

# The economic case for India's smart protein sector

## Unlocking opportunities with lessons from other industries

Smart protein (globally known as alternative protein) is a source of non-animal-derived protein that provides consumers with more sustainable food choices. Smart protein includes alternatives to meat, eggs, dairy, and seafood that can be plant-based, cultivated, fermentation-derived, or a combination of the three. [Governments around the world](#) are increasingly investing in alternative protein to strengthen their domestic food systems, implement environmental action, and take the lead in building robust manufacturing pathways. With an increasing global population, there is an ever-growing demand for protein, particularly from animal-derived sources. Evidence suggests the demand for said protein is already [outpaced](#) by its current availability, necessitating novel foods like smart protein to become supplemental food sources in the coming years.

### Smart protein as a high-margin agri-business opportunity



India can become a leading supplier of inputs such as pulses, legumes, oilseeds, grains, fungi, and algal proteins to the global alternative protein industry. Soy, one of the more popular crops used in plant-based formulations, is an important oilseed crop [growing in demand](#). Pea, another crop grown widely in India, is quickly becoming mainstream in plant-based meat applications and presents an untapped opportunity. As the demand for smart protein products rises, innovation by companies to gain substantial market shares will lead to higher quality products with better taste and healthier ingredients being produced at competitive prices at scale.

According to a [report](#) by GFI anticipating the production requirements for plant-based meat, the industry would have to fulfil an expected

minimum of 25 million metric tons in annual global market demand for plant-based meat by 2030. This projection provides an opportunity for agricultural markets to supply protein-rich quality ingredients for plant-based alternatives' production. In the United States, the retail market for plant-based meat was roughly 1.4 billion USD in 2021, whereas in Europe, sales for plant-based meat grew to 2 billion euros in 2022. If India capitalises on this opportunity, much of this supply could come from India. Currently, the majority of India's agricultural exports are commodity-based and consist of minimal value addition. India's share in world agriculture trade in 2019 was only 2.07 percent — a minuscule share for an industry that employs over 50 percent of the Indian population.

As the ingredient base for applications in smart protein expands to millets, chickpeas, and other indigenous crops, it can bring substantial economic returns for India and its farmers. Supporting crop diversification initiatives

and incentivising farmers to meet the rising demand for these crops by demonstrating clear market demand could create a robust supply chain. To this end, dal millers and farmers in the Nagpur region in Maharashtra are already making impressive [efforts](#) to produce plant-protein isolates from pulses. Creating pathways to the global markets will further incentivise farmers to move toward these more resource-efficient crops as they will not have to rely on government incentives alone.

Value addition to agricultural produce depends on the availability of technology and infrastructure, an area where India has significant room for improvement. Currently, only about 16 percent of India's food exports include foods that have undergone post-harvest processing. Plant-based smart protein products require specialised equipment such as high-moisture extruders and separators, that are mostly imported, making them prohibitively expensive to scale. Encouraging the domestic manufacturing of such equipment in India will also promote the capital goods sector and will potentially lead to a vibrant export industry for machinery.

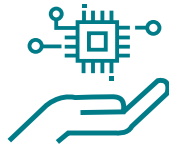
## Leveraging India's booming biotech and manufacturing industries for novel proteins



Similar opportunities exist for fermentation-derived and cultivated proteins that could leverage the scientific knowledge and talent from India's booming biotech industries. Biopharma, nutraceuticals, food enzymes, industrial biomanufacturing, and other related fields can potentially play an important role in advancing smart protein R&D. Notably, the pharmaceutical industry, a cornerstone of the Indian economy, started with limited resources. Enabling policy and regulatory support, that began with the innovative patent legislation of the 1970s, drove massive changes towards low-cost mass production of basic drugs by local firms that grew via imitation and reverse engineering. Today the industry is a 50 billion USD behemoth, supplying 20 percent of generic medicine and over [50 percent](#) of vaccine demand globally. Similarly, given the existing robust biopharma and bioprocessing industry, India is already a prominent manufacturer of growth media and other inputs that go into cultivated meat.

The accelerating demand for smart protein will also [require innovation and scale](#) in the manufacture of cost-effective machinery and equipment. With policy support through 'Make in India' and an uptick in skilled labour, innovation, and technological advances, India has gradually [strengthened](#) its position as a hub for capital goods manufacturing. India's penchant for low-cost innovation in the engineering sciences could fill this critical equipment gap in smart protein production as well as create a whole new export industry in itself.

## Government foresightedness – the key to success for technology-forward sectors



India's IT services and software industry became a multibillion-dollar juggernaut because of the government's pivotal role in enabling the industry to take root and then later championing its development. By the 1980s, a liberal software policy and the establishment of government-backed research institutions were critical to strengthening the foundations of the Indian IT industry. The government's focus on tertiary education led to India producing about 65,000 engineers and 95,000 diploma-holders annually in engineering and technology in the 1990s, through an extensive network of public and private colleges. The establishment of Software Technology Parks in the early 1990s with tax exemptions, reliable electricity, and ready-to-use office space, among other benefits, was another milestone for the industry.

The state's low tax policies and forex gains led to high-profit margins for Indian IT service companies. Soon, the government also emerged as a foremost customer of these companies: in 1999/2000, government spending constituted more than a third of all domestic IT spending in India. The support to the IT industry has continued through initiatives such as Digital India, Startup India, and Production-Linked Incentive scheme, all of which intend to bring the IT hardware industry (laptops, tablets, semiconductors, Ultra Small Form Factors) to India.

The Indian automobile industry is another major export-oriented sector contributing over 7 percent of the GDP that benefited from the right

kind of government support. From the 1980s, the Indian government relaxed many of the protectionist policies of the earlier decades. The import of capital goods, raw materials, and components required for modernising the auto industry was now allowed. The decade saw four Indian firms getting approval to manufacture light commercial vehicles, all in technical-cum-financial collaboration with Japanese companies. The entry of new players and the import relaxation in the 1980s sowed the seed of the automobile industry we see today. The opening up of the economy and the rehauling of industrial policy in 1991 saw production go up sharply, and multiple major global car manufacturers entered India. Presently, the automobile industry is on a journey toward clean energy. To continue to bolster this industry and its green transition, the government has provided significant support through initiatives such as the [National Electric Mobility Mission Plan](#).

The sector's full economic potential is intricately tied to the breadth of [government support](#). This support could range from promoting public R&D, public procurement of alternative protein products for supplemental nutrition programmes, providing tax incentives to promote manufacturing, and building a progressive regulatory environment. The government could support the setting up of manufacturing of alternative proteins along the lines of support extended to IT and automobile industries, thereby playing a pivotal role in shaping the domestic demands for the sector. In its [2022 India Bioeconomy Report](#), the Biotechnology Industry Research Assistance Council (BIRAC) has already identified India's potential for both innovation and manufacture of smart protein. The report mentions the possibility of setting up a fermentation capacity of 10 million litres in India. This kind of development will attract an investment of more than 500 million USD, which could further generate a revenue of 1 billion USD annually.

As per a recent report by ClimateWorks Foundation & Global Methane Hub, alternative proteins could potentially account for 98 percent of the economic value (\$700 billion) generated by food systems innovations aimed at reducing methane by 2050. They can also create 83 million jobs globally by 2050, which accounts for two-thirds of jobs created across all agricultural methane interventions. With the government's timely recognition of this opportunity, India has the potential to gain a lion's share of this. To boost innovation and reduce product costs, the government can eliminate entry barriers associated with the smart protein sector, especially in capital investments for procuring and setting up the necessary infrastructure. From extruders to bioreactors, India can produce low-cost and high-grade food manufacturing tools that can be exported to international markets, thus providing additional revenue streams and adding jobs in allied sectors.

All of these promising prospects point to the possibility of an emerging 'new protein economy' in India, generating immediate positive momentum while also yielding lasting economic, environmental, and societal benefits in the long term. Innovation-friendly and long-sighted strategic short-term actions (investment, policy, and regulatory) can reap exponential long-term future economic growth.

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