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CONTENTS

It gives me immense pleasure to present the inaugural issue of Agri UptoDate (January 2026)—a humble yet determined step toward bridging the gap between agricultural research, innovation, and real-world practice. This first volume reflects our core vision: to make credible, research-backed agricultural knowledge accessible to students, researchers, entrepreneurs, and farming communities alike.

Editor's Note

The current issue brings together a diverse range of themes that are highly relevant in today's rapidly transforming agri-ecosystem. Articles such as "Climate Change Impacts on Vegetable Crops" highlight the pressing challenges faced by production systems, while "Impact of Digitalization on Agriculture and Agripreneurship: A Research-Oriented Perspective" showcases how technology, innovation, and entrepreneurship are reshaping the future of agriculture. Practical and emerging areas such as Mushroom Farming, Lawn Establishment, and Maintenance provide practical value for readers seeking enterprise and livelihood opportunities. The inclusion of Service-Based Startups further expands the discussion beyond conventional farming, reflecting the growing importance of agri-services and knowledge-driven enterprises.

This issue is the result of sincere contributions from researchers, academicians, and young professionals, and I extend my heartfelt gratitude to all authors for sharing their insights and expertise. I also thank our readers for placing their trust in this new initiative.

We hope Agri UptoDate will evolve into a reliable platform for knowledge exchange, critical thinking, and innovation in agriculture. Your feedback, suggestions, and continued support will be crucial in shaping future issues.
Happy reading and learning.

Dr. Manju Thankur
Editor-in-Chief

Agri UptoDate

Editor-in-Chief

Editorial Board

CLIMATE CHANGE IMPACTS ON VEGETABLE CROPS

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Vegetables crops are crucial for human diets as they provide essential nutrients, vitamins, minerals, antioxidants, and dietary fibres. Globally, more than 1.1 billion tons of vegetables are produced annually (FAO, 2023), with Asia contributing nearly 70% of this share. Also, they are source of livelihood for millions of farmers worldwide. However, the looming threat of climate change poses unprecedented challenges to vegetable production systems, directly affecting both yield and quality. The global climate is undergoing rapid shifts, characterized by rising temperatures, erratic rainfall, prolonged droughts, and increased frequency of extreme weather events such as floods, drought, cyclones, and heat waves. These changes disrupt the growth and development of the crops because vegetable crops require specific optimum temperature ranges for growth and reproduction.

Climatic factors that affect the vegetable crops productivity

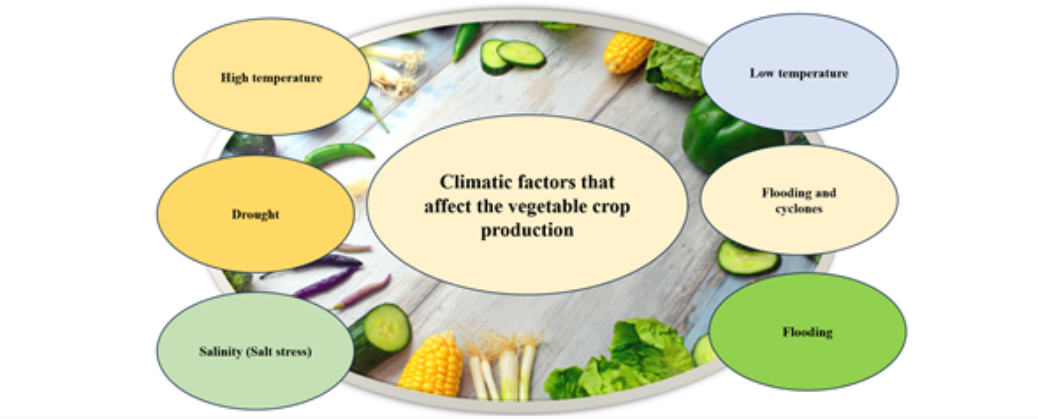
Temperature: Most vegetable crops, including tomato, cauliflower, cabbage, and onion, have optimum temperature ranges. In Tomato, optimum fruit set occurs between 20-25°C. Temperatures above 35 °C induces flower bud drop and pollen sterility (Sato et al., 2000). In case of cauliflower when temperature is above >25 °C cause buttoning and curd loosening, significantly reducing market quality (Chakraborty & Newton, 2011). High night temperatures delay bulb initiation and reduce dry matter accumulation in onion which affects storability (Singh et al., 2019).

Low-temperature stress can be induced by either chilling (<20 °C) or freezing (<0 °C), both of which have differential effects on vegetables. In addition, freezing or chilling temperatures cause hindrance to seed germination as few seeds irregularly germinate, whereas others, for example, beans, do not.

Drought and Salinity: Irregular rainfall and salinity (salt stress) are major threats in vegetable crops. Vegetables such as okra and cucurbits reported yield reductions of 30-50% under moderate water stress (Kumar et al., 2018). On the other hand, excessive rainfall leads to waterlogging, reducing soil oxygen availability, which induces root rot in beans and wilting in solanaceous crops. Salt stress is inflicted on sensitive plants by means of water deficiency, the initial altered concentration ratio of K^+/Na^+ ions which reciprocated wilting, leaf abscission, respiratory changes, epinasty and leaf curling, turgor loss, reduced photosynthesis, a decline in growth, cellular integrity loss, necrosis, potential plant death, retarded plant development, poor seed germination, reduction in nodule formation, and poor crop yield.

Extreme events: Flooding and cyclones not only damage standing crops but also spread soil-borne diseases and pests. For instance, root rot in beans and downy mildew in cucurbits intensify under humid, waterlogged conditions. Floods undoubtedly create excessive moisture in the environment, thereby clogging the root zone and further affecting oxygen availability for aerobic processes. Tomato, for example, induces the excessive synthesis and accumulation of the ethylene precursor, 1-aminocyclopropane-1-carboxylic acid (ACC), as a result of lower oxygen levels under flooding conditions (Bhardwaj 2012).

Pest and Disease Dynamics: Shifts in temperature and humidity alter the life cycles of insect pests and pathogens. Warmer winters allow overwintering of pests such as whiteflies and thrips, which transmit devastating viruses. Similarly, fungal and bacterial infections thrive under changing rainfall patterns. This leads to higher pesticide dependency, raising concerns of resistance, residue, and environmental impact.



Adaptation and Mitigation Strategies

To safeguard vegetable production in a changing climate, multi-dimensional strategies are required:

- **Breeding Climate-Resilient Varieties:** Development of heat-tolerant, drought-resistant, and disease-resistant hybrids through conventional and modern tools such as CRISPR gene editing.
- **Protected Cultivation:** Greenhouses, net houses, and low tunnels help regulate temperature and humidity, ensuring off-season production.
- **Water-Smart Practices:** Drip irrigation, mulching, and rainwater harvesting can mitigate water stress
- **Integrated Pest Management (IPM):** Biological control, resistant varieties, and cultural practices can reduce reliance on chemicals.
- **Diversification and Crop Rotation:** Inclusion of short-duration and stress-tolerant vegetables reduces risks of complete crop failure.

Conclusion

The dual challenge of feeding a growing population and adapting to climate change necessitates urgent action in vegetable research and farming practices. Policymakers, scientists, and farmers must work hand in hand to promote climate-resilient agriculture. Cultivating advanced cropping practices like the use of shelters, raised beds, and mulching can help protect against flooding and high temperatures, and grafting techniques can eliminate the susceptibility of vegetable crops to soil-borne diseases, which enables the development of resistant crops. Harnessing genome sequencing of numerous vegetable crops can help identify genes having the capability to confer stress-tolerant and stress-responsive phenotypes, in addition to using new farm techniques like resource conserving technologies (RCTs) and modified crop and pest management practices. However, most importantly, educating farmers regarding indigenous practices and imparting technical knowledge along with spreading awareness about the serious threats posed to the farming communities and global food security by disastrous climate change can unite people from every social level toward developing immediate measures and utilizing the available resources most beneficially, thereby favouring vegetable production even under the most undesirable climatic conditions.

IMPACT OF DIGITALIZATION ON AGRICULTURE

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IIntroduction

Agriculture is undergoing significant change due to the swift adoption of digitalisation in the sector. The modernisation of agriculture refers to the integration of information and communication technologies (ICTs), automation, smart systems, and data-driven tools into agricultural management, marketing, and operations. These technologies aim to improve productivity, sustainability, profitability, and efficiency in the agricultural sector. In developing countries like India, digital agriculture plays a crucial role in addressing challenges such as resource scarcity, climate change, market inefficiencies, and labour

- **Framework of Digitalisation in Agriculture**

Digitalization in agriculture encompasses the use of technologies such as sensors, geographic information systems (GIS), remote sensing, precision farming tools, artificial intelligence, internet-based platforms, data analytics, and mobile applications. These tools help farmers to make decisions based on information by giving them real-time data on weather conditions, soil health, pest incidence, crop growth, and market prices (Klerkx et al., 2019). The transformation from traditional farming to data-based agriculture marks a step towards sustainable and smart agricultural systems.

- **Effect on Productivity and Crop Production**

There are significant impacts of digitalization in improvement of crop productivity. Precision agriculture technologies help in site-specific management of inputs like fertilizer, seeds, pesticides, and water. These approaches reduce input wastage and improve crop productivity (Gebbers & Adamchuk, 2010). Digital tools such as drones and satellite imagery help in early detection of disease and pest attacks, crop stress, and nutritional deficiencies, helping to control the causes of damage before they occur (Zhang et al., 2019).

- **Effective Resource Management**

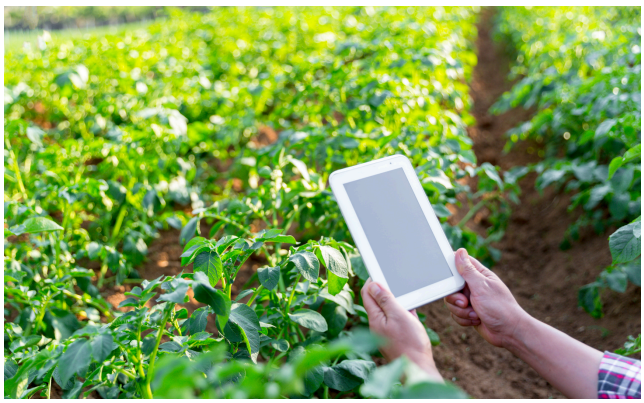
Digitalisation encourages the efficient use of natural resources, especially soil and water. Modern irrigation systems are based on sensors and weather data to optimise water use by delivering the irrigation at the right time and in the right amount. Similarly, digital soil mapping and decision support systems help reduce soil degradation and environmental pollution (Rose & Chilvers, 2018). These factors contribute to long-term resource conservation and sustainable agricultural practices.

- **Impact on Farm Management and Decision Making**

Digital technologies enhance farm management by enabling better planning, monitoring, and evaluation of farm activities. Farm management information systems (FMIS) guide farmers in record-keeping, risk managment and cost evaluation. Access to the real-time data enhances decision-making related to the selection of crops, planting schedules, and harvesting practices (Eastwood et al., 2019). As a outcome, farmers can reduce risks associated with market fluctuation and climate change.

- **Affect on Climate Smart Agriculture**

Digital agriculture acts as a foundation for climate-smart practices by combining weather forecasting models, a climate advisory system, and weather warning services. Farmers can change their practices according to the climatic conditions by adapting different cropping patterns and management practices based on digital advisories (FAO, 2019). The use of big data and artificial intelligence helps to predict extreme weather events early and helps to enhance climate resilience in agriculture.



- **Bottleneck in Digitalization of Agriculture**

Though it has multiple benefits, digitalization faces several challenges, particularly in developing countries. Limited knowledge about digital technologies ad its uses, inadequate infrastructure, high initial costs, and poor internet connectivity reduce the adoption of digital tools among marginal and small farmers (Birner et al., 2021). Data privacy is also a major concern, and unequal access to digital platforms may further widen socioeconomic inequality in rural areas.

- **Future Aspect of Digital Agriculture**

The future of digital agriculture lies in the combination of emerging technologies like robotics, advanced artificial intelligence, and blockchain. Initiatives taken by the government, public-private partnerships, and capacity-building programs help to improve digital involvement in agriculture. Strengthening the digital ecosystem is vital for achieving sustainable agriculture goals related to poverty reduction, food safety, and environmental sustainability (Trendov et al., 2019).

Conclusion

Digitalization has brought major transformation to agriculture by giving positive impacts like improving productivity, farm management, effective use resource and market integration, while challenges persist, effective initiatives and policies can target them, and while infrastructure development and farmer training can accelerate the adoption of digital technologies. Agriculture with digitalization holds immense potential to create a sustainable, resilient, and inclusive agriculture system that is able to target present problems as well as help to secure future food demands.

MUSHROOM FARMING: TODAY'S FARMING TREND

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Introduction

Mushroom farming is becoming a trending and emerging agri-enterprise that plays a significant role in improving nutritional security, sustainable resource utilization, and farm income. Mushrooms are fungi, which are cultivated on organic substrate and don't require arable land, making them suitable for the region having scarcity of land. Because of their short crop cycle, ability to use agricultural waste, and high biological efficiency, mushroom cultivation is widely adopted around the world (Chang & Miles, 2004).

Global Scenario of Mushroom Production

In the last few decades, there is significant increase in mushroom farming. According to FAOSTAT, global mushroom production increase from 12 million tonnes in 2000 to over 42 million tonnes by 2021, showing that mushroom farming rose by 3 times ((Food and Agriculture Organization of the United Nations [FAO], 2022)., 2022). China itself contributes about 75 % (varies yearly) of total world mushroom production, followed by countries like Poland, Netherland and India (Royse et al., 2017).

The expansion in the global edible mushroom market is due to the rise in demands of consumer for plant-based protein and functional foods, with an annual growth rate exceeding by 6 % (Royse et al., 2017; FAO, 2022).

- **Status of India in Mushroom Production**

In India, mushroom farming shifted from seasonal acidity to the commercial agri industry. Production in India has been significantly increased from 50,000 tonnes in the 1990s (Sharma et al., 2017) to approximately 230,000 tonnes by 2022-21 (ICAR, 2021). Currently, India ranks in the top five mushroom-producing countries worldwide.

Button mushroom (Agaricus bisporus) has the command over production in India, which is nearly 70 -75 % of the total output. Oyster mushrooms (Pleurotus spp.) contribute 15 20% while other mushrooms like milky mushroom (Calocybe indica) and paddy straw mushroom (Volvariella volvacea) together contribute in rest of the production (Annepu & Gupta, 2018).

- **Distribution based on Region in India**

In India Mushroom production is concentrated within states with better infrastructure and market access. Northern states such as Punjab, Haryana, Uttar Pradesh, and Himachal Pradesh are major producers of button mushrooms because of their favourable climatic conditions. Whereas states like Odisha and Bihar have emerged as leading producers of milky and oyster mushrooms due to low input requirements and availability of crop waste (ICAR, 2021).

Recent studies show that eastern India contributes about 35 %of total national mushroom production, telling its role in employment and livelihood generation for marginal and small farmers (Annepu & Gupta, 2018).

- **Economic Importance of Mushroom Farming**

Mushroom farming requires no arable land, low input, and high return value. A small-scale unit of 100-150 bags of oyster mushroom or milky mushroom can give a return of Rs 60,000–₹80,000 per crop cycle, depending on market price and their management practices (Singh & Kamal, 2019).

Commercial button mushroom units with maintained environmental conditions can produce 20 -30 kg per square meter annually, giving them an advantage over the traditional crops (ICAR, 2021).

This enterprise also gives employment throughout the year, specifically for women and youths of rural areas, as it requires labour for substrate preparation, harvesting, and further processing.

- **Nutritional Value of Mushroom**

Mushrooms are a nutrient-dense functional food. Fresh mushrooms have 20 -3 0 % of protein on a dry weight basis, comparable to the pluses (Kakon et al., 2012). They have a high amount of minerals like selenium, potassium, phosphorus, also rich in B complex vitamins, with the benefits of low fat and cholesterol levels.

For example, 100g of fresh button mushrooms gives around 2.2 g of carbohydrates, 3.1 g of protein, and 22 kcal, making them suitable for diet-conscious people (Chang & Miles, 2004).

- **Sustainability and Environmental Benefits**

Mushroom cultivation helps to move towards sustainable agriculture by reusing agricultural residues like wheat straws, paddy straws, sawdust, and maize cobs. It is seen that approximately 1 ton of dry organic residue can give us a yield of 600 -800 kg of fresh mushrooms, solving problems like environmental pollution and residue burning (Royse et al., 2017).

In addition, organic substrates can be used as organic manure or animal feed, improving the circular economic cycle.

- **Institutional and Technological Support for Mushroom Cultivation**

In India, institutions such as the Directorate of Mushroom Research (DMR), ICAR, and many State Agricultural Universities provide support to farmers in mushroom production. Recently, there have been technological advancements in spawn production, composting methods, and climate control systems (ICAR, 2021).

As an extension, KVK (Krishi Vigyan Kendras) organise training programmes to increase adaptation of mushroom practice technologies specifically in peri-urban and rural areas (ICAR, 2021).

- Challenges Faced in Mushroom Cultivation
- Although mushroom farming holds huge potential, it also faces multiple challenges, including post-harvest losses (around 20–25%), short shelf life, price fluctuations, and a lack of cold storage facilities (Thakur et al., 2016). Along with less awareness, insufficient technical knowledge, and the initial cost for setup, these limitations limit farmers from practicing mushroom cultivation on a large scale.

- **Outlook of mushroom cultivation**

The prospect of mushroom cultivation is promising, as customer demand is steadily increasing, driven by the need for medicinal and nutraceutical mushrooms, value-added products, and export demand. A combination of climate-controlled production systems, processing units, and a responsible supply chain will further improve mushroom farming itself. With policy support and a boost to mushroom entrepreneurship, mushroom farming can play a significant role in doubling farmers' incomes and securing nutritional security (ICAR, 2021).

AGRIPRENEURSHIP: A RESEARCH-ORIENTED PERSPECTIVE WITH EMPIRICAL INSIGHTS AND CASE STUDIES

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Introduction

Agriculture continues to be the backbone of many developing and emerging economies, contributing significantly to employment, food security, and rural livelihoods. However, traditional agricultural practices are increasingly challenged by climate variability, fragmented landholdings, price volatility, and low profitability. In response to these challenges, agripreneurship has emerged as a transformative approach that integrates agricultural production with entrepreneurial innovation, market orientation, and value creation. From a research perspective, agripreneurship represents a strategic pathway for modernizing agriculture while fostering inclusive economic growth.

- **Conceptual Framework of Agripreneurship**

Agripreneurship is defined as the process by which individuals identify, develop, and manage agricultural ventures using entrepreneurial principles such as innovation, risk-taking, and proactive market engagement. According to agribusiness development theory, agripreneurship extends beyond primary production to encompass the entire agricultural value chain, including input supply, processing, storage, logistics, marketing, and export.

Scholars argue that agripreneurship bridges the gap between agriculture and industry by encouraging value addition and commercialisation. Unlike subsistence farming, agripreneurship emphasises profitability, scalability, and sustainability. This approach aligns with Schumpeter's theory of entrepreneurship, where innovation serves as the driving force of economic development

- **Economic and Developmental Significance**

Empirical studies indicate that agripreneurship plays a crucial role in rural transformation. Research conducted by international development agencies shows that agro-based enterprises can significantly increase rural incomes and reduce poverty. Small and medium agripreneurial ventures contribute to employment generation, particularly for rural youth and women, who are often excluded from formal labour markets.

- Agripreneurship also strengthens food systems resilience. Through improved supply chain management, cold storage, and processing facilities, agripreneurs help reduce post-harvest losses, which account for a substantial percentage of food wastage in many countries. Additionally, agripreneurial innovations in climate-smart agriculture promote efficient resource use and environmental sustainability.
- Role of Technology and Innovation

Technological innovation is a cornerstone of modern agripreneurship. Research shows that digital tools such as mobile-based advisory services, precision farming technologies, artificial intelligence, and data analytics have enhanced productivity and decision-making. Agripreneurs increasingly rely on e-commerce platforms and digital marketplaces to access wider consumer bases, bypass intermediaries, and ensure better price realization.

Innovations in biotechnology, irrigation systems, renewable energy, and food processing have further expanded agripreneurial opportunities. These advancements enable farmers to diversify their income sources and reduce dependency on traditional cropping systems.

Case Studies in Agripreneurship

- **Case Study 1: Amul – Cooperative Agripreneurship Model (India)**

Amul stands as a classic example of successful agripreneurship through a cooperative organisation. Established as a dairy cooperative, Amul transformed millions of small-scale milk producers into agripreneurs by providing them access to markets, technology, processing facilities, and fair pricing. Research studies reveal that the Amul model significantly increased rural incomes, empowered farmers, and created one of the largest dairy brands globally. This case demonstrates how collective agripreneurship can overcome scale and market access constraints.

- **Case Study 2: DeHaat – Digital Agripreneurship Platform**

DeHaat, an agri-tech startup, exemplifies technology-driven agripreneurship. The platform integrates advisory services, input supply, and market linkage through digital infrastructure. Empirical assessments show that farmers associated with DeHaat experience higher yields and reduced transaction costs. This case highlights the role of digital agripreneurs in strengthening agricultural ecosystems and improving efficiency across the value chain.

- **Case Study 3: Organic Farming Enterprises**

Research on organic agripreneurship indicates growing consumer demand for chemical-free and sustainably produced food. Successful organic agripreneurs have adopted certification, branding, and direct-to-consumer models to capture premium markets. Studies suggest that organic agripreneurship not only enhances farm profitability but also improves soil health and biodiversity, aligning economic goals with environmental sustainability.

- **Challenges and Constraints**

Despite its potential, agripreneurship faces multiple structural and institutional challenges. Academic research identifies limited access to credit, lack of collateral, inadequate infrastructure, and insufficient entrepreneurial training as major barriers. Climate risks and market price fluctuations further increase uncertainty for agripreneurs. Moreover, policy implementation gaps often limit the effectiveness of government support programs.

Addressing these challenges requires integrated policy interventions, financial inclusion strategies, and capacity-building initiatives.

- **Role of Education, Institutions, and Policy**

Education is a critical enabler of agripreneurship. Studies emphasise the importance of incorporating entrepreneurship education into agricultural curricula. Extension services, incubation centres, and mentorship programs enhance entrepreneurial competencies among farmers and agribusiness professionals.

Supportive public policies—such as startup incentives, crop insurance schemes, export promotion, and infrastructure development—create a conducive environment for agripreneurial growth. Public-private partnerships have proven effective in scaling agripreneurship initiatives.

- **Conclusion**

From a research perspective, agripreneurship represents a paradigm shift in agricultural development, combining innovation, entrepreneurship, and sustainability. Empirical evidence and case studies demonstrate that agripreneurship enhances productivity, income, employment, and food system resilience. As global challenges such as climate change, population growth, and resource scarcity intensify, agripreneurship offers a viable and strategic solution for building a resilient and inclusive agricultural economy. Strengthening institutional support, education, and technology adoption will be essential to unlocking the full potential of agripreneurship in the years ahead.

THE POTENTIAL OF SERVICE-BASED STARTUPS: AN INTRODUCTION

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Introduction

A startup is a newly established business venture in the early stages of development, usually driven by innovation, unique ideas, and the potential for rapid growth. Startups play a critical role in economic development by fostering innovation, generating employment, enhancing competition, and introducing new technologies. While much attention is often given to product-based startups, service-based startups have emerged as equally important drivers of growth in today's service-oriented economy.

This article focuses on Service-Based Startups (SBS)—their concept, characteristics, scope, advantages, and growth potential. Service-based startups primarily provide services rather than tangible goods, offering skills, expertise, advisory support, customised solutions, or acting as intermediaries between producers and consumers. With changing consumer preferences and increasing demand for personalised solutions, service-based startups are becoming powerful agents of transformation across industries

Understanding Service-Based Startups

Definition

Service-based startups are entrepreneurial ventures that focus on delivering intangible services instead of physical products. Their value proposition lies in providing expertise, knowledge, problem-solving capabilities, and high-quality customer experiences. These startups aim to address specific customer needs through innovative service delivery models.

Key Characteristics of Service-Based Startups

Service-based startups differ significantly from product-based ventures due to their unique nature and operating style. Some of their defining characteristics include:

- **Intangible Offerings**

Unlike product-based businesses, SBS deliver non-physical outputs such as consulting, advisory services, digital solutions, healthcare services, or skill-based support. Their success depends on perceived value rather than physical ownership.

- **Customer-Centric Approach**

Customer satisfaction is central to service-based startups. They focus on understanding customer pain points, building long-term relationships, and delivering consistent, high-quality services. Feedback plays a vital role in service improvement.

- **Expertise and Knowledge-Driven**

These startups rely heavily on specialized knowledge and professional expertise. Their competitive advantage lies in their ability to provide effective solutions to complex problems.

- **Personalisation and Customisation**

Service-based startups often offer tailored solutions based on individual client needs. This flexibility allows them to deliver personalised experiences that enhance customer trust and loyalty.

- **Collaborative Ecosystem**

Many service-based startups operate within collaborative networks, partnering with other firms, professionals, or freelancers to enhance service quality and expand market reach.

- **Relationship-Based Revenue**

Revenue models often include retainers, subscriptions, or long-term contracts. Trust and customer relationships are key assets for financial sustainability.

Types of Services Offered by Startups

Service-based startups operate across a wide range of sectors, including:

- **Consulting Services**: Management, financial, technology, and marketing consulting.
- **Digital Marketing Agencies**: SEO, social media marketing, content creation, and online advertising.
- **Software Development and IT Services**: Web and app development, cloud solutions, cybersecurity, and IT consulting.
- **Financial Services**: Accounting, bookkeeping, fintech solutions, investment advisory, and financial planning.
- **Education and Training**: Online learning platforms, professional skill development, and e-learning solutions.
- **Event Planning and Management**: Corporate events, conferences, exhibitions, and logistics management.
- **Hospitality and Travel Services**: Travel planning, accommodation platforms, and experience-based tourism services.

The scope of services continues to expand as technology evolves and new market needs emerge.

Service-Based vs Product-Based Startups

Service-based and product-based startups differ in several important ways:

- **Nature of Offerings**: Services are intangible, while products are tangible or digital goods.
- **Business Models:** Service-based startups earn through fees, subscriptions, or contracts; product-based startups rely on sales volume.
- **Customer Relationships:** SBS emphasize long-term, personalised relationships, whereas product startups often focus on transactional interactions.
- **Scalability:** Product-based startups generally scale faster due to mass production, while service-based startups face human resource and customisation constraints.
- **Supply Chain:** Service startups avoid manufacturing and inventory complexities, reducing operational burden.

Despite these differences, hybrid models such as SaaS and platform-based services increasingly blur the line between products and services.

- **Scope of Service-Based Startups**

The scope of service-based startups is vast and continuously expanding:

Diverse Industry Presence

They operate in professional services, creative industries, technology, healthcare, finance, agriculture, and hospitality.

B2B and B2C Opportunities

Service-based startups cater to both business clients (B2B) and individual consumers (B2C), offering specialised or personalised solutions.

Local to Global Reach

Digital platforms enable service-based startups to serve local markets and global customers alike, overcoming geographical limitations.

Innovation and Disruption

By rethinking service delivery and leveraging technology, SBS can disrupt traditional industries and create new market spaces.

Strong Customer Focus

A deep emphasis on customer experience allows service-based startups to differentiate themselves in competitive markets.

PRODUCTION TECHNOLOGY FOR LAWN ESTABLISHMENT AND MAINTENANCE

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Introduction

In the present fast-paced and stressful lifestyle, green spaces play an important role in maintaining mental peace and environmental balance. A well-maintained lawn not only enhances the aesthetic appeal of homes, parks, institutions, and farmhouses but also provides a pleasant space for recreation, relaxation, and social activities. Because of its uniform green appearance, a lawn is often referred to as the “green carpet” of the landscape.

Importance of Lawns

Lawns contribute significantly to beautifying the surroundings while offering functional value. They help in reducing dust, moderating temperature, and improving air quality. A lush green lawn provides satisfaction to the owner and becomes the center of many garden activities. Beyond its material value, a lawn also has psychological benefits, helping to reduce stress after a long working day.

Suitable Grasses for Lawn Development

Several grass species are suitable for lawn establishment depending on climate, soil type, and water availability. Commonly used lawn grasses include:

- Bermuda grass (*Cynodon dactylon*)
- Korean grass (*Zoysia japonica*)
- Manila grass (*Zoysia matrella*)
- Korean velvet grass (*Zoysia tenuifolia*)

Under Indian conditions, Bermuda grass is considered the most suitable due to its wide adaptability, fast spreading nature, and low cost. It grows well across different agro-climatic regions of the country and requires comparatively less maintenance.

Soil Preparation for Lawn

Proper soil preparation is the foundation of a healthy lawn.

- The ideal soil pH ranges from 5.5 to 7.0
- Soil should be well-drained, loose, and finely leveled
- April to June is considered the best period for soil preparation
- Organic matter such as well-decomposed farmyard manure improves soil structure and fertility

Methods of Lawn Establishment

Different planting methods are practiced for lawn development, including:

1. Seeding
2. Dibbling of roots
3. Turfing
4. Bricking

Among these, turfing is considered the most effective method for obtaining a dense and uniform lawn, provided sufficient labor is available.

Irrigation and Nutrient Management

Adequate moisture is essential for successful lawn establishment and maintenance.

- Soil moisture should be maintained at around 60% of field capacity for optimum growth
- Fertilization can be done during spring, summer (with rainfall or irrigation), and autumn
- Balanced application of nutrients helps maintain healthy color and dense growth

Mowing and Lawn Care

Regular mowing is necessary to maintain uniform height and attractive appearance.

- Reel mowers are suitable for large lawns
- Rotary mowers are ideal for small home lawns
- Mowing should be done periodically, avoiding removal of excessive leaf area at one time

Weed, Pest, and Disease Management

Weeds are a major challenge in lawn management. In the Indian subcontinent, motha grass (Cyperus rotundus) is one of the most problematic weeds. Regular raking and timely management practices help in controlling weed infestation.

Common lawn diseases include various types of patch diseases, while major insect pests such as army worms and green bugs can cause severe damage if not managed in time.

Conclusion

The lawn grass industry has witnessed rapid growth due to increasing demand for landscaping and recreational green spaces. With proper selection of grass species, timely soil preparation, adequate irrigation, balanced fertilization, and regular maintenance, a healthy and attractive lawn can be easily developed. Adoption of scientific lawn management practices not only improves aesthetic value but also contributes to environmental sustainability.

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