



Small farmers, big tech: agrarian commerce and knowledge on Myanmar Facebook

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Accepted: 1 March 2023 / Published online: 6 May 2023
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Abstract

Despite increasing attention to the sensors, drones, robots, and apps permeating agri-food systems, little attention has been paid to social media, perhaps the most ubiquitous digital technology in rural areas globally. This article draws on analysis of farming groups on Myanmar Facebook to posit social media as *appropriated agritech*: a generic technology incorporated into existing circuits of economic and social exchange that becomes a site of agrarian innovation. Through analysis of an original archive of popular posts collected from Myanmar-language Facebook pages and groups related to agriculture, I explore the ways that farmers, traders, agronomists and agricultural companies use social media to further agrarian commerce and knowledge. These activities evidence that farmers use Facebook not only to exchange market or planting information, but also to interact in ways structured by existing social, political and economic relations. More broadly, my analysis builds on insights from STS and postcolonial computing to disrupt assumptions about the totalizing power of digital technologies and affirm the relevance of social media to agriculture, while inviting new research into the surprising, ambiguous relationships between small farmers and big tech.

Keywords Digital agriculture · Agritech · Agrarian studies · Facebook · Myanmar

Introduction

The Cornell Initiative for Digital Agriculture brings together industry, faculty and students in to showcase digital solutions for agriculture, providing a powerful example of growing interest in agritech. The closing panel at CIDA's 2021 conference took a surprising turn, however, when speakers from various disciplinary backgrounds converged on social media as a key tool in farming systems. Rather than focusing on the robotic pollinators, nuclear magnetic resonance monitors, and predictive models for automated milking systems that had served as the focal points of scheduled programming, these experts agreed that Facebook was one of the most important technologies in places where they worked, which ranged from Africa to North America. One economist went so far as to hail the mobile phone as the biggest

innovation in agriculture, describing the transformational effects of farmers' abilities to take photos of afflicted plants and send them for advice using Facebook and Whatsapp. Appended to formal presentations, these final remarks left questions about social media as the most ubiquitous and least-scrutinized example of global agritech.

A growing body of critical scholarship has considered the role of big data, algorithms, and automation in agriculture (Bronson and Knezevic 2016; Klerkx et al. 2019; Bronson 2022). Much of this work has focused on the ways in which digital innovations stand to shore up the power of familiar actors in the food system (Miles 2019; Prause et al. 2021), including through new alliances between big ag and big tech (Bronson and Sengers 2022). By focusing on the discourses of corporates and capitalists, scholars have shown how narrow, techno-solutionist framings limit imaginable solutions in digital agriculture (Biltekoff and Guthman 2022; Duncan et al. 2021; Fairbairn et al. 2022). This focus reveals how digital agriculture replicates existing inequalities and is particularly important in light of growing private investment in American agritech entrepreneurs and purpose-built platforms. In the Global South, limited work to date has investigated ways in which digital solutions may replicate

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colonial dynamics in data grabs linked to land grabs (Fraser 2019), as new iterations of Green Revolution-style development projects (Fairbairn and Kish 2022), and as forms of surveillance agriculture (Stone 2022). In contrast, development actors often frame digital technologies as bringing positive transformation. A recent publication from the United Nations Food and Agriculture Program, for example, states: “it would be hard to overstate the scope for Information and Communications Technologies (ICTs) to drive agriculture and rural development, especially for the poorest smallholders and other households” (Treinen and van der Elstraeten 2018, p. 1). Absent from both analyses of domination and promises of modernization are accounts of how farmers and other agricultural actors in the Global South redeploy, resist, and make sense of new technologies.

Such stories are important; attention solely to elites runs a risk of overdetermining the impacts and obscuring the unintended consequences of their interventions. Scholars working in North America have called attention to farmers’ practices of tinkering, hacking, and translating new technologies (Carolan 2020; Rotz et al. 2019), observations that resonate with recent work in this journal on the everyday digitalization of agriculture (Forney et al. 2022). Networked and interactive, social media’s technological affordances, and attention-based profit models, invite creative reinterpretation. Drawing on classic STS literature and new work in postcolonial computing, this paper posits Myanmar farmers’ social media practices as *appropriated agritech*. In doing so, I push beyond a focus on the intentions of designers in the Global North to highlight the ways in which corporate technologies are redeployed within agricultural ecologies, economies, and societies, especially in the Global South. A play on the notion of appropriate technologies, which are carefully designed with a particular setting in mind, *appropriated agritech* names the process of incorporating new digital technologies that are not originally intended for farming into agricultural systems. Here, I focus on how farmers, traders, machine owners, and businesses in Myanmar repurpose generic social media, situating Facebook use in a longer, localized tradition of agrarian innovation, rather than the promise of imported invention. In doing so, I aim to expand our understanding as what counts as agritech, who are considered its designers, and how we assess its ambivalent and wide-ranging effects.

In Myanmar, the rapid arrival of Facebook among a predominantly rural population reliant on small-scale farming and historically isolated from extension services and international markets set the stage for farmers and traders to repurpose social media. Facebook’s public, multimedia features, easily accessed by mobile phone and promoted through corporate schemes that yielded extremely high rates of adoption, facilitated wide sharing not only of daily prices and best practices, but also embodied experiences and structural

critiques, captured on live stream videos and comment chain debates. Below, I outline my conceptual framing and introduce the study site and methodology before analyzing how Myanmar farmers, brokers, government and company staff incorporated Facebook into existing and evolving circuits of agrarian commerce and knowledge. I draw on an analysis of 798 posts from popular Myanmar-language Facebook pages and groups concerned with agriculture, as well as ethnographic research in Myanmar conducted since 2014, to find a robust conversation about farming taking place online that provides insights into the processes rapidly transforming Myanmar agriculture and illustrates the ways that social media use constitutes a form of digital agriculture.

Such phenomena bring our attention beyond CRISPR, robots, and satellites towards the infiltration of banal technologies into the everyday activities of agrarian life. Appropriation is not necessarily emancipatory, for example when online agricultural advice shores up patriarchal expertise, promotes chemical inputs, and produces platform profits. Yet the notion of *appropriated agritech* reminds us that the story of digital technology is not only the story of Silicon Valley, but also a story authored by small farmers in the Global South, who increasingly confront the challenges of everyday life with a sickle in one hand, and a smartphone in the other.

Theorizing appropriated agritech

The notion of *appropriated agritech* builds on classic work in Science and Technology Studies (STS) that underscores the agency of users and recent scholarship in postcolonial computing that emphasizes the ongoing, creative work of repair. Existing scholarship on digital agriculture often associates agritech with powerful forces of either modernization or exploitation, attributed to the intentions of designers or the political economy of platforms and production. On the farm, as in the city, artifacts do indeed have politics: take, for example, the transformations wrought to California labor relations by the arrival of the mechanical tomato harvester in the late 1940s (Winner 1980). Yet there is also a politics in highlighting the strategic appropriation of existing technologies by marginalized groups, rather than telling familiar stories of domination (Fouché 2006) or glorifying innovation as single, wholesale transformation (Suchman 2002; de Laet and Mol 2000). Analytically, a focus on impact risks missing the ways in which users “consume, modify, domesticate, design, reconfigure, and resist technologies,” (Oudshoorn and Pinch 2003, 1) and, in doing so, reformulate devices as well as their own social identities. Writing of the arrival of the automobile in rural America, for example, Kline and Pinch (1996) describe how initial resistance was followed by redeployment, a process that both reinforced and

reshaped gender relations as the car was used as an engine for the “men’s work” of shelling, grinding and sawmilling as well as for the “women’s work” of washing clothes, separating cream, and selling produce. Ultimately, Ford both undermined and adopted these reappropriations, for example by voiding warranties for modified model Ts while introducing new products, such as the truck, that formalized alternate uses. Such a history illustrates the role of rural users in reshaping technology’s materiality and meaning, within the constraints of evolving capitalist structures and gender relations. In his account of hunting in Zimbabwe, Clapperton Chakanesta Mayhunga (2014) goes a step further to argue that villagers themselves are best understood not as users, but as designers, importing and deploying technologies from the outside within generations of hunting tradition in acts of everyday innovation that serve their own needs and desires.

Contemporary data infrastructures, as well as the complicated work of maintaining and adapting them amidst breakdown, crisis, and dissolution—what Steve Jackson (2014) conceptualizes as “repair”—emerge from particular landscapes shaped by unfolding histories of uneven global development (Mann 2017; Faxon & Kintzi 2022). Building on Miller and Slater’s (2001) early ethnography of the internet as socially constructed and locally improvised in Trinidad, recent work in postcolonial computing (Irani et al. 2010) decenters design to highlight “making do” (Ames et al. 2021) as a form of everyday invention on the periphery (Chan 2014). In Paraguay, schoolchildren repurpose donated laptops as media devices (Ames 2019); on Native American reservations, tribes harness radio and telecommunications to overcome colonial disconnection, enacting networked sovereignty (Duarte 2017). In this vein, appropriated agritech can be seen as a form of “creative infrastructural action,” defined by Jack et al. (2019) as the resourceful and imaginative work of integrating new tools into older cultural practices and contemporary constraints. Within the broader context of heterogenous rural digital adaptations (Su et al. 2021) and longer history of agrarian creativity, resilience and vibrancy (Borras 2009; McMichael 2014), such an analytic underscores the capacity of agrarian actors to reinterpret and reinvent.

Empirically, appropriated agritech directs our attention beyond promises and pitches to grounded practices of everyday digitalization (Forney et al. 2022). Traditionally, agritech is defined as labor-saving technologies, sensors, and apps explicitly designed for farming. While critical scholarship has provided cogent analyses of the underlying labor and practical limitations of purpose-built platforms for ethical food consumption (Schneider and Eli 2022), plant classification (Heimstädt 2023), and agricultural advice (Fairbairn and Kish in press), less attention has been paid to the ways farmers and traders make use of social media sites (though

see Bos and Owen 2016; Martindale 2021). Such a focus is important because limited evidence to date shows that, on the ground, purpose-built platforms may not be as powerful as they appear. In Myanmar, I interviewed designers of several different agricultural advice apps in Yangon, but adoption was low just outside the city. In the more remote areas where I worked, I never met a farmer who used any of these apps, though many used Facebook (Faxon 2022). Similarly, in Kenya, Facebook, Youtube and Whatsapp, rather than purpose-built agricultural platforms, are increasingly enlisted into everyday activities such as buying and selling produce (Schoemaker et al. 2022). While social media is designed for multivalent social interaction, the specific ways that farmers and traders turn its affordances towards their own aspirations exceed the imagination of both social media and app designers.

Like the adaptation of the car in rural America or the radio station on Native land, farmers’ social media activities take place within the constraints of corporate ownership and political domination. Writing of the US, Liu and Sengers (2021) highlight the legacy of racialized dispossession that shapes the development and deployment of digital agriculture. In Myanmar, appropriated agritech was bounded not only by algorithmic opacity, but also by authoritarian politics, socialist legacies, patriarchal norms, and geopolitical threats. Existing agrarian social relations shaped how merchants promoted domestic companies and smallholders shared personal experiences. While all of these online activities ultimately accumulated platform profit, corporate power was a minor concern for small farmers struggling under a repressive regime. Within conditions of precarity, Facebook provided avenues towards income generation, knowledge-sharing and solidarity. In his account of social media use in Brazilian favelas, David Nemer writes that the “tension between oppression and empowerment turns digital technologies—as with every aspect of the life of the oppressed—into a site of struggle... to survive, [people] need to consciously resist oppressions and appropriate technology rather than reject it.” (Nemer 2022, 3). In this sense, appropriated agritech is an act of hope, part of a broader struggle to seek liberation from political, economic, and digital repression.

Research site and methodology

The prevalence of agriculture and swift arrival of social media in Myanmar make it a powerful site to investigate agrarian innovation on social media. Like many other countries in the Global South, small farming persists (Rigg et al. 2016; The World Bank 2008): a recent study found farms under two hectares account for 84% of farms worldwide, operate on about 12% of all agricultural land, and produce about 35% of the world’s food (Lowder et al. 2021). In

Myanmar, agriculture makes up a decreasing share of GDP, but continues to support two-thirds of the nation's households (Government of Myanmar 2018). While Myanmar is notable for large-scale land concessions granted to military-connected cronies, many farmers maintain modest plots. In the village where I lived for a month in 2018, for example, eight acres was considered the average for landholding families, who comprised about half the households and employed seasonal workers from the other, landless households for planting and harvest. Historically reliant on rice farming, as well as the cultivation of sunflowers, sugar cane, sesame, durians, bananas, and avocados, Myanmar's smallholders had suffered under a half-century of civil war, international isolation, and lack of state support. Even amidst the construction of new H&M garment factories on the urban periphery and the formalization of labor migration routes to Thailand and South Korea during the democratic turn in the 2010s, farming remained a significant source of income and site of social and political life.

Big tech arrived with the privatization of the military telecommunications monopoly in 2013, which brought an influx of foreign construction firms, internet service providers, and digital platforms to Myanmar. For Meta, Facebook's parent corporation,¹ this meant a major new market, with 60 million potential users in the world's second-to-last telecommunications frontier (North Korea is the final hold-out). The company quickly established dominance, including by provisioning free trials as part of its Free Basics program, an initiative rolled out in several Global South countries that the company claims was humanitarian, but which has been harshly criticized by net neutrality advocates for ensnaring users and bounding them to a single, private platform. Facebook in Myanmar became a topic of global notoriety in 2017, when the social media platform's role in spreading hate speech and incitements to violence against Muslim minority received international scrutiny during the Rohingya genocide. Such infamy prompted a shift in corporate policy, including hiring Myanmar-speaking content moderators, bringing on national advisors, and building dedicated country and regional expertise in the Singapore office. In the shadow of scandal, the platform's public, interactive, and mobile-friendly features became critical to a wide range of domestic activities, from state-building to cultural preservation to online shopping (The-Thitsar 2021; Frydenlund and Shunn Lei 2021; Tønnesson 2022). For small farmers like the ones I lived and worked with, cheap SIM cards meant new forms of exchange and connection; rural people harnessed Facebook for securing livelihoods, supporting community and mobilizing for land justice. In the digital village,

creative adaptations of social media shaped not only agricultural production but also the social reproduction and politics of agrarian life (Faxon 2022).

This paper extends these ethnographic insights through a social media analysis of popular farmers' Facebook pages and groups. This work began with an exploratory digital ethnography conducted in October 2020 of 51 farmers' Facebook pages and groups, selected by referral from ethnographic informants and then tracking popular users and reposted content. This work aimed to map broad types of pages and groups, and to inductively generate initial themes. Using Crowdtangle, a public insights tool owned and operated by Meta that enables the monitoring and analysis of public content on Reddit, Instagram, and Facebook,² my team then assembled and analyzed an original corpus of 2005 popular Myanmar-language Facebook posts related to farming collected between December 2020 and April 2021. To build the corpus, we first identified relevant and popular Facebook pages and groups based on a keyword search of Myanmar words relating to farming, agriculture, and farmland, using both Unicode and Zawgyi, a Burmese-specific encoding, generating lists of 1,000 public pages and 1,000 public groups with the highest number of interactions in the past 30-day period (CrowdTangle Team 2020). Next, we conducted a manual review for focus on agricultural content, arriving at a final database of 110 pages and 100 groups. Each of 13 weeks, we collected the top viral posts from these groups, using CrowdTangle's overperforming score as a proxy for popularity.³ For each post, we used CrowdTangle to collect data on text, timing, number and type of interactions, storing this data on encrypted google sheets. Screenshots of each original post as well as links were also stored on an encrypted google drive using unique IDs that linked to metadata and analysis sheets. Here, I focus on the 798 posts in the corpus that were collected before Myanmar's 2021 military coup.

My team analyzed data both quantitatively—graphing total monthly posts and interactions for top groups, for example—and qualitatively. Posts were coded qualitatively by multiple members of the research team according to 40 iteratively developed categories. I developed and revised the codebook based on the exploratory digital ethnography and subsequent discussion of emergent themes in weekly group

¹ I use Meta to refer to Facebook's parent corporation, and Facebook to refer to the online platform, throughout this article.

² For more on CrowdTangle and the data it tracks, see: <https://help.crowdtangle.com/en/articles/4201940-about-us> <https://help.crowdtangle.com/en/articles/1140930-what-data-is-crowdtangle-tracking>.

³ Overperforming score is calculated based on the expected response to posts making it an imperfect, but the best available, proxy for popularity. For more on CrowdTangle's limitations, see: <https://www.techtransparencyproject.org/articles/facebook-leans-states-spot-voter-interference>; and <https://www.theverge.com/interface/2020/7/22/21332774/facebook-crowdtangle-kevin-roose-nyt-tweets-interactions-reach-engagement>.

meetings conducted on zoom. For this article, I conducted an ethnographic re-engagement with key pages and groups in June 2022, in which I watched videos, reviewed posts, and translated comments while taking field notes. I also draw on four interviews with agricultural app developers and Facebook page administrators, which I conducted between 2017 and 2022. Both data collection and analysis are deeply indebted to the insights of my research team, including Kay Zak Wine, Van Tran, Swan Ye Htut, and Kendra Kintzi.⁴ My analysis is also informed by ethnographic, participatory, and mixed-method research on land politics and agrarian change in Myanmar since 2014, including 26 months of ethnographic research in 2017–2019. Past research experience, interviews and collaboration helped partially overcome the limitations of a social media analysis—including ignorance of the offline identities of users and the impacts of online discussions on offline behaviors—by enabling me to interpret posts and identify key themes. This paper therefore forms part of a broader research project that employed both online and offline methodologies to understand the intersection of technological and agrarian change, both before and after Myanmar’s military coup (Faxon 2022; Faxon et al. 2023).

Myanmar Facebook as appropriated agritech

In Myanmar, a country with a predominantly agrarian population, liberalizing economy, and recently-shattered telecoms monopoly, new digital technologies enabled a range of practices that changed farming both economically and ecologically. These uses were embedded in existing relationships of agricultural capital and expertise and structured by historical state efforts to control fields and markets. While Facebook was not designed with Myanmar agriculture in mind, farmers, traders, government offices and agricultural companies took up the platform to build their businesses and solicit and offer agricultural advice. Social media content analysis reveals a robust conversation around farming taking place online, troubling traditional assumptions about who designs and what counts as agritech.

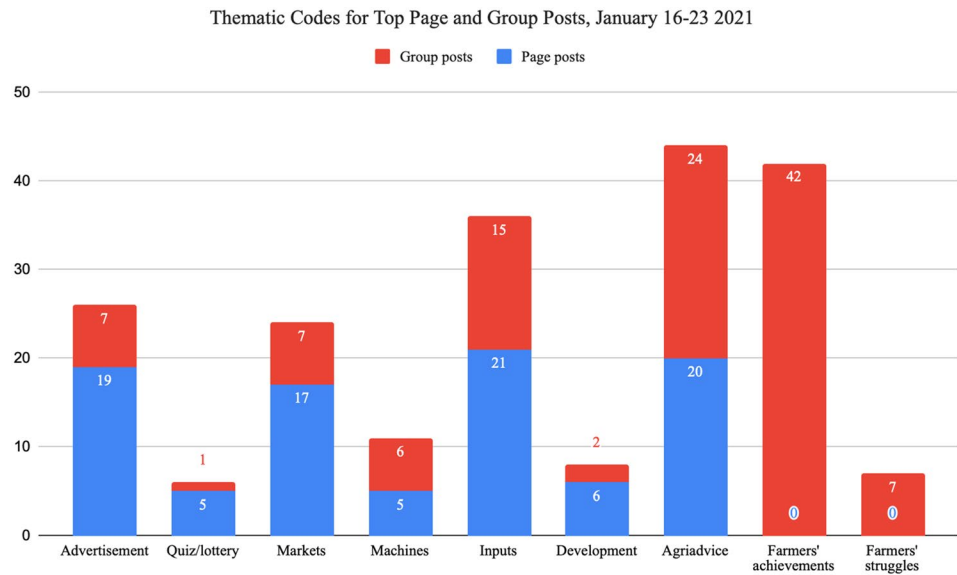
These interactions were structured by the technological affordances of the particular social media platform, including features that made photos and videos easy to share publicly and types of sub-platform that promoted more or less

hierarchical styles of communication. Both the types of actors and activities varied significantly across pages and groups. By design, Facebook pages are less interactive than groups: only the page administrator can post directly, though followers can comment on and interact with posts. Pages thus served as a platform for agricultural businesses, media pages, and government departments to make announcements to potential clients and constituents. Facebook pages in the dataset included 50 businesses selling machines, fertilizers, and agricultural products, 12 government agencies, seven agricultural associations, five media organizations, six non-profit and educational institutions, and 30 others. About 30 pages had more than 100,000 followers in December 2020. The most popular included The Department of Meteorology & Hydrology, which posted frequent weather reports and earthquake information, and Htwet Toe, a digital news and education subsidy of Myanmar’s largest agro-chemical corporation. Content production was highly concentrated, and posts generally yielded a modest number of comments. In contrast, groups were more interactive and heterogeneous spaces for sharing agricultural advice, market information, and personal experiences. Groups were often organized around a specific crop—with titles like, “Bamboo-lovers,” “Online Rice Commodity Exchange”—or as a place to share agricultural techniques and connect with others—“Modern Agricultural Technology,” “Paddy Farmers Share Practical Challenges and Successes.” About 40 groups had more than 50,000 members in December 2020. Smaller followings were complicated by greater density of interactions, group posts were often more complex than page posts, could be shared across multiple groups, were generated by a higher number of users and yielded a higher number of comments, likes and shares. While companies and government offices used pages to promote products and share information, farmers and traders both absorbed this content and generated new types of interaction around specific questions and crops.

A snapshot of the top page and group posts from one week in January 2021 illustrates broad patterns in Facebook use. From January 16–23, five pages generated 47 of the top 100 posts: two government departments, two agrichemical companies, and one sustainable farming social enterprise. Five groups generated 42 of the top 100 posts, with titles that reveal the popularity of horticulture and innovation: “A Place for Orchids and Flower Lovers,” “Agricultural Information and Technology,” “Orchids and All Kinds of Flowers,” “Sharing Creative Farming Methods,” and “Anthurium and all Kinds of Orchids.” Photos were included in 78% of the top page posts and 76% of the top group posts. Posts with photos generated high numbers of reactions, with just under 100,000 likes, comments and shares for the top photo posts in pages and another 100,000 reactions for photo posts in groups over the course of the week. 15% and 10%, respectively, of top page and group posts included video. The

⁴ Due to safety concerns for researchers inside Myanmar generally and those working on or with Facebook specifically, I leave my in-country team unnamed here or use pseudonyms. These individuals were paid by a grant from Facebook Research, however, Facebook Research did not oversee or control our research in any way. Research design and analysis is my own.

Fig. 1 Thematic codes for top page and group posts, January 16–23 2021



top, overlapping themes of the posts from weekly coding are shown below (Fig. 1). Promotions were common across both pages and groups, but pages were more likely to use traditional advertisements as well as quizzes and lotteries. Posts included discussions of markets, inputs, machines, and development as well as agricultural advice, and, in groups, documentation of farmers' achievements and struggles.

In the sections that follow, I provide in-depth qualitative analysis around two topics—market integration and production practices—that motivate many ICT4D initiatives, incorporating these inductively coded key themes. In “commerce,” I show how social media provided a platform for promotion and price information, but also for sharing political economy analysis and personal experience of international trade. In “knowledge,” I trace the circulation of agricultural advice, linking these patterns to the absence of public extension, existing gendered roles and debates about the future of farming.

Commerce

The sheer amount of promotional content on farmers' Facebook was striking: about a third of all top posts encouraged readers to buy or use a product or service. However, almost none of this content employed platform advertising functions purchased from Meta. Rather, promotional posts benefitted domestic corporations as well as local brokers, farmers, and machinery owners. From professional videos of shiny new tractors to grainy photos of orchids, pages and groups provided sites of commerce, with extended comment chains questioning regional availability and haggling over price. Yet beyond corporate advertising and individual sales, Facebook posts connected market prices to broader international political economy and documented the lived

experience of commodity trade. Commercialization took place in self-conscious ways that differed from typical social media advertising business models, demonstrating the complex relationships between farmers and markets.

The buying and selling of seeds, services, and crops on Facebook was shaped by Myanmar's broader liberalization. Under the socialist-authoritarian regime of the 1960s, '70s, and '80s, Myanmar practiced an isolationist foreign policy while encouraging domestic food production with quotas and fixed prices. Older farmers I worked with referred to this period as the era of the rice tax due to the pervasive practice of collecting a certain number of baskets of rice per acre to pay to officials. In the 1990s and early 2000s, a new regime turned away from socialism and allocated large-scale land concessions to military-connected elite in the name of food and energy security, for example for oil palm and jatropha. The turn towards democracy in the 2010s was accompanied by a turn to agricultural markets as a vehicle for the development of the country's agrarian population. The 2018 Myanmar Agriculture Development Strategy and Investment Plan, for example, outlined a vision premised on commercial expansion of crops and livestock production as well as increased access to international markets (Government of Myanmar 2018, ix). Online agrarian commerce both extended and reshaped longstanding practices of buying and selling that, in the 2010s, were super-charged by the embrace of agricultural markets.

On company pages, standard advertisements for machines and fertilizers were accompanied by creative marketing designed to foster interaction, for example in quizzes with small prizes that could be won after downloading an app, or announcements that anyone who liked and shared the post, took a screenshot, and sent it in would get sent phone credit. Other advertisements drew on existing cultural forms



Fig. 2 Professional advertisements including a promotional quiz about insecticides (left) and a traditional dance performance to be streamed on Facebook Live sponsored by a major agrochemical company (right)

popular in rural areas, for example with online broadcasts of traditional dance shows and livestreamed lucky draw lotteries (Fig. 2). By turning traditional entertainment forms into online advertisements and activities, agrochemical companies and social enterprises used Facebook pages to sell products and extend their reach. Major companies like Awba, Myanmar’s largest provider of agrochemicals, fertilizers, and seeds, published a steady stream of glossy photos, short essays, and cartoon videos on their pages, often providing agricultural advice alongside directives to buy. One smaller, family-run agricultural machinery company I interviewed explained that Facebook provided a way not only to promote products, for example with custom-made videos, but also to track competition, through platform analytics provided to Page administrators. The company also used Facebook to communicate with customers, scheduling staff shifts on Facebook messenger, and often chatting with migrant workers abroad saving up to buy machinery for their family farms back home. Social enterprises used similar social media methods to promote organic fertilizers and alternative agricultural practices. Notably, agrarian commerce did not take place on Facebook Marketplace, the platform’s designated arena for sales, nor did commercial entities take out advertisements, though some did pay to boost their posts. Rather than designated Facebook features, commercial behavior relied primarily on existing cultural forms and human labor. Like the Alternative Food Networks that Martindale (2021) studies in China, social media was a key channel for recruiting and retaining customers, with daily labor carried out by professional marketing staff.

While groups had roughly the same amount of promotional content as pages, the material had a distinctly different flavor, with farmers, machine-owners, and brokers extending localized networks of producers, traders and clients within the interactive community of the Facebook group. In the

manner of Craigslist postings, promotions were highly personalized, for example when a truck or combine harvester owner advertised crop transporter or harvest services with a photograph and brief text, or a farmer announced that he would soon harvest a certain rice variety and sell the seeds. Groups also served as a space for interested buyers, in ways that echoed newspaper classified sections: “Is there anyone who wants to sell a combine harvester with the price around 150 lahks,⁵ as I need it urgently?” one wrote, which yielded over 60 comments from potential sellers who provided contact information. Some promotions were extremely subtle, for example when authors posted photographs of flowers without captions, but answered questions in the comments about pricing and delivery. Such examples highlight the range of commercial interactions taking place on Facebook, from major corporations fostering brand loyalty to artisanal producers showcasing a limited supply of a particular crop.

Beyond sales, farmers’ Facebook provided a space to share market insights. Most notably, posts abounded with discussions of crop price. Bullet-pointed or photographed lists provided succinct updates of the going rate at major national markets or at international borders, for example in multiple posts of the day’s rate for various bean varieties. Other times, farmers shared extremely local information, for example documenting trading onions and chilli in regional markets with the total weight, going rate, and photographs of successful sales. Market prices were sometimes offered alongside rapid assessments of farmers’ prospects: “Though rice millers in Shwebo industrial zone buy Paw San [variety] rice (stored from rainy season) with 16 lahks, the farmers have to sell it with 14 lahks only,” or, alongside photos of the

⁵ Lahk is an Indian unit corresponding to 100,000; 150 lahks is 15 million Myanmar Kyat, or about US\$11,250 in December 2020.

harvest, “Today we harvest Shwepyi Thu Kha [variety] rice. The price is so good. They offer the price up to 8 lakhs.” Like Myanmar Facebook groups for buying and selling land, posts like these not only conveyed price information, but also performed the market itself while connecting brokers and producers in new ways (Wittekind and Faxon 2023).

Commentary linked daily prices and local accounts to global trade and to shifting national policies. For example, one post admonished farmers to plant properly and cultivate high-quality vegetables that could penetrate the international market in order for Myanmar farmers together to overcome the dependence on border trade and associated price fluctuations. Such posts reflected increased connection with global commodity markets, including and beyond long-standing trade at the Chinese, Indian, and Thai borders, during 2010s liberalization. In light of decades of international isolation, farmers and traders expressed both excitement and concern over the new opportunities and risks. Rumors abounded about imminent price spikes or collapses. Anti-Chinese sentiments permeated analyses that blamed farmers’ suffering on the exclusionary policies of Myanmar’s largest agricultural trading partner. Other posts requested the government provide a fair and guaranteed crop price for rice, sugar cane, and bananas, harkening back to domestic socialist policy. One post explained that in the city, tomatoes were sold for 1,500mmk per kilo, but farmers only got 200mmk, and were therefore forced to feed tomatoes to cows and remained mired in debt. “Forget about profit, farmers are not even getting a refund for their investment. Farmers feel this every year. There is no guarantee, no market for farmers. This country can never be rich without fulfilling these things to farmers.” Such demands suggest that, in Myanmar as elsewhere, small farmers’ notion of a good market is characterized not by responsiveness to supply and demand but rather dependable prices that could reliably support household living costs (Madsen 2022). Facebook was therefore a forum not only for sharing price updates, but also for analyzing, criticizing, and speculating about the broader political economy that produced price.

To better understand how agrarian commerce was enacted on Facebook, consider the watermelon. While watermelon is consumed domestically, particularly during March and April’s hot season, an estimated 90% of the crop goes to China (Kubo 2018). Over a decade, exports doubled; official statistics reported a jump from 238 thousand metric tons exported to China in 2011 to 533 thousand metric tons in 2016 (Kubo 2018). Each day during the dry months, with peak production in February, trucks full of the fruit grown in central Myanmar roll uphill from Mandalay into the wholesale market by the border town of Muse, where brokers auction the fruit to Chinese buyers. Facebook posts collected during the fruit’s planting and harvest season reported on the price for various qualities of watermelon. They also shared

information about conditions on the road and at the border market, for example in an announcement warning that trucks without a license would not be able to pass the border, and that watermelons could be damaged if they were moved to other, licensed, vehicles. Rumors circulated about new trade deals and their impacts of farmers:

Last week, the government signed a contract to trade watermelon to Singapore and Canada. Now, China offers to buy watermelon with double the price. We need to be aware of it. I think you remember that China refused to buy the watermelon at the border and many trucks of watermelon were damaged in the previous years. Now, China offers double price only when the market extends to other countries. Their intention is clear. They can influence as they like only when the market price is not stable in this country. So, don’t be greedy. Consider the global market for the long term.

Other posts explicitly called for stopping sales to China, recalling past border closures that had resulted in discarding massive quantities of unsold fruit on the Myanmar side of the border. One hoped for a new trade deal with the UAE that could provide a more stable and lucrative buyer, or “guarantee for [a farmer’s] whole life.” These speculations went beyond mere market information to analyze and imagine the future of the watermelon industry within Myanmar’s geopolitical trajectory.

Facebook also provided a forum to document present, lived realities of agrarian commerce. Each week, several of the top posts were live videos of the watermelon trade depicting the collection of fruits from farmers, packaging for storage and transport, and noisy traffic jams at the border (Fig. 3). A close analysis of one of these surprisingly popular amateur videos illustrates that they were not promotions aiming at sales but rather sensory accounts of the everyday experience of harvest and trade. In one 15-min video with over 5000 views, a young man in a surgical mask and a baseball hat begins with a selfie before switching the camera to reveal that he is sitting on the back of a truck lined with hay and filled with watermelons. The truck waits in a line surrounded by men in masks; Chinese characters are visible on the surrounding storefronts. The shooter pans the camera and makes occasional remarks into a walkie-talkie, counting something and declaring, “today the market is good.” Four minutes in, the truck moves forward and men in leather jackets with notebooks and pens peer over the sides and jump in the back of the truck. The camera goes black, and we hear shouts of “lai, lai, lai” calling the truck forward. When the image returns, flip flopped-feet are standing on the pile of fruit and a watermelon is cut in half to reveal the bright red flesh. For the next five minutes, a man cuts fruit, offering samples off the tip of his pocket knife. Eventually the filmmaker leaves the truck and begins walking through the

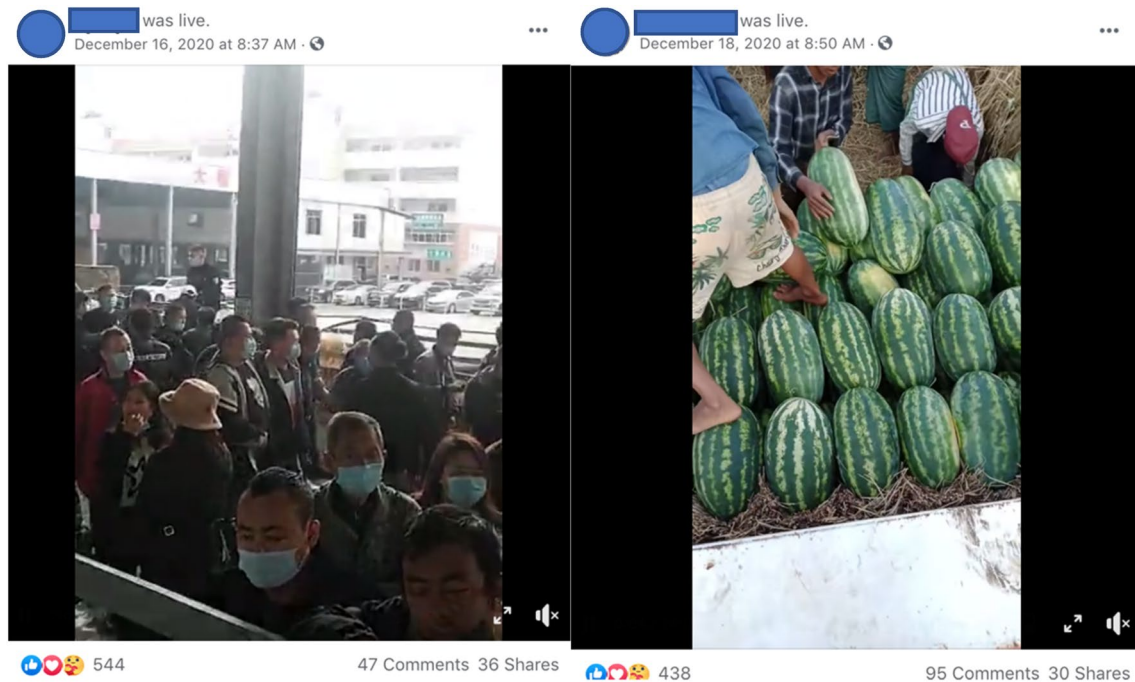


Fig. 3 Live videos of watermelon trading at the Myanmar-China border

crowd, down the line of trucks, which have Myanmar license plates. The image is shaky; occasionally fingers cover the camera. On the concrete, men, and a few women, in jeans, adidas track pants, high-tops, and Myanmar longyis stand around discussing commerce amidst a carnage of smashed watermelons. Besides them are motorcycles with Chinese license plates, beyond are multi-story concrete buildings, lines of trucks, and green hills. The live video ends with another selfie, walkie-talkie pinned to chest and surgical mask down. Comments ask questions, express surprise, and wish luck: “are you going for trading, big brother?” “tell a little about the conditions there, please” “which market are you at?” “there are a lot of cars!” “may you have good selling!” Framed with selfie shots and presented without narrative, the live video presents an autobiographical testimony of border trade. While people have many goals in producing Facebook content, including intimacy and popularity (Tobin et al. 2020; Park et al. 2011), in contexts characterized by oppression, banal posts, such as the selfie, are often careful, curated acts of self-expression that document everyday struggle and persistence (Nemer 2022).

Facebook pages and groups provided arenas for agrarian commerce in multiple forms at a moment in which Myanmar’s agricultural policy was increasingly focused on commercializing production and internationalizing trade. From corporate advertising to localized buying and selling, rice reports to rumors to livestreams, online agrarian commerce went beyond mere advertising or information to reflect the rich social life and geopolitics of trade. While the

social media presence of entrenched corporate agriculture firms was substantial, Facebook also provided a forum for traders, machine-owners, truck-drivers and larger farmers to build their businesses, spurring capitalism from below. Facebook brought its users closer to agricultural markets in both predictable and unexpected ways, advertising products and updating price even as it provided a space to document, reflect on, and critique the structures and daily experiences of the agrarian economy. Rather than another story about the commodification of online user data to accrue platform profits, Myanmar farmers’ Facebook evidences the specific dynamics of post-socialist commercialization as well as the broader continuation of smallholders’ uneven integration into global markets.

Knowledge

Rice varieties, chilis, onions and watermelons appeared not only as commodities, but also as plants requiring treatment and care. The most common type of post in farmers’ Facebook pages and groups was agricultural advice, a category that included giving or requesting advice about planting, harvesting, making and applying fertilizers, and other aspects of farming. On corporate pages, agricultural advice was often linked to advertising, for example in product descriptions and instructions, weekly discussions with employees about pesticide and fertilizer applications and other farming practices, or advertisements that included food safety and public

health information about COVID-19. On groups, agricultural advice came from individual farmers or agricultural extension agents who shared methods and techniques, usually without an intention to sell. Groups organized around particular crops, whether bamboo, avocados, or rice, conducted animated discussions of cultivation techniques, while others focused on tractors and combine harvesters traded tips about the use and maintenance of these relatively new machines. Groups with titles like, “From traditional to modern agriculture,” and “Sharing creative farming methods,” focused explicitly on collective education, sharing fertilizer recipes, transplantation and mechanical tips, and at-home pest remedies for healthier plants and more successful harvests. Facebook farming advice was not merely agronomical or ecological, but also frequently tied into structural critiques and embodied experience.

The popularity of these social media tips must be read within the historical dearth of agricultural extension. During ethnographic research in Myanmar’s rural northwest, provincial officials told me frankly that they rarely left their urban offices, while most farmers explained that they actively avoided civil servants. Many smallholders had witnessed, or directly experienced, coercive taxation practices and dispossession at the hands of men in uniform; they had no expectation of state support. In this context, it was family members, neighbors, and corporate staff to whom farmers turned for farming advice, for example calling up the employee who had sold them seeds for tips on how to manage a new type of crop. Facebook provided a platform to share this advice more widely, and in doing so made visible alternative forms of agricultural expertise.

This is not to say that the government was absent from Facebook. Two of the most popular pages were the Department of Meteorology & Hydrology, which posted frequent short updates about national rain patterns, earthquakes, and weather, and the Sagaing Region Department of Agriculture, which provided photographs and descriptions from trainings, meetings, inspections, donations and other activities carried out across one of the country’s largest regions. Posts on government pages were often recirculated and discussed in other groups, for example a widely-shared post from the Ministry of Agriculture, Livestock, and Irrigation listing 266 prohibited fertilizers. But groups also provided space to debate policies or share additional thoughts, for example in an active discussion over a particular brand of input promoted by a multi-level marketing company called “Successmore,” which yielded both strong criticism of MLM companies and interest in the product. While grassroots agricultural advice was not always verifiable and sometimes raised concerns—for example a post explaining that a certain type of leaf could heal snake bite, so farmers did not need to spend money by going to the hospital—it provided farmers with the type of insights and ongoing conversation that the state,

with its one-way broadcast of selective information or documentation of activities, did not.

Farmers increasingly used Facebook to look to amateurs for agricultural advice. Popular posts explained ways of planting okra and chrysanthemums, or methods for tying up plants to prevent damage. Certain users became prolific posters, for example one who posted long descriptions and photographs of seedling care, how to cultivate papaya, and instructions on making fruit supplements in a group called “Agricultural Technology” and then shared them across multiple different groups. Others were specialists, for example one with the username “Teacher [x]” who posted prolifically across multiple groups about his experience growing mushrooms, pairing images of the care and collection process with tips for cultivation and offers to sell mushrooms (Fig. 4). Another group, called “Wisara Agriculture Education” orbited around a single charismatic administrator and agronomist, who responded to questions in a manner roughly analogous to a newspaper advice column. “Dear Teacher, there are a lot of weeds on my carrot farm,” one wrote, “Will the carrot plants die if I spray the weed killer?” The teacher replied that any herbicide would affect the carrot plants at this stage, and it would be better to spray earlier in the crop cycle. This friendly, tailored advice contrasted with the formal, time-consuming, and often unsuccessful process of soliciting help from a regional government agent.

Male teachers dispensing farming wisdom undermined state claims to agricultural expertise while simultaneously reinforcing patriarchal authority. Notably, the vast majority of the self-identified teachers were male, a practice consistent with the typical association of “farmer” with “man” in Myanmar (Faxon 2017). Images shared on the groups, for example those depicting men carrying water and plowing while women plant or weed, both reflected and reinforced typical gendered divisions of labor in the countryside. Anxiety about potential disruptions to traditional gender roles was also apparent in jokes about the arrival of new machines, discussed below, which are typically owned and operated by men. Wildly popular videos featured women in skirts driving tractors through farmland with captions like, “after buying tractors,” and, “bought a tractor and then...” The presence of such media alongside operational tips highlights the ways in which encouragements of technological innovation came hand-in-hand with the reinforcement of old gender norms about the way things are done on the farm.

These videos made up a small portion of a large number of posts that debated, celebrated and offered tips for new farm equipment. Agricultural mechanization increased dramatically in the 2010s, with threshers, tractors, and combine harvesters proliferating across the country and the number of machinery supply outlets increasing 338% from 2008 to 2018. While large landowners were often the owners of new machines for land preparation and harvesting, both large



Fig. 4 Informational posts about mushroom cultivation and harvesting, signed by Teacher [x]

and small farmers accessed machines through a robust rental market, dominated by informal small businesses that leveraged social ties to provision services (Belton et al. 2021). Facebook groups devoted to tractors and combine harvesters served both as a marketing platform and a forum for information-sharing. Groups featured discussions of driving techniques and fuel usage, as well as how to manage rental businesses. Insights into the nascent industry and practical repair tips were interspersed with advertisements and jokes, for example in videos of backhoe crashes or combine harvesters stuck in the mud. Sometimes, advice took the form of first-person accounts of the struggles of managing new technologies as a machine owners:

Machine owners, be aware of this! I rented my combine harvesters to other regions with my driver. Then, I couldn't go there due to restrictions on movement because of Covid-19. The farmers there will have difficulty if I bring my machines back. So, I let the driver to harvest the rice alone. Then, I had to bring those machines back before finishing all the farmlands there. My two machines harvested 143 acres all together. I got 42 receipts for buying extra tools and only 2 lakhs after paying for driver fees. Then, I couldn't contact him later. I also had to spend 15 lakhs to repair my machines. I don't want to blame anyone. This is just for your information so that you can be aware of. So, it'd be better to bring back your

machine if you cannot send your trusted one with the machines for harvest in other regions.

Advice like this was most relevant to a select group of male, middle-class machine owners, as emphasized in a series of memes expressing the opinion that only the rich could afford to buy and use tractors. Experiential advice and meme-ified class analysis further emphasized that agrarian knowledge circulating on Facebook emerged from, and was received and evaluated according to, offline social locations.

Farming advice also reflected awareness of broader structural conditions and presented an opportunity to advance alternative visions. Posts discussed managing irrigation and water shortages in the context of aging infrastructure and a changing climate. Others provided links to an application for measuring acreage with satellite imagery, an attractive option in contrast to notoriously unreliable land documents. Discussions of rural development frequently compared Myanmar to other countries. In one post, an author contrasted Myanmar's production and trading system with Thailand, China, Japan and Korea, discussing import policy, cultivation techniques, and labor hiring costs. Another discussed an agricultural technology in Israel to extract nutrients from sand and salt water, arguing that, with far richer soils and abundant water, Myanmar could be very wealthy if only it was united and driven. Such commentaries insist on embedding farming innovation within global political economy and domestic politics. Social media also provided

a forum to advance alternatives to industrial agriculture. Posts featuring tips on using coconut water or sucker fish as homemade fertilizer represent efforts to break dependency on chemical inputs and repurpose waste products from the local environment. Groups focused on organic farming provided tips on making soil supplements and plant food, often framing these practices in terms of human health in the context of unreliable and underregulated inputs and growing concerns over food safety.

More broadly, Facebook groups provided forums for debate about the future of farming. One popular post featured an interview with a director of a rural development organization, who discussed the performance of the government for agricultural development during the NLD period (2015–2020) and suggestions for the next five years. The interviewee highlighted the need to go beyond modest increases in the available amounts of agricultural loans to enact sweeping reforms to improve farmers' lives. In the comments, users chimed in with other suggestions. One wrote:

Thank you for supporting the farmers, who are suffering not only from weather conditions but also the exorbitant prices by oil and pesticide companies. My personal opinion is that there are a lot of fertilizers and pesticides around these days and the more they advertise, the higher prices the farmers have to pay.

Another advocated for stronger farmers' unions and good leaders in government. A person who identified themselves as a former creditor shared:

After getting the government loan, instead of using it for farming, the farmers have to use it to pay back other debts. And we do not get high prices for our crops. Standardizing crop prices, agricultural technology, agricultural machinery, knowledge, skills: only by taking a multi-pronged approach, including other low-income jobs, can farmers' lives improve.

Such accounts, aired in public and online, contrast with secrecy and silence under military rule. But they also contrast with typical understanding of agricultural extension or digital information, which emphasize objectivity and transferability. Interspersed with broad structural critique, advice about what fertilizers to use and how to rent out machines was rooted in an awareness of the particular opportunities and constraints of Myanmar agriculture.

Facebook farming advice was also deeply personal. Groups with names like, "The farmers will share the practical difficulties and successes," and "The space for farmers to share their feelings" went beyond trading tips to foster celebration, frustration, and debate. Almost half of the top posts in farmers' Facebook groups shared farmers' achievements. Photographs of colorful flowers and vegetables, sometimes

interspersed with portraits of farmers at work or standing in front of their fields, provided an intimate picture of agrarian life and celebrated the beauty of rural landscapes. While sometimes these images served as promotions, with sales of homegrown plants taking place in comment chains, they also provoked compliments, congratulations and encouragements. Facebook provided a forum not only for showcasing successes but also for sharing struggles. Images of farmlands, harvest activities, and individuals were sometimes accompanied by long, poetic texts expressing the difficult lives of farmers and tractor drivers. Agricultural advice posts yielded comments complaining about the costs of inputs, demanding better irrigation, or expressing frustration that only company owners and product owners, not farmers, could ever get rich. Rather than the efficient communication of disembodied information, Facebook fostered personalized, often emotional exchanges that emerged from everyday joys and frustrations, as comments built community through interaction, debate and affirmation.

As small farmers, machine owners, and corporate staff took to social media to exchange agricultural advice in the context of a historical lack of state support, they fostered a new type of online agrarian community that expressed embodied knowledge and debated the future of farming. To highlight the social qualities of these online spaces is not to romanticize them as egalitarian; discussions of ideal techniques were likely confined to better-off farmers and reproduced patriarchal forms of agrarian expertise. Yet whether by advancing organic farming or encouraging mechanization, the authors of these posts repurposed the platform. As a key venue for cultivation tips that fostered wider sharing of experiences and opinions, Facebook was *appropriated agritech*.

Discussion

In the wake of rapid internet adoption in Myanmar, a robust conversation about farming was taking place online across Facebook pages and groups. These interactions brought producers closer to the market in multiple ways, from exposure to corporate advertising to solicitations for services to documentation of the daily experiences of border trade. They also provided a platform for personalized agricultural advice in the absence of public extension services and for broader discussion over the directions of Myanmar agriculture. Simultaneously a platform for selling seeds, seeking advice, and cultivating solidarity, Facebook posts went beyond commercial or agronomic information to share structural critiques and embodied experiences. In the hands of Myanmar smallholders and those they buy from and work with, Facebook was *appropriated agritech*, a generic technology repurposed for agrarian ends.

This argument has several implications for scholarship on digital agriculture. First, it decenters design, emphasizing everyday innovation. This suggests that it is not engineers, but rather farmers, that ultimately define agritech. The consequence is expanded empirical focus to include not only technologies intended for the fields, but also those actually used to support farm livelihoods. In some cases, this may mean stepping back from purpose-built platforms, vast datasets and “cutting edge” AI to document and analyze the more banal ways that various actors in specific contexts are refusing, reinterpreting, or redeploying digital technologies in everyday life. As Kelly Bronson (2022, p. 113) notes, attention to various data practices throws a wrench in seemingly inevitable visions of *the* future, opening space for alternatives. Second, this analysis redefines the purpose of digital agriculture, emphasizing the inherently social and situated nature of information. Myanmar Farmers’ Facebook use was not primarily about increasing yield per acre, rather, they used the platform to promote products, find services, stay up-to-date on market prices and border closures, share advice, speculate on geopolitics, vent frustration, dream of the future, and kill time. Characterizing how agrarian actors interacted on social media therefore provides an expanded sense of the possible goals and values of agritech.

While the opening vignette from the Cornell Initiative for Digital Agriculture makes clear the popularity of smart phones and social media across the global countryside, every use of digital technology is not automatically agritech. Here, online commerce and knowledge became tightly integrated with activities in the fields and in the market, inextricably linking online exchange to offline farming. These patterns will vary substantially across agrarian political economies and platforms, for example when large, transnational farmers use LinkedIn to cultivate international partners, brokers chat in private Whatsapp groups in Brazil or on censored WeChat networks in China, or small farmers transact with M-Pesa in Kenya. Agrarian structures, including the prevalence of small farmers, the turn towards commercialization, and the historic lack of extension support, formed the conditions of possibility for online connections. The particular affordances of Facebook, including its public, multimedia nature and the interactive qualities of groups as opposed to pages, shaped the type of activities that emerged. While the concept could be applied to technologies beyond social media, doing so would demand demonstrating the ways in which non-agricultural objects were redesigned for agrarian ends. More research across sites and platforms, as well as studies that connect online activities to offline positionalities by interviewing administrators and frequent posters, is necessary to articulate the dimensions and determine the conceptual mobility of appropriated agritech.

Appropriated technology is not necessarily emancipatory technology. Farmers may take to online forums to express

exclusionary and offensive political views (Jones-Garcia and Touboulic 2021). Patterns of online activity can shore up existing inequalities in agrarian society. In Myanmar, national agrochemical corporations used the platform to strengthen brand loyalty and machine-owners, traders, and larger landowners appeared to make up a large share of active users. While agricultural advice filled a long-standing gap in extension services, it also reinforced norms of masculine expertise. Such findings suggest that while social media does not necessarily determine a specific type of accumulation, it does stand to benefit those already advantaged culturally and materially. Chief among these, of course, is Meta. Like rural repair of the car or Native use of the radio tower, appropriation does not erase the capitalist and colonial systems through which digital technologies are forged. While, to my knowledge, Meta did not target Myanmar farmers, their Facebook activity meant more user traffic and platform power, at least temporarily. In Myanmar, both farmer and Facebook agency was soon severely restricted by the realities of violent authoritarian repression. In the immediate aftermath of a military coup in February 2021, the pages and groups in this study abounded with expressions of agrarian resistance, but eventually the regime’s outlawing of Facebook and VPNs, internet blackouts, targeted arrest of social media influences, and widespread, brutal crackdowns on civilians restricted internet use in general, and political expression almost completely (Faxon et al. 2023). Read alongside Darren Byler’s (2022) account of how social media was initially embraced by Uyghur men in China seeking a transnational religious community, then turned against them by the Chinese surveillance state, this trajectory highlights the limitations of appropriation in contexts of political violence, as well as the importance of studying these processes as they unfold over time.

Conclusion

This paper has contributed an alternative account of the relationships between farming and technology by highlighting the ways in which social media can be remade as a form of digital agriculture. I have analyzed how Myanmar farmers, tractor-owners, traders, truck-drivers, agrochemical companies, entrepreneurs and agronomists incorporated generic digital technology into existing circuits of agrarian exchange and innovation, renovating Facebook into a site of commercialization, critique and collective wisdom. While the platform’s design enabled certain types of interactions, the uses and usefulness of pages and groups were adapted to Myanmar’s particular agrarian context. Positioning Myanmar farmers’ Facebook use as appropriation expands our understanding of agritech by decentring design and highlighting the expanded possibilities and purposes of everyday innovation. Without abandoning critical scrutiny of powerful actors, appropriated agritech centers the creative adaptations of small farmers, provincializing big tech.

Acknowledgements I am grateful to Kay Zak Wine, Van Tran, Swan Ye Htut, Kenda Kintzi, and other members of our research team for their invaluable assistance in data collection and preliminary analysis. Ryan Nehring and members of the Science and Technology Studies Food and Agriculture Network provided helpful feedback that greatly improved the manuscript.

Declarations

Competing interests Data collection and preliminary analysis was funded by a grant from Facebook Research on digital literacy, demographics and misinformation in Myanmar. The grant was given as an unrestricted gift to a local organization in Myanmar. And Facebook had no control, oversight, or involvement in the research process. This source of funding has not affected analysis or findings.

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