



FEED THE FUTURE ENABLING ENVIRONMENT FOR FOOD SECURITY

FACTORS FOR ANIMAL SOURCE FOOD MARKET SYSTEM SUCCESS

Technical Learning Note

OVERVIEW

The Feed the Future Enabling Environment for Food Security (EEFS) project has developed a comprehensive literature review to inform analyses of the enabling environment for animal source food (ASF) market systems to support **inclusive economic growth, resilient livelihoods, and improved nutrition**. The target audience for this review are United States Agency for International Development (USAID) Missions interested in developing ASF market systems in Feed the Future countries.

ASF market systems are complex with various interconnected considerations unique from crop subsector considerations. ASF market systems themselves are also diverse, with enabling environment considerations that are specific to livestock type, environment, and product channel. The literature review, excerpted from in this technical learning note, identifies a comprehensive set of enabling environment factors structured in three parts:

- 1) **Supply-side factors** — those that enable or impede the production of ASF
- 2) **Marketing factors** — those that affect consumer demand and the ability of producers to reach their end market destination safely and efficiently
- 3) **Financial services factors** — those that enable system-wide uptake of improved technologies and practices by reducing risks and increasing liquidity

SUPPLY-SIDE FACTORS

Animal Feed

The cost, quality, and seasonal availability of animal feeds are key determinants of success in any ASF market system. While the competitiveness of smallholder ruminant producers is partly driven by their ability to source feed materials from their own land, monogastric species such as pigs and poultry often depend on higher quality feed materials that cannot be easily produced on farm, such as commercial crop by-products and commercially processed feeds.

- **Commercial Feed:** The quality of feed can vary significantly,¹ particularly over seasons as availability/prices of materials change, and processors alter feed mixes accordingly. This variability leads to poor livestock performance and lack of trust among producers, who may choose to create their own feed mixes using purchased crop by-products — a practice which reduces costs but may not improve performance.
- **Feedstuffs:** The availability of feedstuffs, including both domestically available and imported, are critical determinants of feed quality and cost. Countries without adequate supplies of feed materials may rely heavily on imported feedstuffs, including vitamins, minerals, and other additives. Reasons for feedstuff undersupply are typically shortage of arable land, high demand for grains for human food consumption, rising prices, or lack of oilseed crops being grown domestically. Any tariffs and non-tariff barriers (NTBs) on imported feedstuffs will increase costs and reduce reliable



availability for domestic feed processors. Access to foreign exchange is also an important determinant for domestic actors to import feedstuffs.

- **Fodder Markets:** Forages, hay, and crop residues are often marketed at large scale, providing a significant proportion of the feed supply for ruminant production systems. These markets may be largely informal and unregulated, but may also depend to some extent on public infrastructure, such as designated market points to store material and to transact. Public support for such fodder market systems may lead to positive outcomes for feed supply reliability.
- **Planted Forages:** In many mixed-crop livestock systems, producers are increasingly turning to specialized planted forages; however, producer access to planting material may be constrained. Private sector seed systems have shown limited interest in investing in the production and distribution of forage seed, and while national systems may support forage seed production and delivery, their effectiveness and efficiency at scale is often constrained.

Animal Genetics

A significant determinant of livestock productivity is the genetic makeup of the animals — or Farm Animal Genetic Resources (FAnGR).² FAnGR impact an animal's ability to convert feed resources into outputs, such as meat, milk, and eggs, as well as their rate of reproduction, fitness, and the animal's ability to survive and produce in a given agroclimatic setting. Producers select animals for breeding which exhibit combinations of productivity, input needs, and resilience that best meet their objectives.

- **Public Sector Roles:** The public sector has typically been the core initial resource for improving breed performance, after which partnerships with private breeders typically develop. A key factor for public sector institutions to support genetic improvement is not only their ability to demonstrate year-on-year genetic gains towards agreed breeding objectives, but also their operational capacity and ability to deliver genetics at the necessary scale, cost, and manner to reach target producers.
- **Private Sector Roles:** As livestock systems develop and producers become more commercially oriented, private sector animal genetics producers and distributors will play a larger role, supplying semen or breeding animals (often along with other farm services). Ideally, these actors work in close cooperation with public breeding programs, sharing strategies, facilities, and germplasm and conducting joint training. Additionally, private actors often rely heavily or entirely on imported genetics from global suppliers. Therefore, import regulations, tariffs, and NTBs will affect domestic producer access to these genetic resources.
- **National Strategies and Policies:** National breed strategies and policies often prioritize the conservation of FAnGR, given the real or perceived threats from uncontrolled crossbreeding.³ This concern is in recognition of the long-term value of retaining these genetic resources to mitigate future risks, including climate change, emerging diseases, and changing market demands. The issue that must be balanced with these conservation considerations is whether strategies and policies place additional burdens on access to types of improved genetics producers are likely to select.
- **Species-Specific Factors:** The full literature review details factors for improved genetics specific to cattle, poultry, small ruminants, and pigs.

Animal Health

Livestock diseases in developing countries continue to constrain production and opportunities to respond to growing market demand. Infectious diseases increase mortality, reduce animal productivity, and also

constrain export opportunities. A wide range of animal health services and veterinary products are required to mitigate the risks associated with animal disease for actors all along the supply chain.

- **Public vs. Private Sector Roles:** The roles of private versus public animal health services can impact market system performance where those roles reduce producer access to services and drugs. It is generally agreed that government focus should be on the control of epidemic diseases, including zoonotic diseases, which have large public externality implications. Epidemic disease control measures include sanitary measures, quarantine services (although market-driven quarantine requirements could be privately funded), movement controls, surveillance, and vaccination.⁴ While epidemic disease control should be publicly funded, private actors can provide the delivery, facilitating opportunities for public/private partnerships.
- **Veterinary and Para-Veterinary Capacity:** The capacity and role of veterinary professionals in the market system (including both service delivery and public policy advocacy) influence its performance. However, paraprofessional animal health workers should also play a central role.⁵ Paraprofessionals operate at a lower cost and in more remote areas and can therefore fulfill a critical function for resource-poor livestock keepers and market actors. To be effective, paraprofessional systems should be developed interactively with local communities (including women and youth who keep livestock), employ sound business practice, and be in line with veterinary authorities, disease surveillance/reporting systems, and veterinary drug controls.
- **Veterinary Drug Availability and Quality:** The availability of veterinary drugs (therapeutics and vaccines) for commercial producers is generally better than for smallholders, who may be more exposed to the counterfeit, substandard, expired, or noncompliant drugs being offered at lower costs. These substandard drugs affect animal safety and disease control/treatment efficacy, ultimately hindering incentives for smallholder adoption.
- **Harmonized Quality Control Standards:** Individual countries may not have the infrastructure, specialized personnel, and/or financial resources to regulate the importation or domestic production of substandard veterinary drugs. Where this is the case, countries should coordinate with regional organizations to develop and employ harmonized quality control standards, such as those developed by the Pan African Veterinary Vaccine Center of the African Union.^{6, 7} If government lacks the resources to enforce drug quality regulation, then training and awareness raising among producers, veterinarians, dealers, and retailers are essential.⁸

Access to Land, Water, and Labor

It is generally understood that fundamental resources such as land and water are needed for livestock production systems; however, the conditions in the enabling environment that impede or facilitate access to these resources can often be overlooked. In addition, the importance of labor for smallholder intensification is particularly underappreciated. The literature review examines the factors that support access to these resources.

- **Land Tenure:** Secure land tenure is important for livestock systems to incentivize long-term investments, to enable generational transfer of enterprises, to scale up enterprises through land consolidation, and to provide clarity in community-managed areas. While secure access to land can be critical, monogastrics such as pigs and poultry can be raised in small, confined settings, and even smallholder-intensive dairy production can be largely unconstrained by access to land.⁹
- **Land Rights for Women:** The inclusivity of land rights is particularly important for women. For instance, in the case of spousal death, inability to inherit property may impact the surviving spouse's livestock enterprise operations.¹⁰
- **Traditional Community Rights:** In pastoral settings, traditional community rights to and limitations for land use rights exist alongside increasing regularization of rights in legal terms.

Traditional rights must be accompanied by effective community institutional structures to govern them, including and the management of conflicts that may occur.¹¹

- **Access to Water:** Water is a critical input for all livestock systems, although the needs per animal vary significantly by species, husbandry, and environment. In relatively intensive crop-livestock systems, water can be available from a variety of sources, including surface water, wells, boreholes, rainwater harvesting, public water points, piped public water supply, or commercial delivery by truck. The type and variety of such sources will affect both reliability and price. In dryland pastoral systems, the sources are more limited and vary seasonally. It is important to assess availability and cost as well as seasonal variation, since those may impact the viability of the enterprise, even in relatively high-rainfall settings.
- **Availability of Labor:** An important, but often overlooked factor, particularly in smallholder settings, is the availability of labor compared to other factors of production, such as land. Many improved technologies require increased labor, including planted forages, silage-making, confined zero-grazing, and utilization/treatment of crop residues among other activities. Evidence suggests the most important determinant of the use of intensive practices is the ratio of labor wage rates to land rental rates.¹² Land scarcity is associated with labor-intensive and higher productivity practices;¹³ however, the proximity to urban centers will raise relative wage rates. Assessing these ratios in target areas is necessary to understand the capacity for uptake of improved practices.

MARKETING FACTORS

End-Market Demand

ASF market system development efforts should start with a detailed consideration of end-market demand dynamics. The target market channels (local versus export, fresh versus frozen, etc.) must be identified, and the product specifications/expectations of buyers and consumers in that channel must be well understood. These specifications should drive responsive producers, processors, and other actors along the chain to meet those demands by adapting their practices accordingly.

- **Formal and Informal Channels:** Understanding the dynamics of both formal and informal market channels is important. An understanding of which products in what form (to which specifications/standards) are likely to attract buyers, and who and where those buyers will be, are all critical aspects to assessing the potential for ASF market system success.
- **Local Market Demand:** The factors that influence local consumption patterns will have an outsized effect on local nutritional outcomes. Due to low-income consumer resistance to the higher costs of formally processed products, informal markets for raw or traditionally processed products are likely to continue to play a large role for the foreseeable future.
- **Standards and Consumer Preference:** Top-down attempts to mandate product and process standards may be expected to fail if they do not reflect buyer demand, and may instead lead to increased informality of supply chains. The evidence is clear that demand for product differentiation is driven by the nature of consumer buyer behavior. Changes in consumer preferences related to traditional foods and product attributes, such as packaging and refrigeration, are more likely to change over the long run.

Trade Facilitation

The literature review discusses several factors in the enabling environment which either impede or facilitate trade in ASF, including infrastructure, sanitary and phytosanitary (SPS) requirements, tariffs and NTBs, and bilateral trade agreements.

- **Infrastructure:** Where ASF exports are economically sustainable, specific types of infrastructure are needed. In the case of live animal trade, certain infrastructure is related to animal movement across distance, including holding pens, water, feed, and health points along transport routes. In some cases, these may be publicly supported, but large private market actors may also play a role in providing these services.
- **Cross-Border Price Transmission:** Factors such as informal, unpredictable taxation at borders, lack of standards harmonization, and other NTBs across countries have been found to affect price transmission, which limits market actor ability to respond to market signals and hinders the competitive potential of the market system. Assessments of ASF market systems prior to project design/investment with export market aspirations must consider these factors and endeavor to alleviate these barriers.
- **SPS Requirements:** One of the key bodies establishing SPS requirements in ASF products is the Codex Alimentarius, which sets food standards, guidelines, and codes of practice recognized by the World Trade Organization. A key capacity feature of an export-oriented livestock industry is the ability to comply with SPS requirements, which require, among numerous criteria, foot-and-mouth disease-free animals. A number of mechanisms can be implemented to meet these requirements, including the establishment of disease-free zones and export corridors that keep livestock from being exposed, so that they can be exported even without vaccination. The economic returns to such investments are, however, mixed.
- **Bilateral Agreements:** Where countries are unable to meet international SPS requirements, bilateral agreements can facilitate trade between partners without meeting the full international requirements. Evidence of these agreements (e.g., between Horn of Africa producer countries and Arabian Peninsula buyer countries) shows that increased trade can result, but risks of zoonotic disease outbreaks, such as Rift Valley Fever, can affect human health, prompt livestock import bans, or cause animal consignment rejections.

Food Safety Control

Most foodborne risks from ASFs are from microbial pathogens (such as Salmonella), contaminants (such as aflatoxins in feed supply), and zoonotic diseases. The threats of unsafe food go beyond those of public health, as they can have significant economic consequences as well. Consumer demand for improved food safety control relies on increasing consumer awareness as well as disposable income growth to pay the higher associated costs.

- **Public Sector Food Safety Control:** There are several pathways for public sector food safety control in settings where public resources for regulatory enforcement are limited, and consumers are less willing or able to pay for increased safety.¹⁴ Among these pathways is the promotion of co-regulation, in contrast to enforcement of regulation. Experience in developed countries has shown that top-down enforcement of regulations through inspection and punishment generally does not work as well as enabling actors to self-regulate, accompanied by appropriate incentives.¹⁵ Co-regulation approaches require close interaction and coordination among private sector actors and public regulators.¹⁶
- **Evidence-Based Risk Analysis:** This approach — designed to reveal risk threat points and types in the value chain — is generally accepted as the most effective approach; however, the capacity for this sort of analysis is limited in developing countries and not often implemented. The existence of a single authority to oversee food safety would improve effectiveness, but in practice this is difficult to achieve, as this authority is often split between the agricultural and health authorities. Effective coordination among those authorities increases the efficacy of evidence-based efforts.

- **Private Food Safety Standards:** Private voluntary standards have increasingly emerged in both domestic and international markets as a response to heightened consumer interest in food safety and willingness to pay for increased assurance.¹⁷ Although these are voluntary, noncompliance blocks access to those particular market channels. Private standards often exceed public standards in several ways, including stricter specifications, and display more attention to practices and processes along the supply chain (e.g., Good Animal Husbandry Practices) rather than just end results in terms of food safety attributes. Private sector industry associations and networks can play a key role in developing and promoting standards with members.

FINANCIAL SERVICES FACTORS

Access to Credit

Access to capital is often critical for livestock operations. For instance, capital is needed to acquire initial animal stock, thereby limiting new entry to livestock production. Access to working capital can also be a constraint to enterprise operations — for example, for fattening operations where no revenue is generated until animals are sold. Credit supply constraints often include high transaction costs, such as obtaining accurate information, and servicing rural areas. Credit demand constraints often include farmers' inability to meet immovable collateral requirements, or the loan limits may be too low to enable purchase of replacement animals. Women farmers in particular may face higher barriers to accessing credit in instances where collateral is in the spouse's name.

- **Secured Transaction Law and Movable Asset Registry:** The legal framework needed for formal credit includes, among other requirements, a secured transaction law which allows lenders to secure assets in the event of default.¹⁸ A properly designed secured transaction law allows for a range of collateral types, from real property to movable assets (including livestock), or accounts receivable, such as future milk deliveries. An official movable asset registry can reduce the transaction costs associated with formal credit supply in ASF market systems.
- **Credit Certifying Organizations:** An alternative arrangement to movable collateral is where credit certifying organizations verify the creditworthiness of producers through smartphone collection of expense and return records. They then link to financial organizations to provide loans directly to those farmers based on the credit certification.
- **Informal Credit:** Where formal access to livestock production credit is limited, informal credit schemes have demonstrated success in the livestock sector. For instance, traditional loan practices include livestock credit in-kind in the form of a live animal loan between producers (e.g., heifer-in-trust), wherein a female animal is loaned to another producer who returns the animal after a herd is established. Despite small-scale successes of informal lending programs, the investment needed to establish and operate modern ASFs production, processing, and marketing facilities will require credit through commercial channels.
- **Value Chain Finance:** Credit facilitated between suppliers and buyers can be an effective alternative to increase producer access to inputs. For instance, whereby a buyer of live animals provides in-kind credit to their suppliers in the form of young animals, feed, and veterinary supplies. This type of credit does not usually require collateralized assets, and the security of the arrangement lies in the mutual dependencies between actors. Nonetheless, contract laws as well as their transparent and impartial enforcement can regularize these arrangements.

Livestock Insurance

Livestock insurance can reduce risks associated with loss of animals due to disease, climate, accidents, and other uncontrollable events. In many cases, livestock insurance programs have failed due to the high risk of fraud and the complexity of implementation.¹⁹ Importantly, livestock insurance should not be viewed

as an isolated product, as it can be more effective as part of a full-service support package to producers to reduce production risks, including improved access to animal health services/products, feed, genetics, credit, and output markets. Nonetheless, the literature review identifies the following factors for success.

- **Index-Based Insurance:** Index-based products are increasingly popular, as they reduce information asymmetry and transaction costs. When satellite data of pastureland show conditions that predict livestock mortality in excess of a threshold, the insurance issues a payout to contract-holders — which may or may not fully cover their losses — and proof of animal mortality is typically not required under such products.
- **Digital Technologies:** New digital technologies have emerged to help mitigate risks of insurance fraud. For instance, smartphones are increasing rural access to agricultural insurance generally and, in the case of livestock, have assisted with dedicated apps for animal identification and paper-free claims processing.
- **Cost of Insurance:** The cost of insurance can be a limiting factor, and public sector subsidies for premiums, claims, or reinsurance have often been needed to sustain livestock insurance schemes. Evidence from developing countries demonstrates that public sector support has been required to sustain these programs. In Mongolia for instance, an index-based scheme required producers to absorb small losses, while larger losses were covered by the private insurer, and extreme losses were covered by a public safety net program.²⁰ In Kenya, an index-based livestock insurance program designed to protect producers from drought-related losses relies on government support.²¹ In this case, the social safety net component has been emphasized as a means to protect the most vulnerable communities.

KEY TAKEAWAYS

ASF market systems present tremendous potential to deliver economic growth, resilience, women's empowerment, youth engagement, and improved nutrition; however, various factors in the enabling environment will drive the impact that is achieved. A literature review developed by the [EEFS project](#) serves as a guide for evidence-based analysis of the enabling environment for ASF market systems. Key factors have been identified that support more competitive, inclusive, resilient, and nutrition-sensitive market systems, drawing upon lessons learned from various developing country contexts. This list of factors is not intended to be exhaustive, and other factors may be critical determinants in any given system, particularly the political economy.

The literature review is primarily intended for USAID Missions to effectively design ASF market system development efforts; however, the findings are also relevant to a range of actors, including national policymakers, social impact investors, and private sector actors seeking to maximize socio-economic impact.

For information on how USAID can access the EEFS mechanism for ASF market system analysis, contact Adam Keatts (COP) at akeatts@fintrac.com or Lourdes Martinez Romero (COR) at lmartinezromero@usaid.gov.

NOTES

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