AGRICULTURE

Q. What is Agricultural Science?

The study of agriculture is termed as agricultural science. It is a multidisciplinary field which consists of a variety of scientific, technical and business subjects that promote the efficient production of quality food on the farm and in the agricultural-food industry linked to farming.

Closely related to biological science, it uses the principles of biology, chemistry, physics and mathematics to solve the problems related to agriculture. Agricultural science include research and development on production techniques; improving agricultural productivity in terms of quantity and quality; transformation of primary products into end consumer products and prevention and correction of adversities. Major areas of specialization within agricultural science are food science, plant science, soil science and animal science.

Agricultural science professionals specialize in agricultural production and livestock. They play an important role in maintaining the nation's food supply. Some of the major tasks performed by them involves improving the quality and quantity of farming; improving crop yield with less labour; conservation of soil and water; controlling pests and weeds more safely and effectively etc. In short, Agricultural scientists engage in research to discover and promote effective, practical pathways to sustainable land use, food and fiber production and food harvesting

Q. How can I pursue a course in Agriculture?

Various universities and colleges in India offers Under-graduate, Post-graduate, Diploma and Doctorate courses in agriculture science. The basic eligibility criteria for B.Sc Agriculture Science is 10+2 or equivalent with science subjects with a minimum 50% marks. Duration of the course is 4 years and the admission to most of the institutions is based on merit or performance in the entrance examination conducted by the concerned institute/ university or on the basis of marks obtained in the ICAR Examination. B.Sc or B.Tech degree in relevant subject is needed for the 2 year Master's degree programmes. In M.Sc. Agriculture science several specializations are offered in the branches like agronomy, plant physiology, seed technology, soil science and soil conservation, sericulture, animal husbandry and dairy, horticulture, water conservation,

farming system management, agricultural botany, agricultural biotechnology, agricultural chemistry, agricultural Economics, agricultural marketing management and so on.

For the 3 years Ph.D, one needs to have post graduate degree like M.Sc or M.Tech in related field. Almost all the agricultural universities provide Ph.D degree in different disciplines. Several institutes offer P.G Diploma courses in agriculture and those having a bachelors degree with an extensive knowledge base in agricultural science can opt for these courses.

Admission to all the courses in Agricultural science are made through Entrance Examination. These exams are conducted by the concerned institute/ university. Indian Council of Agricultural Research (ICAR), New Delhi conduct an entrance examination separately for graduate and postgraduate courses. Eligibility requirement for the exam is 12th pass in science / agriculture with 50% marks for graduate level courses, and 60% marks in B.Sc / B.Sc (Agriculture) for postgraduate level courses. Certain institutes admit students on the basis of the marks obtained in ICAR examination. ICAR also provide fellowship for all the students of postgraduate courses and for those students who've got Junior Research Fellowship during the entrance exam at the postgraduate level. Indian Agricultural Research Institute (IARI), Delhi; Indian Veterinary Research Institute, Izatnagar; National Dairy Research Institute, Karnal and Central Institute on Fisheries Education, Mumbai are some of the major institutes that conducts their own entrance examination.

Apart from the conventional courses such as B.Sc in agriculture, horticulture, forestry and home science, the agriculture universities are now offering technology oriented courses - B.Tech in food process engineering, energy and environmental engineering, bio-technology, and bioinformatics.

Q. What qualities/attributes are required to become a successful agricultural professional?

To be a successful agricultural professional, one must have a good knowledge in science, and be familiar with crops, pastures, soil types, agricultural and horticultural chemicals etc. They should have a keen and analytical mind, a high level of concentration, an aptitude for research, ability to work as part of a team, abundant physical stamina to put in long hours of work and patience. Other needed attributes are good observation skills, communication skill, organizing skills,

written and oral skills, the ability to give presentations and knowledge of common business concepts. Computer knowledge is essential to analyze data and to control biological and chemical processing. This profession demands hard work and high level of patience along with many years of study.

Q. What are the various area of specialization in the field of agricultural Science?

Among the various specializations within agricultural science, the major broad areas are food science, plant science, soil science and animal science.

- Food Science: In this field, researches and works is being done for developing new and improved ways of preserving, processing, packaging, storing and delivering foods. Food science professionals/ scientists analyze food content to determine levels of vitamins, fat, sugar, or protein; or search for substitutes for harmful or undesirable additives and preservatives.
- Plant Science or Horticulture: This field comprises of agronomy, environmental science, plant breeding and entomology. Agronomy is the scientific management of soil and the production of crops. Entomology is the study of insects and their relationship to plants. Plant breeding include Forestry, Floriculture etc
- Soil Science : Soil science is the study of the physical, chemical and biological composition of soils; its impact on plant growth and how various types of soils respond to things such as fertilizers, crop rotation etc.
- Animal Science: It is the field which conducts research and development to improve the production and processing of meats, fish and dairy products. Dairy scientists, animal breeders, poultry & fishery scientists, are the related scientists who specialize in nutrition, genetics, reproduction, and growth of domestic farm animals. Animal scientists examine and grade livestock food products, purchase of livestock, or work in technical sales or marketing.

Other fields of agricultural science are agricultural economics; waste management; environmental science, ecology; agricultural engineering, bio-systems engineering; biotechnology; genetic engineering; microbiology, etc.

Q. What are the career prospect/employment opportunities for graduate in Agriculture?

As an enormous and expanding field, agriculture industry offers numerous career options to agricultural professionals. Most careers in these fields are either business or science related. Entrepreneurship in this field can generate handsome profits while salaried jobs with various government and private concerns provide a regular income. Agriculture professionals can seek employment in Central and State Government ministries and departments; Agricultural finance corporation research institutions; nationalized banks and rural banks; Krishi Vigyan Kendras; Agro - Industry Sector; Agricultural universities and various agricultural service organizations. Their work profile involves pest control, fieldwork control of plant diseases, food science and nutrition, conducting surveys and reports etc. Horticulture, floriculture, dairy and poultry farming, fishery, agricultural journalism, etc are some of the areas offering good career potential.

Graduates in agricultural science are employed as agricultural managers/ inspectors in farm related organizations, agro-industries, food-processing unit, dairy fields, NGO's and breeding centers. Many of these positions can be in areas that support the marketing and distribution of agricultural commodities as well as in the production sector of agribusiness operations. They can also set their own business in primary economic sector such as farming, plantations, fisheries, mining, cattle rearing, poultry farming etc.

Union Public Service Commission (UPSC) and State Public Service Commission recruit post graduates to the post of agricultural extension officer, rural development officer, field officer, agricultural credit officers, agricultural probationary officer, plant protection officer, soil conservation officer, seed production officers, agricultural assistants, farm superintendents or technical assistants. Depending on the areas of specializations, post graduates with doctoral degree are employed in the agricultural universities as plant pathologist, agronomist, economic botanist, agro-meteorologist, research engineer, associate professor etc. Reserve Bank of India, State Bank of India and the nationalized banks offer openings for postgraduates in agriculture and allied areas as Field Officers, Rural Development Officers and Agricultural and Probationary Officers. The Department of Agriculture in every state recruits gazetted officers like District Agriculture Officer, Assistant Director of Agriculture through the State Service Commission (SSC). The recruitment to the post of Agricultural Development Officer (ADO)/ Block

Development Officer (BDO) is also through entrance examination conducted by public service commission/ concerned department. International Crops Research Institute for the Semi-Arid-Tropics (ICRISAT) with its head quarters at Andhra Pradesh is a non-profit, non-political organization for research related job of agriculture field.

Q. What is Agricultural Economics? How can I become an Agricultural Economist?

Agriculture has emerged as a vast and diversified field encompassing so many areas, that there are numerous career opportunities to be considered in this field. The field of agriculture includes farm management, businesses and industries that manufacture agricultural machinery, industries that buy and process the farm products, banking activities for financing and developing farms, research for improving quantity and quality of farm products, so on and so forth.

Study of economic principles, with emphasis on their application, to the solution of farm, agribusiness and agricultural industry problems in relationship to other sectors is known as Agricultural Economics. Agricultural economics deals with the business side of agriculture. The field of agricultural economics looks at all elements of food production and applies rational thought and planning as a whole. From crops, livestock, land usage and soil content, all aspects of farm life are examined, including how its relation to one another can be strengthened.

Those who work in this business field of agriculture is known by the name Agricultural economists. Agricultural economists manage farms and other agricultural industries by applying business concepts and problem-solving techniques. Agricultural economists also predict trends in markets for farm products. They closely observe and explain changes in the market. An agricultural economist; would monitor crops, prices, animal health, equipment, imports and exports, weather cycles, buying patterns, and new methods of production.

A career in agricultural economics is ideal for those who enjoy agricultural business and also have a knack for calculation and economical theory. Agricultural economics combines the technical aspects of agriculture with the business aspects of management, marketing and finance thus providing range of careers in fields like marketing of commodities and management of agribusinesses, farms and ranches

Students who wish to pursue a career in agricultural economics should possess a strong base in botany, physics, chemistry and mathematics. Various agricultural universities and colleges in India offer Under-graduate, Post-graduate, Diploma and Doctorate courses in agricultural economics. To be an Agricultural economist at least a master's degree is required.

Q. What is ICAR?

The Indian Council of Agricultural Research (ICAR) is an autonomous organization under the Department of Agricultural Research and Education (DARE), Ministry of Agriculture, Government of India. Formerly known as Imperial Council of Agricultural Research, it was **established on 16 July 1929** as a registered society under the Societies Registration Act, 1860 in pursuance of the report of the Royal Commission on Agriculture. The ICAR has its headquarters at New Delhi. The Council is the apex body for co-coordinating, guiding and managing research and education in agriculture including horticulture, fisheries and animal sciences in the entire country. With **97 ICAR institutes** and **47 agricultural universities** spread across the country this is one of the largest national agricultural systems in the world.

The ICAR has played a pioneering role in ushering Green Revolution and subsequent developments in agriculture in India through its research and technology development that has **enabled the country to increase the production of food grains by 4 times**, **horticultural crops by 6 times**, **fish by 9 times (marine 5 times and inland 17 times)**, **milk 6 times** and **eggs 27 times** since 1950-51, thus making a visible impact on the national food and nutritional security. It has played a major role in promoting excellence in higher education in agriculture. It is engaged in cutting edge areas of science and technology development and its scientists are internationally acknowledged in their fields.

The Education Division of ICAR undertakes planning, development, coordination and quality assurance in higher agricultural education in the country and, thus, strives for maintaining and upgrading quality and relevance of higher agricultural education through partnership and efforts of the components of the ICAR-Agricultural Universities (AUs) System comprising State

Agricultural Universities (SAUs), Deemed to be universities (DUs), Central Agricultural University (CAU) and Central Universities (CUs) with Agriculture Faculty. The Division has a National Academy of Agricultural Research Management (NAARM) at Hyderabad for facilitating capacity building of the National Agricultural Research System (NARS) in research and education policy, planning and management and a National Centre for Agricultural Economics and Policy Research. (Visit www.icar.org.in)

Q. What is Horticulture?

Horticulture is the science and art involved in the cultivation, propagation, processing and marketing of ornamental plants, flowers, turf, vegetables, fruits, and nuts. It is unique among plant sciences because it not only involves science and technology, but it also incorporates art and principles of design.

Horticulture, as an industry, is divided on the basis of crop and plant use. For instance, horticulture can be divided into two groups including edible plants and aesthetic plants [meaning those grown for their beauty]. The branch of horticulture which deals with the production, storage, processing, and marketing of vegetables, such as sweet potatoes, lettuce, peppers, and sweet corn, is called olericulture. The science and practice of fruit production is called pomology. Pomological crops include apples, oranges, blueberries, and strawberries. Floriculture is the cultivation and management of cut flowers, flowering plants, and foliage plants. Plants used as cut flowers include chrysanthemums, roses, carnations, and orchids. Easter lilies, poinsettias, and begonias are grown as flowering potted plants. Examples of foliage plants include philodendron, ferns, and ficus. Nursery crop culture is the propagation and production of young trees, shrubs, grown covers, and vines for use in exterior landscapes. Landscape horticulture entails the design, construction and maintenance of landscapes for homes, businesses and public areas [municipal buildings, highway right-of-way, rest areas, public/private golf courses, city/state/federal parks, athletic fields].

What are the career scopes in the field of Horticulture?

Career opportunities in horticulture are as numerous and diversified as the industry described above. The Department of Horticulture offers three distinct areas of concentration in the Plant

and Soil Systems curriculum to fit the personal needs of our students. Our *Ornamental, Olericulture and Pomology Option* is our most diverse option. This area offers many opportunities for eager and aggressive graduates. Entrepreneurial and professional employment opportunities exist in the nursery crop production industry, installation and maintenance of outdoor/indoor landscapes, and in wholesale and retail sales. Many students interested in this option intern nationwide at prestigious arboretums, amusement parks and large-scale nurseries. This option is also flexible enough to fulfill the needs of students interested in the production of fruits, nuts, and vegetables and the allied service sector, i.e. field representatives for produce brokers/buyers, food processors, or crop consultants. The *Turfgrass Management Option* trains students to manage golf courses, athletic or recreational fields. Aggressive turfgrass management specialists often command some of the highest salaries available in professional agriculture. The *Science Option* is for students interested in teaching and/or research in horticulture. Most students taking this option pursue an advanced degree.

Horticulture is more or less a smaller version of agriculture. While agriculture deals with cultivation on a large scale, Horticulture is gardening done on a smaller scale. The name 'Horticulture' is derived from the Latin terms 'hortus' (garden) and 'cultura' (cultivation) which means garden cultivation. Horticulture is the Science and art of gardening which is associated with the cultivation of fruits, vegetables, flowers, spices, ornamental plants, plantation crops, tuber crops, medicinal and aromatic plants. Plants play a major role in everyday life, from the fruit and vegetables we eat, to the trees that make our parks and streets beautiful, through to flowers that brighten up our gardens and homes. Therefore, Horticulture the study of the cultivation of plants is of great importance in an agrarian economy like India. Horticulture is an applied science, relying upon many other disciplines such as chemistry, physics, engineering, art, meteorology, economics, entomology, botany and many more. Horticulturist uses the basic information and theories of these related fields and tries to find an application for these ideas for the benefit of people and the environment.

The field of horticulture not only involves knowledge or beautification of surroundings, but also the study of plants and their significance. Horticulture deals with plant propagation and cultivation, crop production, preparation of soil, plant breeding and genetic engineering, plant biochemistry and plant physiology. This branch of agriculture supplies food products to man,

feed to animals and many raw materials of plant origin to numerous industries (food, mixed-feed, textile, pharmaceutical, and perfume industries). Hence, Horticulture is closely associated with animal husbandry. It includes vegetable growing, fruit growing, viticulture (science of grape growing), meadow management, forestry and floriculture. Food production is the largest and fastest growing area of horticulture.

Horticulture is the best choice for those who love outdoors and greenery. Horticulture industry encompasses various fields such as fruit and vegetable industry, spice industry, floriculture industry, gardening and nursery industry, and other related fields such as landscaping. Horticulturists work and conduct research in various areas of horticulture, to improve crop yield, quality, nutritional value, and resistance to insects, diseases, and environmental stresses. Now Horticulture has entered the field of medicine also by the name Horticulture Therapy. It is the practice of engaging people in various therapeutic horticultural practices for the improvement of their mental and physical well being. Horticultural Therapists use horticultural activities and environments to positively influence human well-being, emotions, health and behaviour.

Q. What are the educational opportunity/courses available in Horticulture?

The level of education that you need depends upon the type of horticultural occupation that interest you and the rank to which you wish to advance. Entry to this field starts from undergraduate level. Candidates who have passed 10+2 in Science stream (class 12th) with physics, chemistry and mathematics/biology/agriculture as the subjects can opt for Bachelors degree in Horticulture as a separate discipline or as a subject of B.Sc Agriculture Science. The same basic qualification is required for doing diploma programme. After doing B.Sc in Horticulture one can continue his/her further study in the field by doing M.Sc in Horticulture. Post Graduates in Horticulture are eligible for M.Phil.

For admission to Ph.D Program different agricultural universities exercise different modes of admission. Most of the State Agriculture Universities and ICAR Institutes conduct Entrance Examinations for Ph.D. admissions. Horticulture courses include subject areas of plant propagation, plant materials, tissue culture, crop production, post-harvest handling, plant breeding, pollination management, crop nutrition, entomology, plant pathology, economics, and business.

Q. What is Horticulture Therapy?

Horticultural therapy is an exciting and challenging field. Horticultural Therapists often work in conjunction or liaison with other professionals such as psychologists, occupational therapists, physicians and social workers. Horticultural Therapists treat those who have physical disabilities, mental health problems and learning difficulties, those recovering from major injuries or illnesses, and elderly people. Programmes can also be developed for the rehabilitation of offenders or those suffering from drug or alcohol abuse. With more and more people opting for naturopathic treatment of diseases, growing of medicinal plants has become significant, which provide attractive business opportunity to horticultural nursery/gardens.

Q. What is Floriculture?

Floriculture or flower farming as it is popularly called is a discipline of Horticulture, and is the study of growing and marketing flowers and foliage plants. Floriculture includes cultivation of flowering and ornamental plants for sales or for use as raw materials in cosmetic and perfume industry and the pharmaceutical sector. The persons associated with this field are called floriculturists.

Officially Floriculture began in the late 1800's in England where flowers were grown in large estates, and now has spread to most other countries as well. The floral industry today has grown to much larger proportions and offers a wide scope for growth and profits.

The countries involved in the import of flowers are Netherlands, Germany, France, Italy and Japan while those involved in export are Columbia, Israel, Spain and Kenya. Floriculture or flower farming as it is popularly called is a discipline of Horticulture, and is the study of growing and marketing flowers and foliage plants. Floriculture includes cultivation of flowering and ornamental plants for sales or for use as raw materials in cosmetic and perfume industry and the pharmaceutical sector. The persons associated with this field are called floriculturists.

In India, Floriculture industry comprises flower trade, production of nursery plants and potted plants, seed and bulb production, micro propagation and extraction of essential oils. Though the annual domestic demand for the flowers is growing at a rate of over 25% and international

demand at around Rs 90,000 crore India's share in international market of flowers is negligible. India has a blooming future as far as floriculture is concerned. Enormous genetic diversity, varied agro climatic conditions, versatile human resources etc offer India a unique scope for judicious employment of existing resources and exploration of avenues yet untouched. Karnataka is the leader in floriculture, accounting for 75% of India's total flower production. The state has the highest area under modern cut flowers, and 40 flower growing and exporting units. The expert committee set up by Govt. of India for promotion of export oriented floriculture units has identified Bangalore, Pune, New Delhi and Hyderabad as the major areas suitable for such activity especially for cut flowers. APEDA (Agricultural and Processed Food Products Export Development Authority) is the registering authority for such units.

The employment opportunities in this field are as varied as the nature of work itself. One can join the field of floriculture as farm/estate managers, plantation experts and supervisors, project coordinators etc. Research and teaching are some other avenues of employment in the field. Marketing of Floriculture products for different ventures is emerging as a potential segment of this field. Besides one can work as consultant, landscape architect etc with proper training. One can also work as entrepreneur and offer employment to others. In addition to these careers which involve research and actual growing of crops, floriculture also provides service career opportunities which include such jobs as floral designers, groundskeepers, landscape designers, architects and horticultural therapists. Such jobs require practitioners to deal directly with clients.

Q. What are the courses available in the field of Floriculture?

Floriculture is not available as a subject at the undergraduate/degree level. Those who wish to join the floriculture stream should enroll for an undergraduate course in Agriculture (i.e a BSc Agriculture degree) after which they can opt for an MSc in Horticulture at the post graduate level. An MSc in Horticulture offers specializations in floriculture, pomology (cultivation of fruits), and olericulture (cultivation of vegetables). Students graduating in these subjects find jobs with companies as supervisors, farm or estate managers, handling large-scale production of certain varieties of flowers. A combined knowledge of floriculture with management enables one to get managerial or marketing positions with organizations involved in the processing and marketing of flowers and flowering plants.

Q. What is the career prospect in field of Dairy Industry?

Dairy Industry is one of the industries which play a dynamic role in India's agro-based economy. Dairy farming includes breeding and care of milk yielding cattle, procuring milk and processing of milk into a variety of dairy products. Dairy products are a major exporting industry and earn considerable foreign exchange for the country. In 1946, the foundation of Anand Milk Union Ltd (AMUL), led to the development of a better organized dairy industry and gave momentum to education in dairying in India.

Dairy industry, now a highly specialized field today involves production, procurement, storage, processing and distribution of dairy products. The main jobs are in production and processing.

Production process includes the collection of milk, breeding of high yielding cattle and taking care of the animals. Dairy Scientists are employed to cover the production aspect of the industry. They conduct experiments to determine the effects of different kinds of feeds and environmental conditions on the quantity, quality and nutritive value of milk produced. They also research breeding to improve dairy breeds, feeding and management of dairy cattle.

Q. How can I pursue a course in Dairy Science/Dairy Technology?

Traditionally dairy technology was a part of veterinary and animal husbandry courses. These courses were and still are offered by Agricultural Universities as a part of the B.VSc, (Bachelor of Veterinary Science and Animal Husbandry). Now there are several institutes offering exclusive diploma, undergraduate and postgraduate courses in Dairy Technology. Many general universities also offer dairy science as vocational subject at the BSc level. Dairying is also available as a vocational subject for the 10+2 level education.

A dairy technology course comprises of three basic areas like Dairy Engineering which deals with only the technological aspects of the product; Dairy Chemistry which comprises the products, such as the percentage ratio of milk and cream contained in a specific dairy products and Dairy Bacteriology which maintain products standards and the role of a biotechnologist is very important.

Courses in dairy technology are available at the diploma, graduation, postgraduate and doctoral levels. The diploma and degree courses in dairy technology require candidates who have passed the 10 + 2 examination, with Chemistry, Physics, Mathematics and English or Physics, chemistry, Biology or Agriculture with a minimum aggregate of 50 % marks. The diploma courses of two years duration include Indian Dairy Diploma (IDD) and National Dairy Diploma (NDD). This is a base course for BSc / B.Tech dairy degree and gives basic knowledge on breeding, feeding of animals, their health care, farm management, planning a farm, milk products, dairy chemistry, bacteriology, book keeping etc. At the graduation level, the course is usually called B.Tech./B.Sc. in Dairy technology or Dairy Science. After graduating in dairying, candidates can opt for further studies and specialisation through a Master's programme in Dairying (M.Tech in Dairy Technology/ MSc Dairy Science), or related areas such as animal genetics and breeding, livestock production, Animal biochemistry, Animal bio-technology or in fields of food technology and preservation.

Dairy Technology is a challenging career which offers enormous prospects for trained professionals. There are now more than 400 dairy plants in the country and many Dairy equipment manufacturers.

Openings for a dairy technologist are available in both the public and the private sector. They can find job in dairy farms, cooperatives, rural banks, milk product processing and manufacturing industries. Quality control departments also recruit dairy technologists. A large number of dairy technologists also start their own business such as small-scale milk plants, creamery, ice-cream units etc or work as consultants. A consultant, however, needs several years of working experience in dairy farms to be successful. Besides there are opportunities for teaching as well as Research and development which is another growing area, crucial for the dairy industry

Q. What is Sericulture?

The word 'Sericulture' is derived from the Greek word 'Sericos' meaning 'Silk' and the English word 'Culture' meaning 'Rearing'. Sericulture is the art and technology of raising silk worms for production of raw silk yarn. Sericulture is a farm based, labour intensive and commercially attractive economic activity falling under the cottage and small scale sector. As a cottage

industry, it provides ample work for the women in rural areas. This agro based industry playing an eminent role in the rural economy of India, is not limited to just worms, but includes all activities related to them, like mulberry cultivation and even post-cocoon technology. It requires both technical know-how as well as specialization. Innovative researches have turned sericulture into an industry and now it has become a major cash crop of the country. The sericulture industry is unique for more than one reason.

It is based on agricultural output viz., cocoons and cottage based labour intensive in nature. Sericulture refers to the conscious mass-scale rearing of silk producing organisms to obtain silk. Mulberry Sericulture involves the cultivation of mulberry to produce leaf rearing of silkworm to convert leaf to the cocoon, reeling of the cocoon to obtain silk yarn and weaving to convert the yarn to Fabric. The industry comprises of reeling, silk preparatory and weaving, silk knitting, silk wet and processing consisting of degumming, dyeing, printing and finishing besides garment manufacturing. China and Japan were the two main producers of silk yarn, together producing over 50 per cent of the total world production each year but now Japan has been relegated to the third position ever since India has doubled its production of silk. The trends in international silk production suggests that sericulture has better prospects for growth in the developing countries rather than in the developed countries. The principle silk consuming countries are India, USA, Canada, Germany, France, Italy, Denmark, Sweden, Netherlands, Switzerland, Japan, Austria and Australia. India is home to a vast variety of silk because of diversity of silk moths. Our country has gained the unique distinction of being the producer of all the five commercially traded varieties of silks namely mulberry, tropical tasar, oak tasar, eri and muga. Among the Silk Producing Countries India Tops in the Production of Tropical Tasar and Eri Silk.

Socio-economic studies have shown that sericulture which needs less investment, small land holdings and higher returns can provide best career options to job seekers and entrepreneurs. The export of silk products has shown a steady growth and export earnings have also increased during the last decade. Being one of the largest exporters of silk, chances for boost in the economic field is comparatively high for our country, which in turn give new openings to the job seekers.

Q. What are the courses available in the field of Sericulture?

To become a Sericulture Graduate one has to pass four years degree from Sericulture College of State Agricultural Universities or Silk Institutes of various Universities. There are two types of degree, B.Sc. (Sericulture) and B.Sc. Silk Technology (Sericulture).

For a course leading to a degree in Sericulture, the basic qualification required for admission is HSC (10+2) with subjects such as Biology and Chemistry. There are post-graduates courses too for which a basic degree in sericulture is essential. The course duration for the degree course is four years while that for post-graduation is two years.

BSc (Sericulture) and BSc Silk Technology (Sericulture) involves courses on Silk Worm Rearing and Grainage, S/W Breeding and Genetics, Silk Reeling and Spinning, Silk Grading and Testing, Seed Technology, Arboriculture and Moriculture, Diseases and Pests of Silk Worm and Food Plants, Production Planning and Exterision, Costing and Management, Silk Weaving Technology, Silk Dying and Printing Technology. Fourth year syllabus contains practical experience for setting up Sericulture Farm/Silk Realing Unit/Weaving and Dyeing-Printing Mill etc. Candidates who have passed B.Sc. Sericulture/Silk Technology can apply for M.Sc. Sericulture/Silk Technology courses.

Q. What are the career opportunities in Sericulture?

Sericulture, in recent times, has begun to offer a wide variety of employment and entrepreneurship options. Most importantly, every state in India has a sericulture department to focus on rearing of silk worms, production of fibre and marketing. There are many laboratories that conduct experimentation on this natural fibre and these serve as excellent avenues for those inclined towards technology and scientific experimentation. There is demand for Indian silk items from America, Japan, Spain, Germany, Italy and Europe. Demand for Kashmiri silk carpets has been on the rise constantly.

All this has created additional avenues for Seri culturists. Sericulture is quite popular in Southern India and is now available as a career option in Northern India too. With research institutions devising new technological processes, Sericulture is now being recognized as a mainstream profession. Sericulture offers career opportunity in Govt. research centers, silk boards, academic fields, sericulture units, agriculture sector banks etc. One can get jobs in

Central Government agencies like Central Silk Board/Silk Export Promotion Council/Fao/Nabard, Krishi Vigyan Kendra etc. Candidates with M.Sc sericulture can apply for the post of lecturer, professor and lab assistant. Seri culturists can find employment as officers, managers in the agricultural loan sector of nationalized as well as private banks. They can work as a manager in Sericulture Farm, Grainage, Silk Reeling (Filature), Silk weaving mill, Dyeing, Printing and Spinning mill etc. as well as in various central government sponsored schemes like SGSY, Welfare Dep't. Scheme Run By NGO's like Pradan, Vikash Bharati etc. Seri culturists can also set up their own enterprise or start up as entrepreneurs in silk retailing, weaving, exporting etc. Consultants with a thorough and updated knowledge of the field are also in demand, especially to provide guidance for the setting up of sericulture farms.

Q. What are Fisheries and what is its scope?

Fisheries, as the name suggests is an organized effort which is related to the capturing of fish including inland and sea or other aquatic species. This industry involves catching, processing, marketing and conservation of fish. Fisheries Science is an academic discipline of managing and understanding fisheries. This is a multidisciplinary subject that includes the biological study of life, habits and breeding of various species of fish. It also involves farming and husbandry of important fishes and aquatic organisms in fresh water, brackish water and any marine environment. Fisheries aim at developing and maintaining sea wealth. Fisheries are estimated to provide 16% of the world population's protein and India holds the seventh position in the world as regards to the value of fish exports. Around 8 million people of India are directly or indirectly dependent on the fisheries sector. The rapidly developing fishery industry provides employment not only to the traditional fishermen, but also to the highly skilled personnel engaged in the scientific breeding and management of fisheries. The scope in the field of fishery science is increasing with the development of brackish water and freshwater aquaculture. Because of the country's expansive natural resources, dynamic entrepreneurial skills, this profession is advantageous to the Indian economy also.

A career in fisheries science can create an aqua culturist, farm managers, exporters, traders, breeders and modern fishermen's, etc. The main objective of fisheries science is to make available the much needed technically competent extension personnel for transfer of technology.

It helps a person to assist the research and development; to develop and execute fisheries development plan

Q. How can I study a graduate level course in Fisheries Science?

Fisheries Science can be studied at the graduate and postgraduate level. To become a fisheries graduate one has to pass a 4 year degree course i.e B.F.Sc (Bachelor of Fisheries Science) from fisheries colleges of state agriculture universities. Eligibility criteria for B.F.Sc is 10+2 with biological science as one of the subjects. The B.F.Sc course enables a candidate with basic knowledge in all the three categories of fisheries science i.e. capture, culture and post harvest technology.

For admission to various Central Institute of Fisheries Education in the country, candidates have to appear for an all India level common entrance test conducted by ICAR (Indian Council of Agricultural Research), New Delhi.

After completing B.F. Sc., one can take M.F.Sc. which is of 2 year duration. (Masters of Fisheries Science). After getting a professional degree in Fisheries Science, one can goes into research- oriented activities.

B.F. Sc. students are trained in a wide variety of subjects such as aquaculture (inland and freshwater), mariculture, industrial fisheries, fish processing and post harvest technology, fish nutrition, pathology, environment, ecology and extension etc. Sustainable fish production practices and scientific breeding and management of fishes are major areas of specialization. The course also contains practical experience like on sea cruise on fishing vessels for data collection & fishing, in processing plants and on aqua farms.

Those who have taken fishery science as a career must possess a genuine interest in marine life and should be free from sea sickness. The field requires a lot of research work and one should have research oriented mentality. Dedication to work, devotion, hard working, patients, a curious, inquisitive mind are essential. Quick thinking and the ability to come up with new ideas are advantageous. A good Managerial skill is also required, as fishery science is a filed which is directly or indirectly related to business.

Apart from the B.F.Sc & M.F.Sc. various fisheries institutes several vocational training courses related to fisheries and allied disciplines.

Q. What are the career scopes in the field of Fisheries Science?

Fishery Science offers numerous career avenues. Fisheries graduates can find employment in the public sector organizations such as the fisheries department and the nationalized banks. Opportunities lie in government agencies, State Departments of Agriculture and organisations such as the Central Marine Fisheries Research Institute (CMFRI). Recruitment to these institutions is through the State Public Service Commission. For those having good research skills, can find employment in organisations such as the Central Institute of Fisheries Technology (CIFT) and the National Fisheries Development Board as research assistant, biochemist, biologist, technicians, etc.

In the state government sector, a fisheries graduate can apply for the post of Assistant Fisheries Development Officer (AFDO)/ Fisheries Extension Officer (FEO) and District Fisheries Development Officer. Various opportunities in Central government agencies are in Marine Products Export Development Authority (MPEDA), Fisheries survey of India (FSI), NIO, WHO etc. They can also be employed as a field banks officer, managers in agriculture loan section in nationalized as well as private banks. Job prospects are also available in private sector in aquaculture farms, hatcheries and processing plants. Commercial fish farming, seed production and export of marine products and ornamental dishes are potential areas of self employment and entrepreneurship development in fisheries.

M.F.Sc degree holders can be appointed as assistant professor in the faculty of fisheries and those with doctorate can be recruited as scientists in various agricultural and fisheries institutions. Recruitment to these positions are by the Agricultural Scientists Recruitment Board (ASRB) through a nation-wide competitive examination followed by a personal interview

Private research companies in India and abroad are also entering into this field with large investments. Fisheries graduates are in great demand for fisheries professional in the aquaculture and processing sectors in gulf and African countries.

Q. What is Tea Management & what are the career prospects in tea industry?

Tea is one of the most refreshing and popular beverages of the world. India being the world's largest producer, exporter and consumer of tea, there is wide scope for careers in this field. Though not a very well known career option, jobs in this area can be interesting.

There are a variety of jobs one can specialize in a tea industry. The jobs put together are known as tea management. Tea tasting is one of the highly specialized areas of work. Other areas are that of researchers, plantation managers, tea brokers, consultants etc.

Work in the Tea industry includes plantation work, processing, auctioning, branding, marketing and research. Plantation work involves nurturing tea plants in the plantations which includes preparing the soil, applying the appropriate fertilizers, choosing the right variety best suited for the prevailing conditions and supervising the pinching and plucking of the leaves. Processing work involves the crushing, tearing and curling of the leaves, which takes place in the factories. The tea is then packed and dispatched to auction centers. The various samples of tea from different plantations are tested, blended and branded by the tea tasters in the auction centers. Tea brokers who have a background in planting, tasting and a knowhow of market trends, auction the tea and the Marketing personnel market the final product. Although computers are now used for blending varieties of tea, the tea taster’s verdict is still considered the ultimate test for determining the quality of tea. In India, best tea growing areas are Assam, Darjeeling and Nilgiris. Several varieties of tea can be grown in one garden. As tea is a seasonal plant, the same leaves from the same bush, plucked in different seasons, have different bouquets. Each of these varieties requires different ways of handling.

Q. What are the qualifications required to enter the tea industry?

Even though anybody who has a basic educational background can get into tea industry, and pick up the skills required on the job, a degree in Agricultural Science or a B.Sc. in Botany, Food Sciences, Horticulture or allied fields is preferred these days. Candidates who have specialized in business management or marketing are recruited for marketing jobs.

New entrants are taken on as Assistants at the plantation level. After gaining experience and

competence an assistant can get promoted to the level of Assistant Manager, and then Manager of a tea garden. Most assistants can expect to become managers in 12-15 years of service.

Potential tea tasters selected are trained on the job. Besides natural talents, vigorous training for a number of years is essential before becoming a professional tea taster and then a tea tasting manager. Besides acquiring skills in tasting, they need to work on their managerial and marketing capabilities too.

One opting for a career in the field must have an interest and liking for outdoor life. He must be physically fit, adaptable and self-reliant. Leadership qualities and the ability to deal with labourers is an added asset for plantation/ factory managers. One must also have initiative, be knowledgeable about the tea market and be alert to changing market forces, and should be willing to undertake strenuous work. One should also possess fair knowledge about the topography and geographical location of the tea estate. Tea tasters need to have keen taste buds and should keep their sensitivities clean. They should therefore be inclined to keep smoking, drinking and intake of spicy foods in check. Those planning to become brokers should be level headed and disciplined and be able to strike a good rapport with producers and buyers. India being the leading producer of tea in the world, the scope for a career in this field is immense. Tea companies or tea gardens, Tea broking Houses, Tea associations and the Tea Board of India offer lucrative positions. An experienced tea planter can move into tea brokerage or tea tasting or take up a job in a tea broking house. Senior professionals can branch off into becoming consultants offering advice. Those academically inclined may get into research positions open at many tea plantations.

Who are Plantation / Factory Manager?

Tea gardens are controlled by Managers who have junior assistants and Assistant Managers, depending on the size and requirement of the garden, to assist them in the smooth functioning of the tea estate. Their work involves supervision of all plantation work involved from planting to plucking, processing to packing and transport of tea to auction houses. New entrants are taken on as Assistants at the plantation level. Experience is the deciding factor in the appointment of a manager. It is a long wait as it usually takes twelve to fifteen years. The Indian Institute of

Plantation Management, Bangalore offers a training programme on the relevant subject under the Indian Commodity economy.

Who is a Tea Taster?

Tea tasting is a highly specialized area. Tea tasters differentiate between the various flavours of tea and help to brand the varieties according to quality. Most tea companies employ tea tasters for ensuring quality standards, and preparing blends. Tea tasting is typically learnt on the job. Tea tasters have to develop the expertise to distinguish between the taste and aroma of different teas. Tea tasters need to develop managerial as well as marketing skills. Tea tasters should keep their sensitivities clean and should keep smoking, drinking and intake of spicy foods in check. The drawbacks can be damage to your digestive system especially at the peak season when you may have taste as many as 200-300 cups of tea a day and result in stains on your teeth which has to be removed periodically. Tasters are recruited by manufacturing companies, brokers as well as buyers. In a manufacturing company, the taster detects defects in the production process by looking at the colour and size of the leaves to determine if they have been fermented or dried under fire and sends them back to the factory to rectify if needed. They also have to coordinate with gardens, look after import and exports, advice researchers on commercial factors like taste, economic viability and maturity of tea etc. In the broker's office, the taster plays an advisory role and informs manufacturers about market trends. In buying houses besides ensuring quality, tasters have to know what's happening in both the domestic and international markets. Many youngsters opt for this profession because of the out-of-the-ordinary nature of the work and the high pay.

Who is a Tea Broker?

Tea brokers act as intermediaries between the planter-producer and the buyer, and must be up-to-date with market trends and international prices. A background in tea industry and developing a keen tea tasting ability are important requisites in becoming a broker. At the auction centers, the tea samples are listed and evaluated by tea brokers. There are broking houses in the country where the brokers test the various samples of tea, which come from the different tea gardens. Those planning to become brokers should be level headed and disciplined and be able to strike a good rapport with producers and buyers.

Q. What is Food Technology?

Food technology is a branch of science in which food science is applied in the manufacturing and preservation of food products. It is the application of science and technology to the treatment, processing, preservation and distribution of food. The term 'Food Technology' has a wide meaning, it deals with developing new methods and systems for keeping food products safe, resistant to the threat of natural problems like bacteria. Food Technology in simpler terms is the application of food science in manufacturing safe, wholesome and nutritious food products. Due to the fact that food is the basic need of every human being, food technology is directly associated with the benefit of mankind. This field is so old, that research has been going on for decades, on record from the time that Louis Pasteur developed the process of Pasteurization- the process of heating milk and milk products to prevent food spoilage and destroy disease producing organisms.

Q. What is the scope in Food Technology?

India being one of the largest producer of consumable foods stuffs, need for processing is on the increase, consequently new technology in food processing and preservation is the need of the hour. The health and welfare of people everywhere depend not only on good agricultural yields but also on the reliable storage, successful processing and safe handling of all types of food. Food processing industry is one of the most technology-oriented industries which cover a range of food products. These include basic or primary foods, such as wheat and rice products, sugar, oil and pulses etc and the processes for converting them into edible form. The research and development in food technology has resulted in the production of safe and nutritious food. Food processing industry is comparatively a vast field which comprises of various processes such as quality management, primary and secondary processing, preservation, packaging and labeling of various products such as confectionery products, dairy products, fish products, meat & poultry products, fruit & vegetable products; food grains etc.

Now a days there is an ever increasing demand for packaged, processed and ready to eat foods. This requires continuous research and innovation of methods to preserve food stuff for long periods without losing its nutritious content. Food technologists are involved in a wide variety of activities associated with providing nutritious food. They study the chemical, physical and

microbiological makeup of the food. The food is processed, preserved, packaged and stored according to the specifications by industries and the government.

Food processing companies need food technology personnel to work for them in different sections like Production, Quality Assurance, R&D (Research and Development) etc. You can work as a Product Development Manager to devise food products according to the needs of the consumers and effectively put the products in service in an innovative way. You can work as a Sensory scientist or Quality controller to monitor organic properties like aroma, flavour, quality, hygiene and more. Food technologists work in research laboratories or R&D sectors to develop new products, test current ones, and control the overall food quality.

There are private as well as public sectors which provide lucrative job opportunities to Food technologists. In the public sector one can find jobs companies like The Food Corporation of India which handles the purchase, storage, transport and distribution of food grains and other food items, Modern Food Corporation which markets bread, fruit juices, edible oils, soft drink concentrates, North-Eastern Agricultural Marketing Corporation which markets and process fruits and vegetables etc. Major job providers in private sector include Amul, Cadbury, Britannia, Metro Diary, Hindustan Lever, Kellogs, Nestle and such others. The food firms in foreign countries like the United States as well as Australia give special preferences to Indian candidates

There are many lucrative positions open to food technologists like Quality Assurance Manager, Laboratory Supervisor, Production Manager and food packaging manager.

Production Managers/Supervisors: They are responsible for the entire the processes in the manufacturing of a product, right from the purchase of raw materials to the production of the final product.

Quality Assurance Managers/Supervisors: They are responsible for ensuring the quality of food throughout the whole production process. This includes the quality of raw materials, equipment, finished goods, packaging, processing and storage procedures.

Laboratory Supervisors/Technicians: They carry out or supervise quality tests, such as microbiological and chemical analyses, before any product is released.

Food Packaging Managers/Technologists: They are responsible for the research and development of new food packaging systems and filling equipment.

Research Scientists: They are responsible for the continuing research and development programmes within the industry. Research scientists are employed in a wide variety of projects with Government, Food Research Institutes and Food companies.

Product Development Managers/Technologists: They are responsible for the improvement of the existing food products as well as for the development of new products.

Lecturers and Advisers: They work in a range of posts in the Government sector and in Universities, as college lecturers or in advisory and inspection jobs.

Q. What Educational qualification is required for entering the field of Food Technology?
The general criteria for admission to undergraduate food technology courses is twelve years of schooling (10+2) in science related subjects. A post graduate course will require the student to complete his graduation in Food technology or other related fields.

The courses cover the various aspects like food science, food biotechnology, food analysis, microbiology, food preservation techniques, genetics and food packaging, marketing and advertising, food logistics management, operations management etc

A food technologist should have a scientific bend of mind, power of observation & concentration, interest in scientific and technological development and an interest in health and nutrition. Other useful traits required for aspiring food technologists include a sense of responsibility, ability to work well on their own as well as a part of a team, effective communication skills and a discerning approach to food items. A genuine interest in science, high standards of cleanliness, commitment, enthusiasm and motivation are other requisites for this job. A high level of accuracy is also very essential to be a good food technologist

Training in Food technology gives adequate knowledge regarding the quality analyzes of raw materials, packaging standards and methodology, health and hygiene parameters, processing techniques, storage and food value, methodologies for extracting useful byproducts from industrial and domestic waste. Thus the future of the food industries, on a global scale, is in the hands of Food technologists

Q. What is Botany & who is a Botanist?

Botany is a branch of biological science which deals with the study of plants. Scientific disciplines such as agricultural sciences and forestry are based on the basic science of botany. Botany studies the structure, growth, reproduction, metabolism, development, diseases and chemical properties and evolutionary relationships between different groups of plants. It encompasses the study of more than three hundred thousand species of plants ranging from ground-hugging mosses to giant redwood trees.

Botany as a career is best suited for people who have an affinity towards nature and plants. A person qualified in botany is called a Botanist. Botanists play an important part in modern science and industry. Their work affects agriculture, agronomy (soil and crop science), conservation, forestry, and horticulture. In general, Botanists study the development and life processes of plants. In a broader sense, botanist is one who study and research on various aspects of the plant kingdom such as origin and development of various plant species, taxonomic classification, plant physiology, plant pathology, plant fossils, mycology (study of fungi) and so on. Overall, botanists study the behavior of plants from the chromosome level to the reproduction process. Botanical studies have helped in the development of many medicines and drugs which are extracted from plants and are really helpful to fight many diseases. It also help in the production of plants which provide natural raw materials like cotton, rubber, paper, silk, vegetable oils etc.

What are the Educational opportunities in Botany?

Botany is one of the preferred choices of study among the science students. But it is necessary that the students who learn botany has interest in plants and enjoy working with them. Minimum

requirement for a career as botanist is a bachelor's degree. However for higher degrees you require to specialize in one of the many areas of botany.

Courses are offered at bachelor level, master level and doctoral level. For bachelor course, the basic requirement is 10+2 science. After graduation, one can go for post graduate and then doctoral course. Bachelor course is of 3 years and post graduate course, of 2 years duration. You need to study for an additional two to three years to obtain a doctoral degree. After doctoral degree, one can work at the administrator level or teach in institutes, or do research work. In this field, a botany student can choose from many specializations according to the area of interest. Each area of specialization concentrates on a particular subject necessary to know about the plant.

Q. What are the specializations available in the field of Botany?

Various Specializations as botanists are that of:

Plant Taxonomists- Plant taxonomy involves the identification and classification of plants. Plant taxonomists are botanists who work to identify, describe, classify and name plant species. Plant taxonomists identify new plant species previously unknown to the field. They also produce new source of plant genes. Most taxonomists are engaged in field work, which involves arduous physical activity as well as environments that are unsafe or uncomfortable. Plant taxonomists usually work in herbariums, botanical gardens and research institutes.

Plant Ecologists- Plant ecologists are botanists who work to understand the relationship between plant and the world in which they live. In other words, Ecologists study the connection between plants, animals and their physical environment. They examine the environmental factors such as rainfall, population, pollutants, temperature and altitude that regulate plant growth. In some cases, ecologists may be exposed to unsafe or unhealthy working conditions. For example, when plant materials have to be studied after an environmental disaster, the condition in which they have to work may not be safe or healthy. Plant ecologists are employed by government regulatory agencies and departments as well as by colleges and universities. Some may also find work with nonprofit environmental organizations.

Plant Morphologist- Plant morphologist study the manner in which cells are arranged to give each plant its form. To determine the cellular arrangement of plant they study how different plants transport and conduct food and water. They work generally in research laboratories.

Plant cytologists- Botanists who study plant cells are known as cytologists. They study the structure, function and life history of plant cells. Cytologists study minute particles of plant tissue with the help of microscopes. They are concerned with the physical arrangement of DNA in a particular species of plants. They also study the cells concerned with reproduction as well as the means by which chromosomes divide or unite. Cytologists can find employment in research laboratories and pharmaceutical industry.

Plant physiologist - A plant physiologist studies the internal functions and processes of plants. Plant processes include growth, respiration, cultivation, excretion, reproduction and various other functions. They develop an understanding of the biological, chemical and physical processes that are basic to plant life, so that they can regulate and control plant growth. Plant physiologists play an important role in agriculture where drought-resistance, crop production, nutritional value, quality of food crops, germination as well as the storage of seed and the production of fruit are studied. Physiologists are mainly engaged in field work as well as laboratory work.

Ethno botanist - Ethno botany is the study of the relationship between plants and people, 'Ethno' is the study of people and 'botany' is the study of plants. Ethno botanists study relationships between plants and human cultures in a search for better medicines and more efficient food production. Ethno botanists study the different ways in which people make use of plants, whether for food, fiber, medicine or any other purpose. In other words, Ethno botanists study plants and their applications, for potential economic, medicinal or other benefits to communities. Ethno botanists develop new products for food, herbal, and pharmaceutical companies and sometimes assist in managing biological resources. Ethno botanists mainly hold research positions for companies in the pharmaceutical, cosmetic and alternative health product industries, as well as universities and government health agencies.

Mycologist - Mycologists study fungi and apply their findings to medicine, agriculture, and industry. Fungi often live in symbiosis with plants and play an important role in the ecology of

the environment. They cause decay in food and other natural products and they are also important in the chemical and pharmaceutical industries. Mycologists may spend a lot of time out in the field collecting specimens and performing research in laboratories.

Plant geneticists - A plant geneticists are botanists who study plant heredity and plant variation. Plant geneticists study the origin and development of inherited traits. Plant geneticist works to improve breeding methods to ensure that future plant generations possess the desired traits. Geneticists are employed by both government and private forestry organizations to work on programmes for the improvement of trees for cultivation.

Palynologist- Palynology is a highly specialized branch of systematic science and it involves the identification of plant species through analyzing the pollen with light- and electron microscopes. Palynology is the study of fossil and living- pollen, spores, similar plant structures etc. Palynologist's services are also used in forensic medicine and criminology because it is possible to identify pollen on clothes, shoes and the body.

Palaeobotanist -The Palaeobotanist studies plant fossils and must have an interest in rocks and geology. Palaeobotanists and Palynologists are employed in archaeological museums where they are responsible for the study and research of plant fossils. Palaeobotany is a branch of paleontology or paleobiology.

Plant Pathologist - Plant Pathologists study the nature, cause and control of plant diseases as well as the decay of plant products. They attempt to isolate disease causing agents and study the habits and life cycles of various plants. They work mainly in research laboratories.

Weed scientist - Weed scientists study the different types of weed as well as mechanical, chemical and biological methods of control. Knowledge of ecology is also necessary to be in his field. Ecology makes it possible to understand why weeds invade certain areas and to make predictions.

Q. What are the job prospects in the field of Botany?

Job prospects for botanists are generally good. Challenging positions will be available for well-trained botanists. Options are not only confined to India, numerous opportunities are also

available abroad. Careers in botany offer individual freedom, varied work, pleasant surroundings, inspiring coworkers, and travel opportunities. If you like nature and being outdoors, you might enjoy a career as botany. Job opportunities usually depend on educational training and experience. Candidates with advanced qualifications can pursue either an academic career in institutions as lecturers and professors, or a scientific career in various scientific positions such as Plant Scientists, Weed Scientists etc.

The major employers of plant biologists are educational institutions, central and state agencies and industries. Almost all colleges and universities offer courses in plant science and there are faculty positions for botanists who have different specialties. In addition, educational institutions employ botanists as researchers and as administrators. Plant scientists also work in the State Departments, Botanical Survey of India, and Environmental Protection Agency etc. Drug companies, oil industry, chemical industry, lumber and paper companies, genetic research industry, botanical gardens, nurseries, fruit growers, food companies, archaeological museums, fermentation industries all hire men and women trained in botany. The demand for botanists is increasing in areas such as medical plant research, plant diseases, plant breeding and plant genetics. Some botanists work in administration and marketing for biological supply houses, seed companies, biotechnology firms and pharmaceutical manufacturers. There are few others who work as scientific writers, illustrators and photographers. Entry to Botanical Survey of India and other Government departments is through UPSC exams. The notification of various posts is known through leading newspapers and employment news.

Q. What is Veterinary Science? What jobs are dealt with by Veterinary Doctors?

Veterinary Science is the science of diagnosing, treating and curing the diverse types of diseases in birds and animals. The subject broadly covers the study of animal physiology, treatment and prevention of diseases among animals. The basic principles of this specialized branch of study are quite similar to that of human medical sciences. But the job profile of a veterinary doctor or a vet is much more than that of a general physician or a surgeon. It involves not only taking care of animal health but also includes scientific breeding and handling of livestock. Besides giving treatment, Vets perform surgery, prevent spreading of diseases in animals by administering timely vaccination and medicines and give advice on care of pets and farm animals.

Their activities may also include Animal husbandry- animal breed improvement by 'selection breeding' and artificial insemination, animal research in order to control spread of diseases transmitted through animals; thus protecting the public from exposure to diseases carried by animals, wildlife conservation, poultry management and health care, livestock insurance and rural development. Broadly a veterinary doctor has a major role in the conservation of livestock and domestic animal wealth.

Veterinary doctors deal with the treatment, care and handling of domestic pets, livestock, and animals in the zoo, laboratory, sporting animals or animals with the government's animal husbandry departments. They take up practice exclusively of either large animals such as cattle including horses, pigs, sheep; poultry etc or small animals mainly household pets including dogs, cats, birds etc. or both. The approach in treatment varies according to different animals. The vets must be familiar with the many breeds of pets or livestock and the characteristics of each so that they can recommend diets, exercise regiments and treatment, specific to the breed

Q. How can I become a Veterinary Doctor?

To practice as a veterinarian it is essential to have a Bachelor's degree in Veterinary Science (B.V.Sc.). To be eligible for the Bachelor's in Veterinary Science and Animal Husbandry (B.V.Sc & AH) course, a candidate should have passed the class 12 examination with science subjects such as Physics, Che mistry and Biology.

Admission to most veterinary colleges is on the basis of results obtained in the entrance examination conducted by the concerned universities. Veterinary Council of India conducts an 'All India Common Entrance examination' (AICEE) for admission to first year Bachelor of Veterinary Science (BVSc) & Animal Husbandry (AH) degree course for filling up 15% of the total number of seats of each veterinary college of all states; about 36 colleges where Indian Veterinary council Act, 1984 extends. This Entrance exam is usually held in the month of May each year. For admission to masters degree programme, an All India Entrance Examination is conducted by the Indian Council for Agricultural Research (ICAR).

The duration of the BVSc & AH varies from four and a half years to five years, including the period of internship. The first four years of the training programme are devoted to imparting

skills through theoretical and practical training in various disciplines, like anatomy, physiology, biochemistry, nutrition, livestock management and production, production technology, pathology, microbiology, pharmacology, genetics and breeding, gynaecology, surgery, medicine and animal husbandry extension, among others and the fifth year is devoted to hands-on training, of which six months is through internship. The internship includes three months' training at the Teaching Veterinary Clinical Service Complex (TVCSC) under the supervision of a senior clinician and in field veterinary hospitals on a rotation basis. Veterinary students undergo a one-month practical training in livestock production and management at animal farms, then one-month training in poultry production and management and another one-month training in livestock products' technology and other services. Apart from learning to treat animals, training is also provided in dairying and poultry sciences. Generally after doing B.VSc, most candidates go on to do a post graduation, namely a Master in Veterinary Science. The Postgraduate course in Veterinary Science (M.V.Sc.) is a 2 year course and the candidate has the option to specialize in areas like medicine, surgery, anatomy, bacteriology, biochemistry, cardiology, dermatology, microbiology, molecular biology, anaesthesia, gynaecology, pathology, toxicology, virology pharmacology, etc. For jobs in the research and teaching areas, a post-graduate degree in veterinary science and animal husbandry is a minimum qualification, while a Ph.D. is preferred.

The first and foremost attribute required for a good veterinarian is genuine love and compassion for animals. A good vet must read the signs from the animal's behavior and diagnose the ailment. As the animals cannot describe the problem, vets have to diagnose it skillfully. Vets must also be able to handle emergencies and work in physically disagreeable conditions, or in rural areas where working hours may be long and irregular, and working conditions uncomfortable. Working with large animals requires physical stamina and quick body reflexes to tackle the animal's moody behavior and should be able to instinctively gauge the animal's condition. A vet should have the ability to put the animals at ease, to do teamwork, have powers of observation and self reliance, adaptability, indifference to the occasionally disagreeable conditions of work. He needs to be extra sensitive and patient.

Q. What are the employment opportunities for Veterinarians?

Veterinary science offers a large number of avenues of work and the demand for Veterinary doctors has increased tremendously. Veterinarians can choose to work with the government animal husbandry departments, poultry farms, dairy farms, sheep and rabbit farms, race clubs, stud farms, private and government veterinary hospitals and clinics. Wildlife sanctuaries and zoological parks as well as aviaries need veterinarians.

The Army and the Border Security Forces also employ veterinarians for the care and treatment of their mounted regiments which have horses, mules, camels and dogs. Private practice is another option they can consider. Teaching is another option as experienced professionals are recruited in various institutions to train the new entrants to the field.

Besides regular practice, vets can also take up research work, either on their own or in association with the government such as ICAR (Indian council for Agricultural Research). Pharmaceutical industries appoint veterinary scientists in their research and development divisions for the research and development of drugs, chemicals and bio-products particularly antibiotics and vaccines both for human and animal use.

Q. How can I take a career in Poultry Production/Poultry Farming?

Poultry production in India is primitive practice and today this science is emerged from traditional farming to highly profitable industry and research oriented enterprises equivalent to other important fields such as biotechnology, management studies and computer science. Currently, India is the third largest producer of eggs and fifth largest producer of poultry meat in the world. Indian poultry sector is advancing speedily. Candidate can choose poultry specialist as a career mainly in research, education, business, government & public sector and poultry industry. In Poultry Science, experts train students how to raise and manage healthy chickens, turkeys, and ducks for eggs or meat. Students learn to apply principles of biology and chemistry to develop productivity. They study animal nutrition and food science. Poultry science education provides a valuable contributor to human health.

Students must be (10+2) with Physics, Chemistry, and Biology (PCB) for completion of B.V.Sc and AH degree (Bachelor of Veterinary Science and Animal Husbandry). After graduation, most of the students enroll in postgraduate program, M.V.Sc (Master of Veterinary Science). The

M.V.Sc is a two-year course and the candidate can choose optional subjects to specialize in different areas. Various courses in poultry science are Evaluation of Live Poultry, Introduction to HACCP (Hazard Analysis and Critical Control Points System), Avian Physiology, Production and Management of Game Birds in Confinement, Comparative Nutrition, Turkey Production, Commercial Egg Production, Incubation and Hatchery Management, Feed Mill Management and Feed Formulation, Poultry Breeding.

Typical work in a poultry farm involves various tasks related to:

- Management of the Farm
- Breeding and rearing Chicks
- Preventing, diagnosing and controlling disease
- Feed formulation and analysis
- Administration and Personnel Management
- Marketing
- Finance

A variety of jobs can be taken up in various Hatcheries, veterinary Hospital, pharmaceutical concerns, feed miller and feed production companies, feed analysis laboratories. Once established in the field and after attaining some exposure and expertise in poultry farming, one can set up own poultry farms. A large number of entrepreneurs in the country have taken up these types of ventures and have become quite successful too.