TOP 10 IDEAS

INVESTING FOR IMPACT

Food, Agri and AgriTech

— Impact Future Project —

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The Impact Future Project (IFP) is a thought-leadership platform and an appreciative enquiry about the imminent Impact Economy. IFP will generate bold, transformative investment ideas for 2030 with 200+ business and investment leaders, in sectoral communities of 20-30 each, to create new research, knowledge, awareness and advocacy for an era of impact measurement & reporting.

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— Impact Future Project —

TOP 10 IDEAS

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Founder's Preface

Visionary voices for a century, from Mahatma Gandhi to recent Nobel Laureates such as Muhammad Yunus and Al Gore unequivocally support the idea of a sustainable Impact Economy. The world's social and sustainability challenges have accelerated protests over the last decade, from Occupy Wall Street to Extinction Rebellion. Impact Economies provide a solution to address these challenges and achieve the UN's Sustainable Development Goals (SDGs), as we embed Impact, alongside Risk and Return, in every business, investment, policy & consumption decision. The imminent Impact Economy requires us to envision the future, so that India may chart her path with confidence.

The Impact Movement, which has grown globally to $59 trillion, as per GSIA, is an unstoppable trend. We estimate that India has attracted only ~1% of this global capital pool. India Inc. must enhance its embrace of the Impact movement. The environment cost alone of India's 35 large companies at $200 billion, is three times their net profit, rendering them uncompetitive in this new era of Impact Capitalism. The root cause is a lack of corporate alignment with impact, as there is no mandatory Impact Reporting. The recent Government decision to increase mandated Business Responsibility & Sustainability Reporting (BRSR) from the top 500 to the top 1000 companies is a welcome step, but just not enough. We need distinct ESG (Responsibility), Sustainability & Impact standards and strategies.

Aspire's Impact Future Project (IFP) set up in 2020, ten Impact Communities of ~20 leaders each, with representatives of different stakeholder groups. These IFP groups have held quarterly conversations to spark an appreciative enquiry about our shared Impact Future. IFP seeks to grow the knowledge & research, awareness & advocacy, education & training for the Impact Movement.

We are proud to release the third of our ten research reports, on "Food, Agri & AgriTech". Our research highlight the Top 10 emerging investment themes in the sector-Dairy Farming, Sustainable Forestry, Water and Soil Management, Farm Mechanisation and Farmgate Infrastructure, Cold Chain and Logistics, Climate Risk Mitigations, Food Fortification, Plant Based Proteins, Bio-inputs and Sustainable Farming, Protected Cultivation, Vertical Farming & Hydroponics - can collectively attract $272 billion investment by 2030, up from $93 billion in 2020 and create revenues of $813 billion, up from $226 billion in 2020. This is the promise of Impact in Food, Agri & AgriTech.

I thank all our Impact Leaders, our Co-Chairs, our Knowledge Partners, our Industry Partners, our Event/Convening Partners and Capgemini, our sponsor, for their support. I hope this comprehensive research across 10 sectors and 1000 start-ups is compelling for your own Impact journey.

Sincerely,

Amit Bhatia
Founder & CEO- Aspire Circle & Aspire Impact

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Co-Chairs

Dear Readers,

Only when we get ahead together do we win as a nation. The narrative of Indian farmers desiring a better life for their progeny away from agriculture needs to be altered. For that to happen, agriculture must become a steady and profitable trade for India's 130 million farmers and their families. Agritech entrepreneurs will be part of that solution, leveraging innovation, technology, and persistence to reinvent agriculture and food systems. Today, Indian agriculture is at an inflexion point. We have only just begun solving legacy issues in Indian agriculture and paving the way for a more climate-resilient future. There is a boundless scope for innovation and growth that is driving this space. In the years to come, we hope to see more scalable, long-term solutions to help the agri ecosystem move away from practices based on natural resources extraction and depletion to ones designed for regeneration.

Jinesh Shah
Managing Partner
Omnivore

Dear Readers,

We live in unprecedented times. The world's oldest industry is also the newest sunrise sector. From massive movements towards plant-based proteins to protected cultivation to tech-driven farmer services and collectivization of small-hold farmers, man's ability to produce more with less in a socially-responsible-environment-friendly manner has grown by leaps and bounds. The complexity also is huge with demanding consumers (better products at lower prices), improved farmer livelihoods and environmental concerns working at cross-purposes. In country like India, this is also politically sensitive sector impacting lives of extremely large section of society making reforms difficult. In this context, platform like IFP is extremely valuable bringing various stakeholders together, ideating on the solutions and identifying actionable initiatives. I hope the ideas and suggestions in this report ignites the transformation desperately required in agriculture and food sector

Purnima Khandelwal
Co-Founder
INI Farms

Messages

Sponsor

Dear Readers,

Capgemini is delighted to support and sponsor the Impact Future Project (IFP). We believe the time has come when the idea of an "Impact Economy" must be mainstreamed. The pandemic has reminded us on the sustainable balance we must maintain with the planet and amongst the people. This will only be possible when all organisations, for-profits and non-profits, corporations and funds, transparently measure and report their impact. We believe the IFP is a significant thought leadership initiative in helping build this awareness and a greater imperative to act. IFP not just resonates our values and pursuits of a purposeful existence, but takes us a step forward towards this envisioned impact future.

Anurag Pratap
Vice President, Digital Inclusion & Sustainability Leader, Capgemini

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Knowledge Partner

Dear Readers,

India is on the verge of taking a giant leap in the Agriculture sector. Apart from maintaining the food security, the additional focus is on creating economic value for stakeholders in value chain and addressing the climate and environment challenges facing the sector. We have partnered with Aspire India for Impact Future Project (IFP) to curate 10 impact investment ideas in Food, Agri and AgriTech. These ideas have been identified based on assessment on critical parameters such as potential economic value, growth prospects, unique problem areas addressed, contribution to SDGs, etc. These have been further developed into practical ideas to drive state investment agenda, impact policies for SDGs, generation of employment opportunities and galvanization of the impact start-up ecosystem. We sincerely hope this would be useful for Governments, Businesses, Farmers, Community Based organizations and Technology Innovators as we embark on journey to create sustainable impact.

Ashok Varma
Partner
PWC

Quotes from Community Leaders

IFP Agri exploration of innovative yet practical and grounded solutions to India's Agri challenges is a breath of fresh air. The recommendations will be immensely valuable to all stakeholders in the entire Farm to Fork Value chain.

Anuraag Srivastava
COO & Co-Founder, Rainshine Entertainment

Constructive multi stakeholder dialogue, collaboration and progressive policies are a key to unlocking the potential for Indian Agriculture to become USD 1 trillion economy.

Asitava Sen
CEO, CropLife India

I am a firm advocate that all agriculture and food solutions should have a smart food triple bottom line – good for you, planet and farmer.

Joanna Kane-Potaka
Co-Founder & ED, FOOD2030

The Agriculture sector needs large investments which are pro-poor & open up new markets for farmers through access to technology. This requires dialogue between the state, private sector, investors, farmer cooperatives & civil society. I am so glad this process has been started by Aspire.

Apoorva Oza
Chief Executive, Aga Khan Rural Support Programme

Indian agriculture needs disruptions through use of technology to make the supply chain resilient and sustainable. IFP is doing a great job in building multi-stakeholder engagement to drive the innovation agenda for the sector.

Hemendra Mathur
Co-Founder, ThinkAg

Providing solutions to 1st mile in Agri chain remains one of the critical areas to address. The venture capital and private equity industry has shown their commitment with investments increasing at a faster pace post pandemic.

Rajat Tandon
President, IVCA

The food and agri ecosystem should be seen as a continuum to ensure sustainable development across the entire chain. Anything else would be a piecemeal approach leading to suboptimal outcomes.

Raman Ahuja
Co-Founder,
ThinkAg

No discussion on impact and sustainability within India can be complete without addressing and understanding the issues and opportunities within the food and agri value chain.

Uday Garg
Founder & Managing Partner,
Mandala Capital

Agri sector is now the hotbed of disruptions from biotech innovation to supply chain transformation. Ripe time for investments in Agritech.

Rema Subramanian
Co-Founder & Managing Partner,
Ankur Capital Fund

Introduction

The agricultural sector provides livelihoods for large populations in developing countries and helps sustain economic growth in developed economies. By 2050, the world's population is expected to reach 10 billion, which makes it crucial to find solutions to fulfil future requirements of food, feed, fuel and industry.[1]

Globally, food demand is expected to increase in the range of 59-98 percent by 2050.[2] To meet this demand, agricultural produce in 2050 will need to increase by 50 percent as compared to that in in 2012. In the near future, regions with high population growth will have most of the additional demand for food, particularly India, the Middle East, North Africa and Sub-Saharan Africa. It is estimated that India will overtake China as the world's most populous country by 2027.[3] While India's population is projected to grow at the compounded annual growth rate (CAGR) of 2 percent, demand for key food grains is expected to grow at a CAGR of 3 percent.[4]

Alongside meeting future food grains demand, sustainable and responsible use of natural resources will be equally important for world agriculture in the coming decades. This was emphasised at the 26th Conference of Parties (COP26) of the United Nations Framework Convention on Climate Change at which 27 global economies made new commitments to make their agricultural practices more sustainable and less polluting, and to invest in the science needed for sustainable agriculture and for protecting food supplies against climate change. Henceforth, an increased focus on per unit productivity while keeping sustainability at the centerstage will be required not only to ramp up growth in the agriculture sector, but also materially change the way farming is done across the world.

With an aggregate gross sectoral value of USD 414 billion (2019-20) agriculture continues to be one of the critical components of the Indian economy. Currently, India is the world's fourth-largest producer of agrochemicals and accounts for nearly a third of global tractor production. To add to that, the country is the largest producer of spices, pulses, and milk and the second largest producer of wheat, rice, tea, fruits and vegetables, sugarcane, farmed fish, cotton and oilseeds.[5]

Aspire Impact in consultation with PwC India developed a framework to brainstorm with Agri community leaders in food, agri and agritech. The framework assessed the attractiveness of impact ideas against key parameters such as gross value addition/ potential economic value and growth prospects, unique problem areas to be addressed, potential livelihood impacted, enabling government policy, contribution to sustainable development goals (SDG) and overall impact. Based on a preliminary assessment and in-house consultations, a total of 10 ideas were selected for discussion in 2021. A survey identifying the potential of the top 10 investment ideas in Food, Agri and AgriTech on various impact parameters is given on the next page.

[1] The future of Food and agriculture – Trends and Challenges, FAO 2017

[2] World Fisheries and Aquaculture, FAO 2020,

[3] UN's department of Economic and social affairs (UN – DESA), 2018

[4] ICAR Vision 2030

[5] FICCI PwC Report- Agri startups: Heralding the next level of agricultural transformation, Feb 2021

FOOD, AGRI AND AGRITECH

RANKING OF THE TOP 10 IDEAS

Investment Idea	Investment Stage	Business Model Validation	Impact on People	Impact on Planet	Need for policy support	Need for investment potential	Technical Maturity	Ease of Scalability
IDEA 1 **Dairy Farming**	◕	◕	◕	◕	◕	◕	◕	◕
IDEA 2 **Sustainable Forestry**	◑	◑	◑	◕	◔	◑	◔	◑
IDEA 3 **Water and Soil Management**	◑	◑	◑	◕	◑	◑	◑	◑
IDEA 4 **Farm Mechanization & Farmgate Infrastructure**	◑	◑	◑	◕	◑	◑	◔	◑
IDEA 5 **Cold Chain and Logistics**	◑	◑	◑	◕	◑	◑	◑	◑
IDEA 6 **Climate Risk Mitigations**	◑	◑	◑	◕	◑	◑	◑	◑
IDEA 7 **Food Fortification**	◑	◑	◑	◑	◕	◑	◑	◑
IDEA 8 **Plant Based Proteins**	◑	◑	◑	◕	◑	◑	◑	◑
IDEA 9 **Bio-inputs and Sustainable Farming**	◑	◑	◑	◕	◑	◑	◔	◑
IDEA 10 **Protected Cultivation, Vertical Farming & Hydroponics**	◔	◔	◑	◕	◑	◔	◔	◔

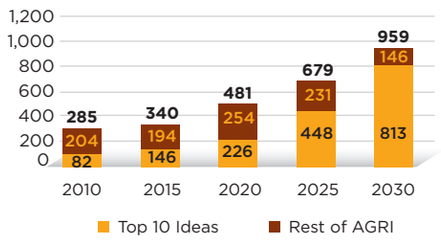
The Changing Face of India's Agriculture through AgriTech

With the advent of farm equipment and technology, India has witnessed an extraordinary growth in farm output which has helped it transform from an import-dependent nation to a self-sufficient one. As a result, the contribution of agriculture exports increased from 8.5 percent in 2009-10 to 12.6 percent in 2018-19, meeting external demand from regions such as the Middle East and Australia.[6] Many critical businesses in secondary and tertiary sectors, such as consumer packaged goods, retail, textiles and e-commerce, rely on agricultural output, thereby increasing agriculture's impact on India's economy. Post the covid-19 pandemic, while the country's agriculture sector has been adjusting to the changing economic and market conditions, there is also a need to set the agenda for the next level of growth and transformation.

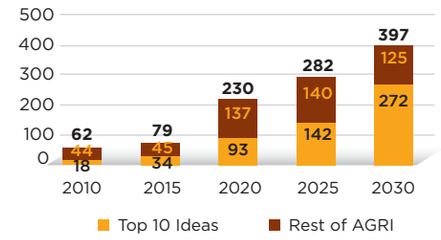
On one hand, the sector is being driven by factors such as a growing population, increased demand for agriculture and food products, and an enhanced focus on doubling farmers' income. On the other, the overall ecosystem is being constrained by systemic challenges that are leading to reduced resource use efficiency and farm incomes. Small and fragmented landholdings, lower yields compared to global benchmarks, and uncertainties and risks involved in traditional farming are some of the challenges in Indian agriculture.

At the pre-production stage of the agriculture value chain, enhancing per unit productivity while conserving natural resources is an urgent need. This calls for impact investment in better water and soil management practices and adopting bio-inputs for safer and sustainable farming. At the production stage, the ecosystem

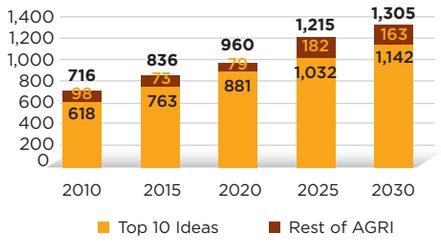
Revenues (USD Bn)



Investment (USD Bn)



People Impacted (Mn)



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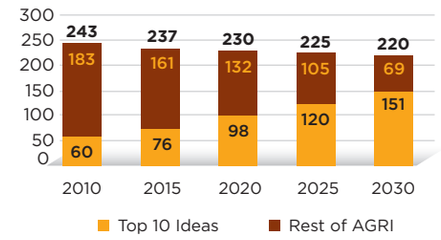


is grappling with challenges such as limited farm manpower, emigration of farm labourers to the non-farm sector and fragmented and shrinking landholdings affecting economies of scale. To address these challenges, adoption of future-ready farm mechanisation and enabling farmgate infrastructure are important interventions with significant impact potential. At the post-production level, investments can be directed towards value addition and wastage reduction to meet future food and nutrient requirements. Total harvest and post-harvest losses amounted to USD 14 billion in 2018,[7] indicating the need for impact investments in technology-based cold chain and integrated logistics. In order to ensure health and nutritional security, opportunities could also be pursued in fortification of foods and seeds.

Between April 2000 to March 2019, India attracted more than USD 9 billion in Foreign Direct Investment (FDI) in the agriculture sector. Nevertheless, the sector is predominantly operating in the age-old way, without much transformation in terms of technology use and innovation. At the same time, the country boasts of more than 600 startups in agritech, with one in every nine agritech startups globally. Agritech startups in the country are growing at 25 percent year-on-year. As per a report by the National Association of Software and Service Companies in 2019, Indian agritech startups attracted USD 250 million in venture funding in 2019, more than three times the amount of funding in 2018, and are likely to attract more than USD 500 million in next few years. With a massive boost to agritech funding, more than 48 percent of agritech CEOs in the country believe that they will have the next agritech unicorn within a three-year time frame. Early-stage investment in these startups has been led by regional investors such as Aavishkaar, Accel, Ankur Capital, Beenext and Omnivore while the series rounds have attracted global investors such as Blume, Nexus, Sequoia, Tiger Global and RTP.[8]

India is undergoing a policy transformation with multiple initiatives in place to support the overall development of agriculture and allied sectors. Also, there is an increased focus on doubling farmers' income, developing market linkages, ensuring quality and timely input supply, promoting investments across the value chain and technology integration. The policies are well designed in terms of tackling the vulnerabilities and challenges in sub- sectors. However, the integration of Environmental, Social and Governance (ESG) goals and sustainability aspects with an enhanced focus on responsible and impact investments will be important in the coming days.

The Impact Future Project (IFP) has been conceptualized by Aspire Impact aims to generate ideas to help India becoming a USD 10 trillion economy by 2030 and contain poverty, unlocking USD 1 trillion for investment in SDGs. In line with this, IFP 2021, through its collaborative thought leadership platform, has focused on areas that will help secure the livelihoods of large population and innovative and impact ideas in the agri-ecosystem that require investment focus in the medium and long term. Among thematic investment areas, prospects for impact investments in dairy, vertical farming and hydroponics, plant-based proteins, responsible investments in sustainable forestry, and climate risk mitigations in agriculture have been identified, as described in detail in subsequent sections.

[6] http://agriexchange.apeda.gov.in/indexp/reportlist.aspx and PwC analysis

[7] https://www.fao.org/3/ca6030en/ca6030en.pdf

[8] https://www.ibef.org/blogs/agritech-start-ups-the-ray-of-hope-in-indian-agriculture

INVESTMENT IDEA 1

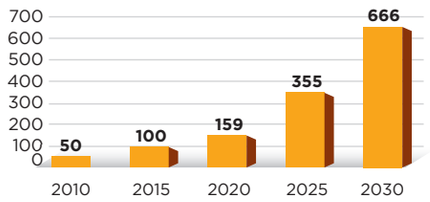
Dairy Farming

India is the largest milk producing country with an aggregate production of 198 million tonnes in 2019-20.[9] The overall agricultural and allied sector's output value in country is estimated at around USD 373 billion wherein the milk's contributions is more than 25 percent of the total value of output.[10] With the rise in population, urbanisation and an enabling policy environment for dairy sector, it is estimated that India would require around 600 million tonnes of milk per year to fulfil the demand for milk and milk products in 2060 and onwards.[11] It infers that India's milk production has to grow at around 3.2 percent CAGR for the next 40 years.

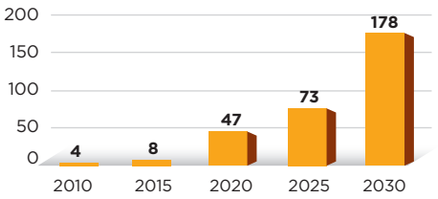
Though, there is a robust current and estimated future demand base for dairy in India, the livestock sector is grappling with multiple challenges such as low productivity, large population of unproductive cattle, absence of effective extension system, low health care, immunization and hygienic programme, lack of cold chain logistics, unorganised marketing, etc.[12] Another constraint area for overall dairy sector development is the unavailability of quality fodder and feed, majorly due to inadequate fodder seed production, market linkages, and very low seed replacement rate.

For a progressive future of the dairy sector the cost of milk production need to be brought down along with ensuring remunerative and sustainable value chain. Investment ideas for dairy sectors include product innovations and increased processing efficiency, Traceability, Technology innovations in niche dairy products such as flavoured camel milk powder, camel milk-based skincare products or goat milk ghee, Tech enabled milk and milk-product delivery platforms, Technology needs in genetic breed improvement, forage management, Artificial Insemination, disease management etc.

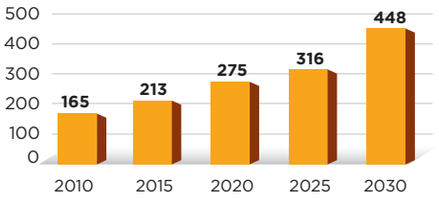
Revenues (USD Bn)



Investment (USD Bn)



People Impacted (Mn)



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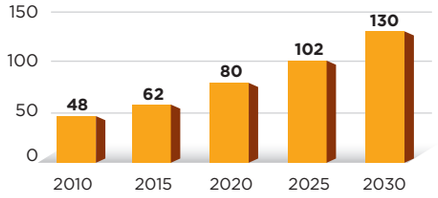


To convert these investment ideas into ground realities, ecosystem backstopping is required at 2 levels:

- **Capability enhancements**: Improving awareness on health, nutrition and farm management in dairy - Training and capacity building of Milk FPCs and Cooperatives; Improved scheme awareness and stakeholders' participation: National Programme for Dairy Development (NPDD), Dairy Entrepreneurship Development Scheme (DEDS), Dairy Processing and Infrastructure Development Fund (DIDF), Animal Husbandry Infrastructure Development Fund (AHIDF)

- **Process innovations, re-engineering and policy support**: Product and process innovations and focus on specialty products (such as buffalo milk-based mozzarella cheese); strategies for infrastructure development such as focusing production, processing and marketing infrastructure to meet international quality requirements; optimizing production cost to increase the competitiveness of Indian dairy industry; increasing productivity of animals, improving animal health care and breeding facilities; incentivize exports and exploring options for specialized dairy product exports ; promote commercial cultivation of fodder; developing ways to bridge the gap between demand and supply of green, dry and feed of livestock.

In order to scale up the prospects of impact investment in Dairy, 2 potential areas with scalable business models have been identified and presented herewith:

1. **A multi-stakeholder managed end-to end supply chain**: A robust dairy supply chain will always require a well-managed backend at the level of cattle health and yield management. A collaborative or integrated business model interweaving the key stakeholders at each level of supply chain will help in optimizing the overall cost of production and will make the supply chain more remunerative. With advancements in forage management, the nutrient requirements need to be adjusted and balanced scientifically for higher milk producing animals.

2. **Incentives and market support mechanisms to augment exports**: The sustainability of dairy lies in ensuring that the farmers continue to get remunerative prices for the milk sold to processor in private sector as well as in cooperatives, which could be achieved better while participating in exports' supply chain. There is a huge potential for augmenting dairy exports from India. A stable policy framework with due impetus on Dairy exports will ensure and allow the stakeholders to customise their business models with medium- to long-term plans and hence creating a strong proposition for an Indian dairy export product.

Looking at the current opportunities, future prospects and enabling government policy measures, investability options have been identified and have been presented herewith:

- R&D in genetic breed improvement, forage management, artificial Insemination, disease management etc.
- Impact investments in product innovation with flavoured and fortified milk from different sources including plant based.
- Processing and marketing infrastructure
- Improvised temperature controlled logistic solutions
- Micro-chillers and controlled temperature collection centres at rural level
- Tech enabled milk and milk-product delivery platforms

Dairy industry is highly fragmented, with about 60 percent surplus milk being handled by the unorganised sector. Such fragmented presence of suppliers and retail outlets pose a major challenge in the adoption of technology-based solutions and innovations in product and process development.

[9] https://www.nddb.coop/information/stats/milkprodindia

[10] https://ficci.in/spdocument/23304/Development-Dairy-Sector.pdf

[11] Ramsinbhai P Parmar, Chairman, GCMMF at 45th Annual General Body Meeting, 29th May, 2019

[12] Demand and Supply Projections towards 2033: Crops, Livestock, Fisheries and Agricultural inputs, The Working Group paper, February, 2018, Niti Aayog

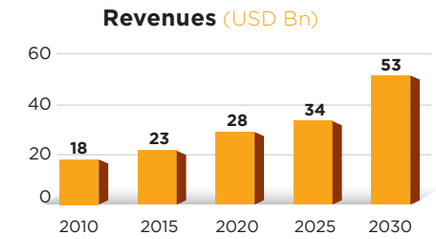
INVESTMENT IDEA 2

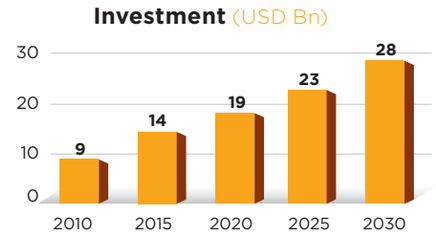
Sustainable Forestry

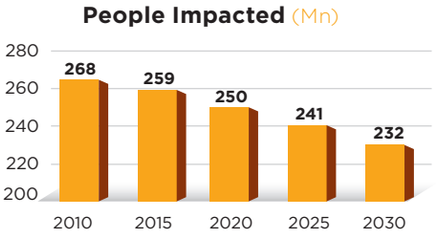
Forests are rich sources of energy, housing, firewood, timber, fodder and employment for a large section of the rural population of the country. Forests contributed 1.7 percent to India's GDP in 2010 well below 2.6 percent in the 1950s but it has been aimed to reach 3.4 percent by 2025.[13] At the same time, with increasing population and food demand, forest resources have become more prone to overutilization than earlier with a challenge of 55 percent of country's forests being prone to fire and 70 percent have no natural regeneration. The other challenges plaguing the forestry sector are less productivity of forests, undervaluation of forest products and ecosystem services, climate change related constraints etc.

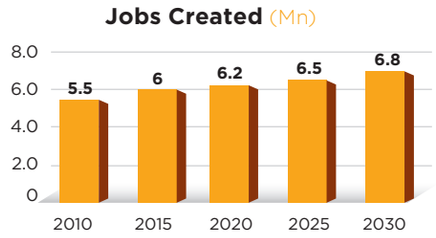
While addressing the aforementioned challenges, sustainable forestry has the potential to contribute many of the SDGs as well such as protection, restoration and management of natural resources, maintaining ecosystems and biodiversity, enhancement of economic growth, poverty and hunger alleviation through food security, employment generation etc. Key opportunities in sustainable forestry in India include conservation of forest resources, biodiversity, forest health and vitality, socio-economic functions of forest resources, convergence with ongoing initiatives such as MGNREGA, NRLM and utilization of institutional and policy framework (forest certification and eco-labelling – 89 percent of world's forests are still uncertified), scaling up innovative forest management models.

Investment ideas under sustainable forestry includes development and management of manmade forests, Adoption of Smart Forest technology solutions such as digital asset registration systems and forest research using high-precision data, smart sensors or green bots to curtail illegal logging,









detecting decayed trunks, assessing a tree's vulnerability to being affected by natural gas leaks at the root level, tech-based forest certification etc. To convert these investment ideas into ground realities, ecosystem backstopping is required at 2 levels:

- **Capability enhancements**: Knowledge and skill enhancement of tribal communities to promote participatory forest-management approach; Development and facilitation of partnership models involving state governments, private organizations, ecologists, environmentalists, environmental non-government organizations (NGOs), and relevant academicians to promote smooth and large-scale adoption of green bots and other technology solutions; Skilling and capacity building of tribal communities / forest department officials/rural entrepreneurs on conservation of forest resources, biodiversity, forest health and vitality, socio-economic functions of forest resources

- **Process innovations and reengineering**: Plantation activities on waste and degraded land; Agroforestry, farm plantations with buyback arrangement from Oil Marketing Companies (OMCs); Develop suitable area / region specific bankable projects on Forestry (including agroforestry, wasteland development, nursery development); Encourage forest certification (both area certification and product certification); Forest monitoring, tracing and labelling of timber and non-timber forest products etc.

In order to scale up the concept of sustainable forestry, 2 potential areas with scalable business models have been identified and presented herewith:

1. **Promotion of innovative and remunerative agroforestry systems**: Forestry is moving towards a well-organized eco-system with enhanced focus on sustainability comprising of stakeholders such as Pulp and paper-based industry players, Matchwood industry, Timber and plywood players, tribal communities, forest department officials and rural entrepreneurs. In order to make the value chain remunerative for the entire ecosystem players, innovative agroforestry models shall be adopted such as Energy plantation based cropping systems (trees + crops during initial years); Agri-horticulture (fruit trees + crops); Agri-silvi-horticulture (trees + fruit trees + crops); Agri-silvi-pasture (trees + crops + pasture or animals); Silvi-olericulture (tree + vegetables) etc.

2. **Institutional collaborations to promote sustainable forestry**: Though, forest-based Industries are entering into bi/tri partite contract farming arrangement to scale up their businesses and to increase the overall price realization for growers with assured buyback, it has to be facilitated further through institutional collaborations involving all stakeholders associated with forestry.

Looking at the current opportunities, future prospects and enabling government policy measures, investability options have been identified and presented herewith:

- Scaling up innovative forest management models around Non-Timber Forest Product
- Innovative agroforestry systems
- Forest certification
- Community based forest models
- Smart Forest technology solutions such as Digital asset registration systems and forest research using high-precision data
- Smart sensors or greenbots skilling and capacity building of communities and forest department officials

Adoption of sustainable forestry may not be adopted at expected pace in different geographies and would require extensive coordination and collaboration among the ecosystem players. Establishment and growth of tech- based forest farming and management eco-system would require a stronger regulatory and policy framework while instilling the confidence among tribal communities and farmer groups.

[13] https://www.nccf.in/wp-content/uploads/2020/05/NCCF-PPT_CB-Webinar_15.05.2020.pdf

INVESTMENT IDEA 3

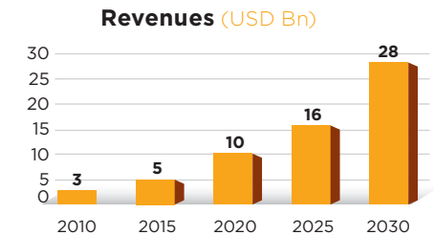
Water and Soil Management

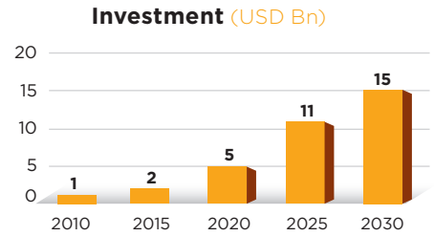
Enhancing productivity while conserving natural resources such as soil and water, is crucial for food as well as environmental security. The efficient use of natural resources is an integral part of sustainably developing Indian agriculture. Approximately 90 percent of freshwater extracted in India is used for agricultural purposes, with groundwater contributing 62 percent of all water used for irrigation in the country. The rate of groundwater extraction in India is so high that water tables are depleting at a rate of 0.3 meter per year. Rice, wheat, cotton and sugarcane together consume up to 70 percent of all the water used in agriculture.[14] This calls for the efficient utilisation of available water resources while enhancing water-use efficiency (WUE) in agriculture and reducing virtual water trade through exports. For efficient soil and nutrient management, the agriculture sector needs to increase its focus on replenishing the soil with essential nutrients, which will further help raise productivity.

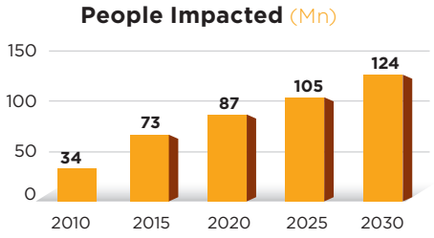
Investment ideas in better water management include smart crop diversification, increased adoption of micro-irrigation systems, Variable Rate Technology (VRT) and GPS- / satellite image-based irrigation and precision irrigation technologies using AI and Robotics. Similarly, in soil and nutrient management, impact investments can be made in the promotion of organic and bio-fertilisers, customised fertilisers, fortified fertilisers, micronutrient mixtures and precision fertigation.

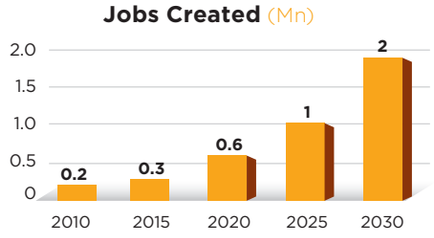
To successfully pursue these investments, ecosystem backstopping is required at two levels:

- **Capability enhancements**: Training, institution and capacity building of small and marginal farmers on water efficient irrigation practices such as MIS, promotion of participatory irrigation through training and exposure, formation of Water User associations and groups,









community-based micro irrigation systems (e.g. solar powered MIS), farmer awareness and capacity building on prescription-based nutrient application, application precautions, balanced plant nutrition and faster adoption of micronutrients and fortified fertiliser

- **Process innovation**: Promoting sustainable water and nutrient use management through better adoption, access to finance, strengthening of soil testing infrastructure

Three approaches with scalable business models are as follows:

1. **Assessment studies to scale up watershed management**: Watershed management is an important and well-proven technique for efficient and sustainable use of water, soil and other natural resources in a community-based approach. In order to augment or scale up an existing watershed, detailed assessment of a given geography, socioeconomic profile of farmers, cropping pattern, soil health status, and availability of water resources must be estimated. The ultimate aim should not only be to increase irrigation outreach but also to promote sustainable water and nutrient-use management.

2. **Innovative financing models promoting rapid adoption of micro-irrigation**: To address the challenges of high initial capital investments, loan availability and delay in subsidy transfer, new and innovative financing models for especially for micro-irrigation need to be adopted. Incentives and low cost financing options with easy documentation can facilitate is larger adoption of micro-irrigation practices.

3. **Promoting and documenting innovative water and soil management techniques**: Innovative practices including promotion of participatory irrigation, reducing water wastages across the agri value chain (farmer incentive programs), promoting bio-pesticides and smart crop diversification are necessary for efficient use of water in agriculture. Documenting the best practices adopted by ecosystem players is just as important as promoting innovative water and soil management practices. Some of these outcome indicators include the quantum of water potential created through conservation efforts, improvement in ground water levels, water saved through improved agricultural practices, benefits to farmers through yield and income improvement and effectiveness of community-led institutions on the governance of shared water assets etc.

Looking at the current opportunities, future prospects and enabling government policy measures, investability options have been identified under both the ideas and have been presented herewith:

Water use management

- Smart crop diversification
- Promotion of participatory irrigation,
- Micro irrigation systems (MIS)
- Digital irrigation
- Variable rate technology (VRT) and GPS / satellite imaging-based irrigation
- Nanotechnology-based irrigation,
- Precision irrigation technologies using artificial intelligence (AI) and robotics

Soil and nutrient management

- Promotion of organic and bio-fertilizers
- Promotion of customized fertilizers
- Fortified fertilizers
- Precision fertigation

Adoption of innovative soil and water management techniques may not be adopted at larger scale and geographies in a limited timeframe and would require extensive coordination and collaboration among the ecosystem players.

[14] Creating an ecosystem for increasing WUE in agriculture, PwC- FICCI, March 2021

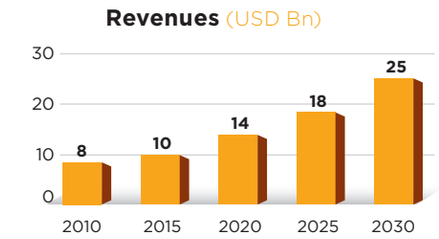
INVESTMENT IDEA 4

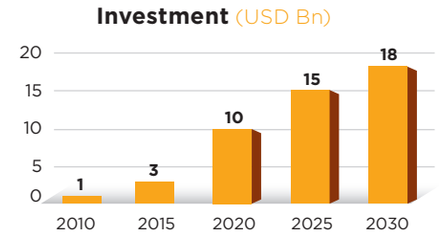
Farm Mechanization & Farmgate Infrastructure

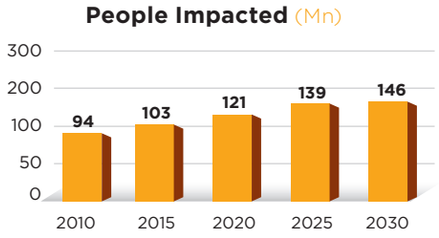
Agriculture is the primary source of livelihood for about 58 percent of India's population. India's agriculture sector accounts for around 16.5 per cent of the country's USD 3 trillion economy and 49 percent of total employment (2019-20).[15] Nevertheless, the sector has been grappling with systemic constraints, which has led to stagnation in per unit farm productivity. Fragmented landholdings preventing economies of scale, emigration of farm labourers to the non-farm sector, drudgery involved in farm activities, supply demand mismatch, limited value addition, weak farmgate infrastructure, limited access to finance and institutional credit, and a subsidy-driven market are major challenges to the sector's growth.

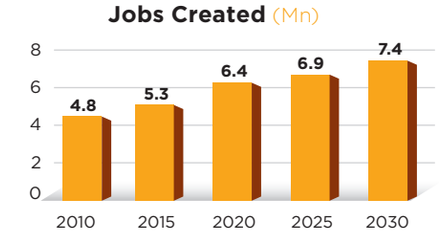
The Indian farm equipment market stands at USD 13 billion, with a 7 percent share of the global market and projected to grow at 6 percent CAGR between 2018-19 and 2024-25. Currently, the mechanisation level in India is 40-45 percent, which is very low compared to that in developed economies, where it has crossed 90 percent.[16] Adoption rates of farm equipment have been on the rise, with increased sales of tractors and rise of Farm Power Availability (FPA) in the last few years, indicating scope for investment. There is also a large opportunity in micro-warehousing and micro-processing infrastructure development at the farm gate level, to enhance farmers' access to markets and increase their net incomes. To convert these investment ideas into ground realities, the ecosystem needs to be reinforced at two levels:

1. **Capability enhancements**: Dissemination of the best mechanisation technologies to farmers and extension agencies through training, demonstrations and mechanisation fair cum exhibitions, farmgate skill upgrade through promotion of Skill Development Centres (SDCs), skilling and capacity building of farmers / rural entrepreneurs on the importance and use of farmgate infrastructure









2. **Process innovations and reengineering**: Efficient scheme implementation and delivery mechanisms, promoting CSR initiatives to set up Custom Hiring Centres (CHC) and distributed cold storage in a public-private arrangement, ensuring improved access to finance, cluster-focused or FPO-nabled approach in strengthening farmgate infrastructure

To scale up future-ready farm mechanisation and enabling farmgate infrastructure, three areas with scalable business models have been identified:

1. **Improving affordability through pay-per-use and Institutional collaboration**: To increase affordability and the use of costly mechanised solutions (e.g., robotics and AI based) among small and marginal farmers, pay per use or rental CHC models (farming as a Service), and institutional collaboration involving funding agencies, government, FPO, farmgate players, village level entrepreneurs and input dealers should be explored.

2. **Promoting Climate smart mechanisation through institutional collaboration**: Agritech startups could collaborate with banking and insurance companies (Agri-FinTech) to encourage small and marginal farmers to adopt climate-smart mechanised solutions and drone use for agricultural purpose.

3. **FPO-MSME-Agtech partnerships to establish farm gate infrastructures**: To reduce post-harvest losses (currently around 40 percent in India) and to increase overall price realisation for farmers, establishing micro-warehouses, micro-processing infrastructure, distributed cold storages micro cool chambers and other measures could be pursued.

Looking at the current status of FPA across the country, it is evident that mechanisation status and needs vary across states. There is also a need to promote and devise strategies customised to crop- and state-specific needs. The rest of this section describes current opportunities, future prospects, enabling policy measures, and investment options in both these areas.

Future-ready FM

- Specialised equipment for small and marginal farmers,
- Shared utility or IT-enabled aggregation,
- Crop-specific and state-specific mechanisation priority plans
- Climate smart and gender-neutral mechanisation - happy seeders, dry seeded rice, system of rice intensification, zero-tillage etc.
- Mechanisation around Farming as a Service (FAAS), IoT and AI.

Farm gate infrastructure

- On-farm sorting and grading units
- Doorstep scientific storage units
- On farm processing centres
- Distributed cold storages, etc.

Labour intensive farm operations involve a lot of drudgery and stress. Such intensive operations call for the faster adoption of suitable and modern farm mechanisation techniques. Modern mechanisation technologies should not be considered as labour replacement interventions, but promoted as an opportunity creator with superior impacts such as increased per unit farm productivity, increased farm operations efficiency, improved employment and entrepreneurship opportunities, skill enhancement and livelihood opportunities for rural youth. These interventions need to be assessed through pilot studies in collaboration with impact investors and funding agencies.

[15] 2019-20, Handbook of Statistics on the Indian Economy, Reserve Bank of India

[16] World Bank Open data 2019, FederUnacoma, PwC analysis

INVESTMENT IDEA 5

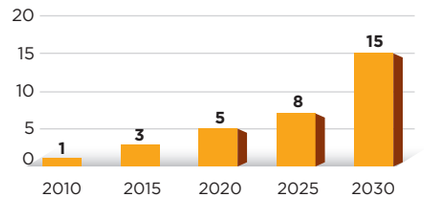
Cold Chain and Logistics

A major challenge faced by the agribusiness and food processing industry in India is the extent of wastage across the value chain of perishables. As per a study conducted by Central Institute of Post-Harvest Engineering and Technology, Ludhiana the total harvest and post-harvest losses amounted to USD 14 billion in 2018. The wastage levels in India vary across categories, with highest wastages in the F&V and Marine sector. This call for a huge opportunity in technology based cold chain and integrated logistics in the country.

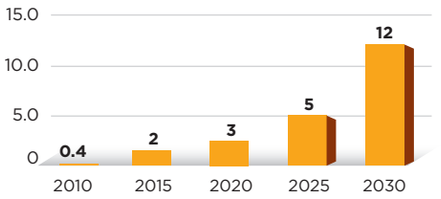
Currently, the cold chain industry for agricultural purposes in India is at a nascent stage and despite large production of perishable produce, the cold chain potential still remains untapped due to high share of single commodity cold storage, high initial capital investment (for refrigerator units and land), lack of enabling infrastructure like power and roads, limited awareness for handling perishable produce and lapse of services either by the storage provider or the transporter leading to poor quality produce. The National Centre for Cold Chain Development (NCCD) has identified a gap of 3.2 million metric ton in cold storage capacity, more than 69,000 packhouses, more than 50,000 reefer vehicles and a gap of around 8,000 ripening chambers in India. It is a highly fragmented industry and the unorganized sector accounts for an estimated 80-85 percent share of the total capacity.

Investment ideas under tech based cold chain and logistics shall include farmgate micro cool chambers, Doorstep Scientific storage solutions- flexible and mobile cold storage solutions, Adoption of clean energy-based technology solutions instead of grid electricity, Passive cooling system to service the last mile with reduced risks and dependency on connected powers, affordable instant milk chillers etc. To convert these investment ideas into ground realities, ecosystem backstopping is required at 2 levels:

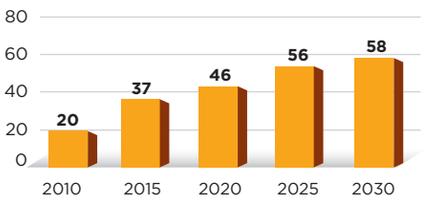
Revenues (USD Bn)



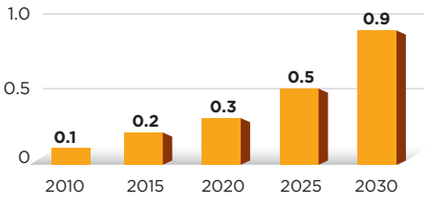
Investment (USD Bn)



People Impacted (Mn)



Jobs Created (Mn)



- **Capability enhancements**: Dissemination of best available technologies to farmers and extension agencies through trainings and demonstrations, Development and facilitation of PPP models for the establishment and operation of specific training facilities like SDCs for cold chain and integrated logistics personnel involved in agri and food processing, Skilling and capacity building of farmers / rural entrepreneurs on importance and usages of cold chain infrastructure.
- **Process innovations and reengineering**: Automation of supply chain to improve efficiency (reduce cost and deliver quality produce) and traceability, Reducing logistics cost and turnaround time in completing a trade, Reduction in cost towards grid electrical energy for operating the cold storage system, Promoting CSR initiatives to set up distributed cold storages in a PPP arrangement, Ensuring improved access to finance, Cluster focused or FPO enabled approach in strengthening farmgate cold chain and logistic infrastructure

In order to scale up the concept of Tech based cold chain and logistics in agriculture in the country, 2 potential areas with scalable business models have been identified and presented herewith:

1. **A one-stop shop model to offer end to end cold chain and logistics solution**: The Cold Chain industry India is moving towards greater efficiency, optimizing end-to-end logistical progress, providing one stop shop cold chain solutions, and taking benefit of the growing number of third-party logistics. Other than storage and distribution, the Cold Chain operators may provide value added services like order processing, packaging, sorting, grading, etc. to create new revenue streams.
2. **Promoting affordable and innovative cold chain solutions through institutional collaborations**: Cold chain operators may adopt energy-efficient practices as part of their strategy to reduce the operating costs. These practices include energy recovery systems, water reclamation systems, solar energy, refrigeration plugins, energy-efficient designs of refrigeration equipment and automation are some of the innovative features. To mitigate the challenges of funding, innovative financing models such as asset financing model, leasing models etc. should be explored while leveraging the benefits of enabling government policy measures in this space such as Agri Infrastructure Fund.

Looking at the current opportunities, future prospects and enabling government policy measures, investability options have been identified and presented herewith:

- Cold Chain Remote Monitoring System
- Mobile- Pre-cooling unit
- Affordable instant milk chiller
- Farmgate micro cool chambers
- Doorstep Scientific storage solutions- flexible and mobile cold storage solutions
- Adoption of clean energy-based technology solutions instead of grid electricity
- Passive cooling system to service the last mile with reduced risks and dependency on connected powers

Adoption of cold storage and logistics should not be considered as high capital investment interventions, but it needs to be promoted as an opportunity creator with superior impacts such as increased market reachability improved value chain efficiency and improved employment and entrepreneurship opportunities. A tech based cold Chain industry would demand for more skilled workforce in various areas such as forklift reach truck operators, refrigeration technicians. In this context, the Government's Skill India Initiative with major focus on training and skilling will help boost the sector in a big way.

INVESTMENT IDEA 6

Climate Risk Mitigations

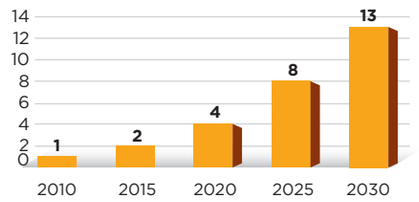
Global warming and climate change have been the major concerns for both the developed and developing economy. Recently, 2019 has been the second hottest year in 140 years after 2016. Such variability in climate accentuates calamities such as unseasonal rainfall, hailstorms, drought, dry spell, sudden pest attacks, sediment discharge, and drainage of river systems etc. This eventually leads to weak resilience, increased vulnerabilities in crop production and reduced livelihood opportunities.

India is at the biggest production risk with more than half (68 percent) of the cultivation area directly depend upon the monsoon which accounts for about 40- 45 percent of the total agriculture production. India is losing 10-40 percent in crop production due to rise in temperature.[17] In order to promote climate risk mitigations in agriculture, GoI has taken many steps in promoting adaptive measures including ex-ante measures (flood proofing, drought proofing, watershed management, extension of irrigation facilities etc.) before the event of crop loss and ex-post measures (risk coverage by Crop insurance: PMFBY) to cope up with climatic aberrations.

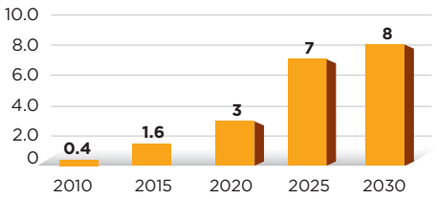
Investment ideas for climate risk mitigation in agriculture include following:

- Water-smart technologies (Laser land levelling, rainwater harvesting, micro-irrigation, crop diversification, raised-bed planting, direct-seeded rice)
- Nutrient-smart technologies (precision nutrient application, leaf color charts, crop residue management)
- Weather-smart technologies (stress-tolerant varieties, ICT based agro - meteorological services)
- Carbon-smart technologies (zero tillage, crop residue management)

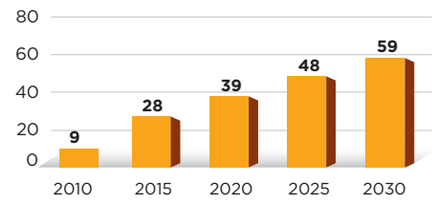
Revenues (USD Bn)



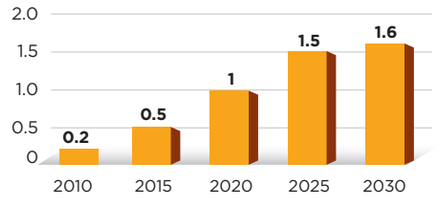
Investment (USD Bn)



People Impacted (Mn)



Jobs Created (Mn)



- Applications of emerging technologies such as satellite imagery, remote-sensing technology, drones, artificial intelligence and machine learning to assess crop losses
- Technology solutions to innovate crop and region-based insurance products (Agri- Fintech solutions)

To convert these investment ideas into ground realities, ecosystem backstopping is required at 2 levels:

- **Capability enhancements**: Awareness and capacity building of stakeholders on adoption of improved climate risk mitigations techniques and conservation agriculture; Assessing the behavioral change in farmers due to adoption of mitigation measures (Impact assessment)
- **Process innovations and re-engineering**: Channelizing Farmers' investment – Changing into need-based input use; diversification of crop portfolio (e.g diversification from paddy and sugarcane to millet) and adoption of climate smart technologies; Creation of a new policy ecosystem to promote sustainable Water and Soil management, Crop mgmt., livestock mgmt., food energy systems and agroforestry: Better adoption, convergence, access to finance etc.

In order to scale up the better adoption of climate risk mitigation practices, 2 potential areas with scalable business models have been identified and presented herewith:

1. **Product innovations and collaborations for increased adoption**: Solving for climate risk needs a holistic, collaborative approach through policy intervention, investment and innovation. Agri startups need to collaborate and engage with banking and insurance companies and innovate crop and region-based credit and insurance products (Agri–Fintech solutions) in such a way that encourages small and marginal farmers to readily adopt climate resilient solutions. The incentives to farmers could be in the form of interest subvention and ultimately it should reduce the premium on loan and insurance products.
2. **Innovative financing and revenue models to increase affordability and adoption**: It is an established fact that a high initial capital investment is the major challenge in the wider adoption of climate resilient solutions in the country, especially among small and marginal farmers Facilitation through financial support under GoI flagship programs such as PM-KUSUM to channelize farmers' investments on more efficient energy usages could be a noteworthy initiative herein. Drip Pool Program promoted by AKRSPI in Gujarat is a salient example of innovative financing which has not only helped small and marginal farmers in Gujarat to afford and adopt the drip irrigation technology on a faster and wider scale, but also has transformed the rural livelihoods.

GoI has launched various initiatives in the form of policies to encourage climate risk mitigation activities in agriculture to maximize the productivity consistently year on year.

Looking at the current opportunities, future prospects and enabling government policy measures, investability options have been identified and have been presented herewith:

- Precision and AI based technologies
- Impact investments in Water Smart, Nutrient smart, Weather Smart and Carbon smart technologies
- Technology solutions to innovate crop and region-based
- Insurance products (Agri- Fintech solutions)

Adoption of Climate risk mitigation activities may involve a high initial capital and time investment which may act as a deterrent in its ready acceptance. Also, climate resilient techniques may not be adopted at larger scale and geographies in a limited timeframe and would require extensive coordination and collaboration among the ecosystem players. Based on detailed assessment of key takeaways including need gap identification, technology solutions, collaboration and implementation modalities, true potential of these investment ideas can be further worked out.

[17] https://www.jstor.org/stable/24078512

INVESTMENT IDEA 7

Food Fortification

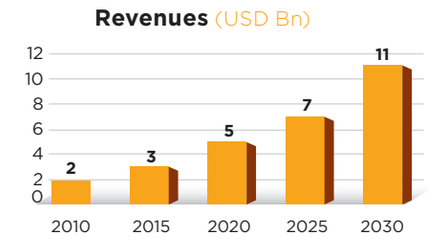
A study done by Global Alliance for Improved Nutrition (GAIN) shows that ~ 26 percent of India's population around 268 million are considered food insecure, consuming less than 80 percent of minimum energy requirement.[18] India accounts for one-third of the global burden of stunted children under the age of five.[19] In this context, agriculture has an important role to play in not only improving the farmer's income but also in leveraging the nutrition and health of the country.

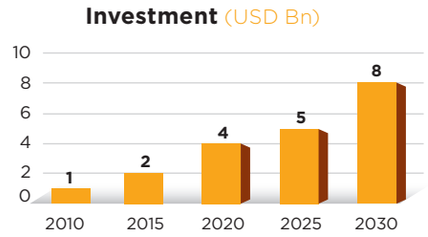
Fortification is a proven and cost effective (<0.1 percent of MRP) approach to mitigate the malnutrition and related challenges. In India, impacts of fortification are quite evident such as introduction of Fortified Wheat Flour in PDS during 2012-14 brought down anaemia levels at national level; fortification of edible oil and milk brought down the levels of Vitamin A deficiency in children (CNNS 2016-17) in Rajasthan.

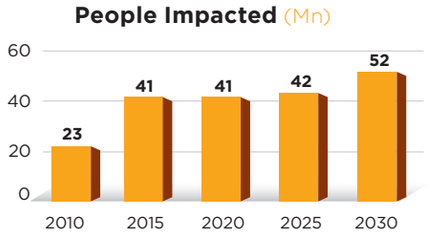
Keeping in mind the health and nutritional security among Indians, the potential investment ideas in fortified foods and seeds include promotion of bio-fortified seeds (Vit A, Zn, Fe), Fortified ready to eat products, meet global standards in fortification methods and processes and enhance R&D opportunities in seed and food fortification.

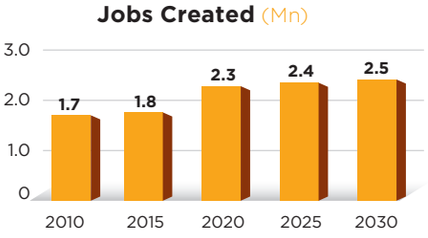
To convert these investment ideas into ground realities, ecosystem backstopping is required at 2 levels:

- **Capability enhancements**: Training, capacity building and collaboration opportunities for the staple food industry on appropriate fortification methods and processes for each staple; and enhanced internal quality assurance and external quality control; building multisector partnerships to popularize fortified foods and seeds; providing technical assistance to government and industry partners (Sharing Indian and global experience as well as good practices on fortification, conducting sensitization workshops and consultations with all stakeholders including FSSAI, FSOs and state FDAs, M&E support, Linking food industry to accredited suppliers and NABL labs)









- **Process innovations, re-engineering and policy support**: Establishing correlation between agriculture and nutrition areas (Nutrition Sensitive Agriculture) and implement related enabling policies (National Agri Nutrition policy); reducing production cost through BPR to bring affordability, leading to greater impact on target micronutrient deficient consumers; ensure mainstreaming of fortified foods into the public funded programmes like the ICDS, MDM and PDS; exploring processing and FP opportunities; Strengthen regulatory monitoring to ensure the quality and safety of fortified foods and seeds; Strengthen distribution mechanism and scaling up of bio-fortified seeds.

In order to scale up the better adoption of fortified food and seeds, 2 potential areas with scalable business models have been identified and presented herewith:

1. **Convergent delivery mechanism and partnerships to promote food fortification at large**: Food fortification is an area that requires convergence among the initiatives under Ministry of Agriculture and Farmer Welfare (MoAandFW), Ministry of Fisheries, Animal Husbandry and Dairying (MoFAandD), Ministry of Food Processing and Industries (MoFPI), Ministry of Consumer Affairs, Food and Public Distribution (MoCA-FandPD), Ministry of Rural Development (MoRD), Ministry of Women and Child Development (MoWCD), Ministry of Health and Family Welfare (MoHandFW), Ministry of Tribal Affairs (MoTA), NITI Aayog, NABARD, ICAR etc. Such convergence can address the micro-nutrient deficiencies at scale. There are ongoing efforts of large-scale food fortification of staple foods, some of these are already being endorsed by the Government of India and this momentum can be further accentuated with enhanced private sector partnerships, funding agencies and impact investors.

2. **Enhanced RandD and Impact assessment of Bio fortification**: Investing in research to evaluate the impact of bio fortification on the micronutrient status of target groups and on other key variables (e.g. farmer adoption rates, consumer acceptance, cropping and seed systems) could be an important step to understand the scalability of bio-fortification initiative. Accordingly, impact investments in R&D would be required to strengthen the ongoing national agriculture research and extension systems (NARES) efforts and seed producers in order to ensure continuous production of high quality, nutritious seeds.

GoI has launched various initiatives in the form of policies to facilitate the adoption of fortified foods among end consumers and bio-fortification by the farmers and rural entrepreneurs of farming business.

Looking at the current opportunities, future prospects and enabling government policy measures, investability options have been identified under both the ideas and have been presented herewith:

- Bio-fortification of seeds
- Product innovations in ready to eat products such ready to cook food, cut vegetables and snacks etc.
- Exploring R&D, food processing opportunities
- A collaborative private- public distribution system

Adoption of fortified foods/functional foods may face limitations due to existing fear of artificial fortification and would require extensive branding, awareness, Behavioural change campaigns, and strengthened distribution system. Based on detailed assessment of key takeaways including need gap identification, technology solutions, collaboration and implementation modalities, true potential of these investment ideas can be further worked out.

[18] https://www.pfndai.org/Document/Association_News/Delhi%20Activity/Food_Fortification_In_India_Enriching_Food_Lives_-_Ms_Deepti_Gulati_.pdf

[19] Development Initiatives, 2018. 2018 Global Nutrition Report: Shining a light to spur action on nutrition. Bristol, UK: Development Initiatives

INVESTMENT IDEA 8

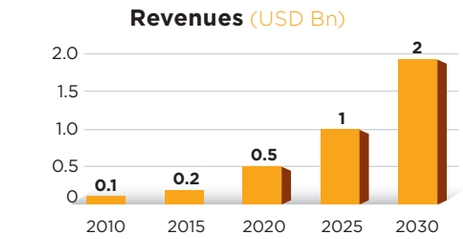
Plant Based Proteins

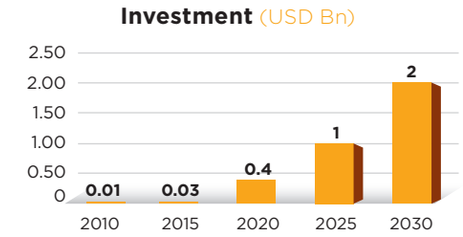
Plant protein market size in India was valued at USD 427 million in FY19 and is expected to grow at a CAGR of 14.5 percent during FY19-24. Soya dominates the Indian Plant protein market.[20] Growth of plant based proteins are majorly being driven by growing population especially middle-income group, crop diversity, greater awareness about fitness and nutrition (Sports nutrition market is expected to grow at 23 percent by 2023), demand surge in vegan products during Covid-19 (40- 60 percent). The key challenges limiting the sectoral growth are low awareness of processed plant protein products, infrastructure challenges and transportation capacities, constrained R&D ecosystem (lowest spending as a percentage of GDP among BRICS nations), high import duties on protein supplements (66 percent) and food processing machineries (27 percent) etc.

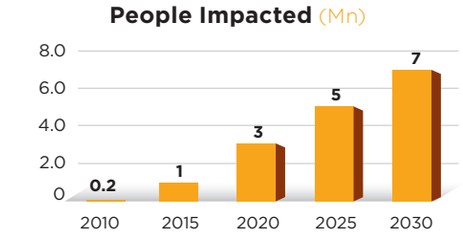
Potential impact investment ideas in plant based proteins include protein supplements (powders/ shakes/bars) from new sources such as pea, rice, quinoa, and almond, product innovations in plant-based dairy-ice cream, yoghurt, cheese and plant-based meats, eggs and seafood, exploring R&D and innovation opportunities (taste, texture and nutritional profile of soy-based meats) etc., meet global standards in protein purification methods, moisture retention technologies and texture techniques.

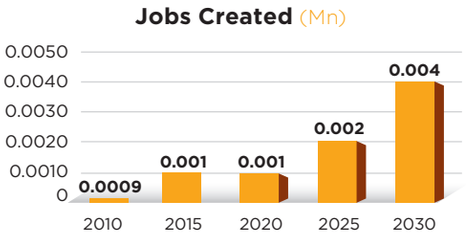
To convert these investment ideas into ground realities, ecosystem backstopping is required at 2 levels:

- **Capability enhancements**: Training, capacity building and collaborations to expand processed plant protein market (85 percent raw plant protein consumption in India); awareness and behavioural change campaign to popularize fitness and nutrition - Targeting youngsters and middle- age population, millennials, vegetarians and flexitarians
- **Process innovations and re-engineering**: Diversification - tapping new protein crops (e.g. pea protein, millets); exploring opportunities with varied applications of plant proteins; reducing production cost through business process reengineering to bring affordability leading to greater impact on target protein deficient consumers; exploring food processing opportunities (millets and sorghum); addressing infrastructure challenges- cold storage and transportation capacities; reducing import duties on protein supplements (66 percent) and food processing machineries (27 percent); investment promotion and facilitation under MoFPI led schemes- to promote plant protein-based startups and MSMEs.









In order to scale up plant-based protein market, 2 potential areas with scalable business models have been identified and presented herewith:

1. **Collaborations for knowledge sharing, R&D and exports**:
   - Knowledge sharing on extraction techniques of legumes seems like an attractive opportunity, as emerging mung bean and chickpea are being explored for different applications like eggs, meat, flours, etc.
   - Research and technology driven collaboration to grow processed product market recipes like burgers, ready-to-cook formats to accommodate Indian tastes and texture which compliment Indian taste buds.
   - A collaborative model with MSMEs, APEDA, food processing units, funding agencies will enable a conducive environment for the growth of this segment.
2. **Innovative marketing model to scale up the acceptance**: High premium pricing of the extracted plant-based protein pose as a major deterrent in the acceptance of the premium products. Introduction of an organized marketing model which includes categorization and identification of the targeted consumer segments with targeted positioning techniques will enhance the acceptance of Plant based protein products.

Looking at the current opportunities, future prospects and enabling government policy measures, investability options have been identified under both the ideas and have been presented herewith:

Enabling government policy measures / initiatives

- 100 percent FDI in food processing sector
- Grant in aid of maximum of USD 100 million for plant and machinery, storage infrastructure, value addition infrastructure and irradiation facilities
- Ministry of Health and Family Welfare , along with FSSAI promoted inclusion of protein-rich, plant-based food to consumer diets, to build a strong body and good immunity during COVID-19

Investability Options

- Protein supplements (Powders/shakes/bars) from new sources such as pea, rice, quinoa, and almond
- Product innovations in plant-based dairy-Ice-cream, yoghurt, cheese and plant-based meats, eggs and seafoods
- Exploring R&D and innovation opportunities (taste, texture and nutritional profile of soy-based meats) etc.
- Protein purification methods, moisture retention technologies and texturizing techniques
- Innovation in plant protein processing: Precision breeding for crop optimization, Upstream approach to manufacture raw plant protein ingredients

While Indian are massive consumers of raw plant product like lentils and pulses, processed products awareness and acceptance is prominent among urban consumers only but it is slowly picking up in smaller cities also through private marketing campaigns.

[20] Quest for Plant Protein India 2020, Euromonitor International 2020

INVESTMENT IDEA 9

Bio-inputs and Sustainable Farming

Enhancing productivity level of crops, while conserving natural resources such as soil, water and air is crucial for food as well as environmental security. Efficient use of natural resources is an integral part of sustainable development of Indian Agriculture. Agricultural practices are one of the potential sources of GHG emissions, with ~18 percent of carbon dioxide (CO2) emission. India's contribution to global GHG emissions rose by an alarming 4.7 percent in 2016, when India became the third largest GHG emitter after the United States and China. Most GHG emissions from Indian agricultural sector are occurring at the input manufacturing stage, followed by usage, farm mechanization and irrigation practices.[21] This calls for limited usage of chemical farm inputs and improved adoption of bio-inputs and sustainable farming.

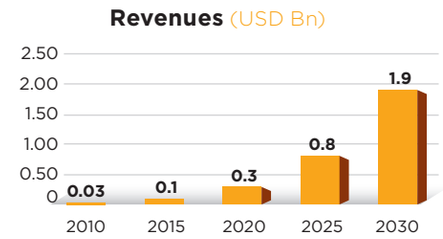
With the advent of Covid-19 pandemic, consumers have become more conscious about the traceability in the food supply chain including residue levels and an increased alienation towards healthy organic foods. A study shows that in last 4 years, the consumption of chemical pesticides grew at 6 percent CAGR whereas bio pesticides grew at 20 percent CAGR in the input sector till 2020-21.[22]

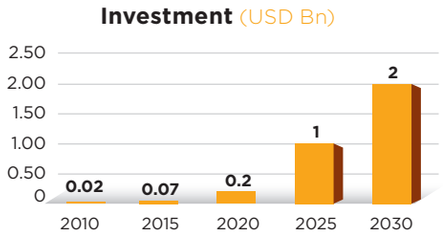
With enhanced focus on environmental security in agriculture, the potential investment ideas in bio-inputs include Fortified bio-fertilizers, AI enabled crop and soil health monitoring and precision application of biologicals, Plant extract-based nutrition sources and enhanced R&D opportunities in Bio release smart fertilizers, Microbial bio-pesticides.

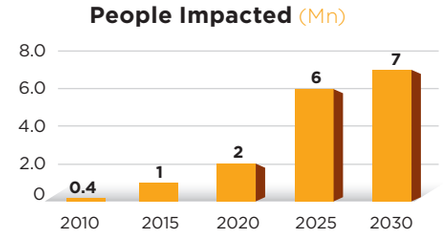
To convert these investment ideas into ground realities, ecosystem backstopping is required at 2 levels:

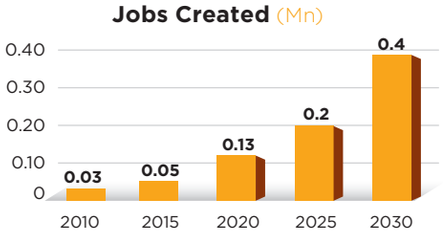
- **Capability enhancements**: Upgradation of skills and knowledge of soil testing laboratory staff, rural entrepreneurs, extension staffs and farmers on organic farming practices through training and demonstrations, Farmer awareness and capacity building on Prescription based bio input applications, application precautions, and faster adoption of organic farming-based approaches, Institution building (FPCs) around organic farming practices

- **Process innovations and re-engineering**: Business Process Reengineering in production, cost effectiveness, minimal residual and high Knockdown effect , Better handling options to deal with the bulkiness of bio-fertilizers , Establish evidences / detailed study on efficacy of bio-pesticides in controlling crop damage and the resultant increase in crop yield , Strengthening of supply chain in order to enhance the usages, Relaxation of licensing requirements of bio products like vesicular-arbuscular mycorrhiza (VAM) to encourage better participations from the channel partners etc.









In order to scale up the better adoption of bio-inputs for safer and sustainable farming, 2 potential areas with scalable business models have been identified and presented herewith:

1. **Promoting organic and bio-inputs in a Unified mode**: Use of organic manure in India is far from satisfactory. Dwindling organic carbon in Indian soils is also leading to reduction in the use efficiency of fertilisers. Policy measures need to be strengthened to promote city compost, press mud compost and other organic fertilisers. Different states have different laws for bio fertilisers which further leads to process inefficacies faced by the marketing companies. A unified policy will encourage bio-input companies to come forward and aggressively take up this product category. Relaxation of licensing requirements for bio products in Unified policy like vesicular-arbuscular mycorrhiza (VAM) bio-fertiliser will further encourage better participation from the pesticide channel which is currently not coming forward to adopt these products because of hassles related to fertiliser licence requirements.

2. **Institution building around organic farming and commercialising bio-inputs**: In India, out of total 227 registered pesticides, only 15 are bio-pesticides. More than 150 companies are involved in production of ~1500 types of bio-pesticides on a limited scale in terms of production and marketing. There is need to promote institutions around organic farming such as Organic FPCs and commercializing bio-inputs while entering into production and marketing of bio-fertilizers and bio-pesticides. State governments may promote such manufacturing units through production linked incentives on similar lines of Gujarat and Uttarakhand.

GoI has launched various initiatives in the form of policies to facilitate the adoption of bio-fertilizers and bio-pesticides and increase its use in agriculture.

Looking at the current opportunities, future prospects and enabling government policy measures, investability options have been identified under both the ideas and have been presented herewith:

- Promotion of organic and bio-fertilizers
- Fortified bio-fertilizers
- AI enabled crop and soil health monitoring and precision application of biologicals
- Plant extract-based nutrition sources
- Bio release smart fertilizers,
- Microbial bio-pesticides

Adoption of bio- fertilizer and bio-pesticide may not be adopted at expected pace in different geographies and would require extensive coordination and collaboration among the ecosystem players. The adoption of bio inputs has major challenges due to bulkiness, slow in action as compared to chemicals, erratic availability, low reliability due to low stability in effect which may dissuade private players from investing capital or resources in this niche sector.

[21] https://www.mdpi.com/2071-1050/12/16/6439/pdf

[22] Statistical Database | Directorate of Plant Protection, Quarantine & Storage | GOI (ppqs.gov.in)

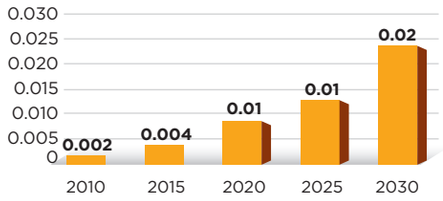
INVESTMENT IDEA 10

Protected Cultivation, Vertical Farming & Hydroponics

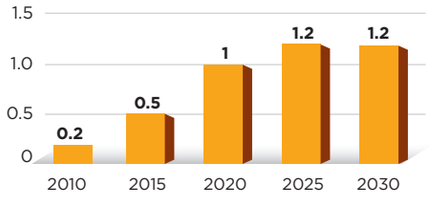
There is growing pressure on agriculture to ensure food and nutritional security for the burgeoning global population, which is expected to reach 10 billion by 2050.[23] Although self-sufficiency and food security continue to be critical components of the sector due to the increasing population and rapid urbanization, there is also an enhanced focus on increasing per unit productivity with limited and shrinking per capita land. In the same context, the vertical farming aims to utilize each and every inch of land and space, no matter whether it is urban or rural for growing maximum possible food for the hungry population. Hydroponics involves growing food in water using mineral nutrient solutions without soil. The advantage of hydroponics is that it reduces soil-related cultivation problems like soil borne insects, pest and diseases. In India, adoption and acceptance of Vertical Farming and Hydroponics have been very low till date due to the high capital investment required, running costs and expertise needed. It forms a miniscule percentage (<0.1 percent) of overall global cultivation.

The potential investment ideas in vertical farming and hydroponics include development of efficient and suitable data management systems required for managing Vertical farming (VF); technologies for precision agriculture equipment, optimal input and service uses in VF and hydroponics; technology solutions for out-door / indoor VF systems, solutions to improve plants' access to light (natural or artificial); Sensor based Smart self-watering pots with enriched soil and right seeds; improved hydroponic gardening technique customized for an individual apartment complex or for a supermarket; Indoor farming technologies. To convert these investment ideas into

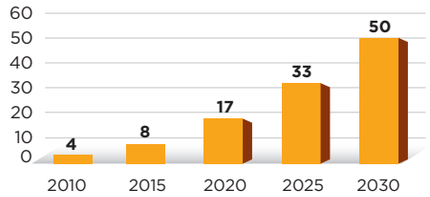
Revenues (USD Bn)



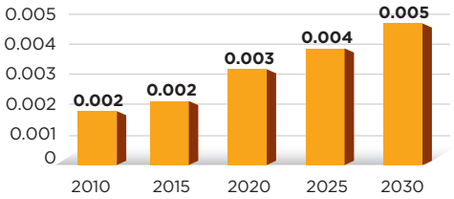
Investment (USD Bn)



People Impacted (Mn)



Jobs Created (Mn)



ground realities, ecosystem backstopping is required at 2 levels:

- **Capability enhancements**: Technical know-how and understanding of the economics of managing and maintaining the vertical farm systems and its economic viability for entrepreneurs and related stakeholders.
- **Process innovations, reengineering and policy support**: Devising ways to include more number of vegetable and flori crops in vertical farming with proven scientific evidences; Breeding programs and processes to identify improved varieties / hybrids exclusively for the purpose of vertical farming; Standardizing Production technologies and Good Agricultural Practices; Need to reengineer the existing buildings by providing additional structures to suit the vertical farming purposes; Need to optimize the cost of infrastructure involved in vertical farming and hydroponics – Implement renewable and sustainable power solutions; Cultivating commercial Aquaponics and vertical farming crops such as Lettuce, Basil, Mint, etc.

In order to scale up vertical farming and hydroponics in India, 2 potential areas with scalable business models have been identified and presented herewith:

1. **Leveraging partnership models for faster expansion of VF and hydroponics in Urban market**: In India, urban farming is still in infant stage and has to be given much more importance by both Government and private agencies to popularize and harness the profitability of urban agriculture. In order to make swift inroads in urban market, there is a need to foster a win-win collaborative partnership among start-ups or private players engaged in vertical farming, local government (especially Urban planning division), Research and Tech institutions and impact investors. Few successful examples of such partnerships in establishing scalable VF include cities such as New York, Portland, Los Angeles, Abu Dhabi, Dubai, Shanghai and Beijing.
2. **Technology integrations to make VF viable**: Emerging technology solutions such as Internet of things (IoT), Big data and simulation modelling has the potential to the make the Vertical farming viable on grounds, using the sensors and actuator technology. With the help of such technologies, the growing environment in vertical farms can be constantly monitored, tested, reviewed and improved. To integrate such innovations in VF and make them economically viable, small scale PoCs and pilots should be undertaken by ecosystem players (as mentioned earlier), and later converting them into large projects/market offerings.

Looking at the current opportunities, future prospects and enabling government policy measures, investability options have been identified under both the ideas and have been presented herewith:

- Exploring R&D and product innovation opportunities for inclusion of more types of high value and exotic produce in VF
- Efficient and suitable data management systems required for managing Vertical farming (VF);
- Technologies for precision agriculture equipment, optimal input and service uses in VF and hydroponics -IoT solutions for effective nutrient management, irrigation and light management and growth zone management
- Sensor based Smart self-watering pots with enriched soil and right seeds
- Improved hydroponic gardening technique customized for an individual apartment complex or for a supermarket

The adoption of VF and hydroponics is at very nascent stage and due to its capital intensiveness for infrastructure maintenance it may not gain the requisite momentum. Based on detailed assessment of key takeaways including need gap identification, technology solutions, collaboration and implementation modalities, true potential of these investment ideas can be further worked out.

[23] World Economic Forum and PwC analysis

100 Startups & Investors

Investment Idea	Startups- Investment Stage/ Last Funding Type				
	Angel/Seed	Series A	Series B	Series C	Series D+
INVESTMENT IDEA 1 **Dairy Farming**	**Startup**: Happy Cow Dairy (2017) **Investors**: Citi Bank **Startup**: MoooFarm (2018) **Investors**: Navus Ventures and VC rockstart **Startup**: WhiteGold Technologies LLP (2017) **Investors**: Unfunded **Startup**: Micro Life Innovation (2017) **Investors**: IIT Madras Incubation Cell **Startup**: Puresh Daily (2020) **Investors**: Alfa Ventures and Agility Venture Partners		**Startup**: Milk basket (2014) **Investors**: Unilever Ventures, Lenovo Capital & Incubator Group, Blume Ventures, BEENEXT, Mayfield Fund, Inflection Point Ventures, Kalaari Capital **Startup**: Stellaps (2011) **Investors**: Omnivore, Blume Ventures, Bill & Melinda Gates Foundation, Indusage Partners, Stride Ventures Capital **Startup**: Animall (2019) **Investors**: SIC Global India Fund, BEENEXT, NEXUS VENTURE PARTNERS, WEH Venture, Omnivore	**Startup**: Country Delight (2015) **Investors**: Orios Venture Partners, Matrix Partners India, Alteria Capital, IIFL Asset Management	**Startup**: Milk Mantra (2009) **Investors**: U.S. International Development Finance Corp and Neev Fund
INVESTMENT IDEA 2 **Sustainable Forestry**	**Startup**: Afforest (2008) **Investors**: Mercedes Benz as CSR **Startup**: Mendha Lekha Village Community Forest (2009) **Investors**: Kalpavriksh Environmental Action Group **Startup**: Balipara Foundation (2019) **Investors**: Wildlife Friendly Enterprise Network **Startup**: Aranya (2019) **Investors**: Government of India and research projects **Startup**: Beco (2018) **Investors**: Titan Capital, Climate Angels, Better Capital, Sequoia Sprout, Rukam Capital				

Continued...

Investment Idea	Startups- Investment Stage/ Last Funding Type				
	Angel/Seed	Series A	Series B	Series C	Series D+
INVESTMENT IDEA 2 **Sustainable Forestry**	**Startup**: Pappco Greenware (2011) **Investors**: Reckitt Benckiser **Startup**: Bambrew (2019) **Investors**: LetsVenture, Amity Innovation Incubator, Upsparks **Startup**: Last Forest (2019) **Investors**: NGO, Keystone Foundation **Startup**: Beforest (2019) **Investors**: Unfunded **Startup**: Technology Engineering Research for Nature (2021) **Investors**: Unfunded				
INVESTMENT IDEA 3 **Water and Soil Management**	**Startup**: Fasal (2018) **Investors**: Zeroth **Startup**: Kheyti (2015) **Investors**: Acumen, Mass Challenge, Columbia University, Draper Richards Kalpan Foundation **Startup**: eXabit System (2014) **Investors**: Faster Capital **Startup**: Flybird Farm Innovation (2013) **Investors**: Vilgro, Artha Initiative, CIIE, Centre for Incubation and Business Acceleration, Platforma Agritech **Startup**: Unnati (2017) **Investors**: NABVENTURES **Startup**: Yutix (2013) **Investors**: Karnataka Startup Cell, Founderpath **Startup**: GramworkX (2019) **Investors**: Bootstrapped **Startup**: Avanijal Agri Automation (2013) **Investors**: CoE IoT **Startup**: Satyukt Analytics (2018) **Investors**: Nabventures, Social Alpha	**Startup**: CultYvate (2016) **Investors**: Villgro			

Investment Idea	Startups- Investment Stage/ Last Funding Type				
	Angel/Seed	Series A	Series B	Series C	Series D+
INVESTMENT IDEA 4 **Farm Mechanisation and Farmgate Infrastructure**	**Startup**: Crofarm (2016) **Investors**: LetsVenture, Yukti, Factor E Group, Smile Group **Startup**: KhetiGaadi (2016) **Investors**: Bootstrapped **Startup**: BigHaat (2015) **Investors**: Beyond Next Venture, JioGenNext, SEP Ventures, Ankur Capital **Startup**: Kamal Kisan (2013) **Investors**: IIT Madras Incubation Cell, Social Alpha **Startup**: FreshoKartz (2016) **Investors**: Rajasthan Venture Capital Fund, AWE Funds **Startup**: AgriBazaar (2011) **Investors**: Self funded	**Startup**: Bijak (2019) **Investors**: Omnivore Partners, Tempo Ventures, Bi Fund	**Startup**: Stellapps (2011) **Investors**: Indusage Partners, Omnivore, Blume Ventures, Stride Ventures, Qualcomm Ventures, ABB Technology Ventures, Venture Highway, BeeNext, 500 Startups **Startup**: Eruvaka (2012) **Investors**: Omnivore, Nutreco	**Startup**: CropIn (2010) **Investors**: BeeNext, Bill & Melinda Gates Foundation's Strategic Investment Fund	
INVESTMENT IDEA 5 **Cold Chain and Logistics**	**Startup**: Vegfru (2015) **Investors**: Wingify **Startup**: FarmLink (2014) **Investors**: Pioneering Ventures, Syngenta **Startup**: ColdStar Logistics (2010) **Investors**: Tuscan Ventures **Startup**: Celcius (2020) **Investors**: Keiretsu Forum, Mumbai Angels, Lumis Partners, Huddle, MaGEHold, EVAN	**Startup**: Ecozen (2010) **Investors**: Omnivore, Villgro, GenNext Ventures, Caspian Impact Investment, Hivos Triodos Fund, Sathguru Catalyzers Advisors **Startup**: Tessol (2013) **Investors**: 1Crowd, Infuse Ventures, Ankur Capital	**Startup**: WinGreen Farms (2010) **Investors**: Sequoia Capital	**Startup**: Waycool (2015) **Investors**: Aspada, FMO, Lightbox, IndusInd Bank **Startup**: Dehaat (2012) **Investors**: Omnivore , Prosus Venture, Sequoia Capital India, Trifecta Capital Advisors	**Startup**: Ninjacart (2015) **Investors**: Accel Partners, NRJN Trust, M&S Partners, Qualcomm Ventures, Mistletoe, Trifecta Capital Advisors, Flipkart, Syngenta Ventures

Investment Idea	Startups- Investment Stage/ Last Funding Type				
	Angel/Seed	Series A	Series B	Series C	Series D+
INVESTMENT IDEA 6 **Climate Risk Mitigations**	**Startup**: Farm Infinity (2020) **Investors**: JioGenNext **Startup**: Mutual Farm (2015) **Investors**: Unfunded **Startup**: Phone Exim (2010) **Investors**: Unfunded **Startup**: Hire My Farmer (2018) **Investors**: Artesian, Brinc, FoodFutureCo **Startup**: I Support Farming (2016) **Investors**: Atal-GreatLakes Balachandran Incubator, 10000 Startups **Startup**: Farminvesta (2016) **Investors**: Deadpooled **Startup**: eKisanCredit (2019) **Investors**: Unfunded	**Startup**: Gramcover (2015) **Investors**: EMVC, Omidar Network India, Omnivore, Flourish Ventures **Startup**: BharatAgri (2017) **Investors**: BYM Ventures, 021 Capital, Better Capital, India Quotient **Startup**: Jai Kisan (2017) **Investors**: Blume Ventures, Arkam Ventures, Mirae Asset, BlackSoil, Trifecta Capital, Stride Ventures			
INVESTMENT IDEA 7 **Food Fortification**	**Startup**: Eggoz (2017) **Investors**: Tracxn labs, AVANA Capital, Caspian Debt **Startup**: Sattviko (2013) **Investors**: GHVH Asia, Venture Gurukool, GHV Accelerator **Startup**: Hoi Foods (2017) **Investors**: 1 Crowd, Prime Holdings, Gemba Capital, 1 Crowd, Sprout Venture Partners, AngelList India **Startup**: Timios (2016) **Investors**: Rangsons Technologies, Paipal Ventures, MTR Foods **Startup**: Abhay Nutrition (2011) **Investors**: SEAF **Startup**: Magellan Life Sciences (2016) **Investors**: SOSV, Rebel Bio, Roquette Ventures		**Startup**: Oziva (2016) **Investors**: Matrix Partners India, Titan Capital, Eight Road Ventures India, F- Prime Capital **Startup**: Well being Nutrition (2019) **Investors**: ACG World, Fireside Ventures **Startup**: ID FreshFood (2019) **Investors**: PremjiInvest, Helion Venture Partners, Benett Coleman and Co Ltd, Sequoia Capital	**Startup**: Epigamia (2016) **Investors**: DSG Consumer Partners, KA enterprises, Verlinvest, Danone Manifesto vENTURE"	

Investment Idea	Startups- Investment Stage/ Last Funding Type				
	Angel/Seed	Series A	Series B	Series C	Series D+
INVESTMENT IDEA 8 **Plant Based Protiens**	**Startup**: Good Dot (2016) **Investors**: Sixth Sense Ventures, New Crop Capital **Startup**: Evo Foods (2019) **Investors**: Kale United, Hearthstone Investments, Glass Wall Syndicate, Anil Advani, Seven Hound Ventures, Capital V, Sustainable Food Ventures, VegInvest, Big Idea Ventures **Startup**: Mister Veg (2018) **Investors**: Jubilant Ingrevia Limited **Startup**: Good Mylk (2017) **Investors**: JGinni International, VegInvest **Startup**: Oh Veg (2019) **Investors**: Unfunded **Startup**: Oats' Up (2020) **Investors**: Humane Entrepreneurship Program **Startup**: PlantMade (2019) **Investors**: VGC Partners **Startup**: ClearMeat (2018) **Investors**: Gastrotrope **Startup**: Ahimsa Food (2008) **Investors**: Unfunded **Startup**: BlueTribe (2020) **Investors**: Unfunded				
INVESTMENT IDEA 9 **Bio-inputs and Sustainable farming**	**Startup**: Vise Organic (2017) **Investors**: a-IDEA, PDPU IIC **Startup**: Distinct Horizon (2011) **Investors**: US-India Science & Technology Endowment Fund Grant, CIIE, IIM Ahmedabad, Tata Chemicals- Society for Rural Development **Startup**: AgroNxt Services Pvt. Ltd (2016) **Investors**: Startup Incubation and Innovation Centre				

Continued...

Investment Idea	Startups- Investment Stage/ Last Funding Type				
	Angel/Seed	Series A	Series B	Series C	Series D+
INVESTMENT IDEA 9 **Bio-inputs and Sustainable farming**	**Startup**: Garden's Grin (2017) **Investors**: Unfunded **Startup**: BioPrime AgriSolutions (2016) **Investors**: Venture Center, Startups @ Venture Center, Future Food Asia **Startup**: EnVERT Agro and Food Pvt Ltd (2018) **Investors**: Unfunded **Startup**: St. Jude Herbals Private Limited (2016) **Investors**: Unfunded **Startup**: Biofactor (2019) **Investors**: Unfunded **Startup**: BVG (2014) **Investors**: Unfunded **Startup**: Blu Soils (2021) **Investors**: Unfunded				
INVESTMENT IDEA 10 **Protected Cultivation, Vertical Farming & Hydroponics**	**Startup**: UrbanKisaan (2017) **Investors**: BASF Venture Capital GmbH (BVC) **Startup**: Clover (2017) **Investors**: Omnivore, Alteria Capital, Accel India and Mayfield Fund **Startup**: Livingfoods (2017) **Investors**: Amasia and SOSV **Startup**: Triton Foodworks (2014) **Investors**: Gastrotope **Startup**: Homecrop (2017) **Investors**: a-Idea **Startup**: Eekifoods (2018) **Investors**: GSF Accelerator **Startup**: Plantica (2016) **Investors**: CCD Ventures **Startup**: Barton Breeze (2015) **Investors**: Unfunded **Startup**: Pindfresh (2016) **Investors**: Unfunded	**Startup**: Rise Garden (2017) **Investors**: True Ventures, Amazon Alexa Fund, Telus Ventures			

Author Bios

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Amit Bhatia (www.amitb.in), is the Founder of Aspire Impact & Aspire Circle, was formerly Inaugural CEO of G7's Global Steering Group for Impact Investment (2017-20); Founding CEO of India's Impact Investors Council (2014-2017); Founding CEO of WNS Knowledge Services; and Founder of McKinsey Knowledge Centre.

Anuraag Srivastava, COO & Co-Founder, Rainshine Entertainment

Anuraag Srivastava is the Co-Founder and CEO, Rainshine India, a leading global entertainment company. Prior to Rainshine he held senior executive roles at organizations such as Zodius Capital, WNS, P&G etc. and founded several other companies in BPO/KPO and Healthcare.

Apoorva Oza, Chief Executive, Aga Khan Rural Support Programme

Apoorva Oza started his career with Gujarat Dairy Development Corporation & currently is the CEO of Aga Khan Rural Support Program (India) since 2001. Apoorva co-founded Coastal Salinity Prevention Cell (CSPC), & Sajjata Sangha; and is on the board of CSPC, Society for Women's Action & Training Initiative, Arid Communities & Technology, Pravah, Charkha & Vikas Anvesh Foundation.

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Ashok Varma leads Agriculture, Social & Sustainability, with over 24 years in formulating public policy & advice on large scale reforms & transformation across development sectors. He works with international donor agencies, national & state government on advisory engagements; alongside working with both public & private sector to create social & economic value for the society.

Asitava Sen, CEO, CropLife India

Asitava Sen is the CEO at CropLife India. He has over 25 years of experience in areas like public policy, social sector advisory, innovative Public Private Partnership initiatives & blended finance. Prior to CropLife India, Asitava was an independent advisor for The World Bank, International Finance Corporation, The World Economic Forum, Food and Agriculture Organization of the United Nations.

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Hemendra Mathur is Venture Partner with Bharat Innovation Fund –investing in early-stage deep-tech start-ups. He is also co-founder of ThinkAg – a platform for accelerating the adoption of innovations in agriculture. He also chairs FICCI Task Force on Agri Start-ups.

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Jinesh Shah is the Co-founder and Managing Partner of Omnivore, a venture capital firm that funds entrepreneurs building the future of Indian agriculture and food systems. He is a member of the IMC Chamber of Commerce and Industry's Agriculture & Food Processing Committee, the core working group of the World Economic Forum related to agriculture, and chairperson of Impact Investors Council's Executive Council.

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Joanna Kane-Potaka, an Australian and marketing specialist, has worked largely in agriculture and food, including international nonprofit organizations in five countries in Asia. She founded the Smart Food initiative, selected by USAID and Australia in the top 10 global food innovations.

Purnima Khandelwal, Co-Founder, INI Farms

Purnima Khandelwal co-founded INI Farms in 2009 & is the first woman CEO of one of the largest fresh fruit companies from India. Purnima is the driving force behind creating India's first "safe food' brand Kimaye leading the entire gamut of brand building initiatives from consumer insights to packaging innovations to distribution. Purnima's experience spans over 20 years including 16 years as an entrepreneur.

Rajat Tandon, President, IVCA

Rajat Tandon is the President of IVCA, responsible for planning, developing, & implementing IVCA's regulatory advocacy activities. He was the VP-NASSCOM & headed 10,000 Start-ups initiative, providing support to Indian tech startups. He is passionate about creating value for entrepreneurs, funding partners, and the ecosystem as a whole.

Raman Ahuja, Co-Founder, ThinkAg

Raman Ahuja is co-founder of ThinkAg (thinkag.co.in), focused on food & agriculture related technology, supply chains and agro-logistics. He has been in the agribusiness, consumer products, ingredients industries having spent time at Hindustan Unilever, built FieldFresh Foods DelMonte & has also led Firmenich – a global leader in fragrance & flavors.

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Rema Subramanian is the Co-Founder and Managing Partner of Ankur Capital Fund, Investing in transformative technologies for the next billion. A sector agnostic fund, they are pioneer investors in early stage agritech and biotech in India. They invest in tech from India for the world.

Uday Garg, Founder & Managing Partner, Mandala Capital

Uday Garg is the Managing Partner and Founder of Mandala Capital, a USD 250m operationally-focused private equity firm focused on sustainable and scalable investments across the food value chain within India and South East Asia.

ACKNOWLEDGEMENTS: SPONSORS

Capgemini- Lead Sponsor for IFP

Tracxn- Data Partner for Startups' data support

ACKNOWLEDGEMENTS: INDUSTRY PARTNER

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ACKNOWLEDGEMENTS: GUEST CONTRIBUTORS

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The information in this report may include forward-looking statements related to the future growth, trends in the industry, and financial or operational performance of the industry/investment ideas. Such forward-looking statements are predictive in nature, and may be based on current expectations, forecasts or assumptions involving risks and uncertainties that could cause actual outcomes and results to differ materially from the forward-looking statements themselves. Such forward-looking statements may, without limitation, be preceded by, followed by, or include words such as "believes", "expects", "anticipates", "estimates", "intends", "plans", or similar expressions, or may employ such future or conditional verbs as "may", "will", "should" or "would", or may otherwise be indicated as forward-looking statements by grammatical construction, phrasing or context.

ASPIRE™

Aspire, founded by Amit Bhatia, focuses on impact leadership and ecosystem development through three initiatives: Aspire Impact (www.aspireimpact.in) for ecosystems, Aspire Circle (www.aspirecircle.org) for social leadership and Aspire Education (www.aspireeducation.in) for education. Aspire, established in 2007, based in Gurgaon (India) is committed to making Impact a way of life.

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