

□□□ **ACADEMIC STUDIES WITHOUT TEARS** □□□

ACADEMIC RESEARCH FINDINGS TURNED INTO INFORMATION THAT ADVOCATES CAN GRASP AND USE EFFORTLESSLY

To learn why we launch this program, read the Explanatory Note placed at the end. Feedbacks welcomed. Contact: min@tinybeamfund.org



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The future of milk and dairy farming



All leaders of advocacy organizations know that milk production in the U.S. has been declining.

There are other topics about milk and dairy farming studied by academics that may fly under the radar of advocates and feature less often in their discussions. This issue of *Academic Studies Without Tears* introduces several of these topics which may seem minor but can raise a few intriguing questions and provide some food for thought (e.g. 75% of Nigeria’s dairy market is controlled by a single company).

The centerpiece of this issue, though, is a trio of papers published in 2020 by a team of academics from the University of Oxford, and funded by the Wellcome Trust (one of the world’s largest health funders). These papers present evidence and arguments that plant-based alternatives to dairy milk and agroecology may not be able to transform global industrial dairy farming as some advocates hope.

1. Dairy’s multiple problems: Are plant-based “milk” and agroecology the silver bullets?

How to fix dairy’s problems and shape the future of dairy farming? This is a hotly debated topic.

Advocates would like to see plant-based milk (“mylk”) and agroecology play major roles because they believe these two approaches can solve the many problems caused by dairy farming.

But these two proposed fixes have problems of their own, cannot address all the key reasons driving dairy farming intensification and industrialization globally, and cannot transform the present seriously flawed system into one that is “more equitable, ethical, and sustainable”.

Dairy farming is a highly complex, multi-faceted, non-linear issue. It is not only a matter of animal welfare. It is also deeply connected with other dimensions – with environmental concerns, with rural developments, livelihoods, social, cultural, and economic dimensions of human well-being, with human health such as food security and malnutrition. It does not help to view each of these dimensions in isolation.

It is also not constructive to frame and compartmentalize the debate about the future of dairy into three distinct trajectories: 1) "More milk" – producing more milk to improve food security and nutrition, relying on industrial producers and value chains. 2) "Better milk" – producing milk that has better quality than conventional, industrial milk (e.g. "local, raw, organic, grass-fed, artisanal"), often done via certification. 3) "Less milk" – consuming less dairy milk, and substituting it with plant-based alternatives instead.

Firstly, the different dimensions and aspects are linked to each other. Adjusting one dimension often impacts another dimension. And one group completely ignoring the negative impacts that would likely hit another group as a result of proposed changes only leads to all parties talking past each other rather than having discussions that treat everyone's needs, interests, and circumstances fairly.

Secondly, viewing dairy farming strictly through the lens of "more, better, less" disregards fundamental issues that must be confronted if problems caused by dairy farming's trend toward industrialization and intensification are to be solved. Of particular concern is that *none* of these three positions tackle the need for *systemic change* and the issue of *social inequalities and power*.

It is very important to ask: How is one to deal with "uneven social and environmental outcomes", with marginalization in terms of race, class, gender? (About two thirds of the world's livestock keepers are women.) "Does dairy production impinge on animal rights or is it an important source of nutrition? Does milk production exacerbate global warming and environmental destruction or is it an essential livelihood? These framings are saturated with biopower (i.e., who gets to decide whose life matters?) and responsibility (i.e., who is to blame and whose job is it to solve these issues?)"

The power currently held by industrial agriculture also needs to be dealt with. A strong case can be made that increasing consumption of plant milk may actually "further entrench market mechanisms as solutions, thereby reinforcing the political economy of industrial agriculture". "By merely grafting plant milks into existing production-consumption practices, agro-industrial problems are not so much fixed as they are diverted, obscured, or even forgotten. Mylks may afford at best an interruption to the challenges they claim to resolve. At worst, they could distract from the need for systemic changes by virtue of fitting so well within the contours of globalized industrial agri-food."

In a nutshell, "policies and programs rooted in these discrete framings" [of more-better-less milk] perpetuates "power imbalances that are firmly embedded within the industrial dairy system". All three framings "privilege certain solutions and actors to implement those solutions" rather than making the discussions and search for solutions more democratic and less polarized.

What about agroecology? Of all the proposed solutions, this one addresses systemic change best and seeks the highest level of transformation. Unfortunately, agroecology has "low feasibility" at present. It faces massive challenges of scaling up, and above all, of mainstreaming in research and policy agendas. Its relevance is unfortunately limited to "small, mixed crop-livestock systems".

A LOT more info:

- "The rapid intensification of dairy production has exacerbated CO₂ emissions, animal welfare abuses, inequities in human health, and the eroding of rural livelihoods and cultural landscapes. Yet transformation is itself a political process. Policies aiming to influence transformative adaptation within dairy systems should be informed by analysis of power differentials in effort to gauge the equity of agricultural policies."

Clay, Nathan, Tara Garnett, and Jamie Lorimer. "Dairy Intensification: Drivers, Impacts and Alternatives." *Ambio* 49, no. 1 (2020): 35–48. doi: 10.1007/s13280-019-01177-y

- "Rwanda is known as a land of milk and honey, parents should let their children develop a culture of drinking milk, and rearing cattle for it is one of the things that define a true Rwandan."—Gérardine Mukeshimana, Rwanda's Minister of Agriculture and Animal Resources (August 24, 2016). "Dairy cows are not gently milked and allowed to roam in the sun and play with friends on factory farms. There is no sunshine or happiness where this milk comes from."—Livekindly 2018 blog (January 24).

Contemporary debates about milk are often framed in ways that highlight seemingly intractable, polarizing issues. The above quotes evoke the lively cultural politics of milk at play across the Global North and South. . . . technology-driven *progress* toward a utopic imaginary of bodily and economic growth, on the one hand; violent, diseased *downfall* of animals, the planet, and human health on the other. These narratives frame problems in binary ways, often pitting rural livelihoods against animal welfare or environmental sustainability against economic growth. Such simplified framings can obscure the complex political ecologies of food production and consumption, serving to entrench rather than transform systemic issues in the contemporary dairy sector.”

- “Dairy continues to be a key source of nutrition and cattle an important store of wealth among rural societies in Africa, Asia, and Latin America, yet access to livestock resources remains highly uneven across class and gender lines.”
- “The recent Twitter campaigns of Veganuary (a month of eating vegan) and Februdairy (the dairy industry’s rebuttal with a month celebrating milk) provide a window onto the divisiveness and polarized notions of care in the ongoing debate about milk and dairy. Vegan activists posted evidence of animal welfare abuses to attest to their care for cows and calves and to justify their calls to remove animals from food systems. Dairy farmers posted images of healthy cows as evidence of their daily practices of care for animals while arguing that vegans care little about farmers’ livelihoods. The rise of plant-based milks and a social media landscape that facilitates virtue-signaling about food consumption choices makes it even easier for these groups to continue talking past each other.”
- “Platforms such as sustainable intensification, organic production, and plant milks offer limited engagement with the complex social–environmental dynamics of dairy systems. These platforms are often pinned to outcomes defined rigidly as more, better, or less such that the rich histories of dairy landscapes are erased. The current infatuation with data-driven global-level studies employing life cycle assessments to compare the environmental footprints of various foods similarly obfuscates the social and environmental heterogeneity within and across dairy landscapes.”
- “The swiftness with which agro-industry has taken control of the plant milk sector raises questions about the degree of transformation offered by these products, including the claims of environmental sustainability that are often used to market plant milks. . . . While the consumption of plant milks constitutes a rejection of exploitative industrial dairy systems that have been continuously propped up by government subsidies, it remains to be seen whether this consumer-led disruption will engender systemic transformation. Paradoxically, claims of less milk might belie an increase in overall milk consumption. With around half of the options on supermarket shelves containing added sugar, the rise of plant milks may be part of an observed global trend of sugar sweetened beverage consumption. Thus, while the less milk trajectory promises lower environmental, health, and animal welfare impacts, in practice plant milks have entrenched reliance on agri-industrial systems which come with negative environmental impacts, no guarantee of higher animal welfare in existing industrial livestock systems, and a product that one ultimately needs to consume more of to get the same nutrition as dairy milk.”

Clay, Nathan, and Kayla Yurco. “Political Ecology of Milk: Contested Futures of a Lively Food.” *Geography Compass* 14, no. 8 (2020): e12497. doi: 10.1111/gec3.12497

- “Increased consumption of plant milk could in theory drive change in dairy systems through decreased demand for dairy milk. Yet such a trajectory is far from given. Dairy systems are highly heterogeneous. Water use, land use, and greenhouse gas emissions varies enormously across farms and regions. . . . If past trajectories of intensification in the dairy sector are an indication, a likely response to decreased milk demand could be for the industrial dairy industry to further intensify production. Even though fluid milk consumption is decreasing in the US and Europe, it is increasing worldwide. One possible outcome is that milk consumption will encourage industrial dairy systems that are environmentally harmful and of limited benefit to rural livelihoods. Continued consolidation into mega-farms has been driven in the past by price competition that privileges economies of scale. At the same time, dairy operations with a lower environmental footprint, higher animal welfare, and value to rural livelihoods and cultural landscapes will likely continue disappearing.”
- “Plant-based milk and meat are flourishing. As these products grow and diversify, it is crucial to consider how they might enable more democratic food futures. Flexitarianism presents a potentially open, inclusive, and democratic form of consumption that could drive food system change in just and sustainable ways.”

Clay, Nathan, Alexandra E. Sexton, Tara Garnett, and Jamie Lorimer. “Palatable Disruption: The Politics of Plant Milk.” *Agriculture and Human Values* (January 30, 2020). doi: 10.1007/s10460-020-10022-y

Note from Tiny Beam Fund: Concentration of power in the hands of a few dominant food corporations in the U.S. is the theme of the January 16, 2021 “Big Ag and Antitrust” conference at Yale University. It includes a panel on animal welfare (recording available [here](#)). Conference guide available [here](#).

2. Serious welfare problems with dairy cows in India

India has the world's largest number of dairy cows. Dairy farms in India's Kerala state cover a broad range of climatic and farming practices, and are on average small (mean 15 cows, median 8). On-farm observation of 38 dairy farms there revealed serious welfare problems.

When housed, cows are tied to their housing on a rope <1m that is attached to a halter piercing the nasal septum "which results in pressure on sensitive tissues throughout the life of the cow and, if carried out without analgesia, would be painful". Sometimes cows are tied up inside for the whole day. When allowed outside, they are usually restricted by close-tying, longline tether, or hobbling.

There seems to be "a trend for larger, wholly indoor farms becoming more common", and cows in larger farms spend more time indoors, close-tied.

Cows are not given access to unlimited water. Water is very important for preventing heat stress, especially since the current mixture of breeds from imported stocks are not resistant to heat stress and not suited to India's climate.

Access to food is also often limited to the extent that cows may be hungry, and quality green forage/fodder that provides roughage is not always provided.

Housing and the cows' lying environment is not adequately cleaned. Many cows are dirty, suffer from hair loss and body lesions.

Are movement and behavioral restrictions, lack of adequate water and high quality food, heat stress, poor hygiene and hair loss present in other dairy farms in India? Are the basic needs of over 48 million cows in that country being met?

Mullan, Siobhan, Surej J. Bunglavan, Elizabeth Rowe, David C. Barrett, Michael R. F. Lee, Deepa Ananth, and John Tarlton. "Welfare Challenges of Dairy Cows in India Identified Through On-Farm Observations." *Animals* 10, no. 4 (March 31, 2020): 586. doi:10.3390/ani10040586



3. Where is Vietnam's dairy sector heading?

Demand for dairy in Vietnam has climbed in recent years. And the country's production of fresh milk has seen a steady rise.

But look closer, and one will notice that many dairy farmers in different regions going out of business or having to throw away their raw milk. At the same time milk processing firms are doing well, expanding, and cannot get enough raw supplies for their needs.

These apparent paradoxes arise out of the unequal distribution of profits made by the sector. Dairy companies have much more power than individual dairy farmers, and "the value added in the chain was biased toward the dairy plants".

What do advocates make of this situation? Do they want to support the farmers (e.g. help them negotiate better prices for their raw milk, set up better waste treatment, choose cows with better disease resistance)? Or do they want the companies to continue to call the tune?

Nguyen, Viet Khoi, Hoang Thi Hai Yen, Tong Van Khai, Linh Huong To, and Nguyen Tien Duc. "Key Analysis of the Dairy Value Chain in Vietnam: The Case of Bavi." *Journal of Agribusiness in Developing and Emerging Economies* 8, no. 2 (June 4, 2018): 222-233. doi: 10.1108/JADEE-06-2016-0041



4. All dairy systems worsen fresh water quality and quantity

Dairy systems in the world fall into three broad categories: 1. Pasture-based systems with open grazing all year round (e.g. Brazil, New Zealand). 2. Zero-grazing systems with cows always confined in buildings and fed food derived from grains (e.g. U.S.). 3. Mixed systems with cows left outdoors to graze except for certain hours of a day, in winter, when raining hard, etc. (e.g. Nepal, Ethiopia).

All these systems, whether in developing or developed countries, put great pressures on the quality and quantity of fresh water. Three points are worth highlighting:

1. Regardless of the system used, plenty of water is needed to produce grass and/or grain feed. Confined systems more so. The water required “to produce the same amount of dry mass (DM) of feed grain . . . is five times that to produce equivalent DM of a mixture of grass, crop residue and fodder”.

2. Preventing urine and liquid manure from polluting water sources is tough, even in developed countries. In developing countries with mixed systems, “solid manure is stored in open heaps for long periods before it is applied on the land, and is often washed away by rain, resulting in contamination”.

Pasture-based systems can have less negative impacts on water quality than confined stall-feeding systems because the latter’s heavy use of concentrated feeds and commercial fertilizers is responsible for more nitrate leaching into groundwater and surface water sources.

3. No matter where in the world and which system is used, there is little attention paid to irrigation practices and management by the majority of dairy farmers and operators (e.g. when to irrigate, how much water to apply, ascertaining soil moisture, using adjustable flow control).

All these concerns need urgent attention as dairy farming is now expanding mainly into areas with warm/warmer climates where grass can grow easily – and the grass often needs irrigation.

KC, Birendra, Bart Schultz, Ian McIndoe, Helen Rutter, Andrew Dark, Krishna Prasad, Suman Sijapati, and Krishna Paudel. “Impacts of Dairy Farming Systems on Water Quantity and Quality in Brazil, Ethiopia, Nepal, New Zealand and the USA.” *Irrigation and Drainage* 69, no. 4 (2020): 944–955. doi: 10.1002/ird.2486



5. Can Brazil’s dairy producers improve production volume and environmental sustainability?

Brazil is a major dairy-producing nation, sitting at the same table as China, India, and the U.S. Its dairy milk supply chain “accounts for approximately 20% of the nation's agribusiness GDP”.

The government is intent on raising the level of milk production in order to reap more economic returns. This puts extra burden on the country’s environmental load.

According to a study of dairy production in Minas Gerais state (the largest and most important dairy region in Brazil), increase in production and environmental sustainability cannot go hand in hand. “A win-win scenario can hardly be found.” Trade-offs need to be made.

So who should decide the priorities? The government? The public? The dairy industry?

Agostinho, F., M.W. Oliveira, F.M. Pulselli, C.M.V.B. Almeida, and B.F. Giannetti. “Emergy Accounting as a Support for a Strategic Planning towards a Regional Sustainable Milk Production.” *Agricultural Systems* 176 (2019): 102647. doi:10.1016/j.agsy.2019.102647



6. Where does the milk consumed by Nigerians come from?

Nigerians rely almost entirely (98%) on *imported* milk and dairy products.

A few foreign players, notably FCW, have long dominated the industry that supplies Nigeria with dairy products. Peak Milk – one of the most popular dairy products in the country – was exported to Nigeria by FCW’s predecessor in 1954. FCW “controls about 75% of dairy market in Nigeria, which arguably is the largest importer of dairy products in Africa”.

Local milk come from myriad smallholders with low productivity and poor linkages to customers.

In other words, homegrown large-scale dairy farming in Nigeria is not a current concern. Is that good news to advocates opposed to factory farms? Do they want things to remain the way they are, leaving it up to imports and a single corporation to provide Nigerians with the dairy products they want?

A bit more info:

- “To understand the challenges and opportunities inherent in the Nigerian dairy industry, there is need to first analyse the peculiarities in the industry, especially with reference to the historical attempts at its development, government policy actions, and multinational agribusiness activities. The very nature of the industry in Nigeria creates strong incentives for foreign businesses with well developed global value chain, while at the same time constituting drawbacks against the development of the local dairy industry. That the Nigerian government has over the past years done little to correct the imbalances raises issues as to whether the unproductive nature of the dairy value chain is attributable to the activities of foreign firms or the constrains that characterise the country’s business environment.”
- “In the business of dairy farming and processing, the Nigerian market is arguably the most fragmented. Up to 95% of all locally produced milk in the country come from smallholder farmers, with little progress made in the areas of cooperative formation, commercial dairy farming and milk production. Although the country is among the top 15 countries in terms of the population of cows according to the 2013 FAO World Cattle Inventory, milk production in the country stands at barely one litre of milk per day per cow. Even the minimal milk production takes place in the remote rural areas with no linkage, no access road, no water, and no electricity. This means that the little milk produced locally hardly gets to the urban markets where it is mostly needed.”

Ekumankama, Ogbuagu, Abel Ezeoha, and Chibuikwe Uche. “The Role of Multinational Corporations in Local Dairy Value Chain Development: Case of Friesland Campina WAMCO (FCW) in Nigeria.” *International Food and Agribusiness Management Review* 23, no. 1 (2020): 55–69. doi: 10.22434/IFAMR2018.0108



7. Why is milk production in China stagnating in spite of growing consumer demand?

“China’s current milk production has fallen by 1.3% compared with 2016, mostly attributed to heat stress [experienced by dairy cows] and small/medium farms exiting operations due to stricter environmental regulations and declining profitability.”

High temperature, humidity, and solar radiation stresses dairy animals. Their well-being and ability to produce milk suffers because heat stress “directly alters and impairs various tissues or organs of the reproductive system”. And breeds that produce more milk are typically more heat sensitive.

Temperatures in China have been increasing, with more extremely hot days. If/when frequency and length of heat waves intensify, heat stress problems will be more severe as extreme weather events are even more stressful to the animals.

A bit more info:

- “Both milk consumption and production are still increasing around the world. . . . global milk consumption is projected to increase by about 60% by 2050, with many new consumers coming from China. . . . The Chinese population is a particularly good example of this trend, with traditionally low milk consumption per capita (<2 kg per capita per year in 1961), but by 2016, this number had increased by a factor of 25.”
- “Currently, China is the world’s leading milk importer. . . . Despite these huge expansions [in the Chinese dairy industry] in recent decades and continued increased demand for dairy products, there are clear signs that production growth is leveling off.”

Ranjitkar, Sailesh, Dengpan Bu, Mark Van Wijk, Ying Ma, Lu Ma, Lianshen Zhao, Jianmin Shi, Chousheng Liu, and Jianchu Xu. "Will Heat Stress Take Its Toll on Milk Production in China?" *Climatic Change* 161, no. 4 (2020): 637–652. doi: 10.1007/s10584-020-02688-4



8. Don't forget dairy goats: Their number is growing rapidly

There were about 218 million dairy goats in the world in 2017. "Most of the world's goat milk is produced and consumed in India, Bangladesh, Pakistan, and Turkey." (The global goat population is estimated to be over a billion, 60% of which are in Asia.)

"During the past decade (2007 to 2017), Asia has seen the largest increase in goat milk production (22%), followed by Africa (13%), and Oceania (9%), Americas (5%), and Europe (4%)." Interestingly, some countries that are keen to develop their dairy goat industry do not have a long tradition in consuming or producing goat milk (e.g. China, United States, New Zealand).

A bit more info:

- "Demand for dairy goat products is rising in both traditional and new markets. Goat milk and products increasingly are preferred for their health and nutritional benefits, including greater digestibility and lipid metabolism, in addition to their taste, compared to cow milk."
- "There is increasing pressure on smallholder dairy goat producers to commercialize and intensify their operations, or lose their livelihoods. . . . As the global dairy goat industry continues to integrate, the dichotomy between subsistence and commercial production persists, and both systems may co-exist within the same country."

Miller, Beth A., and Christopher D. Lu. "Current Status of Global Dairy Goat Production: An Overview." *Asian-Australasian Journal of Animal Sciences* 32, no. 8 (August 1, 2019): 1219–1232. doi: 10.5713/ajas.19.0253

EXPLANATORY NOTE:

- Academic studies are notoriously hard to find, read, and put into practical use by non-academics.
- Super-busy advocates cannot afford to spend a lot of time and effort to dig up, digest, and deploy academic research even though they recognize the value of academic studies in informing and improving their advocacy work.
- *Academic Studies Without Tears* aims to help advocates faced with this dilemma.
- Its target audience are leaders and funders of non-profit advocacy organizations addressing the many negative impacts of industrial animal agriculture in low- and middle-income countries.
- It uses a communication style – reminiscent of quiz or news items – that makes everything a breeze to read.
- Each issue focuses on a particular topic and includes 8 – 10 academic studies.
- It goes without saying that the academic studies featured are *not* the final word. They have flaws and limitations. They are just a tiny selection of perspectives and findings for advocates to consider, to whet their appetite. But every relevant data point and nugget of cogent information adds to one's store of knowledge and has the potential to spark new ideas.

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