

# Fostering a vibrant farming sector with a next generation of farmers

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## Purpose

East Asia and some parts of Southeast Asia are experiencing a rapidly aging farming population raising questions about who will comprise the next generation of farmers. Indonesia is also beginning to experience this. In 2013, only 11 percent of farmers there were under 35 years of age while 27 percent were older than 55. The number of young people working in agriculture is declining sharply. This may have serious implications for future productivity and innovation in the sector. What can Indonesia do about this? Many OECD countries have implemented “young farmer” promotion schemes, while other countries have begun programs to nurture young agro-entrepreneurs. What have these initiatives involved and what lessons can be drawn which are relevant for Indonesia?

## Background: the evolving demographics and dynamics of farming

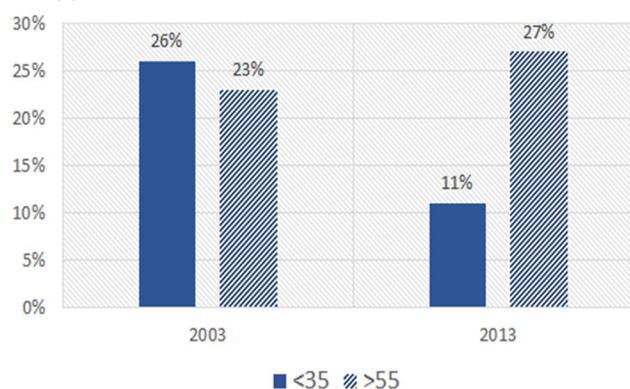
### ***Indonesia's farming population is aging—and youth participation in the sector is declining***

East Asia and some parts of Southeast Asia are experiencing a rapidly aging farming population, raising questions about who (or what) will comprise the next generation of farmers. Indonesia is also beginning to experience this. In 2013, only 11 percent of farmers were less than 35 years old, down from 26 percent a decade earlier, while 27 percent were older than 55 (Figure 1). And the number of young people working in agriculture is declining sharply.

### ***The aging of the farming population is a widespread phenomenon***

Indonesia is by no means the only country facing an aging farming population and a decline in young farmers (Box 1). The phenomenon is widespread: many parts of the world are seeing young adults gravitate away from the farm sector, leaving elder generations behind.

**Figure 1: Indonesia's farming population: share of young and elderly farmers, 2003-13**



Source: Based on Central Bureau of Statistics 2003 and 2013 data in Susilowati n.d.

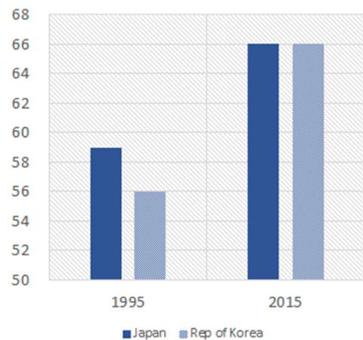
### **Box 1: What is a young farmer?**

There is no common definition of a young farmer. In fact, the age range that this expression designates varies considerably among countries—and it has even been known to vary over time as the median age of the farming population has increased.

- In Korea, for example, the age limit for participating in the Farm Successor Fostering Program gradually increased over time, from 30 in 1981, to 50 in 2008. The program, however, established an upper limit on the number of years a person has farmed as well as a degree requirement to be eligible.
- In the EU, 40 is the cutoff age for benefitting from preferential income subsidies under the Young Farmer Payment program.
- In Taiwan, China, the government selects agricultural ambassadors between the ages of 18 and 40 to participate in an overseas exchange program that is meant to expand youth talent in the sector.
- In the United States, the Beginning Farmers and Ranchers Loan program—one of the key programs supporting young farmers by providing them access to subsidized credit—is one that is not age-based at all, but rather targets farmers with up to 10 years of operating experience.

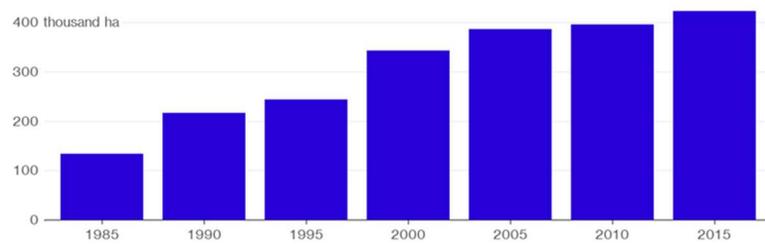
In Japan, for example, the number of farmers has more than halved since 2000, and about two-thirds of those who remain are 65 years old or older (Bloomberg 2016). The average age of farmers increased from 59 to 66 between 1995 and 2015 (Figure 2). As of 2015, over 400,000 hectares of farmland had been abandoned at least partly in connection with this phenomenon (Figure 3) (Bloomberg 2016). Similarly in the Republic of Korea, the average age of farmers increased from 56 to 66 between 1995 and 2015 (FAO forthcoming). In 2016, only 1.1 percent of farmers (around 11,000 farmers) were under the age of 40, and their share of the population was expected to shrink to 0.4 percent by 2025 if the current trend continued (Yonhap News Agency 2017).

**Figure 2: Japan and Republic of Korea: average age of farmers, 1995–2015**



Source: FAO forthcoming

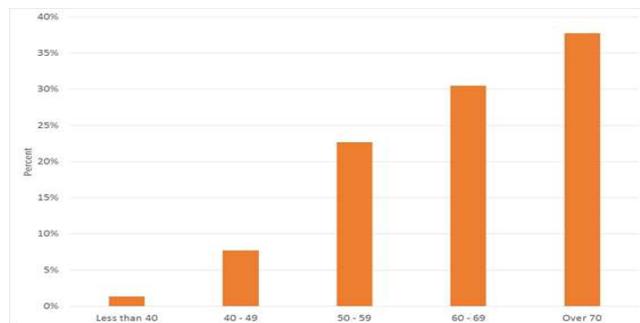
**Figure 3: Farmland without crops for than a year and without recovery plans**



Source: Based on Ministry of Agriculture data in Bloomberg 2016.

And as Figure 4 shows, the age distribution is quite striking, with farmers over the age of 70 now being the largest single group (FAO forthcoming). Farm operators over the age of 60 account for 68 percent of all farmers, and those under 50 accounting for just 9 percent (FAO forthcoming).

**Figure 4: Republic of Korea: distribution of farmers by age group, 2015**

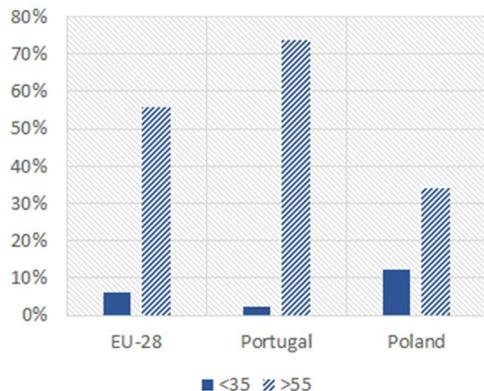


Source: Lee 2017 in FAO forthcoming (2018).

Aging is also taking place in the EU, though at different rates in different parts of the Union. As of 2013, across the Union, over 55 percent of farm operators were over 55 years old, and only 6 percent were under 35 (Eurostat 2018). There are some significant contrasts among countries, however. Portugal tends to have an older farming population for example, whereas Poland has a younger one (**Error! Reference source not found.**). Meanwhile, farmers' retirement is causing a very significant drop in the absolute

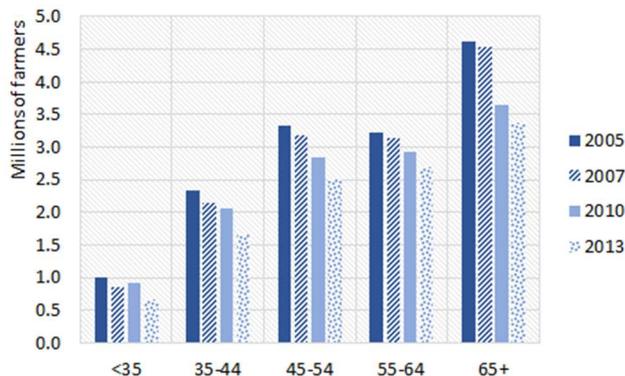
number of farmers over time (Figure 6)—even though the share of elderly farmers has remained relatively constant over the past decade.

**Figure 5: European Union: share of young and elderly farmers, 2013**



Source: Based on Eurostat data.

**Figure 6: European Union: distribution of farmers by age group, 2005-13**



Source: Based on Eurostat data.

### **Drivers include push and pull factors**

In general, the explanations for the lack of farmer renewal—for young persons’ turn away from farming—include push and pull factors. One push factor is the image of farming. In many parts of the world, farming is seen as a low-skilled, old-fashioned, and backbreaking occupation. It is sometimes not seen as a profession at all but rather as a way of life, and not one that is chosen.

Income is also a major push and pull factor. Farming is seen as being or is in fact less lucrative than other forms of employment. It is risky, sometimes associated with poverty and lower standards of living. This perception is especially borne out where small farm sizes make it difficult for farmers to make ends meet, and where rural areas are less developed. There are often better opportunities off farm. In China, for example, per capita income of urbanites was 2.72 times greater, on average, than that of their rural counterparts in 2017, although rural per capita income was growing at a faster pace (6.2 percent versus 5.6 percent) (Xinhua 2017a).

Surveys of young farmers offer deeper insights into some of the challenges young farmers face entering and remaining in the farm sector. For example, a 2017 survey by CEJA, the European young farmers’ association (known by its French acronym), indicated that its constituents see the major barriers to entry and persistence in farming as being: inadequate income, challenges accessing land—including sufficient land to earn “enough”—burdensome administrative procedures, and competition from global markets. In the same survey, young farmers expressed their need (or desire) for more land to constitute larger farms; more and better technical training, including to be able to diversify their products and take up green farming; technology and equipment such as farm management optimization technology, and farm infrastructure and machinery; and a better living environment, including one with better schools for farmers as well as their offspring, better access to high-speed internet, and transport connectivity (CEJA 2017a).

### ***This phenomenon has raised concern about future farm sector productivity and innovation***

The aging phenomenon has raised concerns about its implications for future farm productivity and the sector's capacity for innovation. Whether concern and public sector intervention are justified or not, many countries share the aspiration of trying to “foster the next generation” of farmers. As one official in China<sup>1</sup> put it, “China's countryside should be a fascinating place. Agriculture is an attractive sector and farming should be an admirable occupation” (Xinhua 2017a).

Many countries have implemented “young farmer” promotion schemes, while other countries have initiated programs to nurture young agro-entrepreneurs. What have these initiatives involved and what lessons can be drawn which are relevant for Indonesia? The rest of this note takes a tour of different approaches that have been used internationally to foster a “next generation of farmers.”

### ***Movements of youth returning to or entering the farm sector are bringing a new dynamic in certain countries***

Before turning to examples of initiatives that are fostering a next generation of farmers, it is worth noting that some parts of the world are beginning to see a return to farming among younger generations (so-called generation Ys and millennials<sup>2</sup>)—or at least an entry into farming on their part, since not all of them are from farming households. Liz Whitehurst is a case in point, as this young woman grew up in the suburbs of Chicago in the United States, attended university (a liberal arts college), and left her job in a non-profit organization in Washington DC to take up farming (Figure 7, left). In 2017, the Washington Post reported that in the United States, “A growing number of young Americans are leaving desk jobs to farm” (Dewey 2017) In the United States, the number of farmers under 35 years old is increasing, according to the USDA's 2014 census (USDA 2014 in Dewey 2017). And most were not raised in farming families. About 70 percent have a university degree, a higher share than the general population. Similar reports on a movement of youth returning to the land are coming out of China, though we don't have numbers on the extent of this wave. Shi Yan (Figure 7, right), an organic farmer with a booming business in Beijing is emblematic of this phenomenon—she is known for having established one of the first community-supported agriculture (CSA) programs in China (Yu 2015).

**Figure 7: Newcomers to farming**



Source: Michael Robinson Chavez/The Washington Post.  
Note: Liz Whitehurst, 32, on her Maryland farm.



Source: Katrina Yu/Al Jazeera.  
Note: Shi Yan, 33, organic farmer and CSA pioneer in Beijing.

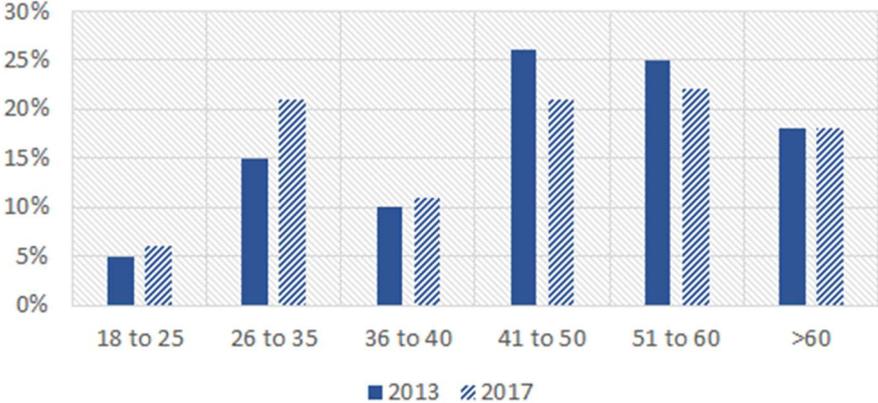
<sup>1</sup> Tang Renjian, deputy director of the central rural work leading group

<sup>2</sup> Generation Y designates people born in the 1980s and 1990s, and decidedly more comfortable than prior generations with digital technology. Millennials the first generation to have reached adulthood in the 21<sup>st</sup> century.

It is important to note that these young farmers are not replacing the loss of retiring farmers. In the United States, the number of farmers ages 25 to 34 grew by 2.2 percent between 2007 and 2012, while the number of oldest farmers shrunk by double-digits (USDA 2014 in Dewey 2017). But these young farmers are seemingly changing the sector’s dynamic. For example, they are strongly associated with the local food buying trend—for example, selling, in the United States, to mega retailers like Walmart that have built local buying programs, and in China, through direct-to-consumer channels like farmers’ markets and CSAs. And they are more likely than the average farmer to be practicing organic farming. Some are also bringing advanced technologies to the business.

This is the case for a number of young farmers in Brazil, where the farming population is actually getting younger, according to a survey by the Brazilian Rural Marketing and Agribusiness Association. The average age of Brazilian farmers fell from 48 in 2013 to 46 in 2017 (Figure 8) (ABMRA 2017).<sup>3</sup> Over this period, the number of farmers with advanced degrees also rose (to 21 percent in 2017). In general, young farmers tend to be tech savvy—nearly all of them use social media—and to show concern for environmental sustainability.

*Figure 8: Distribution of Brazil’s farming population by age, 2013–17*



Source: Based on data from the Brazilian Rural Marketing and Agribusiness Association 2017.

Although their entry into the farm sector may be the reflection of the economic recession that has been hurting urban employment, young farmers anecdotally point to values, mission, and lifestyle as factors that explain their decision to turn to farming. Box 2 presents three young Brazilian farmers who returned to their family farms after attending university. They did not feel at home in the city, wanted to make a difference, and they are bringing modern technologies like biofortified crops, solar irrigation, and precision farming to their work.

<sup>3</sup> The percentage of women in the field also increased by 7 percent, though it remains small overall at around 4 percent.

## Box 2: Three young Brazilian farmers



Joni Knapp, a 20 year old technician in agriculture and the environment, found that his experience in the city lacked “contact with the earth” and he never felt quite at home there. So he took over the family dairy business. He invokes “the values from the countryside, including the importance of health and knowing what you produce,” as what drove him to return to the field in Rio Grande do Sul.



Valdileia Silva, 21, works on her family farm with her father. They have adopted solar irrigation and biofortified crop varieties provided by Embrapa and HarvestPlus. The latter enable her to make more money, by making her crops eligible for municipal food procurement (the Food Acquisition Program (PAA)).



Lívia Gonçalves de Souza, 32, grows sugar cane. She has a degree in agronomy and uses precision agriculture techniques. She talks about how “today, your technical degree is of no use if you’re not a good manager of your property,” signaling her perspective on farming as both a high-tech sector, and as a business.

Source: top picture: unknown in Marques da Silva 2018; middle: Tarcila Viana; bottom: Ewerton Alves/Neomarc.

Source: Based on Marques da Silva 2018.

The question is how the public sector can contribute to fostering and facilitating this kind of participation in the sector by youth—to help keep the sector productive, innovative, and dynamic. What follows is a variety of international experiences attempting to do this.

## Initiatives fostering a next generation of farmers: two conceptual categories

This section provides a tour of various international initiatives that are fostering the next generation of farmers. Some have this as their deliberate aim, and may or may not be doing so effectively. Others may be having this effect even if it is not their explicit purpose. The initiatives described next are grouped in two broad buckets (noting that there is some overlap between the categories): empowering people, and transforming farming.

### **(1) Empowering people—especially youth—to farm**

The first category groups initiatives that are empowering people—especially youth—to farm, and doing that directly or with that explicit aim. These initiatives are helping people enter or remain in the sector *once the decision to work in the sector has already been made, or at least contemplated*. Under this bucket, this note examines two types of initiatives that are addressing a host of constraints to entry and remaining in farming.

(a) The first are self-help initiatives in the form of young farmers’ organizations and networks that are advocating for young and beginning farmers’ needs, and helping them access the resources and support they need, including a host of public programs. Examples of American, European, and global young farmers’ networks are provided in Annex 1a.

(b) The second type of initiatives are public programs that are addressing the constraints to entry and viable farming directly. These programs, for example, address challenges with access to land, credit, risk management tools, access to technical skills—including for themselves and employees—and business management skills as well. Some also address aspects of the rural environment, to try to make it easier to invest and live in the country. And they also sometimes address the image of farming—attempting to change its negative image or capitalize on aspects that appeal to youth—like entrepreneurship and rural living and sustainability. Annex 1b covers examples from the United States, European Union, Republic of Korea, China, Taiwan (China), Japan, and donor programs in Sub-Saharan Africa.

## ***(2) Transforming the farm sector***

The second category consists of initiatives that are transforming, not *farmers*, but *farming*—or at least *supporting* its transformation. The initiatives under this bucket are not explicitly or necessarily focused on youth. These are more broadly aiming to transform the economic and social profile of farming, making the sector more lucrative and appealing to work in by facilitating a shift to higher return activities, and fostering innovation and potentially disruptive businesses, or business models and ecosystems.

Farming is evolving and may look quite different in the future from what it looks like today. In fact, farming has already evolved to encompass a diversity of activities: a mix of traditional and modern, low tech and high tech, and large and small operations (Figure 9). But the preponderance of different activities may evolve differently, going forward, depending on the innovation dynamics of the sector in different countries and regions. To some extent, how the nature of farming continues to evolve will depend on those who come to work in the sector—on how the next generation of farmers will shape it. Hence the relevance of the types of programs that support entry into farming and agro-entrepreneurs. At the same time, the next generation of farmers (who and how many enter farming, and what they do) will itself depend how the sector evolves—whether farming becomes more profitable, more comfortable, more “modern”, whether it develops a new image, and whether it fulfills young people’s aspirations to be successful in business, to protect the environment, or contribute to a sustainable economy and food system. In other words, what it means to be a farmer and the realities of working in the agricultural sector may increasingly diverge across geographies, both *reflecting* and *determining* how the next generation engages in the sector.

Figure 9: What will farming look like in the future?



Sources: from top left to bottom right: greenhouse farming: unknown; hydroponic lettuce: Jatuphon Buraphon; smart farm in Korea: etnews.com; rice farming in Bali: Phil Hill; computer-guided farming: John Deere; farming with a drone in China: unknown; vertical farming: Richmond Lam; precision farming: John Deere; Coding: unknown; farming with machinery in Thailand: Giovanni M. Losavio; cell-cultures, the future of meat: Jean-Paul Chassenet.

The process of farm sector transformation is a vast topic—it is many topics—and this note only attempts to give a flavor of some initiatives that are shaping that process. Two types of initiatives are distinguished within this bucket, although there is no clear delimitation between them and considerable overlap in practice.

(a) The first set includes initiatives that in various ways are supporting the development of higher return farming activities. They include policies and programs that are helping to facilitate, for example, farm consolidation and upgrading, the development of high value farming subsectors like horticulture and certain export crops, value addition activities, and even rural non-farm activities that can help cross-subsidize farming.<sup>4</sup> These initiatives include subsidy programs for farm upgrades, higher value agricultural sub-sectors (like horticulture), and value addition activities. Annex 2a provides Chinese farm support programs and agro-based clusters as illustrations.

These may be of particular relevance to Indonesia, where one factor that may be pushing younger generations out of farming is the preponderance of rice farming. Rice farming, for most, is not highly lucrative, and under the sector's current structure characterized by the predominance of small landholdings, that is unlikely to drastically change. In this context, efforts that go in the direction of supporting higher value farming activities—those relating to horticulture for example—could play a significant role in attracting or retaining a next generation of farmers, while also depending on the entry of highly trained, motivated, and entrepreneurial actors into the sector—up and down the supply chain.

<sup>4</sup> It's interesting to note that a 2013 survey of over 2,000 Korean farming households found that 44 percent of total farm household income came from off-farm work (Korean Statistics 2014 in Hyunjeong Joo 2015).

Indeed, horticulture relies on a well-developed and efficient value chain, so developing that subsector will mean changes beyond the farm level.

(b) The initiatives under the second bucket are also ones that, by stimulating agricultural innovation, and fostering the emergence of transformative and potentially disruptive businesses—or business models and business ecosystems—are contributing to the emergence of qualitatively different and higher return farming activities. By contributing to changing the profile of farming and its fundamental appeal to upcoming generations, these initiatives are nurturing the next generation of farmers in indirect and unexpected ways. These initiatives include agricultural innovation programs like support for clusters, and agribusiness innovation, incubation and acceleration programs. They also include investments in infrastructure and higher education (or measures enabling those investments), including ones that allow the digital economy to flourish, and other “doing business” measures (that is, legal and administrative reforms) that improve the investment environment. By means of illustration, Annex 2b covers support for new types of farm sector actors in China, agricultural innovation programs, and experiences involving online e-commerce, ICT and big data (e-farming).

By means of illustration, China offers an interesting case because it has a rather grand vision of agricultural sector transformation. Box 3 provides a stylized overview of its aspirations for the sector, and the types of measures it is aligning with these.

### Box 3: China’s vision and efforts to transform its farm sector

China is broadly aiming to modernize and professionalize its farm sector, and several of its agricultural policies and programs are prioritizing scaled up and intensive farming, green agriculture, value addition, and agroindustry.

This orientation is clear in the 2018 #1 Central Document, a key policy document which announces major directions of policy for the year (Figure 10). In that document some of the objectives for the agricultural sector include:<sup>5</sup>

- Incentivizing graduates, entrepreneurs and returned overseas students to start rural businesses—to create new ways of making money; and encouraging migrant workers to return home and start their own businesses
- Promoting the direction of agricultural production from increasing production to upgrading
- Promoting the “greenization,” quality, specialization, and branding of agriculture
- Cultivating new types of agricultural management entities and “all kinds of specialized market-oriented service organizations to support full-scale agricultural production and help small farmers to save money and increase efficiency, and modernize
- Promoting agro-industry processing industry, encouraging enterprises to merge and reorganize, eliminating backward production capacity, and

Figure 10: China’s vision for the agricultural sector: key words from the Number One Central Policy Document 2018



<sup>5</sup> The language that follows approximates the original, in translation (Kim 2018).

supporting value addition through on-site processing and conversion of agricultural products in major producing areas

- Vigorously building the infrastructure to promote the development of rural e-commerce.

Consistent with this vision, many of the agricultural sector support programs that have been put in place in recent years can be grouped into the following categories. There are programs supporting:

- i. The upgrading of farms
- ii. The move to higher value agricultural products/activities (things like horticulture and aquaculture)
- iii. Value addition and agro-industry development
- iv. New-type agricultural operators (commercial farms and agro-enterprises)
- v. E-commerce at the service of farmers and rural areas

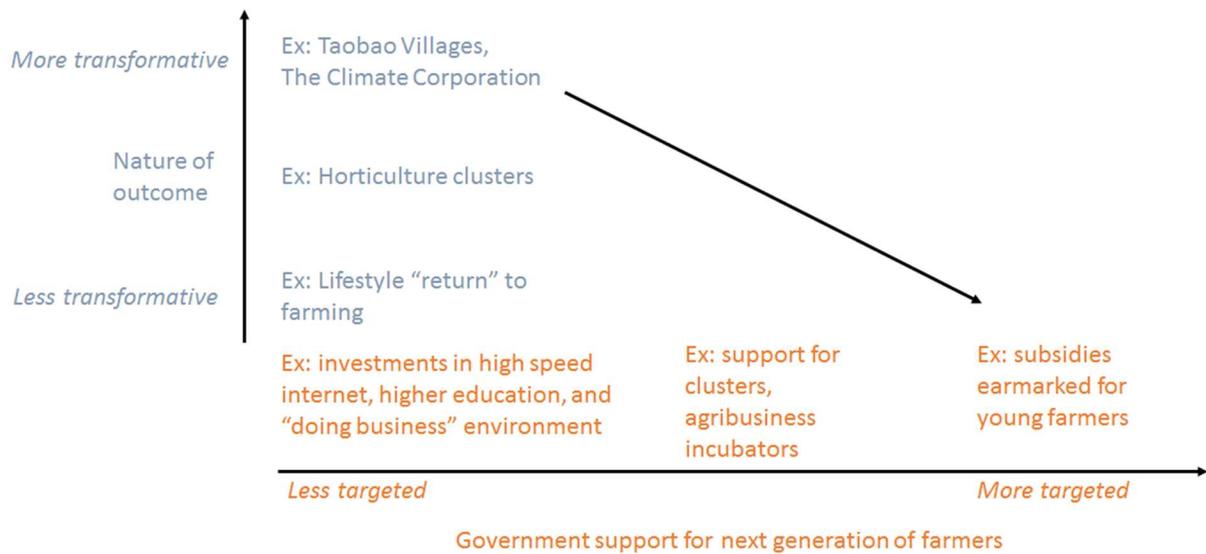
These can be further grouped into efforts supporting more profitable farming activities on the one hand, and efforts to foster innovation and the emergence of transformative businesses (and business models and business ecosystems) on the other—although these two categories represent more of a continuum than a dichotomy. Examples are provided below.

## Key take-aways

The **first** take-away is that there is a wide range of more or less targeted ways in which the public sector can promote young adults' and newcomers' participation in the farm sector and maintain its vitality. Young and beginning farmers do often need support to enter and remain in farming and there are some fairly established ways of doing that. Such targeted measures to support new farmers will have a limited impact on making farming more attractive to youth as a sector, however.

**Second**, the examples reviewed in this note suggest that the least targeted measures may be the ones that lead to the most transformative outcomes—albeit with much less certainty. Figure 11 provides a schematic representation of that.

Figure 11: Effects of more or less targeted measures on a next generation of farmers



In this figure, the x-axis represents how government support for the next generation of farmers can range from measures that are highly targeted to young persons’ and newcomers’ entry into farming, like the young farmer subsidy programs that this note reviews first; to less targeted measures—like the “doing business” type ones that this note ends with. While targeted programs may play a critical role in allowing youth to enter and remain in farming, the chart captures the idea that these are not the measures that are likely to have the most transformative effects on the sector. The downward arrow in the chart represents the idea that, in general, *the more initiatives are targeted to fostering a next generation of farmers, the less transformative they may have the potential to be.*

Targeted initiatives are the most likely to make a difference supporting a next generation of farmers *once the decision to farm has been made, or at least contemplated.* Less targeted measures may have greater potential to more fundamentally change the sector’s attractiveness and attract a critical cadre of people to the sector, by stimulating business innovation and more fundamentally changing the nature and organization and profitability of farming.

Different initiatives serve a different purpose, and a full range of interventions certainly has its place.

A **third** insight is that while the next generation will include people who work the land directly, it may increasingly come to include people engaging in the farm sector in new ways that may not involve farming per se—not in the way we usually think of it.

## Annexes

### Annex 1: Empowering people to farm (bucket 1)

#### Annex 1a: Self-help initiatives via young farmers' organizations

Examples of young farmer coalitions include ones in the EU and United States, and transnational ones (Figure 12):

- In the European Union: the European Council of Young Farmers (CEJA), which benefits from EU funding
- In the United States: the National Young Farmers' Coalition (NYFC), and the Future Farmers' Association, both privately funded
- The Empowering Youth in Agriculture (YPARD) network, a global, donor-funded network that aims to empower youth in agriculture



*Figure 12: Examples of young farmers' coalitions and networks*



Sources: corresponding organizations.

The functions of these organizations are multiple.

One function is to identify the needs of prospective, new, and young farmers, something they do, for example, by carrying out and publicizing surveys of their constituents.

A second function consists of advocating for supportive programs, such as ones relating to credit and land access, and rural development. They do this by writing policy statements, authoring legal texts and designing programs, and lobbying for their adoption. Both the NYFC in the United States and CEJA in the EU have published position papers requesting changes to supportive policies and programs (Box 4).

#### Box 4: Position papers by EU and US young farmers' organizations



Requests of the EU's CEJA include:

- Land Mobility Service
- Succession brokers
- Agricultural land protection
- Preferential loans and dedicated financial instruments
- Advisory services
- Higher direct payments for young farmers
- More support for farmers' organizations
- High speed internet to facilitate e-farming and e-commerce
- Results-based environmental subsidies
- Research on sustainable farming



Requests of the United States' NYFC include:

- More funding for farm ownership loans
- Training on land acquisition; and legal, mediation, and consulting services
- More training on conservation farming
- Higher set-asides and payments for beginning farmers under conservation subsidy programs
- Lower barriers to benefiting from existing programs

Sources: Based on CEJA 2017b and NYFC 2017.

A third function of young farmers' coalitions is to provide their constituents tools and resources. Examples of how they fulfill this function include developing tools (such as ones for financial planning in relation to land acquisition), guiding their constituents to access dedicated resources such as public subsidy programs, and enhancing human and social capital by building networks and facilitating mentorship. This is the prime way in which they act as self-help organizations.

A fourth function is to work at improving the image of farming. They do this primarily by developing marketing and outreach campaigns. Both the NYFC and the FFA in the United States develop such materials. The formats that are used in their online materials are clearly geared toward youth—things like social media posts, and blogs and video narratives. And the materials invoke things that are known to appeal to youth, like social and environmental values, lifestyle preferences, and the entrepreneur identity (Figure 13).

Figure 13: Online marketing and outreach materials of young farmers' organizations in the United States



Sources: NYFC and FFA websites (accessed May 2018).

## Annex 1b: Public programs supporting young and beginning farmers

The overview of public programs that follows is not meant to be complete and exhaustive but illustrative of the range of support young and beginning farmers benefit from in different geographies. The overview begins with the United States, which has a fairly comprehensive set of measures in place, and goes on to more selectively point out noteworthy programs in other countries.

### United States

The United States has a large number of programs that are dedicated to supporting young and beginning farmers. They provide entrants to the sector access subsidized credit, startup funding, preferential rates on crop and livestock insurance, privileged access to conservation payments, help with farmland acquisition from retiring farmers, training, and support for adding value to agricultural products. Programs also include outreach to potential farms, such as one targeting armed service personnel. These programs are covered in bit more detail in Table 1.

Table 1: Programs supporting young and beginning farmers in the United States

Credit
<p>The United States Departments of Agriculture’s Farm Service Agency (FSA) offers farm ownership and operating for beginning farmers; microloans of both kinds are offered for niche/non-traditional farmers and agribusinesses</p> <ul style="list-style-type: none"> <li> <b>Farm ownership loans:</b> No current or previous farm ownership requirements and 100 percent financing available make FSA direct farm ownership loans a valuable resource to help farmers and ranchers become owner-operators of family farms, improve and expand current operations, increase agricultural productivity, and assist with land tenure to save farmland for future generations.                 </li> </ul>

- **Operating loans** can assist beginning farmers in become prosperous and competitive by helping to pay normal operating or family living expenses; open doors to new markets and marketing opportunities; assist with diversifying operations; and so much more
- **Microloans** are for small, beginning farmer, niche and non-traditional farm operations, such as truck farms, farms participating in direct marketing and sales such as farmers' markets, CSA's (Community Supported Agriculture), restaurants and grocery stores, or those using hydroponic, aquaponic, organic and vertical growing methods

#### **Startup funding**

Beginning Farmer and Rancher Individual Development Account (IDA) matches (doubles or triples) the savings of low-income, beginning farmers (in CA, piloted nationally)

#### **Crop/livestock insurance**

Lower premiums and fees; and more advantageous disaster assistance for noninsured crops (including specialty crops and small diversified farms)

#### **Conservation payments**

The EQIP and CSP programs include set-asides for young/beg farmers

#### **Farmland protection and transfer**

Various measures at the state, county, and city levels help protect and preserve agricultural land from being converted for residential, industrial, and commercial development purposes. These include agricultural zoning and right-to-farm laws, subdivision ordinances, farm property tax reduction measures, purchase of development rights programs, and agricultural easements. These ensure that aspiring farmers can purchase or lease affordable land for agricultural purposes.

The Conservation Reserve Program Transition Incentives Program (CRP-TIP) provides incentives for transfer of land from retiring to young, sustainable farmers. The program provides land rental payments to retired or retiring landowners with land in expiring CRP contracts (under which they received payments for keeping the land out of production and for conserving soil and water resources) on condition that they sell or rent their land to a beginning, socially disadvantaged or veteran farmer (or rancher) who agrees to use sustainable practices. This program capitalizes on young farmers' attraction to land stewardship concepts. \$33 million (available until expended) during 2014-18 for the Conservation Reserve Program Transition Incentives Program.

#### **Training programs**

Beginning Farmer and Rancher Development Program (BFRDP) funds training, education, outreach, and technical assistance to beginning farmers and ranchers. It offers competitive grants to nonprofits and universities to develop training. They have been used to develop farm incubators, provide business planning and food safety trainings, and to support on-farm apprenticeships to ready future farm owners and workers.

#### **Incentives for adding value to agricultural products**

Beginning farmers are prioritized to receive Value-Added Agricultural Product Market Development Grants.

#### **Outreach**

Outreach to military veterans about farming and ranching opportunities.

*Sources: USDA 2016, USDA FSA 2018, National Sustainable Agriculture Coalition 2014, Haight and Held 2011.*

## European Union

One of the key measures supporting young farmers in the European Union is tied to income support subsidies in the form of direct payments to farmers under pillar 1 of the Common Agricultural Policy (CAP).

Under the Young Farmer Payment program (effective 2015), farmers under the age of 40 benefit from 25 percent higher direct payments for up to five years (EU 2013). Moreover, 2 percent of the direct payment envelope is set aside for young farmers to ensure that they are served.

The European Union also supports young farmers via a variety of other programs under its Rural Development Pillar (CAP pillar 2). These primarily help farmers with startup costs—with expenses relating to startup farm investments, and equipment acquisition for example. To the extent that young farmers are disproportionately interested in lessening their environmental impact, pillar 2 funds for organic conversion, agri-environment and climate measures, and other environmental measures are also potentially attractive to this population. There are also pillar 2 funds to increase internet coverage in rural areas, an aspect of the rural environment that younger generations are particularly sensitive to (see CEJA survey results in Annex 1a).

Also of note, the EU helps fund CEJA, the young farmers’ organization discussed above.

### Republic of Korea

The key program of note in the Republic of Korea is its Farm Successor Fostering Program, which, established in 1981, happens to be one of the country’s longest-standing farmer support programs (Ma 2014). It is fairly unique in that its aim is to select and support at least one “farm successor” per village. To those it selects, the program provides low interest (2–3 percent) loans (of up to USD 280 thousand, or 300 million won, or nearly IDR 4 billion) repayable over 15 years, plus help accessing other funding opportunities,<sup>6</sup> access to technical assistance and training, and help finding mentors (Ma 2014, Im and Jeong 2014).

Early on, the program selected on the order of 10,000 “successors” per year, but that number was reduced to 1,000–1,500 in 1990s. The age limit for eligibility gradually increased from 30 years of age when the program started, to 50 in 2008; but the years of farming experience were capped (to less than 10) and an agricultural degree was required (KREI2015).

By 2010, the program has supported over 131 thousand successors, or an average of three per village, representing around 10 percent of farms (KREI2015, Ma 2014). Over time, the farming activities of successors have significantly diversified away from staple grains and into horticulture and

*Figure 14: A graduate of Korea’s National College of Agriculture and Fisheries*



Source: Unknown.

Note: This is the picture of Oh Chang-Eon, a 23-year-old graduate of Korea’s National College of Agriculture and Fisheries—a vocational, higher education program that gives graduates priority access to the Young Successor program.

<sup>6</sup> As recently as 2016, the government launched a program to extend grants (up to USD 942 for 3 years), technical assistance, and land leases to innovative farming and distribution projects proposed by applicants under 40.

livestock production.<sup>7</sup> And according to a 2010 evaluation of the program, about 90 percent of successors remained in farming long-term (Ma et al. 2010<sup>8</sup> in KREI2015).<sup>9</sup> Moreover, their average income and scale were larger than those of other farms

Another noteworthy initiative in Korea is a subsidy program that incentivizes older farmers to transfer their land to a younger farmer. Since this direct payment program was put in place in 1997, farmers over 65 years of age who are willing to sell or rent their land to full time farmers for a period of more than five years have been eligible to receive a lump-sum payment. As of 2014, retiring farmers could receive annual payments of up to USD 2,727 (KRW 3 million) per hectare for ten years (Im and Jeong 2014).

The government has also supported efforts to mint highly skilled and specialized young farmers. In 1997, for example, the government established Korea's National College of Agriculture and Fisheries, a vocational, higher education program that gives graduates priority access to the Young Successor program (Figure 14) (Ma 2014, KREI2015). And in 2006 programs were put in place to revitalize agricultural high schools and colleges, and ensure that they teach business skills, offer on-the-job learning via farm visits and internships, exposure to professionals, job search support, and so forth (Ma 2014).

## China

In China, one program that is directly supporting young and beginning farmers is one that is aiming to develop, among other things, 10,000 “modern young farmers,” and to “expand the new professional peasants’ contingent” (Tuli 2015). The program recruits in cities as well as rural areas, and offers training in “agricultural skills” and “the management of leading industries.” What is interesting about it is that it targets distinct groups including professional family farm operators, famers’ cooperative leaders, agricultural business management personnel, agricultural social service workers, returning migrant workers, and what China calls “new-type occupational farmers”—a concept we will return to below.<sup>10</sup>

## Taiwan, China

The government of Taiwan, China, also has programs in place to encourage young adults to pursue a career in agriculture. In 2016, the Council of Agriculture (re-)developed a website that is dedicated to guiding young farmers to various resources, including a popular Young Farmers Counseling Program, to an award program for young farmers, to subsidized credit resources, and more.

*Figure 15: Agricultural Ambassadors in Taiwan, China*

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<sup>7</sup> 1985: 54% rice and combined ag, 9% in specialty crops, 37% livestock; 2010: 29% rice and combined ag, 15% specialty crops, 56% livestock (based on KREI 2015).

<sup>8</sup> Full citation for Ma et al. 2010 is not provided in the source document.

<sup>9</sup> although a 2014 account points to problems tracking successors (Ma 2014).

<sup>10</sup> Below, they are referred to as “new-type agricultural operators,” reflecting a different translation.

One public program in Taiwan—the Agriculture Youth Ambassador “New South” Exchange Program—selects farmers and agro-entrepreneurs ages 18–40 to be “agricultural ambassadors” and participate in study tours within the region (Figure 15). So far, there have been study tours in Vietnam, Malaysia, the Philippines and Indonesia. The program is meant to inspire youth to pursue a career in agriculture and help them establish international contacts (Taiwan Council of Agriculture 2018).



Source: Taiwan Council of Agriculture.

## Japan

Japan, too, has instituted programs to try to prop up its number of farmers. In 2009, for example, it piloted a “Rural Labor Squad,” a program that helped place unemployed and underemployed youth (including from the cities) in farming jobs, providing them training and so forth (Kirk 2016).

One of Japan’s approaches that stands out as fairly unique is one that has involved “empowering” a specific kind of beginning farmer, and that is the *corporate* farmer, and most recently, *nonagricultural* corporations wanting to get into the business of farming—actors like supermarket and convenience store chains, restaurants, and food manufacturing companies.

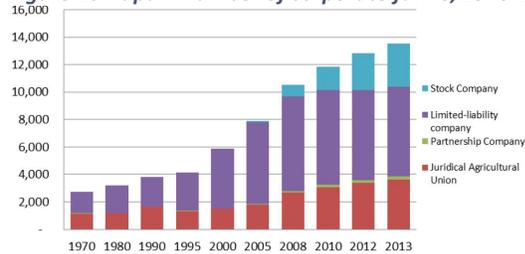
This approach has entailed a gradual process of relaxing laws that were put in place decades ago to protect the agricultural use of farmland, and to reserve farmland for actual, individual farmers—the purpose of these reforms being to ease land consolidation and to maintain the farm sector’s vitality.

*Agricultural* production corporations got legal standing to use farmland as early as the 1960s, but at the time, they could only be created and owned by actual farmers (individuals). That constraint was gradually relaxed, and Figure 16 shows how this allowed the number of corporate farms to rise from the 1970s onward (Clever, Iijima, and Petlock 2014).

A key reform was that of 2009, which significantly relaxed the laws that made it difficult for *nonagricultural* corporations to use farmland. Figure 17 shows the sudden and resulting rise of nonagricultural corporate farms that resulted (red bars).

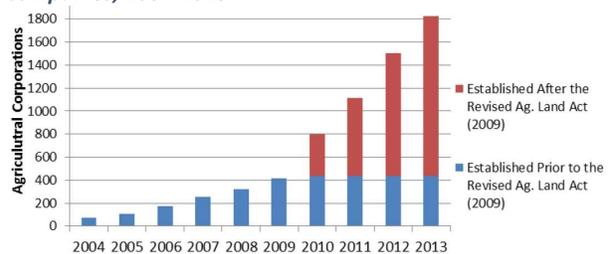
Whether or not this is a positive development, the thinking on this, and hence its relevance, is that corporate farms can, among other things: help consolidate and maintain productive farmland, help aging farm families continue to cultivate their fields, and educate and develop next-generation farmers and newcomers to farming.

**Figure 16: Japan: number of corporate farms, 1970-2013**



Source: Clever, Iijima, and Petlock 2014.

**Figure 17: Number established by nonagricultural companies, 2004-2013**



Source: Clever, Iijima, and Petlock 2014.

## Donor-funded programs in Sub-Saharan Africa

A large number of donor-funded programs are supporting agro-entrepreneurs in Sub-Saharan Africa (and elsewhere). They include development projects funded by donors like USAID, and on the smaller scale, the Mastercard Foundation, and others, and implemented by partners like Making Cents, Chemonics, SNV, Technoserve, and others.

Although there is a wide variety of programs spanning multiple countries, many of them have common elements. For example, they typically help agro-entrepreneurs develop business and entrepreneurship skills through training and mentorship programs, and gain access to a wider range of technical resources. Some make efforts to connect agricultural research systems to SMEs, and many develop activities to try to strengthen business linkages and ecosystems. Programs typically help aspiring agro-entrepreneurs access information and human resources—by helping them build networks and collectives, and by supporting mentorship programs—as well as financial resources. Many support the development of appropriate financial services (tailored to varied scales of production, product lines, risks, financial capacity), including through credit guarantee programs to draw in commercial financial institutions. And it is common for donor programs to coach agro-entrepreneurs to help them access financial services. Some programs also address youth’s motivation to develop agro-entreprises, through efforts to rebrand the agricultural sector, as through exhibitions showcasing divers agricultural sector professions and businesses.

These programs tend to be more focused on agro-enterprise than on farming per se, but many are closely connected to farming activities, and they may or may not be explicitly youth-focused. Nonetheless, these programs are relevant here because they generally aim to empower young people to take on activities that have the potential to bring vitality to the farm sector, adding value to and finding new markets for agricultural products, offering services to farmers that improve productivity and resilience, and ultimately helping to make farming more profitable and viable.

## Annex 2: Transforming farming (bucket 2)

### Annex 2a: Supporting more profitable farming activities

Support for farm upgrades, higher value farming activities, and value addition: China's farm support programs

China has a variety of farm support programs in place to upgrade farms, support higher value farming activities or products, and to encourage more value addition to agricultural products.

Examples of support include:<sup>11</sup>

- Funding to reform/develop extension services focused on green, high-efficiency farming
- Measures to protect productive agricultural land
- Subsidies for green farming machinery
- Capacity building for family farm cooperatives focused on green agriculture, local specialty agriculture, standardized production, and the processing of agricultural products
- Cost-sharing grants (30 percent) for on-farm storage and processing equipment
- Various forms of support for the regional and ecological branding of agricultural products, and related agro-tourism
- Investments in modern agricultural industrial parks

These measures are not unique to China. Quite a few countries have made investments, for example, in modern agro-industrial parks, or what is probably the equivalent of agro-based clusters.

### Agro-based clusters

Agro-based clusters are a concentration of producers, agro-industries, traders, and other private and public actors engaged in the same industry connecting in a variety of formal and informal ways—and interacting in cooperative as well as competitive ways. Well-known examples of agro-based clusters include the grape cluster in Maharashtra, India, Chile's fruit cluster, Kenya's cluster for cut flowers, and Peru's asparagus cluster (Figure 18).

*Figure 18: Agro-based clusters*



Sources: from left to right: India grapes: Fresh Express; Chile fruit: freshplaza.com; Kenya flowers: Christopher Furlong/Getty Images; Peru asparagus: FreshPlaza.



<sup>11</sup> Sources include Tuliu 2015 and Ministry of Agriculture and Rural Affairs News Office 2018.

Clusters have been shown to foster innovation and the upgrading of the firms involved. And dynamic clusters often attract investors, who can reinforce this cycle. Clusters have been particularly helpful to export agriculture by improving productivity, value-addition, and access to high-value markets. They have also benefited small producers by allowing them to participate in economies of scale and share costs related to training, quality management, market information, and capital-intensive assets. In some cases, clusters also help create a regional or brand identity, often with links to other industries such as tourism.

Successful clusters are very rarely government creations, but they often benefit from its help. The public sector usually plays a supportive rather than a leading role, by for example: promoting cooperation among firms in a given location, strengthening applied research institutions, and adopting industry-friendly policies. The public sector can also indirectly support clusters (and more) by investing in education, training, and human capital more generally.

Agro-based clusters already represent a move into the next category of measures: measures that are not just resulting in farm upgrades but that are also contributing to transforming the nature and organization of farming.

## Annex 2b: Fostering innovation and the emergence of potentially disruptive businesses (and business models and business ecosystems)

### Subsidies for China’s “new-type agricultural operators”

Around 2015–16, when China embarked on a major overhaul of its farm support programs (see note on the reforming and greening of farm support programs), China’s farm subsidies have been singling out<sup>12</sup> a specific range of actors for support, or what it sometimes calls “new-type farm operators.” They include large-scale, business-oriented farmers, collective farming arrangements—which involve bringing together small farms so that they can be farmed as though they were a larger operation—and various farm service providers. The latter—farm service providers—are farm-oriented businesses

*Figure 19: Man operating a drone over a field in China*



Source: AFP/Getty Images.

offering things like professional pest management, input application, mechanized drying, deep plowing, crop straw management, storage, and even turnkey farm management. These businesses are not necessarily offering such high-tech services as the one pictured in Figure 19, which shows a man using a drone to spray pesticides over an agricultural field. More importantly, these businesses are testing new

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<sup>12</sup> When China merged its three major agricultural subsidies—those for grain farmers, improved seed, and inputs—into the Protective Agricultural Subsidy in 2015–16, it set-aside around 20 percent of the new subsidy for these new-type operators (Tuliu 2016).

business models, and ones that often—as is probably the case in the drone example—only make economic sense when they can service large or multiple farms.

The relevance of these actors to fostering a next generation of farmers is that they offer new ways of engaging in the farm sector—one that does not necessarily involve land ownership and that is business-oriented—that may hold more appeal to aspiring young entrepreneurs than farming per se. In some respects, these businesses are changing the nature of farming. Furthermore, the services they provide may contribute to making actual farming more economically viable—and even safer and more environmentally sustainable—by improving farming techniques, and creating economies of scale.

### Agricultural innovation programs

China is not the only country taking measures to stimulate business innovation in the farm sector. Other countries are doing so through agribusiness incubation (and acceleration)<sup>13</sup>—an approach that has been refined over the past 15–20 years as a means of stimulating commercial agriculture and helping the sector develop an edge in differentiated product markets. There are different types of incubation (and acceleration) programs, but a defining characteristic is that they directly engage with startups to help them grow, usually offering them a range of advisory and business development services geared to improving firms’ competitiveness and access to markets. Figure 20 summarizes the kinds of services agribusiness incubators generally offer. They include services that help young firms: better understand and link to markets; gain access to finance, skills and technology; navigate the requirements of business including industry standards and regulatory compliance; and build networks.

*Figure 20: Services typically offered by agribusiness incubators*

Market linkages	Market information, marketing skills, and market linkages backward and forward in the value chain
Finance	Financial management skills and access to appropriate financing products
Technology	Technology information, training, and technology access
Business services	Business mentoring and coaching, and assistance with navigating regulatory requirements and standards
Networks	Agribusiness entrepreneur networks, competitions, and fairs

*Source:* Based on World Bank 2013 (modified).

Beyond a common core, incubators vary in their focus and functions, and there are different ways in which they can help engage a next generation of farmers. Some programs are supporting aspiring entrepreneurs engage in the farm sector—by making a business out of the provision of valuable products and services to farmers. The offerings of these entrepreneurs may, in turn, contribute to modernizing and upgrading

<sup>13</sup> Accelerators are part of the same family but tend to take on cohorts of companies and to work with them for a shorter of period of time to specifically help them access investment. And accelerators sometimes take a financial stake in the companies they select competitively.

farms, thus attenuating the “push” factors that drive upcoming generations out of farming. In Brazil, for example, a climate innovation center was launched in 2018 to support agro-entrepreneurs adapt their offerings to small farms to help them expand their market, and in the process, help make small farms more resilient and viable (Box 5). Other incubators similarly contribute indirectly to upgrading farms by dedicating themselves to technology commercialization and technology transfer. Indonesia’s IAA-IPB, affiliated with Bogor University, is one of those incubators that focuses primarily on technology commercialization (Jaffee et al. 2016).

**Box 5: NITA: the climate innovation center in Santa Catarina Brazil**

In 2018, the World Bank helped launch a climate innovation center named NITA in Brazil’s state of Santa Catarina to help bring climate-smart farming technologies to small, family farms. While there is no shortage of farm service providers and technology in the market, they to be oriented toward large-scale, commercial farms, and to be of little use to the majority of farms, which are smaller scale and family run. To help bridge this gap, the partnership will help new and existing agro-SMEs adapt their products and services to the needs of small family farms, thus helping agro-entrepreneurs cater to a market they are not yet reaching.<sup>14</sup> The partnership, which involves at least 11 different local organizations, will function like a broker of existing programs and resources, drawing on its many founding partners to offer a range of services to qualifying SMEs to address their challenges, and indirectly, those of small family farms (Figure 21). These services include support with R&D, gaining an understanding of the family farm client and market, developing commercialization strategies, accessing public programs, and finding investors. The center will support a range of SMEs at different stages of maturity, provided that they are contributing to advancing climate smart agriculture.

*Figure 21: NITA: a public-private partnership supporting agro-SMEs deliver climate smart farming technologies to small family farms*



Source: NITA

Other incubators are working more directly with farmers, along with other value chain actors, to help them become more profitable. For example, Nepal’s Agribusiness Incubation Center works with small farmers and agro-entrepreneurs to expand into new products as well as to expand into new markets (World Bank 2013). Timbali Industrial Incubator in South Africa for high-end floriculture, and Fundacion Jalisco in Mexico for packed fresh berries, have developed farm-level business models that large numbers

<sup>14</sup> To develop a program that would help bridge this gap, the World Bank facilitated a drawn out design process, whereby time was spent gaining a deep understanding of different partners’ motivations and challenges, and then testing explanations for these as well as different solutions. The process was iterative.

of small-scale producers can adopt, along with a suite of supportive farm-level and supply chain services (such as the identification of new inputs, cropping methods and handling technologies, marketing, packing, order fulfillment, logistics, and cash management). These incubators are helping what are generally low-asset, low-capacity, risk-averse producers to access distant and high-value niche markets that they would not be able to access on their own, or even through existing farmers' organizations (Jaffee et al. 2016).

Government involvement in agribusiness incubation varies significantly. Many incubators are non-profits and start out with public sector and other external sources of funding from which they wean themselves to varying degrees. Incubators are generally able to cover some if not all of their operating costs by charging firms for access to their services and facilities, that is, by charging consulting, business development, marketing, franchising, rental, and other fees. Over time, certain incubators invest in the firms they incubate as well as their intellectual property, allowing them to share in their profits and royalties (Jaffee et al. 2016).

Investments in public goods and “doing business” measures supporting potentially disruptive businesses, including in e-commerce and e-farming)

This section provides examples of three non-farm businesses that may have a disruptive effect on the farm sector and profession, changing what it means to be or become a farmer. These examples make the point that some of the most impactful public measures vis-à-vis a next generation of farmers may be highly indirect ones.

In China, Tuli, an integrated online land service agency (and offline “land service center”), is presumably facilitating land acquisition by new entrants, while also facilitating farm consolidation and allowing for more profitable farming. Alibaba's online “Taobao” marketplace is helping to connect urban and rural markets in China, creating new agricultural and rural livelihood opportunities by opening new marketing channels for rural products, and improving rural quality of life by increasing income and access to consumer goods. And in the United States, the Climate Corporation is putting “big data” at the service of farmers to help them manage weather risk, and illustrates the unlikely journey into “farming” of two former Google employees.

Public investments that are likely to have made the emergence of these potentially transformative business actors possible include ones in research and higher education, urban-rural connectivity (roads, electricity, telecommunications), and high-speed internet; and legal and regulatory measures supporting the private provision of these as well as business investment.

#### *Tuli: Facilitating Land Acquisition and Farm Consolidation*

Tuli is an online business that was founded in 2009 by a young university graduate in Chengdu who had the dream of “beginning an era of online land circulation.” And that is what Tuli does. The business that started as a class project is now an “integrated online land service agency”—as well as an offline “land service center”—that claims to have facilitated the transfer of 140 million hectares of land resources in China, and to have over 1 million “certified” users. Tuli offers a variety of services, including land data, listings, and analytics, land auctions, partner identification, legal consulting, policy information, news, and more (Figure 22 and Figure 23).

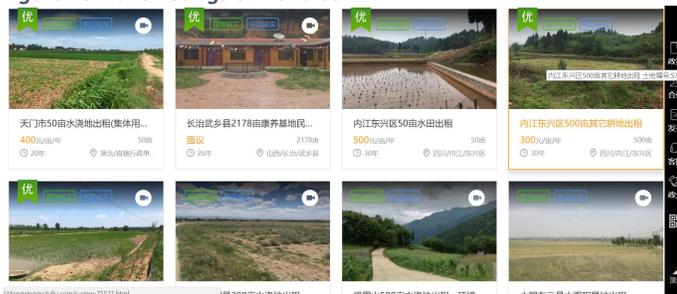
Its relevance to a next generation of farmers is that by facilitating the transfer of land rights, it is presumably facilitating land acquisition by new entrants (helping with things like land identification and purchase, and legal advisory), and also facilitating farm consolidation, which may be a key to allowing for more profitable farming (given China’s small average farm size).

Figure 22: Tuliu mobile app



Source: Tuliu website (accessed 2014, in Xiang 2014).

Figure 23: Land listings on Tuliu.com



Source: Tuliu website (accessed 2018).

### Alibaba’s Taobao Villages: Transforming the Market for Niche Products

Another business that is potentially game-changing for the farm sector—opening new possibilities for a next generation of farmers—is Alibaba’s “Taobao Villages.” Taobao Villages are essentially clusters of rural entrepreneurs who have opened shops on Alibaba’s online platform, and are sending their products to the cities on the trucks that are bringing them equipment and consumer goods. Founded in 1999 and now a vast conglomerate with one of the highest valuations of any company in the world, Alibaba is at its heart an online marketplace that connects businesses to consumers and other businesses, and provides a range of online services. Its founder Jack Ma’s insight was that the trucks delivering refrigerators and washers to the countryside (ordered on Alibaba) were returning empty, and that there was a missed opportunity there. What if they could return full? Now, Alibaba defines Taobao Villages as rural communities that are doing at least USD 1.6 million (>22bn rupiah) in online transactions a year, and where at least 10 percent of households are actively engaged, or where there are over 100 active online shops (Alizila 2016). The number of Taobao Villages rose from 200 in 2014 to 2,100 in 2017—representing hundreds of thousands of active online shops (Xinhua 2017b). And in 2017, Taobao Villages did USD 18.7 bn (263.5 trillion rupiah) in transactions.

Figure 24: Taobao Village seller



Source: Alizila News (video).

The impact or potential of Taobao Villages on the farm sector is best grasped through examples. Take the story of Du Qianli (Figure 24), from a remote village in the Taihang Mountains in Henan Province (Alizila News 2012, Erickson 2012). After attending university, he became a school teacher and was trying to make ends meet. Finding it difficult to do so while remaining in his home village, he decided to set up an online store to sell products from the mountains—fruits, nuts, herbs, and other specialty items.<sup>15</sup> By one account,

<sup>15</sup> Because he was facing internet connectivity problems, he started his own internet shop to address that issue. He tells his story in an online video available here: <http://business4etrade.org/2017/04/05/taobao-e-commerce-platform-helps-mountain-farmers-in-chinas-henan-province/>.

he earned about 100,000 yuan per month 2014, which would be the equivalent of over USD 185K (or 2.6 bn rupiah) per year (Zuo 2014). This example is not meant to dismiss the many questions this raises as to the replicability and sustainability of this experience, but to highlight the potential for Alibaba's online marketplace to be game-changing for rural areas.

In relation to a next generation of farmers, Taobao Villages are relevant for several reasons. First, they are supporting rural incomes by opening up new and higher value marketing channels for agricultural and rural products. They are giving farmers access to much larger markets, including for niche and regionally branded products. For example, Aksu prefecture in Zinjiang Uygur autonomous region sold 1 million kg of apples in half a day—and you can see them celebrating in Figure 25 (Qiang and Dongjie 2018). Liu Jingwen, a farmer in his 30s from that region, is now selling more than 20 kinds of regionally-branded agricultural products and receiving tens of thousands of orders monthly (Qiang and Dongjie 2018). Taobao Villages are creating new opportunities for regional branding: for example, dragon fruit from Hainan, passion fruit and kiwi from Fujian, oranges from Chongqing, peaches from Zhejiang and Hebei, and so on (Qiang and Dongjie 2018).

Second, Taobao Villages are generating new and diverse types of rural employment. There are nearly 60,000 Taobao assistants working in nearly 30,000 villages around China, helping millions of farmers navigate online business, but also sending their products to hundreds of millions of buyers from cities (Qiang and Dongjie 2018). In other words, this platform is opening up new ways of engaging in the farm sector.

Third, Taobao Villages may be improving the quality of life in rural areas by providing access to more consumer goods. Farmers in a village in eastern China's Jiangxi province place are reportedly placing more than 800 orders each month for items of daily use, appliances and agricultural tools from places all around China, all via a rural Taobao shop with a service center (Qiang and Dongjie 2018). In the words of Li Tianyu, a project manager for Alibaba's Taobao Villages, "We are not pushing to send people to the countryside. Instead, we pour energy into the rural market, attracting talent to the villages themselves" (Qiang and Dongjie 2018).

*Figure 25: Taobao Village apple sellers in China*



Source: China Daily.

Note: Farmers in Zinjiang Uygur autonomous region, China, celebrate a groundbreaking sale of regionally branded apples via the Taobao marketplace.



Source: Alizila News.

*Figure 26: From Google to Monsanto*

### *From Google to Monsanto: The Climate Corporation*

Little did David Friedberg and Siraj Khaliq know, when they went for their physics and computer science degrees at the Universities of Berkeley and Stanford—some of the top universities in the world—and went on to work for Google, that they would be putting their skills to use in the farm sector (Figure 26). Like many others in their generation, they were motivated by entrepreneurship, and by the idea of using “big data” to have social and environmental impact—notably, to help businesses adapt to climate change.

When they left their day jobs at Google, it was to create a startup that would offer weather insurance policies to a variety of business sectors. The Climate Corporation quickly came to focus on agricultural businesses. And before they knew it, their company was bought up by Monsanto, under whose roof they went on to develop an analytic product line for commercial farms.

It basically analyzes weather, soil, and field data to determine potential yield-limiting factors.



Sources: Google logo: Google; Siraj Khaliq and David Friedberg: Annie Tritt for the New York Times; Climate FieldView™: Business Wire and The Climate Corporation (Monsanto); Monsanto logo: Monsanto.

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