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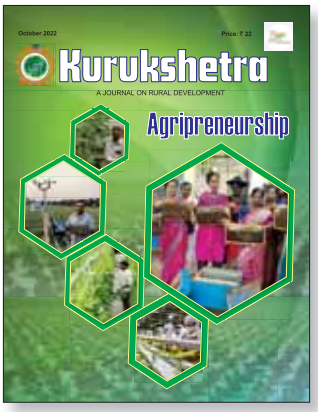

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Editorial

India has been an agrarian economy for ages but the agriculture sector was not considered lucrative in terms of money for a long time. Green revolution, that started around 1965, changed the scenario and ensured food security, increased the productivity of agriculture sector as well as reduced poverty in rural areas by using certain measures such as increasing area under farming, double-cropping, adoption of HYV of seeds, increasing use of inorganic fertilisers and pesticides, better irrigation facilities, improved mechanisation and crop protection measures. But, the aftermaths of the green revolution were not all good; it had adverse effects on environment, soil quality as well as on health of farmers. Apart from this, it includes highly water intensive irrigation methods.

It also had another aspect: after the launch of Green Revolution, there arose an immense need for agricultural inputs like inorganic fertilisers, pesticides, machinery, etc. Various domestic and multinational companies digged in the opportunity and ventured in the sector. This shift from agriculture to agri-business paved the way to revitalise agriculture and make it a profitable sector. Transforming agriculture into a more alluring and lucrative business venture is agri-entrepreneurship, also termed as agripreneurship. It is not only an opportunity but also a necessity for improving the production and profitability of the agriculture sector. Recognising its importance in the current agricultural and allied sectors, the theme of this issue of Kurukshetra is *Agripreneurship*.

This sector has invited interest of youth from rural as well as urban areas as evident from the rising number of agri-startups. These agri start-ups are very different in their nature of business when compared to the mammoth business entities that have been serving so far. They don't only provide goods and services to the farmers but also create a bonding with them. This is the new business model that the agri start-ups have introduced. Extension services are part and parcel of their business strategy. They not only sell their goods and services to farmers but create value for them by making the farmers partners in their business, says the article *Agri Start-ups: Transforming Agripreneurship*.

Government of India, through various policies and programmes, is promoting Agripreneurship on a large scale. Our lead article *AatmaNirbharta through Agripreneurship* provides a brief description of such policies and programmes. It states that a convergence of approaches of various Ministries/Departments of the Central Government, along with those of the state governments would go a long way in making the agripreneurs self-reliant and through them make the country AatmaNirbhar.

The fertilisers and chemicals used in the field to increase yield adversely affects the quality of soil and also contaminate ground water. One approach to curb such contamination is to promote organic farming. There are many agripreneurs who are actively working in the field to generate awareness and guide farmers to switch to organic farming. The article *Organic Farming* throws light on its various aspects, agripreneurship and tells us about the government interventions and scheme to popularise it among smallholder farmers.

We hope that this issue provides relevant information to the readers about agri-entrepreneurship as well as motivate the youth to consider agriculture and allied sector as a source of profitable means of self-employment. With this issue, we wish our readers a very Happy Diwali in advance.

AatmaNirbharta through Agripreneurship

Dr. Ishita G. Tripathy
Pawan Kumar Singh

One of the options which mitigates the burden on agriculture, while at the same time arrests rural-urban migration, is agripreneurship i.e., entrepreneurship in agriculture and its allied sectors. Adoption of new and innovative methods, processes and techniques in agriculture and its allied sectors ensures better output and remuneration, and is the harbinger of progressive change in the rural economy. The demand for an entrepreneur in the agriculture and allied set-up has grown in the recent past, due to the rapid integration in global supply chains and the associated compliances required in maintaining ecological balance.

Hon'ble Prime Minister's clarion call for 'Udyami Bharat' on 30 June 2022 sets the context of the importance of entrepreneurship and its underlying potential. In economic theory, the reward for entrepreneurship, which is one of the four factors of production, is profit. An entrepreneur is willing to take the risk of appropriately organising the other three factors of production, viz. land, labour and capital, to maximise the pre-determined objectives which may be maximising sales, revenue, profit, etc.

Agriculture remains one of the key sectors of the Indian economy, accounting for around 18-20 percent share in the gross domestic product. Approximately, 70 percent of the rural population depends on agriculture and allied sectors for their livelihood. Relatively poorer infrastructural facility is one of the key push factors, while better job opportunities in urban areas is one of the important pull factors contributing to the growing rural-urban migration. The ratio of urban population to total population of the country grew at an annual exponential rate of 2.76 percent due to which the urban population which stood at 27.81 percent in 2001 increased to 31.16 percent in 2011. The increase of 91.1 million persons to urban population during 2001-11 is the highest registered increase in urban population. Almost 56 percent of the increase in urban population during 2001-11 is ascribed to reasons such as rural-urban migration, reclassification of rural settlements into urban and boundary changes[1].

In this backdrop, one of the options which mitigates the burden on agriculture, while at the same time arrests rural-urban migration, is agripreneurship i.e. entrepreneurship in agriculture and its allied sectors. Adoption of new and innovative methods, processes and techniques in agriculture and its allied sectors ensures better output and remuneration, and is the harbinger of progressive change in the rural economy. The demand for an entrepreneur in the agriculture and allied set-up has grown in the recent past, due to the rapid integration in global supply chains and the associated

compliances required in maintaining ecological balance. An agripreneur bears the risks arising out of the vagaries of nature, market and consumer preferences. The agripreneur proves his/her mettle by keeping abreast of all developments, making use of information at the right time, relying on innovative solutions, and, if possible, using state-of-the-art technology. Further, by promoting agripreneurship, it can be ensured that losses involving perishable commodities are minimised; consumer benefits are enhanced; and price discovery is attained effectively.

Agripreneurship spans across various sub-sectors, viz. food processing, fisheries, tissue culture, apiary, seed processing, smart agri-tech provisioning, soil testing, vermi-compost, etc. Agripreneurs may be engaged in the production of diverse species of vegetables, fruits, etc. and in their post-production operations, including processing and marketing. Processing and marketing of farm produce require specialised handling and consequently, necessitating higher investment. Successful ventures may be in the form of cooperatives, e.g. dairy cooperatives. Agripreneurship may include rice mills, pulses mills, sugar factories, bakeries, fertiliser production units, food processing units, agricultural implements, agro service centres, etc. Agripreneurship can even be a tool for women empowerment.

There exists a heavy employment burden on the primary sector. With mechanisation, awareness generation and positive attitudinal changes, inculcating qualities of agripreneurship is fast becoming an option of weaning the disguised and unemployed workforce away from agriculture and providing them a remunerative alternative which can strengthen the supply chain. Moreover, agripreneurship makes use of local resources, decreases the possibility of post-harvest losses besides reducing the push factor for rural-urban migration. In this context, this article reviews the initiatives taken to tackle the current challenges faced by agripreneurs and how agripreneurship can help in attaining self-reliance.

Policies and Programmes

Various Ministries and Departments of the Government of India promote agripreneurship through their policies, programmes and schemes. The objectives of these policies, programmes and schemes inter alia include skilling of people, especially in the rural set-up; promoting entrepreneurship; and providing an enabling environment leading to creation of self-employment.

The Ministry of Agriculture & Farmers Welfare revised the Rashtriya Krishi Vikas Yojana in 2017 as Rashtriya Krishi Vikas Yojana - Remunerative Approaches for Agriculture and Allied sector Rejuvenation (RKVY-RAFTAAR). The scheme aims at making farming a remunerative economic activity. For this purpose, the scheme provides for financial support and nurtures the incubation ecosystem by strengthening farmers' efforts, risk mitigation, focus on development and creation of pre and post-harvest infrastructure, promoting agripreneurship and innovations. More than 5,000 projects have been approved under this scheme, five Knowledge Partners and 24 agribusiness incubators have been appointed[2]. RKVY-RAFTAAR includes agripreneurship orientation, with a stipend for the entrepreneur; seed stage funding and funding for incubatees[3]. Eight percent of the annual outlay of the scheme is earmarked for incubation. Some success stories under RKVY enumerated in the Ministry of Agriculture and Farmers Welfare's Annual Report, 2021-22, include wayside market stalls in Arunachal Pradesh and solar solutions for farmers. As the number of agripreneurs grows in the country, the database of successful entrepreneurs in the agriculture and allied sectors has now been started being maintained. National Institute of Agricultural Extension Management under the Ministry of Agriculture and Farmers Welfare's publication on '200 Enterprising Agripreneurs in Rural India'[4] not only captures the success stories of agripreneurs, but it also encourages aspiring entrepreneurs. Besides, the Ministry of Food Processing Industries' PM Formalisation of Micro Food Processing Enterprises Scheme, with an outlay of Rs. 10,000 crore, provides financial, technical and business support for upgradation of existing micro food processing enterprises. The scheme aims to enhance the competitiveness of existing individual microenterprises in the unorganised segment of the food processing industry and promote formalisation of the sector. A total of 51,792 registrations were done on the scheme's portal till 20 July 2022. The State/UT-wise details of the registrations are given in Table-1.

Table-1: State/UT-wise Details of Registration of Micro Food Processing under PM Formalisation of Micro Food Processing Enterprises Scheme till 20 July 2022

States/UTs	No. of Registrations
Andaman & Nicobar Islands	29
Andhra Pradesh	5,113
Arunachal Pradesh	116
Assam	5,831
Bihar	1,914
Chandigarh	24
Chhattisgarh	419
Dadra & Nagar Haveli and Daman & Diu	16
Delhi	336
Goa	45
Gujarat	307
Haryana	907
Himachal Pradesh	879
Jammu & Kashmir	706
Jharkhand	118
Karnataka	2,602
Kerala	515
Ladakh	72
Lakshadweep	1
Madhya Pradesh	3,149
Maharashtra	10,781
Manipur	2,111
Meghalaya	149
Mizoram	35
Nagaland	363
Odisha	1,719
Puducherry	104
Punjab	1,314
Rajasthan	1,400
Sikkim	73
Tamil Nadu	2,949
Telangana	1,724
Tripura	184
Uttarakhand	241
Uttar Pradesh	5,536
Total	**51,792**

Source: Lok Sabha Unstarred Question No. 2754 answered on 02.08.2022

As a part of the AatmaNirbhar Bharat Package, an Agriculture Infrastructure Fund was launched in 2020 as a dedicated Central Government scheme for providing medium to long term credit facility for investment in creation of post-harvest management infrastructure and community farming assets. This entailed a three percent interest subvention from the Government and credit guarantee fee by Credit Guarantee Fund Trust for Micro and Small Enterprises upto Rs. 2 crore. So far, out of more than 23,000 applications received on the integrated Portal of Agri Infra Fund, www.agriinfra.dac.gov.in, 13,700 applicants have been sanctioned amounting to Rs.10,131 crore loans[5]. The sanctioned infrastructure projects include warehouses, assaying units, primary processing units, custom hiring centres, sorting and grading units, cold store and cold chain projects, bio-stimulant manufacturing facilities, seed processing units, etc.

Enterprises with an investment on plant and machinery or equipment of up to Rs. 50 crore and a turnover of Rs. 250 crore can register on the Udyam registration portal of the Ministry of Micro, Small and Medium Enterprises (MSME), and avail benefits of Priority Sector Lending of banks and also those of programmes and schemes of the Ministry of MSME. The revision in the definition of MSMEs was adopted on 26 June 2020 and the Udyam registration portal was launched on 01 July 2020. Both the definition and the launch of the portal were a part of the AatmaNirbhar Bharat package, which had been specifically designed to help MSMEs emerge out of the ill effects of the COVID-19 pandemic. As many as 1.06 crore MSMEs have registered voluntarily in just about 26 months since the launch of Udyam portal[6]. Of these, around 10 percent have declared that they are involved in some kind of agripreneurship (Table-2) The enterprises mentioned in the table are currently operational. The figures mentioned in the table include both urban and rural areas and as evident, registrations span across a myriad of sectors, with food products having a conspicuous presence.

Table-2: Agripreneurs Registered on Udyam Registration Portal

Type of Existing Agripreneurship	No. of Enterprises	Percenatge
Operation of agricultural irrigation equipment	31,594	3.2
Support activities for animal production	29,233	3.0
Seed processing for propagation	16,137	1.6
Processing and preserving of fish, crustaceans and molluscs and products thereof	24,222	2.5
Processing and preserving of fruit and vegetables	83,455	8.5
Manufacturing of vegetable and animal oils and fats	43,696	4.5
Manufacturing of dairy products	1,37,224	14.0
Manufacturing of grain mill products	1,63,063	16.6
Manufacturing of starches and starch product	7,702	0.8
Manufacturing of bakery products	86,104	8.8
Manufacturing of sugar	13,191	1.3
Manufacturing of cocoa, chocolate and sugar confectionery	29,649	3.0
Manufacturing of macaroni, noodles, couscous and similar farinaceous	10,061	1.0
Manufacturing of prepared meals and dishes	20,677	2.1
Manufacturing of other food products	2,54,510	26.00
Manufacturing of prepared animal feeds	30,793	3.1
Total	**9,81,311**	**100**

Source: Udyam Registration Portal

The Ministry of MSME's programmes such as Prime Minister's Employment Generation Programme and A Scheme for Promotion of Innovation, Rural Industries and Entrepreneurship (ASPIRE) and Khadi and Village Industries Commission's schemes promote self-employment emanating from agricultural activities in rural areas. Gramodyog Vikas Yojana of the Ministry of MSME, which is an artisan centric programme implemented with the aim of revival of traditional and inherent skills of rural artisans in village industries, has a special focus on the Agro Based and Food Processing Industry which includes Oil Industry, Aromatic Oil, Honey and Bee-Keeping, Pal Gur and other Palm products, fruits and vegetable processing Industry, Pulses and Cereals Processing Industry, Spices and Condiments Processing Industry, Gur and Khandsari Industry, Collection of Minor forest produce, Bamboo, Cane and Reed Industry, Organic Dying Industry, Medicinal Plant Collection and Processing Industry. Another important scheme aimed towards inculcating entrepreneurial habits is Ministry of MSME's Enterprise and Skill Development Programme.

Two of the most important challenges faced by any entrepreneur include access to affordable finance and technology. In this context, the Ministry of MSME's Collateral Guarantee Scheme is a scheme involving collateral free loans for Micro and Small Entrepreneurs. Further, the Self Reliant India Fund announced as a part of the AatmaNirbhar Bharat package focuses on providing equity infusion to micro, small and medium entrepreneurs. For

Scheduled Castes and Scheduled Tribe (SC/ST) micro and small entrepreneurs, the Ministry of MSME's Special Credit Linked Capital Subsidy Scheme (SCLCSS) promotes the setting up of new enterprises by aspiring entrepreneurs and capacity building of existing entrepreneurs. All the SC/ST micro and small entrepreneurs of manufacturing and services sector are eligible for 25 percent subsidy under SCLCSS component of National SC/ST Hub for procurement of plant and machinery or equipment through institutional credit, for which the maximum subsidy is Rs. 25 lakh. Innovation is an important pre-requisite for entrepreneurship. The Government of India has been promoting innovation amongst the youth and new ventures. For instance, the Idea Hackathon of the Ministry of MSME launched in March 2022 aims at supporting untapped creativity and making innovation affordable.

Way Ahead

The last two financial years were marred by the adverse effects of COVID-19. Just like all other sectors, the self-employed too faced hardships due to the pandemic. The Central Government adopted a holistic corrective approach, which has now started showing positive signs.

Entrepreneurship has been adopted as a subject in the curricula of many teaching institutes so that young entrepreneurs are aware of entrepreneurship being one of the career options and also for honing the skills of young entrepreneurs. Specifically, it is observed that READY (Rural Entrepreneurship Awareness Development Yojana) which has been incorporated in undergraduate education of agriculture and its allied sub sectors can be successful in generating awareness and interest amongst the youth.

As is well known, the country's diversity is reflected in the variation across its geographies, land profiles, and consequently the agricultural produce. The obvious corollary of such heterogeneity is that the agripreneurship policies need to incorporate the region-specific potential and demands. AatmaNirbhar Bharat or Self Reliant India is based on the tenet of maximising the inherent potential. As has been elucidated in the above paragraphs, agripreneurship is a cornerstone of self-reliance.

There is an urgent need for promoting entrepreneurial culture among people in rural areas. Providing area-specific technical training programmes may help to develop the technical competence of potential entrepreneurs. Such initiatives will certainly need to be supplemented by adequate infrastructural facilities. The potential of agripreneurship can be tapped fully only if there is effective management of soil, seed, water, etc.

An important ingredient for the success of any development strategy is the awareness it generates amongst all stakeholders. For this purpose, a converging approach is required amongst the initiatives being taken by the various Ministries/Departments of the Central Government, along with those of the state governments. A convergence of their approach would go a long way in making the agripreneurs self-reliant and through them make the country AatmaNirbhar.

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Skills for Agri-Entrepreneurship

Souvik Ghosh
Usha Das

Agriculture offers several opportunities for entrepreneurship. There are many new prospects in the agribusiness sector, including packaging, the provision of raw materials, processed agri-food manufacturing, export of agricultural products, and other related industries. High-skilled workers' perspectives are changing as a result of increased microfinancing, lax government regulations, access to cutting-edge technology, guidance, and workshops on agri and related fields. As a result they are choosing to work for themselves in agriculture and allied sectors.

Entrepreneurship is the process of identifying and utilising available opportunities and resources to convert an idea into a product or service to market. Thus, it represents the changes in society. For initiating and sustaining socio-economic development entrepreneurs have been considered as an instrument. Agriculture used to be viewed as a low-tech industry dominated by small farm enterprises that were mostly concerned with improving the on-going practices rather than looking for innovations to doing new things. However, due to economic liberalisation and a rapidly changing society, this situation has changed dramatically over the last two decades. Agricultural enterprises must adjust to market instability, shifting consumer preferences, rigorous environmental restrictions, new product quality standards, sustainable food standards, and other factors. Due to these changes, more participants, innovation, and entrepreneurship are now possible. The development and survival of the rural economy are significantly impacted by agricultural entrepreneurship. It encourages farmers of all sizes to adopt entrepreneurial agriculture.

The development of an entrepreneur is the process of imbuing a person with entrepreneurial abilities, such as desirable knowledge, advanced technical, financial, marketing, and managerial

expertise, as well as fostering an entrepreneurial mindset. Entrepreneurial development programmes are designed to assist people in enhancing their entrepreneurial drive and in acquiring the skills and talents required for them to play their entrepreneurial role effectively. Realistically, entrepreneurial skills of agri-entrepreneurs are those abilities that are required to do tasks and activities associated to a farm business, and these may be acquired by capacity building measures.

Concept of Entrepreneurship

The term 'Entrepreneur' is derived from a French verb 'Entreprendre' which means 'to undertake'. In early 16th century, the Frenchmen who led military expeditions were referred as entrepreneurs. The French economist Richard Cantillon had used the term entrepreneurship for the first time in 1730s by more or less picturing 'entrepreneurship' as 'self-employment of any nature' and called 'entrepreneur' as a risk taker, in the sense that they purchased goods at certain prices in the present to sell at uncertain prices in the future. Joseph Schumpeter (an Austrian Economist) in 1934 popularised the term Entrepreneurship. He defined entrepreneur as an individual who introduces something new in the 'economy'—a method of production not yet tested, a product with which consumers are not yet familiar, a new source of raw material or of new market.

Entrepreneurship is the process of identifying opportunities in market place, arranging the resources required for pursuing these opportunities and investing the resources to exploit the opportunities for a long-term gain. The term entrepreneurship is often used synonymously with the term entrepreneur. Though they are two sides of same coin but conceptually they are different. The Oxford Concise English Dictionary defines entrepreneur "as a person who sets up a business or businesses taking on greater than normal financial risks in order to do so".

Agri-Entrepreneurship

The imperative to transform agriculture into a more alluring and lucrative business venture is agri-entrepreneurship. Agriculture offers tremendous opportunity for entrepreneurship, but this potential can only be realised through efficient management of agri-elements like soil, seed, water, and market demands. In layman's terms, agri-entrepreneurship is agriculture that is sustainable, community-oriented, and directly marketed. An agricultural farm transforms to an agribusiness through the beneficial fusion of agriculture and entrepreneurship. This association promotes agri-entrepreneurs who innovates, identify markets, and meet needs in novel ways. Agri-entrepreneurship is synonymous with agricultural entrepreneurship and refers to the establishment of agricultural and allied businesses. Agricultural entrepreneurs undertake business related to agricultural activities; some entrepreneurial areas in agriculture are farming, product marketing, inputs marketing, and processing of agricultural produce.

Agri-entrepreneurship has the ability to contribute to both social and economic development, including job creation, poverty reduction, improved nutrition, improved health, increased food security, and improving rural economy. The solution to reducing the burden of agriculture, generating employment opportunities for rural youth, preventing rural-to-urban migration, raising the national income, sustaining industrial development in rural areas, and easing pressure on urban areas can be achieved through agri-entrepreneurship. It helps small farmers become more productive, profitable, and marketable on a local, national, and global scale. It encourages business opportunities in both urban and rural areas, accelerates growth, and diversifies income.

Opportunities in Agri-Entrepreneurship

As a result of the WTO's policy reforms, the agriculture sector has expanded in opportunity. The scope and potential in agri-entrepreneurship have greatly increased as a result of the globalisation of trade and agriculture as well as national policy reforms, sparking unprecedented corporate interest in this industry. According to surveys, India's total rural market is greater than its entire urban market, and it is essential for the development of the nation's corporate growth plan. With advanced technology and management, agribusiness has created several opportunities for agricultural product value addition, packaging, retailing, and exports. A significant portion of the Indian population is heavily dependent on agriculture, which also provides the raw materials for other industries. The most likely factor in determining India's economic growth is agribusiness.

Agriculture offers several opportunities for entrepreneurship. There are many new prospects in the agribusiness sector, including packaging, the provision of raw materials, processed agri-food manufacturing, export of agricultural products, and other related industries. High-skilled workers' perspectives are changing as a result of increased microfinancing, lax government regulations, access to cutting-edge technology, guidance, and workshops on agri and related fields. As a result they are choosing to work for themselves in agriculture, which is boosting the outlook for agri-entrepreneurship in India, in areas such as dairying, sericulture, goat and sheep husbandry, floriculture, fish farming, vegetable cultivation, nursery raising, and farm forestry.

Potential agri-entrepreneurship opportunities are as follows.

i) **Agro-Produce Processing units:** In these facilities, no new products are manufactured; instead, only agricultural produce is processed. For instance, consider mills for grinding grains (rice, wheat), pulses, etc.

ii) **Agro-Produce Manufacturing facilities:** In these facilities, completely new goods are created using agricultural products as the primary raw material. Examples include bakeries, straw board factories, and sugar factories.

iii) **Agro-Input Manufacturing facilities:** Here, items are produced for either mechanising agriculture or expanding manufacturing facilities. Examples include fertiliser production units, agricultural tool manufacturing units, etc.

iv) **Agro-Service Centres:** These include the stores and repair facilities for farm equipment, implement, and machinery.

v) **Miscellaneous Areas:** In addition, the establishment of apiaries, feed processing facilities, seed processing facilities, mushroom production facilities, goat rearing, organic vegetable and fruit retail outlets, bamboo plantations, etc. may be possible in these areas.

Factors of Entrepreneurship

Several factors contribute to the success of an enterprise, including the entrepreneur's organisational, marketing, and human relations strategies. Market, methods, team, and company are some of the influential factors of entrepreneurial success. Entrepreneurial motivations can be broadly divided into two groups which are “push” and “pull” factors. Under the category of “push” factors, elements such lack of income, dissatisfactions from previous work and need for flexible timetable are factors that drive one to become an entrepreneur in rural areas. The motivation is mainly to have better income and livelihood. “Pull” factors are associated with independence, dream, desire for wealth and power, and self-efficacy. Motivation to start up an agribusiness is associated to their need to be more independent, achieve job satisfaction and self-actualisation.

Four distinct factors influence entrepreneurship: economic development, culture, technological development, and education. These factors may have an impact on the emergence of entrepreneurship in both positive and negative ways. The economic environment has the most immediate and direct effect on entrepreneurial activity. The economic factors that influence the growth of entrepreneurship are capital, labour, raw materials, market and infrastructure. Social factors that can play an important role in encouraging entrepreneurship are family background, education, attitude of the society, and political support. Psychological factors often referred are motives, need for achievement, status and respect. While negative influences provide an atmosphere that is inhibitive for entrepreneurship, positive influences of the factors produce enabling and suitable conditions for its formation.

Core Competencies and Skills

An entrepreneur is someone who assumes the risk of starting own business in hopes of earning a profit. He is the one who comes up with the concept, creates the plan, gathers the resources, and executes the plan to reach his/her objectives. Specific traits and abilities are needed to be an entrepreneur, and these may frequently be acquired through training, efforts, and preparation. The skills and competencies of an agri-entrepreneur are combined to form their characteristics. Planning, implementation, and control are the three key facets of farm management that need knowledge and proficiency from farmer-entrepreneurs. They also need information on input supply, financial services, transportation, packaging, marketing, and consulting services, as

well as primary production, harvesting, processing, wholesaling, and retailing. Essential entrepreneurial attributes for an agri-entrepreneur are initiative, ambition, concentrated problem-solving, creative thinking, taking chances, flexibility and adaptation, interpersonal skills, networking, and a willingness to learn. Important entrepreneurial characteristics are as follows.

Need for Achievement: Entrepreneurs have a strong drive to succeed in their business and in life. Their aspirations go well beyond merely reaching one target; instead, they are always striving to surpass it.

Visualisation: Entrepreneurs have dreams, and they envision the means by which they will be realised. In doing so, they create a future for their business enterprises based on market demands, the socio-economic environment, and the technology environment.

Technical Expertise: Whether it is in terms of technology, operations, finances, or market dynamics, an entrepreneur is fully knowledgeable about all the technical aspects of his/her enterprise. Entrepreneurs are curious about how things operate. They make the effort and take decision to look into the unforeseen.

Innovativeness: Entrepreneurs don't always adhere to the traditional guidelines. They are constantly looking for fresh opportunities to expand the current company. They build new things and come up with ideas through imagining solutions to issues.

Independency: An entrepreneur frequently finds it challenging to work in a regulated setting due to their desire for control and the freedom to make decisions. Entrepreneurs require independency in their job and decision-making. They create their own laws and destiny instead of working according to general guidelines.

Risk Bearing Ability: Entrepreneurship is inextricably linked to risk. Entrepreneurs who take reasonable risks (moderate risk/ calculated risk) outperform those who take excessive or no risks at all in terms of returns on their assets. The entrepreneur accepts future uncertainty while reducing risk by preparation, skill development, and research.

Leadership Ability: Entrepreneurs exemplify leadership traits. They have good communication skills, are good decision-makers, good planners, organisers, and motivators who take the initiative to carry out plans and are goal-oriented.

Human Relations Skills: In order to make money and gain customers' trust for their goods and services, entrepreneurs need to get along well with their customers. To manage their business profitably, they must also maintain strong ties with their employees.

Diligent: Entrepreneurs are very hard-working and put up a lot of effort to see a business venture through to success. They are sometimes referred to as workaholics. For them, working is worship. They continuously work toward achievement and are aware that there is no replacement for putting in a lot of effort.

Self-Confidence: Entrepreneurs have faith in their abilities. Any uncertainties are dispelled by their confidence.

Flexibility: Entrepreneurs need to be adaptable to shifting markets, trends, technology, laws, and regulatory frameworks, as well as shifting economic conditions.

Entrepreneurs perform several functions which are broadly categorised as innovation, risk bearing, organisation and management function. It encompasses idea generation, determining objectives, raising funds, procurement of machinery and raw materials, market survey, determination of form of enterprise, manpower recruitment and operating the enterprise.

To be successful as an agri-entrepreneur, a farmer must be able to blend their managerial, technical, and entrepreneurial skills in practice. The three key technical aspects that demand expertise are managing inputs, production, and marketing. Entrepreneurial and technical competencies must be supported with managerial competencies in diagnosis, planning, organising, leading, and managing. Managing inputs, production, and marketing are performed by the agri-entrepreneur in each of the core areas of farm business. The important skills required for being agri-entrepreneur are business planning/management skills, leadership skills, communication skills, customer service skills, financial skills, analytical and problem-solving skills, critical thinking skills, and strategic thinking and planning skills.

Global Forum for Rural Advisory Services (GFRAS) in its Guide on Agricultural Entrepreneurship has listed different skills required by agri-entrepreneur as given below.

To conduct business planning, an agri-entrepreneur requires the following skills:

- Aligning business objectives with the value proposition
- Identifying a value proposition that meets customers' requirements and preferences
- Situational analyses by collecting, arranging, analysing, and interpreting information
- Diagnosing problems and finding their pertinent causes
- Evaluating and contrasting potential solutions to a given problem
- Forecasting
- Estimating the work and time necessary to execute jobs
- Implementing, monitoring and evaluating activities

Essential production operation skills that the agri-entrepreneur requires are:

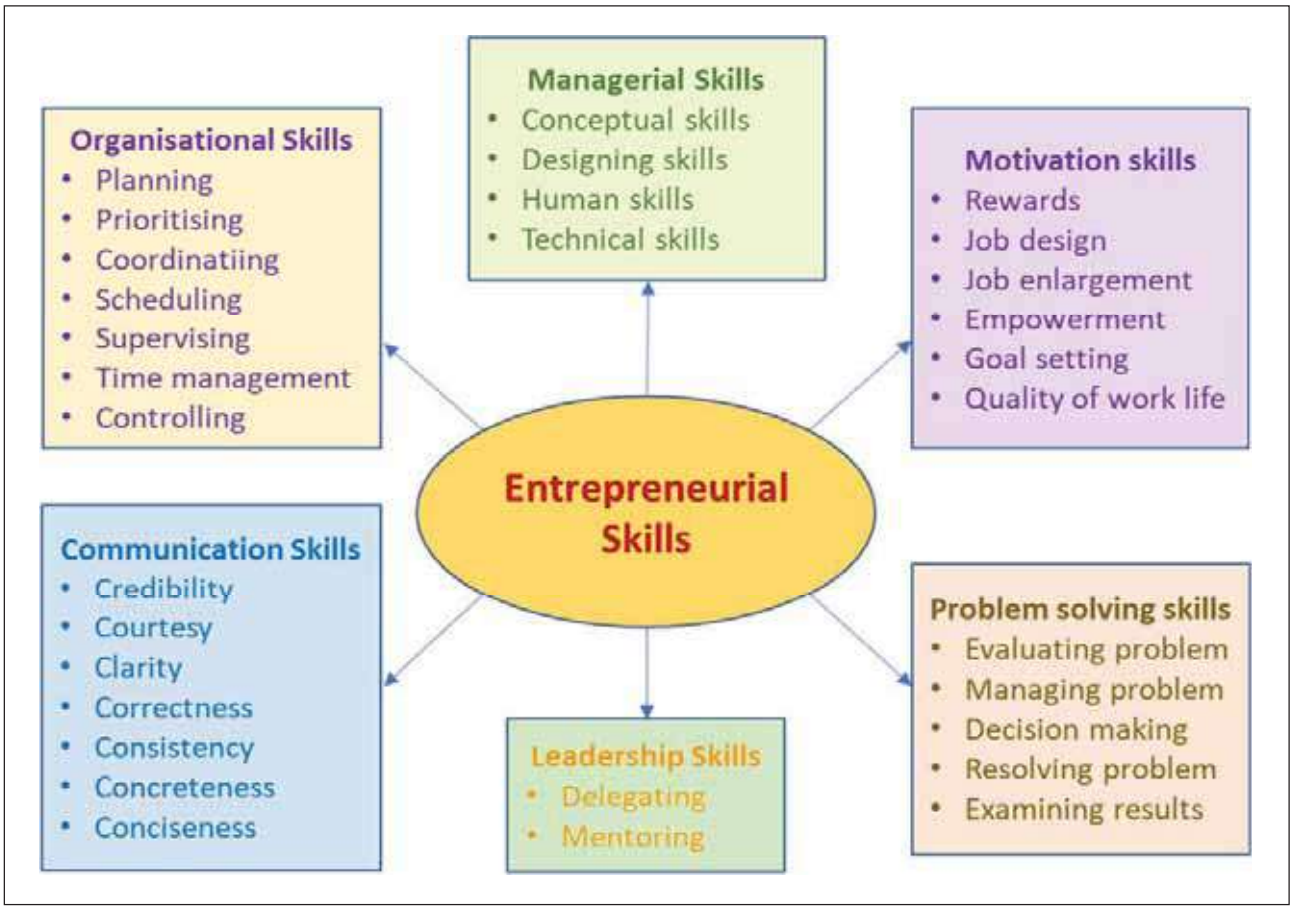
- Selecting, designing, running, managing, and updating the agricultural production system
- Planning on a short- and long-term basis for what and how to produce
- Making choices about the timing of production processes, such as sowing based on seasons, soil types, methods of sowing, fertility
- Arranging the resources and raw materials required for agricultural production process
- Coordinating and managing production processes
- Choosing and operating farm equipment and machinery
- Designing the workflow from arranging inputs (e.g., seeds, fertilisers, pesticides, etc.) to packaging of produce and sale of agricultural produce
- Production process monitoring and appraisal
- Resolving difficult issues that may arise during production.

Market analysis is one of the important functions of an agri-entrepreneur who needs to have several skills for it such as critical thinking, system analysis, operations analysis, decision-making, problem-solving, coordination, and communication abilities. To perform the sales function of the products, an agri-entrepreneur requires to have prospecting skills, verbal and non-verbal communication skills, influencing and persuasion skills, presentation skills in order to make an effective sales presentation, and report writing skills in order to compile regular sales reports.

An agri-entrepreneur would also require negotiating skills like active listening, clarifying issues, identifying the key negotiating issues and common ground between the negotiating parties, argument logically and reasonably, using verbal communication skills to keeping points clearly and understandably, identifying and structuring the problem as well as potential solutions or courses of action, and deciding on the most appropriate course of action.

Skill Development Initiatives

The organisations like National Institute of Micro, Small and Medium Enterprise (NIMSME), Hyderabad under Ministry of Micro, Small and Medium Enterprises; Indian Institute of Entrepreneurship (IIE), Guwahati; National Institute for Entrepreneurship and Small Business Development (NIESBUD), Noida; and National Skill Development Corporation, National Skill Development Agency and National Skill Development Fund under Ministry of Skill Development and Entrepreneurship have been engaged in training, consultancy, research, etc. in order to promote entrepreneurship and skill development. NABARD has been partner of Government in implementing schemes for agri-entrepreneurship like New Agricultural Marketing Infrastructure (AMI) sub scheme of Integrated Scheme for Agricultural Marketing (ISAM), Agri Clinics and Agri Business Centres Scheme (ACABC), National Livestock Mission - Entrepreneurship Development and Employment Generation (NLM-EDEG), Dairy Entrepreneurship Development Scheme (DEDS), Commercial production units of organic inputs - National Project on Organic Farming (NPOF). Ministry of Agriculture and Farmers' Welfare, Government of India under revamped Rashtriya Krishi Vikas Yojana has launched a new Scheme named Innovation and Agri-Entrepreneurship Development to promote agri-entrepreneurship and agribusiness by providing financial support and nurturing the



incubation ecosystem. Initiative for Development of Entrepreneurs in Agriculture (IDEA) under (NEDFL Schemes) Ministry of Development of North Eastern Region intends to promote agri-business ventures in the North-East Region and assist in establishing agri-business as a profitable venture. It also provides gainful employment opportunities and makes available supplementary sources of input supply and services.

Way Forward

In order to transform subsistence activities into profitable business ventures, equipping, aspiring agri-entrepreneurs with skills in management of enterprise, marketing efficiency and capability, production ability, information and communication technology, and financial management will help a great deal. Agri-entrepreneurs must use a variety of strategies to effectively employ their entrepreneurial skills. They may aim to diversify their sources of income to make them more successful and sustainable by capturing value along the value chain through integration of value adding enterprises individually or collectively. They need to be adept at identifying and capitalising on opportunities to grow their businesses. They must, however, be efficient in terms of resource utilisation, transportation, and marketing of produce. To adapt to a changing economy and market, new technologies are required. Not only should farmer entrepreneurs be consumers and users of these technologies, but also active contributors in their design, testing, modification, and introduction into the farming system. To meet the demands of increasing complexity, agri-entrepreneurs must continue to improve their managerial skills. Extension and agro-advisories need to promote group entrepreneurship by organising group of entrepreneurs and establishing linkages along the value chain.

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Economic Development

Manjula Wadhwa

The agriculture sector has a large potential to add to the national income while simultaneously ensuring direct employment and income to the numerically larger and susceptible sections of the society. In fact, Agripreneurship is not only a prospect but also a prerequisite for improving the creation and profitability in agriculture. Changing the way a local farmer thinks to increase production is not difficult, what is difficult is to adapt to the mindset of an agripreneur.

A shift from agriculture to agribusiness is an essential pathway to revitalise Indian agriculture and to make it more attractive and profitable venture. Agripreneurship has the potential to contribute to a range of social and economic development such as employment generation, poverty reduction and improvement in nutrition, health and overall food security in the national economy. It also aids in the reduction of food prices and supply risks and the betterment of the diet of the country's rural and urban poor. Additionally, it also stimulates growth in rural and urban areas by diversifying income and creating entrepreneurship opportunities.

At the outset, let us gather the conceptual understanding-Agripreneurship is the profitable confluence of agriculture and entrepreneurship brought in by the people with innovative ideas to develop the existing practices for better productivity as well as establishment of new ventures in agriculture and allied sectors. Expressing it in a structured way, we can say, Agripreneurship is sustainable, community oriented, directly marketed agriculture.

Since the inception of New Economic Reforms, adoption of liberalisation, privatisation and globalisation and World Trade Organisation in 1992-95, it is expected that rural areas will grow at par with urban areas. Performance of agriculture during first phase of economic reforms till 1998 remained a driving force for our nation among all the spheres of academia, administration and government. However, things went on different path in the later years and for improving performance of agriculture much needs to be done even today. During the last decade, agriculture used to be treated as just an activity of land tilling and crop harvesting but growing waste land, depleting natural resources. Growing migration by rural youth to urban areas, negative perception of the children of farmers towards

farming and emerging technologies in agriculture have necessitated redesigning of agricultural activities. Applying the thought and practice of entrepreneurship in the field of agriculture generates wide range of economic benefits like – increased agri productivity, creation of new business ventures, new jobs, innovative products and services, development of rural areas and increased wealth. Traditional farmers, unaware of scientific agriculture and effective agri-management systems, are unable to cope up with delaying monsoons, drought, crop debts, fake seeds and shortage of fertilisers, as a result resort to committing suicides. The managerial, technical and innovative skills of entrepreneurship applied in the field of agriculture yield positive results and a well-trained agripreneur may become a role model to all such disheartened farmers. In fact, developing entrepreneurs in agriculture can solve problems by (a) reducing the burden of agriculture (b) generating employment opportunities for rural youth (c) controlling migration from rural to urban areas (d) increasing national income (e) supporting industrial development in rural areas (f) reducing the pressure on urban cities.

The recent data shows, the share of the agriculture and allied sector in our total Gross Value Added has improved to 20.2 percent in 2020-21 and 18.8 percent in 2021-22[1]. As per Economic Survey 2021-22, agriculture and the allied sector proved to be the most resilient to the COVID-19 shock as it registered a growth of 3.6 per cent in 2020-21 which further improved to 3.9 per cent in 2021-22. In terms of the real value added, the Indian agriculture sector ranks second after China[2]. This implies that agriculture is likely to remain a priority, both for policymakers as well as businesses in the foreseeable future and any move to ramp up the sector calls for a multi-pronged strategy.

In recent years, there has been a considerable emphasis on crop diversification towards horticulture (fruits, vegetables, ornamental crops, medicinal and aromatic plants and spices), plantation crops (coconut, cashew nuts and cocoa), increasing manufacturing plants e.g.-fertiliser production units, food processing units, Agro service centres etc. Besides the above mentioned areas, the following areas may prove to be encouraging to establish agri-enterprises such as setting up of Apiaries, food processing units, seed processing units, mushroom production units, commercial vermi-compost units, goat rearing, organic vegetable and fruits retail outlet, bamboo plantation and jatropha cultivation. Thus, Agripreneurship is not only an opportunity but also a necessity for improving the production and profitability in agriculture and allied sectors and this potentiality can be tapped only by effective management of agri elements such as soil, seed, water and market needs. An individual with risk bearing capacity and a quest for latest knowledge in agriculture sector can prove to be a right agripreneur.

Nowadays, easy access to technology, emergence of micro financing, liberalised government rules, awareness and training programmes on agri and allied sectors and finally changing mindset of the highly qualified people to go for self-employment in the field of agriculture have been contributing significantly in enhancing the potentiality for agripreneuership. The possible areas of entrepreneurship in agriculture are:- 1. Agro-Produce processing units—these units do not manufacture any new product, they merely process the agriculture produce; for example, rice mills, dal mills, decorticating mills, etc. 2. Agro-Produce manufacturing units—these units produce entirely new products based on the agricultural produce as the main raw material such as sugar factories, bakery, straw board units, etc. 3. Agro-Inputs manufacturing units—these units produce goods either for mechanisation of agriculture or for increasing manufacturing plants; e.g, fertiliser production units, food processing units, agricultural implement units etc. 4. Agro service centres—these include the workshops and service centre for repairing and servicing the agricultural implements used in agriculture. 5. Miscellaneous areas.

If we look at the recent trends in Agricultural Markets, we find, Agriculture has shifted from a deficit-driven to a surplus-driven industry. Contract farming is becoming more common these days. Commercial and Regional Rural banks have a tremendous amount of experience in funding agribusiness projects. Public and private/corporate managers have transformed scientific results and discoveries into tangible programmes and action policies. RBI, NABARD, Cooperatives, Panchayats, Non-Governmental Organisations and the Media all work together to spread awareness and information, and improve consumer access. Bilateral, regional,

and trade agreements have paved the way for reduced tariff and non-tariff barriers to cross-border agricultural production flow and increased financial market transparency resulting in increased capital flow into developing countries like India, especially in the form of FDI. Furthermore, since 1990s, FDI liberalisation has created numerous opportunities for developing countries to invest in post-harvest processing and agricultural retailing. Contract farming, producer alliances and mega markets are examples of structural developments in the food procurement and distribution system. National Spot Exchange Limited (NSEL) is a nationalised transparent electronic spot exchange based in Mumbai, established in 2005 which is a cutting-edge marketplace that offers tailored solutions to agricultural producers, processors, exporters, importers, buyers, and other commodity stakeholders. The e-Seva Kendra of the Grameen Sanchar Society (GRASSO) offers agri-related services such as market access, price for agricultural products, availability of cold storage facilities and labour and job opportunities. Agricultural Marketing Information System (AGMARKNET), the internet-based information system, seeks to provide a "single window" service appealing to various information demands.

Similarly, the Agricultural and Processed Food Products Export Development Authority (APEDA), an independent body under the Ministry of Commerce, serves as a link between Indian producers and global markets and provides financial assistance through a variety of programmes aimed at promoting and developing agricultural exports. The Indian Tobacco Company's e-choupals also been a major hit in agricultural marketing. Further, in May 2005, National Horticulture Mission was launched as a major initiative to diversify agriculture marketing.

Now, it would be worthwhile to discuss the institutional support available for boosting up the market opportunities in Agri-Entrepreneurship. National Bank for Agriculture and Rural Development (NABARD) founded in July 1982 to focus on agriculture, small-scale cottage and agro-based industries in rural areas, has been effectively overseeing all agro-based and rural development activities. At the district level, Agricultural Technology Management Agency (ATMA) is in place to use the services of Agripreneurs with a view to provide value added extension services to farmers through a Public-Private partnership model. The Central Government provides grants to states to help them establish modern training facilities and the National Council of State Agricultural Marketing Boards oversees these programmes. Farmers Market is a unique move by some state governments known for Uzhavar Santhai (Tamil Nadu), Rythu Bazaars (Andhra Pradesh), and Apna Mandi (Punjab). These markets researches the enormous potential for agribusiness entrepreneurship training to improve business skills provided by Krishi Vigyan Kendras (KVKs). Likewise, Domestic and Export Market Intelligence Cell (DEMIC) helps agri-entrepreneurs indirectly make money. Furthermore, it performs the role of commodity price forecasting.

Agriclinic and Agribusiness Centre scheme, launched by Ministry of Agriculture in association with NABARD, aims to tap the expertise available in the large pool of agri-graduates. The concessional loan, subsidy and now the start-up training is also provided to graduates in agriculture and allied subjects, with a view to make them agripreneurs. Ceiling of project cost for subsidy has been enhanced to Rs. 20 lakhs[3] for an individual project and Rs. 100 lakhs for group projects. Depending upon the type of venture and with a moratorium upto 2 years, the loans are repayable within a period of 5-10 years. Delivery of extension services is the main component of ACABC projects for availing subsidy. A composite, back-ended subsidy under the scheme is 44 percent of project cost for women/SC/ST and candidates from hilly and NE regions and 36 percent for all others.

Dairy Entrepreneurship Development Scheme is another milestone in the desired direction. The main objectives behind it are setting up modern dairy farms for production of clean milk, upgradation of traditional technology to handle milk production on commercial scale, generate self-employment and provide infrastructure, especially in the unorganised dairy sector. Back-ended subsidy of 25 percent of outlay for general category and 33.33 percent for SC, ST farmers is adjusted against the last few instalments of repayment of bank loan.

National Livestock Mission-Entrepreneurship Development and Employment Generation (EDEG) commenced from 2014-15 is designed to cover all the activities required to ensure quantitative and

qualitative improvement in livestock production systems and capacity building of stakeholders. NABARD is the subsidy channelising agency under EDEG component.

Coming to the challenges, we observe, just like other pastures, this arena is also not as green as it should be on account of the following stumbling blocks. The basic problem is the low literacy level of rural folks which acts as root cause for majority of challenges discussed below. Since low productivity in the agricultural sector is a major challenge due to factors like an uncertain monsoon, poor fertility of the land, poor quality seeds and inputs, people are shifting from agriculture rather than thinking how to increase productivity. These entrepreneurs can only be successful if the farmers keep doing farming and produce in a good quantity and quality. Even today, the poor and small/marginal farmers are unable to access the modern infrastructure and technology trending in the market for better productivity and ease of work. Rural marketers have much less threat bearing capability because of loss of economic sources and outside support. Even though various developmental activities are going on, the development of technologies is very slow as compared to developed nations like USA and European countries. Further, the farmers don't have much of entrepreneurial ability in setting up and management of such business models. Moreover, rural marketers face intense opposition from huge sized groups and concrete marketers. Major issues that the entrepreneurs confront, are of standardisation and opposition from huge scale devices. Management troubles like i) lack of technological dissemination, ii) legal formalities, iii) lack of technical understanding, iv) poor quality control are the other bottlenecks in the growth of agripreneurship.

To meet the above challenges, a number of organisations like IFCI, SIDBI, NABARD are putting all-out efforts. Marketing constraints are associated with distribution channel, pricing, product endorsement, etc. In order to make the rural entrepreneurs to initiate the business venture, the following strategies may be adopted.

1. The financial institutions and banks which assure prompt financial security to entrepreneurs must create unique cells for providing easy finance to rural entrepreneurs.
2. The rural entrepreneurs need to be provided finance at concessional interest and easy repayment terms. The burdensome sanctioning procedures should be minimised.
3. Proper supply of scarce raw materials should be made on a priority basis. A subsidy could also be offered to make the products manufactured by rural entrepreneurs cost competitive and remunerative.
4. Adequate training facilities is the need of the hour-presently the economically weaker entrepreneurs of the society are offered such training facility under Prime Minister Rozgar Yojana (PMRY). Voluntary organisations can also arrange such training programmes to provide them stimulation, counselling and assistance.
5. Proper encouragement and assistance should be provided to rural entrepreneurs for setting up marketing co-operatives.

All schemes, programmes and activities of the government ensure that farmers take an interest in becoming agricultural entrepreneurs voluntarily. The budget allocation of the last eight years, the substantial increase in it and more farmer friendly agri-policies are a part of the government's positive thinking and strong will power. The budget allocation for agriculture has increased by almost six times in the last eight years. Truly, it is no small feat that amidst the challenges of the COVID-19 pandemic, India has easily supplied food grains to many countries. Even during the Russia-Ukraine crisis, India has emerged as a major supplier of food grains to the countries in need. The Agriculture Ministry budget this year has given special emphasis on agriculture start-ups and agri-entrepreneurship. Through its farmer friendly schemes, the Government of India will be capable of taking our agriculture sector to new heights in the future.

Equally important is to understand the relationship between Agripreneurship and Marketing, especially contractual marketing, which is an approach in which companies that are in different levels of the value chain focus on working together to provide the best possible financial results than they could have on their own. Contractual marketing gives stakeholders in the value chain the opportunity to work with enterprises that could help them increase their reach and acquire a more diverse clientele.

Digital marketing helps in creating a strong digital footprint which is necessary these days. Enterprises of any kind, without at least a basic digital presence, will not be able to turn to agripreneurship and compete against massive farming corporations. Innovation is a part of entrepreneurship and agripreneurship and so it cannot fall behind. Value chains work the best but without innovation, local farms will not be able to flourish. As a young farmer, one need to try and find that one innovative spark that will fire up their businesses and make them an important stakeholder in the global agricultural market!

To deduce, Agricultural entrepreneurship is synonymous with many characteristics of "generic" entrepreneurship, but also has its unique features in the specific context of agriculture. It is obvious that there is a great scope for entrepreneurship in agriculture and this potentiality can be mobilised only by effective management of agricultural elements. The agriculture sector has a large potential to add to the national income while simultaneously ensuring direct employment and income to the numerically larger and susceptible sections of the society. In fact, Agripreneurship is not only a prospect but also a prerequisite for improving the creation and profitability in agriculture. Changing the way a local farmer thinks to increase production is not difficult, what is difficult is to adapt to the mindset of an agripreneur. There is an entire study behind agripreneurship and it focuses on understanding the role of the farmer entrepreneur in the new market, identifying all the potential clients of this new and innovative type of entrepreneurship and of course defining the business idea behind the value chain.

In agripreneurship, the most important thing that stakeholders need to remember is that the business needs to now have a much more enhanced commercial activity that involves trade and trading in every form. The enterprise, which in this case, is the business or organisation that provides goods or services aiming to make a profit needs to have a value capture. That means that the enterprise needs to maintain the percentage of the value they provide in every single transaction. Entrepreneurship, after all, is all about high quality and value. Hence, Let us all strive together to realise the vision of our current Prime Minister:-

"Scale of India's development needs is huge. Need to achieve it is urgent. We cannot simply continue on traditional paths to development".

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Agri Start-ups: Transforming Agripreneurship

Bhuwan Bhaskar

Agritech start-ups work with technology at the core of their work philosophy. But the uniqueness lies in the innovative ways that they have followed to link the technological advancement to farmers. Most of the agritech start-ups have based their business models around state-of-the-art technologies like, Artificial Intelligence (AI), Machine Learning (ML) and the Internet of Things (IoT). Through them, the farmers are being introduced to the new agri practices and are getting exposure to the tools in a way they never were earlier. To take more and more farmers in their folds, these start-ups are leading multiple innovations which bring technology at doorsteps of the farmers at cheaper and affordable rates. This way these agritech start-ups are transforming the agripreneurship.

Businesses have never been considered friendly with agriculture in the Indian context, at least as per the traditional folklores. We have been listening to stories and watching movies since our childhood about some business entity or individual usurping farmers' land or exploiting them in the name of helping them in their agriculture. This psyche runs deep inside our Indian perception of businesses vis-a-vis agriculture and farmers. So, when the success of agripreneurship in India is measured against their numbers, investment and intervention, it may come as surprise for many. It has developed in many stages though. After the Green Revolution was launched in 1965, huge amounts of inputs like fertilisers, pesticides, seeds, etc. were needed by the farmers and corporates sensed a big business opportunity in Indian agriculture. In later phases, various domestic and multinational companies producing all sorts of inputs as well as agri machines ventured into the sector.

Agripreneurship is not a new thing for India. But when we think of the expansion of entrepreneurship in agriculture in terms of reach and impact, a renewed interest of young entrepreneurs can easily be noticed in recent times which has given birth to hundreds of agri start-ups, especially after 2014. With special focus on agri marketing and use of technology in agriculture by the Government of India, the sector witnessed a sudden surge of small agri enterprises. Number of agritech start-ups which were 43 in 2013, swelled to 1,300 by April 2022.

These agritech start-ups are very different in their nature of business when compared to the mammoth business entities that have been serving so far. They don't only provide goods and services to the farmers but also create a bonding with them. This is the new business model that the agri start-ups have introduced. Extension services are part and parcel of their business strategy. They not only sell their goods and services to farmers but create value for them by making the farmers partners in their business.

The information technology revolution in India, which already has penetrated through villages, is playing a vital role in facilitating the rural youth to explore the world in the quest to find new ways to enrich their cultivation practices; but this is just a start. By 2021, the smartphone penetration in India was 35.4 percent as against 66 percent in China and 82.2 percent in US. A report by Deloitte—2022 Global TMT (Technology, Media and Entertainment, Telecom) has predicted the total number of smartphone users in India to increase by 30 percent to reach 1 billion by 2026 from 750 million in 2021. Moreover, the internet users are also on rise in rural India. The growth of internet usage in India is being driven by rural India as the number of internet users has grown to 351 million in 2021, compared with 341 million in urban India, states a report by the Internet and Mobile Association of India (IAMAI)-Kantar, based on ICUBE 2021. This speaks about the potential of internet and smartphone based businesses in rural India.

The other side of the story includes increasing income levels of Indians, expanding middle class base, changing food habits and increasing focus on health and wellness which has created a large scale demand of quality agri products and promises a premium pricing for such products. As the agrarian community has started understanding the power of technology in all walks of the field ranging from pre-sowing preparations up to efficient marketing of the crop, this has created a huge gap in demand and supply of technology and modern tools in rural India. This is creating ample opportunities for businesses in agri related activities which eventually has triggered a rush of both talent and funds in agri businesses. In this context, the Indian agricultural landscape has emerged as a great world of possibilities for entrepreneurship. Let's understand this part of the story through some data crunching.

According to a study by India Brand Equity Foundation, the investments and growth phase for agritech start-ups started in 2019 and India has received a total funding of USD 1.6 billion in these entities till 2021. Agritech funding stood at USD 245.2 million in 2019 which increased at a whopping 90 percent CAGR to USD 889 million as of 2021. Around USD 305 million out of the USD 1.6 billion funding was directed towards market linkage segment, which includes the setting up of digital marketplace for agri inputs. The external funding has jumped exponentially from USD 1.1 million to USD 889 million in the period of 2014 to 2021. In a report, EY predicts Indian agritech market to grow at around USD 24 billion by 2025 whereas Bain & Company projects it to be around USD 30-35 billion by the same time. The fact that India is third in the ranking of receiving funds for agritech start-ups (according to a report by Bain & Company) shows the potential the world sees in this sector.

The agri start-ups have basically emerged into five categories.

1. Market linkage and supply chain
2. Farm Inputs
3. Precision agriculture and farm management
4. Farming as a Service (FaaS)
5. Financial Services.

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Through them, the farmers are being introduced to the new agri practices and are getting exposure to the tools in a way they never were earlier. To take more and more farmers in their folds, these start-ups are leading multiple innovations which bring technology at doorsteps of the farmers at cheaper and affordable rates. This way these agritech start-ups are transforming the agripreneurship. Let's dive deeper to understand how this transformation is taking place and changing the face of Indian agriculture.

Bringing Technology to the Fields

Using inputs in the fields might seem the most basic agri practice which farmers have been doing for hundreds of years. But the truth is that most of the farmers get it wrong. They seldom have any idea about which fertiliser to be used at what time and in what quantity, which pesticide to be used for what reason and how much, which seed to be used for exactly what kind of soil and water availability, etc. Till some years ago, farmers had nowhere to go other than Krishi Vigyan Kendra (KVKs) or agri universities to find the solutions for these problems. The corporates manufacturing and selling these input brands focussed only on their distribution and sales network. But this started changing with the agri start-ups coming in the picture. Dozens of such companies are helping thousands of farmers to solve the problem of timing and quantity of using these inputs by geo-tagging and satellite-mapping of their small fields. By deploying technology at a very affordable prices, these companies analyse the air vapour arising from these fields to know the exact level of various nutrients in the soil. Sitting in their offices, they watch the vapours in different colours. These colours represent different nutrients and show if any particular element is deficient. On the basis of this analysis, the farmers get to know what fertiliser they need to use and in what quantity.

Vertical farming, automation and robotics, livestock technology, modern greenhouse practice, precision farming, artificial intelligence, blockchain and drone farming are some of the prominent technologies that are transforming today's agriculture. These technologies are very sophisticated and come at a hefty price. But these agritech start-ups are taking it to the farmers' doorstep at affordable prices. Take a look on these technologies and their impacts:

Vertical Farming: India is a country of small and marginal farmers. Around 86 percent of the total farmers have either 5 acres of land or less. This comes as a major challenge when increase in farmers' income is targeted for the reason that with traditional methods of cultivation and crops, a farmer can normally earn Rs. 15,000-20,000 per acre per crop season. So, his total income for the year doesn't get above Rs. 1 lakh from 2.5-3 acres of land in normal circumstances, if we take two crop seasons into account. And if it is doubled, even then the household income can reach only Rs. 2 lakh per annum which translates to around Rs. 16,000 per month. Not sufficient for any household of 4-5 members. Vertical farming may be the solution of this problem as this technology facilitates farmers to cultivate 4-5 times more crops on a single piece of land. This is called four-level or five-level cultivation in which different types of crops are selected on the basis of their place of fruiting. Apart from increasing income with a limited portion of land, the relevancy of vertical farming has shot up multi-fold on its efficiency to save water. Water consumption in vertical farming, for instance, can be reduced by 95 percent. This could prove crucial in a country like India, where 84 percent of its total available water goes for irrigation purposes. In addition, India has a history of severe droughts that have been attributed to a drop in agricultural production of 20-40 percent.

Hydroponics, aquaponics and aeroponics are also part of this technology where the necessary nutrients are supplied directly from water or air. The most important aspect of these vertical farming technologies is that they may help people grow vegetables in the balconies or on their terrace. Also, people may grow live greeneries in their drawing room. According to the National Census of 2011, more than 377 million Indians (31.16 percent) live in urban areas, and the number is expected to increase. In densely populated cities like Delhi and Mumbai, vertical farms can provide fresh vegetables, herbs, and fruits all year round, alleviating some of the stress of conventional agriculture. An interesting estimate to this effect is that a 30-floor building can produce the equivalent of 2,400 acres of horizontal farming.

Urban Kisaan, Urban Green Fate (UGF) Farms, Triton Foodworks, 365Dfarms are some start-ups which are offering very unique solutions. While Urban Kisaan boasts of producing 30 times more produce as compared to the traditional farming even with 95 percent less water, Triton Foodworks owns and operates a staggering 1,50,000 square feet of vertical farms in Northern India with over 20 crop types, including strawberries, tomatoes, coriander, broccoli, microgreens, cherry tomatoes, leafy greens, bell peppers, cucumbers, and oregano. UGF Farms specialises in micro farming and produces zero carbon footprint crops such as leafy greens and microgreens.

AI Farming and Precision Farming: Although both these technologies are different, the goal is same. To use the resources including land, water, labour and other resources to the optimum level for decreasing the cost and increasing the production. These companies help farmers in getting weather forecasts beforehand based on real-time data to make arrangements. They use Artificial Intelligence (AI) for increasing crop yield, control pests, monitor soil. Cropin, Fasal, Intello Labs, Dwara E-Registry, SatSure, AgNext, ReshaMandi and DeHaat are some notable start-ups that are making their mark in AI based and precision farming. Cropin's SmartFarm Plus digitises farm data through third-party ERP (Enterprise Resource Planning) solutions and satellite-based meteorological data, drones, and other IoT (Internet of Things) devices. Fasal provides crop specific actionable guidelines on the basis of on-farm sensors and machine learning algorithms. Intello Labs and DeHaat also use various AI technologies to help farmers beat the challenges of agriculture.

Robotics and Drone Technology: The major problems of Indian agriculture today include lack of awareness among farmers about using right quantity of input at right time and lack of man power. Using pesticides manually in open atmosphere is hazardous for the health of farmers and dozens of incidents have been reported from across India where farmers died while spreading chemicals in their fields. Lakhs or may be crores suffer from serious respiratory problems which is not even registered as problems created by their farming practices. Apart from farmers' health, traditional ways of using pesticides and fertilisers are hazardous for soil health and ground water too as use of surplus inputs directly go to soil and ground water to contaminate them. Using robotics and drone technology in agriculture may easily save us from these hazards. They increase efficiency. TartanSense, Blue River Technology, Precision Hawk, Ibex Automation, TRITHI Robotics etc. are some most promising robotics and drone agriculture start-ups who are changing the way cultivation has been done over the centuries.

Agri Fintech Platform

Arranging funds at the right point of time is key to success in agriculture. In a time when agriculture has taken a huge leap in terms of technology and mechanisation, no farmer or farmer group can afford to lag behind on using them in their favour. Even in basic traditional cultivation practices, farmers need funds for purchasing seeds, tilling their fields, arranging for irrigation and buying right mix of fertilisers and pesticides. After harvesting, to save themselves from distress sale, they need funds to store their crop, to pay for transportation and warehouse rents. That is where the farmers get trapped in the vicious loan cycles by local moneylenders because regulated banking system normally is not very enthusiastic to serve them for the lack of fulfilling documentation needs by these farmers. Even the Reserve Bank of India (RBI) data says that only 41 percent of the small and marginal farmers are covered by public and private banks. Agrifintech platforms play an important role in filling the gap. Samunnati, Jai Kisan, FarMart, Arya.ag etc. are some prominent fintech agri start-ups. These companies are providing value chain finance, financial services, agricultural finance, market linkages and also crop insurance. Moreover these companies don't turn their back on farmers after disbursing loans. Rather they work with these farmers helping and suggesting them on various farming aspects.

Organic Farming

Organic farming is fast becoming the flavour of the season. Especially after the Government of India has officially started giving thrust on organic and natural farming, exponential growth potential has started unravelling. But growth of organic farming beyond a level needs more than zeal and goodwill. Lakhs of individual farmers are already following organic cultivation, but it has only been on individual basis till now. To escalate it to mass scale, a well-structured industrial mechanism must be developed to ensure an authentic quality of bio-fertilisers, bio-pesticides, vermi-compost, natural compost, *jeevamrit*, etc. on affordable rates to crores of farmers across the country. Agri start-ups are playing this role very efficiently. UGF Farms, Pindfresh, Growing Greens, Herbivore Farms, Homecrop, iKheti, Urban Kisaan, etc. are some of such start-ups working to popularise organic farming with their innovative solutions.

Livestock Farming Technology

Livestock management includes dairy, poultry,

fishery, shrimp farming, etc. These are called allied sectors which are not agri, in strict sense, but are agri based and normally farmers only do these activities on smaller scales to increase their income level. They have gathered huge importance in recent years due to various government plans targeting the development of these sectors. In fact, according to a communication released by PIB last year, "Livestock Sector in our country has been growing at a Compound Annual Growth Rate (CAGR) of 8.15 percent (at constant prices) from 2014-15 to 2019-20. Milk production, Egg Production and Meat Production in the country are growing at compound annual growth rate of 6.28 percent, 7.82 percent and 5.15 percent respectively from 2014-15 to 2019-20." This super growth rate is in stark contrast with that of agriculture which had been hovering around 1-3 percent during the stated period.

There are scores of start-ups who help farmers in setting up these businesses apart from providing inputs and creating infrastructure for them. In dairy, Bhairaj Organics Pvt. Ltd., Country Delight, Stellapps, Milk Mantra, Milkbasket, Puresh Daily, Whyte Farms etc. are some of the top start-ups, while Statlogic, Marsco, HealVenture Biosciences LLP, PakshiMitra, AquaBio Solutions, Dr.Pashu Technologies, etc. are among some top start-ups who are providing solutions ranging from monitoring livestock health to waste reduction and transformation of waste into valuable products.

There could be no debate about the transformation that these agri start-ups are bringing to agriculture. But the remarkable thing is that this transformation is not happening only in terms of yield or farming practices only but is taking place by indulging the farmers as partners and not just a tool to make more profits.

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Artificial Intelligence in Agripreneurship

Irtif Lone

The need to increase the agricultural production has become immense as the population is rising at a fast pace globally. Today, while the technology plays an important role in all the aspects of life, it has made significant inroads into the field of agriculture. We have seen the growth of start-ups particularly in this field, which is not only helping to increase the production but also the efficiency of even the small land holding farmers. Artificial Intelligence as a technology is still developing and a great future can be seen ahead, if the utilisation of this technology and many related technologies is put to use. The use of pesticides and fertilisers can also decrease with the help of this technology. Therefore, the need to strengthen the technology and make it affordable for the farmers, even with small land holdings will be a game changer and ultimately lead to sustainability.

The world's population is assumed to be nearly 10 billion by 2050, boosting agricultural order in a situation of humble financial development by somewhere in the range of 50 percent contrasted with 2013. (FAO, 2017).

Agriculture, though a gradual process, has been an important factor in the growth of civilisations. Humanity learned the art of cultivation long ago leading to the settled life based on farming and the development of civilisations thereof. Through agriculture, surplus food was produced and stored for consumption during lean periods, which eventually facilitated the nomadic communities to settle permanently close to their land. This led to the creation of cities and new economies.

However, the progress and use of technology in agriculture-related fields were slow. It was only in the last century that technological interventions sped up and multiplied production in this field. But

even then, agriculture remains one of the world's most pressing problems today. The increase in population has led to an increased demand for food. It is believed that 70 percent more food would need to be produced to meet the demands. Therefore, a pressing need to find new ways to sustainably raise agricultural output, strengthen the international food supply system, cut down on food waste, and feed everyone hungry or malnourished has to be on the top of the priority list. To make our food and agricultural systems more sustainable, resilient, and inclusive, technological interventions have become imperative. The need for sustainable agriculture techniques and food systems to be undertaken holistically and integrated has become immensely important.

The increase in population is one of the major issues at hand contributing to the inequitable access to food. The rise in population is particularly taking place in countries where the food scarcity is already an issue. Shipping of surplus food cannot be a long-term solution, particularly for the countries which are comparatively poor. Therefore, the advancement of technology and particularly the use of this technology in countries across the globe to sustain and provide food security are imperative. These technological advances in agriculture enable countries to generate higher quality food and higher yields and significantly reduce the need for both chemicals and trade.

In India, agriculture has been and will continue to be the bedrock of the economy. It also accounts for 18-20 percent of the nation’s GDP and about 11 percent of its exports. India has the second-largest arable land base and gross irrigated area. Major agricultural products include rice, wheat, cotton, oilseeds, jute, tea, sugarcane, milk, and potatoes. More than 60 percent of the country's population, several million small farming households, rely on agriculture as a primary income source and land remains the key asset for livelihood stability.

From the creation of jobs to its contribution to national income, agriculture is vital. It contributes significantly to the economic success of industrialised nations and also plays an important role in the economies of emerging nations. The expansion of agriculture has led to a substantial rise in the per capita income of rural communities. Therefore, a stronger emphasis on the agriculture sector would be reasonable and appropriate. For nations like India, the agricultural sector contributes 18 percent of the gross domestic product and employs 50 percent of the labour force. Development in the agricultural sector will stimulate rural development, leading to rural transformation and, ultimately, structural transformation.

In a recent discussion paper, NITI Aayog sees AI solutions critical for industries, including agriculture. In agriculture, AI machines are able to give farmers information on soil quality and other information like when to sow, where to apply herbicide, and where to anticipate insect outbreaks. India might see a farming revolution if AI systems can advise farmers on optimum practices. Scaling up such a prospective scenario to span the full value chain with considerations such as capacity growth and cost reduction poses a difficult problem.

Agriculture is a high-priority sector of the Indian economy, as 58 percent of the country's families are dependent on it in some way, either directly or indirectly, for their means of subsistence. The industry as a whole is facing a great deal of difficulty right now, which has brought it to a crucial crossroads. Even while the implementation of digital technology can help address some of the issues, the successes that have been achieved in this domain have been localised and have not been scaled up to an appropriate degree.

In recent years, technology related to artificial intelligence (AI), such as machine learning, robots, and computer vision, has been integrated into the business models of many agri-tech companies. Applications of artificial intelligence, such as using it in an alternative credit scoring or "smart" farm equipment, for example, have the potential to reduce the cost of serving smallholder farmers across the agriculture ecosystem, improve the efficient and sustainable use of resources, and overcome market asymmetries that prevent farmers from accessing regional and global value chains. In recent years, improvements in big-data analytics, increased computing power, and cloud-based storage, in addition to cost reductions in satellite imagery, remote sensors, and other related technologies, have made it possible for agri-tech

companies to use AI technologies in their products on a commercial scale.

In light of the present societal situation—declining manual labour, limited useable agronomic land, and a wider gap between total food production and the global population—scientists throughout the globe have spent years developing and improving Artificial Intelligence as one of the most plausible answers to those challenges. This is because AI corresponds to the current social situation of decreasing manual labour, limited usable agronomic land, and a greater gap between total food produced and the world population. At the beginning of this analysis, the definitions of AI are presented with the Turing Test serving as the primary example of AI. After that, two subfields that AI has been playing a significant part in are displayed. These are soil management and weed management, and after that, the Internet of Things (IoT), a valuable data processing and storage technology that has extensive use in agriculture is introduced. This analysis also highlights three significant difficulties associated with the application of AI in agricultural settings: first, the distribution of modern technology is uneven because of certain geographical, social, or political reasons, which foreshadows that the application of AI will have its limitation in certain areas; second, despite significant improvements made over the past few years to transfer AI-based machines and algorithms from control experiments to real agricultural environment requires much more studies and research, as well as the ability to handle large sets of data and to interpret them; third, there are concerns over the security of devices used to collect the data and the privacy of the data collected.

One area where AI has the potential to bring about a radical transformation in how farming is seen is in cross-disciplinary applications. With the help of AI, farmers will be able to get more done in less time while simultaneously boosting product quality and accelerating crop delivery to stores. Technological developments in areas such as Artificial Intelligence, Big Data, and the Internet of Things are now the primary impetuses behind the widespread adoption of digital IT solutions across all industries. Therefore, it is recommended to apply digital solutions supported by AI to improve the living conditions of the exploited farmer community while also presenting a fresh chance for businesses and entrepreneurs through the implementation of smart farms as a service.

Today, India is ranked second globally for the number of registered "agritech" start-ups. As per the community paper on Artificial Intelligence for Agriculture Innovation published World Economic Forum, "India has 3,116 registered start-ups in food and agriculture, and there has been 25-30 percent growth in this number year-on-year. Since 2014, USD 500 million has been invested in this area and rapid uptake in the last 12 months highlights the impact of emerging technologies in a post-COVID world."

Applications of IoT in Agriculture

The application of Internet of Things technology in farming has the potential to revolutionise not only human life but also life on the entire planet. Extreme weather, eroding soil, drying land, and the collapse of ecosystems are all factors that are now making food production more difficult and expensive.

The amounts of both organised and unstructured data continue to increase constantly. Evidence of this kind may be found in things like weather records, soil reports, new studies, rainfall, bug infestation, drone and camera photographs, and so on.

With all this data at their disposal, cognitive IoT can analyse it all and boost production. Intelligent data fusion uses both nearby and far away sensor technologies. High-resolution information is utilised during soil testing. In contrast to proximity sensing, which uses sensors located near the target area, remote sensing uses sensors located in the air or on satellites. Soil can then be classified according to its depth of occurrence.

In order to maximise yield, hardware solutions are combined with software and robots to apply the right amount of nourishment to each plant.

Agri Tech Startups

DeHaat: Farmers in India may take use of the comprehensive suite of agricultural services

offered by DeHaat, an online platform. DeHaat, which literally translates to "village" in Hindi, is a company that assists farmers with a few of the most significant difficulties, including the implementation of AI-enabled solutions that improve supply chain efficiency and production effectiveness in the agricultural sector. It is one of the very few companies in India that offers complete services and solutions to the agriculture sector. Additionally, it is one of the agritech industry's start-up businesses that are growing at the most rapid pace now. They are already operational in the states of Bihar, UP, Odisha, and West Bengal, and the network is comprised of more than one million farmers from those regions. On a single platform, the business with offices in Gurgaon and Patna has brought together buyers, institutional lenders, and agri-input product companies that offer their wares. In addition to this, it collaborates with more than 3,000 microentrepreneurs to provide last-mile delivery and aggregation services.

More than 650,000 farmers in the states of Bihar, UP, Jharkhand, and Odisha are said to have benefitted from DeHaat's assistance.

See Tree: See Tree was launched in 2017 to provide farmers with vital data for managing and optimising the health of their trees. The firm has created AI systems that track the health of each tree, finding failing trees and groups of healthy trees. It evaluates the impact of various farming approaches and provides actionable data on their effectiveness. In the second place, it optimises the number of fruits per tree and provides estimates just before harvest. It uses digital farm management to oversee each individual tree and continuously collect data from them. Technology advancements in aerial, ground, and boots-on-the-ground data gathering make it possible to acquire the highest quality information for use in developing the most effective strategies.

CropIn: CropIn is an India-based Agri-Tech Start-up, an intuitive, intelligent, and self-evolving technology that provides farming solutions that are future-ready for the whole agricultural industry. It provides agribusinesses with decision-making tools that promote consistency, reliability, and sustainability. CropIn is digitising every farm and data-managing the whole ecosystem by providing capabilities for live reporting, analysis, interpretation, and insights that span continents. Their smarter farming solutions are powered in real-time, allowing users to record patterns, forecast trends, and create a business plan for the future.

It constantly ensures effective operations, lower expenses, and improved visibility for your field agents. Scaling productivity through real-time actionable analytics enables farm management organisations to make strategic and timely business choices. The predictability of yield quantity and quality, coupled with reduced operational costs, increases business productivity and strengthens sustainability by meeting current Agri-needs while bolstering resources for the future through the creation of a healthy environment, economic profitability, and social and economic equity for all. It enables companies to profit from actionable information while empowering farmers through advising and alerts.

The use of new technology particularly Artificial Intelligence has paved way for the precision farming. Precision farming has become an essential component in the impending agricultural revolution, which is about to sweep the globe. The mechanisation of agriculture made it possible to multiply the production manifolds, however a few decades ago saw the beginning of another revolution, which was known as the Green Revolution. Because of the advancement of science, genetically modified newer sets of crops that are resistant to pests and use less water have been introduced. The new revolution will rely heavily on highly developed analytic skills as well as continually developing internet of things capabilities such as drones designed for precision agriculture.

This has and will continue to increase the overall agricultural production overall. However, the achievement of the best possible results requires both the careful selection of problem areas and the application of various agricultural inputs. Use of AI helps cut down on waste and also save money on labour expenses while decreasing the production costs. The utilisation of precise quantities at the appropriate times helps to cut down on waste also reducing the environmental effect.

Implementing precision agriculture successfully is not a matter of finding a rapid solution to a problem; rather, it is often a process that evolves over time and may not show instant benefits.

The use of technology is however not limited to the agriculture only but has spread its wings to the allied activities such as dairy farming. Artificial intelligence (AI) has emerged as one of the most important strategies ever developed for enhancing the genetics of farm animals. Its most prevalent use is in dairy cow breeding. The most significant advantage of AI is that it makes it possible to take full use of the tremendous potential of good sires. In 1968, artificial insemination made it possible for a single dairy sire to provide enough sperm for over 60,000 services. The use of artificial insemination protects sires from contracting contagious illnesses, which in turn lowers the likelihood that a disease would spread.

One of the start-ups in this sector Stellapps is the first company of its kind to concentrate on digitising the dairy supply chain as its primary business objective. Since its founding in 2011, it has been actively promoting the use of technology interventions in the production of milk, especially in developing nations where output per animal is low, traceability is poor, and quality is not up to standards. They have created the SmartMoo platform, which is a full stack Internet of Things solution, in order to digitalise and optimise milk production as well as milk procurement and cold chain management. The SmartMoo platform and suite of apps are now responsible for interacting with more than two billion litres of milk each and every year. Stellapps' SmartMoo IoT platform receives data from sensors that are installed into milking machines, animal wearables, milk chilling equipment, and milk procurement peripherals.

While we can't help but feel excited about the potential of AI, however the majority of farmers in India have relatively tiny landholdings, and as a result, they are unable to afford the cost of purchasing costly technologies and other necessities. This might present a significant challenge to the adoption of technology. It has to be relevant, inexpensive, accessible, attainable, and sustainable.

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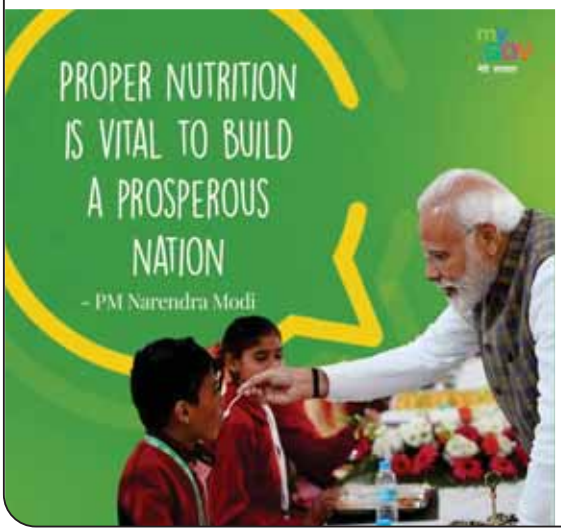
BENEFITS OF BREAST MILK



Agripreneurship and Farm Prosperity

Rajiv Theodore

It is the beginning of a new era in agriculture with the meteoric rise of Agricultural Entrepreneurship or Agripreneurship promising to pump adrenalin into farming and usher in prosperity. Agripreneurship is considered as a one-stop solution for many economic problems like poverty, urbanisation, unemployment and economic development. Agriculture with its diversity is now seen as an enterprise with good profit which is possible by changing the way it has been practiced. The major concern is proper utilisation of the existing resources. Women farmers need to be made aware, motivated, and trained about these diverse agripreneurial opportunities to adopt them as their alternate livelihood options.

Winds of transition are sweeping India's agriculture sector. Once seen as a low-tech industry with limited dynamics, the agriculture sector is today adapting to the market enhanced ecological regulations, new necessities for product quality, chain management, food security, sustainability, and so on. These alterations have cleared the way for new participators, innovations, and portfolio entrepreneurships—in short a different rhythm is being played out in India's agriculture sector once known for its traditional biases amidst a laid back fervour. It is the beginning of a new era in agriculture with the meteoric rise of Agricultural Entrepreneurship or Agripreneurship promising to pump adrenalin into farming and usher in prosperity.

Agripreneurship plays various roles in the growth and development of the national economy. Entrepreneurship development increases the income level and employment opportunities in rural as well as urban areas. Most importantly, agripreneurship helps induce productivity gains of smallholder farmers while integrating them into local, national and international markets. Finally, agripreneurship is not only an opportunity but

also a necessity for improving the production and profitability of the agriculture sector. Increasing Indian farmers' income wouldn't be possible without an innovative and vibrant food and agriculture industrial complex. Entrepreneurs solving issues that both farmers and consumers face are critical in realising India's potential as a dominant food and agri player globally.

Scope of Agripreneurship

In India, these days a combination of excess technology, emergence of micro financing, liberalised government rules, awareness and training programmes on agri and allied sectors and a growing tribe of open minded qualified professionals who are looking for independent and self-employment opportunities are a sure shot recipe for the rise of agripreneurs. The country offers an enviable array of choices for such entrepreneurs that include: dairying, sericulture, goat and rabbit rearing, floriculture, fisheries, shrimp farming, sheep rearing, vegetable cultivation, nursery farming, farm forestry and so on. Other areas where opportunities exist include setting up of Agro Produce Processing Units or mills that process agriculture produces like rice and pulses; Agro Produce Manufacturing Units that produce products based on agricultural produce from raw materials or byproducts of sugar factories, bakery, straw board units etc; Agro-Inputs Manufacturing Units –that produces goods either for mechanisation like agricultural implements; Agro Service Centres –these include workshops and service centre for repairing and serving the agricultural implement used in agriculture; establishing of Agri-Enterprises like apiaries, feed processing units, seed processing units, mushroom production units, commercial vermi compost units, goat rearing farms, organic vegetable and fruits retail outlet, bamboo plantation and jatropha cultivation. For small entrepreneurs at the village level there are several opportunities in areas like biopesticides, soil amendments, biofertilisers, vermicompost, growing exotic species of vegetables, fruits, ornamentals, production of cattle feed concentrate, etc.

Rise of Agri-startups

Also, it is pertinent to include here a new breed of entrepreneurs who are changing the complexion of entrepreneurship in India—the Agri-startups. India, with around 118.7 million farmers, which accounts for more than half of its population, depends on agriculture as its primary source of income. However, the use of technology in the agricultural industry has been limited in India. As a result, the agriculture industry in India contributes merely 17-18 percent to its GDP. However, in the last couple of years, India has seen a rise in the number of agritech start-ups that are not only making technology more accessible but also helping farmers improve their lives. Some of the top agritech startups helping Indian farmers are: Ninjacart—solves the fresh agricultural produce supply chain problem for the farmers and the retailers; WayCool—uses technology to control end-to-end agriculture supply chain right from farming inputs to last-mile distribution to help the farmers to sell their produce through multiple distribution channels; AgroStar—helps farmers by providing real-time advice from experts on how to manage their crops and boost their yield; DeHaat—offers agricultural services like access to agricultural inputs like seeds and fertilisers at affordable prices, personalised assistance, soil testing, weather reports, micro-finance, and insurance; Stellapps—helps dairy farmers and cooperatives to maximise their profits by digitising and optimising milk procurement and coldchain management through its IoT-based SmartMoo platform; Bijak—enables traders and wholesalers to discover new suppliers, maintain ledgers, make payments, and access working capital through its app to scale their business; CropIn Technology—offers real-time weather updates, ability to manage farm activities, and predicts crop yields to minimise risk and yield better produce; EM3 AgriServices— helps small farmers who can’t afford to buy expensive farming technology to rent specialisation machines to boost productivity at cheaper costs; Intello Labs— uses technologies like computer vision and deep learning to help farmers, retailers and exporters to assess the quality of their fruits and vegetables. Aibono—uses soil sensors, IoT devices and imaging drones to collect farm data and transfers it onto their cloud platform which uses predictive analytics to help the farmers make smart agriculture decisions in order to increase their produce.

Some Success Stories of Agripreneurs

- Soibam S. Singh, a post graduate diploma holder in fisheries science opted for self-

employment through integrated organic fish farming instead of settling down in a job. He has done tremendous work in integrating fish farming with Piggery and Dairy farming, through which he enhanced fish production by adopting the latest scientific techniques of pisciculture. Soibam is also the Secretary of High Tech Integrated Fish Farming Society of Manipur. He has chosen conserving the rare species of Pengba fish as his Goal.

- Vijay Bharath, founder of 'Mobile Agricultural School and Services'(MASS), provides a platform to farmers of remote villages in Jharkhand and Bihar to access, understand and adopt modern methods of agriculture and use inputs which will take them one rung above on the ladder of agro-economic development. All this is done by providing services to farmers at their doorsteps in their villages, thanks to the conceptualisation and efforts put in by Bharath, an agripreneur trained at the "Society for Rural Industrialisation" Ranchi.
- Dr. Gajendrakumar Kantilal Bamania, a 33-year old Veterinary Doctor from Ahmedabad provides Cattle Artificial Insemination (AI) Programme which includes: herd testing services; supply of AI accessories like tags, sheath, gloves and other farm products; advises in selection of dairy bulls, heifers and cows; offers complete consultancy on establishment of scientific dairy farms.
- K.N. Sharma, an Agriculture Post Graduate engaged in contract farming of Gherkin crop that enables contract farmers access to technology, credit and marketing.
- Innasimuthu's Green Madurai firm is raising a wide variety of plant saplings and selling suitable bio-manure. The firm also provides consultancy on landscaping and gardening and is equipped with a soil testing lab for testing soil fertility and water quality standards.
- Haritam Horti Agri-Clinic established in Vijayawada city by R. Suresh Kumar in 2003 provides technical support to farmers of Krishna, Guntur and West Godavari districts in soil and water testing and agronomical practices besides promoting bio-pesticides at a reasonable cost.

Women in Agripreneurship

Agriculture, which provides employment to nearly 50 percent of the total population has a whopping 70 percent as women farmers. These women farmers act as primary food producers, dedicate maximum time to agriculture but remain unreported in statistics and to channelise and empower them women agripreneurship is a medium to make them self-sufficient, economically stable, independent, and socio-culturally more active. "They need to be motivated—one of the ways is by organising them into cooperatives, Self Help Groups (SHGs), providing them land ownership, attracting them towards Micro, Small and Medium sized enterprises (MSMEs) and a proactive policy to make agriculture more attractive and remunerative for them", says Dr. P. Chandra Shekara, Director General, MANAGE [National Institute of Agricultural Extension Management (MANAGE), Hyderabad—an autonomous organisation under the Ministry of Agriculture & Farmers Welfare].

Agripreneurship is considered as a one stop solution for many economic problems like poverty, urbanisation, unemployment and economic development. Agriculture with its diversity is now seen as an enterprise with good profit which is possible by changing the way it has been practiced. The major concern is proper utilisation of the existing resources. Women farmers need to be made aware, motivated and trained about these diverse agripreneurial opportunities to adopt them as their alternate livelihood options. The major opportunities in agriculture, livestock and fishery sectors are enterprises involved in production, service, input supply, processing, value addition and marketing. "Strategic implementation of gender sensitive entrepreneurial models will ultimately improve the participation of women in diversified farming with integrated approach and post-harvest activities making them self-sustainable (AatmaNirbhar)" according to Dr. Anil Kumar Director (Acting) ICAR- CIWA—(Indian Council of Agricultural Research ICAR - Central Institute for Women in Agriculture).

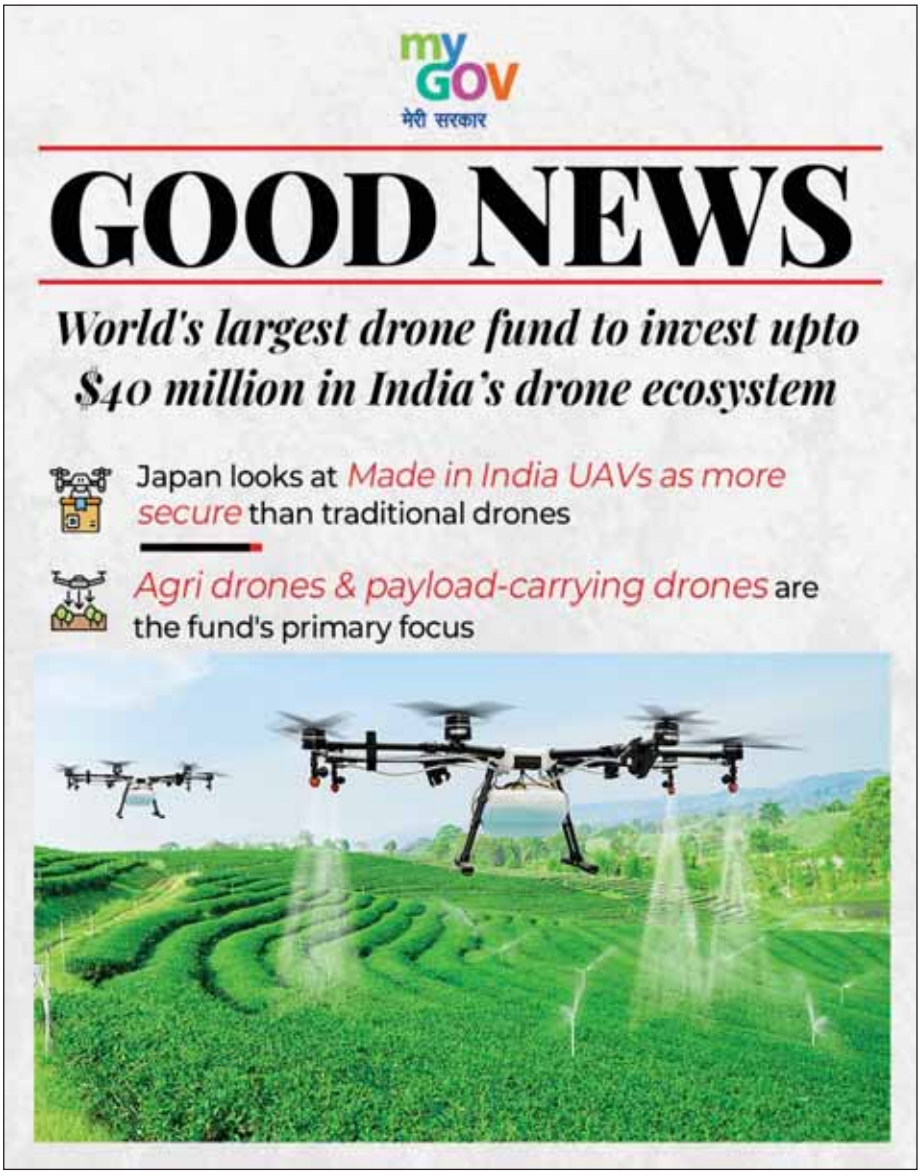
Role of Agripreneurs and Prosperity of the Farmers

Agriculture used to be treated as just an activity of land tilling and crop harvesting but spread of waste

land, depleting natural resources, ever increasing migration to urban areas, have necessitated redesigning of agricultural activities. Applying the thought and practice of entrepreneurship in the field of agriculture generates a wide range of economic benefits like – increased agri productivity, creation of new business ventures, new Jobs, innovative products and services, development of rural areas and increased wealth. Traditional farmers who are unaware of scientific agriculture and effective agri management systems are unable to cope up with delaying monsoons, drought, crop debts, fake seeds and shortage of fertiliser, as a result resort to committing suicide. The managerial, technical and innovative skills of entrepreneurship applied in the field of agriculture may yield positive results and such well-trained agripreneurs may become role models to all such disheartened farmers. Agripreneurship notable helps :

- in inducing productivity gains of smallholder farmers and integrating them into local, national and international markets.
- in reducing food costs, supply uncertainties and improving the diets of the rural and urban poor in the country.
- in generating growth, increasing and diversifying income, and providing entrepreneurial opportunities in both rural and urban areas.

In recent years, there has been a considerable emphasis on crop diversification towards horticulture (fruits, vegetables, ornamental crops, medicinal and aromatic plants, and spices), plantation crops (coconut, cashew nuts, and cocoa) and allied activities. Creation of critical infrastructure for cold storage, refrigerated transportation, rapid transit, grading, processing, packaging and quality control measures open major opportunities for investment. India is the second highest fruits and vegetables producer in the world with cold storage facilities available only for a small portion of the produce. The country is also the second highest producer of milk with a smaller cold storage and sixth largest producer of fish and fifth largest producer of eggs in the world. Investments in cold chains requiring storing surplus of meat and poultry products throws huge opportunities for investors and entrepreneurs. Thus, Indian agriculture needs to propel its agribusiness through agripreneurship development.



India needs agripreneurship to generate innovative solutions to some of the critical agricultural issues such as precision farming techniques to increase crops productivity. Secondly, the input costs can be minimised by incorporating data-driven decision making and streamlining efficiency in the farm supply chain. Thirdly, the colossal crop wastages must be reduced through new entrepreneurial ventures that can improve the supply chain infrastructure and bring in innovative storage facilities as mentioned earlier. Presently, crops worth USD14 billion are wasted each year in India.

Indian agripreneurs could adopt some of the successful tech ventures in agriculture like integrated Remote Sensing (that can provide bio-geophysical data for agricultural crop monitoring and agromet advisory services), Geographic Information System (GIS), Internet of Things. IoT-based smart farming is a system built for monitoring crop field with the help of sensors that provide data on temperature, soil moisture, light and humidity. Such measures will help in monitoring crop health, automating irrigation systems, etc., and applying analytics can improve farm productivity, minimise farm wastage and thereby increase farmers' income. These technologies can also be used to map the cropping pattern, cropping intensity, drought assessment and better understand the agronomics of crops.

Agripreneurship thus transforms agriculture into an attractive and profitable venture as it is evident that there is a tremendous scope for agripreneurship in India. It can be tapped via effective management of agri elements such as – soil, seed, water and market needs. The agriculture sector has a large potential to contribute to the national income while at the same time providing direct employment and income to the numerically larger and vulnerable section of the society—in this regard agripreneurship is not only an opportunity but also a necessity for improving the production and profitability in agriculture and allied sector.

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Organic Farming

Dr. Mahi Pal

Since organic farming not only adequately addresses issues of soil, ecology and human health but also gives impetus to sustainable agriculture, it received the attention of the Government of India. In view of this, in 2005, Organic Farming Policy was introduced by the Government of India. The Organic Farming Policy intends to promote technically sound, economically viable, environmentally non-degrading, and socially acceptable use of natural resources for organic farming.

In spite of all odds, registering 3.6 percent growth rate of agriculture and allied sectors (crops, livestock, forestry and logging and fishing and aquaculture) in 2020-21 is a significant achievement. But at the same time, other realities may be kept in view. For instance, the growth rate of agriculture and allied sectors which was 6.8 percent in 2016-17 came down to 3.6 per cent within four years in 2020-21. Higher growth in the agriculture and allied sector could happen due to buoyancy in livestock and fisheries sub-sectors. For example, in 2018-19 the growth of the sector as a whole was buoyed due the performance of livestock and fisheries, otherwise Gross Value Added (GVA) for crops was -1.6 percent (Economic Survey, 2021-22). Formation of the Gross Capital Formation is also an issue. For instance, public investment has remained stable between 2-3 percent from 2011-12 to 2019-20 and the private investment truncated to 14.30 percent in 2019-20 from 15.90 percent in 2011-12 (ibid). The budget allocation for the current year (2022-23) of this sector vis-à-vis crop sector may also be looked into. The allocation for the fisheries, animal husbandry and dairying sectors have increased by Rs. 1,714 crore (40 percent) in 2022-23(BE) as compared to 2021-22(BE). Conversely, allocation for the crop sector have been reduced by Rs.2,049 crore (4 percent) in BE(2022-23) as compared to 2021-22(BE).

In this background where crop sub-sector is in fix, the idea of organic farming and its sustenance are to be examined from the point of view of the benefits and challenges and how to address the challenges. Broadly, organic farming or natural farming denotes farming without using chemical fertilisers, insecticides and pesticides.

Meaning and Concept of Organic Farming

There are many cheers for Indian agriculture during past 75 years. Food grain production which was 50.82 million tonnes in 1950-51 has ascended to 295.5 million tonnes in 2019-20 and to 308.6 million tonnes in 2020-21. Green Revolution and other research and development in the field of crops cultivation played an important role in this regard. However, indiscriminate and excessive use of chemicals and fertilisers coupled with insecticides and pesticides has put a question mark on the sustainable agriculture. This is not only spoiling soil but also jeopardising future of coming generation. Lives of children has been put into peril. For instance, a Report of the Standing Committee of the Parliament (2016) highlighted the problem by its findings as "A study of Haryana on 283 pregnant women has shown 65 percent of have Zinc deficiency (SCP,p.22)". Thus in order to provide better health to humans, animals and finally to entire ecosystem, we should move towards integrated management system of agriculture. The Standing Committee of the Parliament defined the organic farming in these words: "Organic Farming is based upon sound agronomic practices, crop rotation, use of farm land manure for bio-fertilisers and bio-pesticides for enhancing soil productivity and use of natural methods and bio pesticides to control pests and weeds are important ways to avoid harmful impacts associated with chemical fertilisers and pesticides on agriculture and allied sectors in the country" (ibid, p.42). Since organic farming not only adequately addresses issues of soil, ecology and human health but also gives impetus to sustainable agriculture, it received the attention of the Government of India. In view of this, in 2005, Organic Farming Policy was introduced by the Government of India. The Organic Farming Policy intends to promote technically sound, economically viable, environmentally non-degrading, and socially acceptable use of natural resources for organic farming. The Policy seeks to actualise the area and crop potential for organic farming, sustaining soil fertility, conserving bio-resources, strengthening rural economy, promoting value addition, accelerating the growth of agro-business and securing a fair standard of living for the farmers and agricultural workers and their families. On the basis of above premises, objectives of the Organic Farming Policy are given in box-1.

Box-1

Objectives of the Organic Farming Policy, 2005

- Maintenance of soil fertility by encouraging and enhancing the biological cycle within farming systems involving micro-organisms, soil flora and fauna, plants and animals
- Identification of areas and crops suitable for organic farming
- Development of organic package of practices
- Setting up of model organic farms for getting seed material for organic cultivation.
- Assurance of production and supply of quality organic input
- Adoption of biological methods for pest and disease control
- Adoption of biological and mechanical methods for weed management
- Harnessing of traditional and indigenous knowledge relating to organic farming
- Creation of awareness among farmers towards organic agriculture
- Development of domestic market for organic produce
- Improvement in farmers' income through quality produce
- Generation of rural employment opportunities
- Simplification of certification system and recognition of adequate certification agencies, especially for domestic market
- Promotion of group certification
- Maintaining a diversity of plant and animal species as a basis for ecological balance and economic stability
- Improvement in conditions of livestock that allow them to perform all aspects of their innate behaviour
- Development of regulatory mechanism for various organic inputs and produce.

Source: Organic Farming Policy, 2005, Ministry of Agriculture, Department of Agriculture and Cooperation, p.2

Evidence-based Research on the Practices of Organic Farming and Outcomes

The Indian Council of Agricultural Research (ICAR) through the Institute of Farming System Research (IIFSR), Modipuram, Meerut District, UP conducted studies on the impact of organic approach, integrated approach, and inorganic approach on yield, soil and quality of food. The study was done

during 2004-05 to 2019 at 13 centres in 12 states. Presently, going on at 20 centres in 16 states in five ecosystems namely arid, semi-arid, humid, sub-humid and coastal. The approaches and methods adopted in the study given in Table-1, which are self-explanatory.

Table -1 : Approaches and Methods of Studying Organic/Natural Farming

Three Approaches	Six Methods
Organic approach (ORG)	Organic method (OF), with 100 percent of the nutrients from organic sources and complete organic management
	Organic innovative method (OIN), with 75 percent of the nutrients from organic sources + innovative inputs 25 precent [any two of cow urine (10 percent), panchgavya, plant growth-promoting rhizobacteria and vermiwash (10 percent)]
Integrated approach (INT)	Integrated method (IN75) - with 75 percent organic + 25 percent inorganic nutrients and management
	Integrated method (IN50) - with 50 percent organic + 50 percent inorganic nutrients and management
Inorganic approach (INO)	Inorganic method (IOF), with 100 percent inorganic nutrients and management
	State recommended (SR) method or farmers package (choice given to centres)

Source: Presentation made by Abhay Kumar Singh , 'Centre for Science and Environment' on the theme "Evidence(2004-20) on holistic Benefits of Organic and natural Farming in India" in a webinar organised by AGRASRI, Tirupati on February 02, 2022.

Findings of the Study are summarised below:

i. Net returns are highest in 64 percent with organic approach at 12 centres, 11 percent with integrated approach at four centres and 25 percent with inorganic approach at five centres.

ii. The five year mean net returns with organic approach are higher than inorganic approach in 67 percent cropping systems.

iii. The long-term trends revealed that net returns are much better with organic approach than inorganic approach.

iv. Organic/Natural farming increase soil health and fertility.

v. Organic farming improves sustainability index and increases carbon sequestration and overall resilience.

vi. Higher yield is produced with organic/natural farming.

vii. Cost of inputs is comparatively low in organic farming as these are locally and naturally available.

It is clear from the findings of a comprehensive study that organic/natural farming is far better than the inorganic farming because inputs costs are less in organic than that of inorganic farming as they are locally and naturally available.

Programmes and Policies for Organic Farming

As mentioned above after the adverse impact of Green Revolution, agro-ecological issues and concerns started surfacing because of the use of chemicals and fertilisers in farming. In the year 2005, the Organic Farming Policy was also announced but put into practice half-heartedly as its implementation reveals. However, toward this end, in 2015-16, Paramparagat Krishi Vikas Yojana (PKVY) was initiated, which has been implemented on a very limited scale. Two more small components of the sustainable agriculture have also been initiated which are known as Mission Organic Value Chain Development for North-eastern Region and Integrated Nutrient Management of Organic Farming. A review of these is given as follows.

Paramparagat Krishi Vikas Yojana (PKVY)

PKVY was implemented as Centrally Sponsored Scheme initially for three years (2015-2017) but subsequently revised for the next 3 years. The Scheme is implemented in a cluster fashion in size of 1000 ha in plain areas and 500 ha in hilly areas for better facilitation and marketing of organic produces. All farmers are eligible but within a group, a farmer can avail benefit up to a maximum of 2 ha. and the limit of assistance is Rs.50,000 per ha, out of which 62 percent i.e., Rs. 31,000 is given as incentive to a farmer for organic conversion, organic inputs, on farm inputs, production infrastructure, etc. The broad components of the scheme are (i) implementation, handholding, capacity building and certification (ii) Participatory Guarantee System Certification (iii) Incentive to farmers (iv) Value addition, marketing and publicity.

Financial Progress under PKVY

The financial progress of the scheme from 2015-16 to 2020-21 has been given in Table 2. It shows that during last six years BE was Rs. 2,132 crore, of which Rs. 1,363.61 crore has been spent.

In six years, maximum funds were used in 2018-19 (91.52 percent) followed by 2019-20 (87.28 percent) and 2015-16 (75.40 percent).

Table-2 : Financial Status of PKVY

(*Rs in crore*)

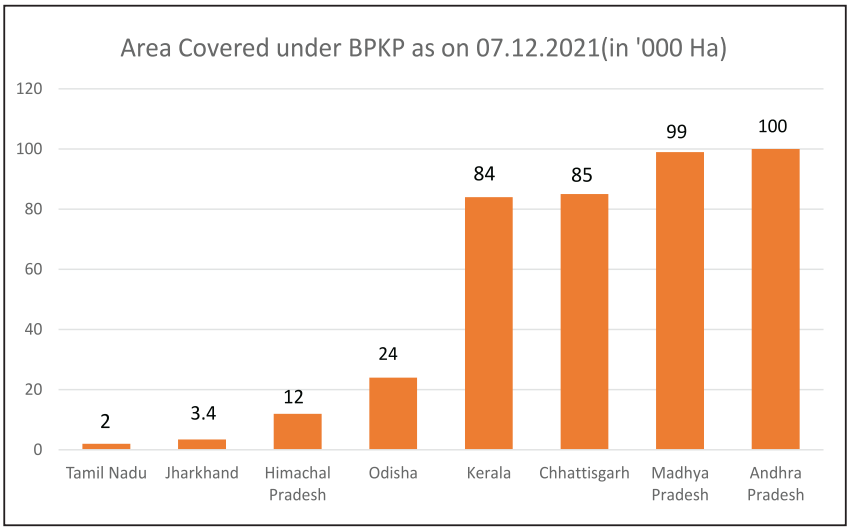
Year	Budget Estimate (BE)	Revised Estimate (RE)	Release
2015-16	300.00	249.60	226.19 (75.40%)
2016-17	297.00	165.96	152.82 (51.45%)
2017-18	350.00	250.00	203.46 (58.13%)
2018-19	360.00	335.91	329.46 (91.52%)
2019-20	325.00	299.36	283.67 (87.28%)
2020-21	500.00	-	168.01 (33.60%)
Total	2132.00	1300.83	1363.61(64.00%)

Source: Annual Report 2020-21, Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture and Farmers Welfare, p.95

Bharatiya Prakritik Krishi Paddhati (BPKP)

BPKP or Natural farming has been designed to enhance farmers' profitability, access to quality food and restoration of soil fertility and farm land ecosystem as well as employment and contribute to rural development (Economic Survey, 2021-22, p.250). BPKP is a sub-mission under the PKVY which falls within umbrella of the National Mission on Sustainable Agriculture. It aims at promoting traditional indigenous practices, which give freedom to farmers from externally purchased inputs. It focuses on on-farm biomass recycling with major stress on biomass mulching; use of cow dung-urine formulation and exclusion of all synthetic chemical inputs either directly or indirectly. The outlay of the scheme is Rs. 4,635.69 crore for the period of six years from 2019-2020 to 2024-25 (NITI Aayog Website naturalfarming.niti.gov.in/bharatiya-prakritik-krishi-paddhati-bpkp/). Under BPKP, financial assistance of Rs.12,200 per ha for three years is provided for cluster formation, capacity building and continuous handholding by trained personnel, certification and residue analysis with a vision of covering 12 lakh ha. in 600 major blocks. Although this scheme was launched in 2019-20, only eight states namely Andhra Pradesh, Chattisgarh, Kerala, Himachal Pradesh, Madhya Pradesh, Odisha, Tamil Nadu, Jharkhand have implemented it. Among these states, in four states namely Tamil Nadu, Jharkhand, Himachal Pradesh and Odisha progress is shown in the figure -1. It appears that lack of awareness among farmers and their lack of interest are the causes of such dismal progress of the scheme. Perhaps, where civil society presence in the form of SHGs is in existence, the scheme might have progressed well there.

Figure 1: Area Covered under BPKP as on 07.12.2021 (in '000)



Source: Economic Survey 2021-22, Ministry of Finance

In the current year Budget (2022-23), schemes of agriculture like Pradhan Mantri Krishi Sinchai Yojana (PMKSY), Paramparagat Krishi Vikas Yojana (PKVY), National Project on Soil and Health Fertility, Rainfed Area Development and Climate Change, Sub-Mission on Agriculture Mechanisation, including Management of Crop Residues, etc. have been subsumed in Rashtriya Krishi Vikas Yojana (RKVY). As PKVY and other schemes related to organic farming have been merged in RKVY, it is not clear at present how much budget has been provided for the PKVY scheme for 2022-23.

Mission Organic Value Chain Development for North Eastern Region (MOVCDNER)

It is a Central Sector Scheme with an outlay of Rs. 400 crores. Under the scheme, 169 Farmer Producer Companies have been formed and registered including 83,096 farmers and 79,445 ha area. In NE States organic farming progressed better as evident from the fact that out of total RE funds available (Rs. 667.93 crore), about 90 percent (Rs. 593.09 crore) was spent indicating better outcomes (Annual Report 2020-21, MoA&FW, pp 101-102).

Integrated Nutrition Management (INM) and Organic Farming

The INM and organic farming financial assistance is provided for mechanistion, promotion of bio-fertiliser testing laboratories, support of research, and establishing teaching institute (ibid, p.92).

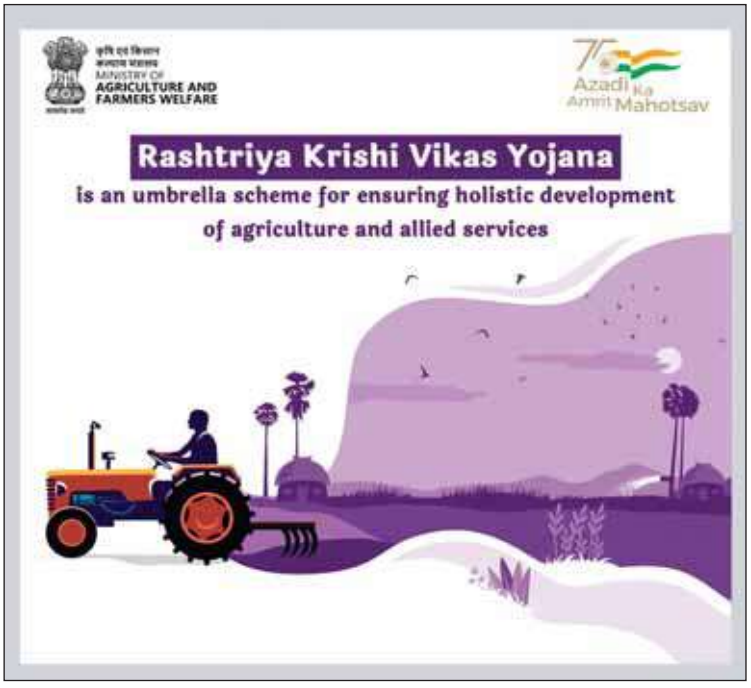
DAY-NRLM and Organic Farming

Organic farming is being implemented with the women farmers of the Self-Help Groups (SHGs) under DAY-NRLM. It has strengthened livelihoods of women. Till December 2021, about 2,41,961 SHG of women have been organised into 23,692 Local Groups. Under value chain development, promotion of Producers Groups and Producers Enterprises has been initiated. In this regard, upto December, 2021, 183 numbers of producers groups have been promoted by the 16 State level-DAY-NRLM (Annual Report, 2021-22, MoRD).

Way forward

Seeing the seriousness of deteriorated condition of soil and its impact on nutritional level in grains and non-grain produces, Organic Farming policy was announced about two decades ago and subsequently, schemes for organic farming have also been announced by the Government of India. Food grains are essential for the growing population in the country. Completely banking upon on organic or natural farming is not an appropriate solution. The Parliament Committee rightly observed that "fertilizers are going to be crucial input in future as well, given the increasing food demands of growing population and insufficient availability of alternative nutrient sources. The country will require about 300 MT of food grains by 2025 to feed its teeming millions. This would necessitate use of about 45 MT of nutrients. While about 6-8 MT of nutrients could be supplied through existing organic sources, the rest has to come from chemical fertilizers" (Standing Committee on Agriculture, 2015-16, p.11). So, following suggestions are offered in this regard.

1. Awareness building about the benefits of organic farming may be done among different stakeholders. Extension component of agricultural development has to be very effective.
2. Continuous training, capacity building and handholding support to farmers is indispensable for this venture.



3. Those farmers who are motivated to shift from non-organic to organic should be adequately compensated to meet out their yield gap.

4. Marketing facilities should be arranged at local level where farmers could sell their produces without any problem. There should be separate counters for organic produces.

5. Value addition in the organic produces should also be taken up at local level. For this, effective convergence of various schemes at decentralised level should be operationalised.

6. The shift of agriculture from inorganic to organic should be a component of larger strategy of betterment of health. People have to be communicated with effective IEC (Information, Education and Communications) that grains lack organic micronutrients is like 'hidden hunger'. Such IEC package will have impact on masses.

Conclusion

The study conducted by the ICAR-Institute of Farming System Research revealed that organic/ natural farming is better than inorganic farming. This finding of the study must be like a household name among farmers. But rarely farmers are aware about it. An effective IEC strategy is required for the propagation of organic farming in the countryside. In philosophical terms organic farming denotes 'farming in spirits of organic relationship between/ amongst soil, water, plants'. The spirit of organism has to be propagated in systematic and sustained basis for better outcomes.

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Kurukshetra Logo

A new logo of Kurukshetra is being used from this issue of the journal. The logo has been designed keeping in mind the growth and development in different sectors. The symbol of plants in the logo depicts agriculture and

the growth in the sector while the WiFi depicts information technology and data collection. The gear portrays industrial growth and production. We congratulate the winner for designing the logo.

Promoting Women Agripreneurship

Dr. Amiya Kumar Mohapatra
Dr. Nandeesh V Hiremath

Women entrepreneurs, especially women agripreneurs, represent the fastest growing category of entrepreneurship worldwide and India is no exception. By starting the business enterprises, women agripreneurs necessitated strong willpower, skills, risk-taking attitude and appetite for the hard work, with grit and determination to succeed. Since 2016, the "Startup India, Standup India" campaigns have gained considerable momentum. In addition, it has been enhancing their morale and enthusiasm to do something productive for their family, local community and in turn to the nation.

Since the launch of Startup India initiative by Government of India on 16 January 2016, the growth of start-ups and new-generation enterprises has been manifold. Bangalore is the only city from India with rank 15, among the Top-30 Global Start-up hubs as per a Global Survey by Compass.com. However, the number of women participating in the entrepreneurship activities has been relatively less, when compared to the number of their men counterparts, for variety of reasons. The women's participation in economic activities is about 25 percent, while they constitute over 48 percent of the Indian population. Forbes India Report 2019 indicated that Indian women leaders occupy about 30 percent of senior corporate leadership positions in India (notably higher than the global average of 24 percent), while India gets rank of 113 out of 135 countries in gender equality in overall workforce. And, according to Global Women Entrepreneurs Leader Report 2015 by ACG Inc., India has ranked 29 out of 31 countries. Similarly, World Bank's India Development Report 2018 has revealed that India has one of the lowest female participation in workforce globally, with rank of 120 from among 131 countries. Considering the above dimensions and ground realities, there is an urgent need to design the institutional strategies to promote the ecosystem for promoting women entrepreneurship in general and women agripreneurship in particular, which is essential for the integrated development of India.

Agripreneurship and Women Empowerment

Agripreneurship is a synthesis of agriculture/ allied sectors and entrepreneurship to generate commercially-viable products/services and high-value

businesses/processes. The agripreneurship comprises of the creation, development, nurturing and expansion of the agri-business enterprises in agri-based and its allied sectors, which include entrepreneurial interventions of agri-tech, farming, and marketing of agri-products in organised business practices from comparatively unorganised sector. The agripreneurs exhibit inherent risk-taking capabilities, having hunger for growth with entrepreneurial acumen, much similar to entrepreneurs in any other sector.

The women entrepreneurs, especially women agripreneurs, represent the fastest growing category of entrepreneurship worldwide and India is no exception to it in the recent years. Women play a vital role in the integrated development of agriculture and allied sectors, while adding considerable value to the transformation of society by silently adding fuel to the robust growth of rural economy in India. That's why it is rightly said by Dr. APJ Abdul Kalam that *'empowering women is a pre requisite for creating a good nation, when women are empowered, society with stability is assured. Empowerment of women is essential as their thoughts and their value systems lead to the development of a good family, good society and ultimately a good nation'*.

Like every other sector, the scope for women agripreneurship has been growing and is witnessing an upward growth trend. At present, the women in India contribute to about 14 percent of agri-business owners. According to various estimates and survey findings, it has been found that more than 1/3rd of the total agri/rural start-ups are being managed by women agripreneurs, which is setting new benchmarks for the viable and profitable business enterprises, especially in the last two decades. From many recent studies and research findings, it has been observed that women can start new agri-businesses which are catering to an entirely different market-segment and/or unique and niche markets, when compared to their male counterpart agripreneurs. These findings are found concomitant with the Goldman Sachs Report (2018) which states *"enabling women, particularly as entrepreneurs, benefits future generations because women tend to spend more on their children's education and health, which should boost productivity as well"*. In other words, the women entrepreneurs and particularly increasing number of women agripreneurs are significantly contributing for the improved socio-economic growth, sustainable and holistic development of rural areas in India.

Scope and Prospects for Promoting Women Agripreneurship

There is unlimited scope for promoting the women agripreneurs, especially because nearly 70 percent of agriculture and its allied activities are predominantly managed by women. It only requires a concerted effort and an institutional support mechanism, apart from access to the quality training, funding opportunities, marketing networks, leveraging the technology through e-commerce platforms, innovative approaches to take their products to the target customers, etc.

Women are expected to dominate the workforce-trends and leadership positions in India in the upcoming few decades, and this trend is almost similar in case of women agripreneurs, thereby supporting to improve the India's future by 2030. As per the recent report by India Brand Equity Foundation (IBEF), a trust established by Ministry of Commerce and Industry, Government of India, more than 30 million additional women-owned business enterprises are expected to create about 150 to 170 million jobs by 2030 and it can be said that the economic outlook is projected to grow dramatically as a consequence of this enabling ecosystem of women entrepreneurs and women agripreneurs.

This positive trend is further supported by the recent findings through McKinsey Global Institute Report 2021 that *'the concerted efforts in minimizing the gender gap in labor-force/ workforce participation holds the key and has the potential to augment US$12 trillion to global GDP by 2025'*. Simply stated, women are the future of India's progress, and development, since they possess the multi-tasking skills, are predominantly focused, empathetic and inclusive leaders, while managing any business enterprises.

Further, it can be observed that a significant number of agri-based business opportunities have taken roots recently in the agro-spheres such as agro-product processing, agri-based food packaging, export of fresh vegetables and fruits, organised retail-supply of agricultural semi-processed/processed products. This has got significant growth potential due to enhanced availability of institutional micro-finance, enabling regulations by Central/state governments, ease of access to high-tech solutions, streamlined techno-managerial guidance and trainings/workshops on agri-based and its allied aspects. These provisions

are progressively transforming the outlook of the agripreneurship industry, with special focus on women agripreneurship ventures. This is significantly bringing the 'inclusive growth of women agripreneurs' thereby promoting the enabling ecosystem of nurturing the variety of agri-enterprises.

Table 1: Areas /Scope for Women Agripreneurship

S. No.	Agriculture & Allied Activities /Sectors	Products/Output
1	Fruits and Vegetables	Pickles, Salad, Fruits Export, Canned Fruits, Sauce, Juice, Dry fruits, Nuts
2	Cereals and Pulses	Gram Flour, Corn Flour, Wheat Flour, Bajara Flour, Maida, Dal
3	Mushroom Cultivation	Fresh Mushroom, Retail Mushroom, Export Mushroom, Dried Mushroom, Medicines
4	Dairy Products	Yogurt, Saturated Butter, Butter, Ice cream, Milk, Buttermilk, Ghee
5	Bee Keeping (Apiculture)	Honey, Wax, Medicine, Pollen, Cosmetics, Pharmaceutical
6	Floriculture	Religious offering flowers, Festive Flowers, Ornamental Plants

Public Policy Initiatives

Women agripreneurship opens up various ways and means for socio-economic attainment by creating livelihood from farming, empowering women, better standard of living and inclusive development. To achieve the same, Government of India has initiated various programmes, schemes and also created dedicated institutions/projects to foster the agripreneurship in India. Some of the significant initiatives brought in the recent years by the Government of India are briefly enumerated here:

a) **Institutionalised Initiatives for Promoting Agripreneurship:** The novel scheme of agripreneurship designed for effective implementation by National Institute of Agricultural Extension Management (MANAGE), Hyderabad with its 'Agri-Clinics and Agri-Business Centers Scheme' for the agri-graduates/agri-diploma holders, has given considerable boost with financial and institutional support from Ministry of Agriculture, Government of India. This system has been promoting and fast-tracking the prevailing process of both agri-extension activities and also empowering the transfer of technology in agri/agri-based enterprise ecosystem by building-up the integrated supply of agri-inputs on one hand and encouraging the marketing of agri-based enterprise products/services on the other. It is noteworthy to mention that a significant number of these trained agripreneurs and women agripreneurs have been able to successfully establish and manage the agri-based technical/consultancy extension services to farming community which was not the trend earlier.

b) **Promoting Local Agripreneurs and Agri-Business Incubators (ABIs):** The Prime Minister of India Shri Narendra Modi has been emphasising upon the innovative practices and use of technology in agri-based and allied agri-sectors to nurture the agri-business enterprises, so as to create employment in a large scale, for ensuring the social/economic equity and inclusive growth, achieving the self-reliance through agri-based start-ups and agripreneurs. For instance, 'Organic Sikkim' has been successfully making agri-farmers to earn about 20 percent higher income by taking away the middlemen and discovering of newer markets for their agri-products through Sikkim's organic retail stores – predominantly managed by women agripreneurs for variety of agri-based products like pulses, rice, turmeric, ginger, mandarin oranges, cardamom, etc. and these stores have been set up with government's support, while the marketing is done across major cities in India.

c) **Rashtriya Krishi Vikas Yojana (RKVY):** It should be noted that through this scheme, the Government of India has been promoting agripreneurship and innovative agri-enterprises by extending technical and financial support and also by enabling the localised/regional incubation ecosystem through State Agricultural Universities and ICAR Research Institutions. These agri-startup entrepreneurs, including women agripreneurs, have been given the structured training for 60-days through 29 Agri-Business Incubation (ABIs) centres across India, thus contributing to the growth of agripreneurship in general and women agripreneurship in particular. These agri-enterprise have been able to enhance the income-generation activities and

address the unemployment issue in the local/ rural ecosystem, thereby contributing to growth of farming community – of which 70 percent are women. Thereby creating growth-opportunities at the doorsteps of farm-women and women agripreneurs.

d) **NABARD Promoted Agri-Entrepreneurship Initiatives:** The NABARD (National Bank for Agriculture and Rural Development) through its District Development Managers (DDMs) at all the districts across India has been managing a variety of agri-businesses and women agripreneurs enterprises, in partnership with many NGOs (Non-Government Organisations), CSR (Corporate Social Responsibility) Projects of corporates and large organisations, etc.

e) **Micro-Finance Institutions (MFIs):** The microfinance movement, which commenced in Karnataka along with MYRADA (an NGO) has promoted and nurtured thousands of micro, small and medium women agripreneurs. At present, this MFI movement is the largest movement in the world, which is impacting the transformation of millions of women in the rural India, in variety of ways through 'Diversity, Equity and Inclusion' (DEI) principles.

The initiatives taken by Government of India has significantly boosted the confidence of women agripreneurs and their holistic approach towards life, self-reliance, socio-economic empowerment and thereby self-actualisation. This will help in attaining localised and regional development, as women agripreneurship is primarily rural-based. This is also reducing rural-urban migration, which will improve the economic status of rural women and community as whole. This has been helping in infrastructure development by creating in situ employment opportunities for others, and also reducing the social discord/evils and overall boost the socio-economic wellbeing by adopting new production systems.

In addition to the structured and instructional initiatives by the Central and state governments, there are some unique women agripreneurship initiatives, which have been contributing significantly. One such unique project is 'WeACT'(Women Entrepreneurs Access Connect Transform) is a national level network of women entrepreneurs, where the interventions undertaken are executed in collaboration with Entrepreneurship Development Institute of India (EDII), Ahmedabad and Accenture Pvt. Ltd, along with many other partners. Till Dec 2021, about 3,651 women enterprises have been nurtured across 14 states in 3 core sectors, viz., Food and Agro-based Enterprises, Handloom and Handicraft Enterprises and Household Supply Enterprises, and of which over 65 percent of the women enterprises are group-based and about 35 percent of women enterprises are individual-driven. The institutionalised capacity building, integrated marketing linkages and digital support systems have enabled them to become profitable and sustainable. It is worth to note that among the 3,651 various categories of women women-led enterprises, the food and agro-based enterprises are majority with 56.81 percent of the All India total, which is significant, given the diversity of Indian agricultural ecosystem.

In short, the India is witnessing more of women agripreneurs from rural areas marching towards semi-urban and urban centers/towns, with their (finished or semi-finished) products and this has been adding considerable boost to the growth and development of rural India by enabling them to make entry into the entrepreneurial world, and some of them have harnessed the possible market opportunities using the digital revolution and e-commerce platforms.

Issues and Challenges

Even though the women agripreneurs are using their creativity, ability and hard work to prove their skills and competencies in current-days of competition and volatility, they are facing more challenges and problems while starting the agri-enterprises and also during their management and growth phases.

Women agripreneurs face various challenges during the time of work and implementation, including dual responsibility of home and enterprises, serious threats from established corporate players, lack of knowledge/market awareness, lack of knowledge in branding, management, accounting, lack of information source, required skill sets and training. Sometimes, the women do not get enough support from their family including spouse, and family members. In addition to this, the fear of failure, low risk-taking capacity, also act as deterrent to their growth. The infrastructure challenges including storage, warehousing, electricity and credit facility and finance especially formal finance (for both investment credit and working capital financing) continue to daunt the women agripreneurs.

As it is known, the dependency on money lenders leads to exploitation, when the institutional credit is not forthcoming for managing their business enterprises.

Although, there are a spectrum of challenges, the women agripreneurs have been emerging fast with resilience and agility in learning, adaptation to the market dynamics, scouting for newer opportunities, taking their products to the doorsteps of their customers, leveraging the digital platforms, using the mobile and social media campaigns, etc. Thanks to the State-level Start-up Policy promoted by all the States/ Union Territories, subsequent to the Startup India Policy started in 2016 by Government of India, which has added significant boost to the growth of start-ups and MSMEs in agri-business domain.

Way Forward

With the faster-pace of the global growth across 30+ industrial sectors, the women in business are advancing at a faster rate than earlier decades. It is needless to mention that Indian women agripreneurs have been making significant strides of growth in changing/transforming Indian agri-ecosystem. This has been getting expedited owing to enabling policies for start-ups by Government of India and start-up Policies by all the state governments, enhanced access to the educational/training programs and digital media, and of course ease-of-access to fund/credit facility, grant-in-aid by various agencies like SSI Board, KVIC, NIESBUD, State Financial Corporations, CSR Grants by Corporates, etc. The concerted efforts have given a stronger boost to the growth of start-up culture and enabling entrepreneurial ecosystem, where the women agripreneurs are not only actively supporting in our economy, but also contributing to the global entrepreneurial ecosystem.

By starting the business enterprises, women agripreneurs necessitated strong willpower, skills, risk-taking attitude and appetite for the hard work, with grit and determination to succeed. Since 2016, the "Startup India, Standup India" campaigns have gained considerable momentum. In addition, it has been enhancing their morale and enthusiasm to do something productive for their family, local community and in turn to the nation. This will help in creating their identity and make them financially independent, so that they can nurture their families. Furthermore, it will help in attaining inclusive growth, breaking the not-so-useful society norms by empowering women and helping in attaining gender equity.

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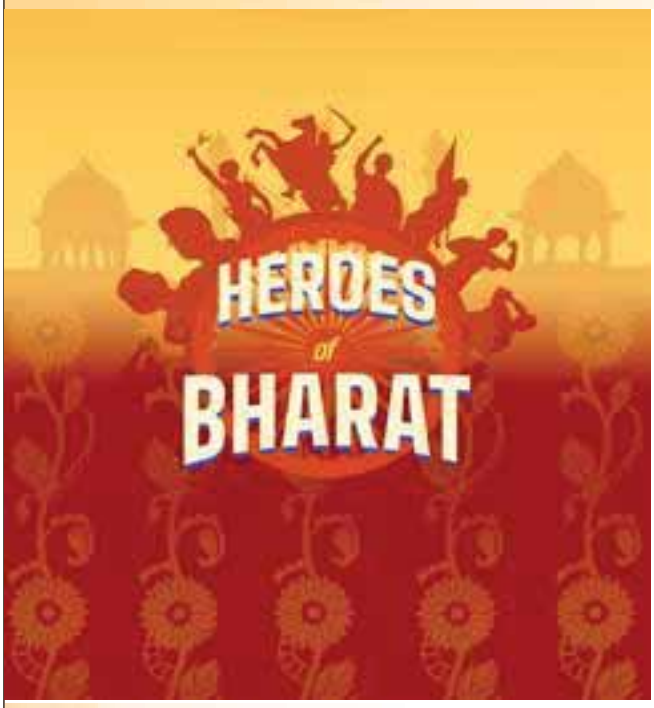
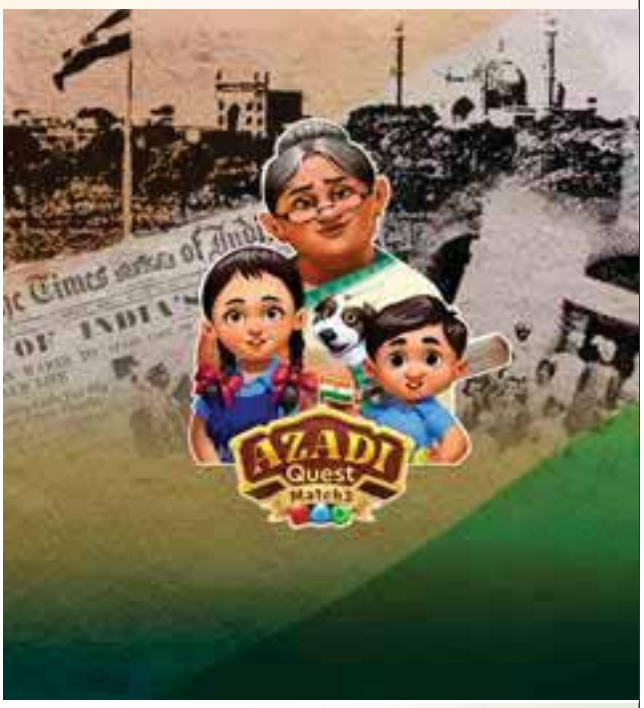
Azadi Quest- Series of Games on India's Freedom Struggle





As part of the celebration of Azadi Ka Amrit Mahotsav and to bring to forth the story of Indian freedom struggle, 'Azadi Quest', a series of online educational mobile games were launched in August, 2022.

About Azadi Quest

The Azadi Quest games are available for android and iOS devices in English and Hindi for the people. The unique game series, based on the concept of 'Gamification of Education' will revolutionise the education sector in the country.

Game-based learning provides an equitable and lifelong education by expanding the learning process beyond the classroom and age. Azadi Quest series will impart the knowledge of India's freedom struggle and the legends of country's great freedom fighters, thereby inducing upon the players, a feeling of pride and a sense of duty and will be instrumental in removing the sense of colonial mindset as also emphasised upon by the Prime Minister in his 76th Independence day speech as *'Panch Pran of Amrit Kaal'*.

The games in the series Azadi Quest tell the story of India's freedom struggle, highlighting key milestones and heroes, interwoven with fun game play. The games' content is simple yet comprehensive, having been specially curated by the Publications Division and vetted by experts of the Indian Council of Historical Research.

(*Source: PIB*)

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