



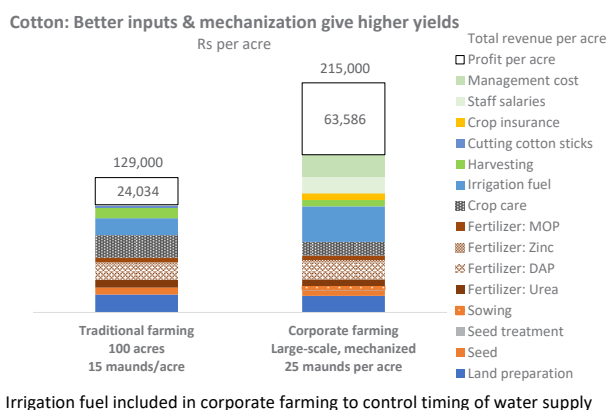
**FINANCING
GROWTH IN
AGRICULTURE**

IV. Financing growth in agriculture

Pakistan's agriculture sector needs capital to progress! It remains stagnant in a low productivity, low returns cycle with limited access to capital. A jump to a higher level of productivity and returns is not possible through debt alone. Therefore, growth in agriculture requires not only working capital financing (especially formal credit) and risk transfer tools (such as crop insurance) but also funding for transformative investments through equity, grant funding, risk mitigation tools, etc. **This chapter outlines these constraints and presents specific solutions that have been developed by Pakistan's corporate and financial sector players.**

What it takes to raise agri-productivity: Figure 24 illustrates the jump from traditional farming to precision agriculture practice at scale through corporate farming. It compares the basic profit & loss statement for traditional cotton cultivation taking place in Pakistan with the profit & loss for corporate farming with mechanization. Better seed sown by machines increases not only the germination level of the seeds (how many of the seeds sown will actually sprout into plants) but also the population of plants sown per acre. This means that a higher yield can be achieved. This potential yield is protected through a better fertilizer mix. This contributes to better plant health. Modern farming involves less crop care cost per acre not only because of more efficient mechanized spraying but also because of pest scouting which gives an indication of whether a segment of the crop requires spraying or not. The example shows higher use of fuel for irrigation to control the timing of water supply. Since corporate farming is agriculture with much higher predictability than traditional agriculture, crop insurance becomes an essential expense. Finally, the staff salaries and management cost are significantly higher than in corporate farming similar to an industrial activity requiring technical expertise and management muscle.

Figure 24: The jump to precision agriculture



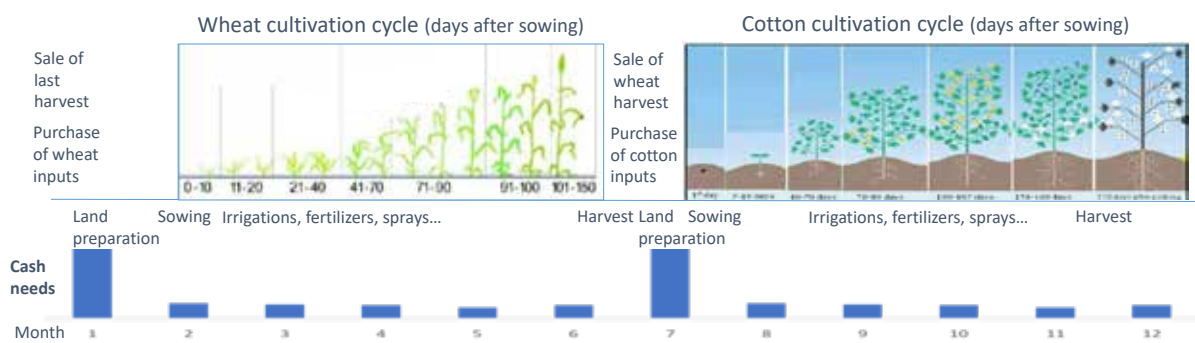
The jump from traditional farming to corporate farming requires a significant capital investment which has to come mostly from equity. Mechanized farming brings reduction in cost and increase in yield: in rice cultivation, mechanization can bring the farmer's breakeven point down from Rs. 900 per acre to the range of Rs. 700 per acre which can make Pakistan's rice more competitive in export markets. But mechanized agriculture requires scale! For example, the modern 6-row cotton picker requires at least 10,000 acres for it to be a financially viable investment. Figure 24 shows only the depreciation and opex related to modern farm machinery. But the machines first have to be financed somehow.

For modern cotton cultivation, sufficient scale is preferable to include a ginning operation inside the farming operation. This allows elimination of the loss of quantity and quality of cotton between farm and gin. A modern gin becomes a viable investment if the cotton cultivation operation associated with it is at the scale of 50,000 acres. The investment required for such projects is in the range of \$1,200 per acre. Pakistan must start investment in such projects not least since even Uzbekistan has begun to mount such projects with cultivation at 50,000 or 100,000 acres including ginning operations to feed spinners directly.

In summary, the main reasons for the low productivity and low returns in Pakistan's agriculture are both systemic and farm-level. At the systemic level, quality seed is only available to a small minority of farmers and for a limited number of crops; water availability is irregular and unsuited to the scheduling needs of the crops being sown in each area. On the farm level, traditional farming methods are being practiced even on larger farms with little mechanization. **The shift to higher productivity and higher returns through precision agriculture requires not only debt but all the pillars of finance: debt, equity, insurance, and government support.**

Agriculture is a highly time-sensitive business. On most of Pakistan's cultivable land, every day of delay in wheat sowing from its ideal window of October 15 to November 15 means a lower wheat yield at harvest time. For field crops, the change-over from one crop to the next is typically the time when farmers have the highest working capital needs. Over 80 percent of Pakistan's farms cultivate wheat over the winter. As figure 25 shows, a farmer cultivating the wheat-cotton rotation, the sale of the wheat harvest typically produces revenues that can be used to secure the inputs for the cotton crop. Over half the expenditure on each crop is made in its first month. This need is best addressed through credit.

Figure 25: Understanding financial needs in the agriculture sector



Credit

Commodity trade players estimate that only a quarter of Pakistan's farmers have been able to extricate themselves from the clutches of the middleman (*arhti*). And these are mostly large farmers. The middleman has many names and avatars along the value chain, all of them much maligned. But **the most important play of the middleman is to connect the sale of the last crop's harvest with the purchase decision for the next crop's inputs**. This gives the middleman control of commodity in his role as aggregator. As a result of this combined transaction, the majority of Pakistan's farmer are not paying cash for the next crop's inputs. And this 'delayed payment' for crop inputs is booked by the middleman at a higher price: typically, 13-15 percent higher than the price to be paid if payment is made in cash. Since the crop cycle for major crops is typically 130-150 days, the annual percentage rate is extrapolated to be north of 35%. Money from speculators typically follows this route into agriculture as informal funding.

How far are banks falling short on agri-credit? According to the last Agriculture Census, 88% of Pakistan's 8.26 million farms have less than 12.5 acres (5 hectares, considered a minimum for sustainable farming). Further, two-thirds of Pakistan's farms are below 5 acres. On the other end of the spectrum only 90,000 farms have 50 acres or more.

The traditional collateral for farm loans required by banks is a two-step arrangement: the first security is the crop itself while the second security is the land owned by the farmer. A section below outlines how the insurance associated with the crop is sub-optimal in Pakistan. This reduces the value of the crop as collateral. So, the land comes into greater focus as collateral against direct loans to farmers which brings many constraints. The first is the low loan-to-value ratio: the loan is typically in the range of 1-2% of land value which farmers do not appreciate. On the other hand, banks do not prefer land either since it is considered illiquid collateral. Finally, the requirement of land as collateral means the exclusion of tenant farmers from formal credit—these are often the best farmers. Loan processing and disbursement time is usually in weeks which also makes formal lending unattractive for farmers. And, typically, small farmers also report shabby treatment by bank staff.

In this light, there is little surprise that for 8.2 million farms, there are only 1.4 million direct farm sector loans from banks in FY20 with PKR 638 billion disbursed directly for all crops. Of these loans, only about 3,000 large farms (above 50 acres) received some 60 percent of the financing. So, while an estimated 18% of Pakistan's farms had loans directly from banks, 1.34 million smallholder farmers received only 28% of -the financing. The lack of access to direct bank lending to small farmers is one of the key constraints to Pakistan's agriculture sector.

When farmers are asked why they are not direct borrowers from the banking sector, their most common responses (two-thirds) are either that the documentation requirements are complex or that they do not know how to get a bank loan (Karandaaz, 2023). The result is that two-thirds of farmers report that they borrow informally from family/friends and money lenders/loan sharks. Some 14% report that they

borrow from ZTBL (which has the largest portfolio of smallholder farmers), 12% report they borrow from microfinance banks and 4% report borrowing from commercial banks which cater mainly to larger farmers, hence the smaller proportion (Karandaaz, 2023). The theme that large farmers dominate direct borrowing from banks is supported by the fact that the average loan size reported for loans from commercial banks is PKR 600,000 compared to about PKR 100,000 or less from all other sources mentioned.

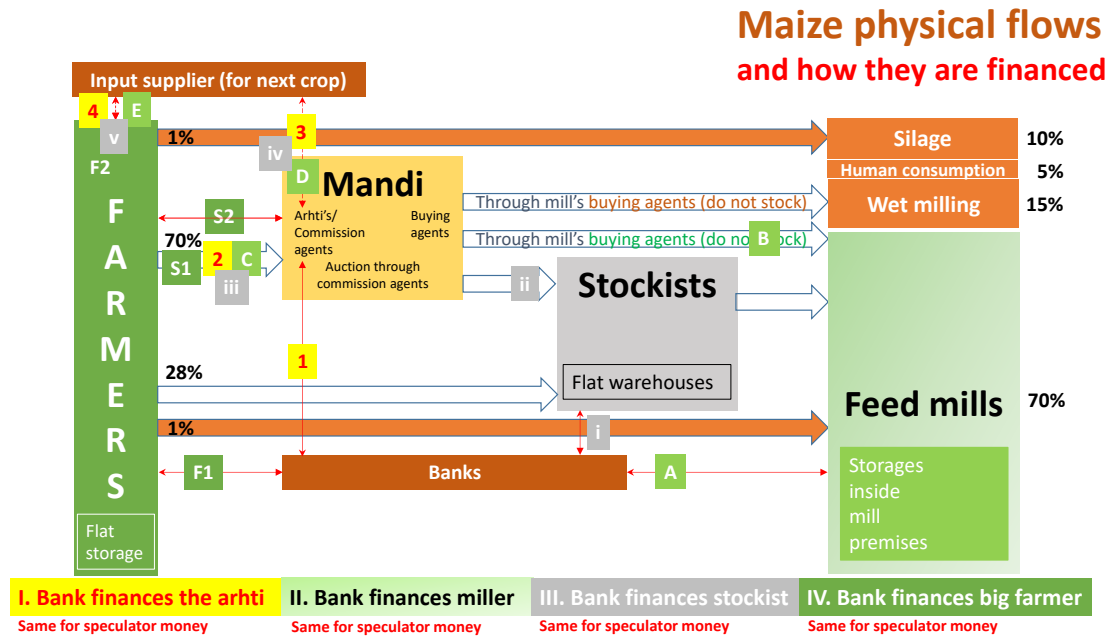
A simple estimate of credit demand among Pakistan's farms can be made by multiplying the loan limit (ceiling for lending per acre) for each crop advised by the State Bank of Pakistan with the actual acreage under each crop. This calculation was done for FY20 and the result for only the five major field crops was PKR 2.6 trillion compared to actual disbursement of PKR 638 billion for all crops! The breakdown of the credit demand estimate by farm size reveals a demand of PKR 338 billion for farms above 50 acres (which is comparable to the PKR 384 billion actually disbursed to farms above 50 acres in FY20), PKR 843 billion for farms of 12.5-50 acres (compared to PKR 73 billion actually disbursed to this category), and PKR 1,450 billion for farms below 12.5 acres (which is 8 times the PKR 181 billion actually disbursed to such smallholder farmers). So, the smallholder farmers are the ones beholden to the middlemen!

These estimates indicate that some 80% of Pakistan's farms lack direct access to bank credit and at least 75% of the credit demand for crops is not being met through bank credit. It is clear that the coverage and flow of bank credit to Pakistan's farmers, especially small farmers, needs to be expanded manifold.

More bridges are needed between farmers and banks. The bridges between the banking sector and farmers remain thin. Figure 26 outlines these links in the maize value chain. Generally, there are four routes for bank financing (and also speculator money) to reach farmers:

- I. When the bank finances the middleman (*arhti*), the middleman uses these funds to make a partial payment to the farmer against the farmer's harvest of the last crop and to make a payment to input suppliers on behalf of the farmer;
- II. The more common route is for the bank to lend to a processor of the farmer's crop. This processor basically on-lends these funds through its buying agents to the middleman in the wholesale market (*mandi*). And the funds find their way to middlemen/aggregators and follow the steps outlined in route I above;
- III. A small portion of bank credit goes to stockists who purchase commodity at harvest, stock them for 2-3 months and mostly on-sell to processors. When a bank finances a stockist, the funds also find their way to middlemen/aggregators and follow the steps outlined in I above;
- IV. A small portion of bank credit goes directly to (mostly large) farmers who have the capacity to store the last crop's harvest on their farms and use the bank funding to purchase inputs for the next crop.

Figure 26: Four different routes for bank credit (and speculator money) to reach farmers



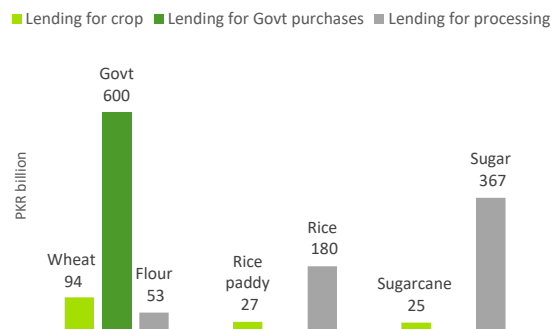
Source: IFC

Of these, the route that carries the largest amount of credit is the one that passes through processors. As figure 26 shows, bank lending to sugar millers was more than half the value of sugar produced in FY22. This is a strong conduit for bank financing to reach sugarcane farmers but at the terms dictated by millers and middlemen. The numbers for wheat are telling: bank lending to wheat farmers is higher than bank lending to flour millers. The key reasons are that an estimated 40 percent of the wheat crop is retained by farmers for their own families' consumption over the rest of the year so it is not milled. Also, wheat is the only crop purchased by the government (heavily financed by banks) for sale to millers later on.

Banks lend to agriculture through processors mainly because through this route: (i) they understand their exposure better, and (ii) they can work with one counterpart rather than thousands of farmers. This can be a springboard for growth in agriculture.

Excellence in Pakistan's agriculture is often seen where processors have done backward integration with farmers. It is true that Pakistan's progressive farmers are conducting high performance agriculture. But there are some processors which have bolstered their supply chain by helping large numbers of small- and medium-sized farmers upgrade not only farm performance but also profitability. The most-cited examples of processors who have conducted highly successful backward

Figure 27: Lending: crop vs. end-product (FY22)



Source: State Bank of Pakistan, IFC

integration with large numbers of farmers are Rafhan in maize, JDW in sugarcane, Nestle in milk, British American Tobacco in tobacco, and PepsiCo Lays in potato, etc.

For example, contract farming relationships developed by PepsiCo Lays over the past decade have resulted in globally competitive potato yields achieved by farmers in the Okara area. A contract price is set before each season for off-take by the processor with a promise of payment within 3 days of harvest being delivered by the farmer (down from the traditional 45 days or more). In addition, farmers are given high quality potato seed by the processor on unsecured credit. The processor's off-take guarantee becomes a backstop for financial institutions to lend to participating farmers. In case of a default, the processor aims to recoup the loss from future payments to the farmer. In recent years, PepsiCo Lays started offering a premium to farmers using drip irrigation to promote sustainability goals.

This arrangement brings supply security and predictable prices to the processor and a reliable off-taker with a known price for each participating farmer. This allows the elimination of exploitation by middlemen. In the 2014-15 season, excessive frost caused destruction of about 50 percent of the crop. But farmers provided PepsiCo Lays with the agreed supply from the surviving portion of the crop. This shows that a mutually beneficial relationship garners a farmer loyalty that is not seen commonly.

Expanding agri-credit through securitization of agri-commodities: As mentioned earlier, the exploitation of the farmer by middlemen is through the bundling of two transactions sorely needed by the farmer: the sale of the last crop's harvest and the purchase of the next crop's inputs. An eco-system that separates these two transactions for the farmer has been introduced in Pakistan. This is the Electronic Warehouse Receipts (EWR) eco-system intended mainly for non-perishable items.

What are EWRs? Under a warehouse receipts-based financing regime, any owner of an eligible commodity can get their commodity tested for entry into an accredited warehouse/silo and secure bank financing against their warehouse receipt as collateral. Commodities eligible for EWR-based financing are usually non-perishable and have a highly liquid market. In Pakistan, these commodities are: wheat, maize, rice paddy, rice, sugar, oilseeds, etc. Banks as well as holders of commodity are looking for an alternative to land as collateral for agri-financing. The prospect of receiving bank financing creates a strong incentive for all stakeholders to preserve its quality so it can pass the testing requirements for proper storage. This will reduce Pakistan's high post-harvest losses.

Within 18 months of its launch, this regime has issued electronic warehouse receipts over Rs. 2 billion worth of commodity in mainly in maize and rice. Participating banks have disbursed loans against 90% of these EWRs within 24 hours to holders of electronic warehouse receipts (due diligence and KYC is completed before the season starts). This feature and the fact that no property documents other than the electronic warehouse receipt is required for a loan are being appreciated by traders, farmers, and 'farmer-cum-traders'. The critical addition required is the expansion of modern warehousing companies which can garner the confidence of banks as well as holders of electronic warehouse receipts.

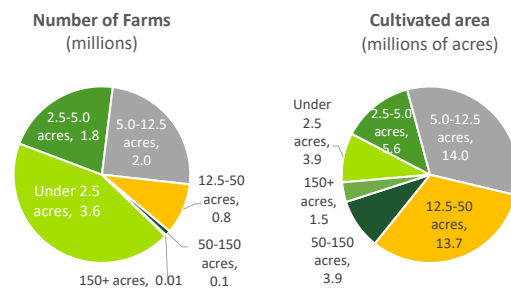
The securitization of agri-commodities in the form of electronic warehouse receipts holds great prospects for upgrading Pakistan’s grain supply chains. This eco-system has the potential to become the backbone of a national commodity market for Pakistan with trading of electronic warehouse receipts which represent tested, standardized agri-commodities that buyers can trust within Pakistan and abroad.

Equity

A critical financial pillar required to catapult the agriculture sector towards high growth is equity whether it is in the form of capital invested in farm machinery, modern warehousing and cool chains, human resources, etc., or in the form of land. In the absence of detailed financial information about farms today, land can be taken as a proxy for equity in the agriculture sector. The distribution of the 42.6 million acres (17.3 million hectares) of cultivated land among Pakistan’s 8.2 million farms is such that 45% of the cultivated area is with farms which have less than 12.5 acres while 55% of the cultivated area is with farms which have more than 12.5 acres. On the other end of the spectrum, only about 13,500 farms are of more than 150 acres holding about 1.5 million acres. Therefore, the vast majority of farms are highly unlikely to own machinery, storage, cash reserves, etc., given that they have hardly any ability to invest. A plain measure of the value of this land can be taken by multiplying the 42.6 million acres of cultivated land with an average price of PKR 2.5 million per acre of agricultural land. The total is PKR 106.5 trillion.

The question is: is this enormous asset of Pakistan being utilized to high productivity. Unfortunately, a vast proportion of *large farms* are also being run with traditional practices due to absentee landlords. These larger farms are typically located in upper Sindh and southern Punjab. Corporate farming remains restricted to a few, small islands of excellence but truly large-scale farming is yet to emerge in Pakistan. This must change if Pakistan is transition to the next level of agricultural productivity.

Figure 28: Cultivated area dominated by larger farms



Source: Agriculture Census of Pakistan (2010)

In recent years, investments from venture capital funds—both global and local—were made in new agri-tech start-ups: digital financial services, last-mile delivery solutions, services supporting precision agriculture, etc. The impact of these new operations has not yet reached scale and their impact is awaited.

Insurance

Rising need for insurance: Pakistan's banks remain wary of lending to farmers without strong collateral. The key risk is the farmer's ability to repay the loan when the farmer's main source of revenue—the crop—is unsecured from climate and biological risks. The data presented earlier indicates a preference for banks to lend to large farmers. This is mainly because large farmers have non-crop collateral (mainly property) that banks are more comfortable with. The small farmer, on the other hand, only has the cropped land and the crop itself as collateral. The need for effective crop insurance to address these risks has been understood for some time. But more recently, the rising impact of climate risks has begun to bring crop insurance into greater focus.

Traditional indemnity insurance is suited to situations where the types of damage are easily verifiable. Unlike insurance for cars (where accident, theft, etc., can be verified easily), crops are impacted by perils (typically not controllable by humans) whereby the extent of damage caused by them is not easy to agree upon. Therefore, indemnity insurance is not well-suited to serving farming operations. An alternate is weather-index insurance which simply offers a payout if, for example, the temperature rises above 45 centigrade during a certain portion of the crop cycle. This can be useful to protect the wheat crop from heat waves close to the harvesting period (as experienced in 2022). But some crops are impacted heavily by non-weather perils such as the pest attacks for the cotton crop. For such applications, area yield index-based insurance provides a more comprehensive cover. As explained in Annex D, under this type of insurance, the yield achieved in an entire area is taken as a proxy for the extent of damage by identified perils that impact the crop. This also benefits farmers by giving them a graduated payout scale (the greater the yield loss, the greater the payout) rather than a fixed payout only if a specific temperature is crossed.

Existing crop insurance schemes: There is broad consensus in banking and insurance circles that Pakistan's existing crop insurance offerings require upgrade. The *Crop Loan Insurance Scheme (CLIS)* was introduced in 2008 as a federal government scheme administered by State Bank of Pakistan, the central bank. CLIS made crop loan insurance mandatory for all crop loans by regulated banks which means up to 1.4 million farmers benefit from this insurance and, of these, CLIS subsidizes premium for 300,000 to 500,000 small farmers per season. CLIS subsidizes crop insurance premium for farmers with less than 25 acres. Farmers above 25 acres pay in the range of 1.4% of sum insured as premium for their crop loan insurance. This scheme puts an artificial ceiling of 2% on the insurance premium.

This scheme covers the main perils typically covered by crop insurance schemes globally but has two major constraints: (i) the trigger for insurance pay-out in an area is a declaration of calamity by the government (which is a subjective decision not linked to an accepted scientific method), and (ii) the maximum insurance payout is limited for each bank at three times the insurance premium paid by the bank (this is often a minuscule amount compared to the losses incurred by farmers as well as banks). These constraints also help explain the limited extent of crop loans by regulated banks to Pakistan's farmers.

Apart from this crop *loan* insurance scheme, Pakistan's Punjab province has a government-run program called the *Punjab Fasal Bema* scheme. This program was initiated in 2018 with World Bank advice and is based on area yield index insurance with crop data collection by the Government of Punjab's Crop Reporting Service. The Punjab Fasal Bema scheme subsidizes the premium for small farmers without bundling the insurance with loans or any other commodity. This program involves participating insurers directly marketing crop insurance to farmers and has reached around 300,000 farmers to date.

Government support

Governments typically support farmers through fiscal incentives, subsidized credit, direct transfers of cash or inputs, and grants for specific purchases (mainly for technology upgrades). **Policy packages for farmers** offered by the government are typically a mix of measures to address farmers' working capital requirements and their investment needs. Typically, the government policy packages are tilted in favor of working capital requirements with a primary dependence on loans. The Kissan Package announced in late 2022 is a case in point. It offered Rs. 1,800 billion in agri loans, Rs. 50 billion in subsidized loans for agri projects of rural youth, no import duties on used tractors, reduced duty on tractor parts, and interest-free loans to shift 300,000 tube wells to solar power. The Kissan Package 2022 also offered a reduction in fertilizer cost (DAP price reduction and Rs. 30 billion urea subsidy), cheaper gas to fertilizer producers to reduce the price of urea, a subsidized electricity tariff for farmers to run tube wells, and for flood victims: 1.2 million bags of wheat seed and Rs. 5 billion in interest-free loans to landless farmers.

Grant support Government support can introduce new technology into private hands in agriculture. An excellent example from Pakistan's own experience is the introduction of laser land levelers across Punjab.

Laser land levelling of farms ensures that plants are neither suffocated with excess water in a trough on the farm surface nor kept thirsty on a crest. It has been shown to bring on-farm water saving of 30-40% and yield increase of 15-20%. Traditionally, provincial governments would purchase a few laser land levelers for each district and allow these to be used by farmers. Invariably, these were captured by local big wigs with nominal machine utilization during each sowing season. In 2003-04, the Government of Punjab offered 50% grant with World Bank support for the purchase of laser land levelers by farmers. This led to a mushrooming of small service providers all over Punjab who shot the utilization of their equipment to nearly 100% during the sowing season. Today, Punjab has some 17,000 land levelers and Sindh is following the same path with strong uptake in lower Sindh. Uptake is slow in upper Sindh because the large farms there require a one-time land levelling by earth-moving equipment after which laser land levelers can do their work.

From the average farmer's point of view, laser land levelers are a reasonable capital expenditure at Rs. 500,000-600,000 each. With fifty percent grant, many small and medium sized farmers can become service providers. But this is not the case for regular rice transplanters (Rs. 2.7 million each) or rice harvesters (Rs. 4 million each) at FY22 prices. These machines are also more complex and require expert training plus a parts inventory to make sure the farmer's sowing time is not lost to machine breakdowns. This is why Pakistan's agriculture sector requires a fledgling crop of farm machinery service providers. This need has begun to be addressed by a number of enterprising rural entrepreneurs in the informal sector. But they have little access to capital and import scrap machinery from China, Thailand, Vietnam, etc.

Conclusions and policy priorities

Not through debt alone! The jump from traditional, small-scale agriculture to large-scale precision agriculture with machines and quality inputs does not come without risk. In particular, large-scale corporate agriculture would at least be on thousands of acres for which modern farm machinery is typically intended. For new players to enter corporate agriculture, even in partnership with leading local farmers, there is a steep learning curve regarding the cultivation of each crop in a specific agro-climatic zone and on a specific soil with a new management team that needs to be grown. The uncertainties to be tackled mean that this jump is not ideally taken with debt alone—equity capital is required. At this stage of minimal corporate farming in Pakistan, government land in rural areas can be offered under public-private partnerships on long-term lease to kick-start this activity, as done in many countries. The demonstration effect of a few large-scale operations can shift the direction of Pakistan's agriculture. But they will also require crop insurance.

Crop insurance offered to be availed by farmers voluntarily has not scaled up anywhere in the world. For the vast majority of Pakistan's small farmers to be protected from climate and biological perils, the global good practice of aggregating insurance for large numbers of farmers is required. Banks are a natural aggregator through their lending portfolios. But over 80 percent of Pakistan's farmers do not borrow directly from banks and cannot afford the insurance premium anyway. Here, the global good practice is that governments consider crop insurance a public good and subsidize its cost for smallholder farmers. Out of 104 countries with crop insurance schemes, 85% involve insurance premium subsidies from governments (including in developed countries) and these subsidies covered 68 percent of average premium value⁵. Subsidization of insurance premium for small farmers has also been prevalent in Pakistan for over 15 years.

⁵ The World Bank (2010). *Government Support to Agricultural Insurance: Challenge and Options for Developing Countries*, Oliver Mahul and Charles Stutley

Therefore, the main recommendation is for each provincial government to become the insurance policy holder on behalf of its smallholder farmers. To increase efficiency and transparency in distribution of insurance pay-outs, the pay-outs should be made directly from insurers to the farmers insured, rather than to the government, even when the government is the policyholder. Finally, Pakistan's farmers can be provided crop insurance on a much larger scale if global reinsurers participate by underwriting the majority of the risk alongside local reinsurers. The participation of specialized insuretech firms brings comfort to global reinsurers to take a proposed level of risk. Corporate agriculture can absorb its cost of insurance.

Commodity markets Governments, donors, and others have attempted for decades without success to upgrade—even dislodge—Pakistan's traditional wholesale market system (mandi's) and its powerful middlemen. At the very least, the legal and regulatory space for new market mechanisms to appear beside the traditional mandi system has been created. This offers the opportunity for investment in parallel trading mechanisms and agri-storages which are a win-win for all stakeholders. This is where the electronic warehouse receipts eco-system can become the foundation of a modern nation-wide agri-commodity market. The proof of concept has been done with farmers getting loan disbursements within 24 hours of collateralizing their commodity. The critical need is for reputable players to be attracted to invest in modern warehousing under this regime. For this, some government measures are required to mitigate risks associated with land title in rural areas, regulations associated with commodities considered essential food items, fear of food department raids related to wheat, etc.

Building service providers: Given so many small farmers and a general lack of capacity among large farmers for a shift to modern farming, the role of service providers becomes very important. One-time grant funding from government towards purchase of reliable new technology must be provided to service providers. The key is to make it feasible for reputable formal sector players to operate in this space without unfair competition from those who are running informal, cash-only operations. For this, tax incentives have already been provided by the Government of Punjab in 2020 such as reduction in the sales tax on farm machinery services from 16% to 1%. Now a focused effort to get this industry goes is required. Finally, international expertise is an essential ingredient for rapidly building up domestic human resources.