



LESS IS MORE

**IMPROVING MYANMAR GINGER QUALITY AND VALUE THROUGH
LOW-TECH ALTERNATIVES TO PESTICIDES AND HERBICIDES**

USAID'S VALUE CHAINS FOR RURAL DEVELOPMENT

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OVERVIEW

USAID/Burma's Value Chains for Rural Development project ("the project") is helping ginger farmers, processors, and exporters change the way they do business and establish Myanmar as a new origin of high quality fresh ginger and dried, sliced ginger. This report highlights value chain developments and learning achieved over a 3-year period (2016 to early 2019).

Prior to 2016, Myanmar was not "on the map" of ginger producers even though it was the 11th largest producer of ginger globally. The ginger trade in Myanmar was centralized in the hands of less than 30 trading houses in Aungban and Heho, where a relatively small number of buyers set local prices and made no price distinctions based on ginger quality, other than for size and color. Smallholder farmers operated independently and were price takers. Farmer Groups are now selling directly to processors and exporters that pay higher prices based on quality, including food safety.

The project is helping increase the value of Myanmar ginger and smallholder incomes by:

- Testing and promoting improved practices and technologies to increase ginger quality and yields;
- Promoting formation of community and township-level Farmers Groups to empower smallholders through aggregation;

- Helping farmers produce ginger without pesticides, herbicides, and fungicides to access global markets (hereafter referred to as "residue-free ginger" to signify without chemical residues);
- Providing grants to finance expansion, upgrades, and certifications of ginger processing systems to comply with global food safety standards;
- Linking Farmer Groups directly to domestic and foreign buyers who pay premiums for higher quality ginger, offer lower transaction costs, and facilitate long-term relationships (refer to Box 1);
- Supporting farmers and buyers to pilot new production, sourcing, and marketing models;
- Helping build the capacities of farmers and processors to provide extension support, quality control, and farmer-to-farmer training and organize the production and sale of quality ginger seed rhizomes, bokashi, and other inputs; and
- facilitating access to trade financing.

As of April 2019, the project has helped train over 6,000 ginger farmers and worked closely with a core subset of progressive farmers and buyers to test new on farm practices and market relationships. Six newly formed township-level Farmers Groups are engaged in assessing production costs in preparation for planning production and negotiating prices in consultation with key buyers.

VCRD's support for ginger value chain development is a story of learning by doing and adaptation. Selected project interventions and milestones are briefly summarized below.

Understanding baseline conditions.

When the project team first considered working in the ginger value chain in 2016, two issues were readily apparent: ginger farmers were overusing and mishandling pesticides and herbicides in ways that endangered their health and were ineffective against disease; and soils in many areas were infertile and/or contaminated with pathogens.

Initial training and demonstration plots.

Starting with a single community-based local field assistant (LFA), the project established three organic (non-certified, residue-free) ginger demonstration plots in Taung Kwe village tract to test new practices and initiate a dialogue with local farmers on ginger quality. Results showed improved yields and reduced incidence of disease. The project subsequently organized a series of Farmer Field Days and distributed a simple instruction booklet to introduce new inputs and practices, such as soil additives (e.g. *Trichoderma* and Effective Micro-organisms (EM) for bokashi, a natural fertilizer), intercropping, and mulching. In November 2016, VCRD increased the number of LFAs to 8 to expand project activities across six townships in southern Shan (Kalaw, Pindaya, Hopong, Lawksawk, Nam-sang and Pinlaung), covering over 80 percent of the total ginger production in the region. LFAs were tasked with identifying the ginger producing communities and the number of ginger farmers.

Improving processing capacities.

VCRD's initial work with ginger processors focused on a \$72,900 Innovative Grant to Myanmar Agri-Business Group (MAGB) in late 2016 for a new ginger washing line, slicer, drier, vacuum packer, and steam sterilizer. MABG made additional investments in line with guidance provided by the United Nations Industrial Development Organization (UNIDO) to meet Hazard Analysis and Critical Control Points (HACCP) certification requirements.

Adapting, testing, and scaling up.

In early 2017, the project fielded Dr. Reza Rafie, Extension Specialist at Virginia State University, to refine the ginger guidelines and provide training of trainers (ToT) to five local CBOs and lead farmers. Project staff and LFAs subsequently trained over 1,900 ginger farmers and extension providers prior to the ginger sowing period in April and May, on seed selection and preparation, spacing, contouring, mulching, fertilizing, hilling and intercropping with shade trees and other crops. In parallel, the team established 16 test plots to assess and demonstrate the feasibility and cost-effectiveness of recommended practices. Thirteen plots were in open fields and 3 were in agroforestry settings. Seven scenarios were tested: basic good agricultural practices (GAP)¹, GAP plus mulching, GAP plus intercrop-

BOX 1: BENEFITS OF IMPROVED GINGER QUALITY AND PRODUCER-BUYER RELATIONSHIPS

The following benefits increase profits
irrespective of market price fluctuations.

For farmers

- Price premiums for higher quality
- More resilient, healthy ginger rhizomes
- Lower sales transaction fees/costs
- Greater transparency
- Mutually beneficial relationships with buyers

For buyers

- Access to larger quantities of higher quality ginger that can be sold in premium markets: **quality = chemical residue-free, larger size, longer shelf life, pungent, and consistent**
- Reduced losses associated with reject rates compared to ginger purchased from Aungban traders
- Longer-term relationships with farmers and production planning facilitate supply chain management

ping, GAP plus removing mother rhizomes in July, organic GAP, basic GAP in an agroforestry system, and organic GAP in an agroforestry system. The open field organic and agroforestry organic treatments showed the best average net income (\$1,365-\$1,770/ha), followed by the agroforestry GAP and GAP (\$1,153-\$1,241/ha). The team estimated that in areas where the land is fertile and all improved agricultural practices are followed strictly, the maximum potential net income could reach \$6,000/ha (around 3.5 million MMK/acre), based on potential yields of 35 MT/ha and market prices of 800 MMK/viss for certified organic and 600 MMK/viss for GAP residue-free (compared to 300-400 MMK/viss for conventional ginger). VCRD shared the findings with farmers and discussed which practices they would be interested in adopting based on the evidence.

VCRD scaled up training activities, reaching over 6,000 farmers from the estimated 10,000 households engaged in ginger cultivation in the project area. This created a critical mass of farmers who started to adopt new practices. January 2018 marked the last time the project delivered trainings to farmers. Subsequent survey results from a random sample of the project participant population showed the highest adoption rates for the following practices in 2018: increasing row space (47 percent, compared to a baseline of 6 percent), applying bokashi (37 percent compared to a baseline of 13 percent), not removing mother rhizomes

1 GAP is used generically in this case and is unrelated to the Government of Myanmar's GAP Protocol and Guidelines (2017) for 15 other crops.



and cutting seed with a clean knife (23 and 22 percent compared to baselines of 8 and 2 percent respectively); intercropping with other crops for shade and applying EM-5 solution for disease prevention (18 percent each compared to baselines of 15 and 6 percent respectively); and not applying pesticides, organic production (no chemical pesticides, herbicides or fertilizer), mulching with organic matter, and treating seed with EM solution before sowing (8-10 percent each compared to baselines of 2.5 percent or less)². Forthcoming survey results will provide a more complete picture of adoption rates, yields, and sales, as production of residue-free ginger appears to have increased substantially in the 2018-19 season.

The case for stopping pesticides was more readily understood by farmers than the case against herbicides. Pesticide costs eroded profits because they are ineffective against diseases like rhizome rot and bacterial wilt. However, herbicides saved farmers approximately 50 MMK/viss ginger by minimizing labor costs associated with weeding. At that time, local traders and buyers did not recognize the value of residue-free ginger and farmers did not know how to communicate its value or provide evidence of residue-free status.

Market linkages.

In late 2017 VCRD shifted its focus from training to facilitating market linkages between progressive farmers and buy-

ers seeking higher quality, residue-free ginger. The project hosted a Business to Business (B2B) event in Aungban, the major trading center for ginger in Myanmar, to bring together a diverse set of value chain actors. Control Union, a certification firm, presented on the organic certification process and market opportunities, but noted that their clients were processors and other medium to large size firms and they did not have a cost-effective solution for small-holder certification. The most significant outcome of this event was that key partnerships started to form between farmers, processors, and exporters, including Organic AgroLand (OAL), Myanmar Agri-Business Group (MABG), and EcoMa Organics, among others. In addition, farmers came to realize the importance of organizing themselves and aggregating production to link directly to buyers.

Facilitating access to finance.

In late 2017, VCRD introduced OAL, a ginger, turmeric and pulses processor, to Ayeyarwaddy Farmers Development Bank (aka "A bank"), which was established to promote agriculture and was seeking SME customers. A bank provided approximately \$200,000 in trade finance to OAL to export organic turmeric (dried and powdered), conventional turmeric, and ginger to importers in the U.S. Europe and Asia. OAL submitted its export invoices to the bank and obtained up to 90 percent of the invoice amount from a revolving cash fund to provide a bridge until receipt of payment from importers.

2 Baseline data is from the FY17 baseline survey conducted for the project.

Emergence of residue-free Farmers Groups.

In 2018, in response to buyer interest, VCRD helped organize 32 Farmers Groups comprised of the 339 progressive farmers in Pinlaung, Kalaw, Pindaya, Lawksawk, Pinlon and Hopong who had decided to stop applying pesticides and herbicides on part or all of their ginger plots (a few later dropped out, leaving 29 groups). Participants opted to produce residue-free rather than certified organic ginger to save the time and costs associated with certification, and because initial buyers were primarily interested in higher quality, residue-free ginger. Twenty-four Lead Farmers volunteered to establish and manage demonstration plots at their own expense. Their significance in demonstrating the benefits of new practices exceeded expectations. A key buyer, Green Eastern Agri (GEA), sourced most of its Grade A ginger from 3 of the plots, confirming the market potential. The ginger from the other 21 demo plots was sold and/or retained as high quality seed.

In March 2018, H.D. De Silva & Sons (HDDSES), a Sri Lankan spice buyer and exporter, recommended that the groups aggregate further to help buyers source more efficiently. VCRD organized a trip for group leaders to meet with Shwe Taung Thu, a specialty coffee enterprise established by Farmers Groups in Ywangan, to learn from peers about the process and benefits of forming a similar enterprise for ginger producers. The project also arranged meetings with potential buyers such as FAME and Snacks Mandalay. Inspired, the farmers formed eight township-level producers enterprises (later reduced to six) and decided to register them as cooperatives. The project provided organizational development training.

Processing upgrades.

As a result of B2B and trade promotion events organized by VCRD, in 2018 Green Eastern Agri (GEA) and Heho Potato Company also decided to establish ginger processing and packaging centers in southern Shan to sell to high-end local and export markets. GEA and Heho Potato obtained grants from Mennonite Economic Development Associates (MEDA) and the Responsible Business Fund (RBF) for equipment upgrades, training, and/or global certifications.³ In return, grant conditions required them to develop contract farming schemes with over 2,000 ginger producers, provide extension support, and pay good prices. MEDA also provided a \$125,000 grant to EcoMa Organics for food safety. VCRD supported these awards by linking the processors to emerging Farmers Groups, training resources, and potential buyers. In addition, volunteer consulting teams from the Emerging Markets Lab at Thunderbird School of Global Management helped Heho Potato rede-



sign its organizational structure, transition to cloud-based digital record keeping, and launch a website to attract accounts and promote high-quality, smallholder-grown produce from Shan; and helped Snacks Mandalay update its sales, marketing and distribution systems and develop Excel-based tools for budgeting and financial projections.

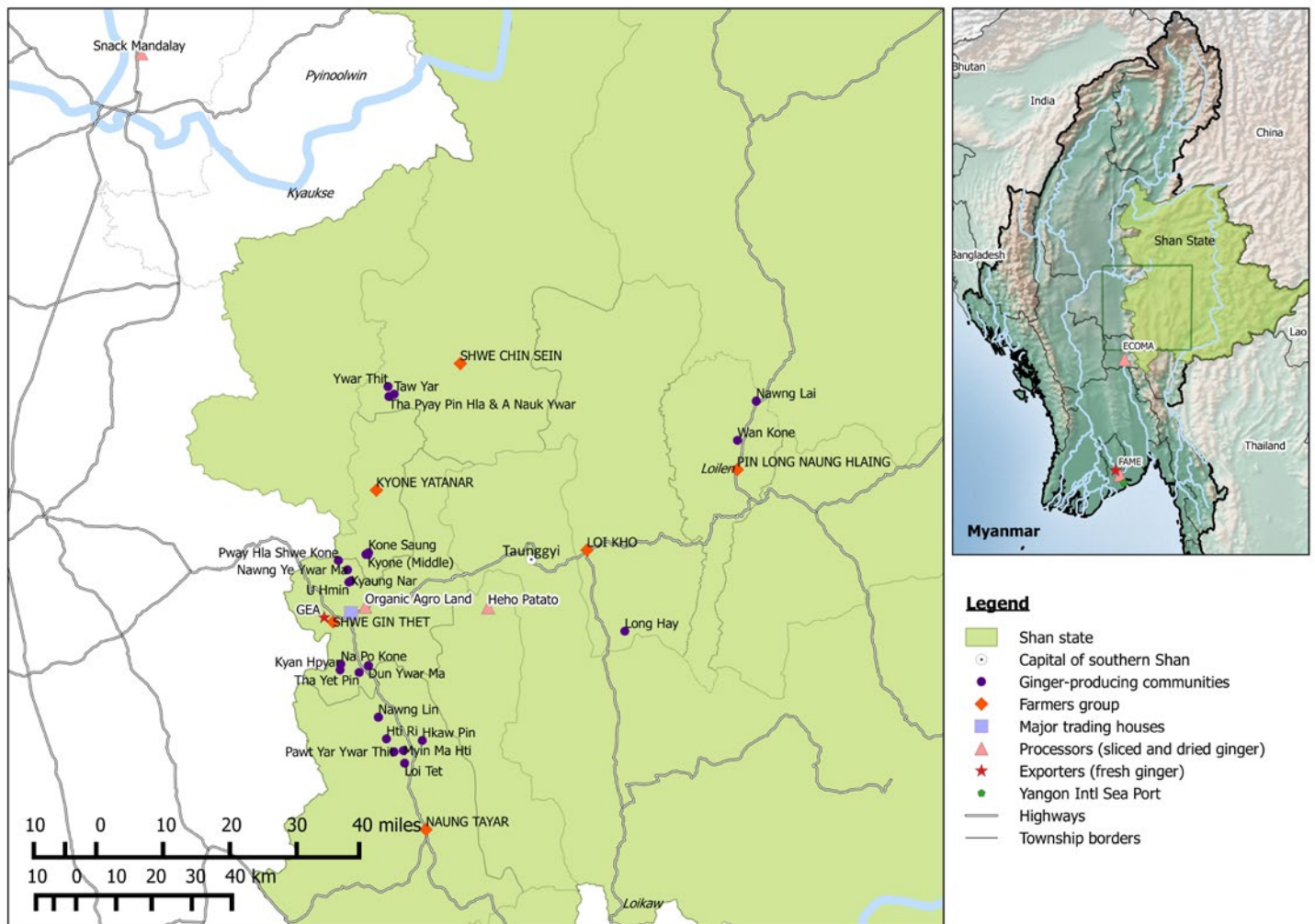
Refer to Figure 1 for a map of key residue-free value chain actors assisted by the project, including community-level Farmers Groups (ginger producing communities in the key), township-level Farmers Groups or cooperatives (Farmers Groups in the key), processors, and exporters.

Trading houses improve practices

Increased demand for higher quality ginger and new market channels that enabled ginger farmers to sell directly to processors and exporters motivated several influential Aungban trading houses to improve trading and ginger handling practices. For example, VCRD's collaboration with the International Labour Organization's 2018 Vision Zero Fund encouraged ginger traders to provide their workers with trolleys for heavy loads and install cleaning stations to remove dust/dirt particles.

³ GEA received a \$76,600 grant from MEDA for equipment and training and a \$200,000 equity investment from Singaporean Ben Koo and private investors. Heho Potato received a \$30,500 grant from MEDA and a \$25,100 grant from the Danish Government's Responsible Business Fund to obtain certification for its new ginger and potato processing and cold storage plant.

Figure 1: Map of Residue-free Ginger Value Chain Actors



Initial exports first two seasons.

To assess the feasibility and profitability of ginger exports, VCRD encouraged farmers to start with relatively small lots, sufficient to gain experience with export processes, costs and procedures while minimizing risk. This approach also aligns with buyers' preferences. Several foreign buyers placed orders for Myanmar residue-free ginger samples to test its quality. Newly established GEA accepted an order from a Miami-based buyer, even though their washing and packing station was not scheduled to be fully operational until the end of the ginger harvest in late March 2018. GEA purchased 4.1 MT of ginger from individual farmers who were among those who had committed to not use pesticides and sent a pilot shipment of 800 kilograms to Miami. The shipment marked the first time smallholders produced high-quality (large size, residue-free) ginger for export and earned price premiums for higher quality. GEA paid farmers 600 MMK/viss, compared to local prices for conventional ginger of 400-450 MMK/viss. The U.S. buyer placed an order for four shipping containers (80 MT) for the 2019 season and offered to pay 50 percent up front. In the face of the unexpected ginger price spike that started in August 2018 (described later), GEA only purchased 30 MT, primarily to maintain their relationship with the buyer. GEA bought from farmers in Pinlaung, Kalaw, Hopong and Pindaya and paid them 950-1,200 MMK/viss.

In late 2018 VCRD connected with FAME Pharmaceuticals Industry Co., a company that manages a 45-acre organic farm in Pyin Oo Lwin and produces natural medicines at an ISO-certified, carbon-neutral factory near Yangon. FAME received a large order for fresh ginger from a European buyer. Initially, they attempted to fill the order purchasing ginger from Aungban traders. They had to reject a high percentage of the ginger and the initial sample they sent to their buyer failed pesticide residue tests. FAME subsequently signed a contract with the newly established township-level Farmers Group, Shwe Chin Sein, for 9.8 MT (6,000 viss) of residue-free ginger. They paid cash down \$387/MT (1,000 MMK/viss), compared to the local price at that time of \$290/MT (750 MMK/viss). This was the first case in which farmers received a premium for residue-free ginger. FAME's European buyer subsequently placed an order for 8 MT. FAME declined, having decided to shift from fresh ginger to dried ginger, for reasons explained in the "challenges and learning" section.

EVIDENCE OF MARKET SYSTEMS DEVELOPMENT: BEFORE AND AFTER

The following table summarizes value chain development milestones and outcomes (2016 to early 2019) and contrasts them with prevailing market conditions before VCRD support (2015). Project achievements to date include establishing **proof of concept** for residue-free ginger production and exports and facilitating **learning and adaptation**.

Table 1: Residue-free Ginger Value Chain Development Milestones and Outcomes

Market Features	Baseline (2015)	Project Years (2016-early 2019)
Access to training and extension services	<ul style="list-style-type: none"> Farmers had no access to public or private sector extension services, with the exception of limited access to non-governmental organizations (NGOs) Farmers and consumers in Myanmar were largely unaware of the health risks associated with applying pesticides or eating foods with pesticide residues 	<p>Project-facilitated training and collaboration. The project helped train over 6,000 ginger farmers on improved management practices and technologies, including over 1,500 farmers on safe use and handling of pesticides. Building on VCRD's efforts, the International Labor Organization (ILO's) Vision Zero Fund selected the ginger value chain as the primary focus of their training activities in Myanmar. They trained 416 farmers on Global Gap requirements, including but not limited to Occupational Safety and Health and pesticide safety.⁴ In addition, in early 2019 the United Nations Industrial Development Organization (UNIDO) expressed interest in supporting ginger Farmers Groups under its MSME Development Project.</p> <p>Farmers Group-delivered training and extension. Experienced township-level groups such as Shwe Chin Sein and others are now training their own members and new groups to expand production of residue-free ginger.</p> <p>Processor-provided extension services. To improve supply chain management and quality control, GEA has hired five extension staff (trained by VCRD) to disseminate information on recommended practices, monitor, and trouble-shoot. Snacks Mandalay organized a 2-day training for farmers on production of chemical-free ginger and other products.</p> <p>Social media. Value chain actors are using Facebook to disseminate information; for example, GEA posts photos of ginger "Do's and Don'ts". Farmers use Facebook and Viber to share extension knowledge.</p> <p>Demo plots. Similarly, GEA collaborated with 3 Lead Farmers to establish ginger GAP demo plots and hosted the first private sector lead Farmer Field Day events in three communities. They plan to establish 3 additional plots in mid-2019. Heho Potato has established a 10-hectare farm to produce quality ginger (including seeds), demonstrate improved practices, and conduct trials. It plans to start hosting Farmer Field Days in 2019.</p>
Access to inputs and services	<ul style="list-style-type: none"> Smallholders did not have access to quality seed or other inputs 	<p>Input supply SME development</p> <ul style="list-style-type: none"> Jaguco Myanmar is providing organic inputs like Effective Microorganism® (EM) liquid, neem oil, and fish amino acid to make bokashi and organic pesticide. Sein Lan Wai (formerly Services Network for Farmers) is producing bokashi fertilizer for sale. Shwe Chin Sein has produced 125 MT bokashi for its members in preparation for the planting season. It also anticipates establishing ginger cleaning services. Heho Potato Co. is producing healthy ginger seed and plans to distribute quality seed to smallholders under a contract growing program. In response to new demand for higher quality ginger and the emergence of bacterial wilt disease, seven farmers started producing quality residue-free seed in late 2018. In turn, they will help expand the network of quality seed producers by training other farmers.

4 "ILO Makes Ginger Farming Safer and More Productive," YouTube video, July 1, 2018.

Market Features	Baseline (2015)	Project Years (2016-early 2019)
On-farm practices and post-harvest handling	<ul style="list-style-type: none"> Excessive, unsafe use of pesticides and fungicides incurred unnecessary input costs, failed to control plant diseases, and exposed farmers and consumers to high residue levels Some farmers produced residue-free ginger by default (not spending money on agrochemicals), but not in the context of adopting a broader set of improved agricultural practices Farmers broke off mother tubers when prices were high, which left the ginger that remained in the ground susceptible to bacteria and disease, such as bacterial wilt. In general, ginger farmers were not aware of any of the practices listed in the right column. 	<p>Improved practices. The following VCRD-promoted practices minimize use of pesticides, conserve soil fertility, limit erosion and rhizome rot, minimize input costs, and/or increase yields:</p> <ul style="list-style-type: none"> Using healthy ginger seed rhizomes and cutting and treating seed scars with a household bleach solution to sterilize the cuts <i>Trichoderma</i> soil application, a fungus that enhances root growth and helps prevent disease Mulching to suppress weeds and retain moisture Soaking rhizomes in EM solution Application of <i>bokashi</i> (natural compost) as an alternative to chemical fertilizers Intercropping with pigeon pea, mango, sunflower and maize for shade and increased income Planting along contours to reduce erosion Proper, wider spacing and mounding reduces seed costs and increases the size of individual ginger rhizomes Improved seed selection: Inspecting the ginger root and leaves while the rhizome is still in the ground and marking the locations of the best specimens with bamboo sticks (rather than selecting clean ginger with good eyes and hands during the post-harvest sorting process) Avoiding pesticides, herbicides, and fungicides <p>Adoption rates. Refer to the prior section for 2018 adoption rates; 2019 adoption rates are forthcoming.</p>
Standards, grades, and certifications	<ul style="list-style-type: none"> Aungban buyers did not have transparent criteria for assessing quality or paying higher prices; however, some paid 100-200 MMK/viss more for larger size and/or the preferred color, pink or white (differences in soil composition produce different colors and preferences vary between regions). The Myanmar Organic Grower and Producer Association (MOGPA) was established under the Myanmar Fruit, Flower, and Vegetables Producers and Exporters Association (MFVP) in 2009. Since 2014, it has supported Participatory Guarantee System (PGS) certification as an alternative to third party organic certification. 	<p>The project did not focus on standards and certifications because they were not essential to linking to buyers and earning premiums. VCRD instead focused on helping farmers meet buyer's requirements. The following developments are listed for context:</p> <ul style="list-style-type: none"> Myanmar's Good Agricultural Practices (GAP) Protocol and Guidelines were launched in December 2017 for 15 priority crops. ILO and DOA are discussing adding ginger. GlZ and UNIDO are promoting Global GAP certification in Myanmar, which focuses on control points. Heho Potato is considering certification, but wants to first confirm that it has a buyer because it is costly and takes a long time. VCRD has identified two buyers of Global GAP certified ginger in the Netherlands who have been slow to respond. MAGB, OAL, EcoMa, and HDDES have received organic certification through Control Union. UNIDO has expressed interest in supporting organic certification. <p>Refer to additional information on organic certification issues in the "challenges and learning" section.</p>
Buyers' requirements	<ul style="list-style-type: none"> See above 	<p>Buyers' requirements vary and include some or all of the following:</p> <p>Chemical free. Some buyers require that ginger has not been produced using pesticides, herbicides, or fungicides. Lab tests confirm if chemical residues are within acceptable limits.</p> <p>Disease-free.</p> <p>Size. GEA buys lots that contain at least 30-40% ginger rhizome "hands" heavier than 270 grams; FAME buys ginger that is at least 150 grams per rhizome hand; and Snacks Mandalay, EcoMa, and Hein Company buy all sizes. Processors of dried, sliced ginger are not concerned with size.</p> <p>Packaging. GEA's ginger exports for the U.S. market are packaged in accordance with buyer specifications; for example, ventilated boxes sized for 30 lbs, labelled with "Product of Myanmar" and seller's logo.</p>

Market Features	Baseline (2015)	Project Years (2016-early 2019)
Ginger quality and yields	<ul style="list-style-type: none"> ▪ Quality. Ginger had high incidence of disease (white spot), prevalence of mother tubers rather than daughter rhizomes, and small size (most ginger was less than 150 gram). ▪ Yields and inputs. Based on research conducted at the time of VCRD's field trials (test plots), farmers reported that they generally sowed 1,000 viss/acre ginger seed and produced 3,000-4,000 viss/acre ginger rhizome (3-4 times the seed volume). Some produced 5,000-10,000 viss/acre, considered very good to exceptional. ▪ Seed production. Only 30-40% of the ginger produced was seed quality. 	<ul style="list-style-type: none"> ▪ Quality. Farmers have started meeting buyers' quality requirements, evidenced by sales. In addition: <ul style="list-style-type: none"> - Size. Up to 60% of the ginger produced is export-size - Shelf-life. A U.S. importer, Total Green Tropical, noted that residue-free ginger from Myanmar has a longer shelf-life than ginger from China - Resilience. Farmers reported that ginger grown without herbicides is less prone to disease - Grades. Farmers Groups and new buyers are learning and have varied results. GEA assesses the quality of ginger lots it buys post-washing. Of 26 lots, 7 had 30-42% Grade A (GEA's own designation), 14 had over 20% Grade A, and 12 had less than 20% Grade A. ▪ Yields and inputs. Data from VCRD's field trials showed average yields of 3,964 viss/acre and a range of 2,101 to 8,620 viss/acre – which is not significantly different than for conventional yields. However, the test plots used half the amount of seed and saved the cost of pesticides. In Myanmar, farmers measure ginger yields as a multiplier of the seed sown. Producing the same volume per acre with half the seed doubles the yield in their calculations. ▪ Seed production. 70-80% of the ginger produced is seed quality, compared to 30-40% with conventional methods. <p>Additional data on ginger quality and yields will be collected as part of VCRD's 2019 post-harvest results survey.</p>



Market Features	Baseline (2015)	Project Years (2016-early 2019)
Farmers Groups and associations	<ul style="list-style-type: none"> Farmers had worked together to build roads and monasteries; however, they did not have experience with Farmers Groups The Myanmar Fruit, Flower, and Vegetable Producers Association (MFVP) was active and included a Myanmar Organic Producer and Exporter Association and cluster 	<ul style="list-style-type: none"> Community-level. In the 2018-19 season, 339 farmers in Shan State formed 32 active community-level, residue-free Farmers Groups. By the end of the season, 290 farmers and 29 Farmers Groups remained committed to residue-free production. They have started to produce higher quality and continue to learn and improve. Township-level. Advised by a buyer to aggregate further and inspired by examples in the specialty coffee value chain, group leaders opted to establish township-level, producer-focused cooperatives (rather than activate the southern Shan ginger association, which seemed designed to represent traders' interests⁵). On the eve of the 2019 planting season, six have formed, comprised of 190 farmers. Evidence of capacity-building. <ul style="list-style-type: none"> <i>Relationships with buyers.</i> Some of these township-level groups interact directly with buyers, seek out buyers themselves, are preparing to sign advance purchase agreements, have an internal communication mechanism with their members, and have representatives with authority to negotiate with buyers on behalf of members. <i>Price risk management.</i> Following a price risk management and season debrief workshop in early 2019, Farmers Groups have calculated their break-even price for producing residue-free ginger in preparation for price negotiations. <i>Farmer-to-Farmer training.</i> One group is providing training to other farmers in new areas to expand its network so that it can meet buyers' volume requirements. Farmers Groups have made significant progress but require business development support to improve their governance systems, communications with members, production planning, and contract negotiations with buyers. <i>Formal registration.</i> Two township-level Farmers Groups have registered as a cooperative: Shwe Chin Sein and Naung Ta Yar. The local Cooperative Department noted that this is the first time they have encountered a group registering for the purpose of establishing an active enterprise, rather than simply meeting a requirement for accessing micro-finance. <i>Quality seed production.</i> For example, Pinlaung Farmers Group sold quality seed to Hay Hein Company, a mining company, to establish a 10 ha ginger plantation that will support local livelihoods.
Linkages to buyers	<ul style="list-style-type: none"> Individual farmers sold to one of 14 regional Aungban trading houses, controlled by a cartel. They had no relationships with end market buyers or advance purchase agreements. Traders sold to processors or end buyers. Some farmers left their ginger by the side of the road and paid truck owners to transport it to the trading house. They were easily cheated by under-reporting the actual weight and/or price. 	<ul style="list-style-type: none"> In 2018, buyers entered into informal agreements with Farmers Groups for the first time that specified volumes, quality criteria, and price premiums. As of late March 2019, at least two township-level groups are preparing to negotiate more formal advance purchase agreements with a buyer. In the 2018-19 season, farmers who shifted to residue-free ginger production sold 111 MT of fresh ginger to 7 buyers interested in forming long-term relationships: FAME, Snacks Mandalay, Ecoma, GEA, Hey Hein Company, and two Aungban traders. In response to exceptionally high prices and regional demand in the 2018-19 season (described below), Aungban traders have started to travel to ginger producing communities to buy from farmers. Some are buying ginger while it is still in the ground – digging up a sample to estimate the volume, negotiating the price with the farmer, paying a cash advance, and assuming responsibility for transportation once it's harvested. These transactions largely involve conventional ginger. Residue-free farmers have been holding out for price premiums from the new buyers they've established relationships with.

5 In 2017 a prominent ginger trader invited farmers and MFVP to form the Southern Shan Ginger and Turmeric Producer and Exporter Association, hoping to meet a buyer's requirement to source from a cooperative. The process lacked buy-in and follow-through and the association was not registered.

Market Features	Baseline (2015)	Project Years (2016-early 2019)
Export markets	<ul style="list-style-type: none"> Although Myanmar produced about 1% of the global supply of ginger (3 million MT, FAOSTAT) and ranked as the 11th largest producer, Myanmar was not “on the map” of ginger producers. Approximately 68 percent of ginger was exported, largely to markets within Asia: Bangladesh, China, Sri Lanka, and India. Some dried, sliced ginger was exported to Europe. 	<p>Fresh residue-free ginger has been exported to the U.S., Europe, and other markets for the first time.</p> <p><i>Firms.</i> GEA exported their first sample of fresh ginger to a buyer in Miami at the end of the 2017-18 harvest season, who subsequently placed an order for 80 MT for the 2018-19 season. FAME exported a residue-free fresh ginger sample to Europe in January 2019. That company placed an additional order for 8 MT, but FAME declined because, they were contemplating shifting from fresh to dried ginger. In early 2019, Snacks Mandalay sent a sample of dried, sliced ginger to a foreign buyer. If the buyer approves the sample, Snacks Mandalay anticipates an order of 800 MT, which they will source through contract farming.</p> <p><i>Farmers Groups.</i> Companies ready to pay a premium for quality ginger are now seeking sources in Shan State and approaching Farmers Groups directly. For example, Taiyo Company, a Japanese company based in Thailand, is in discussion with Shwe Chin Sein to produce high quality baby ginger for the Japanese market. Shwe Thazin Minn Company, a fragrant ginger company, is interested in testing a new ginger variety with Shwe Chin Sein.</p>
Transaction costs and price premiums	<p>Farmers incurred the following transaction costs (basket = 35 viss = 57.05 kg):</p> <ul style="list-style-type: none"> Transport to Aungban (30-50 MMK/viss) Basket cost (2,000 MMK, basket used up to 5 times) 5-7% brokers fees Weight deduction (3 viss/basket), presumably for dirt content Labor for loading and unloading (200 MMK/basket) <p>According to Ministry of Commerce data, average prices for fresh ginger in Aungban for the 2016-17 and 2017-18 seasons (November-March) were 330-335 MMK/viss. Although after the baseline period, it is significant when compared to 2018-19 prices.</p>	<p>Lower transaction costs, improved transparency. Buyers of residue-free ginger pay transport, basket, and labor costs and use a digital scale for accurate weights.</p> <p>Higher prices.</p> <ul style="list-style-type: none"> Planned. Going into the 2018-2019 season, buyers expected to pay prices for higher quality and/or residue-free ginger that were 3 times the price for conventional ginger in the prior season (1,000-1,070 MMK/viss, compared to 335 MMK/viss). Actual. However, by August market prices for conventional ginger in Aungban had skyrocketed and the average price for the 2018-19 season was 856 MMK/viss and daily prices reached as high as 1,200 MMK/viss in February and March. Based on 14 transactions between project-assisted ginger producers and buyers in the 2018-19 season totalling 111 MT, the average weighted sales price (\$409/MT) was <u>5 percent higher</u> than the average weighted price offered by traders in Aungban (\$390/MT) on the same dates. The spread would have been substantially larger if not for the dramatic spike in ginger market prices.
Processing facilities	<ul style="list-style-type: none"> Myanmar had no washing station for fresh ginger exports Large dried, sliced ginger processing facilities existed (such as Phyto Kyaw), but ginger was dried on the ground in unhygienic conditions Ginger processors did not have well developed business development and marketing strategies or branding 	<p>New or upgraded facilities in Shan State assisted by VCRD.</p> <ul style="list-style-type: none"> Myanmar Agri-Business Group upgraded its ginger, turmeric, and chili processing plant to meet food HACCP certification requirements in 2017. VCRD provided an in-kind grant for a new ginger washing line, dryer, slicer, grinder, vacuum packer, and steam sterilizer. GEA established a ginger washing station on land rented from Golden Ground Organics in early 2018. Heho Potato constructed one of the first washing and packaging facilities in southern Shan for ginger, turmeric, and garlic in 2018 and began installing cold storage. It plans to produce dried, sliced ginger.

CHALLENGES AND LEARNING

Producing higher quality, residue-free ginger is more labor-intensive than conventional ginger and requires quality control. Dramatic ginger price fluctuations complicated efforts to establish price differentials for residue-free, higher quality ginger and conventional ginger. This section highlights how market actors and VCRD have responded to challenges, learned, and adapted, based on information collected from interviews in early 2019.

Collaboration, learning, and adaptation (CLA)

Importance of organizing like-minded farmers and starting small.

Leaders of newly established ginger Farmers Groups (aka “Lead Farmers”) noted the importance of engaging farmers that are committed to adopting recommended practices, cultivating long-term relationships with buyers, and continuous learning and improvement. They also noted the importance of starting small and growing slowly to maintain quality control. Existing Farmers Groups largely formed through self-selection. Some farmers have since dropped out, while new farmers have expressed interest in joining, motivated by higher prices and the opportunity for long-term relationships with buyers. Group leaders indicated that, going forward, they will set membership limits and establish selection criteria. In general, farmers are adept at learning-by-doing and identifying solutions when problems arise. Results varied considerably within and between Farmers Groups, which may seem undesirable when assessing short-term project outcomes. But farmers have evolved at their own pace and differences in adoption rates and results have reinforced learning, because buyers only bought ginger lots that met their pre-disclosed criteria. Farmers now have a better understanding of the importance of ginger quality and how to achieve it and may be less likely to take short-cuts in the future.

Reducing herbicide use through farmer-to-farmer monitoring and support.

As noted earlier, farmers readily gave up pesticides when they understood that they are ineffective against disease. They were more reluctant to give up herbicides. To protect ginger lots from being contaminated, Farmers Groups have established and adapted internal controls. For example: the project advised Farmers Groups to task two leaders with monitoring agro-chemical use. One Farmers Group developed a more decentralized, farmer-to-farmer monitoring model in which neighboring members monitor each other’s practices on a daily basis. For farmers without

a neighbor in the group, the group interviews their closest neighbors. If any spraying has been observed, they follow up with the member. This honor system is effective because people trust members to answer honestly. In addition, farmers understand that buyers will test their ginger lots for residues and that any contamination will be traced back to the responsible party. Farmers who use chemicals are not automatically kicked out. Instead, their ginger is excluded from aggregation during the current season and they are allowed to try again the following season.

To ensure that farmers do not face labor constraints during weeding periods (which could tempt them to resort to herbicides), group members contribute labor to help weed each other’s plots.

Communal and participant learning.

One Farmers Group established a communal residue-free ginger plot managed by eight participants. They kept records of participants’ labor contributions to facilitate equitable sharing of responsibilities. In parallel, some participants established individual plots. The Lead Farmer reported that collaboration facilitated better learning and problem-solving. Group members put more effort into the communal plot and observed different results between plots that they attributed to differences in applying recommended practices. Whether working on individual or communal plots, Lead Farmers encourage group members to designate one part of their plot that they give their best effort to, so that even if they face constraints adhering to all the recommended practices, they can make comparisons and understand the benefits of different methods.

In both the 2018 and 2019 ginger seasons, processors like GEA demonstrated their willingness to participate in end-of-season sessions with farmers to discuss what worked well, review challenges, identify ways to improve, and plan for the following season. For example, in 2019 GEA invited farmers from six townships in southern Shan to a meeting to discuss the decision to end ginger processing operations at their 1-year-old facility near Aungban due to high operating costs, share information about future business opportunities with GEA, and clarify their ginger purchasing criteria.⁶ Although GEA had informed Farmers Groups that it would purchase lots in which a significant portion of the rhizome “hands” (at least 30-40 percent) were export size (at least 270 grams each) – including posting photos of export quality ginger in participating communities – farmers that did not meet GEA’s criteria were disappointed that their ginger wasn’t purchased. GEA acknowledged inconsistencies in their purchasing practices that may have contributed to farmer confusion about what GEA wanted and the prices farmers could expect. Group Leaders requested that GEA set clear purchasing guidelines and prices earlier in the season to enable Farmers Groups to rally

6 Thirty-eight farmers attended, including representatives of all six Farmers Groups aggregating quality ginger. VCRD facilitated farmers’ transport to the meeting and advised GEA on discussion points and the meeting structure to facilitate collective learning.



members to aggregate sufficient supplies of high-quality fresh ginger. Ending the meeting on a positive note, GEA announced that they would strengthen their support to ginger farmers by establishing three ginger demonstration plots (similar to VCRD demo plots managed by LFAs in prior seasons) and hiring five extension staff that had been previously trained by VCRD. Stakeholder meetings fostered open communication and problem-solving and helped preserve new business relationships despite encountering some significant bumps.

Effective feedback mechanisms.

Project M&E plans tend to suggest that collecting monitoring data is central to project learning and adaptation. However, outcomes are measured post-season, which is often too late to adapt in a timely manner if farmers are not adopting improved management practices and technologies or a significant shift occurs in market factors that needs to be addressed. The ginger team integrated analysis and feedback on an intervention-by-intervention basis throughout the agricultural calendar. For example, they routinely tested and assessed costs and benefits of project recommendations, shared this information with farmers during demonstration events, and asked them about the feasibility and likelihood of implementing new practices. In addition, they routinely facilitated post-season review sessions with value chain actors to identify issues and solutions and plan for the following season. In parallel, VCRD started holding internal Quarterly Review sessions to stop and reflect on project results. Multi-tiered feedback mechanisms were substantially more effective for adaptive management and project story-telling than monitoring data alone.

Fresh ginger exports.

Late in the season FAME initially decided to shift from exporting fresh ginger to dried, sliced ginger based on a single, trial export to Europe; after the season ended, they appeared to be reconsidering whether to pursue ginger

trade. They did not anticipate the 9-10 percent weight loss in transit (which is standard), and lost an additional 2.5 MT due to mold, a consequence of inadequate ventilation in the box or container (which can usually be corrected once ventilated). Fresh ginger spot prices in US markets have consistently been around \$20-\$24 per 30-lb box (2,200-2,600 MMK/vis). According to VCRD's calculations, fresh ginger exports can be profitable. However, selling both fresh and dried ginger may be more profitable because dried ginger provides a way to utilize the portion of ginger that does not meet the size requirements for fresh.

SME opportunities.

Individual farmers and Farmers Groups are identifying new business opportunities that address constraints to pesticide-free ginger production. For example:

BOKASHI AND MULCH.

Producing bokashi (natural fertilizer) is fairly labor-intensive and requires coordination of critical inputs. In 2019 Shwe Chin Sein is producing 125 MT of bokashi for their members and has indicated that they plan to eventually expand production to sell to farmers beyond their group. Aggregating and transporting organic matter for mulching presents a similar opportunity.

QUALITY SEED.

Three farmers produced 34 MT high quality seed (refraining from harvesting and selling mother tubers in July and August despite high prices). In response to unmet demand, more seed producers who have been trained by VCRD have committed to producing quality seed rhizome in the coming years.

AGGREGATION AND TRADING.

A progressive farmer opened a Facebook account and started posting about ginger. Traders approached him to help with sourcing and he is now buying and aggregating ginger from farmers outside his group.

Market challenges

Price fluctuations.

Farmers and buyers noted that ginger prices tend to fluctuate in 3-4 year cycles. Following a peak price year, more farmers plant ginger leading to increased supply and lower prices. Uncertainty about prices discourages some farmers from investing the additional labor required to adhere to residue-free requirements and achieve other quality improvements. As noted earlier, dramatic price fluctuations complicated buyers' efforts to pay price premiums. Throughout the 2018-19 harvest season, the average fresh ginger purchasing price in Aungban was around 350 USD/MT (+/- 100 USD/MT), 2-3 times the normal price for conventional ginger (150 USD/MT +/- 50 USD/MT for the past two seasons). In some cases it exceeded the expected price negotiated between buyers and farmers for residue-free and/or higher quality ginger (\$404 - \$432/MT). It also exceeded the magnitude of price increases observed in other markets and has been attributed to lower ginger production in key ginger-producing countries in Asia.⁷ Several farmers in the residue-free Farmers Groups sold individually to traders because some potential buyers backed out or failed to clearly communicate their intentions, and it was easier to sell to traders at comparable prices. For example, GEA reduced the number of metric tons they planned to purchase due to cash flow constraints; and HDES opted to not buy Myanmar ginger due to the high price. In addition, some group members did not meet the new buyers' requirements and traders offered comparable prices irrespective of ginger residue levels, size, and health. Other farmers recognized that this peak price will likely not be repeated in future years and that they would benefit in the long run by maintaining relationships with buyers who are generally willing to offer price premiums. The project team and Farmers Groups continued to seek new buyers. Both farmers and buyers would benefit from greater price stability. In theory, price stability could be facilitated by negotiating price floors and ceilings, but agreements would be difficult to enforce.

Confusion over residue-free price premiums.

The term "price premium" may have created confusion among farmers. Some buyers offer a premium for residue-free ginger. Others offer a premium for ginger that is largely related to higher quality, but also expect it to be free from chemical residues. The unexpected spike in conventional ginger prices far exceeded price premiums and nullified them in some cases. Consequently, farmers who used chemicals received similar prices for conventional ginger. This discouraged some residue-free farmers, even though the prices they received were not lower than expected. These experiences highlight the importance of



clearly communicating buyers' specifications and pricing guidelines, preferably in writing and with provisions that anticipate market price fluctuations. In 2019 the project is working with Farmers Groups to further assess the added costs of hand weeding and managing internal control systems (such as payment of at least one staff to monitor), in preparation for negotiating prices with potential buyers. In parallel, farmers have recognized the importance of educating the local market about the health benefits of residue-free ginger relative to conventional ginger, to influence consumers' willingness to pay premiums. The project will encourage Farmers Groups to share public awareness messages on Facebook that target consumers and traders, using existing content developed by organic agriculture stakeholders in Myanmar.

Organic certification.

The project team discussed the pros and cons of promoting organic certification and eventually opted to focus on non-certified, residue-free ginger because the certification process requires three years with no chemical use before land can qualify if chemicals have been used historically -- which could not be achieved within the remaining project period. Helping Farmers Groups produce residue-free ginger and establish Internal Control Systems (ICS) is feasible, improves ginger quality, and puts farmers on the path to organic certification (counting toward the 3-year qualification period should they decide to pursue certification).

The following factors shape the markets for certified organic produce internationally and within Myanmar and suggest that ginger value chain actors should continue to assess the feasibility and financial benefits of certification over non-certified chemical free ginger prior to pursuing certification:

⁷ For example, adverse weather conditions and flooding in China and India lowered production. Refer to the VCRD FY2019 Q2 Quarterly Report for additional information.

- **Diverse standards in export markets.** Organic certification regulations vary across countries and regions and therefore across potential buyers. In addition, regulations continue to evolve. For example, the European Union passed a new organic regulation in May 2018 that will apply starting January 2021.
- **Input supply.** Approximately 15 companies in Myanmar are currently selling inputs for organic agriculture, such as compost. In parallel, conventional input suppliers are aggressively marketing agro-chemicals and China is dumping banned agro-chemicals. Given the lack of regulatory enforcement capacity, the project continues to identify market-based solutions that involve working with reputable input suppliers to help them promote safe practices and encouraging producers to spread information about residue-free ginger production practices and benefits via Facebook.
- **Worth the cost?** Within Myanmar, organic and conventional ginger sell for similar prices in Aungban, the primary ginger trading center – though this could shift through marketing that raises consumer awareness of the prevalence of agrochemicals in local produce and associated health risks, and expanded linkages with foreign buyers willing to pay higher prices for certified organic. As noted above, certification costs and benefits need to be weighed against non-certified, residue-free ginger.
- **Who benefits?** Greater transparency in the value chain will be required to enable farmers to benefit from organic certification. Organic certificates are typically held by land owners because they apply to land parcels and are valid for all crops produced on that land. However, a few ginger processing plants in Myanmar allegedly obtained organic certificates for smallholder plots without informing the farmers, including collecting soil samples and obtaining letters from the Department of Agriculture (DOA) stating that no chemicals had been used for 3 years on the plots – though subsequent lab tests revealed that some soil samples had Maximum Residue Levels (MRLs). This practice was a marketing strategy designed to benefit processors. It did not raise farmers' awareness of improved practices nor provide farmers incentives to not use chemicals, such as price premiums.
- **Group certification.** Control Union Myanmar is currently exploring ways to offer affordable group certification services to smallholders. According to the International Federation of Organic Agriculture Movements (IFOAM), group certification is the dominant approach for organic certification of smallholder farm plots in developing countries. It relies on ICS and is currently used to certify millions of farmers worldwide.

Control Union's efforts will be informed by the Swiss Research Institute of Organic Agriculture's (FiBL) study of lessons learned on group certification and ICS (March 2019)⁸ and IFOAM-Organics International's multi-stakeholder process to refine group certification requirements in support of the European Union's new organic regulation (launched April 2019).

Enabling environment constraints.

GEA identified the following priorities for improving the enabling environment for quality ginger production and exports: 1) regulating banned pesticides; 2) removing the Ministry of Commerce's requirement of FOB payment terms for exports or facilitating bridge financing; 3) improving contract enforcement; 4) establishing a seed bank in Shan State; and 5) establishing a certified lab in Myanmar that can test for pesticide residues. Although beyond the scope of the current project, these recommendations point to potential policy advocacy for other private sector development projects.

LOOKING AHEAD

As VCRD approaches the end of the project period, the Farmers Groups committed to pesticide-free ginger during the 2017-18 and 2018-19 seasons and have achieved significant improvements in ginger quality, linked to buyers interested in cultivating long-term relationships, and tested and adapted approaches for implementing effective internal control systems and negotiating advance purchase agreements. Group members have reassessed their commitment to pursuing these new ways of doing business. Some farmers have opted out, while new farmers have joined. This on-going self-selection, learning, and improvement process enables the relatively young groups to focus on improving ginger quality and relationships with buyers. In turn, it is a sound strategy for **demonstrating and replicating successful models** to achieve greater scale over the medium to long term, by attracting -- through higher prices and more transparent transactions -- the 6,000 farmers who have been trained on and started to adopt improved practices. Important next steps for strengthening the business skills of township-level Farmers Groups include **facilitating access to business development services (BDS)** to improve governance systems, communications with members, production planning, contract negotiations, and supply chain traceability, and **facilitating knowledge management** to capture and share learning and successful approaches across Farmers Groups. This case study represents an initial contribution.

8 Meinshausen, Florentine; Richter, Toralf; Blockeel, Johan and Huber, Beate (2019) Group Certification. Internal Control Systems in Organic Agriculture: Significance, Opportunities and Challenges. Research Institute of Organic Agriculture, Switzerland [<http://orgprints.org/35159/>].



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