



CDEIS POLICY BRIEF SERIES ON PUNJAB ECONOMY

#2020-02

Impact of COVID-19- Lockdown on Punjab Agriculture

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October, 2020

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CDEIS Policy Brief Series on Punjab Economy

The COVID-19 pandemic has shaken the economies globally and added to the existing problems and their intensity like climate change, poverty, unemployment, migration, education, and of course, health. Developing economies have suffered even more due to their vulnerabilities to such sudden and large shocks. India is no exception to this trend and has regional variations in the impact of COVID-19 as there is much disparity and specificity in the levels of development of state economies. Punjab being an agriculturally grown state though still highly dependent on its agriculture and rural non-farm economy for significant proportion of its population and their livelihoods in the presence of public resource crunch has also faced this COVID-19 onslaught while being in economic, social and environmental crisis.

In this context, it was thought fit to get an independent set of policy directions from scholars in their respective domains based in Punjab, outside Punjab and even overseas to encourage public policy debate in and outside the state about the nature and magnitude of Punjab's economic and developmental crisis and the COVID-19 implications for it and explore possible ways forward to make the economic and social systems of the state move out of the situation of economic and policy inertia.

The policy briefs in this series numbering more than 20 examine issues ranging from agricultural sustainability, environmental and market aspects of the agricultural systems to allied sector and informal and small-scale sector livelihoods including dairy and MSMEs. The marginalised group livelihoods like women, schedule castes, and farm labour and other rural and migrant workers also get adequate attention. The sectors of health and education are also examined. On the fiscal front, institutional credit for recovery and revenue of the state post-GST are analysed. The larger aspects of governance, federalism and diaspora also get a coverage as contextual and overarching themes.

We hope that these briefs would serve to encourage more informed debate and discussion in the interest of the betterment of the state economy and society to aid post-COVID recovery and medium and long-term sustainable development policy making.

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Abstract

The shutdown of almost all economic activities to inhibit the spread of COVID-19 occurred in early 2020 in India including Punjab and had serious implications for Punjab agriculture as wheat harvesting was just going to start faced with immediate shortages of labour and machinery and posing challenges for effective procurement. A few months after the wheat harvesting, sowing/transplantation of kharif crops such as cotton, maize and paddy required multiple times more labour force and posed serious challenges to farmers across the state. This paper provides a preliminary assessment of the adaptations strategies of Punjab farmers under such situation. The assessment is based on telephonic/personal survey of 120 farmers under the auspices of the TIGRESS (Transforming India's Green Revolution by Research and Empowerment for Sustainable food Supplies of University of Cambridge, UK) Project, a collaborative and interdisciplinary programme designed to improve the sustainability of India's agriculture.

Despite considerable challenges, farmers adopted different strategies to address labour shortages and marketing challenges as influenced by their holding size, financial resources and access to local information networks. Marginal and small farmers increased the use of family labour, while medium and large famers showed an increased use of machinery. The medium and large farmers who showed higher dependence on machinery were inclined to diversify their cropping pattern in kharif season.

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Introduction

Punjab agriculture has played an unparalleled role in the growth and development of India ever since the advent of Green Revolution in the mid-1960s. The success of green revolution led to the prosperity and development of rural masses as evident from the highest levels of average monthly income of a farming household in Punjab (GoI, 2017). Contribution of state agricultural sector towards ensuring food security, poverty alleviation, uplifting rural economy and generating employment is notable (Dhillon et al., 2010). With only 1.52% of the total geographical area, Punjab is the largest producer of wheat and paddy and significant contributor to the national pool of foodgrains. This is due to the highest levels of crop yields, cropping intensity of 190% and almost entire area under assured irrigation as compared to the rest of the country (GoP, 2020). A combination of innovative technology, agricultural infrastructure and supportive government policies has enabled the state to become the 'bread basket of India'.

Contributing over 28% of the Gross Value Added of the state in 2019-20, agriculture and allied activities employs 26% of the labour force in the state. Despite large scale farm mechanization, mainly driven by the model of Green Revolution, labour continues to play a crucial role in state agriculture. Activities like paddy sowing and transplantation, cotton picking, animal husbandry, etc. are labour intensive. In addition to local labour, the state agriculture is heavily dependent on migrant labour, which usually arrives via cyclical migration every year during the peak agricultural season – sowing and harvesting (Kaur et al., 2011). With the aforementioned vitality of the state agriculture directly and indirectly supporting various sectors and individuals dependent on it, any disruption in this sector would mean a disruption in not only the state but national welfare as well.

Covid-19 and Punjab Agriculture

The unexpected pandemic COVID-19 and its relentless spread brought country-wide socio-economic disruptions, sparing none of the sectors of the economy. The pandemic arrived during a time when north-west India was approaching the harvesting time for Rabi crops, especially wheat; thus, impacting the agriculture sector in Punjab.

In order to inhibit the spread of COVID-19, the Punjab government effected a state curfew on March 22, 2020, which was later converted into a state-wide lockdown thereby, virtually shutting down almost all economic activities, except essential services, in the state. In this backdrop, the state agriculture was expected to be exposed to unprecedented challenges, with likely implications on marketing and production during the approaching rabi harvesting season in the month of April; followed by kharif sowing season that begins in mid-June. Since Punjab is one of the major wheat-growing states and almost all the marketed surplus is procured by the national procurement agency (Food Corporation of India), restrictions in movement of people and goods carriers were likely to have adverse consequences on the smooth harvesting and sale of produce. The fact that the majority of the farmers are dependent on this network of sale, engendered apprehensions about the resultant adverse impact on farmers' revenue.

The immediate outcomes due to the extended pandemic lockdown were predicted to be as shortage of labour and the resultant hike of wages of the limited labour available. Due to sealing of state borders and restricted interstate movement, the necessary migrant labour was feared to be unavailable; hence, the likely labour shortage was almost inevitable. In addition, shortage of machinery and farm inputs were also expected to be an issue since their availability was also expected to be impacted by the lockdown. Further precipitation of this into increase in farm costs like wages of labour, machinery rentals, and

costs of farm inputs like seeds and fertilizers, and other farm inputs and services was plausible. The ramifications of such disruption were expected to be grave for resource-poor smaller farm households that form about one-third of the total farm households in the state.

The present study attempts to identify and assess the full impact of the pandemic induced economic slow-down on agricultural production and marketing, and understand perspectives and needs of farmers for undertaking smooth agricultural operations.

Sampling and methodology

In this direction, a survey was developed, pre-tested and then data was collected from 120 farmers through telephonic interviews and personal visits (wherever possible). These farmers are a part of the ongoing FP4-TIGR2ESS project. The farmers were approached, briefed about purpose of the survey, and were surveyed after receiving their consent. Each telephonic conversation took about 20-25 minutes and each personal interview lasted between 40-50 minutes per person. The survey was conducted in May to get a fair picture of the impact of pandemic on rabi crop as the procurement of wheat in the state is generally over by this time. The details of the study sample are provided in Table 1.

Table 1: Details of the study sample

| Category of farmers | No. of farmers | Average area of landholding (Acre) |
|-------------------------|----------------|------------------------------------|
| Marginal (≤2.5 acres) | 15 (12.5) | 1.90 |
| Small (≤5 acres) | 24 (20.0) | 4.09 |
| Semi-medium (≤15 acres) | 49 (40.8) | 9.59 |
| Medium (≤25 acres) | 16 (13.3) | 19.84 |
| Large (> 25 acres) | 16 (13.3) | 36.03 |
| Total | 120 (100.0) | 12.43 |

Note: Figures in parenthesis are percentages of the total

Results of the survey

Rabi Season

Analysis of the survey data revealed that wheat was grown on 85% area followed by potato and fodder on about 7% and 6% area, respectively. COVID-19 pandemic lockdown was expected to impact various facets of agriculture that are broadly classified as production and marketing factors. A

detailed study of these factors is revealed as under:

A. Production/harvesting

With the onset of harvesting season, free movement of labour, agricultural machinery and agricultural produce are of paramount importance in order to ensure smooth process of harvesting; however, due to the pandemic-lockdown these were likely to be impeded. The study revealed that, farmers were facing more than one constraint with regards to smooth harvesting process. About 52% of the farmers were facing shortage of labour and about 35% paid higher wages to arrange labour (Table 2). Marginal farmers being resource-poor faced more such problem than their larger counterparts. Among all the problems faced by marginal farmers in the process of harvesting, struggle to arrange labour and the subsequent high expenditure on wages were prime concerns. In some villages wages went up by almost 50%. On the other hand, availability of machinery did not appear as a major challenge as only about 9% of farmers complained of their poor or untimely availability and less than one per cent farmers had to pay higher rentals for the machinery.

Table 2: Problems faced during harvesting of Rabi crops (multiple response) (%)

| Category of farmers | Scarcity of labour | High wage rate | Availability of Machine | High hiring charges of machine | Any other |
|---------------------|--------------------|----------------|-------------------------|--------------------------------|-----------|
| Marginal | 71.43 | 28.57 | - | - | - |
| Small | 50.00 | 33.33 | 16.67 | - | - |
| Semi-medium | 48.65 | 35.14 | 10.81 | - | 5.41 |
| Medium | 54.55 | 27.27 | - | 9.09 | 9.09 |
| Large | 50.00 | 42.86 | 7.14 | 0.00 | - |
| Total | 51.85 | 34.57 | 8.64 | 1.23 | 3.70 |

The role of state government in strategic and timely arrangement of required machinery is appreciable as it ensured the movement of harvesters in Punjab from other states for their sufficient and timely availability. All the agricultural services were excluded from the purview of curfew to facilitate smooth harvesting activities.

B. Marketing

A widespread adverse impact of Covid-19 was expected on wheat procurement in Punjab but the state government planned and implemented an effective procurement strategy. The study revealed that only one-third of farmers faced issues of delayed and staggered procurement. The government followed extensive measures to ensure smooth and timely procurement of wheat through a token system, and promoted a staggered procurement system that would limit gathering of farmers in the *mandis*, avoid a sudden rush for transportation, etc. Very few farmers reported selling below the MSP. About 13% of the total farmers experienced delayed payments, mostly the ones sourced through middlemen. Another 18% of the total farmers experienced problems of transportation, especially for transporting the produce to the markets (Table 3). Overall, the problems faced during the wheat procurement were not widespread unlike as expected when the lockdown was initiated.

Table 3: %age of farmers facing problems in marketing of rabi crops

| (multiple response) | |
|------------------------------|-----------|
| Problem | % farmers |
| Delayed procurement | 30.0 |
| Staggered procurement | 31.4 |
| Sold at price lower than MSP | 2.9 |
| Delayed payment | 12.9 |
| Transportation issues | 18.6 |
| Any other | 2.9 |

The aforementioned constraints were likely to impact the farmers with regards to

Table 5: Measures to tackle labour issues (%)
(a) Scarcity of labour

| Category of farmers | Arranging local labour | Family Labour |
|---------------------|------------------------|---------------|
| Marginal | 33.3 | 0.0 |
| Small | 25.0 | 0.0 |
| Semi-medium | 32.7 | 4.1 |
| Medium | 18.8 | 18.8 |
| Large | 18.8 | 25.0 |
| Total | 27.5 | 7.5 |

management of their produce. However, about 73% of the total farmers sold their produce in the *mandis* immediately after harvesting while only about 20% had to store wheat to follow the norms of staggered procurement (Table 4). It was found that both ways, all the produce of the state was managed well, and none was dumped.

Table 4: Pattern of management of rabi produce (%)

| Management strategy | % farmers |
|-----------------------------|-----------|
| Sold directly in the market | 73.4 |
| Stored before sale | 5.8 |
| Others/multiple | 20.8 |

Contrary to the apprehensions of widespread decline in yield of crops and credit, only 12% of the farmers complained about problems in accessing credit, primarily due to restrictions in movement; and only about one-third of farmers experienced decline in the yields due to reasons other than the lockdown.

Farmers' initiatives

Despite facilitation of procurement by the state government by tweaking policies and guidelines of lockdown, farmers also resorted to some measures independently. While almost 28% of the farmers tried to address the labour shortages by hiring local labour, about 8% of the total farmers involved family labour to mitigate such shortages. Of the total farmers, about 6% eased the burden of higher expenditure on wages by adopting mechanization, though about 17% had to incur higher wages (Table 5 a & b).

b.High wages

| Category of farmers | Adopted mechanization | Incurred higher wage | Negotiated for lower wages |
|---------------------|-----------------------|----------------------|----------------------------|
| Marginal | 6.7 | 6.7 | 0.0 |
| Small | 4.2 | 12.5 | 0.0 |
| Semi-medium | 8.2 | 16.3 | 2.0 |
| Medium | 0.0 | 18.8 | 0.0 |
| Large | 6.3 | 31.3 | 0.0 |
| Total | 5.8 | 16.7 | 0.8 |

About 4% of the total farmers were observed to have experienced delayed harvesting as they were waiting for their turn to hire the machinery; on the other hand

another 2% of the total farmers also faced issues in arranging machinery due to sudden rush in demand for the same, though they were able to arrange the same in time (Table 6).

Table 6: Measures to tackle machinery shortage (%)

| Category of farmers | Arranging machinery | Waiting |
|---------------------|---------------------|---------|
| Marginal | 0.0 | 0.0 |
| Small | 0.0 | 8.3 |
| Semi-medium | 4.1 | 4.1 |
| Medium | 0.0 | 0.0 |
| Large | 0.0 | 6.3 |
| Total | 1.7 | 4.2 |

Transportation was the second most prominent problem, preceded by labour issues that were faced by farmers. In an attempt to deal with the issues pertaining to transportation insufficiency, about 9% of the total farmers

ended up incurring higher cost for the same (Table 7). However, about 3% of the farmers preferred to store their produce to be moved and sold later, when the lockdown constraints were to subside.

Table 7: Measures to deal with transportation issues (%)

| Category of farmers | Incurring higher cost | Pooling resources with fellow farmers | Storing and selling in mandi (part) | Completely stored | Sold locally |
|---------------------|-----------------------|---------------------------------------|-------------------------------------|-------------------|--------------|
| Marginal | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Small | 12.5 | 4.2 | 4.2 | 8.3 | 4.2 |
| Semi-medium | 6.1 | 2.0 | 2.0 | 4.1 | 2.0 |
| Medium | 12.5 | 0.0 | 0.0 | 0.0 | 0.0 |
| Large | 18.8 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total | 9.2 | 1.7 | 1.7 | 3.3 | 1.7 |

The pandemic fear and lockdown caused a sudden rush in demand for transport relative to its supply, thus creating constraints during harvesting and marketing. Nonetheless, all the farmers were seen to have had adopted various means to resolve these issues, though in some cases they ended up incurring a higher cost.

Kharif season

The kharif season was to start with the sowing of cotton and maize and transplantation of paddy. The demand for labour was expected to grow more than 12 times than in the wheat harvesting period, and most of the labour was required for transplantation of paddy. Labour supply was hampered as many of the seasonal migrant workers, the primary agricultural workforce, could not reach the Punjab state due to restrictions in inter-state travel, and many other migrant labourers that were

residing in the state reverse migrated to the native states. A glaring mismatch between the demand and supply of labour and the consequent rise in wages was expected to ensue a considerable shift in the cropping pattern, increase in area under basmati rice, shift to direct seeding of rice and short-duration rice varieties, and mechanical alternatives of transplantation. All these strategies could help in reducing labour demand or spreading the sowing over a longer period for better management.

The study revealed that the farmers had no intention to reduce area under paddy (compared to previous year) as it provided higher returns. However, the area under Basmati was expected to increase. No other major changes were expected in the cropping pattern in response to the covid-19 situation.

Problems likely to be faced during kharif season

Farmers were apprehensive of future course of action with regards to farming in the presences and further spread of COVID-19. During kharif season, labour shortage was perceived as the most probable problem (72%); while upward of 20% farmers

perceived facing problems in arranging inputs like seeds and fertilizers (Table 8). The proportion of farmers perceiving such problems increased with the increase in land size, which means that relatively large farmers perceived more problems than their smaller counterparts.

Table 8: Problems expected to be faced during Kharif season (multiple responses) (%)

| Category of farmers | Buying of improved seeds | Buying of fertilisers/agro-chemicals | Hiring of labour | Hiring of machinery | Prices of crops | Marketing of crops | Methods of cultivation |
|---------------------|--------------------------|--------------------------------------|------------------|---------------------|-----------------|--------------------|------------------------|
| Marginal | 9.52 | 14.29 | 47.62 | 9.52 | 9.52 | 4.76 | 4.76 |
| Small | 16.67 | 20.83 | 70.83 | 8.33 | 4.17 | 0.00 | 12.50 |
| Semi-medium | 20.41 | 20.41 | 73.47 | 10.20 | 12.24 | 8.16 | 14.29 |
| Medium | 25.00 | 31.25 | 62.50 | 25.00 | 12.50 | 6.25 | 31.25 |
| Large | 31.25 | 18.75 | 81.25 | 18.75 | 12.50 | 6.25 | 31.25 |
| Total | 20.83 | 21.67 | 71.67 | 13.33 | 10.83 | 5.83 | 17.50 |

In order to deal with the anticipated problem of labour shortage and the subsequent higher costs, majority (31.7%) of the total farmers, expressed the plausibility of adopting mechanization for paddy sowing. Therefore, they are prioritizing arrangement of machinery, especially DSR machines that

would promote labour saving (Table 9). Such approaches would also promote water saving. Another 19% of farmers are planning to arrange labour from their own and nearby villages to meet the required demand. A category wise analysis reveals that while more of the marginal farmers are keen to arrange labour, a larger proportion of the rest of the farmers are planning to undertake labour substitution with machinery.

Table 9: Measures to deal with perceived shortage of labour

| Category of farmers | Arranging local labour | Arranging machinery | Arranging both local and machinery | Crop diversification | Fellow farmers | Hiring expensive | Waiting for labour |
|---------------------|------------------------|---------------------|------------------------------------|----------------------|----------------|------------------|--------------------|
| Marginal | 26.7 | 6.7 | 13.3 | 0.0 | 6.7 | 6.7 | 6.7 |
| Small | 20.8 | 29.2 | 4.2 | 8.3 | 0.0 | 0.0 | 8.3 |
| Semi-medium | 12.2 | 40.8 | 16.3 | 0.0 | 0.0 | 0.0 | 4.1 |
| Medium | 25.0 | 31.3 | 0.0 | 0.0 | 0.0 | 6.3 | 0.0 |
| Large | 25.0 | 31.3 | 12.5 | 0.0 | 0.0 | 12.5 | 0.0 |
| Total | 19.2 | 31.7 | 10.8 | 1.7 | 0.8 | 3.3 | 4.2 |

In order to deal with the perceived problem of shortage of seeds, about 9% of the total farmers were expected to arrange the same from fellow farmers, while about 6% were planning to procure from Punjab Agricultural

University well before time so as to avoid any delays during sowing (Table 10). In addition, only 3% of the total farmers were expecting to incur higher expenditure on seeds.

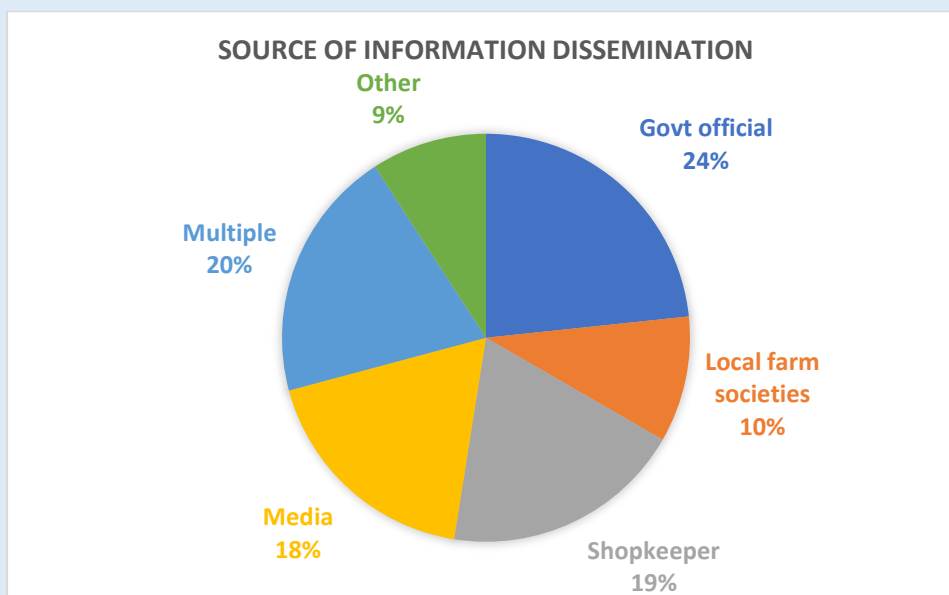
Table 10: Measures to deal with expected shortage of paddy seeds during Kharif season

| Category of farmers | Arrange from other farmers | Purchase from PAU | Seed purchased on high rate | Still waiting |
|---------------------|----------------------------|-------------------|-----------------------------|---------------|
| Marginal | 0.0 | 6.7 | 0.0 | 6.7 |
| Small | 4.2 | 8.3 | 4.2 | 0.0 |
| Semi-medium | 12.2 | 2.0 | 2.0 | 4.1 |
| Medium | 12.5 | 12.5 | 0.0 | 0.0 |
| Large | 12.5 | 6.3 | 6.3 | 6.3 |
| Total | 9.2 | 5.8 | 3.3 | 3.3 |

Information Dissemination

The government made extensive efforts to disseminate information to farmers to facilitate their day-to-day agricultural activities and decision making through various government departments and institutions. About 23% of the sampled farmers were getting the required information from government officials; shopkeepers, TV and online news-media and local farm societies were also performing a

crucial role of information dissemination as 19, 18 and 10 %respectively of the total farmers were receiving important information from these respective sources. Overall, the smaller farmers were seen to be dependent more on informal sources of information, like the shopkeepers, as compared to their larger counterparts that gained information largely from official sources like government, farm societies and media.



Water use

The majority of the farmers did not perceive any change with regards to use of water in the approaching Kharif season as compared to the last season. However, about 32.50% assumed that water use might increase; primarily due to a preponement date of sowing, which might tempt a larger use of water. However, about 5% believed that water use might decline due

to adoption of different techniques of paddy cultivation, which were primarily labour-saving techniques. Nevertheless, only about 4% of farmers were very open to adopting new technologies, especially those that were less labour intensive and more water saving for paddy cultivation; while about 33% of the farmers were moderately open to experimenting with new techniques and technologies.

Conclusions and implications

The present study brought out that although pandemic lockdown did impact various facets of Punjab agriculture, the state administrative machinery did manage to avert distress among the farming community, thereby, curtailing the feared impact. However, labour shortages and subsequent higher wages, and expensive and limited transportation were found to be the relatively common constraints for the farming community. However, these issues did not become widespread. Though a certain rise in farm and marketing costs were experienced,

none of the Rabi produce of the state was lost or wasted due to the pandemic. Individual farmer initiatives in combination with state government support enabled management of the expected obstacles, and planning to tackle the likely constraints during the approaching kharif season was in process. The survey shows that the government needs to intervene to facilitate smooth agricultural operations and curtail the appreciation in farm costs. The government can incentivise workers who choose to work in agriculture. There might be some incentives for the migrant workers also to return to Punjab in the form of health insurance or food entitlements for some time.

The likely economic impact of COVID-19 pandemic-lockdown on agriculture in the forthcoming kharif season might be minimised if the crop diversification and less labour-intensive technique of paddy cultivation might be engendered in the future plans. Also, easy availability of paddy sowing machinery (DSR), by effecting sufficient availability of the required machinery with custom hiring centres and NGOs, would be very fruitful. These steps would not only minimize the feared immediate impact of COVID-19, but would also build strong grounds for growth of state agricultural sector and farmer prosperity in the long run.

In the long run, the following measures in the state may help to build resilience of the state to ward off adverse effects of such abrupt disruptions in the economy, farming sector and supply chains in particular.

1. Strengthening the role of agromachinery service centres in the state in the public as well as in private sector to ensure timely, cost-effective and easy availability of farm machinery.
2. Strengthening of supply chains for quality seeds by active participation of various stakeholders such as Department of Agriculture and Farmers' Welfare (DAFW), farmers' cooperatives, FPOs, etc.
3. Strengthening of supply networks at the local level by involving village Panchayats, farmers' cooperatives and local traders. The focus should be on meeting the local demand effectively. The government may devise incentive mechanisms for strengthening such networks.

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ANNEXURE

Table 1: Measures to deal with delayed procurement

| Category of farmers | Transportation | No response |
|---------------------|----------------|-------------|
| Marginal | 0.0 | 13.3 |
| Small | 0.0 | 4.2 |
| Semi-medium | 2.0 | 18.4 |
| Medium | 6.3 | 18.8 |
| Large | 0.0 | 25.0 |
| Total | 1.7 | 15.8 |

Table 2: Measures taken by farmers to deal with staggered procurement

| Category of farmers | Waiting | No response |
|---------------------|---------|-------------|
| Marginal | 0.0 | 0.0 |
| Small | 0.0 | 8.3 |
| Semi-medium | 2.0 | 22.4 |
| Medium | 6.3 | 18.8 |
| Large | 6.3 | 18.8 |
| Total | 1.7 | 16.7 |

Table 3: Measures taken by farmers to deal with delayed payments

| Category of farmers | Waiting | No response |
|---------------------|---------|-------------|
| Marginal | 0.0 | 13.3 |
| Small | 0.0 | 4.2 |
| Semi-medium | 2.0 | 2.0 |
| Medium | 0.0 | 18.8 |
| Large | 6.3 | 0.0 |
| Total | 1.7 | 5.8 |

Table 4: Measures to deal with perceived problem of machinery shortage

| Category of farmers | Arrange machinery | Wait | Arrange labour |
|---------------------|-------------------|------|----------------|
| Marginal | 6.7 | 0.0 | 6.7 |
| Small | 0.0 | 4.2 | 4.2 |
| Semi-medium | 4.1 | 4.1 | 2.0 |
| Medium | 12.5 | 0.0 | 12.5 |
| Large | 6.3 | 0.0 | 12.5 |
| Total | 5.0 | 2.5 | 5.8 |

Table 5: Readiness to adopt new technology for Kharif cultivation

| Category of farmers | Very open | Moderately open | neither | Moderately opposed | Very opposed |
|---------------------|-----------|-----------------|---------|--------------------|--------------|
| Marginal | 0.0 | 13.3 | 80.0 | 6.7 | 0.0 |
| Small | 0.0 | 41.7 | 45.8 | 8.3 | 4.2 |
| Semi-medium | 6.1 | 36.7 | 53.1 | 0.0 | 4.1 |
| Medium | 12.5 | 25.0 | 56.3 | 6.3 | 0.0 |
| Large | 0.0 | 31.3 | 62.5 | 6.3 | 0.0 |
| Total | 4.2 | 32.5 | 56.7 | 4.2 | 2.5 |

Table 6: Sources of dissemination of information to farmers (%)

| Category of farmers | Govt official | Local farm societies | Shopkeeper | Media | Multiple | Other |
|---------------------|---------------|----------------------|------------|-------|----------|-------|
| Marginal | 20.0 | 13.3 | 33.3 | 13.3 | 20.0 | 0.0 |
| Small | 16.7 | 8.3 | 33.3 | 8.3 | 16.7 | 16.7 |
| Semi-medium | 20.4 | 14.3 | 8.2 | 20.4 | 30.6 | 6.1 |
| Medium | 43.8 | 6.3 | 18.8 | 18.8 | 12.5 | 0.0 |
| Large | 25.0 | 0.0 | 18.8 | 31.3 | 12.5 | 12.5 |
| Total | 23.3 | 10.0 | 19.2 | 18.3 | 20.0 | 9.2 |

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