Beacon

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

TINY BEAM FUND

Issue 7 | December 2025

Seven studies are featured. They cover:

1. Power of agrifood firms sabotages consumers' agency and choice.
2. Using diverse types of data to reveal aquaculture development in 150 countries.
3. Pollution and conflicts caused by industrial pig and poultry production in Yucatan.
4. Large livestock companies in China and the US use different business models.
5. Urgent need for livestock systems that are climate-friendly and socially fair.
6. Big players own industrial broiler production in Brazil, Mexico, India, China.
7. Development banks drive animal agriculture GHG emissions in sub-Saharan Africa

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 Clapp, Jennifer, et al. **"Corporate concentration and power matter for agency in food systems."** *Food Policy* 134 (2025): 102897. link.

People's "choices and voices" in food systems are sabotaged by the disproportionate power of giant agrifood firms.

A small number of very large agrifood companies have the power to influence markets, technologies, and governments, shaping food systems to advance their interests. This undermines the ability of citizens to make their own choices and to have a say in food-related policymaking that affects them.

- *Agency*, or the ability to make choices about one's own life and have a say in wider societal decisions, is fundamental to human rights and dignity.
- However, large agribusiness firms restrict the agency of individuals in matters related to food systems.
- These firms have become so large and powerful that they can set prices, suppress wages, control production technologies, working conditions, and the types of food available, and obtain favorable government policies.
- This reduces individual agency in many different ways, in both production and consumption and from personal food choices to who gets a say about food systems governance. A farmer who can only sell animals to a single, giant meatpacking company may be unable to implement higher-welfare practices. A peasant collective is unlikely to be heard as clearly as a transnational corporation in an international food forum.
- The result is that food systems become increasingly shaped by corporate actions, and individuals' choices become more and more constrained.

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

- This paper is relevant to CON2: "What are the drivers of increased meat consumption in LMICs? What are the most effective interventions and communication strategies to stop or slow the trend?"
- The amount of any kind of food consumed - *including animal products* - is shaped by how much of that food is available, how much it costs, how it is produced, how it tastes, how it is marketed, how accessible it is to consumers, etc.
- This paper argues that a small number of agrifood corporations have a disproportionate influence over all of these factors. It follows that *actions and decisions taken by these corporations are a key driver of increased meat consumption in LMICs*; individual producers, workers, and consumers have relatively little say.
- If corporate power erodes people's agency, *it makes little sense to rely on individual food choices* to push back against industrial animal agriculture in LMICs.

- Instead, the authors propose solutions based on *policy and social movements* that reassert individual and community agency in the face of corporate power.

Deeper Dive

1. Agrifood markets are dominated by just a few companies

- All the way up the food supply chain, from seeds to grocery stores, a small number of agrifood companies possess large market shares. This is true both globally and in many individual countries.
- For example: the top three soy importing firms control 94% of the market in China; just two firms own 95% of global poultry genetics; and the top two grocery companies control nearly all of the food retail market in Brazil.
- Corporate concentration in seeds, fertilizer, soybeans, and poultry appears to be a growing problem in sub-Saharan Africa.

2. This concentration confers great power

- With such large market shares, companies can *distort markets, dictate material conditions* (technologies, working conditions, product formulations, etc.), and *intervene in politics*.
- With fewer buyers and sellers, there is less competition to keep consumer prices low, pay living wages to workers, or pay good prices for inputs. Companies have been found guilty of colluding to raise prices of milk, eggs, and several other products, and of suppressing the wages of slaughterhouse workers.
- Large firms can set the conditions under which others must operate, such as by restricting where machinery can be repaired and granting themselves the power to unilaterally change contract terms. Their influence over technologies such as animal genetics has likely played a significant role in the industrialization of animal agriculture.
- A few, large firms can coordinate more effectively than many smaller ones, enabling them to exercise political power via donations, lobbying, etc., and to crowd out other voices.
- Individually, each of these actions might affect only small segments of society. However, the cumulative effect could be to substantially reduce the agency of individuals and communities in general.

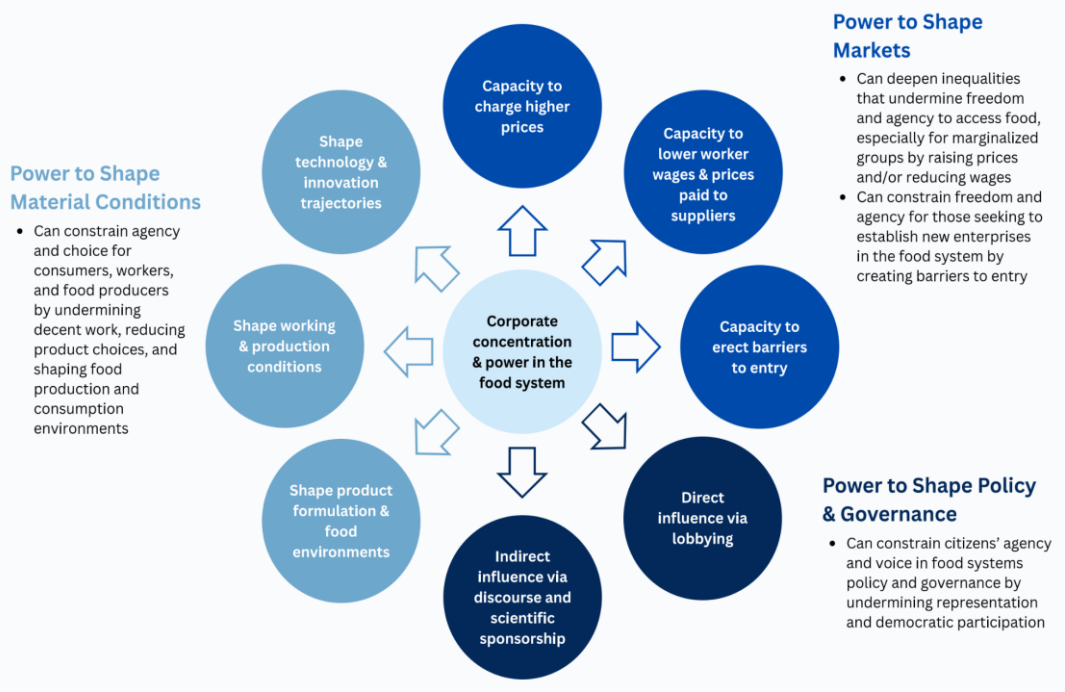
3. We don’t yet know the full picture

- Although there are clear examples of corporate behavior that restricts agency, researchers still can’t say precisely when and how agrifood companies wield their power to shape food systems, and what the full set of consequences has been for the rest of society.
- It is difficult to come to detailed conclusions because a lot of information about corporate actions is proprietary, locked behind prohibitive paywalls, or simply not tracked. *This is particularly true in LMICs.*

4. There are several routes to restoring balance

- Even without complete information, there are still several actions that make sense given the clear imbalance of power between corporations and individuals, and the risk of harmful effects.
- *Stronger competition policies* would prevent companies becoming so large and markets so concentrated in the first place.
- *More robust rules around political donations, lobbying, and conflicts of interest* would help to limit companies’ ability to manipulate the rules of the game. Requiring *more transparency and data-sharing* in general would help us to track problems and progress.

- *Companies organized around values other than profit* could help to shift corporate practices. However, *the authors are skeptical about existing corporate-led partnerships with NGOs, academics, etc*., as some of these have led only to "greenwashing" in the past.
- *Grassroots movements and protests* can help to keep attention on issues of agency and corporate power, as well as offering alternatives *such as agroecology and food sovereignty*.
- None of these solutions will be easy to implement. Nonetheless, those concerned about the rise of industrial animal agriculture in LMICs would do well to support *collective action* that aims to return some control to producers, workers, and citizens, rather than relying on consumer choice alone.



"Fig. 3. Pathways via Which Agency is Affected by Corporate Concentration and Power in the Food System."

2 Partelow, Stefan, et al. **"Archetypes of aquaculture development across 150 countries."** *Aquaculture* 595 (2025): 741484. link.

Combining social, environmental, economic, and governance data reveals patterns in aquaculture development across 150 countries.

The aquaculture sectors of 150 countries can be classified into four distinct groups. This grouping highlights shared conditions that shape how aquaculture develops, and should help to guide future interventions. Identifying these groups required integrating diverse types of data.

- This paper uses indicators of social, economic, environmental and governance conditions to group countries into four "*archetypes*" of aquaculture development.
- Countries within each archetype - *emerging aquaculture producers, limited aquaculture engagement, developing aquaculture producers, and wealthy aquaculture producers* - have certain elements in common. These include attributes such as prevalence of malnourishment, quality of governance, amount of inland freshwater, and degree of exposure to climate change.
- The archetypes are useful partly because they provide a starting point for understanding how aquaculture in different countries could be developed to provide the most benefit with the least harm.
- The indicators also reveal that much aquaculture takes place in countries with poor environmental performance and high exposure to climate change. This implies that the sector may not deliver on its promises to improve nutrition if these vulnerabilities are not addressed.

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

- This study is relevant to PROD 2: "What do we know about the current status and growth of industrial animal agriculture in LMICs, including the prevalence of industrial practices (versus other systems), the number of animals involved (by species), global supply chains, and government regulations?"
- The paper provides data related to the status and growth of aquaculture in 150 countries, including the top 100 producers.
- However, beyond just supplying facts and figures, the study also integrates various types of data to form a more informative picture of aquaculture trends and trajectories in these countries.
- It provides a new way of thinking about aquaculture developments, gathering countries into broad but useful groups without relying only on one-dimensional indicators such as production statistics.
- Importantly, these groupings were found using information from both the *social AND ecological* domains. The paper demonstrates that neither type of data alone could tell such a rich story about the current status and possible future of aquaculture in a wide range of countries.

Deeper Dive

- This study started from the question "what factors are driving aquaculture development across countries?". Previous studies had relied on expert opinion, were based on data about just a few drivers, or were relevant to only a few countries, which limited their ability to answer this question.
- The authors recognized that many different drivers could be important, from sea surface temperatures to the ease of doing business in a country. For each of 150 countries (including the top 100 aquaculture producers), they therefore gathered 42 indicators across six domains:
    - Population and its relation to seafood (e.g. human development index, seafood consumption per capita)
    - Governance performance (e.g. corruption, political stability)
    - Conditions relevant to aquaculture (e.g. coastline length, drought stress)
    - Aquaculture production (e.g. number of species produced)
    - Broader social and economic characteristics (e.g. GDP, rural population)
    - Climate change risk
- They used their consistent, country-level *dataset* to gauge the *conditions* in which most aquaculture is occurring, identify four *aquaculture development archetypes*, and determine which *indicators contributed most* to defining the archetypes.

1. Aquaculture takes place in vulnerable locations

- The data showed that, outside of China (whose production is so high it would dominate the statistics), most aquaculture production is taking place in countries with variable food supplies, high climate risk, and/or few environmental safeguards.
- As aquaculture relies on abundant, good-quality water and stable environmental conditions, this raises concerns about the sustainability of the sector and whether it can be relied upon to provide much-needed nutrition.

2. Four archetypes emerge from the data

- *Emerging aquaculture producers* have small aquaculture sectors that are growing fast. They also have high rates of malnourishment, low GDP, and relatively poor governance and environmental performance. These countries are mostly in *central Africa and western Asia*.
- Countries with *limited aquatic food engagement*, which are mainly in *eastern Europe*, are wealthier but have low levels of aquaculture production.
- *Developing economy aquaculture producers* consume, produce, and export a lot of aquaculture products. They have long coastlines, copious inland water, and high irrigation ability, as well as large populations. Unfortunately they also have relatively low environmental and governance scores. Most of *southeast Asia and Latin America* is in this group, along with *Russia*.
- *Wealthy economy aquatic producers* resemble the previous category in terms of aquaculture production, but have higher environmental and governance scores. They are generally high-GDP countries in *North America and western Europe*, plus a handful of other relatively wealthy nations.

3. The data and archetypes can inform interventions and future research

- For example, the authors show that nutrition and livelihoods are important concerns in "emerging producer" countries. They suggest that supporting community-based initiatives will be helpful there. In "developing producer" countries, policy work that addresses competing demands for densely-populated coastal land is likely to be important.

- The archetypes can also be used to judge whether a lesson learned in one country is likely to transfer well to another: an intervention that worked well in a certain country may be a promising candidate for another country in the same group.
- More detailed, country-specific information will also be needed to make these decisions, but this study provides a data-based starting point. Researchers can also use the authors' new dataset of many indicators for many countries to generate and test hypotheses about aquaculture development around the world.

3 Rodríguez-López, Abelardo, and Emilio De Los Ríos-Ibarra. **"Industrial poultry and swine groundwater pollution in a karstic environment: Yucatan, Mexico."** *Academia Environmental Sciences and Sustainability* 2.1 (2025). link.

There is an urgent need for dialogue among all stakeholders to resolve conflicts caused by pollution from industrial pig and poultry operations in Yucatán.

In Mexico's Yucatán peninsula, the expansion of industrial pig and poultry production has led to air and groundwater contamination and conflicts between citizens and companies. New research highlights flaws in water management policy, confirms that large-scale pig and poultry production pollutes Yucatán's environment, and urges a moratorium on new farms.

- Industrial pig and poultry production in Yucatán relies on feed imported from outside the region, some of which is converted by the animals into manure.
- Yucatán's thin soils and porous geology means that manure nitrogen percolates into the shallow groundwater table, which has subsequently become contaminated with harmful nitrates.
- There is no systematic monitoring of individual farms. However, this paper calculates that *so much nitrogen is imported and excreted on industrial poultry and pig farms that groundwater contamination is unavoidable.*
- Some underlying causes: Government policy has encouraged the expansion of pork production in Mexico (partly for export); companies are attracted to Yucatán's abundant land, water, and cheap labor; groundwater regulations contain many loopholes, favor farm operators over communities, and are weakly enforced.
- Agribusiness companies benefit while local communities, many of them indigenous Mayans, have lost access to clean water and livelihoods that depend on it.
- *The authors urge a moratorium on new industrial farms.* They also suggest transporting manure to other regions, and relocating some existing farms.
- It is striking that a dispassionate analysis of nitrogen flows implies untenable levels of pollution, even before considering matters of equity and indigenous rights. Government and industry urgently need to come together with local communities to address the evidence and identify better ways of managing groundwater and manure.

4 Chen, Guancheng. **"Comparative analysis of livestock industry chains: China vs. the United States: Insights from Wens and Tyson Foods China."** *Proceedings of the 2024 2nd International Conference on Economic Management, Financial Innovation and Public Service* 327 (2025): 107–19. link.

Livestock companies in China and the US have different business models, which are shaped by different consumer preferences, labor costs, and fast-food market demand.

Large Chinese livestock companies are adapted to conditions in China, so their business models may not transfer well to other markets. Such companies are recommended to adopt techniques used by successful US firms, such as modernizing production methods, creating products adapted to different countries' tastes, and improving their marketing.

- This study compares the livestock industries in the US and China, using two major, well-known companies as examples: Wens (China), and Tyson Foods (US).
- Wens mainly sells live chickens and pigs, supplying animals, feed, and vaccines to farmers who raise the animals.
- Tyson buys cattle and pigs directly, and uses contract farmers for chickens. It slaughters the animals and sells ready-to-cook or prepared meals to restaurants and supermarkets.
- Wens has better cash flow, but it does not consistently make a profit. Tyson manages its supply chains better, is better able to pay debts, and its profits are more stable.
- There are several reasons for these differences. Labor costs are much lower in China, Chinese consumers prefer fresh meat (while Americans buy more packaged and ready-to-eat products), and China has fewer fast food restaurants buying processed meat.
- To compete in global markets, the author recommends that Chinese livestock firms automate and modernize production to offset higher labor costs.
- They should also adapt products to local tastes and cultures, create partnerships with processors and distributors, improve marketing strategies and build stronger brands, and follow US food safety and import regulations.
- *This information can help those outside China understand how and why large Chinese livestock companies work the way they do*, enabling them to tailor their communications and more effectively influence these companies and their value chains.

5 Thornton, Philip, et al. **"Options for a just transition for livestock under climate change."** *Outlook on Agriculture* 54.3 (2025): 222–33. link.

A transition to livestock systems that meet environmental and climate goals while being socially fair is both urgently needed and hugely challenging.

Livestock production is enormously consequential, in terms of the livelihoods it supports and its effects on the climate. A transition to climate-friendly, resilient systems must avoid harming vulnerable farmers, workers, and communities, but achieving such a "just transition" requires overcoming a complex set of social, political, and financial obstacles.

- Livestock production supports the livelihoods of an estimated 1.3 billion people, more than any other sector of the global economy.
- It is also a major source of greenhouse gas emissions while simultaneously being seriously threatened by climate change. Much of the adverse impact falls on *producers in LMICs* who are least responsible for emissions.
- The sector must therefore urgently shift to climate-friendly, resilient systems, via a just transition which combines fairness in participation, equitable sharing of costs and benefits, and respect for all groups.
- This means finding ways to reduce climate impacts while respecting livelihoods, cultures, and dignity, reducing inequality, and ensuring that all stakeholders may participate in designing their futures.
- We have numerous options for improving livestock systems, from incorporating trees in pastures to new technologies for monitoring methane emissions. However, *there are many barriers* to implementing solutions at scale and in ways that ensure that "none are left behind". Progress so far has been limited.
- Success will require creating integrated sets of policies, ending subsidies to climate-harming activities, fostering participatory decision-making, and securing sufficient funding, in particular from higher-income countries. Governments must move from pledges and commitments to incentives and action.
- Given the technological, institutional, financial, and cultural changes involved, a just transition will be a "*monumental challenge*".

6 Karamchedu, Ambarish, and Ben Coles. **"Who owns chickens: Corporate control and industrial broiler production in the global south."** Tiny Beam Fund, August 2025. link.

Broiler chickens in Brazil, Mexico, India, China are mostly produced and controlled by a cluster of giant corporations and financial institutions.

Worldwide, 376 companies are responsible for 75% of broiler chickens production, with ownership increasingly concentrated through mergers and institutional investment. In Brazil, Mexico, India, China, 91 firms control 36% of production. Key levers for change include financial activism toward companies and investors, legal and investigative actions, higher animal welfare standards, government support for local non-industrial systems.

- Industrial broiler chickens production in:
  - *Brazil*: In the hands of only a few firms - JBS, BRF, Aurora Alimentos, Lar Cooperativa Agroindustrial, and Copacol.
  - *Mexico*: Controlled by two major corporations - Industrias Bachoco, and Pilgrim's de Mexico.
  - *India*: Dominated by privately-owned firms, but global financial and corporate actors are increasingly present. Suguna, a private company, was the largest producer from 2018-2024. A major new entrant in 2024 is LDC India (subsidiary of the huge French agribusiness Louis Dreyfus company).
  - *China*: A more complicated picture, with a rapidly growing and diverse set of owners. It nonetheless shows the significant footprint of powerful U.S.-based multinationals operating alongside publicly-traded and state-influenced domestic firms.
- *Major U.S. investment firms*, including Blackrock and Vanguard, own significant stakes in the largest publicly-traded chicken companies in Brazil and Mexico.
- The industrial model is the only game in town. The intense market pressure exerted by these financial giants forces nearly all producers, regardless of their ownership structure, to adopt similar models.
- The extreme concentration of corporate and financial power gives rise to corruption and collusion, animal suffering, labor exploitation, systemic risk to the food supply, displacement of more resilient, localized food systems.
- Four levers of action in both the global north and south:
  1. *Financial activism* targeting public companies and their investors.
  2. *Legal and investigative actions* targeting private companies.
  3. Push *corporations for higher animal welfare* standards.
  4. Urge *governments* to support research and development of resilient, *local alternatives* including indigenous chicken breeds and expansion of backyard, small-scale poultry schemes.

7 Narain, Divya. **"Climate course correction: Preventing greenhouse gas emission (GHG) lock-in from development finance driven industrialization of animal agriculture in low-income countries."** Tiny Beam Fund, September 2025. link.

Development banks' investments in industrial animal agriculture in low-income countries (mainly in sub-Saharan Africa) drive and "lock-in" GHG emissions in these countries.

The key problem with development banks' investments to industrialize animal agriculture in low-income countries is that these investments entrench high-emission infrastructure, behaviors, and institutions that are difficult to shift away from. This resulting 'GHG lock-in' constrains the transition to lower-emission alternatives.

- Despite their own commitments to align with the Paris Climate Agreement, multilateral development banks (MDBs) are funding industrial livestock projects in low-income countries (LICs) - concentrated mostly in sub-Saharan Africa countries such as Madagascar - *locking these countries into high-emissions production and consumption trajectories.*
- Between 2018 and 2024, MDBs - including the World Bank, African Development Bank (AfDB), and International Finance Corporation (IFC) - funded 55 livestock projects in LICs, 22 out of which involved industrialization. US$673 million has been directed to 'exclusive livestock-sector' projects that trigger industrialization-induced GHG lock-in in LICs.
- MDB funding of the industrialization of animal agriculture in LICs (US$1 billion) now nearly matches the amount allocated to strengthening traditional pastoral systems, which have long been the predominant form of livestock production in the sub-Saharan Africa region (US$1.8 billion).
- MDBs trigger industrialization-induced GHG lock-in in LICs primarily by *financing vertical integration of value chains, construction of long-lived infrastructure, and intensification of production*.
- GHG lock-in in the livestock sector of LICs is *not inevitable*, but course correction and halting the financing of industrial animal agriculture must happen now. Actions MDBs can take include: Strengthening the *vetting criteria* for livestock projects, and shifting funds from industrial animal agriculture to *climate-smart alternatives* and leveraging their expertise in *supporting traditional systems* like pastoralism.

Brief mention (non-academic reports):

1 *Transforming food and agriculture through a systems approach*. Rome: FAO, 2025. link.

- "The purpose of *Transforming food and agriculture through a systems approach* is to clarify what a systems approach involves in practice across agrifood systems. It explains **what** a systems approach means in the context of agrifood systems, **why** it matters and **how** to adopt it. It advances the operationalization of a systems approach by outlining the key shifts needed to embed systems thinking into policies, programmes, projects, and interventions and illustrating how countries, regions and municipalities are putting these shifts into practice."
- "A systems approach is not a one-time fix. It is a continuous journey of adopting new ways of thinking, acting and working together, step by step. There is no single blueprint. The approach evolves through experience and adaptation. It is less about doing things "right" and more about doing them "better." All of the examples of on-the-ground experience illustrated here are partial – but they show that steps are being made to identify, make and modify relationships in agrifood systems. Progress often begins with small, deliberate shifts – reframing a problem, convening new groups or changing how decisions are made."

2 *FAO Global Conference on Sustainable Livestock.* Rome, FAO, 29 September - 1 October, 2025. link to recordings of six sessions; descriptions of side events.

- Six sessions: 1. Opening and Ministerial Panel on national commitments. 2. Commitments and perspectives by global stakeholders. 3. Innovative technologies and practices. 4. Social and Institutional Innovations and FAO Recognition. 5. Driving solutions to address livestock sector challenges. 6. Advancing sustainable livestock transformation.
- Side events: 1. Rangelands and pastoralists: What role for private sector? 2. Launch of the FAO LEAP guidelines on ecosystem services and circular bioeconomy. 3. Catalyzing sustainable livestock transformation through private sector investment. 4. Innovating for inclusive and resilient livestock systems. 5. Leaving the land better: Navigating innovation and sustainability in livestock farming. 6. A call to action: Investing in animal health to halt the spread of transboundary diseases. 7. Charting a path for sustainable livestock investments in Latin America. 8. Tackling tick and acaricide resistance through surveillance and diagnostics – from local expertise to global coordination. 9. Biosecurity for a sustainable livestock transformation – a shared responsibility to achieve impact at scale. 10. Today's leaders, tomorrow's success – youth leadership in sustainable livestock. 11. Better food future: Establish global traceability standards for deforestation-free beef and leather. 12. Supporting innovation at the farm level: Improving good husbandry practices and prudent antimicrobial use. 13. Making dairy work for the most vulnerable. 14. Cultivated forages as climate solutions to transform livestock systems in the global south. 15. Movie night: World Without Cows. 16. Innovation forum. 17. Accelerating national pathways to sustainable development through livestock multistakeholder partnerships. 18. Feeding the future: Building pathways to more sustainable livestock production. 19. Scaling animal production and One Health solutions, powering agrifood systems transformation.

About Beacon

Why?

- Tiny Beam Fund's flagship *Burning Questions Initiative* produces a list of 'burning questions'. These questions were contributed by over 25 organizations and funders critical of and working to tackle industrial animal agriculture, especially concerning low- and middle-income countries (LMICs). These questions focus on topics that they would most like academic researchers to address and answer. The current (2023) 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