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How Did Agri-start-ups Fare during the COVID-19 Pandemic? Challenges and the Way Forward

NEERU BHOOSHAN, ANJANI KUMAR

Although agricultural start-ups in India took a hit due to the COVID-19-induced lockdown, they have enormous potential in aiding economic recovery. A survey of 162 start-ups from 29 states, located in 98 cities, reveals that many start-ups have tailored their products, modified their technologies and invested in their long-term growth potential, even as they suffered from liquidity crunch, lack of investor funds and poor demand. The government should provide capital access, market access support and end-to-end solutions for innovation and marketing towards harnessing the power of these start-ups.

Neeru Bhooshan (ps.ztmiari@gmail.com) is in-charge, ZTM-Business Planning and Development Unit, Indian Agricultural Research Institute, New Delhi. Anjani Kumar (anjani.kumar@cgiar.org) is Senior Research Fellow, International Food Policy Research Institute, South Asia Regional Office, New Delhi.

The unprecedented impact of COVID-19 and resultant national lockdowns have plunged the global economy into a recessionary phase, with most countries sealing their international borders and restricting movements of people and trade. In India, the lockdown from 24 March to 31 May had affected all sectors of its economy. Even after the lockdown, the uncertain economic environment prevails in both the formal and informal sectors.

The agriculture sector, which still employs about 44% of the workforce, has been the least affected, although it has been facing multiple challenges such as in harvesting, procurement and storage of crops, ensuring the right price at the right time to farmers and in preparing for the next sowing season. In addition, they are struggling to ensure uninterrupted food supply with last-mile delivery after maintaining new protocols of social distancing, restricted mobility of resources, shortage of labour, and liquidity crunch in the market, along with other inherited challenges at the farmers' level. There is a need to develop new, innovative and indigenous technologies, processes and procedures, services, business models and customer acquisition models aligning with the central government's policy of making India a self-reliant nation. To move forward, equal and meaningful participation from all stakeholders of the ecosystem is required.

Going forward, agri-start-ups will have an indispensable role in combating the economic fallouts of COVID-19. They need to be made ready to adjust and adapt to a new normal with better cash flow management and revenue streams. However, the challenges and opportunities for agri-start-ups due to COVID-19 are yet to

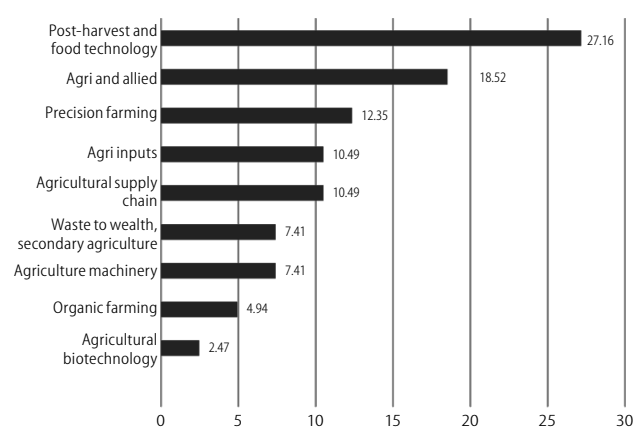
be understood. Start-ups in their seed phase are the most vulnerable because they usually arrange funds from personal investors, friends and banks, given that institutional funding agencies are not ready to invest (Beatrice Kessler 2020). These start-ups are likely to be affected adversely and deserve special attention, as they are in a sensitive and fragile stage of their business lifecycle (Baker et al 2020). Even with the resilient crisis-management strategies that start-ups are adopting at individual levels, better coping mechanism and government-initiated policy frameworks to redesign, rework or reinvent the technologies and protocols in a post-COVID-19 scenario are required, thereby creating the paradigm for a new normal within a minimum response time. However, the empirical understanding on the functioning and challenges of agri-start-ups is virtually absent in India.

To address this important research gap, we conducted a survey of 162 start-ups from 29 states, located in 98 cities, over telephone to understand the performance, constraints and opportunities for agri-start-ups in India. The inference from this survey will be helpful in designing policy interventions for ensuring the sustainability of agri-start-ups. To the best of our knowledge, the current study is the only one which has examined the constraints and possibilities for start-ups with the help of fresh primary data to draw valuable policy implications. The specific objectives of the present study are to identify the role of agri-start-ups in the current scenario (COVID-19) with already available innovative technologies, to know the strategies of survival and sustainability adopted by start-ups, and to identify the role of the government's financial support during the COVID-19 crisis.

Methodology

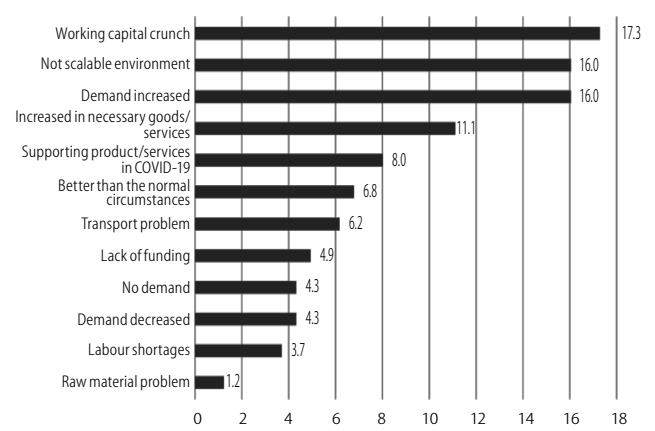
The current study is based on the primary survey of Indian agri-start-ups. An online survey was conducted with a pre-tested questionnaire designed for this study. A total of 162 start-ups, based in 98 cities covering 29 states, were surveyed

Figure 1: Focus of Agri-start-ups during and post COVID-19 (%)



Source: Authors' calculation based on telephonic survey.

Figure 2: Constraints and Opportunities for Start-ups in Current Crisis (%)



Source: Same as Figure 1.

from 5 May 2020 to 15 May 2020. The start-ups comprised 15 different agriculture domains like agricultural inputs, machinery, internet of things (IoT) in fisheries, IoT in dairy, supply chain management, post-harvest technologies, waste to wealth and extension activities. Start-ups from three stages—prototype, minimum viable product (MVP)/pre-commercialised stage, and commercialised (in market)—were part of the survey.

Results and Discussion

Innovation and role of agri-start-ups:

About 27.16% of the start-ups surveyed were trying to provide innovative solutions to minimise huge post-harvest losses and add value to existing produce by developing new ready-to-eat products according to consumer tastes and preferences. Being a vital component for increasing the productivity and efficiency of agriculture operations, 10.49% of agri-start-ups were developing innovative technologies in agri-inputs.

During the current COVID-19 situation, fragmented supply chains and the lack of local-level infrastructure to sustain farm-gate production and procuring, grading, sorting, packaging and delivering of essential commodities like vegetables, fruits, milk and eggs and other grocery items had put local administrations under tremendous pressure. Ensuring uninterrupted supply to consumers after maintaining new protocols of social distancing and contactless deliveries has been a challenge. Interestingly, 9.26% of agri-start-ups are coming up with innovative

supply chain management to minimise exploitation, provide a better price for the produce to farmers, reduce consumer-end prices and accelerate the process of delivery by putting in place a new system.

In the post-COVID-19 environment, farm and agricultural operations will have to operate very differently using advanced, sophisticated precision farming technologies like IoT, soil testing and fertiliser recommendation, instruments, temperature and moisture sensors, robots, drones, aerial images, blockchain, and global positioning system (GPS) technologies. Our data shows that 12.35% agri-start-ups are developing solutions, which when adopted at scale, will increase the yield and income with the provision of precise information about agri-inputs on a real-time basis with geospatial technologies.

Due to acute labour shortages in the near future, there is a need to ramp up resources towards farm mechanisation with the aid of disruptive technologies for major agricultural operations like procurement, packaging and storage of harvested rabi crop, field preparation for kharif sowing, paddy transplantation in the coming kharif season, and so on. About 7.41% agri-start-ups are focused on innovative farm machineries, which can be tested and supported with the help of academia, incubators, corporate and government agencies to find solutions to crucial challenges facing the farm sector.

About 18.52% agri-start-ups are innovating in allied sectors and providing solutions like IoT tools—high-performance, low costs and easy to deploy and

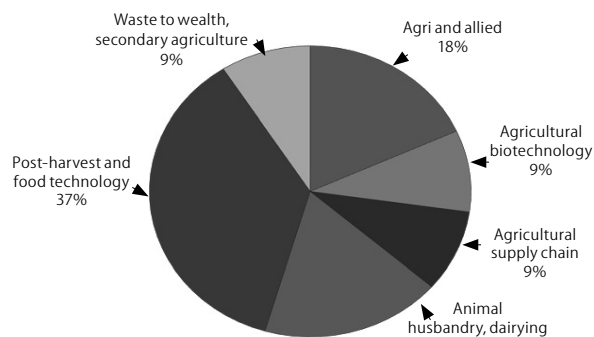
use—for animal husbandry and fish farming. Waste-to-wealth technologies developed by 7.4% agri-start-ups are also getting their due recognition in the value chain of agriculture by providing additional income to farmers along with the creation of opportunities for micro-enterprise generation at the local level.

This analysis shows that agri-start-ups are already working in the entire spectrum of agriculture, and innovative technologies are available with them. There is a need to harness their potential by creating a fast-track mechanism to identify innovative technologies and facilitate solutions that may be in different stages of their technical development. Support should be given to them to have accelerated testing, piloting, evaluation, refinement, and scaling production and deployment as per market requirements with the help of all stakeholders of the ecosystem.

Constraints faced by start-ups: Figure 1 clearly suggests that start-ups are helping or can help the farming community directly or indirectly by innovating and providing pre- and post-harvesting solutions across agriculture domains. During the lockdown, agri-start-ups were given exemption to operate under the category of essential goods and services. However, only 15% of the start-ups surveyed were able to conduct their business activities successfully, and the remaining 85% were severely affected due to the lockdown.

The present study identifies various constraints faced by agri-start-ups in the

Figure 3: Domains of Start-ups Doing Better during and post COVID-19 Lockdown **Figure 4: Sustainability Measures Taken by Agri-start-ups** (%)



Source: Same as Figure 1.

current COVID-19 situation—about 17.3% respondents faced a working capital crunch, 16% found their current business non-scaleable, 6.2% could not get transport facilities, while 4.9% respondents lacked funds (Figure 2, p 14). Other constraints include decrease in demand, raw material and labour shortage.

Interestingly, amidst these constraints faced by the majority of the start-ups, 6.8% of the surveyed start-ups said that the ongoing situation had turned favourable for their businesses. They were catering towards products and services that came under the category of essential goods and services. Thus, the products and services of around 16% of such organisations experienced increase in demand under the prevailing condition.

Among the start-ups that are doing better during and post-COVID-19 lockdown include post-harvest and food technologies (37%), agriculture allied sectors, that is, animal husbandry, dairying and fisheries (18%) and agricultural supply chain (9%) (Figure 3).

Survival and sustainability strategies adopted by agri-start-ups:

For attaining sustainability, agri-start-ups took different steps—35.8% reduced their operational costs, 32.1% postponed their plans for entering new markets, while 3.7% reduced their working hours or labour costs (Figure 4). Furthermore, continuous funding support even in times of the pandemic from various sources played an important role in sustaining these start-ups.

As per Jennifer Bouey (2020), if this pandemic is prolonged and market demand dries up, it may force small and medium enterprises (SMEs) to lay off

workers in the wake of the lack of visible revenues, which will further hamper demand in the market. Our survey reveals that about 4% of the start-ups will not be able to sustain their current venture if the pandemic is prolonged for another six months to a year.

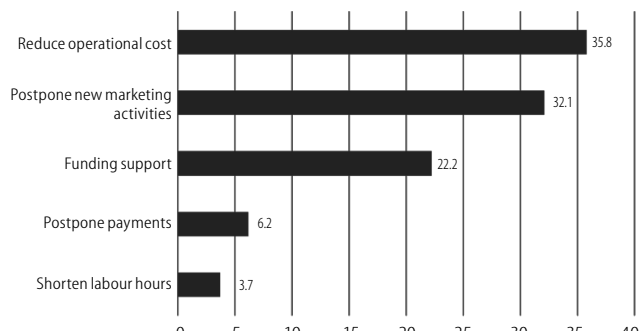
Since multiple waves of the pandemic are likely to persist for a year, a majority of the start-ups may succumb under this high-stress situation. However, being true to their character, around 41% of the start-ups surveyed pivoted their technologies towards current requirements to keep themselves sustainable. For instance, Masterbrain Agro Industry—an agri-start-up based in Punjab—modified their tractor-mounted, pesticide sprayer machine for the sanitisation of roads and supplied it to the Government of Punjab.

During this time, start-ups have been serving the community by providing products (45%) through efficient use of their existing supply chains with limited person-power and resources. Another 19% are providing services and assistance to farmers (29%) (Figure 5).

Employment status of start-ups during COVID-19:

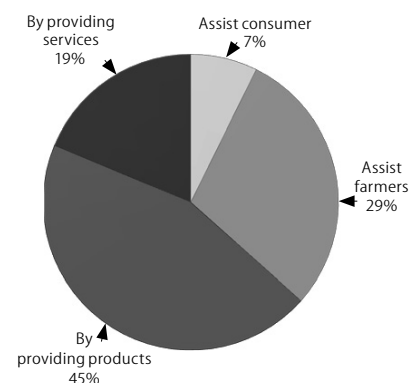
A lot of businesses, including start-ups, suspended normal working hours as per the government's instructions during the lockdown to contain the spread of COVID-19. It is not surprising that unemployment is at an all-time high. The current study illustrates that 44% start-ups reduced their labour pool while 32% retained their staff strength. Interestingly, 24% start-ups hired new staff during this time.

Further analysis revealed that the agricultural supply chain sector added



Source: Same as Figure 1.

Figure 5: Distribution of Start-ups in Assisting Various Stakeholders (%)



Source: Same as Figure 1.

nearly 38% employment under the prevailing COVID-19 situation.

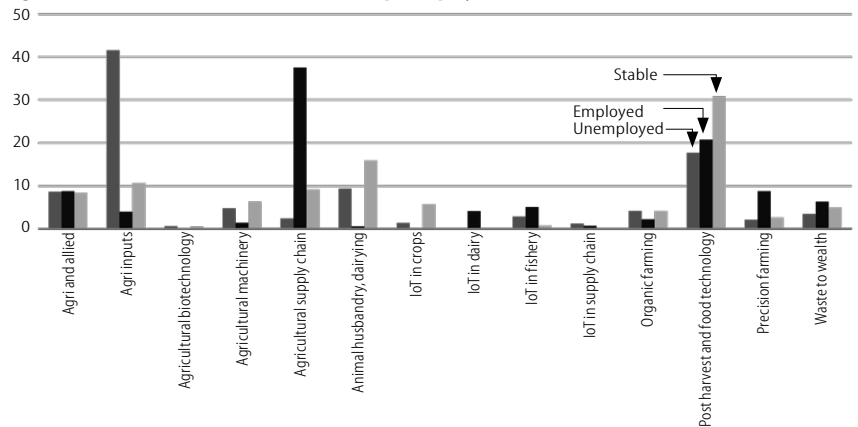
Variated results were observed in the post-harvest sector where 20.8% new employment was generated, 30.8% sustained their jobs while 17.7% lost their employment.

The domains that laid off maximum staff were the agri-input sector (41.5%), animal husbandry and dairy sectors (9.4%) and farm machinery (4.8%) (Figure 6, p 16). This trend of laying off employees adds to the already grim situation of unemployment during this time.

Funding Support

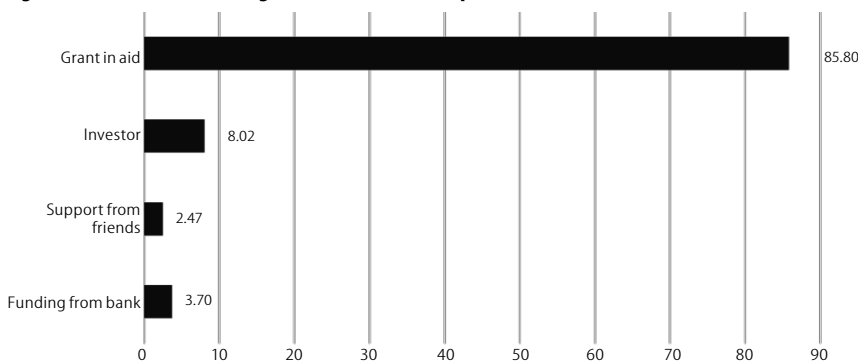
It is common knowledge that investments can help start-ups grow faster and achieve scale. However, the investment needs to be raised at the proper time and from the right source. Initially, the majority of start-ups are bootstrapped. After the initial start, if they get incubated with any incubator for gaining support in technology validation, business mentoring and industry connect as well as grants-in-aid. Typically, they are more

Figure 6: Domain-wise Distribution of Start-ups' Employment Status



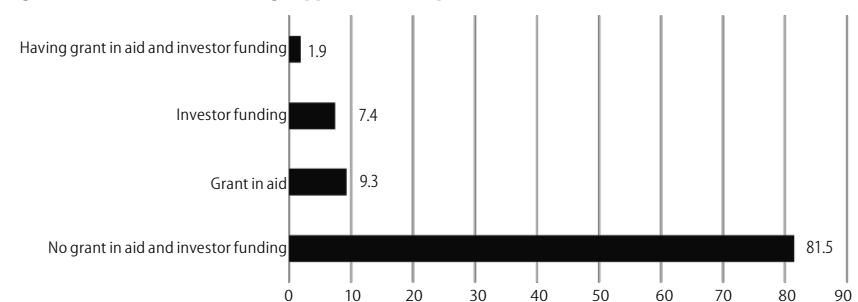
Source: Same as Figure 1.

Figure 7: Preference of Funding Mechanism for Start-ups



Source: Same as Figure 1.

Figure 8: Distribution of Funding Support to Start-ups



Source: Same as Figure 1.

confident to raise future investment from the market either as debt from banks or as equity from investors. Mostly, investors prefer to come at the later part when start-ups have gained substantial progress with product-market fit and have dedicated customers.

Therefore, the role of these grants-in-aid support holds much significance when it is required to mitigate the initial risk of setting up start-ups, increase their sustainability, and prepare them to scale up and attract serious investors' funding later on. The current study shows that 86% start-ups preferred grants-in-aid (Figure 7).

It was observed that 89% start-ups have not received grants-in-aid and almost 91% start-ups have not raised any investor funding. About 21.6% felt that they are not ready for raising investment. Furthermore, our combined analysis suggests that 81.5% start-ups (Figure 8) have not received any type of grants-in-aid and investor funding. Only 9.3% start-ups got grants-in-aid and 7.4% received investor funding.

It was examined that 10% start-ups responded that grants-in-aid cannot help in scaling their start-ups due to low demand, transport constraints, and shortages in labour and raw materials. About 12% of the

start-ups cannot even spend these grants in the current business environment because they have no demand for their products or services.

Nevertheless, the remaining start-ups suggested that grants will help them in research and development activities for product development and scaling up eventually. Therefore, the sustainability of start-ups should be taken as a priority, and focus must be laid on both continuing existing measures under various government schemes along with new initiatives for tackling the ongoing pandemic situation.

Our analysis shows that there is an urgent need to increase activities related to fund facilitation towards start-ups to help them scale up at a faster rate. The start-up community can play a pivotal role during this crisis as they are dealing with ideas and technologies that are focused on solving problems in the existing value chain in the face of the pandemic. Policy measures must not only focus on providing grants-in-aid to start-ups, but also in expediting measures for alleviating the pressure caused by constrained disbursement of these aids. That will ensure support to the wider entrepreneurial ecosystem and facilitate rapid recovery and economic growth (Kuckertz et al 2020).

Conclusions

This study examined the impact of COVID-19 on start-ups engaged in the agriculture sector whose interests are in providing innovative solutions to increase productivity, efficiency of agricultural operations, maximising resource management and minimising the pre- and post-harvest losses. COVID-19 has had devastating effects on the survival and sustainability of agri-start-ups because of a sudden erosion of value. There are only a few start-ups that would be able to survive if this current crisis continues beyond six months to a year. However, there are many start-ups that are trying to sail through this crisis by adopting measures such as reducing their staff strength, minimising operational costs, postponing new market entries, modification of technologies as per current needs and reducing working hours.

Around 42% of the start-ups in the survey modified their technologies to suit the current business environment and sustain their revenue model. On the other hand, 45% of the start-ups surveyed reduced their staff strength, 32% retained their staff strength, while 23% start-ups hired employees during this time. It is to be noted that 81.5% start-ups did not receive any type of grants-in-aid or investor funding. Interestingly, 6.8% start-ups suggested that the ongoing situation had turned favourable for their businesses. This was primarily due to the fact that these start-ups were catering towards products or services that came under the category of essential goods and services.

The government should invest in establishing local innovation systems that encourage local-level staff to work near their own hometowns or villages. Also, technology-led agriculture, by customising and embracing already available cross-industry technological solutions, could function as a vital employment sector for engineers, scientists, and

entrepreneurs. This will also improve the efficiency of the agricultural operation along the value chain.

This current crisis offers a great opportunity for agricultural transformation with enablers like agri-start-ups, academia, corporate and government collaboration through smart incentives and easy regulation. The government needs to be at the forefront of this effort, ensuring food security while reducing dependency on imports. There is a need to develop targeted policies, procedures and investments with a “moonshot” approach establishing end-to-end programmes for piloting, emphasising collaboration and communication, developing business consortia, providing holistic research and development solutions, leveraging networks and innovation support schemes with a shift towards knowledge and innovation-based economy. The government can provide capital access and market access support—creation of separate fast-tracked agri-start-up fund, easy term loans/debt funding/collateral-free loans to replenish their working

capital and assets—to unlock the potential of start-ups at this crucial juncture.

REFERENCES

- Baker, Scott, Nicholas Bloom, Steven Davis, Stephen Terry, Richard Baldwin, Beatrice Weder di Mauro, Benjamin Pugsley et al (2020): “Startups and Employment Following the COVID-19 Pandemic: A Calculator,” <https://voxeu.org/article/startup-employment-calculator-covid-19>.
- IMF (2020): *World Economic Outlook*, April 2020, International Monetary Fund.
- Jennifer, Bouey (2020): “March 10, 2020 Assessment of COVID-19’s Impact on Small and Medium-sized Enterprises: Implications from China,” Testimony, 10 March.
- Kessler, Beatrice (2020): “COVID-19 Impact: Most Vulnerable Are Startups in the Early Phase (seed),” Startup Spider, 18 March, https://www.startupspider.com/assets/files/EN_Tips&Tricks4Startups_COVID19_StartupImpact.pdf.
- Kuckertz, Andreas, Leif Br€andle, Anja Gaudig et al (2020): “Startups in Times of Crisis—A Rapid Response to the COVID-19 Pandemic Venturing Insights,” *Journal of Business Venturing Insights*, Vol 13, e00169.
- Mathieu De Clercq, Anshu Vats and Alvaro Biel (2018): “Agriculture 4.0: The Future of Farming Technology,” <https://www.oliverwyman.com/our-expertise/insights/2018/feb/agriculture-4-0-the-future-of-farming-technology.html>.
- Smith, Gavin, Dominic Anderson and Elyse Adam (2020): “The Impact of the COVID-19 Crisis on the Startup Ecosystem,” Allens Australia, <https://www.allens.com.au/insights-news/insights/2020/04/the-impact-of-the-covid-19-crisis-on-the-startup-ecosystem/>.
- Start-up India, <https://www.indianweb2.com/complete-list-incubators-india/>.

EPWRF India Time Series Module on Health Statistics

The screenshot displays the EPWRF India Time Series web application. The main content area is titled 'Health Status Indicators' and features a list of communicable diseases: AIDS, Malaria, Chikungunya, Kala Azar, and Dengue. Below this, there are several filter boxes: 'All-India/State' (with options for All-India, Andhra Pradesh, Anunachal Pradesh, Assam), 'Gender' (Male, Female, Total), 'Data Type' (Cases, Deaths, Discharges), and 'Year' (1980, 1981, 1982, 1983). A 'Description' box states: 'Health status section provides state-wise details regarding various diseases and disorders affecting health of country's population, which is one of the significant factors in gauging wellbeing of the community.' At the bottom, there are buttons for 'SUBMIT', 'CHART', 'EXPORT', 'PRINT', and 'SAVE QUERY'.

Features

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