



## CAREER OPPORTUNITIES IN AGRICULTURE SECTOR



*Notes*

In the previous lessons, you learned about the importance of agriculture in the growth and development of our country. You also explored how new technologies can help address some of the major challenges faced by this sector. Trained professionals in these emerging technologies are required to transform the farming sector. The field of agriculture is vast, offering professionals various opportunities to work in sectors such as crop production, crop protection, marketing and sales, farm engineering, farm management, academia and research, or entrepreneurship. After graduation, you may choose from a wide range of career opportunities within agriculture and allied sectors.



### LEARNING OUTCOMES

After studying this lesson, the learner:

- recognizes the employment opportunities in the field of agriculture;
- identifies agriculture related educational programmes available in India; and
- explains the roles and responsibilities of popular professions of the agriculture field.

### 25.1 AGRICULTURE: AS A PROFESSION

When India gained independence, the then Prime Minister of India Pandit Jawaharlal Nehru, stated, “**Everything else can wait, but not agriculture**”. This statement was reaffirmed during the Covid-19 pandemic in 2019-2020, while all other sectors of the economy halted, but agriculture continued at its pace, as food is a necessity and we rely on it daily.

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In addition to final consumption, agricultural outputs serve as raw materials for various industries. The commercialization of agriculture calls for specialized production, post-harvest management, and the expansion of processing, storage, transportation, packaging, and marketing operations, both domestically and internationally. However, in India, about 20-30% of crops are wasted annually due to improper handling, spoilage, floods, droughts, pests, diseases, and lack of knowledge of post-harvest technology. Certain sectors, such as floriculture, aquaculture, poultry, fruits and vegetables are especially vulnerable to these problems. Therefore, professionals with advanced scientific knowledge and management skills are in high demand throughout the world.

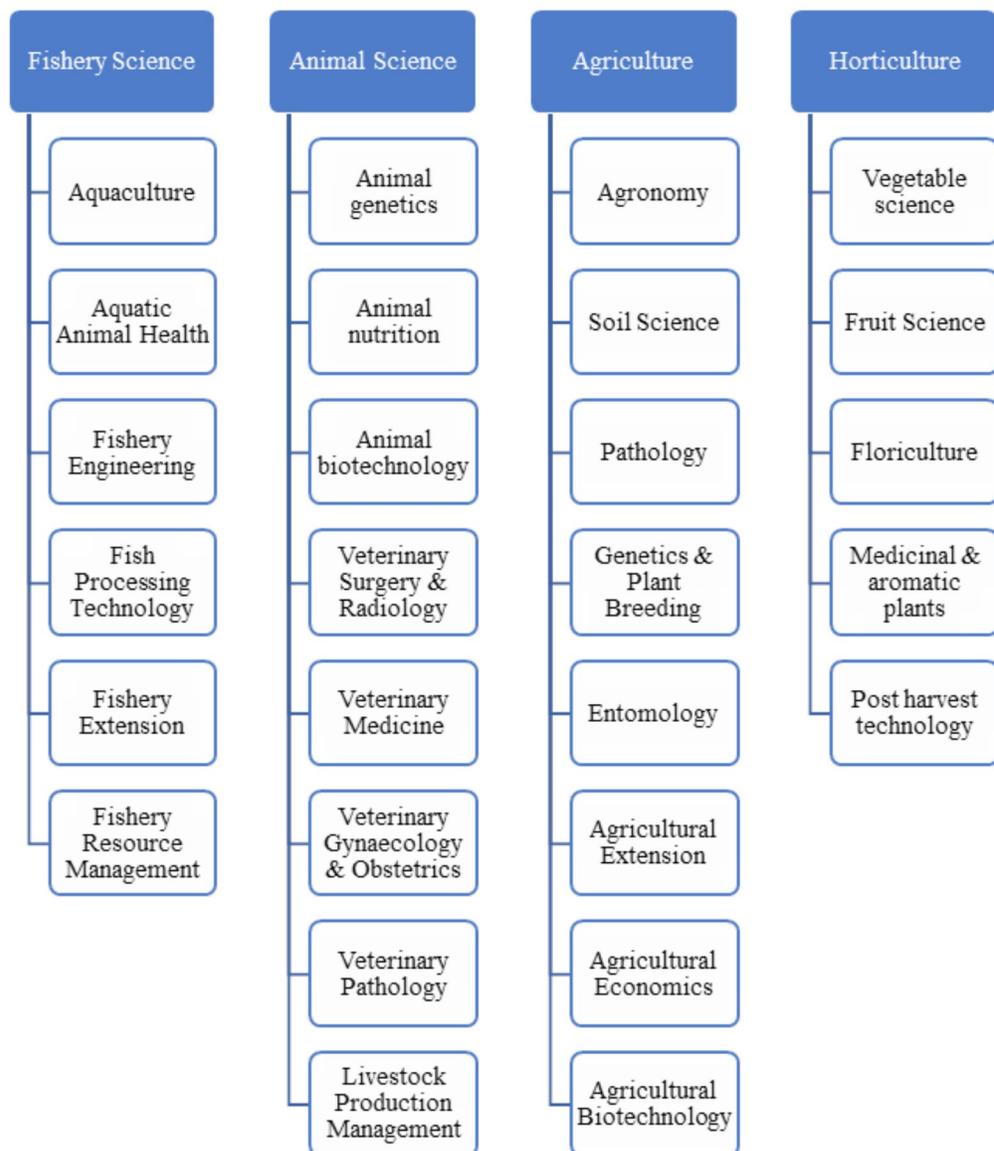


Fig. 25.1: Major divisions of agricultural and allied sciences



If you are interested in a career in agriculture, you may explore the various lines of employment in agriculture and the skills needed to succeed in these roles. Career paths may involve activities ranging from crop production to large scale plantations, manufacturing bio-fertilizers and bio-pesticides, or raising livestock like cattle, pigs, poultry and fish. There are several branches of agricultural science, like crop science, horticulture, biotechnology, water management, economics and marketing, agronomy, soil science, pathology and entomology, etc. Similarly, allied fields like animal sciences cover disciplines such as dairying, animal husbandry, rearing of sheep and goat, animal diseases, animal feed and fodder, animal biotechnology, poultry, fisheries, apiculture and sericulture.

New avenues are emerging through innovations and reforms in agriculture, leading to increased production and optimized benefits. Our country needs professionally qualified individuals who understand technological advancements to tackle the challenges in this sector.

### 25.2 EDUCATIONAL PROGRAMMES AVAILABLE IN AGRICULTURE SCIENCE

Formal education in agriculture can provide you a fulfilling career in agriculture. In India, there are numerous government and private universities offering undergraduate, post-graduate, and doctoral degrees in agriculture. After completing school education, you can pursue a bachelor's degree in agriculture or related disciplines. Some of the educational programmes available at the undergraduate level are mentioned in the table below.

Table 25.1: Undergraduate courses offered in agriculture and allied disciplines

Bachelor of Science (B.Sc.) in Agriculture	B.Sc. in Horticulture	B.Sc. in Forestry
B.Sc. in Animal Husbandry	B. V. Sc. (Bachelor in Fishery Science)	B.F.Sc. (Bachelor in Veterinary Science)
Bachelor of Technology (B.Tech.) in Agricultural Engineering	Bachelor of Technology (B.Tech.) in Dairy Technology	Bachelor of Technology (B.Tech.) in Food Technology
Bachelor of Technology (B.Tech.) in Plant Biotechnology	B.Sc. in Tea Husbandry and Technology	B.Sc. in Community Science

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B.Sc. in Sericulture	B.Sc. in Food Nutrition & Dietetics	Bachelor in Agribusiness Management
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Most of the professional courses listed are of four year duration (except B.V.Sc.) are offered by agricultural universities across India. Currently, there are 63 state agricultural universities accredited by the Indian Council of Agricultural Research (ICAR) (<https://www.icar.org.in/state-agricultural-universities>). In addition to state agricultural universities (SAUs), several other universities run by Government of India offer agricultural programs. These can be categorised as deemed universities, central agricultural universities, and central universities with agriculture departments.

**Deemed Universities:**

1. ICAR-Central Institute of Fisheries Education, Mumbai
2. ICAR-Indian Agricultural Research Institute, New Delhi
3. ICAR-Indian Veterinary Research Institute, Izatnagar, Uttar Pradesh
4. ICAR-National Dairy Research Institute, Karnal, Haryana

**Central Agricultural Universities:**

1. Central Agricultural University, Imphal, Manipur
2. Dr. Rajendra Prasad Central Agricultural University, Samastipur, Bihar
3. Rani Laxami Bai Central Agricultural University, Jhansi, Uttar Pradesh

**Central Universities with Agriculture Departments:**

1. Aligarh Muslim University, Aligarh, Uttar Pradesh
2. Banaras Hindu University, Varanasi, Uttar Pradesh
3. Nagaland University, Lumami, Nagaland
4. Vishwa Bharti University, Shantiniketan, West Bengal

After completing an undergraduate degree (B.Sc./B.Tech./B.V.Sc./B.F.Sc.), students can pursue postgraduate degrees (M.Sc./M.Tech./M.V.Sc./M.F.Sc.), and a PhD (Doctor of Philosophy) in various sub-disciplines. These advanced degrees can lead to teaching and research-oriented careers. Candidates with higher academic qualifications and relevant work experience may find employment with reputed national and international institutions.



**DO YOU KNOW**

Indian Institute of Technology, Kharagpur is the only IIT in the country that offers a B.Tech. degree in agricultural engineering.



**ACTIVITY-1**

You can explore the list of agricultural universities in India by following this link: <https://icar.org.in/state-agricultural-universities>. Check whether there are any agricultural universities located in your state.

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**National and International Recruiting Agency**

Several national and international organizations recruit agriculture graduates and post-graduates in various roles for leveraging their diverse skill sets in the field of to food production, environmental sustainability, and rural development. These national organizations include

- Indian Council of Agricultural Research (ICAR)
- Indian Council of Forestry Research and Education (ICFRE)
- Indian Space Research Organization (ISRO)
- Defence Research & Development Organisation (DRDO)
- Food Corporation of India (FCI)
- Agricultural & Processed Food Products Export Development Authority (APEDA)
- Food Safety and Standards Authority of India (FSSAI)
- Ministry of Agriculture and Farmers' Welfare
- Ministry of Fisheries, Animal Husbandry and Dairying



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- Ministry of Rural Development
- Commercial banks
- National Bank for Agriculture and Rural Development (NABARD)
- Central Silk Board
- Tea Board of India
- Coffee Board of India and others

Some prominent international agriculture organizations which provide opportunities to work for sustainable agricultural practices, food security, and rural development are:

- Food and Agricultural Organization (FAO), Rome, Italy
- International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Hyderabad, India
- International Rice Research Institute (IRRI), Los Baños, Philippines
- International Maize and Wheat Improvement Center (CIMMYT), Mexico
- International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria
- International Water Management Institute (IWMI), Colombo, Sri Lanka
- International Livestock Research Institute (ILRI), Nairobi, Kenya
- The International Center for Agricultural Research in the Dry Areas (ICARDA), Beirut, Lebanon
- International Potato Center (CIP), Lima, Peru
- The World Vegetable Center, Taiwan

### **Management Programmes in Agriculture Sectors**

After graduating in agricultural and allied sciences, you can also pursue an MBA (Master of Business Administration) or PGDM (Post-Graduate Diploma in Management) with a specialization in Agribusiness Management to build capacity for managing the agribusiness sector. These are two-year courses, offered by many agricultural universities, as well as autonomous public and private business schools. Some of the renowned institutes in India offering degrees in agribusiness management are:

1. Indian Institute of Management (IIM), Ahmedabad
2. Indian Institute of Management (IIM), Lucknow
3. National Institute of Agricultural Extension Management (MANAGE), Hyderabad
4. National Institute of Agricultural Marketing (NIAM), Jaipur
5. National Academy of Agricultural Research Management (NAARM), Hyderabad
6. Institute of Rural Management (IRMA), Anand, Gujarat



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### Short Term Courses

If formal education in agriculture sector is not feasible for you, you may consider opting for various short term courses, workshops, or training programmes offered by agricultural universities, open universities, Krishi Vigyan Kendras (KVKs) or the Department of Agriculture under the state or central government. These courses can be especially useful for those interested in pursuing agri start-ups or agri enterprises. The National Institute of Open Schooling (NIOS) also offers several vocational courses in different disciplines of agriculture, aimed at building practical competencies, knowledge, and values among students from a young age. Below is a list of short term courses offered by NIOS:

#### List of offered courses (<https://www.nios.ac.in/>)

- |                        |                                   |
|------------------------|-----------------------------------|
| 1. Mushroom Production | 2. Vermicomposting                |
| 3. Bee Keeping         | 4. Paddy Farming                  |
| 5. Poultry Farming     | 6. Bamboo Cultivation             |
| 7. Plant Protection    | 8. Soil and Fertilizer Management |



#### INTEXT QUESTIONS 25.1

1. Give examples of any three undergraduate programmes for pursuing a career in the agriculture sector.

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2. If you want to become a veterinary doctor, the preferable undergraduate degree would be:
  - a. B.Sc. in Agriculture
  - b. B.Sc. in Sericulture
  - c. B.Tech. in Dairy Technology
  - d. Bachelor in Veterinary Science
3. In India, the duration of the 'Bachelor in Agricultural Science' course is .....

### 25.3 POPULAR JOB OPPORTUNITIES IN AGRICULTURE SECTOR

#### A. Agri-entrepreneur

Entrepreneurs are individuals who develop and manage their businesses to earn profits. In the agriculture sector, they can venture into various fields such as apiculture, fishery, mushroom cultivation, vermi-composting, and the cultivation of medicinal and aromatic plants. Selling vermi-compost products is also a viable option. Additionally, the nursery business in urban areas has become a profitable avenue for agriculture professionals. Agri-entrepreneurs design new tools, equipment, technologies, and strategies for agricultural applications in alignment with government policies, schemes, and focus areas.

#### Success story of an agri-entrepreneur:

Mr. Srikant Singh is a farmer from Khakhra village in Aurangabad, Bihar. His family has been involved in agriculture for several generations. He manages approximately 3 hectares of land, equipped with modern irrigation systems like drip and sprinkler, and earns a modest income from his agricultural activities.

To increase his income, Mr. Singh decided to venture into vermicompost production. This process involves the decomposition of organic material by earthworms. While cow dung is commonly used as the primary input, other agricultural wastes can also be utilized. For this purpose, specialized pits are created and the earthworms take around 45-50 days to decompose the material and produce vermicompost.

Mr. Singh attended a training program at the Krishi Vigyan Kendra (KVK) in



Aurangabad district, where he learned the techniques for producing high-quality vermicompost.

After completing the training, he actively engaged in vermi-compost production, digging 135 pits and filling them with cattle dung. The expenditure for creating these pits was approximately ₹2,53,800/-. He earned ₹ 3,94,200/- from selling vermi-compost to the state agricultural department.

Generally, the production cost for 1 kg of vermi-compost is around ₹ 4-5, and it is sold in the market at ₹ 10-12/kg. In the year 2022, he supplied 400 quintals of vermi-compost and has provided employment to 4-5 rural men and women in his village.



Fig. 25.2: Vermicomposting unit of Mr. Srikant Singh

### Success story of an inspired Tassar silk cocoon grower of Bihar:

Mr. Dhanu Singh, a resident of South Bhorsar village in the Katoria block of Banka district, Bihar, has been involved in his family's Tassar silk cocoon production business for generations. The rearing of the cocoons occurs biannually, from July to September and from September to December, each cycle lasting approximately 45 days. During this period, the silk larvae undergo five moulting stages. The first and second moulting stages occur on one plant within 5-6 days, while the larvae are moved to another plant for the third and fourth moulting stages, which occur within 3-4 days. The fifth moulting stage takes place within 12 days.

PRADAN and NGOs at the district level provide assistance for plantation and Tassar seed procurement. They offer a Tassar seed packet (200 grams) priced at Rs. 1,600/-, containing approximately 20,000-22,000 eggs, from which approximately 9000-10000 cocoons can be reared. Typically, 2-3 packets of seeds are required annually for cultivation. The Tassar plants are spaced approximately 5 meters apart for commercial purposes and 10 meters apart in forest areas, with each plant capable of rearing 250-300 cocoons. A total of 2,000-3,000 Tassar

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plants are used for cocoon production. A single packet of seed can produce about 4000 high grade cocoons and 5000-6000 low grade cocoons .

The market price of higher-grade cocoons varies between 7-8 rupees per piece, whereas lower-grade cocoons fetch Rs. 4-5 per piece. Additionally, the price for cocoon compost is set at Rs. 1.5 per unit. He makes an annual profit of approximately Rs. 80,000 to Rs. 100,000, from the sales of both cocoons and cocoon compost. He markets his products in local markets and nearby areas, including Bihar Sarif, Nawada, Bhagalpur, and West Bengal. He stays updated on the latest techniques and addresses production related issues by consulting with experts and extension personnel.

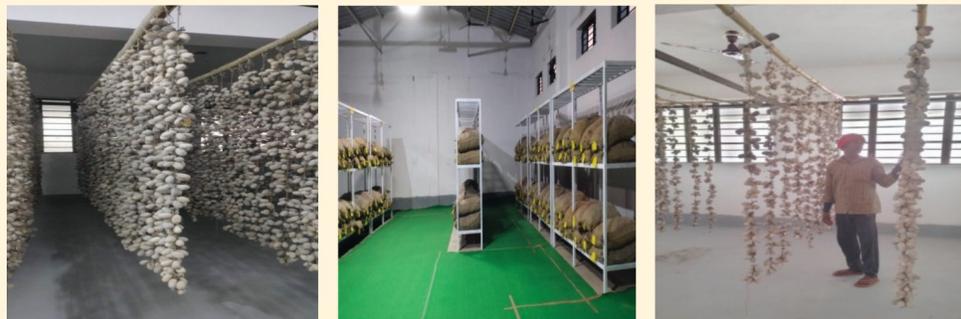


Fig. 25.3: Sericulture unit of Mr. Dhanu Singh

### Success story of an inspirational mushroom grower of Punjab:

Mr. S. Sukhdev Singh, a resident of Meeranpur village in the district of Patiala, has been successfully engaged in mushroom production since 2014 . Through his hard work and dedication, he has become a source of inspiration for rural youth by developing his mushroom farm over an area of two acres. Mr. Singh initially began mushroom cultivation as a subsidiary occupation by preparing compost from 100 quintals of wheat straw. Over the subsequent years, he gained valuable experience in the field of mushroom production and transitioned to the short method of composting, by obtaining a 40% subsidy on his composting unit from the Department of Horticulture, Government of Punjab.

Mr. Singh constructed a bunker and a pasteurization chamber/tunnel with a capacity of 30 tonnes for preparing compost for button mushroom production. The compost produced through this method is of superior quality and free of diseases, resulting in greater yields compared to the long composting method. Initially, he used the compost solely for his own farm but later began preparing and selling compost to small and medium-scale growers as well as urban dwellers. This approach effectively promotes



mushroom cultivation throughout the state. To cultivate mushrooms, the farmer constructed 35 mushroom huts using paddy straw and bamboo, each with dimensions of 30' x 60' and a capacity to accommodate 2,200-2,400 bags. He effectively utilized agricultural residue from his own fields as well as from adjacent fields. Approximately one acre of paddy straw from fields is used to construct a single mushroom hut. Following recommendations from the Punjab Agricultural University in Ludhiana, the farmer prepared compost using a 1:1 ratio of wheat and paddy straw, resulting in better yields. He also provides employment to 20-30 individuals for compost making, watering, harvesting, and post-harvest care. To market his fresh produce, he sells in local markets and Ludhiana Mandi. Additionally, he cultivates summer varieties such as milky and paddy straw mushrooms on a small scale. To stay updated on current knowledge and address any mushroom-related problems, he remains in touch with experts from the Punjab Agricultural University in Ludhiana.



Fig. 25.4: Few glimpses of Mr. Sukhdev Singh's Milky mushroom cultivation

## B. Agronomist

The agronomists are professionals specialized in crop production, pest control, and soil management. Several government organizations and agribusiness companies, like seed and agro-chemical companies, recruit agronomists for their research labs or field experiment stations. Their primary goal is to enhance the well-being and health of crops.

### Responsibilities of an agronomist:

#### 1. Develop better cultivation, planting and harvesting techniques:

Agronomists seek innovative methods to improve farming practices, including

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experimenting with new planting methods, optimizing irrigation techniques, and implementing sustainable farming practices to enhance crop growth and yield.

2. **Improve crop yield:** They work to maximize the productivity of crops by identifying factors that limit growth and implementing strategies to address these issues. This may involve selecting high-yielding crop varieties, managing nutrient levels in the soil, and controlling pests and diseases that affect crop health and yield.
3. **Maintaining the quality of seed and nutritional value of crops:** Agronomists evaluate seed varieties for traits such as disease resistance, drought tolerance, and nutritional content to improve crop performance and meet consumer demands for nutritious food.
4. **Improve soil productivity:** They assess soil health, fertility, and quality to develop strategies for enhancing soil productivity and sustainability. This may involve soil testing, implementing conservation practices, and recommending appropriate fertilization and crop rotation methods to maintain soil fertility over time.

**C. Soil Scientist**

Such scientists conduct research both in field and laboratory to improve fertility and productivity of soil. They collect soil samples from farms to analyze nutritional needs and fertilizer requirements. A soil and plant scientist's job focuses on

- ❖ Testing soil and plant to obtain the information about nutrient status
- ❖ Improving soil health and understanding how it affects plant growth
- ❖ Researching alternative methods of growing crops to maximize crop yield
- ❖ Protecting the soil from erosion and degradation.

**D. Plant Breeder**

Plant breeder is a professional who specializes in the art and science of breeding plants. Plant breeding involves the controlled manipulation of plant species to produce plants with desired traits and characteristics. This process is essential for developing new and improved varieties of crops, ornamental plants, and other cultivated species.



### **E. Farm Manager**

In this occupation, the individual is responsible for overseeing farm operations and making strategic business decisions within budgetary constraints. Duties include managing the maintenance and repair of farm buildings and equipment, as well as marketing the farm's products. Previous experience in farming is essential, along with technical knowledge encompassing compliance with government regulations and adherence to health and safety standards. Farm managers are generally recruited by Krishi Vigyan Kendras (KVKs), agricultural universities, research institutes, and seed companies.

### **F. Academic /Lecturer Jobs**

India has a network of 70+ agricultural universities and 100+ research institutes under the Indian Council of Agricultural Research (ICAR). These organizations recruit young scholars as assistant professors or junior scientists after completion of a Master's or PhD degree in a specialized discipline. Lecturers provide basic knowledge of agriculture and allied disciplines to students and conduct experimental research in agricultural colleges and universities.

### **G. Agricultural Economist**

In this role, an agricultural economist applies principles of micro and macroeconomics to understand economic decisions such as

- I. Determining the rationale behind producing a specific combination of food crops in a given year.
- II. Strategizing resource optimization in both production and post-production stages.
- III. Analyzing how government support for farmers is determined.

They collect and analyze economic data to find and determine trends in economic activity. They also develop future possible scenario through simulations based on past data, which help the policy makers in developing strategies for future.

### **H. Commercial Horticulturalist**

A horticulturalist focuses on day-to-day activities for vegetable and fruit production process - overseeing the cultivation, harvesting, packaging, distribution and sale of fruits, vegetable flowers and plants.

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A landscape horticulturist may work with planners, architects and designers to create parks, gardens and recreational areas. They are also engaged in the maintenance of public gardens, managing fruit orchards, overseeing the production of organic fruits and vegetables.

**Success story of a flower entrepreneur:**

Ms. Vinod Kumari Shah is a woman entrepreneur from the village Maili, District Hoshiarpur, Punjab. She started farming with her parents after completing her higher secondary studies. Initially serving as a president of the Sandhya Self Help Group (SHG), she underwent training at KVK Bahawal with other members and was involved in activities like stitching, painting, making pickles (Achar) and chutneys. However, the returns from these endeavors were not satisfactory, prompting her to explore alternative avenues.

In 2014, an expert team from Punjab Agricultural University visited Maili village to conduct an awareness programme for a Government of India project. They interacted with Ms. Vinod Kumari Shah and encouraged her to undergo training in value-added products from vegetables and flowers. Subsequently, Ms. Shah attended hands-on training at village Maili and PAU, Ludhiana on value addition techniques for vegetables and flowers, including mixed pickles of cauliflower and carrot, black carrot Murraba, black carrot Kanji, tomato sauce and puree, Ghia chutney, rose Sharbat, and Gulkand. This marked a turning point in her life. She started producing 100% natural Rose sharbat using fresh desi rose petals sourced from local farmers in the kandi region of district Hoshiarpur. The beauty of her product is that it contains no synthetic preservatives or colours. The shelf life of this rose sharbat is about two years at normal room temperature. Ms. Vinod Kumari has been awarded with Sardarni Jagbir Kaur Memorial Award 2016 by Chief Minister of Punjab during the PAU Kisan Mela at Ludhiana, for her achievements in agriculture and allied enterprises. Due to her consistent efforts, there has been a significant increase in the sales of rose sharbat bottles (4000-5000 bottles per year), as well as other value-added products. Currently, Sandhya's SHG has about 150 associated members and generates an annual revenue of approximately Rs. 18-20 lakhs.

**I. Agricultural Engineer**

Various farm machineries, tools, and equipments are required in the agriculture sector. Individuals with technical knowledge of agricultural engineering oversee the design, manufacturing and maintenance processes of machineries like tractors and harvesters. Other important roles they fulfil include:

**SENIOR SECONDARY**

- Planning, designing, and overseeing the construction of irrigation projects for the distribution and application of water to agricultural lands
- Developing strategies to conserve soil and water resources
- Enhancing the processing and storage of agricultural products
- Supervising the production of machinery



**INTEXT QUESTIONS 25.2**



*Notes*

1. The person who develops their own agricultural businesses and manages its operation is called
  - a. Agronomist
  - b. Agri-entrepreneur
  - c. Farm manager
  - d. Agricultural engineer
2. An agronomist works for
  - a. Overall well being of crops
  - b. Construction of irrigation projects
  - c. Conservation of forest
  - d. None of these
3. Farm managers can be recruited at .....
4. Design, manufacture, and maintenance of farm machineries are done by agricultural engineers (True/False).
5. Which professionals area engaged in the creation of parks, gardens and recreational areas?

**J. Administrative Jobs**

There are separate agriculture departments in both the central and state governments. Individuals with an agriculture background are often recruited as agriculture development officers, horticulture development officers, fishery

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inspectors, or livestock officers within these departments. Their primary responsibilities include:

- ❖ Enforcing government policies pertaining to agriculture
- ❖ Promoting integrated development of the rural economy through agricultural initiatives
- ❖ Developing an effective extension plan to disseminate proven and viable production technologies to the farming community
- ❖ Supervising the agricultural activities of the area under their respective jurisdictions
- ❖ Performing tasks such as book-keeping, project implementation, and accounting

**K. Technical Assistant/Lab Technician**

Monitoring the nutrient content of soil and plants, as well as the quality of seeds, fertilizers, pesticides, and food, is necessary for successful crop production, marketing, and human consumption. To ensure this, various government and private organizations recruit technical assistants or lab technicians who help in analyzing, examining and evaluating the quality of agricultural produce in laboratories. Their primary responsibilities include:

- ❖ Collecting field samples from different sites and assisting in the management of field and glasshouse trials
- ❖ Accurately recording data and information from research trials to ensure uniformity and quality in samples
- ❖ Conducting laboratory experiments in accordance with designated protocols
- ❖ Operating and maintaining field equipment and laboratory instruments as per the required standards

**L. Agricultural Marketing and Salespersons**

The agribusiness industry needs to sell its products like seeds, fertilizers, agrochemicals, animal feed, and machinery to farmers. For this, the sellers are also required to provide advice related to product features and the benefits to be realized. Therefore, companies hire individuals with technical knowledge of agriculture for such positions. The recruits listen to the needs of the farmers and then recommend suitable products to meet their requirements.



### M. Agricultural Extension Specialists

Agricultural extension specialists are village-level extension workers who serve as a conduit to transfer improved farming practices and knowledge of scientific innovations to the last-mile farmers. They act as a bridge between the laboratory and the land. They provide advice, support, and training to farmers and help improve the efficiency and productivity of farming operations. Their primary responsibilities include:

1. To monitor the production and productivity of crops in their area to maintain the base records for comparison
2. To conduct, organize and supervise demonstrations, seed village programmes, diversified cropping programmes, and introduction of new crops/varieties along with group discussions
3. To prepare situation-specific crop production plans for each farmer and assess their input requirements realistically
4. To advise on and prepare long term action plans for encouraging sustainable agricultural practices, optimal fertilizer consumption, use of bio-fertilizers, use of improved farm implements and machinery, and increasing irrigation potential through dug wells, deep/shallow tube wells, etc.

### N. Plant Protection/Quarantine Specialist

It is common for plants or agricultural products to be infested with fungus, virus, bacteria, insects, weeds, mites or nematodes in field as well as in storage. A Plant Protection Specialist, also known as a Plant Health Specialist or Plant Pathologist, is a professional who specializes in safeguarding crops and plants from pests, diseases, and other environmental threats. To become an expert in plant protection, one must specialize in weed science, entomology, plant pathology or nematology. Key job aspects of plant protection specialists include:

- To direct or monitor the quarantine, treatment, or destruction of plants or plant products
- To promote integrated pest management
- To ensure the availability of safe and quality pesticides
- To streamline quarantine measures

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**O. Animal Doctor/Veterinarian**

A veterinarian, sometimes referred to as a vet, is an animal doctor who is responsible for diagnosing and treating animals those are sick, injured, or need routine care. To be a veterinarian, one must complete a B.V.Sc. (Bachelor in Veterinary Science) degree, which is a 5.5 year course. After completing this degree, a person can be recruited in both the government and private sectors. A veterinarian can also start a veterinary pet clinic, as the number of pets is growing steadily along with the demand for their healthcare.



Fig. 25.5: Veterinarian

**Success story of backyard poultry farming**

Sania Tuddu, a college student from Burudih village in Saraikela, Jharkhand, faced numerous challenges during her school years. She comes from a financially struggling family that could only afford two basic meals a day. Completion of education was a great challenge for her. To finance her college education, she began working as a farm labourer. During a visit to a Kisan Mela organized in the district, she learned about backyard poultry farming, which she found to be a lucrative means to support both her family and educational expenses.

Attending training programs helped Sania to gain the necessary knowledge and skills related to improved techniques for backyard poultry farming, covering aspects like breeds, feeding, disease control, vaccination, and marketing.

In 2015, she began poultry farming with 20 Jharsim breed poultry birds provided by the agricultural university. While studying in college, she scheduled her poultry farming activities in the morning and evening. After six months, the birds started laying eggs and gained weight, with an average body weight of 3 to 3.5 kg. She collected approximately 130 eggs and sold them for ₹10 each, while the birds were sold for ₹280 per kg. With a profit of ₹12,000, she expanded her backyard poultry farming business and increased her flock size to 135 birds over the next two years.

She now earns an average annual income of ₹30,000 to ₹35,000 by selling birds and eggs. Recognizing her entrepreneurial spirit, she was invited to share her success story on the regional Doordarshan channel and radio, and was honored by the Hon'ble Governor of Jharkhand with an award.



Fig. 25.6: Ms. Sania Tudu with her poultry birds



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## P. Fish Hatchery Manager

A fish hatchery is a place where young fishes are produced and reared commercially for distribution and selling to fish farms at a later period. A fish hatchery manager oversees the daily operations of a fish hatchery. A person with technical knowledge in fishery is preferred over others. Their work includes:

- ❖ Overseeing egg incubation, fish spawning, and fish rearing
- ❖ Performing hatchery operations
- ❖ Coordinating with employees
- ❖ Preparing the budget

### Success story of a progressive fish farmer:

Sh. Manvender Singh, a resident of Bhurewala village in Ambala district, Haryana ventured into the fisheries sector in 2018. He received valuable advice and encouragement after consulting with District Fisheries Officer, Ambala. Later, he underwent training from the Fisheries Department, Haryana. In November 2018, he constructed a fish pond on two hectares of his own land. Over the time, he dug three more small ponds for nursery. For the construction of fisheries farm (digging of ponds, construction of office and store room, seed, medicine, equipment, aerators and feed), he spent a total of Rs. 15 Lakhs. He received a financial subsidy of Rs.5.37 lakhs towards pond excavation and inputs assistance from the Fisheries Department, Haryana.

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In year 2020, Mr. Singh procured one lakh fish seeds from the Fisheries Department and stocked them in the nursery pond. After a couple of weeks, the fingerlings were transferred to the main pond. By the end of the same year, he sold 20 tonnes of fish. In that year, his earnings from fish farming were Rs. 20 lakhs, with a net profit of approximately Rs. 12 Lakhs. He plans to develop more ponds to boost fish production in the coming years.



Fig. 25.7: Fisheries farm of Mr. Manvender Singh

### Q. Forest Conservationist

A person with training in preservation, protection, and management of forests and other natural areas is a forest conservationist or forester. Another vital aspect of a forester's role is the conservation of wildlife habitats within forests. Therefore, knowledge and capacities for management of forest, the environment, and wildlife are crucial for a forester. They work in partnership with government agencies, landowners, and environmental groups. After graduation, you can appear for Indian Forest Service (IFS) or State Forest Service (SFS) exams to become a forester in central and state forest departments.

### R. Food Inspector/Food Safety Officer

Food inspectors are experts in public health who verify that food items adhere to safety and labelling regulations. They also guarantee the cleanliness and safety of the food supply. Generally persons with degrees in biological sciences such as agriculture, food science/food technology, botany, zoology, microbiology or biochemistry are preferred as food inspectors. Their main duties include:

- ❖ To take samples of any food or substance which appears to have been sold for human consumption
- ❖ To inspect any place where the food is manufactured or stored for sale

- ❖ To check for the manufacturing or storage of any adulterants and take samples of such food or adulterants for analysis

### S. Dairy Manager

Depending on the size and kind of dairy farm, a dairy manager's duties can vary, but in general, they are in charge of managing the daily operations of the dairy. To become a dairy manager, one must complete training in dairy technology. Some common responsibilities associated with a dairy manager include:

- ❖ Animal care
- ❖ Managing the milking operation
- ❖ Quality control of milk
- ❖ Staff management
- ❖ Maintaining records of animal health, production and breeding
- ❖ Maintenance of dairy instruments



Notes

#### Success story of a dairy farm:

Located just a few kilometers from the National Dairy Research Institute (NDRI) in Karnal, Haryana, lies the quaint village of Nalvikhurd, surrounded by lush green wheat and berseem fields. Among the several commercial dairy farms in the area, Arvind Dairy Farm stands out. Owned by Mr. Parmod Khokhar and his brother Mr. Ravi Khokhar, the farm has a rich history of traditional farming.

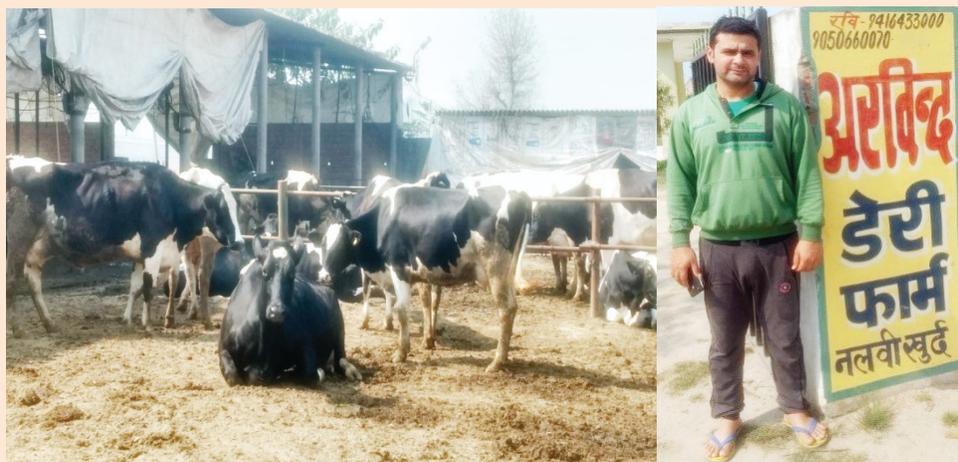


Fig. 25.8: Arvind Dairy Farm of village Nalvikhurd

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## Notes

Although the family has traditionally pursued farming, it was only five years ago that Mr. Khokhar decided to diversify the farm by rearing crossbred dairy animals. The farm currently houses 80 crossbred cattle (Holstein Friesian cross) along with an automated milk collection system and a meticulously maintained cattle shed and feeding area. The animals are fed high quality forages like a mixture of green and dry fodder (berseem, oats, and wheat straw), homemade concentrate (maize/wheat/barley + deoiled cake + neem) and mineral mixtures to ensure good health and high-quality milk production. Proper and timely vaccination is administered to maintain the sound health of the animals. Mr. Khokhar reports milk yields of 35-53 liters per day and average annual profit of 47 lakhs from his farm.

Currently, the farm supplies milk to big companies like Nestle, nearby villages, local sweet shops, and community functions as needed. The farm has also sold around 50-60 animals and provides advice on dairy farming to other farmers in the region. Due to its outstanding success in dairy sector, the farm was awarded the title of "Milk Champion" in 2015 at the Dairy Mela organized by the National Dairy Research Institute, Karnal. Mr. Khokhar attributes the success of Arvind Dairy Farm to NDRI, other research and development organizations, and private companies. The family envisions expanding the farm with a greater number of high-quality pure H.F. breeds.

**A. Banker**

Commercial banks in India recruit graduates in agriculture and related fields as Agricultural Field Officers (AFOs) for promoting the banks' financial products and services like crop loans, insurance, or Kisan Credit Cards (KCC), to farmers and landlords in rural areas. Additionally, They are also employed by NABARD (National Bank for Agriculture and Rural Development), which is the apex bank for providing finance in rural development and regulating rural banks operating in India.

**Success Story of Honey Production:**

Mr. Jatinder Jeet Pal is a young honey entrepreneur of M/s Maghi Ram and Sons, located at Doraha, Ludhiana, Punjab. The brand name of his honey is "Samanyu Honey". Mr. Jatinder began his business in 2001 with 200 honey boxes after receiving comprehensive training in honey production from Punjab Agricultural University, Ludhiana. He has expanded his business beyond pure honey production (raw honey and blend honey) to include manufacturing of beekeeping equipments, such as honey processing plants, bee hives, honey extractors, pollen traps, and

grafting needles. Mr. Jatinder has been awarded with National level awards like Krishi Bhushan award from the Maharashtra Government and Parman Patra from the Punjab Government. 'Samanyu Honey' from Maghi Ram & Sons is being exported to USA, Middle East, and Japan with an annual turnover of Rs.15-20 crores.

#### U. Organic Farmer

Excessive use of agro-chemicals like fertilizers or pesticides can damage human health and the environment. As a result, consumers today prefer to buy organic products, which are free from harmful chemicals. Organic products are sold at higher prices than conventional ones, making organic farming a lucrative career choice in present times. An organic farmer performs agricultural operations similarly to a traditional farmer but focuses on minimizing the use of synthetic agrochemicals as much as possible.

#### Success story of a organic farmer:

Atinderpal Singh started turmeric cultivation in 2019 with the primary aim of processing and catering to local demand. Having completed his Master's in Agronomy from PAU, Ludhiana, Singh began growing, processing, and selling his produce directly in the local market, following a direct farm to kitchen model. Instead of relying on the chemicals for pest and weed management, Mr. Singh employs cultural as well as biological methods. In Punjab, where breaking away from the wheat-paddy cycle is difficult, he has successfully adopted crop diversification and moved away from water intensive paddy. He noted that after shifting away from paddy, beneficial animals like wild rabbits, quails, pheasants, red-wattled lapwings etc. had returned to the fields, a sign he sees as restoring ecological balance. The crop is grown, processed, and packaged on the farm and is sold at the farm gate. Starting with 2 acres of turmeric cultivation, he now cultivates 10 acres and sells it directly to end consumers. The farmer takes great pride in stating that his crop is pesticide and adulterant-free. Recounting his experience, he states that after initial difficulties in selling his crop, all his produce now sells directly from the farm gate itself. Economically, the initial cost of setting up the processing plant was 12 lakh rupees. In the first year, he generated a gross income of 3-4 lakhs, which has now increased to 20-22 lakhs. The farmer has been awarded several times for his crop diversification efforts by the Department of Agriculture and Farmers Welfare, Punjab.



*Notes*

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*Notes***Success story of Fox Nut/Makhana production:**

Sumitra Foods was co-founded in 2019 by Er. Ruchi Mandal and Er. Shravan Kr. Roy. They are driven by three strong objectives: empowering underprivileged women through training and employment, fostering an entrepreneurial mindset, and revolutionizing the Makhana processing industry. Shravan's interest in Makhana processing during his B.Tech in Food Process Engineering at the Indian Institute of Food Processing Technology sparked his vision for its global market potential. In 2019, Shravan left his corporate job and returned to Darbhanga, Bihar, to establish a Makhana processing unit. He convinced Ruchi, who was working with Samsung India Limited, to join him. With their personal savings, they launched Sumitra Foods, specializing in high-quality customized Makhana products. The enterprise's process involves handpicking raw Makhana seeds from ponds and processing them to meet clients' specific requirements. Sumitra Foods operates on a pan-India level, serving both B2B (Business to Business) and B2C (Business to Consumer) markets.

Sumitra Foods actively empowers women by providing employment opportunities and training in various aspects of food processing. The enterprise utilizes social media platforms such as WhatsApp, Facebook, and LinkedIn for effective marketing. The primary objective of Sumitra Foods is to cultivate an entrepreneurial mindset among daily wage workers, particularly women from financially disadvantaged backgrounds. They extend their support on a national scale by providing comprehensive training and supplying raw Makhana to women who express interest in establishing their own processing units. In 2020, Sumitra Foods had the honor of representing Bihar at the prestigious Organic Food Festival held in New Delhi. Their commendable efforts were recognized, and the enterprise was honored with the Tally MSME Honours in 2021.

Sumitra Foods is dedicated to establishing Makhana as a globally recognized agricultural product through their emphasis on women empowerment, transformative Makhana processing techniques, and promotion of entrepreneurship. The enterprise has emerged as a prominent player in the industry, driven by its unwavering commitment to quality, innovation, and social impact. By incorporating sustainable practices and fostering inclusive growth, Sumitra Foods not only contributes to the expansion of the Makhana industry but also uplifts underprivileged women and marginalized communities. This success is evidenced by their achievements in enhancing product value, creating employment opportunities, and fostering socio-economic development.



Notes



Fig. 25.9: Makhana packaging by local women and men



**INTEXT QUESTIONS 25.3**

1. The person who acts as a bridge between laboratory and land is known as .....
2. Plant protection specialists are also known as .....
3. Who undertakes the preservation, protection and management of forests?
4. What are the roles and responsibilities of a food inspector?



**ACTIVITY 2**

Visit nearby Krishi Vigyan Kendras (KVKs) or Block Agriculture Office to inquire about the types of crops generally grown in your locality. Additionally, collect agriculture related books or pamphlets written in your mother tongue.

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**WHAT YOU HAVE LEARNT**

- As agriculture is such a broad discipline, agricultural experts have many options where they might work, including academia, research, crop production, crop protection, marketing, sales, farm engineering, and farm management.

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- In India, there are numerous public and private universities that offer undergraduate, post-graduate and Ph.D. degrees in agriculture and allied disciplines.
- Common undergraduate degrees offered in the field of agriculture include Bachelors in Agriculture, Horticulture, Veterinary Science, Fishery, Community Science, Agricultural Engineering, and Dairy Technology.
- There are plenty of jobs in the agriculture sector, including roles such as agronomist, commercial horticulturist, farm manager, agricultural chemist, veterinarian, agricultural economist, extension worker, hatchery manager.

**TERMINAL QUESTIONS**

1. Discuss the key skills and capabilities required for jobs in agriculture.
2. What entrepreneurial job opportunities exist in the agricultural sector?
3. What educational programmes are available to become an agricultural professional?
4. Explain the responsibilities of an agronomist. How do they contribute to the overall well-being and health of crops?
5. Discuss the role of agricultural extension specialists in improving the efficiency and productivity of farming operations. Provide examples of activities they undertake to support farmers.

**ANSWERS TO INTEXT QUESTIONS****25.1**

1. B.Sc. in Agriculture, B.Tech. in Agricultural Engineering, B.V.Sc. in Veterinary Science
2. Option d (Bachelor in Veterinary Science)
3. Four years

25.2

1. Option b (Agri-entrepreneur)
2. Option a (overall well being of crops)
3. Krishi Vigyan Kendras (KVKs), agricultural universities and research institutes, seed companies
4. True
5. Landscape horticulturists

25.3

1. Village level extension workers
2. Plant health specialist or plant pathologist
3. Forester
4. To assure the safety and quality of the food products

**GLOSSARY**

**Agricultural Entomology:** Agricultural entomology is a branch of agriculture that focuses on the study of insects and their interactions with agricultural crops.

**Apiculture:** Apiculture, commonly referred to as beekeeping, is the art of raising honey bees for the purpose of producing wax and honey.

**Plant Pathology:** Plant pathology is the sub-discipline of agricultural science that involves the scientific study of plant diseases caused by pathogens such as fungi, bacteria, viruses.

**Vermicompost:** Vermicompost is the type of compost created by the decomposition of biodegradable wastes in the presence of earthworms.



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*Notes*

# WHAT YOU HAVE LEARNT

