing, love, faith, acted as the driving force. This brand then developed into an intricate occupation laced with art and science of clinical disciplines, harnessing of laboratory diagnostics aids and expertise to put in action plan to prevent disease outbreaks in domestic and other animals. The core structure of veterinary education has radically changed due to demand by market forces and the integration of scientific disciplines. The veterinarians are now required to undertake multitude of tests and work in multidisciplinary environment.

After independence, the pace of development in animal science education in the state gathered momentum. The second state veterinary college was established in 1958 at Nagpur. Then came establishment of agricultural universities in the state of Maharashtra and to cater to vast aspiring students few more colleges at Parbhani (1972), Akola (1982), Shirwal (1988) and Udgir (1989), were established. These colleges offer 530 seats for students to undertake veterinary education. The College of Dairy technology was established in the year 1985 to cater to increasing demand of dairy technologists in the country.

It was rightly felt that under state agriculture universities the education and research in the fields of animal and fishery sciences and dairy technology lagged behind a great deal, having regard to the current era of micro-specialization in these fields. The enhancement of the professional skill and performance of veterinarians, fishery scientists and dairy technologists is necessary corollary since their job is of applied nature and they are to be equipped not only with skills and knowledge but also the art of dissemination of these for human welfare. Although animal husbandry has been considered as an integral part of agriculture, in view of uncertainties in agriculture, livestock rearing has independently played vital role in rural economy. The annual growth rate of employment in livestock sector in rural area was more than 4 percent as against 1 percent in agriculture.

The Government of Maharashtra took a right decision to establish Maharashtra Animal & Fishery Sciences University at Nagpur with the avowed objectives prescribed as MANDATES of the university. It is therefore befitting that the deficiencies in animal and fishery sciences education research and extension are met with complete planning. Livestock rearing provides employment and supplementary income to rural population the vast majority are landless and marginal farmers.

2. MANDATE

The primary mandate of the University is to impart education in diverse branches of veterinary medicine, animal & fishery sciences and dairy technology to further advancement of learning and prosecution of research in these areas. An important object of the university is to undertake extension programs in these sciences to benefit rural farmers, in co-operation and in close co-ordination with the State Departments of Animal Husbandry, Dairy Development and Fisheries, Government of Maharashtra and the NGOs. As the government employment opportunities are fast diminishing, the students graduating out from this University should have to be prepared as techno businessmen to produce direct employment.

ORGANISATIONAL SET UP

The Governor of the State is the Chancellor and head of the University, the Minster for Animal Husbandry is the Pro-Chancellor and the Vice-Chancellor is its Chief Executive Officer and Academic Head. The University is governed by the Executive Council, which is the ultimate policy making body. The Vice-Chancellor is the ex-officio Chairman of the Executive Council. The Registrar is the Ex-officio Secretary. The structure of the Executive committee is as under. The ex-officio members are Commissioners of Departments of Animal Husbandry, Dairy Development, Fisheries Development, Agriculture; Principal Chief Conservator of Forest, One Director and Deans of the University. The other members include, an eminent Scientist, nominated by the Chancellor, nominee each from ICAR and Veterinary Council of India, Medical Council of India, three members of Legislative Assembly and two members of the Legislative Council, two progressive breeders in animal and fisheries sectors, six chairman of the Animal Husbandry and Dairying Committee of Zilla Parishad's of any six districts in the State. One eminent Women Social Worker to be nominated by the Chancellor. There is also a provision for nomination of one President of the co-operative society of Dairy, Poultry and Fisheries by the Pro-Chancellor, and one Industrialist each from Dairy, Fisheries and Poultry industry.

The academic matters of the University is monitored and governed by the Academic Council. The Academic Council is responsible for maintenance of standard of education, examinations and other academic matters. The Vice-Chancellor is the Chairman of the Academic Council. Other members are Directors of the University, Dean of each Faculty of the University, Associate Deans of the Colleges, Heads of the Academic Departments, one nominee from Veterinary Council of India and academic staff member to be elected from each faculty of the University.

The University currently has four faculties namely Faculty of Veterinary Science, Dairy Technology, Lower education and Fisheries Sciences. The Faculty has the overall responsibility to propose new courses of studies, curriculum, establishment of new department, reconstitution of existing departments etc. to the Academic Council. The Dean is the Chairman of the Faculty. The members are Associate Deans of the Colleges, Heads of the Departments, One Professor, One Associate Professor and two Assistant Professor to be elected from amongst the academic staff of the faculty and four opted members of which two are divisional officers of the concerned Development Departments within the faculty, Deans of other faculties, Senior Heads of the Departments of teaching institutes of the respective faculty.

Other authorities of the University are Board of Studies, standing Committee for Finance, Budget, Development & Planning, Board of Examination, Research Council and Extension and Continuing Education Council, Advisory Council of the Associate Deans of Constituent Colleges, Grievance Committee for the University employees, Committee for Library & Information Centre, Students Welfare Committee & University Employees Welfare Committee. The Planning Committee develops guidelines and perspective plan of the University and the Annual Plan in accordance with the state or national Plan. The Board of examination has mandate to oversee organization, supervision and conduct of examinations. The research Council is the policy making body on research undertaken in the University.

The Vice-Chancellor is the Chairman of the Research Council. The Director of Research is the Member Secretary. Other members are Deans and Directors of the University, Commissioners of Agriculture, Animal Husbandry, Dairy Development, Fisheries, Director of Research of Four Agricultural Universities in the state and also non official members representing different bodies like Indian Council of Agricultural Research, Veterinary Council of India, Indian Council of Medical Research, Livestock Industries and so forth. The Research Council prepares the annual program of research by identifying need-based, emerging and frontline areas of research, and undertake review and evaluate the on-going research programs to make recommendations for provision of research facilities.

The Extension programs are guided by the Extension and Continuing Education Council with Vice-Chancellor as its Chairman and the Director of Extension Education as the Member Secretary. Other members are Deans and Directors of the University, Commissioners of Agriculture, Animal Husbandry, Dairy Development, Fisheries Development in the state, Associate Deans of the Colleges, Directors of Extension Education of the four State Agriculture Universities and members representing different bodies like ICAR, National Dairy Development Board, Livestock Industries and so forth.

3. GROWTH

Although the Maharashtra Animal and Fishery Sciences was established in the year 2000, the constituent colleges of the University are quite old and have been imparting veterinary education since several decades. The Bombay Veterinary College is the oldest college in South East Asia and second oldest in the Asian subcontinent. It was established on 2nd August, 1886 on the land and funds donated by Sir Dinshaw Petit, in what was then called Parel village, with an objective to train persons who would disperse in the country to take care of health and welfare of animals and mitigate their pain and suffering. True to the expectation of the donor, the Bombay Veterinary College gained glory and reputation as one of the finest veterinary colleges. Initially the focus of education in the college was 'horse', but slowly with dwindling of horse population and introduction of scientific livestock farming, the focus changed to other domestic animals including companion animals. The college is housed near the renowned Bai Sakarbai Dinshaw Petit Hospital for Animals, to which the college provides gratuitous curative treatment. Initially the veterinary instructions were largely in the area of anatomy, physiology, shoeing, wound treatment, pharmacy, compounding, etc. Until 1932, British army officers held reins of the college as principal, whereas Rao Bahaddur Phadke was the first Indian Principal, a tradition that continued till India gained independence. (and has been continuing, thereafter)

Considering the demand for veterinary graduates and the expanding livestock related activity, especially in the context of various planned schemes of the State government and to accelerate rural development, the second veterinary college at Nagpur was started in the year 1958 at a picturesque site near Seminary Hills. The college was established on a line similar to Bombay Veterinary College, but was affiliated to the Nagpur University. The two colleges were under the administrative control of Department of Animal Husbandry, then Government of Maharashtra.

University Headquarter, Nagpur

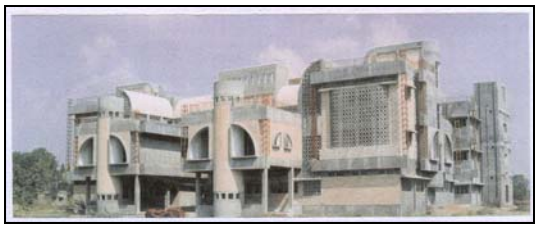
Bombay Veterinary College, Mumbai

Nagpur Veterinary College, Nagpur

Post Graduate Institute, Akola

College of Veterinary Science, Parbhani

K.N.P. Veterinary College, Shirval



College of Dairy Technology, Warud

With introduction of the Land Grant pattern of agricultural education in India, the Maharashtra Agricultural University was established at Rahuri, a small agrarian town near Ahmednagar, in 1968. The Veterinary Colleges in Bombay and Nagpur were transferred to this state agricultural university. Subsequently, for the state of Maharashtra, four agricultural universities were established and the Bombay Veterinary College was made a constituent college of the Konkan Agricultural University, Dapoli, and the Nagpur Veterinary College became a constituent college of Dr. Panjabrao Deshmukh Agricultural University, Akola. In the year 1972, College of Veterinary and Animal Sciences was established at Parbhani and was attached to the Marathwada Agricultural University. The Panjabrao Deshmukh Krishi Vidyapeeth, in the year 1970 decided to establish a post-graduate institute in Veterinary science at Akola, the headquarters of the University. This Institute offers only P.G. courses in eleven disciplines of veterinary sciences.

The four agricultural universities in the state were established to cater to special and distinct needs of the region. The Mahatma Phule Krishi Vidyapeeth, which was established to cater to the needs of western Maharashtra, however did not had a veterinary college and the veterinary faculty, although this region is well known for its animal husbandry and livestock industry. The Government of Maharashtra, therefore, in 1988, decided to establish a new college at Shirval, a small village in Satara district. The College was named after legendry freedom fighter Karmavir Nanasaheb Patil (K.N.P.). In the year 1987, the fifth veterinary college was established at Udgir, an area well known for livestock breeding and home tract for nationally recognized breed of animals like, Deoni, Red Kandhari, Osmanabadi, etc.

The College of Dairy Technology was established at Warud, Taq. Pusad Dist. Yavatmal in Vidarbha in the year in 1992. The admission capacity of the College is at present of 32 students which is expected to be raised to 64 after creation of all the facilities. This degree course leading to B.Tech (Dairy Technology) is of four-year-duration based on the patern of National Dairy Research Institute (NDRI), Karnal, passing 12th standard in science discipline.

It will also be pertinent to review progress of these colleges over the years, so as to provide an idea of the pace of growth. The Bombay Veterinary College initially had Departments that dealt with horse keeping, breeding, shoeing, pharmacy, etc. With independence and rapid industrialization, the horse population dwindled and the focus rightly shifted to the food and pet animals. From 1970 to 1980, as per then in vogue the Maharashtra Krishi Vidyapeeth Statutes, there were five administrative departments to which different disciplines were attached. With framing of new Statutes in 1990, the college was structured as per the ICAR guidelines and 14 independent departments were created. Subsequently, after acceptance of Veterinary Council of India syllabus and the new Maharashtra Animal and Fishery Sciences University statues 2002, the constituent colleges were reorganized into 18 independent teaching departments. The Bombay Veterinary College progressed steadily establishing areas of excellence, such as, Department of Food Hygiene and Public Health, Radio-isotope Laboratory and Department of Poultry Science. These have been the unique distinct features of the Bombay Veterinary College. The Department of Microbiology established a 'Tissue Culture Laboratory' in the year 1986. In order to provide additional space for establishment of the livestock farms, the Government of Maharashtra has allotted 110 acres land in Aarey colony campus at Goregaon. With the help of funds made available by the Government of Maharashtra, an independent undergraduate campus was developed. The College added an 'Embryo Transfer Unit' in the year 1994 and in the year 2000 under the 'Prime Minister's Jai Vigyan Yojna' funds were provided by the Department of Atomic Energy, to the Bombay Veterinary College to establish the country's first Veterinary Nuclear Medicine Center. The Center started functioning from January 2002. The ICAR has provided funds under the revolving fund scheme to Department of Medicine to establish Country's first Animal Blood Bank with facility of fractionation and a referral coagulopathy laboratory. The central computer cell was established in 2001.

The Nagpur Veterinary College since its inception witnessed rapid progress. The creations of various teaching departments were simultaneous to the Bombay Veterinary College. The Nagpur Veterinary College established its teaching

Veterinary Hospital in downtown Nagpur in the year 1960 by acquiring the existing veterinary hospital of the Government of Maharashtra. The Department of Anatomy launched a unique experiment of preparing the anatomy teaching aids, which were in great demand throughout the country. Post-graduate courses were started in the year 1972. A referral center for health monitoring of Zoo and wild life was started in 2000. Initially the college was under the administrative control of Department of Animal Husbandry, Government of Maharashtra. The College was first transferred to Maharashtra Agricultural University in 1970 and subsequently it was transferred to the Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, as its constituent college. The M.V.Sc. program was introduced in the year 1972 in three disciplines. The college started offering facilities of Ph.D. by research from 1972.

With the establishment of Panjabrao Krishi Vidyapeeth in Akola, it was felt that the post-gradate programs in all the faculties should be brought to the university campus at Akola. With this objective an independent Post-Graduate Institute in Veterinary Sciences was established at Akola in 1970. Initially, the Institute offered post-graduate courses in the disciplines; Surgery, Gynecology, Animal Genetics and Breeding and Dairy Cattle Production. Subsequently, M.V.Sc. in five more subjects were added. in 1973. In the same year Ph.D. courses (by course work) were started in all the ten disciplines. At present, the Institute offers post-graduate courses including Ph.D. in 11 disciplines of veterinary faculty. Over the years, the Institute developed steadily; The Department of Gynecology established an ICAR network project on ‘Embryo Transfer Technology’. Under this scheme state-of-art referral laboratories were established. A cattle feed unit for manufacturing complete feed and pellet feed was also commissioned. These units acted as boon to the postgraduate students and facilitated department research. With the financial assistance of BARC, the Department of Pathology established radioimmune assay laboratory (RIA) in the year 1999. Such a facility was created for the first time in Vidarbha, which provided major fillip to endocrinology research. Provision of an affiliated hospital to the college is necessary for imparting clinical and para-clinical training. For this purpose, the Institute started a veterinary hospital, which provides services to the farmers. With the establishment of the new University, development of the Institute in terms of research schemes received a major fillip. The

Postgraduate Institute was shifted into its new building in 1991. At present, the Institute is handling seven research schemes sanctioned by various funding agencies, such as, ICAR, DST, etc.

The College of Veterinary Science at Parbhani progressed enormously due to liberal funds from the Government of Maharashtra. The College established a modern and well equipped teaching veterinary polyclinic in 1978. The polyclinic developed into an excellence center for diagnosis and treatment of large animals over a 500 mA X ray machine for large animals, with ceiling attachment for three-dimensional mobility was added to polyclinic in 1978. This was first such facility in the state of Maharashtra. The Veterinary Polyclinic Parbhani also developed in-patient facilities for sick animals. The new building of the college was completed in different phases whereas the first phase was completed and formally inaugurated in 1979. The college boasts of excellent lecture halls with in-built audio-visual facilities, excellent laboratories, anatomy dissection hall, hostel, etc. The tissue culture laboratory was established in the year 1987 in the Department of Microbiology. The postgraduate program was started in 1980 initially in five subjects and subsequently with creation of infrastructure in other departments, the M.V.Sc. program in other disciplines was started over a period of ten years. At present the college offers M.V.Sc. course in 13 subjects. The college also offers Ph.D. (Research) program for the in-service candidates.

The K.N.P. College of Veterinary and Animal Sciences, Shirwal, however, could not progress as per expectations, although the college is situated in the geographical area well known for livestock industry. The inherent problems of the small village like Shirwal were the main constraints. The College is yet to have its building and equipped laboratories. But, this did not dampen the spirit of the staff, who devoted their energies in improving the standard of education imparted to the students. Expectedly, the students passing out of the college have proven their mettle in ICAR fellowship examinations and as post-graduate students throughout the country. The hostel for girls was completed in 1996, whereas the boys hostel phase I, was completed in December 2003.

The College of Veterinary Sciences at Udgir, also faced problems initially, which were typical to an infant college coming up in true rural set up. The College

however picked up its growth from 2000 onwards. The multipurpose block housing different Departments were constructed in the year 1992, while the hostel building was completed in the year 1998. The Department buildings, however, are yet to be completed. The Udgir Veterinary College has a Deoni purebred farm, which was strengthened under an ICAR scheme and focused on conserving Deoni germplasm. The College started M.V.Sc. program in 2002 in seven subjects.

In order to de-centralize the working of the state level university the, Government of Maharashtra sanctioned sub-campus status to this college and provided focus to institute recent initiatives in Deoni cattle and Osmanabadi breed.

Following livestock farms that were under the management of Department of Animal Husbandry have been transferred to the new University. These farms are meant for conserving local germplasm, for providing required infrastructure.

Cattle Breeding farm, Nagpur.

Cattle Breeding Farm, Borgaon Manju, Akola.

Cattle Breeding Farm, Igatpuri, Dist. Nasik

Deoni Cattle Breeding Farm, Udgir, Dist. Latur.

Imparting graduate education is the primary responsibility of the University. Likewise, it is also important to create middle-cadre technical staff. To achieve this objective, the state agricultural universities approved sanctioning of lower education institutes managed on non-grant basis by private educational organizations. These institutes has been with the new university and in order to expand the coverage to benefit students from a wider area, additional institutes were approved in 2001.

Most members of the faculty possess Doctoral Degrees and quite a few are in the process of acquiring their Ph.D. The University has attached due importance to human resource development (HRD) for which continuous education programs are being offered to improvise the faculty in teaching and research.

The constituent colleges have tried to keep pace with the recent developments in science, even though there has been financial crunch. Modest additions to library, central computing facility and hostels have been routine although a lot needs to be done on this aspect.

The University follows counseling system for students. A group of 10 student is allotted to each staff member who helps them in matters pertaining to academics and their over all development.

Admission to veterinary degree course is on the basis of state level common entrance test (CET), while the admissions to B.Tech (Dairy Tech) and Post Graduate Courses are on the basis of merit in qualifying examination. A separate Board of Examination has been constituted as per the provisions of the Statutes, which oversee conduct of examination.

- A workshop on “State Level Brucella Control Plan” was organized at Nagpur on 21-22 June 2001 for screening the dairy cattle population in the state. Seen in the photograph Dr. D.K. Singh, National Co-ordinator, National Dairy Development Board, Shri. Kolte, Dairy Development Commissioner, Maharashtra State and Dr. S.K. Jawalikar, Addl. Commissioner of Animal Husbandry, Maharashtra State.

- South Asian Regional Poultry Conference was co-hosted by Dr. B.V. Rao Institute of Poultry Management of India, during 24-26 September 2001 at Pune. Seen on the dias are Hon. Shri. Sharadraoji Pawar, Vice-Chairman, Crisis Management Group of Govt. of India and Smt. Anuradha Desai, President, World Poultry Science Association – India Branch and Chairperson, Venkateshwara Group, Pune. Dr. A.T. Sherikar, Vice Chancellor presided over the function.

Glimpses of "Expovet 2003" : A livestock, poultry, aquaworld and industrial exhibition organised at Nagpur during 20-22 September, 2003

Welcome to Expovet 2003

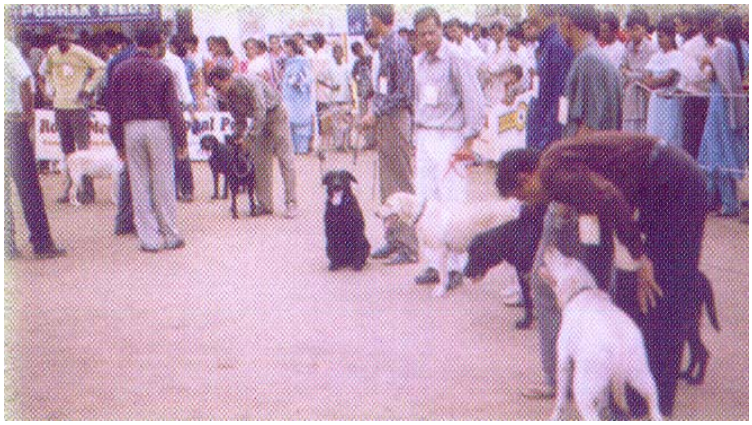
Salutation by the horses of Bhosala Military School

Food Festival for Animals

Glimpses of "Expovet 2003" : A livestock, poultry, aquaworld and industrial exhibition organised at Nagpur during 20-22 September, 2003

Cattle Show

Poultry Show



Dog Show

4. SALIENT RESEARCH ACHIEVEMENTS

Researches done in the constituent colleges have been carried out under various schemes sanctioned by central funding agencies, like, ICAR, DST, DBT, etc. The post-graduate research has been the integral part of the research program. It can be mentioned that the development in research infrastructure has been non-uniform in the constituent colleges and departments within the college.

Following are glimpses of the salient research achievements of various constituent colleges.

a. The dairy technology faculty of the university has a modest research program since there are no post-graduate courses and the staff position in the college is not sufficient even for undergraduate teaching. The faculty has however undertaken work on development of new dairy products. The notable among these, which is also relevant socially, is the development of the process technique for manufacture of probiotic acidophilus milk. The milk treated with viable human strain lactobacillus acidophilus organisms has been found to be suitable for tribal children, especially the one who suffer from severe malnutrition. The product is now ready for large-scale trial. The dairy technology faculty has also paid attention to standardize process and technique for manufacturing of local dairy products, such as, karadkheer.

b. The constituent Veterinary colleges of the University have strong research programs in the discipline of animal nutrition. Attention was paid to identify local vegetation, fodder, forages and grasses that can be used as animal feed. The work on nutritive values of almost all major local vegetations and forages have been completed. In Vidarbha region which is well known for goat rearing, seven local vegetations have been identified as suitable for goats based on their nutritional evaluation. The characteristic of the Indian livestock rearing practice is use of crop residues, in animal feeding although these are

nutritionally poor in quality. Work on bio-enrichment of fibrous crop residues and single cell proteins was carried out. A process was standardized to enrich 'arhar' straw by using urea and molasses. These were then made as block which are now commonly called BAUMB. Extensive studies were undertaken to prove its utility in feeding cattle specially under emergent situations like drought, etc.

The Animal Nutritionists of the University developed a cold process to prepare compressed complete feed blocks from bagasse and wheat straw. The fruits of research in animal nutrition were immediately transferred to the farmers by arranging demonstrations, especially enrichment of wheat straw with urea. Extensive and long-term research program was undertaken to develop methods to utilize slaughterhouse byproduct as animal feed. The constituent colleges have been active in the area of poultry and cattle nutrition. A number of formulations were developed for the dairy animals and poultry. A long-term project on complete feed has resulted in innovative formulations suitable for animals raised under wide range of conditions.

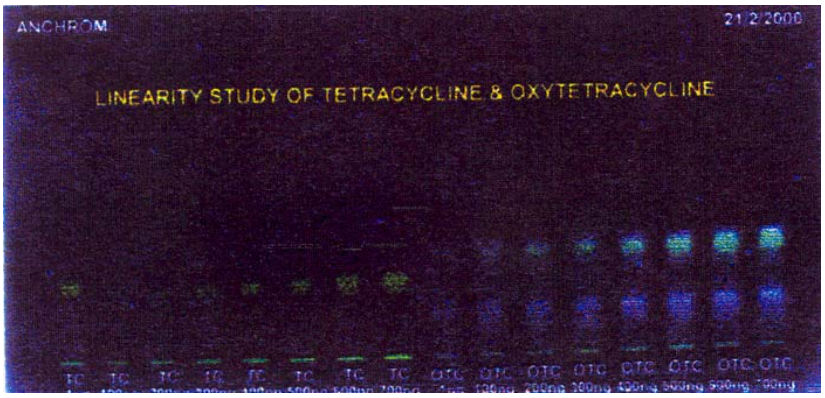
c. The University has been actively engaged in research related to livestock product technology. During 1970 and 1980s, bovine insulin was still the most favored therapeutic drug in human diabetes. In order to save import of insulin the Livestock Product Technologists of the University undertook research on development of indigenous method of purification of insulin from bovine pancreas obtained from slaughterhouse. The research culminated in development of an extremely cost-effective method of purification of pure grade insulin from buffalo pancreas. This research was nationally recognized and the scientists were awarded ICAR biennium award for 1979-1980 for excellence in team research. Simultaneously, a method was developed to isolate and purify heparin from bovine lungs, which is usually discarded in the slaughterhouse as waste. Heparin is an expensive protein molecule and has wide spectrum of uses. It has a number of clinical and chemical applications.

The Scientists of the University hit upon a novel process for purification of heparin from buffalo and cattle lungs.

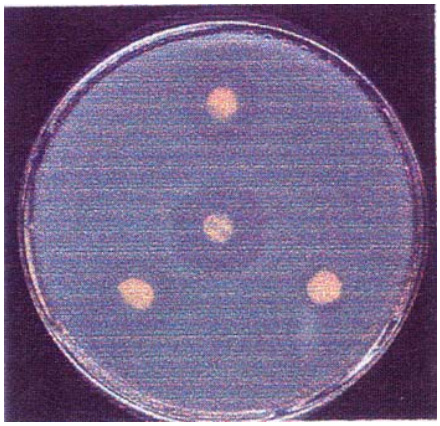
d. 'Neatfoot oil' due to its unique properties is used in varied applications from clock aviation industry. India imports most of its neet foot oil from European countries. The University scientists undertook research to standardize process for purification of 'neat's foot oil' from bovine hooves, generally discarded in any slaughterhouses. Chemical profile of neat's foot oils was also undertaken. The technology is now available for commercial exploitation.

Detection of meat adulteration is a challenging exercise. This is also important from the point of view of jurisdiction, especially for Food and Drug authorities. The University scientists undertook research to develop a method based on presence of specific antigen that is present in almost all cells of the particular species of animal. The scientists identified a ubiquitous protein and standardized method to purify the protein from adrenals and subsequently an ELISA method was developed. The research work proved that with the help of this method the species of animal could be identified with accuracy by testing meat and organs. The University has developed tests for detection of meat from cattle, buffalo, goat and sheep. The technology is now ready for commercial exploitation.

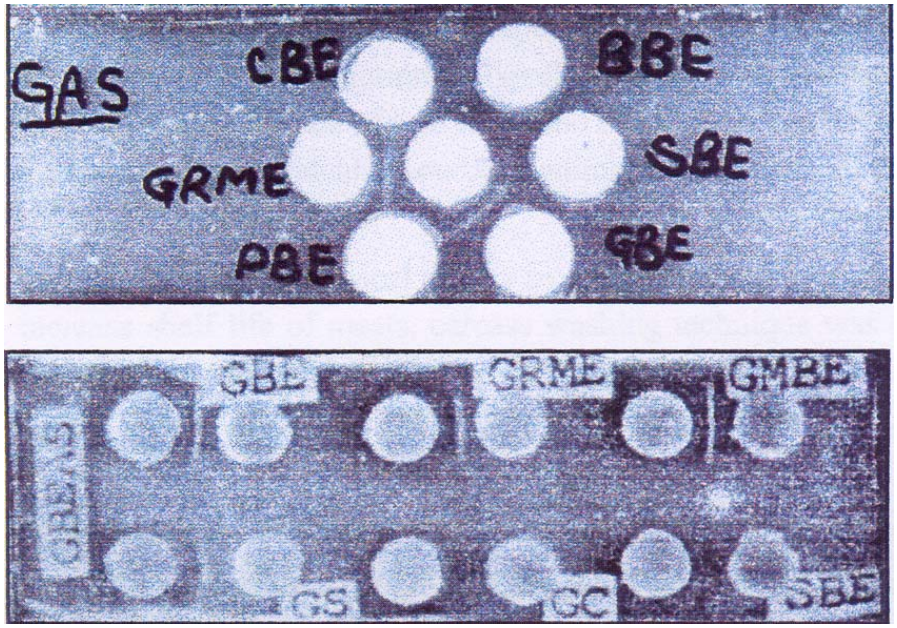
e. Detection of antibiotic and hormone residues is important from the point of determination of safety and quality of meat and milk. The University scientists carried out research to standardize, bioassays, ELISA and HPLC techniques for detection of antimicrobials, and hormone residues from milk, meat and organs. In order to fix up the standard of microbial assessment of meat and milk, extensive studies were undertaken. The research resulted in fixing of the microbial quality assessment standards for meat, meat products, milk and milk products that has now been accepted nationally. This is one of the important contributions of University to human food safety.



Detection of antibacterial drug residues uing HPTLC



Detection of drug residues from meat : Antibiotic assay

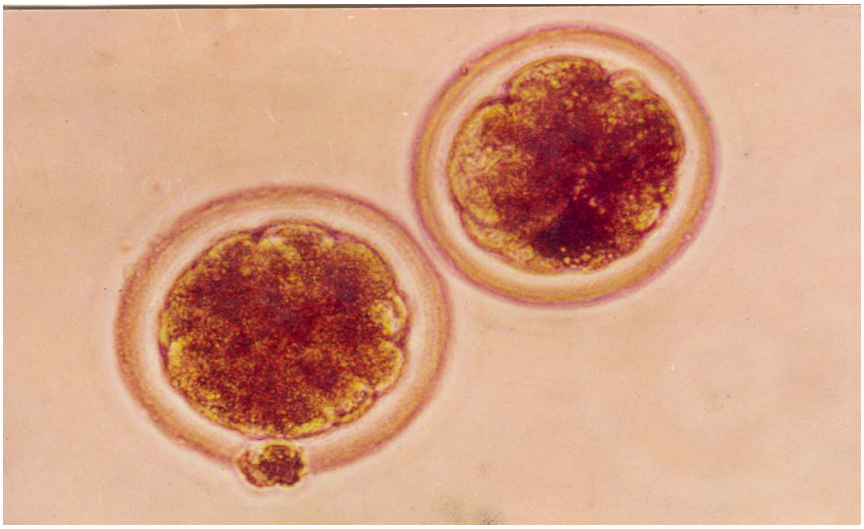


Test for Identification of Meats (TRIM)

f. The University has been active in area of animal reproduction. Optimum breeding capacity in animals is crucial to livestock farmers. A number of protocols have been developed for heat synchronization in various species of animals. The Embryo-transfer research was undertaken in two institutes under the ICAR's network scheme. Both the centers churned out useful research and standardized protocols and techniques. This also provided opportunity to the staff to get trained in the embryo transfer technique. And the program was then successfully extended even to the farmers. Limited studies were undertaken to gauge suitability of the E.T. techniques in the field situation. These Centers could produce 18 elite calves. The Departments of Animal Reproduction in the constituent colleges have also been active in the area of semenology and artificial insemination. The Bombay Veterinary College and the Nagpur Veterinary College (including Post-graduate Institute in Veterinary Science at Akola) have been active in solving the problems related with fertility. The sub-fertility, infertility, anoestrum, endometritis, etc., are the major problems in dairy cows and buffaloes. Extensive research on all aspects of these problems has been undertaken. The strategies involving use of herbal drugs, hormones, etc., have been standardized for filed use. The contribution of Bombay Veterinary College in the area of semenology and artificial insemination is unique. It was this College, which pioneered artificial insemination techniques and program for the state of Maharashtra.

g. The Departments of Microbiology of the constituent colleges have contributed significantly in the area of animal health. These Departments also offer referral services to the field staff of the Department of Animal Husbandry. The Department of Microbiology of the Bombay Veterinary College has achieved significant breakthroughs in establishing the utility of tests to diagnose bacterial and viral diseases. Its work on rabies, infectious hepatitis, brucellosis, enteric infections, mycotic infections has been recognized nationally and internationally. The Department of Microbiology, at Parbhani established its Tissue Culture laboratory in 1980, which carried out pioneering work in blue tongue disease in sheep. The Departments of Microbiology of

Calf born using embryo transfer technology



Embryos collected using embryo transfer technology

the University have also undertaken extensive studies to identify and characterize pathogenic organisms causing mastitis in dairy animals. Recently, research has been carried out to investigate prevalence of BSE and other encephalitides in cows, buffaloes and other animals. A rapid test has been tested for detection of BSE that has shown sensitivity and specificity. The Department of Microbiology has also standardized microbial standards for milk, which has now been accepted by ICAR. The Department of Microbiology at Nagpur has been actively engaged in livestock disease investigations. Currently the department is doing research on disease surveillance and monitoring of the Maharashtra state.

h. The Departments of Pathology of the University have been active in the field of poultry pathology and tumor pathology. A number of the emerging diseases were diagnosed for the first time, which helped in controlling the problem and increasing the productivity. The contribution of the University in developing poultry industry in the state is well recognized. For example, the University scientists diagnosed Gumboro disease, when the disease outbreaks started in the country. At that point of time it appeared to be a mysterious disease that was causing heavy mortality in poultry. The virus was isolated and characterized in detail. This enabled development of a potent vaccine suitable for virus strains prevalent in the country.

The University Departments of Microbiology and Pathology have contributed significantly in the field of research on adeno virus. The virus is known to cause varieties of syndromes in poultry. A virus strain was isolated by Dr. S. M. Ajinkya, which later on proved to be similar to the virus causing obesity in human. The recent work emanating from America has given full credit to the University scientist by naming the virus strain ‘SMA’ (for S. M. Ajinkya). The Departments of Parasitology have carried out pioneering work in parasitic epidemiology and immunology. The work resulted in devising new methods and strategies to control worm load in animals, which is one of the important causes of morbidity.

i. Mastitis in dairy animal is widely prevalent and causes severe economic losses to the diary industry. The University Departments undertook work to investigate causal factors and evaluated various therapeutic measures. There are no good animal-side tests available for diagnosing subclincal mastitis. The University scientists developed a rapid animal-side test, both for individual animal as well as for bulk milk, based on detection of inflammatory mediators in milk. One of the constraint of the test is that the regent is not stable at room temperature for a longer period. Work is envisaged to develop a thermostable reagent after which the test can be made available for commercial exploitation. Employing similar principle, the University scientists have also developed an animal-side test to differentiate the animals suffering with traumatic reticulitis from a similar syndrome that is due to non-piercing foreign body.

j. Hypophosphatemia is commonly encountered deficiency disease in domestic animals. The syndrome is exhibited as diverse clinical presentation, hence diagnosis is possible only when serum levels are determined. This requires determination of phosphorus in blood samples within 2-4 hours of collection of blood. Under rural conditions there are practical difficulties. The University has developed an animal-side test based on the Fiske and Subarrow chemical reaction. The test has been named Bovet-Rapiphos, which has 95% sensitivity and around 90% specificity for detecting animals having less than 3.5 mg/dl srum phosphorus. Currently work is underway to prepare a stable standard colour for comparison. After this, the test can be made available commercially.

k. The University has also carried out studies on pharmaco-kinetic of various drugs in domestic animals. The University's constituent colleges have an active toxicological research program. The University has carried out studies on pesticide exposure in domestic animals when used for agricultural operations. The University has also carried out studies on plant toxicity in domestic animals.

l. The Surgery Departments of the University have developed unique surgical procedures to tackle surgical problems in animals. The University has developed peg made from bovine horn core for use in fracture fixing. A number of studies have been carried out which has shown that bovine horn peg is an extremely cheap, readily available material for fixing fractures in domestic animals. Similarly, the University has developed simple method of making PVC cast for immobilizing fractured limb in small as well as large ruminant. These casts have been proved to be excellent in cases of compound fracture since, unlike the plaster cast, it enables removal and dressing. The constituent colleges of the University have also developed surgical procedures for carrying out corneal grafting and cataract removal in animals. A university surgeon also pioneered new methods of repairs of diaphragmatic hernia, corneal grafting, horn cancer etc.

m. The University Departments of Genetics and Breeding and Livestock Production and Management have been actively involved in a number of research projects directed at conservation and improvement of indigenous breeds of livestock. Until 1980, the Red Kandhari breed of cattle from Marathwada was not considered as a descript breed by national bodies, such as, ICAR. The University scientists carried out in-depth studies to fix up standard phenotypic and genotypic characteristics of Red Kandhari breed of cattle. Studies were carried out on hematology ad biochemistry profile of this breed. The University undertook an extensive survey to demarcate geographic distribution and variation. Due to these efforts, the ICAR gave recognition to Red kandhari cattle as a descript breed. Work has also been undertaken in characterizing other breeds of cattle such as, Deoni and Gir cattle and Osmanabadi goat. The work on Nagpuri buffalo being carried out at Nagpur Veterinary College is the first effort of its kind. The painstaking efforts have led to identification and registration of a large number of Nagpuri buffaloes that are high yielder and have good breeding capacity. It is hoped that this research would give fillip to buffalo farming in Vidarbha region.

n. India has an edge in software development capability. Livestock management in many ways is analogous to animal resource management. This calls for maintenance of dynamic and lifetime data of large number of animals, which needs to be analyzed to calculate performance indices and predict impending problems. Such an analytical approach has resulted in significant improvement in productivity. The constraint was that good softwares, which can be afforded by the Indian livestock industry, were not available. The University therefore established linkage and collaboration programs with the software industry and developed a number of softwares that are now commercially available

Outstanding research projects –

Amongst the 43 on-going projects implemented in various colleges, three unique projects are established for the first time in the country with a total sanctioned outlay of Rs. 3.23 crores.

- ***Veterinary Nuclear Medicine Centre –***

The sophisticated gamma camera used for nuclear imaging of different body parts.

Veterinary Nuclear Medicine Centre is dedicated to disease diagnosis by nuclear imaging in domestic and other animals. It is a collaborative centre funded by the Department of Atomic Energy and Bhabha Atomic Research Centre. The Government of India has provided funds under the Prime Minister's **"Jai Vigyan"** Technology mission. The centre will cater to screening of race horses as well as offer opportunity to research and development units in public and private sectors to undertake whole body scans, internal organ imaging, pharmacodynamics and disposition of new drug molecules without compromising on animal welfare. The total outlay of the project is Rs. 84.59 lakhs.

- ***Establishment of Animal Blood Bank –***

Dr. Urs Geigar, USA explaining the blood collection technique.

The first animal blood bank of the country has been established on scientific lines with facilities to fractionate blood into various components, lyophilised plasma, store blood of various domestic and pet animals for transfusion to needy animals. This centre also offers consultancy services in diagnosing various blood disorders of animals. The centre is set up with the help of the Indian Council of Agricultural Research, New Delhi with a total outlay of Rs. 9.17 lakhs under the revolving fund scheme.

- ***Western Region Referral Laboratory –***

Front view of "Western Region Referral Laboratory for Meat and Meat Products Quality Standards"

Under the World Bank funded National Agricultural Technology Project, the Indian Council of Agricultural Research, New Delhi has set up “Western Region Referral Laboratory for Meat and Meat Products Quality Standards” to cater to the needs of the import-export of meat and its products throughout India for quality control. The Department of Food Hygiene and Veterinary Public Health has pioneered in setting up of standards related to microbiological quality as well as antibiotic, pesticide, hormone and heavy metal residues from milk, meat and their various products meant for human consumption. In recognition of these efforts made by the department, the laboratory has been sanctioned under ***Team of Excellence*** to standardise, monitor and evaluate the harmful residues. The total outlay of the laboratory is Rs. 2.29 crores.

Founding stone laying ceremony at the hands of Shri. J.P. Dange, Principal Secretary, Department of ADF, Shri. J.S. Saharia, Secretary, Department of Agriculture, Govt. of Maharashtra, Shri. Shashi Prabhu, Architect and Dr. A.T. Sherikar, Vice Chancellor on Vijayadashami (4 October, 2003).

WRRLinaguration at the hands of Hon'ble Shri. Sharadji Pawar, Union Minister for Agriculture, Food, Public Distribution & Consumer Affairs, Govt. of India and President, ICAR New Delhi, Dr. A.T. Sherikar, Vice Chancellor, MAFSU, Dr. Mangala Rai, Secretary, DARE and Director General, ICAR, Govt. of India, New Delhi and Smt. Fauzia Khan, MLC on 4th Feb. 2005

5. IMPACT ASSESSMENT

5.1 INPUT OUTPUT ASSESSMENTS

Augmentation of education, problem solving research and fine tuning of training and extension education activities in the livestock sector has resulted in increase in livestock from 293 millions (1950-51) to 470 millions (1992) at national level. The increase in total production is more than 3 times for milk, nearly two times for wool and more than 13 times for eggs. Livestock sector also helped in generation of employment opportunities especially in the rural area. Veterinary colleges have played pivotal role in achieving these successes.

For a University, it is very difficult to assess the outcome impact. There are several outputs that cannot be measured in economic units. For example, it is difficult to assign an output value to the graduates trained by the university. Every year constituent colleges of the University produce around 300 graduates and 125 post-graduates in different disciplines. A large number of graduates have been employed in various states, central governments and private industries. These graduates are shouldering the responsibilities of the state departments, especially in the area of animal health maintenance and productivity. The graduates and post-graduates from constituent colleges of the University have been employed across the country and abroad. They have lent their intelligence and knowledge in development of the livestock sector. Most of the veterinary colleges have been established in the areas that are well known for livestock activity. These colleges have provided services to the farmers, especially when referred by the field veterinary staff. The clinical and para-clinical departments of the University have provided referral services to the field staff and the industry in solving intricate and refractive livestock-related problems.

From the point of view of education it can be deduced that the constituent colleges have contributed to the state and national development. In most of the colleges, the post-graduate programs are being run by the staff that has been sanctioned to shoulder the responsibilities of the undergraduate teaching. Thus, human resources in these colleges have been used efficiently and effectively. The least of producing a graduate or a post graduate must be one of the lowest for any professional courses.

In the area of research however the output interms of technology has not been optimum. For that matter, even the input for research has been irregular and not uniform for all the colleges and departments within each college. In the departments, which received funds from the agencies, some development in infrastructure development did take place, but the larger impact of the research output could not be seen. The constituent colleges did not make efforts to take the research to its logical end, i.e. pro con technology development and up-scaling. The research mostly revolved around degree seekers and hence ended with award of degree. Until year 2000, no product or process 'patent' was filed, even though there could have been few. This was largely due to the perception that research done from public funds must remain in public domain and hence free. The constituent colleges did develop products and processes that benefited the industry. For example, a product developed by Department of Medicine, Bombay Veterinary College in collaboration with Intas pharmaceuticals, has received clearance from Drug Controller of India.

There are a number of research outputs that with some efforts can be commercially exploited and would have larger impact on livestock industry. For example three diagnostic tests, MAUM test for mastitis, Rapiphos test for hypophoshatemia and DOT test for meat specification can be fine tuned and up-called for commercial exploitation. A prototype machine developed for washing carcass in slaughterhouse can also be patented.

In the area of extension too, the constituent colleges of the University could not make much impact. It must be accepted that there were no concerted efforts towards achieving the desired goals.

5.2 SHORTCOMINGS

1) Geographical distribution of the University & distance between the University Headquarters & other colleges.

MAFSU is a state level university with its headquarters at Nagpur. The locations of other colleges & institutes under MAFSU are well distributed throughout Maharashtra. The distance between Nagpur to these institutes ranges between 200

to 900 kms. This creates difficulties & problems for effective management and sharing & utilization of resources amongst the colleges and the university.

Education system: Traditionally, the curriculum of most of the Veterinary Schools world over, seek to prepare the individual as a "generalist", who can meet the health needs of all animals – big and small. This puts pressure on the syllabus in that the students get patches of knowledge in different disciplines. The curriculum framing is in the domain of Veterinary Council of India (VCI), which has mandate to frame uniform syllabus for maintaining standard throughout the country. This leaves little space to excel in local areas of expertise. The requirements of education are changing fast, while, it is rather a long drawn process for the VCI to effect any change in syllabus.

The VCI syllabus is blend of skill development and theoretical understanding, but with the available human and infrastructure resource, it is difficult to achieve these goals. There is an acute shortage of good textbooks and teaching materials that are in tune with our animal husbandry practices and culture. The current policy of selection of students in the animal science, fishery and dairy technology streams, rely more on marks obtained in examination rather than interest and aptitude for the chosen profession. The focus of teaching methodology is more on delivering structured lecture, rather than self-exploring and problem solving method of knowledge empowerments. Thus, the graduates although well prepared theoretically are not confident enough to solve the livestock problems. The training is more in tune with producing officers for government or private employment, and there is also little institutional support for preparing the students for entrepreneurship. The syllabus and the academic pursuit need to be oriented for developing business acumen.

The system of recruitment of academic staff is also defective. Although primarily the academic staff is required to teach, recruitment and promotion rules place more emphasis on research and extension. As a result, the academic staff place more importance to research rather than development of teaching materials and audio-visual aids even though little research infrastructure is available. Although the colleges take pride in modernizing research laboratories and input for

livestock farms, precious little is invested in, modernizing lecture halls and student laboratories. Neither the state government nor the central agencies like ICAR has schemes to provide funds for education infrastructure development. Thus the, whole education system in animal and fishery sciences is non-stimulatory both for students as well as the teachers. We are therefore unable to produce 'knowledge leaders'.

Research systems: Unlike many national laboratories, the University constituent colleges have direct access and linkage with the field. The problems faced in the field are primarily referred to the regional veterinary colleges. Research and investigations are supplementary responsibilities of the University, but there are inherent constraints in livestock research. Few research areas, such as, genetic improvement in livestock requires lot of funding and extended time-period. Recently the demarcation between disciplines and faculties have blurred and therefore on innovative science efforts demand a design-board multidisciplinary approach. The veterinary and animal sciences research however is still restrictive to the faculty and there are inherent institution-created barriers for scientists from other faculties to become part of the team. Establishment of separate universities for each faculty, if not tackled in right spirit, also inherently negates the concept of multidisciplinary approach to education and research, which would cause more damage to science, if enough windows for collaboration are not kept open.

The research carried out in most of the disciplines are primarily the 'student research' which has a definite objective of training the students in research methodology and ends with graduation of the students. These research programs, unless made part of larger research initiative, would not inherently be directed towards technology development. Thus, the research programs are focused on process or product development. There is no administrative support to facilitate research program implementation. The administrative staff is not yet recognized as one of the stakeholders in research accountability and hence they get away even after creating willful obstacles.

The extension education program also lacks vision and although the university has mandate to carry out extension, no staff or infrastructure support from the Government has been given. This is, therefore, being run as an 'outreach

program'. There is a lack of coordination between the state government, which is de facto the 'ground-level extension agency' and the university, which is at best the technology developer or 'trainers training agency'. The continuing education program is yet to take off the ground. There has been no effort so far to harness the benefits of information technology into veterinary/fishery or dairy technology continuing education programs.

Resource mobilization: Most of the states are now facing acute financial crunch with a result that the higher education, especially the university education has become its the first victim. When the veterinary and dairy technology colleges were part of the agriculture university and funds were available in plenty, precious little was done to create infrastructure. Some colleges have not added a single laboratory or lecture hall during the last several decades. Thus, there is no resource available now with the colleges of MAFSU that can be mobilized. The only resource available is the trained staff and land, that has to be optimally and intelligently mobilized. Few colleges like, the one in Mumbai and Nagpur have advantage of the location in that these can offer services to people and earn some revenue. Some colleges like Parbhani, Akola, Udgir and Shirwal have very little advantage of the place. The dairy technology college is in Warud, a remote village that has no dairy processing activity in the near vicinity. Because of these inherent constraints, some colleges would face real problem in resource mobilization.

LESSONS LEARNT, SUGGESTIONS AND OPTIONS FOR FUTURE

a. Lessons Learnt:

- The choice of the place to locate a college or a research center must be based on definite merit criteria and not on political compulsions. This single factor is responsible for lack of campus amenities and infrastructure facilities.
- The number of colleges and institutes should be based on need assessment and should only be started once the minimum infrastructure is available.
- In order for to develop the University as 'autonomous' body, care should be taken that such enabling provisions are incorporated in the Act and the statutes of the University. Any neglect at this stage can lead to failure of the institute.
- The colleges should, as far as possible, be uni-campus, including the livestock farms and research stations. All of these contribute to education standard.

- Enough emphasis should be given to education and senior faculty should be involved in teaching undergraduate.
- In order to attract quality students, efforts should be made to expose the current students to offer campus placements and career options services.
- Most of the research programs are meant for dissertation whereas product development vision is lacking. Many departments do not have long-term research and development goals. In order to achieve perceptible and measurable impact, post-graduate research orientation needs to be changed.
- Due to the lack of information, the University could not take benefit of IPR. The research staff must be made aware of IPR provisions and every effort should be made to exploit the research results commercially in collaboration with industry. Even at the conceptual stage a potential research outcome can be assigned to an industry so that in partnership the product can be developed.

b. Suggestions and Options :

Based on the lessons learnt, following suggestions may be opted in future.

- It is necessary to provide an intellectually stimulating campus environment.
- Develop an outstanding undergraduate programme characterized by high quality instruction, intellectual interaction among students and faculty, strong student support services including counseling, career planning and placement services.
- Review of student – teacher ratio for improvement of education system and increasing the standard of teaching, research and extension.
- More staff should be deputed to training programmes both in India and abroad for updating their technical expertise in their related fields.
- The research programme may be framed with farmers participation and the farmer should be able to get superior germplasm, or technology at first hand.
- For all technical research projects undertaken a simultaneous on field trials should be envisaged for better feed back and reliable results.
- To provide an outstanding extension programme appropriate for the State.
- To stimulate overall economic development with specific emphasis on clean environment and quality of life.

6. SCENARIO

Livestock sector has emerged as an important sector accounting for nearly one third of the total agricultural contribution to GDP in terms of draft animal power, rural transport and animal origin food despite limited infrastructure and technology inputs. India has a large livestock wealth with great diversity. The Indigenous breeds have inherent characteristics like resistance to infectious diseases, high adaptability to extreme geo-climatic conditions and ability to utilize poor quality crop residues and forages. These potentialities need to be judiciously exploited. This calls for efforts to make available professionals that are intensively trained and knowledgeable.

In order to plan for livestock industry, it will be prudent to understand the current scenario. Due to the lack of clear breeding policies and non-availability of required germplasm in the field, genetic inter-mixing and crossing has occurred in a large animal population. Consequently population of many indigenous breeds have dwindled. It is essential to work on genetic improvement of indigenous breeds by carefully planning to genetically insert productivity genes without disturbing positive traits like cellulolytic ability and resistance to infections.

For the livestock industry to progress, it is essential to provide fodder and feed security to the farmers. Currently the Indian livestock sector is based on time-tested crop-residue and forage feeding system. There are efforts by commercial companies to change the practice by introducing to the farmers concentrate feed and feed supplements that may not be necessary considering the productivity of our livestock. There appears to be little focus on forage development programs. Unless this aspect is looked at the livestock industry will face problems related with cost-benefit ratio.

The focus in veterinary services is basically on hospital-based treatment to sick animals or artificial insemination services. In both these the farmer has little option or say. The available semen is used on the animals that are brought to the hospital. Later on there is no continuation in services. The treatment of sick animals

is based on impulsive clinical examination and use of available drugs. There are no diagnostic facilities available. There are no animal-side tests available for field veterinarians.

There is a lack of animal resource database, data on productivity, diseases and productivity. The lack of data is a major impediment in planning livestock development initiatives.

The availability and gaps in livestock produce, such as, milk, eggs, etc, is not uniform throughout the year. The distance between the production center and the markets for the produce increases the overhead costs. There appears to be a larger section of population who cannot afford livestock products. This is largely because of high production cost and low subsidy. With the implementation of GATT, it is feared that the Indian livestock products will face stiff competition both in terms of cost as well as quality. It is therefore necessary that the livestock productivity and quality be enhanced in a demonstrable way.

In order for to participate in global livestock market, it will be imperative for the country and the state to control and later on eradicate infectious livestock diseases. Efforts initially will have to make to create islands that are free from diseases, so that initially the produce from these areas can be marketed globally. For example, there is a great demand for Indian buffaloes, but due to presence of certain diseases, the importing country hesitates to purchase our animals. This requires development of vaccines and biologicals currently not available in the country.

There is also a need to reach out to the biomedical aspect of veterinary science. The veterinary scientists have global opportunity to participate in medical and biomedical research. There is scope of participation of veterinary scientists in areas such as, cloning, transgenic animals, stem cell research, nuclear medicine, new pharmaceutical or biological development and value-added products, such as, hyperimmune milk and hyperimmune egg.

With increase in literacy throughout the country, the livestock farming activity will have to be managed by literate and educated people. In that scenario, there will be pressure on producing quality of the product. Thus, part mechanization of the

livestock farming activity in India is now inevitable. This calls for increased efforts by dairy technology colleges to develop affordable mechanical implements that are suitable to our farming and processing needs.

For the state of Maharashtra there is an urgent need to develop a blue print of livestock development plan so that region-wise development initiatives, in line with local available inputs, market and resources, can be planned. This calls for livestock system research that can be integrated with agriculture.

It will not be out of place to discuss in detail key issues of each livestock sector:

Dairy Development: Indian dairy industry is heading towards an accelerated and positive momentum. With unprecedented growth in milk production by over two and half times in the last two decades, India has emerged as the largest producer of milk in the world. This quantum growth in milk production and per capita availability of milk has risen from 107 g per day to 190 g per day in 1992 and to about 237 g per day by 2001 A.D. This can be attributed to the organized efforts in dairy development undertaken in country since 1970.

In the year 1970, the National Dairy Development Board launched Operation Flood project, with an aim to link dairy development with marketing. The establishment of a co-operative structure as a ready and regular buyer of milk gave a new turn to the rural economy. Today, over 275 dairy plants and 83 milk products factories in the co-operative, public and private sectors handle an estimated 12-15% of the total milk produced. In most of the developed countries, the proportion of milk delivered to the dairies is over 90%. The trends is now changing fast in India too, and it is expected that the processing of milk on organized scale will increase sharply even in India. This will consequently increase the opportunities for value-addition too.

Present Scenario of dairy industry at Maharashtra state vis a vis India.

Particulars	Maharashtra	India
Cattle population	17.44 million	204.5 million
Buffalo Population	5.448 million	84.21 million
Sheep Population	3.077 million	50.78 million
Goat	9.94 million	115.28 million
Total Milk Production	8.44 million tones	78.03 million tones
Av. Milk Production per Animal	3.32 Kg / day	3.65 Kg/ day
Per Capita availability of milk	158 gm / day	237 gm / day

India ranks first in total milk production, however the milk production per animal is still very less. There is a lot of scope for improvement in productivity by careful planning and using innovative approaches. The organized sector can seize the opportunity of tapping the market of value-added dairy products, like butter, cheese, casein, whey protein concentrate, lactose, paneer etc. The social structure in India and other developing countries are changing fast. This calls for a change in marketing and packaging. For example, in metro cities a large families are 'DINK' families, i.e., these have double income (both working) and no kid. These families demand products that can be stored for a longer period time. The kids and youth from middle and upper middle-income groups have money to spend in schools. These require 'trendy products' and innovative market strategy. Even a 10% snatching of customer share from Cola and like brands will create immense market for milk and milk products. Efforts should be made to develop 'suitable 'vending machines' and brands to target youths and school children towards milk and milk product consumption.

Small ruminants Development: There is also great potential for progress in small ruminants. Since India is fast emerging as a developed nation, has a large population and largest middle class population who are known to spend and enjoy, meat and meat products have great market potential. This sector is still an unorganized sector as there is no marketing infrastructure both for raw material as well as for the product. It is the middleman who make exploits the farmers as well

as the consumers. Efforts will have to be made to genetically improve small ruminants, like, sheep and goat by introducing desirable gene and by improving the feeding practices. For encouraging stall-fed farming trial will have to be conducted for silage making from different forages.

Fisheries Scenario: Over the past four and half decades of planned development, the Indian fisheries has metamorphosed from a traditional, subsistence activity into an industry. Fisheries sector has made significant contributions to the Indian economy by way of augmenting production of animal protein, employment and income generation, and foreign exchange earnings.

indian sector: Today, the sector possesses a force of about 5.8 million fishermen with their lives fully dependent on fisheries and aquaculture activities together with an equally large population associated in its ancillary activities. During the past decade and a half, this sector has recorded an impressive eight fold increase in its contribution to the nation's net domestic product i.e. from Rs.8.06 million in 1980-81 to Rs.67.5 million in 1993-94 at current prices while the overall agriculture recorded only four-fold increase during the same period. Consequently, the share of fisheries in GDP originating from agriculture which was 1.90% in 1980-81, has almost doubled i.e. 3.89% in 1993-94. Fish production has now reached 6.0 million tonnes (2002-03) which is significantly high compared to that just a decade back (2.80 million tonnes in 1984-85). Foreign exchange earnings from the export of aqua-products have increased phenomenally to cross the staggering Rs.6,500 crores during 2002-03.

maharashtra sector:

Maharashtra has rich fishery potential in marine, brackish water and inland sectors. State has a west coast line of 720 kms and continental shelf area of 1,11,518 lakes sq. kms.

A general belief that marine fishery resources are inexhaustible and can be exploited without any control has been proved wrong with uncontrolled growth in exploitation and by late 1980's, it has become clear that fisheries resources could no longer sustain rapid and uncontrolled exploitation and development. The urgent

need for conservation and management of marine fishery resources was felt all over the world. In this context, FAO has recommended the formulation of a Global code of conduct for responsible fisheries to establish principles and standards applicable to the conservation, management and development of all fisheries.

The code which was unanimously adopted on 31st October 1995 by the FAO, it has to be provided the necessary frame work for national and international efforts to ensure sustainable exploitation of aquatic living resources in harmony with environment.

The state is endowed with rich fish, crustaceans and molluscan fauna comprising of pomfrets, prawns, Bombay ducks, mackerel ribbon etc., which are prominently exportable varieties. However, 60% of the catch comprises low price fish, which is equally pretentious as high price varieties. The low price varieties are mainly dried or consumed by low-income group. The state contributes about 15% of the total marine fish production of the country and stands 4th in marine fish production. State is also contributing in gaining foreign currency to Govt. of India through export market to the tune of Rs.1000 crores per annum.

Poultry development: Poultry is a singular example of rapid progress, ostensibly due to non-dependence on government and the crucial role-played by the private industry. The development of this industry is to a greater extent is insulated even from the efforts and inputs of the university system. But, this has resulted in monopolizing of the industry in few hands, which ultimately might lead to restrictive trade practices. The poultry industry, which has presence in the metro market is still restricted to 20% of the total poultry sector. The other 80% that constitute backyard poultry still eludes development. There is a need that the University takes up the cause of development of the unorganized poultry sector. This development has to be away from intensive veterinary inputs like repeated vaccinations and quality feed. The aim should be development of backyard poultry that can thrive on house waste, scavenging (of sanitation value), should provide nutrition supplement to house-hold as well as extra income, when needed, since it has greater liquidity. This could also become a part of poverty alleviation program in difficult areas such as, tribal and mountain areas where malnutrition and poverty are rampant due to the lack of occupation and purchasing power.

7. STRENGTH/WEAKNESS/OPPORTUNITIES/THREATS (SWOT) ANALYSIS

Sr. No.	Strengths	Weaknesses	Opportunities	Threats
1.	**Undergraduate Education** The Bombay and Nagpur Veterinary Colleges, have 119 years and 45 years respectively, of experience in imparting Veterinary education. Most of the colleges are about 25 years old. The constituent Colleges and the post graduate institute of the university have a varied range of experience in handling education, research and extension education activities.	More passive lecture sessions, less exposure to newer areas and moulding them into learning forms. Less access to global developments through advanced information technology. Lack of awareness in terms of WTO regulatory environment.	1) Education is the basic bed rock on which research and practice of veterinary medicine are well founded and hence, the VCI intends to implement a robust regulatory system, especially in terms of WTO regulatory environment principally related to sanitory and phyto-sanitory (SPS) practices to be followed in food chain. 2) Through the VCI - Minimum Standard Veterinary Education Regulations, the education standard in the Veterinary Colleges in the country will be maintained uniformly. 3) There is a scope for integration of disciplines, multi disciplinary teaching, problem solving assign-ments, computer aided learning, video interactive modular programmes with free hand to the student to take up elective courses.	1) Veterinary Colleges in the State of Maharashtra, since being feebly staffed with poor infrastructures, are in the state of derecognition by the Veterinary Council of India in terms of the VCI - Minimum Standard of Veterinary Education Regulations 1993. 2) The animal sciences education must be able to meet the challenges by accepting the newer developments else it may degenerate and lose relevance.

Sr. No.	Strengths	Weaknesses	Opportunities	Threats
2.	**PG Education :** Post-Graduate Courses are offered at four veterinary colleges. This enables development of departments in terms of infrastructure facilities and specialised man- power resource in Veterinary Sector. This also enhances under-graduate education, considerably.	The post- graduate education is just a supplementary activity to undergraduate teaching. However specialization in new emerging strategic areas lacking.	Due to global competition, industry participation in research is increasing. This will offer an excellent opportunity to establish linkages with industry.	There is a need to expand the traditional concepts of the veterinarian concerned with farm or companion animals to include the broader and unique contribution to fundamental, biological and medical research, else products of the University will not be globally competitive.
3.	**Faculty :** The new University comprises of four faculties namely Veterinary (Animal) Sciences, Dairy technology, Fisheries Sciences and Lower education. It has inherited eminent scientists and teachers in all branches of Veterinary Science and Dairy Technology. The faculty members of this University have proved their excellence on many national and international arenas and won prestigious awards	There are no standard criteria for evaluation of teachers. The quality of working environment of teachers needs to be made enabling for effective and efficient teaching, for viable and vibrant research and for conspicuous (impact making) extension. There is utmost a need to pool teaching resources at regional and national level.	Leadership in animal science education, knowledge workers and scope for training in veterinary and dairy sciences. More opportunities for all faculty members to undergo foreign training in different fields. Teachers will be trained to improve teaching methods and communication skills. Post doctoral training, fellowships and opportunities for sabbatical leave to be created with the collaboration of international institutes. Centers of excellence and Referral centers to be created	Feebly staffed institutes with poor infrastructures can not produce the human capital of inter-national standard as envisioned by the Policy makers of the nation for developing it as 'NAVABHARAT' by 2020.

			in all branches of faculties.	

Sr. No.	Strengths	Weaknesses	Opportunities	Threats
			An integrated scheme for faculty evaluation containing the parameters like, initiatives for improving teaching, peer evaluation publication, research activities and more important students evaluation, can be evolved out.	The scheme like career advance scheme, if not viewed in right perspective, may encourage inner star for amongst faculty higher responsibility, especially in research and extension education activities.
4.	**Human Resource Development :** Since its inception, i.e. during the last three years period, MAFSU has so for succeeded in retaining its academic positions, revived some lapsed positions. A detailed review of the staff positions both teaching and non-teaching has now been carried out and the State Government have been requested to create some additional posts to enable the University to perform its mandatory functions of teaching, research and extension education activities ably in view of V.C.I. and ICAR norms	The University is in the infant stage. The State Govt. needs to come forward to support it with liberal finance for creation of trained human resource to enable it to meet its mandates. Adequate funds are needed to bring about full-fledged over all development as envisaged in the perspective plan.	The University can equip in terms of human resources and infrastructure facilities like sophisticated library, high tech laboratory and equipment, facilities.	The system must cope up with revolutionary changes in science and technology, else it will perish. Some of the new colleges of the University are under the threat of derecognition by VCI, New Delhi warranting urgent remedial measures.

Sr. No.	Strengths	Weaknesses	Opportunities	Threats
5.	**Information Technology :** The colleges of the university have small centers of information technology associated with agriculture research system funded by ICAR. All these centers need to be equipped with all electronic gadgets and satellite connections to browse information from all over the world.	The ICT network must be expanded for more utility. The awareness on information technology is still to reach all sections of scientific community.	Strengthening of information system to provide International disease data, germplasm profile and access to specific informa-tion systems and technology resources. Virtual campus can be established on the University campus.	High initial establishment and maintenance cost.
6.	**Research :** After the establishment of the University, the impetus given to research programmes is producing very encouraging results. Apart from sponsored on plan research programmes, academic research is being carried out in various fields.	Shortage of funds, resource persons, skilled supportive manpower and absence of high quality research environment is hampering the speedy progress.	The Govt. of India has visioned doubling of animal protein availability through milk, meat, egg and fish in Indian diet from 10g to 20g. by 2010 A.D. This achievement is supposed to be brought about by technological progress in the production, processing and distribution of live stock products. Animal production needs to be increased by bringing about rapid advances in feed improvement, genetic and reproductive technologies.	Prosecution of more applied research on a narrow base of basic research might prove futile. The increasing awareness for bio-safety measures in research programmes calls for meticulous planning and execution to keep the environment clean and non-infectious.

Sr. No.	Strengths	Weaknesses	Opportunities	Threats
			Research activities in Livestock, Dairy Technology and fisheries sector will be pursued as a continuous process into new vistas of developing sciences such as Bio-technology, Molecular biology, Genetic engineering etc., to meet the challenges in the decades to come.	
7.	**Conservation of germplasm:** The constituent colleges of the University have been doing pioneering work in conservation of native germplasm of different species of livestock. Schemes on Nagpuri buffaloes, Osmanabadi goats, Red Kandhari Cattle and Deoni Cattle are successfully in progress within the existing facilities despite the constraints of trained specialized personnel and required infrastructures.	Like crop wise research stations in agriculture education sector, livestock research stations are non-existent in animal husbandry sector in Maharashtra state affecting the efforts for upgrading local breeds according to local geoclimatic conditions and in view of locally available feed resources.	India possesses excellent native germplasm in the domestic animal sector that need to be tapped and utilized and conserved for future germline development. Livestock production farms of the University can be developed into livestock research stations for focused attention on genetic improvement and on developing site specific management packages and diagnostic kits, besides regular institutional activities.	Certain rare breeds are in the extinction stage calling for urgent measures at any cost. Unnecessary piling up of germplasm should also be avoided.

Sr. No.	Strengths	Weaknesses	Opportunities	Threats
8.	**Livestock Resources :** The university with its constituent colleges have modest livestock farms. The colleges have technical capacity to handle livestock.	Calls for nuclear breeding policies. Lack of commercial orientation Introduction of improved exotic germplasm into the existing breeder flock is needed for exploitation of desired traits to the maximum extent. The livestock strength and facilities for modern management are minimum.	Livestock production has attained industrial status throughout the State. The farmers are fully aware of the potential in livestock production and are willing to adopt modern technologies.	Scanty fodder and feed resources. Bio-security measures need strengthening to protect vulnerable exotic germplasm.
9.	**Feed & Fodder Technology :** This University has expertise and technical know how in feed technology, Feed and Fodder analysis and implementation of schemes in this direction. The training programmes are also being conducted successfully for trainers, farmers and other officials.	Lack of data on availability and utilization of fodder resources and production in different agroclimatic zones. Lack of institute and industry linkage.	Ample scope exists for Feed Industry with Livestock production taking a volte-face as leading industrial sector. Scope for utilizing bypass proteins, single cell proteins, probiotics, enzymes, yeast, fungi etc. is bright. There are more opportunities to develop fodder in uncultivated lands.	Lack of cooperation from fodder cultivators. Monsoon factor, unstable quality control further precipitate the problem.

Sr. No.	Strengths	Weaknesses	Opportunities	Threats
10.	**Post Production Technology :** Departments of livestock product technology & veterinary public health are well equipped with active research programmes. These Departments are now nationally recognized. A western regional referral laboratory is attached to these departments, which has a state-of- the art facilities.	Need for augmenting the infrastructure facilities to cope up with development in production technology. It is paradoxical to note that inspite of impressive growth in meat, milk and fish production over last one decade, production of hygienic and clean animal products is still a distant objective to be achieved. Hence, lack of clear national policy on animal products.	More scope for development of aesthetic value added convenience food products of animal origin. Hygienic production of animal products with stable prolonged shelf life will be a boon for both local and export market. Awareness among educated section of population would bring about desired results. Cheese industry offers good potential.	Present scenario of unorganized nature of meat industry and lack of milk, fish & trained human resource. Public health hazards might increase if proper sanitary-Phyto-sanitary measures are not adopted right from origin until the product reaches the consumer. Unscientific production, processing & distribution systems.
11.	**Clinical facilities :** This university possesses excellent clinical facilities, some of which are unique for the country. To its modern infrastructure and experienced technical know-how. Major equipments available include ECG, ophthalmoscope, endoscope, EEG etc.	Lack of sophisticated equipment to carry out microsurgery, Laser Therapy etc. Lack of facilities for introduction of Nuclear and Radiation Therapy as in human medicine.	With ever expanding knowledge based on medical equipment, diagnostic techniques, drug chemistry etc. more service units will be created for different health and surgical conditions. Use of radiation and radio active material for increased production will be amplified.	Financial constraints in maintaining the equipment.

12.	**General :** The University is focusing on meeting the emerging challenges of Maharashtra participating in global market and integrating into the emerging knowledge economy. The University will strive to ensure food and nutritional security and sustainable use of the state's natural resources in animal, dairy and fisheries sectors. By 2025, the University will be an international seat of learning, globally accrediated.	At present, the University has weak financial resources when compared to its mandate and societal expectations from it. Faculty needs newer capacities in the frontier specialised technologies such as information and communication technologies, biotechnologies, genetical engineering, molecular biology, nutrition and disease management and processing.	To develop a virtual integrated campus through the use of information and communication technologies especially the Internet that optimises and brings greater efficiency in the use of its infrastructure and knowledge assets. The University has the potential to become a dynamic core and a leader for the South Asian countries in livestock production, veterinary and fishery sciences and technology generation.	i) Want of support of political will. ii) Inability to retain faculty with proven excellence. iii) High competitions in the emerging scenario of foreign universities as their sub-campuses in India, in place in near future.
13.	**Transfer of Technology :** Transfer of proven technologies to field by all units of the University as a mandatory function are carried out for farmers' benefit. Entrepreneurs and livestock farmers are benefited through	1) Extension wing of the University is feebly staffed. It should contain three segments, namely training, TOT and communication. Both the faculty and the students passed out should possess the acumen of efficient extension professionals and hence,	1) Ample scope for triggering the extension machinery to newer heights using modern information technology tools as these facilities will be available at every village hamlet of this State in near future.	Non-involvement of farmers and entrepreneurs in technology assessment and refinement might prove entire exercise futile, especially due to lack of an effective feed back mechanism.

Sr. No.	Strengths	Weaknesses	Opportunities	Threats
	various extension programmes involving mass media and multimedia. Novel programmes like lab to land and institute village linkage programmes are also in vogue benefiting the masses. Besides the degree colleges, there are about 150 diploma institutes producing more than 6000 diploma holders in dairy and animal husbandry every year. Thus, there is a large pool of vocationals and semi skilled workers in the dairy and animal sector in Maharashtra who can provide required impetus for development of dairying and animal husbandry on scientific lines.	impact making is conspicuously missing. 2) The University lacks the necessary network of extension activities, with the colleges and institutions and NGOs. 3) The Department of Extension Education at the constituent colleges, since being understaffed, are mainly confined to teaching activity only. No adoption of villages with at least nucleus staff for rapport developing and feed back purpose. Participation of Extension Education staff for involvement of farmers by way of on field trials in technology assessment and refinement, is conspicuously missing. Weak linkages between the Department of Extension Education, on one side and co-operative milk unions, N.G.O's live-stock holders associations and self help groups on the other. Enterprising leadership qualities and high professionalism warranted.	2) The University can build up the necessary network of extension activities to reach out farmers and livestock holders, fishermen by involving its diploma schools and self help groups of rural women. 3) Liberalization of patent law and encouraging atmosphere for individual research claims will pave way for strong institute industry linkage benefiting both scientists and entrepreneurs. 4) Maharashtra has taken a lead in horticultural plantation. There is an ample scope for evolving out horticulture-based animal integrated farming system, especially in the backward region like Konkan in the state.	The technology itself is not matching with the socio-eco-culture situations of the users. Moreover, rapid changes in technology make the professionals progressively deficient in knowledge and technology.

Sr. No.	Strengths	Weaknesses	Opportunities	Threats
		4) Extension personnel lack in rural field bias and enthusiasm and are interested in chair based activities in the Department itself, lack of imaginative use of trained manpower at Department level etc., are some of the major reasons for slow technology transfer and hence, accountability is very much called for.	5) Involvement of diploma imparting schools and locally available trained diploma holders vocationals and semi-skilled workers in the extension networking system of the University, is the need of hour. 6) For training of field veterians, virtual campus can be developed. 7) Involvement of Scientists and teachers in TOT.	
14.	**Fisheries:** 1) The State of Maharashtra is endowed with a considerable potential in form of vast expanse of water areas conducive both for marine fisheries as well as for fresh water fisheries and aquaculture activities. Maharashtra's seacoast area is about 720 kms and the total inland water spread area is	1) Compared to the potential of fisheries in Maharashtra very little has so far been achieved. Fisheries resources are lying grossly underutilised. 2) Fisheries communities in the state are under-privileged ones; illiteracy is rampant and therefore, lacks skill of scientific fish farming and technological led management, training	1) A new college is being established at Pench-Nagpur. This will help generate adequate number of graduates' diploma and certificate holders in near future. 2) Within a decade or so, there is a scope for creating post graduate professionals in adequate number both masters and Ph.Ds. to fill up the	1) Because of illiteracy and ignorance, there exists sociological misconceptions, inhibitions, taboos and other such negative traits. 2) Non-availability of qualified personnel endangering teaching, research and extension activities.

	317000 ha. With total number of reservoirs /tanks are 2051. There are 1850 fisheries cooperative societies. Further, there are 42 fish seed farms and farms with hatcheries are 28, besides 14 fish seed rearing centres. Almost every district has fish farmers' development agency (26). 2) Maharashtra also has varied species of finfishes, shellfishes and aquatic plants, which are commercially important from fisheries point of view. Moreover, Maharashtra is bestowed with a very favourable environment regime holding excellent potential for fisheries activities. 3) Maharashtra has a large number of fishermen populations that provides a good contingent of inexpensive labour force needing labour intensive fisheries and aquaculture technologies.	facilities are in adequate. 3) Graduate and post-graduate courses so far offered in Maharashtra are of very generalistic nature. There is a need to develop subject matter specialists and experts. Entrepreneurial segment does not find place in fisheries curriculum. Graduates are after paid jobs. 4) Faculty strength is very feeble. There is a great scarcity of qualified manpower in specialised frontier areas such as biotechnology genetic engineering molecular biology, and disease management and information technology. 5) Research needs to be viewed in a holistic manner. There is a limited development of linkages and partnership. 6) The extension wing is feebly staffed and lack proper facility for transfer of technology and provision of feed back.	shortage of subject specific specialists in various fields of upcoming fisheries and aquaculture industry. Thus, the required HRD can be created. 3) The Fisheries Faculty of the University shall serve as Fisheries 'Think Tank' and can help the state level policy formulation on fisheries. 4) Effective implementation of training and of TOT programmes for faster dissemination of developed technologies, through preparing useful audio-visual and software versions of transferable technologies.	3) Lack of awareness amongst people regarding eco-friendly environments and management of fisheries resources. 4) Collapse of fisheries industries due to pollution hazards, over capturing.

Sr. No.	Strengths	Weaknesses	Opportunities	Threats
	4) Fisheries in Maharashtra contribute substantially to the growth of national economy by earning foreign exchange through the production of high value species such as prawns, lobsters, crabs, edible molluses and seaweeds etc. It also serves as inexpensive source of protein diet for ever expanding population of the country.			
15.	**Dairy Technology Education :** 1) Out of 86.96 million metric tones India's milk production, the contribution of Maharashtra is 9.70 m.m. tones, i.e., share of the State is 11.15%. India possesses 220 million heads of Cattle and 156 million buffaloes. The cattle and buffalo population of Maharashtra is 16.07 millions and 5.73 millions respectively. The milk production of our country is expected to reach minimum 200 m.m. tones by 2020	1) The training centers at the grass root level are inadequate. 2) The Dairy farmers lack knowledge and skills in production of hygienic and clean milk unaware of high demand of quality milk. Milking is taking place in a very primitive way and unhygienic methods, no efforts towards improving the shelf life. More than 50% milk is still sold as unprocessed	1) Milk production in the country is on set of a phenomenal growth. There is tremendous demand for milk & milk products in urban & semi-urban areas because of high income. Milk cooperatives, private Dairies and multi-nationals companies are expected to play their roles in this ever increasing enterprise, Existing processing plants are increasing their capacities. Great opportunities for Dairy	1) Organised Dairy industry in India is mainly in cooperative Sector which provided the necessary impetus for increasing milk production. It is indeed the mainstay of rural economy and employment. Now cooperative setup is facing the threat from private Dairies and Multi-nationals. The monopoly of big business houses may pose a threat to our rural-based-cooperative dairying.

Sr. No.	Strengths	Weaknesses	Opportunities	Threats
	considering the faster growth rate ranging between 51-60% every year. 2) On the pattern of Anand and Gujrat Dairy Cooperatives, dairy cooperatives has taken firm roots in the state of Maharashtra. Now sophisticated transport facilities are available for faster transport of liquid milk and milk products to urban city markets and hence procurement of milk and its marketing does not pose problems. Tremendous scope for setting up of new cooperatives and chilling plants in the state. 3) Gir cattle and Murraha buffaloes even though not natives of Maharashtra, their good pedigree herds in large number are available. They contribute sustained amount of milk to our urban burgoising population.	by vendors. Adulteration is rampant. 3) Adequate numbers of efficient technical qualified personals are not available to solve micro level problems in product preparation and other frontier areas. Product preparation are still in the hands of halwais. 4) Many of the Traders and Dairyman are ignorant of Govt. rules and regulations and not bothered about general safety and public health practies. 5) Little research facilities to solve the problems especially in emergencies, no contingency plan to solve flush in production. No full fledged referred laboratory in the state to ascertain the quality of milk and milk product.	Education from lowest level as technicians, operators to graduate administrators and post-graduate specialists. 2) As Dairying has become a specialized field, more specialists are required. University contain manpower. 3) Quality of food has become essence of Dairy industry. There are opportunities to setup regional referral laboratories with all modern Testing facilities, for milk and milk products. 4) University can develop and market the efficient and quality kits for testing the quality and detection of adulterants and preservatives in dairy products.	2) Cooperative Dairy Sector in the neighboring state like Gujrat is better organised and has taken firm roots and hence, processed milk and products, because of economic scale, are available in Maharashtra and especially in city like Mumbai at competitive prices. This has posed a threat in promoting local dairy development activities. 3) The biggest threat to Dairy products are from simulated products of plant origin such as soya milk, soya paneer, soya cheese, coconut milk and also synthetic milk industry products. 4) Private extension emerging, Public extension will get reduced. Employments in public sector are shrinking.

Sr. No.	Strengths	Weaknesses	Opportunities	Threats
	4) There is one Dairy Technology College at Warud (Pusad) and one Dairy Technology institute at Aarey-Goregaon milk colony-Mumbai (Dairy Diploma Imparting Institute) besides other 150 private diploma instruction schools affiliated to MAFSU. Thus, the university creates adequate trained manpower resource required for development of dairy industry in rural Maharashtra. 5) The Dairy Technology College Warud (Pusad) is at present meeting the need of undergraduate education. Besides, every constituent Veterinary College of Maharashtra Animal & Fishery Sciences University has the live stock Product Technology Department and Post-graduate programmes in LPT. The facility of these institute, though inadequate is capable and engaged in	6) Graduate and post-graduate courses offered in Maharashtra are of very generalistic nature. There is a need to develop subject matter specialists and experts as Dairy Engineers, Dairy business managers, Dairy Micro-biologists fermented milk product technologists and specialists in packaging indigenous milk products, and in quality control and so on. 7) Entrepreneurial segment does not find in Dairy Technology curriculum. Graduates are after salaried jobs. 8) Extension is non-existent for want of staff, lack of proper facilities for transfer of technologies and provision of feedback.	5) Dairy graduates are capable start their own processing unit in rural areas and can provide employment to other non employed youth in vast rural area of the state. The students need to be prepared in skill and aptitudes for private extension works. 6) Dairy Technology Diploma Institute at Aarey-Goregaon, Mumbai can be converted into a College and P.G. research school as well as referral laboratory for milk and milk product. 7) On availability of adequate staff from the State Govt., effective implementation of training, ToT programmes and communication activities can be under taken for faster dissemination of developed technologies through measures like preparing useful audiovisuals, print	5) Because of illiteracy and ignorance, there exists sociological misconceptions, inhibitions, taboos and other such negatives responsible for not enhancing the productivity of milk production and quality of milk products.

Sr. No.	Strengths	Weaknesses	Opportunities	Threats
	guiding and solving day-to-day problems of Dairy Industry.		materials and software versions of transferable technologies. 8) There is a need to have another Dairy Technology College in a city like Mumbai, the main domestic market for milk and milk products, for research and development purposes so as to deal with the unique problems of Dairy Industry, in the city as a hub for export.	