Beacon

A series of key messages from works by academics useful for tackling industrial animal agriculture in developing countries

TINY BEAM FUND

Issue 9 | August 2026

Six studies are featured. They cover:

1. Bangladesh's thriving local chicken value chain threatened by imported breeds.
2. South African black smallholder farmers' participation in industrial beef production.
3. Food system transformation needs everybody from the top and the bottom.
4. Efficiency changes in Chinese broiler farms after shifting from pig production.
5. Farmed fish and wild-caught fish in Myanmar are part of a single system.
6. Local Mexican farmers harmed by maize grown to feed industrial animals.

Learn more about Beacon

Please share *Beacon* with your colleagues and networks.
You can find it on our website's home page: tinybeamfund.org
To subscribe, contact: min@tinybeamfund.org

Table of Contents:

Brief mention (non-academic reports)

1 Hennessey, M. et al. **"Rise of the golden chicken: tracking Bangladeshi Sonali production amid global poultry transformation."** *Agriculture and Human Values* 43.2 (2026): 94. link.

Bangladeshi chicken production is at a crossroads: a thriving local chicken value chain faces encroachment by large corporations using proprietary, imported breeds.

Roughly a third of the chicken consumed in Bangladesh is from the Sonali breed - relatively slow-growing "local" chickens valued for their taste and texture. Large companies are attempting to introduce industrially-produced mimics, which risks reshaping Bangladesh's poultry sector to be both less resilient and more firmly under the influence of big corporations.

- Sonali chickens are hatched in independent and state-run hatcheries, sold by a network of dealers, and raised by independent farmers. Production takes place in a competitive market that includes many relatively small actors.
- These birds fetch higher prices than industrial broilers but they are not well-suited for production in very large-scale, standardized facilities. This creates an incentive for broiler corporations to enter the market with substitutes that can be produced industrially, such as the "Hubbard Premium Color" breed.
- Meat from these breeds is similar to that of the Sonali, but their genetics are owned by the handful of companies that already control most of the world's chicken genetics.
- Encroaching on Sonali chicken production with such breeds would likely reduce farmers' autonomy, increase corporate concentration, and increase the influence of large companies over Bangladesh's government and food system in general.

Why is this academic study particularly useful for addressing 'burning questions'?

It is relevant to two questions:

PROD 3: How does the introduction of high-productivity commercial breeds (that require controlled environments) versus indigenous breeds impact animal welfare, smallholder economic resilience, and input requirements (feed, water, energy, etc.) in LMICs?

- The paper describes how, when commercial breeds are introduced, smallholders tend to become dependent on a few large companies for chicks and other inputs, often through contracts that are more favorable to the company than the farmer.
- In Bangladesh the commercial breeds may largely replace local birds. If this happens, a network of independent businesses and their knowledge of poultry production may disappear.
- Bangladesh is particularly relevant because it is now at a critical juncture. *Other LMICs may soon be in a similar position.* This paper lays out both the underlying forces and drivers and the wider societal consequences of these developments, helping those concerned about such changes recognize similar dynamics occurring elsewhere.

CON 2: To what extent does increased industrial production of animal-sourced foods in LMICs actively drive consumption of these foods (supply-induced demand), or does it merely respond to existing demand?

- The paper shows how industrialization can be driven by corporate strategy rather than consumer preferences.
- Bangladeshi consumers are not demanding the Hubbard Premium Color chicken; it is being introduced as a way for large broiler companies to capture market share.
- Those who wish to resist industrialization need to understand what shapes these corporate decisions, and what their effects are likely to be.

Deeper Dive

1. Types of chicken production in Bangladesh

- Broadly speaking there are three chicken production systems in Bangladesh: backyard chickens, commercial Sonalis, and industrial broilers. The country produces around 500 million broilers and 150 million Sonali chickens each year.
- Both Sonali and broiler production rely on imported feed, but the structure of each sector is quite different.
- Industrial broilers belong to a handful of breeds owned by two overseas companies, Tyson Foods and EWG. Chick breeding is carried out by a relatively small number of companies licensed to produce these birds, such as Kazi Farms which produces 17% of day-old broiler chicks in Bangladesh.
- In contrast, Sonali genetics are public; that is, they can be bred by anyone. Production is "semi-autonomous and decentralised", involving independent hatcheries, chick and feed dealers, smallholder farmers, etc.
- Bangladeshi consumers will pay more for Sonali chicken. This is partly because of its perceived superior taste, but also because of concerns about the use of antibiotics and waste products in industrial broiler production.

2. Replacing the Sonali chicken?

- The broiler companies would like to obtain the high price commanded by Sonali chickens, but their diverse genetics and lower feed conversion efficiency mean that Sonalis do not perform well in industrial systems.
- However, the three global companies that dominate poultry genetics (EWG, Tyson Foods, and Hendrix Genetics) produce some breeds with similar meat quality that can be raised in large-scale, standardized, facilities. International firms interested in the Sonali market have begun to import these birds.

3. The surprising power of chicken genetics

- The consequences of this move may be far-reaching, and they stem from the genetics that poultry production is based on - whether open, like the Sonali, or tightly controlled, like the industrial substitute breeds. The paper argues that what may seem like a narrow, technical issue in fact has many downstream effects.
- In Bangladesh's current industrial broiler system:
    - The handful of companies which control breeding have repeatedly been accused of colluding to raise prices of day-old-chicks.
    - Contract farming (where companies supply chicks and other inputs to farmers and pay for the grown birds) is becoming more common. While this can have advantages for farmers, it can also leave them vulnerable to powerful companies who may not act in farmers' best interests.
    - Large poultry companies may be able to shape regulation and policy in their favor. For example they were involved in drafting the government's new Poultry Policy, while consumer rights advocates were not.

- As Sonali production is not dominated by large companies in the same way, it is less susceptible to these phenomena. But if companies are successful in encroaching on this system with imported breeds, they may gain increasing power to shape Bangladesh’s food system to suit their own interests.
- This may also trade a resilient, locally-controlled system for a potentially more fragile one. Uniform genetics heighten disease risks, farming knowledge becomes centralized within a few companies, and production may become tied to foreign investment that can withdraw if it stops being profitable.

4. What can be done?

- The authors suggest that government investment in high-quality Sonali breeding stock and in supporting the small- and medium-sized enterprises involved in Sonali production would help this system persist. Stronger rules and enforcement around competition and corporate concentration are also needed.
- Such efforts grow harder the longer they are left. As large producers gain economic weight, the government's willingness and capacity to rein them in tends to weaken.

2

Bowman, Andrew, and Andrew Bennie. **"The industrialisation of meat and its implications: Exploring governance, power, and inclusion in the South African beef value chain."** *European Journal of Development Research* (2026) 1-23. link.

The industrial nature of South African beef production determines how smallholders can participate, with far-reaching effects on farming practices, market access, rural communities, and more.

Government and industry in South Africa wish to integrate more smallholder cattle farmers, who are predominantly Black, into a commercial beef value chain that experiences constant pressures to consolidate and intensify. But to succeed commercially, Black smallholders must make fundamental changes to how they raise cattle, while facing discrimination and possessing little bargaining power.

- South Africa's long-standing racial inequities persist in its cattle production sector: a predominantly white-owned, capital-intensive, industrial beef industry exists alongside mainly Black, small-scale cattle farming in regions of high rural poverty.
- Integrating smallholders into the commercial value chain could in theory give them better prices, opportunities to grow, and incentives to improve their production practices, while increasing the supply of cattle to feedlots.
- However, industrial production demands cattle types and biosecurity practices that are fundamentally incompatible with the "whys" and "hows" of much smallholder cattle-raising.
- Those smallholders who do participate tend to have little power to bargain with large companies or to influence the industrial system to be more suited to their needs.
- Changing the smallholder system to allow farmers to more fully participate in industrial production may benefit the relatively well-off at the expense of the most marginalized.
- Policies that recognized smallholder cattle-raising as valuable in its own right, instead of a single-minded focus on expanding commercial production, would likely achieve more equitable outcomes.

Why is this academic study particularly useful for addressing 'burning questions'?

- It is relevant to ECON 1: "How does corporate consolidation in the animal feed and processing sectors shape the contractual models (such as outgrower schemes or contract farming) through which smallholders are integrated into supply chains? Does this lead to genuine economic autonomy or eventual marginalization and displacement?"
- The paper uses interviews with people throughout the South African beef value chain to illustrate what is shaping the system and how smallholders are affected.
- It shows how industrialization and corporate concentration change what type of cattle are bought, from where/whom, and how power asymmetries and racial discrimination mean that participating in industrial production may not bring as many benefits as expected for smaller commercial farmers.

- The authors describe elements of smallholder cattle production that may not be obvious to outsiders, such as how mixing of animals from different herds on common grazing land is not compatible with feedlots' biosecurity requirements.
- They explain how, *even if these "problems" with traditional smallholder systems can be "fixed", outcomes for some smallholders may be marginalization and displacement rather than genuine economic autonomy.*

Deeper Dive

1. How commercial cattle production works in South Africa

- South Africa produces 18 kg of beef per capita, close to the level consumed in high-income countries. Most of this is consumed domestically, but the industry is attempting to *increase exports*.
- South African beef comes from three sources: large-scale, commercial farmers; "emerging" or quasi-commercial, smaller farmers; and 500,000+ smallholders who keep herds for subsistence or semi-commercial purposes.
- In the large-scale, commercial system, cattle start on grass then are sold to feedlots at 6-9 months for fattening. There are around 100 large feedlots (> 1000 cattle) in South Africa, alongside numerous smaller operations.

2. Concentration in the feedlot industry is high and growing

- The top 10 feedlots account for 70% of revenue, and one company, Karan Beef, claims to operate the world's largest feedlot (150,000 cattle).
- The companies operating the large feedlots also own feed mills, slaughterhouses, meat processing facilities, and sometimes brands and retail operations as well. This gives them considerable power to dictate terms to their suppliers.
- Still, *feedlots are under pressure to cut costs*. Global market dynamics and climate variability can increase the price of cattle and feed, consumers are increasingly choosing less expensive proteins over beef, and supermarkets are able to bargain for low prices.
- Firms therefore have an incentive to grow larger to take advantage of economies of scale, including by acquiring smaller companies, so *concentration in the industry tends to increase*.

3. What feedlots want from their suppliers

- To keep costs low, feedlots require animals that can be quickly grown to slaughter weight using as little feed as possible. The ideal animals are young and from breeds developed for high feed conversion efficiency.
- Feedlots are also at high risk of disease outbreaks, which are both costly and limit access to export markets, so they are increasingly concerned about biosecurity.
- They are implementing traceability schemes, selecting animals from disease-free areas, restricting animal movements and mixing, and buying animals via agents rather than at auctions.
- Some of these demands are strict requirements, others radiate out to set expectations and establish norms for South African cattle-raising in general.

4. Smallholder cattle-raising does not simply "slot into" this system

- Smallholders' cattle provide food but are also a means of storing wealth and managing risk, and play a role in ceremonies such as funerals. They have to thrive in harsh environments with little access to veterinary care, etc.

- The animals therefore have very different attributes compared to commercial beef cattle. Different breeds are preferred; the animals tend to be sold at older ages; and they may have characteristics such as horns that are not valued in pure beef cattle.
- In addition, the cattle are frequently grazed on common land without fencing, so herds intermingle, and practices such as controlled breeding and full vaccination coverage are difficult to implement.
- Smallholder cattle-raising and industrial beef production might both involve cows and meat, but they are fundamentally different systems that are not naturally compatible.
- When Black smallholders do sell cattle commercially they often face discriminatory pricing, and sometimes even sell through white intermediaries to achieve a fairer price.

5. Changes may create new problems without solving existing ones

- Changes like dividing communal land into enclosed plots could enable more smallholders to participate in commercial cattle-raising, but *the risk is that local elites would benefit at the expense of poorer farmers*.
- In addition, *this would not remedy racial discrimination or the power imbalances between smallholders and the much larger companies in the system.*

3 Conti, Constanza, et al. **"Top-down vs bottom-up processes: A systematic review clarifying roles and patterns of interactions in food system transformation."** *Global Food Security* 44 (2025): 100833. link.

Food system transformation needs everybody: no single actor, either top-down or bottom-up, can achieve transformation on their own.

Efforts to transform food systems for sustainability can be top-down (initiated by governments, universities, international development organizations, etc.) or bottom-up (led by farmers, community groups, etc.). As many interconnected changes - in technologies, infrastructure, policies, social norms, etc. - are needed, actors of both types must work together if they are to achieve change.

- To understand how top-down and bottom-up actors can work *together* to achieve successful food systems transformations, this article reviewed 40 case studies in 24 countries.
- Sometimes, bottom-up actors mobilized to address local challenges, then engaged with top-down actors to gain traction and legitimacy.
    - Brazil's Ecovida network successfully implemented agroecology in their communities, then worked with policymakers to establish supportive regulations, market support, and infrastructure.
- Elsewhere, top-down actors implemented new priorities, research agendas, and investments, but real progress was only made once farmers and others were involved.
    - The Irish government's nature conservation policies were not widely implemented until local advisory services were set up to engage directly with farmers.
- Occasionally, both types of actors recognized problems at roughly the same time and collaborated to solve them.
    - The Senegalese government actively supported the grass-roots Ecovillage movement by providing access to seeds, solar power, and irrigation infrastructure.
- Rather than thinking in terms of actors and their traditional roles, the authors recommend that we take a broad view of the *functions* that are needed to transform a system: generating knowledge, facilitating access to technology, reducing risk, etc.
- These functions can sometimes arise in unexpected places, such as NGOs stepping in where government capacity is limited, revealing possibilities a roles-based approach may miss.

4 Guo, Donghao, Xinyue Zhuo, and Hua Pu. **"Dynamic changes and heterogeneity in technical efficiency of broiler production under African swine fever shocks: Evidence from production organization and farm size."** *Poultry Science* (2026): 107203. link.

When an African Swine Fever outbreak in China shifted production from pork to chicken, the efficiency of large, small, contract, and non-contract broiler farms changed in different ways.

How does switching production between animal types work in practice? When African Swine Fever pushed China from pork toward chicken, expanding broiler production proved uneven: efficiency fell and rose in stages, and mid-scale farms adapted most readily.

- A natural experiment occurred in China following an outbreak of African Swine Fever in 2018. As pork prices rose, broiler production increased. The share of chicken in China's meat supply rose from 23% to 31% by 2020, while that of pork fell from 63% to 54%.
- This paper examines the shift through the lens of technical efficiency, a farm's actual output as a fraction of its maximum possible output (assuming identical inputs).
- Broiler farms saw an opportunity to profit by increasing production, but they also faced higher feed, chick, and biosecurity costs, as well as the management challenge of expanding quickly.
- Efficiency dropped as farms responded to the initial shock; then increased as they adapted to the new situation; then later fell again slightly.
- Mid-scale farms (30,000 - 100,000 birds per year) adjusted best, with the smallest drop and largest rise in efficiency. Smaller farms had less capacity to capitalize on this opportunity, and larger farms' management structures may have been too complex to allow quick adaptation. Contract farms were more efficient overall, but were less flexible than non-contract farms.
- *Understanding and speaking knowledgeably about such effects helps advocates build credibility, assess tradeoffs, respond to industry talking points, and devise workable solutions.*

5 Tezzo, Xavier. **"Food systems see fish, not fisheries and aquaculture."** *Singapore Journal of Tropical Geography*, 46.2 (2025): 253-262. link.

Farmed fish and wild-caught fish in Myanmar are closely linked through shared water, markets, and food culture. They are part of a single system, not separate sectors.

Separating fish into wild-caught vs farmed, and thinking only about production (e.g. "supporting aquaculture" or "managing capture fisheries") misses important characteristics of Myanmar's present-day aquatic food system. A more systems-minded approach could benefit people throughout the value chain - not just producers - and improve equity and sustainability.

- Myanmar's aquatic food system is transforming in several ways.
  - Common land and water resources are being enclosed and privatized, new fishponds constructed, and aquaculture production intensified.
  - Large, vertically-integrated companies, whose existence is enabled partly by the privatization of common resources, now control major portions of both wild and farmed fish supply chains.
  - Fish used to be consumed locally and seasonally. Now, aquaculture enables production at any time of year, while improved roads and cold chains allow transportation over large distances.
- Aquaculture products are becoming assimilated into traditional fish-related culture. Fish balls, traditionally a delicacy made from wild fish, are now (also) a mass-produced food made from farmed fish.
- This means that *aquaculture and capture fisheries are closely intertwined*. They require some of the same resources, compete for space, are driven by similar forces, and are sold in the same markets.
- In addition, *production, distribution, and consumption are "interrelated… processes unfolding in the same system"*.
- The author argues that taking an integrated, system-based perspective could help identify interventions that benefit participants at more points in the value chain. It would also highlight the inequities and power imbalances that shape who controls and benefits from aquatic resources, and emphasize sustainability in addition to productivity.

6 Mejía, Enrique Antonio. **"Priced out: Living in the shadow of industrial animal feed."** Tiny Beam Fund, 2026. link.

A hidden consequence of industrial food animal production is its negative impact on local farmers of white maize grown for human food in central Mexico.

Small-scale farmers of WHITE maize grown for human food in central Mexico cannot sell their maize at a price that covers their cost to grow it. The price of their maize is set in the U.S. for a different kind of maize - YELLOW maize - grown to feed industrially-raised animals. And the price of yellow maize is always kept low to produce cheap meat.

- In the state of Guanajuato in central Mexico smallholder farmers grow WHITE maize used for human food (such as making tortillas). But the price they get for their maize is not connected to how much it costs them to grow it. Instead the price of their white maize is based on futures contracts on the Chicago Board of Trade in the U.S. Those contracts price a different type of maize - YELLOW maize grown in the United States. *This yellow maize is imported into Mexico to feed animals raised in industrial facilities.*
- The price of yellow maize is *always lower* than that of white maize; it is exported at prices averaging 14 percent below production costs, kept cheap for industrial food animal production. As a result, farmers of white maize in Guanajauto are being priced out of their livelihoods.
- The connection of white maize in Mexico with yellow maize in the U.S. and with the Chicago Board of Trade was not always there. It was built over eighty years through a series of *deliberate policy decisions* that dismantled government price supports and opened Mexico's borders to cheap American imports.
- To change course: Start with the real cost of growing white maize in Guanajuato, not creating cheap meat. Make the guaranteed price for white maize actually attainable. Give maize farmers more options to sell to. Map and fund criollo (native /heirloom) maize conservation. Support rural community organizations. Understand the impacts of the industrial grain-oilseed-livestock complex and the pursuit of cheap meat.

Brief mention (non-academic reports):

1 *Poultry demand in the Yangtze River Delta.* USDA, Global Agricultural Information Network (GAIN), 2026. link.

- Introduction/Market Overview: "The Yangtze River Delta region (Shanghai, Jiangsu, Zhejiang, and Anhui) represents about a quarter of China's overall GDP. Its main city, Shanghai, is the single-largest city in China by nominal GDP (approx. $800 billion in 2025). The Yangtze River Delta region's average per capita disposable income is 1.5 times the national average level, which drives strong and stable demand for higher value imported animal-protein foods."
- "Historically, China has been a dominant pork consumer. In recent years, however, poultry has been steadily gaining ground as an alternative, driven by its affordability and perceived nutritional benefits. Data from the Chinese National Statistics Bureau show that per capita poultry consumption increased from 8.4 kg (18.5 lb) in 2015 to 12.5 kg (27.6 lb) in 2024—implying the average Chinese consumer in recent years eats about 1.5 times as much poultry as they did a decade ago."

2 *Drivers of supply and demand of terrestrial animal source food: An evidence and policy overview on the state of knowledge and gaps.* Rome: FAO, 2026. link.

- Four sections: The food environment. Trends in supply and demand. A review of the evidence. A review of policy and legislative documents related to food environments.
- Key findings from the section "Trends in supply and demand":
  - "The global supply of terrestrial animal source food (TASF), namely milk and dairy products, eggs and meat, has rapidly increased between 1961 and 2022. The increase in per capita supply of TASF was driven by three commodities: eggs, poultry meat and pig meat."
  - "Although the overall global availability of TASF has increased, the per capita availability of bovine meat and offal have remained consistent or declined over the last six decades. Additionally, regional disparities in the production and per capita availability of TASF are observed."
  - "TASFs are more expensive in low- and middle-income countries than in high-income countries relative to the estimated income distribution. This is particularly true for sub-Saharan African and South Asian countries."
  - "An estimated 14 percent of all TASF is either lost or wasted. The key drivers of food loss and waste (FLW) in the context of TASFs are their high perishability, as well as inadequacies in the cold chain infrastructure and subsequent spoilage of the food due to lack of temperature control. This is particularly an issue in low- and middle-income countries.

About Beacon

Why?

- Tiny Beam Fund's flagship *Burning Questions Initiative* produces a list of 'burning questions'. These questions are asked by issue experts (leaders of advocacy organizations, frontline campaigners, academics collaborating with these organizations) experienced with addressing negative impacts of industrial animal agriculture in low- and middle-income countries. They were invited to contribute pressing, under-researched, practical questions that they considered of most urgency and salience to their work. The current (2026) list is here.
- Every 'burning question' is complex and multifaceted. It would be foolish to believe that there is a single, simple, definitive answer to a question.
- Addressing these questions requires welding together many pieces of nuanced, contextualized information, research findings, and perspectives drawn from a broad knowledge base, a rich knowledge bank of studies by academic researchers. It also requires extracting key messages from these studies.
- This welding and extracting endeavor is arduous. But, "a journey of a thousand miles begins with a single step". We hope that our curated series of key messages – named *Beacon* – will serve as a beacon, guiding all those keen to take the first step.

Who's the audience?

- Those who have contributed to the 'burning questions', those who are curious about these questions, those who are interested in using the research undertaken by academics to address the questions.
- Anyone can access *Beacon* on our website. It is easy to read and understand. No academic jargon!

What's in it?

- Each issue contains 6-8 main items. These are works by academic researchers in peer-reviewed journals from the past couple of years. Also included are reports written for Tiny Beam Fund by recipients of its *Burning Questions Initiative* fellowship awards (they are all PhD holders or PhD students close to obtaining their degrees). 1-2 'Brief mention' non-academic reports may also be included.

Read This Issue