Start up

# Opportunity in Animal Husbandry

## - Two Days Colloquium

**26-27 March 2022**

Sher-e-Kashmir University of Agricultural Sciences & Technology- Jammu
Faculty of Veterinary Sciences & Animal Husbandry
RS Pura, Jammu & Kashmir

NAHEP

# STARTUP OPPORTUNITY IN ANIMAL HUSBANDRY

**26-27 March 2022**


**Organized by**

**Faculty of Veterinary Sciences & Animal Husbandry**

**SKUAST-Jammu**

# STARTUP OPPORTUNITY IN ANIMAL HUSBANDRY

**26-27 March 2022**

## Faculty of Veterinary Sciences & Animal Husbandry

## RS Pura-181102

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**Prof. J.P.Sharma**
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**Vice-Chancellor**

# MESSAGE

It is a matter of great pleasure to learn that the Faculty of Veterinary Sciences & Animal Husbandry, R.S. Pura, Jammu is organizing two days **Colloquium on "Startup opportunity in Animal Husbandry"** under NAHEP for UG BVSc&AH students. The theme of this colloquium is very pertinent and in consonance with the need of hour to give impetus to generation of innovative ideas and entrepreneurship. India is an emerging global destination for Innovation, Incubation and Start-up. Government of India has come up with exciting program to support startup ecosystem and to nurture innovations and has launched Startup India action Plan by bringing in policies and frameworks that can support and nurture the startup eco-system. Livestock sector plays an important role in rural livelihood, employment and income generation. There is a huge opportunity in this sector for developing start-up at their own and generation of employment. This is all possible if the skilled graduate of animal husbandry can be motivated for fostering new idea of startup which is market driven.

The plan of colloquium has been rightly directed through discussion on some major topics like; Waste management, Livestock product Technology innovation, Artificial Intelligence in diagnostics etc. which makes this colloquium timely and in right direction.

I hope the students and faculty attending this colloquium would be benefitted through the interaction with experts and come up with some good practices and innovations to fulfill the dream of end-users at large scale.

I extend my best wishes for successful completion of the workshop.

**(J.P.Sharma)**

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**Sher e Kashmir University of Agricultural Sciences and Technology, Jammu**
**Faculty of Veterinary Sciences & Animal Husbandry, R. S. Pura, Jammu**

**Dr. Mohinder Singh Bhadwal**
Dean

## Message

I am very glad to know that Faculty of Veterinary Sciences & Animal Husbandry, R.S. Pura, Jammu is organizing two days **Colloquium on Startup opportunity in Animal Husbandry** through NAHEP with involvement of expert in entrepreneurship development.

The colloquium is envisioned to offer an opportunity to the students and the faculty to inculcate ideas of entrepreneurship and innovative approaches and technology solutions to promote entrepreneurship as well as smart remunerative farming in Animal Husbandry practices in Jammu and Kashmir. Students will be enriched with business ideas to manage animal product and waste in profitable way through technological interventions. Artificial intelligence in disease diagnosis, development of startup and its financial management will be introduced through deliberation by experts in the colloquium which is very much encouraging. I hope the students, scientists and other participants will have a significant take away from these two days colloquium.

I extend my best wishes to the entire team involved in the organization of this Colloquium. I wish this program a grand success.

**M.S. Bhadwal**
**Dean**

# ***Index***

**Schedule for two days colloquium**

**on**

**"*Startup opportunity in Animal Husbandry*"**

**26-27 March 2022**

***Lecture schedule**:*

| Day | 09:30-10:30 | 10:30-11:30 | 11:30-11:45 | 11:45-12:45 | 12:50-01:50 | 02:00-03:00 | 03:00-04:00 | 04:00-04:15 |
|---|---|---|---|---|---|---|---|---|
| 26th March 2022 | Registration | Inauguration | **Tea** | *Lecture 1* | *Lecture 2* | **Lunch** | *Lecture 3* | **Tea Break** |
| 27th March 2022 | | *Lecture 4* | **Break** | *Lecture 5* | *Lecture 6* | **Break** | *Lecture 7* | *Valedictory* |

| Lecture | Topic | Resource Person |
|---|---|---|
| | ***Day 1*** | |
| Lecture –I | *Pet practice startup- A successful model* | *Dr. Shilpi Das*<br>*Director, Companion Care Pet Clinic, Advisor, Cure and Care Pet Clinic* |
| Lecture –II | *Application of Artificial Intelligence in animal health* | *Dr. P. Krihnamoorthy,*<br>*Senior Scientist, ICAR National Institute of Veterinary Epidemiology and Disease Informatics, Bengaluru, Karnataka* |
| Lecture –III | *Entrepreneurship and role of JKEDI in Development of Entrepreneurship* | *Dr. Vinod Kumar,*<br>*In charge Centre for Business Development, JKEDI, Jammu* |
| | ***Day 2*** | |
| Lecture –IV | *Innovation, How should take the steps for Success* | *Dr. Rakesh Singhai, Sr. Professor, Mechanical Engineer, IIT* |
| Lecture –V | *Startup opportunity in milk and meat Industry* | *Dr. Manish Kumar Chatli, Dean, College of Veterinary Science, GADVASU, Rampura Phul* |
| Lecture –VI | *Feasibility Analysis of Business idea* | *Mr. Asif Ali, Sr. Assistant Professor, School of Business Study, Central University of Jammu* |
| Lecture –VII | *Entrepreneurship development in Animal Husbandry for Atmanirbhar Bharat* | *Prof. J.P. Sharma, Vice- Chancellor, SKUAST-Jammu* |

# Application of Artificial Intelligence in Animal Health

**Dr P. Krishnamoorthy and Dr K.P. Suresh**

*Pathoepidemiology Laboratory,*
*ICAR National Institute of Veterinary Epidemiology and Disease Informatics (NIVEDI), Post Box No. 6450, Ramagondanahalli, Yelahanka, Bengaluru 560064, Karnataka.*

Artificial intelligence is a computational science concerned with smart computer machines capable of performing tasks similar to the human intelligence. The term AI is widely used for the projects involved in the developing the intellectual processes of human intelligence such as reasoning ability, meaning discovery, generalization, learning from the past. AI technology mainly analyses the huge amount of data based on the set of instructions or commands known as algorithms to do a specific function or task. The mathematician Alan Turing with a simple question "Can machines think?" revolutionised the history. His paper "Computing Machinery and Intelligence" in 1950 and Turing test has favour the development of goal and the vision of AI.

The research in AI are mainly focussed on the following intelligence components namely

a) Learning
b) Reasoning
c) Problem solving
d) Perception and
e) Language use.

Learning involves different forms when applied to the AI. The simple method of learning by the computer is the trial and error method. The reasoning involves the depending on the situation how to draw the inferences or solutions or actions. The inferences may be divided in to deductive or inductive. Problem solving by AI is characterized by the systematic search through a wide range of possible actions to achieve a specified task or solution or goals. Examples are simple robot action such as pickup, putdown, move right, etc. The perception involves the scanning of the environment by means of sensory organs, which are real or artificial and the scene is divided in the different objects in various spatial relationships. Examples such as optical sensors to identify the individuals, robots roam to collect empty soda cans. The language used in AI is the system of signs having meaning by convention. Examples are, the traffic signs form a mini language, hazard ahead, those clouds mean rain.

AI addresses the three challenges in the animal health, a) understanding a situation and its dynamics, e.g., epidemic spread, b) the perception of the environment, which corresponds to the detection of patterns in animal health (e.g., repeated sequence of observations), forms (protein) and signals (increase mortality compared to a baseline) at different scales, c) computer-based decision making or more realistically, human decision support such as expert systems, diagnostic support, resource allocation (Ezanno et al., 2021).

There is also growing demand for the development and use of wearables, smart cameras and other sensors in animal health for pet animals and on farms. These devices used will generate more amount of data, which results in the potential for AI by using machine learning algorithms and real time data analysis. The data plays a key role in the development of the AI enabled solutions. The quality of data is more important rather than the quantity of data for the solutions derived by using AI and also emphasize the need to collect, organise and make accessible quality data at central point.

**Applications of AI in Animal Health:**

The AI is widely used in the field of human health and gaining importance in the field of animal health also. It has wider applications in the animal health and some of them are given below.

1. AI in animal health helps the veterinary diagnostics easier, accessible medical care by all, and also provides the convenience in data collection.
2. Tool for disease diagnosis-it is used as a tool for disease diagnosis in animals and these programmes suggest the potential diagnosis, next step therapies or course of actions.
3. Imaging tool – organizes the images for the clinical interpretation, increases the efficiency significantly.
4. AI for the pet care and pet industries includes
    a) pet trackers and pet cameras,
    b) pet telehealth,
    c) dog walking,
    d) smart feeder and pet food,
    e) solutions for the pet world (Singh et al., 2021)
5. AI for livestock diseases prediction e.g., NADRES, BT Mobile app. AI and machine learning powered data capturing and forewarning system for livestock diseases are provided.
6. Diagnosing and managing Chronic kidney disease (CKD) in dogs and cats by analysing the available data and high accuracy of AI and machine learning in predicting the CKD.

7. It helps in the informed decision making based on the data rather than decision based on intuitions.

8. It identifies the patterns and forms of diseases in the animal population.

9. It is used in the development of expert systems for making realistic decisions and diagnosis of animal diseases.e.g., CaDDES.

10. AI driven digital platforms for the clinical disease diagnosis of livestock diseases using the image processing and matching for the prevention and early detection of livestock diseases.

11. Animal disease surveillance and digital veterinary services in India

12. Reporting of diseases and risk communication to field Veterinarians in the form of Short Messaging Service (SMS) or voice messaging.

**Case studies:**

To understand better the application of AI in animal health, the below are the few case studies or works undertaken using AI in livestock diseases forewarning and diagnosis in India.

**Case study 1: National Animal Disease Referral Expert System (NADRES)**

Early recognition of aserious or exotic animal disease canbe done which is one of the mostimportant factors influencing thechance of controlling the disease andreducing its economic and socialimpact on the whole country.In an attempt to look for a morereliable model, we developed adisease-climate relationship modelsusing artificial intelligence and GIS topredict 13 economically importantlivestock disease outbreaks in India.Disease outbreaks data collectedfrom 31 AICRP on ADMAS centres is stored andmaintained in NADRES v2 database since year 1987. The riskfactors data consisting ofenvironmental variables such asprecipitation, soil moisture, potentialevaporation, wind speed,temperature, specific humidity,surface pressure was retrieved fromGES DISC"GLDAS_NOAH025_M.2.1"dataset and remote sensing variablessuch as NDVI, LST (MODIS dataproduct). The livestock population data was obtained from 20$^{th}$ Livestock census 2019, Department of Animal Husbandry and Dairying (DAHD), New Delhi.The fitted models were assessed fortheir discriminating power usingReceiving Operating Characteristic(ROC) curve, Cohen's Kappaand True SkillStatistics (TSS).The outcome of best fitted model/s were in probability of diseaseoccurrence and was categorised into6 risk levels-No risk (NR), Very lowrisk (VLR), Low risk (LR),Moderate risk (MR), High risk

(HR)and Very high risk (VHR) are given in Figures 1 and 2. Theresults of forewarning is sent to allthe state animal husbandry departmentsand DAHD for taking necessary preventivemeasures in two months' advance to avoid theoccurrence of disease incidence. Theforewarning results are generated atblock level for 4 economicallyimportant diseases in Karnataka stateas pilot mode and was communicated to2,000 veterinary officers by automessaging to their mobiles.This web applicationprovides several other features such asanalysis results of disease pattern ineach state, disease maps, distributionof livestock population, impactanalysis etc. Epi calculator fordeveloping sampling plan wasincorporated in the application. All results in the application is dynamicand automated by using R software codes and it takes 2-3 days for results generation for a month (Suresh et al., 2019).


Fig. 1 NADRES Home page of the Website

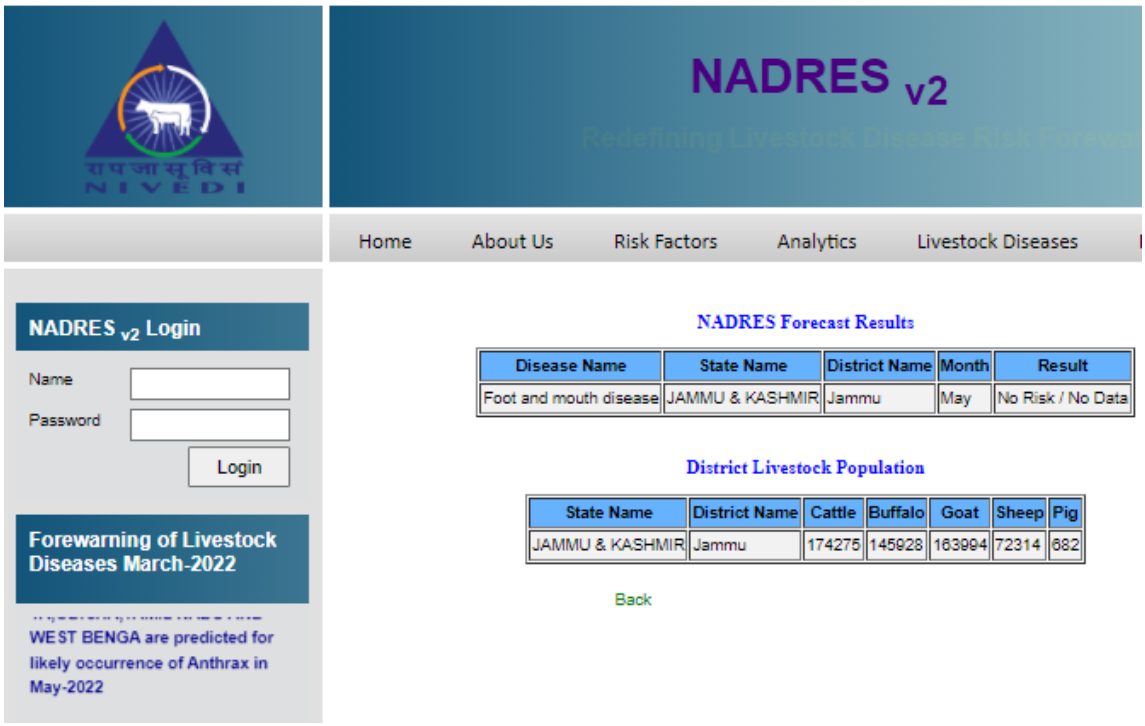


Fig 2. Disease prediction page of NADRES v2.

**Case study 2: Bluetongue forewarning at taluk level for Karnataka mobile app**

The Bluetongue is a contagious, insect borne, viral disease affecting ruminants mainly sheep. In the NADRES, we are forecasting the diseases at district level for two months in advance. But in this mobile application, the disease forewarning is given at the taluk level for Karnataka state (Figure 3) and it helps in taking the preventive measures in less geographical area and includes the data obtained from past years' outbreaks, sero surveillance data, and more number of weather parameters. This was developed under the ICAR sponsored National Innovations in Climate Resilient Agriculture (NICRA) project funds.

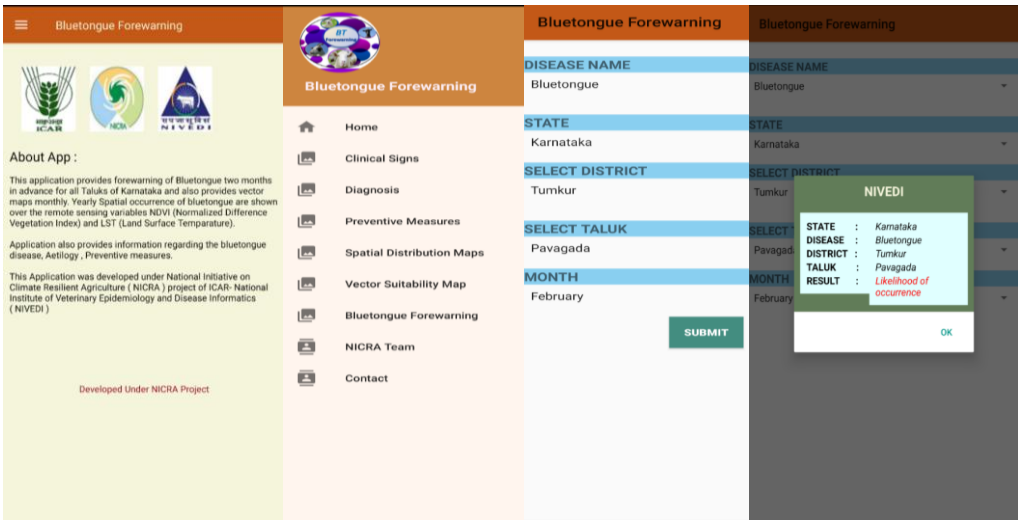


Fig 3. Bluetongue forewarning mobile app screenshots

**Case study 3: Cattle Disease Diagnosis Expert System (CaDDES)**

The CaDDES is a web application (Figure 4) developed for the diagnosis of thirteen cattle diseases in the field conditions using the twelve step process (Krishnamoorthy et al., 2019).

1. Identified clinical signs/symptoms for thirteen cattle diseases (Anaplasmosis, Anthrax, Babesiosis, Black quarter, Foot and Mouth Disease, Haemorrhagic septicaemia, Theileriosis, Trypanosomiasis, Rabies, Infectious Bovine Rhinotracheitis, Leptospirosis, Brucellosis and Mastitis).
2. Prepared questionnaire containing 52 signs/symptoms for the thirteen cattle diseases for collecting the scores based on Likert scale scoring (1-10).
3. Face validity of questionnaire by pilot survey conducted with veterinarians or experts.
4. Scoring (1-10) for clinical signs on the priority based importance in screening a cattle disease by Veterinarians.
5. Content validity was done by analysis of scores given by Veterinarians using Aiken's value.
6. Ranking of the scores for signs/symptoms.
7. Construction of weighted score matrix for each disease with weights assigned for each sign/symptom.
8. Prepared expert system by using the computer programming languages and algorithms by rule based methods.
9. Developed an expert system – Cattle Disease Diagnosis Expert System (CaDDES).
10. Internally Validated the web application.
11. External Validation at the field level for diagnosis of cattle diseases.
12. Development of mobile application for the benefit of Veterinarians.

It helps the veterinarian in the probable diagnosis of the diseases and further steps to be carried for confirmation of disease and to undertake preventive measures.


Fig 4. Home of CaDDES web application

The AI has wider applications and there is need to explore the new avenues based on the innovations in ideas and thought process. The animals do have expressions, voice modulations, body language and memory for the experience as the humans and these factors aid in using the AI based solutions and software which can help in the early diseases diagnosis in animals and save the animals for better human health. It also helps in the AI research and development on a long term basis in animal health. The highly changing scenario of the companies involved in animal health and AI sector whether international companies or start-ups, will able to provide better understanding and the interactions possible. It will also help in the development of linkages with the farmers, society and public or Government services. The opportunities for the possible collaborations with AI teams are required. There are few limitations and constraints of AI approaches such as training effort must be provided and generalized.The boom in the AI makes it possible in the integration of the knowledge and the many animal health players and welfare to upstream further.

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**Innovation is the Key for Future Solutions**

# Entrepreneurship and Role of Jammu & Kashmir Entrepreneurship Development Institute in the Development of Entrepreneurship

**Dr Vinod Kumar**

*Incharge Centre for Business Development, JKEDI*

**Entrepreneurship:**

An **entrepreneur** is an individual who creates a new business, bearing most of the risks and enjoying most of the rewards. The process of setting up a business is known as entrepreneurship. The entrepreneur is commonly seen as an innovator, a source of new ideas, goods, services, and business/or procedures.

Entrepreneurship is an act of being an entrepreneur, or "the owner or manager of a business enterprise who, by risk and initiative, attempts to make profits". Entrepreneurs act as managers and oversee the launch and growth of an enterprise. Entrepreneurship is the process by which either an individual or a team identifies a business opportunity and acquires and deploys the necessary resources required for its exploitation.

An entrepreneur uses their time, energy, and resources into creating value for others. They are rewarded for this effort monetarily and therefore both the consumer of the value created and the entrepreneur are benefitted.

**Characteristics of Entrepreneurship**:

Not all entrepreneurs are successful; there are definite characteristics that make entrepreneurship successful. A few of them are mentioned below:

- **Ability to take a risk-** Starting any new venture involves a considerable amount of failure risk. Therefore, an entrepreneur needs to be courageous and able to evaluate and take risks, which is an essential part of being an entrepreneur.
- **Innovation-** It should be highly innovative to generate new ideas, start a company and earn profits out of it. Change can be the launching of a new product that is new to the market or a process that does the same thing but in a more efficient and economical way.
- **Visionary and Leadership quality-** To be successful, the entrepreneur should have a clear vision of his new venture. However, to turn the idea into reality, a lot of resources and employees are required. Here,

leadership quality is paramount because leaders impart and guide their employees towards the right path of success.

- **Open-Minded-** In a business, every circumstance can be an opportunity and used for the benefit of a company. For example, Paytm recognised the gravity of demonetization and acknowledged the need for online transactions would be more, so it utilised the situation and expanded massively during this time.
- **Flexible-** An entrepreneur should be flexible and open to change according to the situation. To be on the top, a businessperson should be equipped to embrace change in a product and service, as and when needed.
- **Know your Product-**A company owner should know the product offerings and also be aware of the latest trend in the market. It is essential to know if the available product or service meets the demands of the current market, or whether it is time to tweak it a little. Being able to be accountable and then alter as needed is a vital part of entrepreneurship.

**Importance of Entrepreneurship:**

- **Creation of Employment-** Entrepreneurship generates employment. It provides an entry-level job, required for gaining experience and training for unskilled workers.
- **Innovation-** It is the hub of innovation that provides new products, services, ventures, market, technology etc. and increases the standard of living of people.
- **Impact on Society and Community Development-** A society becomes greater if the employment base is large and diversified. It brings about changes in society and promotes facilities like higher expenditure on education, better sanitation, infrastructural development etc. Therefore, entrepreneurship assists the organisation towards a more stable and high quality of community life.
- **Increase Standard of Living-** Entrepreneurship helps to improve the standard of living of a person by increasing the income. The standard of living means, increase in the consumption of various

goods and services by a household for a particular period.

- **Supports research and development-** New products and services need to be researched and tested before launching in the market. Therefore, an entrepreneur also dispenses finance for research and development with research institutions and universities. This promotes research, general construction, and development in the economy.

**Jammu & Kashmir Entrepreneurship Development Institute (JKEDI):**

JKEDI has been established by the Government of Jammu and Kashmir in March 1997 to effectively enable entrepreneurship development in the Union Territory of Jammu & Kashmir. The institute started its regular activities from February 2004 and has positioned itself as a learning centre par excellence with state of the art regional centers across the Union Territory. Besides, JKEDI District Nodal Officers are in all of the districts enabling entrepreneurship and promoting development at the grassroots.

**Role of JKEDI in Entrepreneurship Development:**

For holistic and sustainable entrepreneurship development, there is always a need for JKEDI to step out of its main campuses into the districts, and even deeper into the community. By combining community organizing skills and participatory training practices, JKEDI professionals work at the grassroots to create enterprise awareness and readiness among the youth of Jammu and Kashmir. The Institute has a rich intellectual pool of faculty and experts who work selflessly in the areas of entrepreneurship education, trainings, research, business assistance support services & Startup financing etc.

The Institute so far has implemented various central as well as state sponsored schemes which inter alia include Seed Capital Fund Scheme (SCFS) and Youth Startup Loan Scheme (YSLS) under the auspices of Department of Labour & Employment, Govt. of J&K, Term Loan & Educational Loan Schemes of National Minorities Development Finance Corporation (NMDFC) under the auspices of Ministry of Minority Affairs, Govt. of India and Himayat self-employment scheme under the auspices of Ministry of Rural Development, Govt. of India. The Institute so far has trained more than

38,000 youth under different schemes and till date more than 13,500 enterprises have been set up successfully under various schemes across the length and breadth of the Jammu & Kashmir.

Besides, JKEDI has also been designated as the nodal agency for JK Startup policy 2018. The Start-up Policy-2018 rolled out in September 2018 envisions the creation of 500 new Start-ups in J&K in next 10 years, besides establishing Incubators, Fabrication and Innovation labs. The Policy also contemplates to create two Start-up Hubs in Kashmir and Jammu besides setting up of Angel Networks, Entrepreneurship Development Cells, Sector/Actor Collaboration, Strong incentive Structure and other Academic Interventions

**Conclusion:**

The aim of JKEDI is to develop entrepreneurial ecosystem in the Union Territory of Jammu and Kashmir. The Institute maintains and constantly improves its distinctiveness as a premier Multidisciplinary Development Institution through cross-cutting approaches of awareness, training, consultancy and investment in entrepreneurship education and research.

The entrepreneur with his vision and ability to bear risk can transform the economic scene of the country. They play a vital role in initiating and sustaining the process of economic development of a nation. The Institute's activities are thus targeted to stimulate educated unemployed youth for adopting entrepreneurship as a career option and thus resolving the problem of unemployment in the Jammu & Kashmir.

# Start-up Opportunities in Animal Husbandry

**Dr. Pankaj Goswami and Dr. Sanku Borkataki**

*Faculty of Veterinary Sciences & Animal Husbandry, SKUAST-J, R.S. Pura Jammu*

Unemployment is a big challenge in every sector. In Jammu and Kashmir unemployment rate is 22.2 percent as per the Centre for Monitoring Indian Economy (CMIE) figures, and the rate is even higher than the National level unemployment rate of 7.1 percent recorded across India. Livestock sector plays an important role in rural livelihood, employment and income generation. There is a huge opportunity in this sector for developing start-up at their own and generation of employment. This is all possible if the skilled graduate of animal husbandry can be motivated for fostering new idea of startup which is market driven. Major livestock products like milk and milk products, meat and eggs contribute around one-sixth of the calories and one-third of the proteins in the per capita food supplies of the world. Animal husbandry is the second largest economic activity of rural India. Animal husbandry is a growth engine and annual growth rate in dairying is 5 % and in poultry it is 10% and will alleviate rural poverty and uplift the rural farmer. The availability of per capita animal protein is 10.8g whereas the requirement as per world average is 25g. National sample survey reports that 70-75% of their food budget is for milk and milk products. The need of the hour is increase in production, productivity and improvement through value addition in the marketing channel. Commercialization of cow dung and urine will also encourage people to not discard cows which have stopped milk production. By-products like urine and dung can be used for medicinal and agriculture purposes. It has been reported that start-ups would receive upto 60 per cent initial investment from Government for by-products like cow dung and urine. Eco friendly products can be prepared from dung and urine like Bio CNG, vermicompost, incense sticks, flowerpots, dung log etc. Cow dung soaps, shampoos, toothpaste, shaving creams, sunscreens, face wash, incense sticks and biofertilizers are the major dung and urine products which are present in the market and now even marketed by many online websites like Amazone, Flipkart etc, since livestock itself is a sustainable business, whosoever will get engaged in this form of startup business, that will definitely have

edge to prosper, as such no activities is going on in UT J&K at a large scale.

India is emerging as a global destination for Innovation, Incubation and Start-up. Government of India has come up with exciting programme to support startup ecosystem and to nurture innovations and has launched Startup India action Plan by bringing in policies and frameworks that can support and nurture the start up eco-system. NITI Aayog has developed a collection of tips and schemes which will support India's ability within the international stage, by supporting the Nation's innovators. India ranks third in Start up ecosystem after United States and UK and is emerging as a hub for innovation and has a large population of youth with untapped ideas. Innovations can trigger social change and solve problems faced by contemporary India. Recent findings reveal that success rate in start-ups are only 30 percent. International trading system, economic impact, policies, technology solutions and digital innovations are the major areas which facilitates Startups in the country. Today youth is emerging as job creators rather than job seekers.

**Some of the important thematic areas are given below where specific start-ups are coming with multiple innovative ideas with technological solution:**

i.Traditional Knowledge practices in veterinary care

ii. Wealth from livestock waste

iii. Sensors for management and health of livestock

iv. Artificial intelligent system/tool for optimum productivity, better health and welfare of animals

v. Value addition of milk and milk products

vi. Climate smart dairy farming

vii. Farm data management and sharing in livestock farming

viii. Dairy farm mechanization automation and robotization

ix. Nutrition, breeding, management and diagnostic interventions for livestock

x. Technology options for relief and rescue of animals in Disaster

xi. Innovative livestock business models

**1. Traditional Knowledge practices in veterinary care**

Ethno veterinary practices include the use of local medicinal plants to prevent, cure or treat various ailments in animals. Ethno veterinary practices are known in India since the ancient Vedic period. Ethno veterinary practices concern to animal healthcare is a century old practice stated back to domestication of various livestock species. It involves use of domestic

knowledge, belief, practices and skills pertaining to healthcare and management of human, animals and birds. This branch of science, known as ethno veterinary practices or EVPs is becoming a growing concern in the field of ethno botany. India being a developing country with rich ethno veterinary knowledge, is sought to be a 'EVP hub' owing to practice with decades of experiences. Since time immemorial, the practice is mainly based on the use of plant formulations and other locally available cheap ingredients. Livestock raisers and local people with a strong knowledge of veterinary medicine usually follow traditional ways of classifying, diagnosing, preventing and treating common animal ailments. The traditional medicines that are commonly used for animal healthcare can cut down costs considerably. Moreover, they are readily available to the ordinary farmer. It can be a major alternative to antibiotics use for the purpose of promoting growth and production performance or for prophylaxis and treatment of various pathogenic organisms.

Jammu and Kashmir is blessed with diversified plants with medicinal properties. Exploration of these medicinal value in the plant and it identification bio molecule can be used for various therapeutic preparations. Thus start-up in this sector is very much promising to fill the needs of traditional value in therapeutics as well as conservation of germplasm of medicinal plants.

**2. Opportunities on Waste management in Animal husbandry practices:**

Cow dung processing:

Cow dung is a unique fertilizer having rich source of nutrient for growth of plant. The cow dung can be processed for making various useful purposes. Many major businesses have started to deal with cow dung and cow urine based products. Some of them have even made a million dollar empire. All these products have been completely based on pure extracts of cow urine and cow dung. Cow dung soaps, shampoos, toothpaste, shaving creams, sunscreens, face washes, teas, incense sticks and bio fertilisers are the major cow dung and cow urine products which are present in the market and are now even marketed by many online websites like Amazon, flip kart etc. As long as the smell and the quality are concerned, the reviews of these products online have been quite good. People claim of these products smelling good and also providing extra care to their skin. One more factor that plays an important role in the quality of these products are the cow varieties that are raised with immense care and are provided with proper nutrition. Like all of

the companies stick to a particular variety of cow breed specially the Indian species claiming that the cow dung and cow urine have special properties when fed on special grass or food. Now at present there are many more companies which deal with such products even if not pure cow urine and cow dung but a mixture of it too. Panchagavya products like the products made up of the five products from cow like milk, ghee, cow dung, cow urine and curd, have been produced and marketed online and offline both from the past years too. In Madhypradesh, cow dung products such as manure, cow dung cakes (used as fuel), diyas (lamps) and flower pots made by more than 4,000 women of 354 self-help groups (SHGs) and are now available on e-commerce platforms which is very much encouraging. Earlier, manure was being sold only at the cowsheds, but now it is selling online on platforms such as Amazon due to the increasing demand for manure from public. Thousands of rural and poor women engaged in making products from cow dung in Chhattisgarh's Rajnandgaon district have received a fillip with the administration now ensuring that their products reach a wider market through e-commerce platforms, following a rising demand including from other states.

Panchagavya therapy:

In Indian culture, Cow is the backbone of Indian culture and rural economy, and sustains our life, represent cattle wealth and bio-diversity. Cow is known as "Kamdhenu" and "Gaumata" because of its nourishing nature like mother. Panchgavya is a term used to describe five major substances, obtained from cow, which include cow's urine, milk, ghee, curd and dung. All the five products possess medicinal properties against many disorders and are used for the medicinal purpose singly or in combination withsome other herbs. This kind of treatment is called Panchgavya therapy or cowpathy.

all five products can be used alone or combined or any other synthetic, herbal, or mineral origin. Panchgavya therapy is recommended for a variety of diseases viz., asthma, flu, allergies, cardiovascular diseases, renal disorders, rheumatoid arthritis, leucoderma, wound healing, leucorrhoea, hepatitis, dietary and gastrointestinal tract disorders, obesity, tuberculosis, ulcer, chemical intoxication, other bacterial, fungal and viral infections. The therapy has also demonstrated its therapeutic potential against severe pathological conditions like cancer, AIDS, and diabetes

3. **Start-up on Livestock product Technology innovation:**

Value addition of milk and milk product:

Value addition can be defined as a process of increasing economic value and economic appeal of a commodity. Value is added by changing a commodity's form, colour, taste and other such methods to increase the shelf life of perishables. Value of a product can also be added by capturing the market at the right time. This may include transporting the product to places where it can earn more income, or storing it and selling when there is high demand. A change in the physical state or form of the products and production of a product in a manner that enhances its value as demonstrated through business plan. Value addition minimizes wastage and improves quality of a commodity which realizes better prices.

Jammu and Kashmir is ideally suited for dairy development. The state has registered a steady growth in milk production. The state's milk production in 1995-96 was 3.69 lakh metric tonne which stood at 25.1lakh metric tonne in 2019-20. In 2000-2001, Jammu and Kashmir became a milk surplus state. Dairy farming is a household activity largely done by domestic labour in Jammu and Kashmir. A large number of women are mainly engaged constituting a major percent of the total agricultural labour force and the majority of families have two to three domestic labourers. This shows that in Jammu and Kashmir, dairy development activity is still a subsistence activity but income and employment opportunities can be increased through the modernization of this sector. The Jammu district, which is contiguous to Poonch and Rajouri districts where Gujjar population predominates, is ideally suited for dairy development.

The dairy sector in Jammu provides many opportunities for youth to operate micro and small-scale enterprises. This is because milk is part of farm produce that generates cash on a regular basis and it is one of the foods consumed by almost people of all ages in good quantities. Micro- and small-scale enterprises are affordable and manageable by rural people. They create a large number of non-farm employments and income opportunities in relatively poorly developed areas and require small capital and little sophisticated managerial and technical skills. However dairy farmers in Jammu mostly sell raw milk, which fetch low prices for their produce. Most of the families in tehsil Ranbir singh Pura of the Jammu division are engaged with dairy farming and a large number of women are mainly engaged in various dairy activities. They transport their produce more than 20 Km away from the site of production to the Jammu city as there are very few

processing units in the area and fetch meager amount for their produce. One-way dairy farmers can improve this situation involves value addition on raw milk. Value addition minimizes wastage and improves quality of a commodity which realizes better prices.

Motivation of young youth and capacity building in the area of milk processing may contribute poverty reduction through entrepreneurship development with a particular focus on rural people/unemployed youth. The essential elements are to incorporate the technical skills that encourage the initiatives of entrepreneurs and to enhance the human capacities required to foster entrepreneurial dynamism. To respond to the needs of unemployed youth and to materialize their economic potential and thereby to improve their standard of living, it is necessary to motivate the budding entrepreneurs.

**4. Artificial intelligence in animal health:**

Artificial intelligence is an recent emerging field for technocrats to develop start-up with sensor mechanics, ray based technique ets. Biosensors, as an application for animal health management, are an emerging market that is quickly gaining recognition in the global market. Globally, a number of sensors being produced for animal health management are at various stages of commercialization. Some technologies for producing an accurate health status and disease diagnosis are applicable only for humans, with few modifications or testing in animal models. Now, these innovative technologies are being considered for their future use in livestock development and welfare. Precision livestock farming techniques, which include a wide span of technologies, are being applied, along with advanced technologies like microfluidics, sound analyzers, image-detection techniques, sweat and salivary sensing, serodiagnosis, and others.

# Pet Practice Startup- A Successful Model

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India is the fastest-growing pet care market in the world and the pet population is of an estimate of 28-29 million, with dogs making up the bulk of pet ownership. The rising pet ownership has led to the growth of the pet care eco-system comprising retail chains, pet nutrition pharmaceuticals, grooming, toys, clothing, diagnostics, and clinical practice. The pandemic of Covid-19 has a significant impact on the Indian economy; and the pet industry has seen a steep growth during the pandemic period. Isolation and anxiety during the lockdown led to many restorations to adopt furry companions. The veterinary graduate has a lot of opportunities, and it depends upon the individual as to what sector the student wants to pursue. Employment opportunities include diverse areas such as clinical practice, teaching, and research, regulatory medicines, public health, wildlife specialist, or lab animals. Depending upon the interest, one can start exploring options to work for the pet industry and join the Veterinary pet practice clinical.

To start a pet practice business, one must wear two hats i.e. one as a good clinician and the other as a businessperson. It is important that one has to prepare themselves and develop an interest in clinical practice and be more comfortable with Veterinary medicine. Besides, developing clinical skills it is important to have marketing or business skills too. Once both Veterinary and business skills are developed, it's time to start some research and do some background work.

- Develop a business plan: Initial planning may take time and a good business plan will have a clear set direction for running the clinic. Identify the client base, identify staff, train your staff to deliver a quality customer experience.
- Competition Research: Before starting the practice, it is important to know about competition and to have knowledge of nearby clinics, the offer they are providing, and how different will be your clinic.
- Financial planning: It is imperative to have good financial planning. Understand what the cost would be to set up the clinic and operational cost. Assume, a no-profit period of 4 to 6

months and keep sufficient finance to run the clinic need.

- Legal formalities: Understand legal compliance obligations and necessary registration required. State Veterinary council registration is compulsory. If diagnostics like Ultrasound or X-Ray are placed necessary approvals will be required.
- Build a team: Build a dedicated team

A veterinary clinic can be a small clinic setup, polyclinic, or a hospital. A small clinic can be a small setup and is usually managed by a single doctor with a limited staff, a polyclinic is a larger setup with more diagnostic facilities while a hospital can be a large setup with multiple departments including inpatient dept and providing service 24x7. There may be different facilities a private clinic set up may have, like as below:

- OPD area: A clean, spacious OPD area to cater to multiple cases at a time
- Diagnostic facility: Diagnostics improve the effectiveness of treatments and avoid long-term complications. A Veterinary setup may have its diagnostics or laboratory facility or outsource it. Various laboratories collect the sample from clinics, and a tie-up with such laboratory will be helpful for the setup.
- The facility of Ultrasound and X-Ray: Having aUltrasound and X-Ray at the same setup is always good as it is convenient for the pet parent not to run from one clinic to another diagnostic center. It is, however, important to understand the certification that will be required for establishing these facilitiesand train oneself to use thisequipment.
- Other facilities may be a microchipping facility, dental scaling, ECG, pet store, and medicines, wellness center
- Grooming facility: Pet grooming industry is growing at a fast pace, and the pet parents want their pets to feel fresh and keep them tidy. Pet grooming is also necessary for early identification and treatment of skin infection. A proper grooming center will have a bathing tub with a good water facility, and a powerful dryer to dry up the pet hair.

The Pet industry is growing at a fast phase and as per India Pet Care Market Overview, 2021-2026 it is expected to grow at a value of INR 7500 crores by the end of 2025. Hence, Veterinarians have a huge scope to enter clinical practice and be an entrepreneur.

# Opportunities for Start-ups in Livestock Sector

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## Current scenario of Start-ups in India

India, currently is being evolved as a hub for Revolution, innovation and Start-ups as it holds 3rd rank in global start-up ecosystem worldwide after US and China. The flagship initiative of Government, Startup India, is intended to construct a robust eco-system for fostering innovations and start-ups in the country. Through this initiative, the Government aims to empower the growth of start-ups through new innovations and strategies. As per the reports of Startup India, the start-up sector is expected to mark steady annual growth of 12-15% (startupindia.gov.in). By the year 2018, India already had a list of about 50,000 start-ups. As per the data, more than 800 technology start-ups are being established every year (NASSCOM, 2015). The annual growth has increased to 15% and the number of female entrepreneurs has also increased to 14% (startupindia.gov.in). As of December 2021, the country is home to 81 unicorns which has a total estimate of $ 274.17 Bn. Out of these unicorns, 44 unicorns came into existence in 2021 itself, which was a record year for the country. These Figures show that start-ups have exploded in the country in recent years.

## Scope for Start-ups in Indian Agricultural Systems

Agriculture plays a pivotal role in India's economy. More than 58% of the rural households are primarily dependent on it for generating livelihood. Similarly, the Indian grocery and food market is the 6th largest market in world with retail backing 70% of the sales. The food processing industry of India contributes around 8.39% of Gross Value Added (GVA) in Agriculture (nmoop.gov.in). This sector plays a significant role in rural livelihood, employment and national food security. The share of this sector in gross domestic product (GDP) has touched around 20 % making it the exclusive contributor in GDP performance during 2020-21 as per the Economic Survey 2020-2021 (Shagun, 2021). Still, this is one of the uncertain sectors because its dependency on various factors like market,

weather and topographical conditions. Many efforts are being undertaken to give this sector a boost towards its fullest potential. One of the effective ways to do this is through improvements and innovations in agriculture technology. Which further create a huge scope for Start-ups in this sector. Transforming agriculture to Agribusiness is one of the important strategies. As per reports, start-ups have undoubtedly driven growth (Krishnan, 2018) and also involved in revamping the agriculture sector of the country (Mattoo, 2018). Despite the widespread pandemic, agritech start-ups reaped $152 million in funding through 30 deals in 2020 (thestartuplab.in). The Food Marketplace/Commerce sector has highest start-up investors i.e. 40%, followed by Ag Biotechnology (22%) (Agtech Funding Report, 2016).

**Animal Husbandry as a vital subsector of Agriculture**

Livestock is a vital component of the Indian agriculture as it plays a substantial role in providing food, power and income generation to the poor. It alone contributes 25% to the total agricultural GDP. It also contributes to 4.11 % to the National GDP. Around 16.44 million workers were engaged in the activities of farming of animals, fishing and mixed farming etc. (As per the NSS 68$^{th}$ Round survey, 2011-12). As per the census reports, the country has 535.8 million of total livestock population and 851.8 million of poultry (20$^{th}$ Livestock Census, 2019). Hence, there is a huge scope for the growth in the sector, provided that the industry becomes more organized. Currently most of the livestock production is managed by poor farmers with limited resources which is not likely to provide direct benefits from advanced technologies. Productivity of livestock is very low which is mainly due to poor nutrition, improper management and infectious diseases whereas the demand for livestock products is expanding exponentially. Thus, in order to meet the demand of the livestock industry needs to shift to a larger and effective production system.

**Scope for Start-ups in Livestock Sector**

Livestock sector in India is suffering from a varied problem like unskilled workers, use of outdated equipment, improper infrastructure, and lack of accessibility to wider market. Proper infrastructure, easy access to market and supply chain managements are the more persistent concerns. The major opportunities for start-ups are in precision livestock farming, feed industry, smart AI and IoT based farming, e-marketing, farming processes and technology and so on. Sustainable livestock

business is being practiced through various activities like diversification, value addition, precision farming, e-marketing, organic farming etc. Updating the technological interventions is the primary key to success in market-oriented farming, as this will lead to meet the rising demand at all level.

Being the shock absorber of agriculture sector, livestock sector has diverse scope for start-ups and innovations. Based on a NASSCOM (2019), the country already has more than 450 agritech start-ups, which is still increasing, @ 25% annually. At present there are 103 Livestock Tech start-ups in India (pashudhanpraharee.com). To support a more sustainable growth in livestock industry, Rashtriya Kamdhenu Aayog has been formed, with an initial investment of Rs 500 crore. A funding of 60% from the Government will be given for Cow Dung and Urine Start-ups (https://krishijagran.com/). It is targeted to encourage more youth into initiating Cow based product Start Ups in India.

A few start-ups are doing great in livestock sector viz., moofarm, Stella APP, Licious, Fresh to home, Eggoz, Animall etc. They are using artificial intelligence and internet of things (IoT) based technologies as well as data science and analytics to foster an effective environment of farmers and entrepreneurs.

- **Licious:** Licious is an online platform to deliver of meat and seafood founded during 2015. Its app is available on Android and iOS platforms. It is India's first D2C Unicorn headquartered in Bengaluru, Karnataka. The company is operating on a farm-to-fork model and owns the whole back-end supply chain and cold chain. It is acting as One-Stop Platform for Fresh Meat & Sea Food. Abhay Hanjura and Vivek Gupta of IIT Delhi are the Cofounders.
- **Stellapps:** It provides end to end farm solutions for farmers, works on the concept of One-stop dairy supply chain digitization via IoT. IoT and data analytics technologies are used in order to improve Agri- supply chain parameters viz., milk production, procurement, cold chain, animal insurance, and payments.

**Components of Stellapps**

1. mooON$^{TM}$ : To improve the productivity of cattle. It has 2 parts viz., moon device and moon app.
   - mooOn device: It is a pedometer for cattle which helps to detect heat and various disorders

- mooOn app is a herd management application to manage moon device.
- smartAMCU: An automated Milk Colletion unit targeted to scale up business profits by effective milk procurement operation. It enables IoT-based, real-time acquisition and dissemination of milk procurement data.

2. ConTrak: Helps to regulate and control the cold chain to achieve better shelf life of milk during transport.

- **Animall:** It is an online trading platform for cattle & buffalo. Focused on building a peer-to-peer cattle trading platform. It has reached more than 8 million dairy farmers within 2 years duration. More than 850,000 cattle have been sold through this platform. It is a brainchild of Neetu Yadav and Kirti Jangra of IIT Delhi.
- **Eggoz:** It is a producer of eggs and supplies fresh eggs to households, local shops, and markets through online platform.
- **Activx Animal Health Technologies (Vetzz)**: It is a network of Veterinary Doctors engaged in providing immediate service to the animal owners. It works via real time tele consultation and provides doorstep visits (PIB, 2020).
- **Mooofarm**: It was created with an aim to bridge the gap between technology and dairy farmers. It has a built-in e-commerce platform for trading of animals.

**Components**

  - E-Dairy Mitra: It helps to connect with an Expert Veterinarian, and to schedule a doorstep visit
  - Digital Livestock Management: Gives platform to record cattle lifeline and get predictive analytics for farm
  - E-commerce: Helps in purchasing high-quality dairy farming inputs
  - MoooCoins: Encourages more use through exciting voucher and provides Moo coin on every data input.

Targeted to attract more users.

- **Cowpathy**: Start-up working with cow-based products which makes soap, hair oils, toothpaste, floor cleaners, incense sticks, shaving cream and face wash. It claims that the soap contains dried and pulverised cow dung, lavender powder, orange peel, and gooseberries and their toothpaste contain dung, ghee, and urine (https://krishijagran.com/).

**Initiatives by Government of India to promote entrepreneurship among livestock farmers**

1. **Animal Husbandry Infrastructure Development Fund**: Department of Animal Husbandry and Dairying (DAHD), GoI has launched this Fund worth Rs. 15,000 crore as part of Atma Nirbhar Bharat Abhiyan Stimulus package for incentivizing investments by individual entrepreneurs, private companies, Farmers producers organizations (FPOs) etc. to establish infrastructure for dairy and meat processing and product diversification and Animal feed plant.
2. **e-Gopala App** has been launched by Prime Minster of India to provide marketplace for farmers to trade quality germplasm, good quality cattle of high productivity. It is also providing AI services, vaccination and guiding farmers for animal nutrition and affordable quality treatment.
3. **Dairy Entrepreneurship Development Scheme:** DAHD implementing Dairy Entrepreneurship Development Scheme (DEDS) for creating self-employment opportunities in the dairy sector. It covers activities such as enhancement of milk production, procurement, and preservation, transportation, processing and marketing of milk. It is providing back ended capital subsidy for establishment of farms. The scheme is being implemented by NABARD.
4. **Animal husbandry start-up grand challenge:** The DAHD and Start-up India, on partnership, launched this 'Animal Husbandry Start-up Grand Challenge'. It was planned to search for innovative and commercially reasonable solutions to address the six problem areas in prevailing in

livestock sector. During 2019, it was launched by Hon'ble Prime Minister of India. A total of 12 start-ups were provided with cash grants worth Rs 1.02 Cr. The aim/challenge was to bring a unique solution for six problem statements. In 2021, the second phase of this challenge has been launched as **'Animal Husbandry Start-up Grand Challenge 2.0.** The winners for each of the problem statements will be presented with Rs 10 Lakh cash prize whereas a runner-up will get Rs 7 Lakh cash (PIB, 2021).

5. **National Livestock Mission**: The Department of Animal Husbandry & Dairying, Government of India is implementing the scheme of National Livestock Mission with aims towards employment generation, entrepreneurship development, and increase in per animal productivity. The sub-mission on Breed Development of Livestock and Poultry has sharp focus on entrepreneurship development and breed improvement in poultry, sheep, goat and piggery by providing the incentives. NABARD is the funding agency.

6. **RKVY-RAFTAAR Scheme***:* It is a unique scheme launched by Government of India, which is targeted to strengthen infrastructure in Agriculture and Allied sectors and to promote Agripreneurship and Agribusiness. It is facilitating financial assistance and fostering a system of business incubation. Till date, 24 RKVY-RAFTAAR Agribusiness Incubators (R-ABIs) throughout the country have been established. It has three components as given bellow:

- Agripreneurship Orientation: It is of 2 months duration. The individuals shortlisted will be provided with a monthly stipend of Rs. 10,000/-. Training is provided on various financial, technical, IP issues etc.
    - Seed Stage Funding of R-ABI Incubatees – During this stage, funding upto Rs. 25 lakhs (85% grant from Government & 15% contribution from the incubatee) is provided.
    - Idea stage/Pre-Seed Stage– Funding up to Rs. 5 lakhs (90% grant from Government and 10%

contribution from the incubate/trainee) is provided during this stage (https://pib.gov.in/).

7. **KRI-TA-GYA 2.0: In the term KRI denotes Krishi (Agriculture), TA denotes Taknik (Technology) and GYA denotes Gyan (Knowledge).** This unique event was organized with an aim to provide an opportunity to the students / entrepreneurs / innovators and others to display their innovative approaches & technology solutions in livestock farming. The theme was precision and economic animal farming. The former version of hackathon KRITAGYA was structured to promote potential technology solutions for improving farm mechanization. Special emphasis was given towards women friendly equipment.

8. **Innovation and Agri-entrepreneurship Development programme**: It was launched under Rashtriya Krishi Vikas Yojana to promote innovation and agripreneurship. It is giving financial support for this. These start-ups are under various categories viz., agro-processing, artificial intelligence, waste to wealth, dairy, fisheries, farm mechanisation, etc.

**Current challenges in startups in Agriculture and allied sectors**

As per the reports by NABARD (2020), only 20% of agri-startups are profit-making. Around 44% of start-ups in agri-education are still looking for funds whereas majority of the start-ups possess a team size of less than 5 persons. Some other persistent hinderance are erratic Supply Chain, Involvement of Middlemen and improper access to credible information.

**Proposed solutions**

- Focussing towards more commercially feasible solutions to the existing problem
- Keeping in view the current market status in livestock farming
- Streamlining the funding pattern of agencies
- Competency assessment of the aspiring entrepreneurs before approval of any start-and accordingly provision of refresher trainings

- Encouraging more ICT based solutions using IoT and Artificial intelligence to add transparency.

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