Agricultural Industry Report

Animal Health, Mongolian Wealth:
Unlocking Mongolia's Other Treasure Chest

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I. EXECUTIVE SUMMARY

With abundant copper, gold, coal and uranium resources, Mongolia's mineral wealth is estimated to be a staggering US$ 1 trillion. In mid-2005, Mongolia made this treasure trove available to foreign and domestic investors alike. Mongolia's **mineral product exports increased more than six times** to US$ 4 billion from 2004 to 2016. But Mongolia possesses another resource in abundance that remains relatively unknown. Mongolia has one of the highest per capita livestock ratios in the world, with 19 heads per person. And with 0.5 square km per person, it is also one of the most sparsely populated countries as well. Mongolia's livestock sector, specifically the meat industry, holds tremendous potential. Yet Mongolia has not been able to leverage this endowment into the creation of a global industry. From 2004 to 2016, **agricultural product exports decreased** 21% to US$ 330 million.

- Mongolia's livestock herds and domestic meat production have now surged to record amounts, far in excess of domestic demand. The total number of **livestock** stands at approximately **61.5 million** as of December 2016. Exports to China offer a strong opportunity for diversifying the economy and improving the livelihood of Mongolian herders. Yet in 2016, according to Customs Data, Mongolia only exported an estimated **7,900 tons of meat** —generating US$ 14.8 million revenue — far below its potential capacity.

- **Mongolia's geography** provides it with unique access to favorable **Chinese and Russian markets.** Whereas Russia imports meat primarily from other nearby European countries, China imported 4.5 million tons of meat in 2016 from overseas suppliers like Uruguay, Canada, and Argentina. Mongolia is well-positioned to offer competitively priced meats and capture considerable market share in China. Already, China has formally expressed interested in importing 150,000 tons of meat from Mongolia.

Yet Mongolia has not unlocked its next wealth treasure chest. So what is holding back the development of a robust meat export industry?

- **Both China and Russia have placed import bans** on Mongolian meat products, following the outbreaks of the highly contagious and dangerous **Foot and Mouth Disease (FMD).** The World Organization for Animal Health (OIE) has not given Mongolia FMD-free country status, thus preventing the export of meat products to China and other countries.

- **The Meat Industry Association members and government agencies'** current focus on building upstream industrial meat practices **will not solve the export ban.** Improvements to the traceability of FMD outbreaks, which occur mostly in the east and west, will not address the core problem: the ban is countrywide.

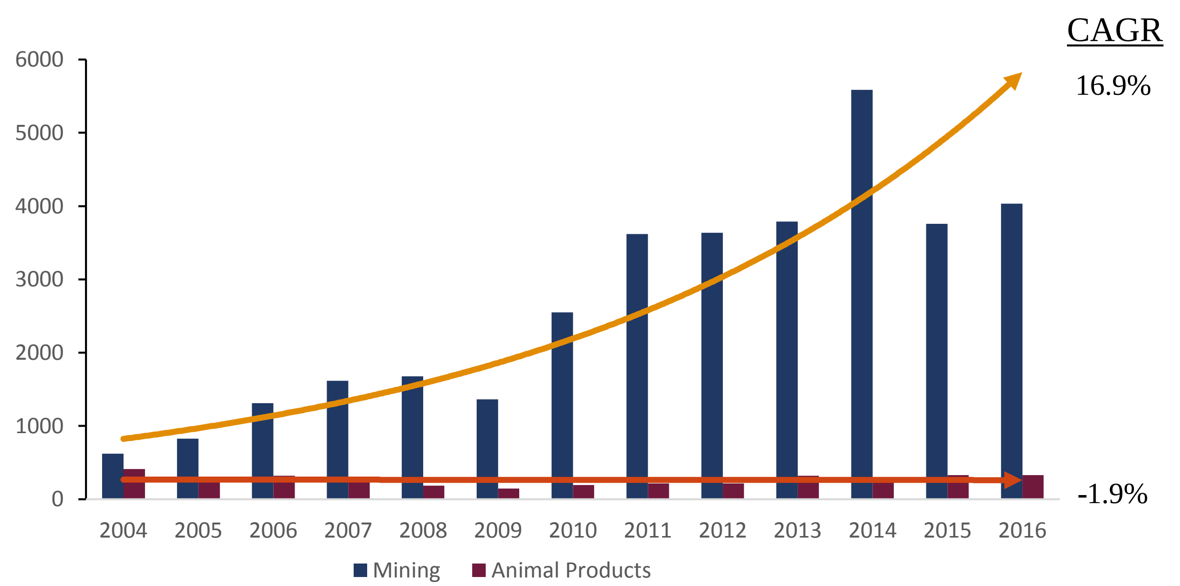
- **Mongolia should develop a countrywide FMD vaccination program** to gain FMD free status**.** The current vaccination program expends US$ 4 million per annum on specific regions after FMD outbreaks have occurred[1]. However, MICC estimates that it would cost US$ 30 million annually for the next three years to vaccinate all the regions in Mongolia and acquire FMD free status. The investment can be recouped through higher taxes on animal husbandry and exports. The government will earn more from individual income and company taxes as herders and export companies' overall wealth increases.

- **Downstream investments in animal health** will also yield positive externalities and improve the quality of other major livestock animal products such as **cashmere** and **leather** — as well as export of other currently banned agricultural products like hay.

II. MEAT MARKET OVERVIEW

Animal husbandry, Mongolia's primary industry, employs a third of the country's labor force and comprises roughly 14% of its GDP. However, livestock products — wool, meat and skins — only constituted approximately US$ 330 million or 7% of exports in 2016, according to Mongolian Customs data. Between 2004 and 2014, mineral product exports rose nearly tenfold to US$5 billion. While mineral exports have fallen due to macroeconomic headwinds, the compound annual growth rate (CAGR) between 2004 and 2016 is 16.9%. The value of animal product exports actually decreased over the same time period, from US$ 414 million to US$ 330 million with a CAGR of -1.9%.

Figure 1.Total Exports by Sector (US$ MLN), 2004 – 2016

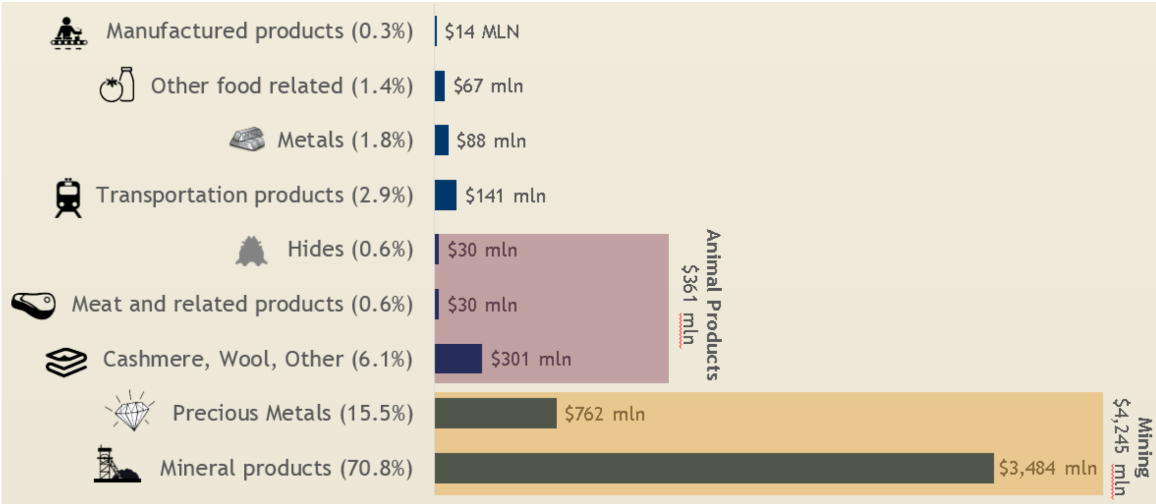


Source: BACI International Trade Database, Customs House

Figure 2, below, offers a more granular breakdown of the peak export year, 2014. Mongolia near-exclusively exported ore and other precious metals. With the exception of cashmere and wool, Mongolian animal products are essentially non-existent in foreign markets.

[1] *In addition to the US$ 4 million for vaccination, other costs include post-outbreak slaughter, veterinary salaries, transportation — notwithstanding the unquantifiable costs of slowed growth rates and animal productivity.*

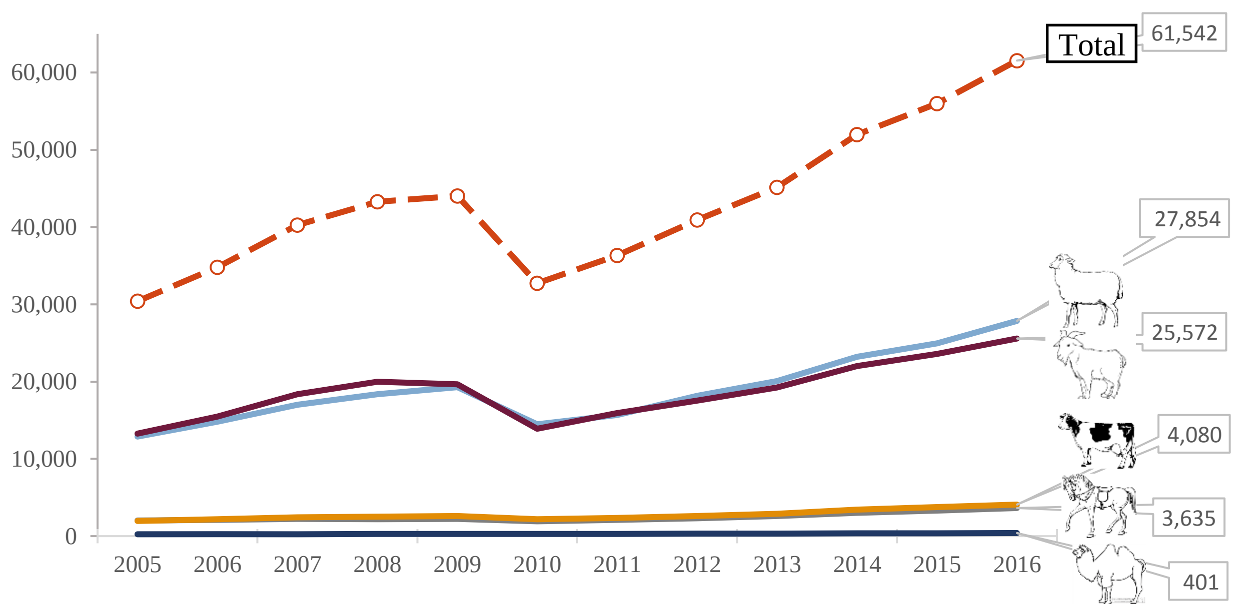
Figure 2. Segmentation of 2016 Exports, US$ 4.9 BLN Total



Source: 2016 Mongolian Customs Data

The meat segment stands apart for its strong historical growth and exciting market opportunities. Figure 3, below, graphs the population of livestock in Mongolia from 2005 to 2016 With the exception of certain extreme weather Dzud events, the livestock population has grown consistently since the 1990s.

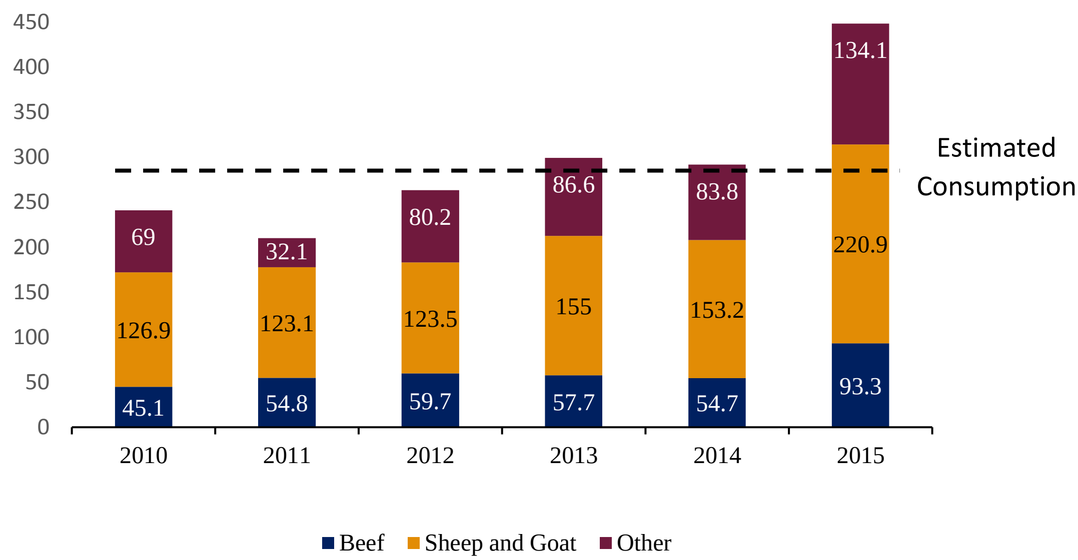
Figure 3.Recorded Number of Livestock ('000 heads), 2005 – 2016



Source: Mongolian Statistical Information Services

Perhaps unsurprisingly, meat production is also at an all-time high. Meat production rates stayed relatively consistent from 2010 to 2014, but, as depicted in Figure 4, skyrocketed to a high of 448,000 tons in 2015. Given Mongolia's per capita meat consumption of 88 kilogram, Mongolia's domestic consumption is estimated to be approximately 269,000 tons annually.

Figure 4.Total Meat Production ('000s Tons) and Estimated Consumption, 2010 – 2015



Source: BACI International Trade Database

Meat production has thus exceeded demand for the past three years — even though 97% of meat is slaughtered by herders instead of in modern abattoirs, suggesting that Mongolia can produce on an export scale without fundamental changes to its supply chain.

III. EXPORT POTENTIAL

Export potential is determined both by Mongolia's livestock endowment and the availability of foreign markets. This section proceeds by estimating Mongolia's capacity for meat production and the oft-discussed Chinese meat market.

New Zealand stands as a strong comparative case for analyzing the long-term potential of Mongolia's meat industry. For starters, New Zealand has a population of roughly 4.5 million — and a comparable annual domestic demand for meat. It has 29.5 million sheep and 3.6 million cattle, nearly identical numbers to Mongolia. According to meat industry trade group BeefLambNZ, New Zealand annually exports over 750,000 tons of meat to 120 different countries and generates more than USD $3.8 billion in revenue.

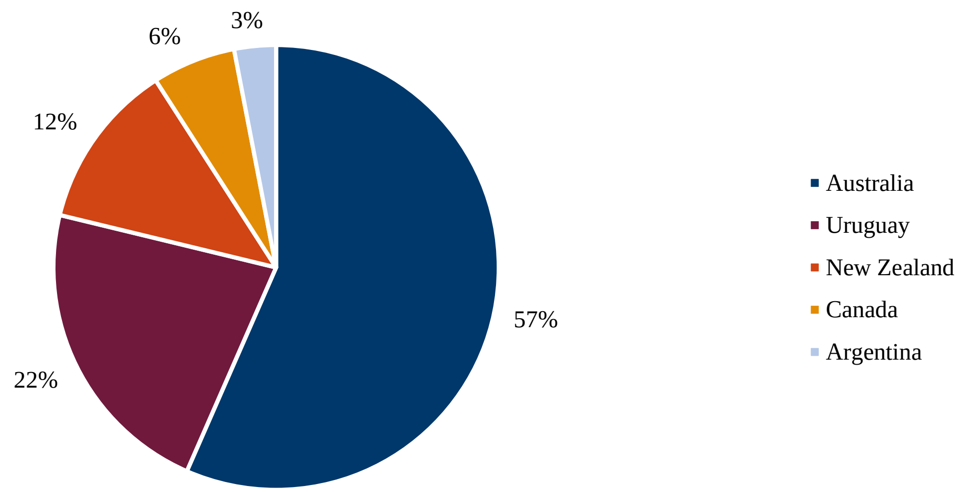
As compared to other countries, Mongolia exports a significantly smaller amount of meat given its livestock endowment. According to the 2016 export numbers, Mongolia exports 0.24 kg of meat for every head of beef and sheep. The table below compares the livestock endowment and exports of major global meat players. The range of per animal (sheep and beef) exports is from 5.61 kg to 33.19 kg, suggesting that Mongolia has an inefficient export industry primed for expansion.

Exporter	Livestock (Mln Sheep + Cow)	Meat Exports ('000s tons)	Export Rate (kg per livestock)	Mongolian Export Potential at Comparative Rate ('000 tons)
New Zealand	33.1	750	22.65	**723**
Australia	103.5	1,590	15.36	490
Canada	12.0	322.3	26.86	857
Uruguay	11.9	395	33.19	1,059
India	376.1[2]	2,123	5.61	179

Source: Beef + Lamb 2016 Update

China provides a geographically favorable and massive market. China consumes approximately 28% of the global meat supply, yet its animal husbandry industry cannot support domestic demand. Per capita meat consumption in China has grown from 13 kg in 1982 to 63 kg in 2016. It is predicted to skyrocket to 93 kg by 2030. The U.S. Meat Export Federation estimated that China imported 4.5 million tons of meat in 2016. The Australian Bureau of Agriculture and Resource Economics and Sciences estimates that by 2050 China will import a total of US$ 150 billion annually, driven by the growth of its middle class. Mongolia's geographic proximity raises the possibility of capturing market share from overseas suppliers and entering a more upscale meat market. Figure 5 depicts the estimated percentage breakdown and value of beef imports; the breakdown for sheep imports is similar. China relies on foreign countries that have high shipping, storage and labor costs. Mongolia is well-positioned to provide lower cost — but pasture-raised and free range — meat as a substitute for Uruguayan, Canadian, and Argentinian products. Furthermore, according to the price aggregator database Numbeo, average beef round prices in China (USD $11.23/kg) are approximately 39% higher than in Mongolia (USD $8.1/kg). Clearly, China is lucrative market.

Figure 5.Estimated Beef Imports to China, 2014 (US$ 1.35 BLN)



Sources: Statista: "Distribution of Beef Imports to China", Beef Magazine

Promising signs for Mongolia's meat market have recently emerged. China, for instance, has formally expressed its interest in importing up to 150,000 tons of meat. Livestock numbers are

[2] *Includes water buffalo, which are classified as beef by the USDA.*

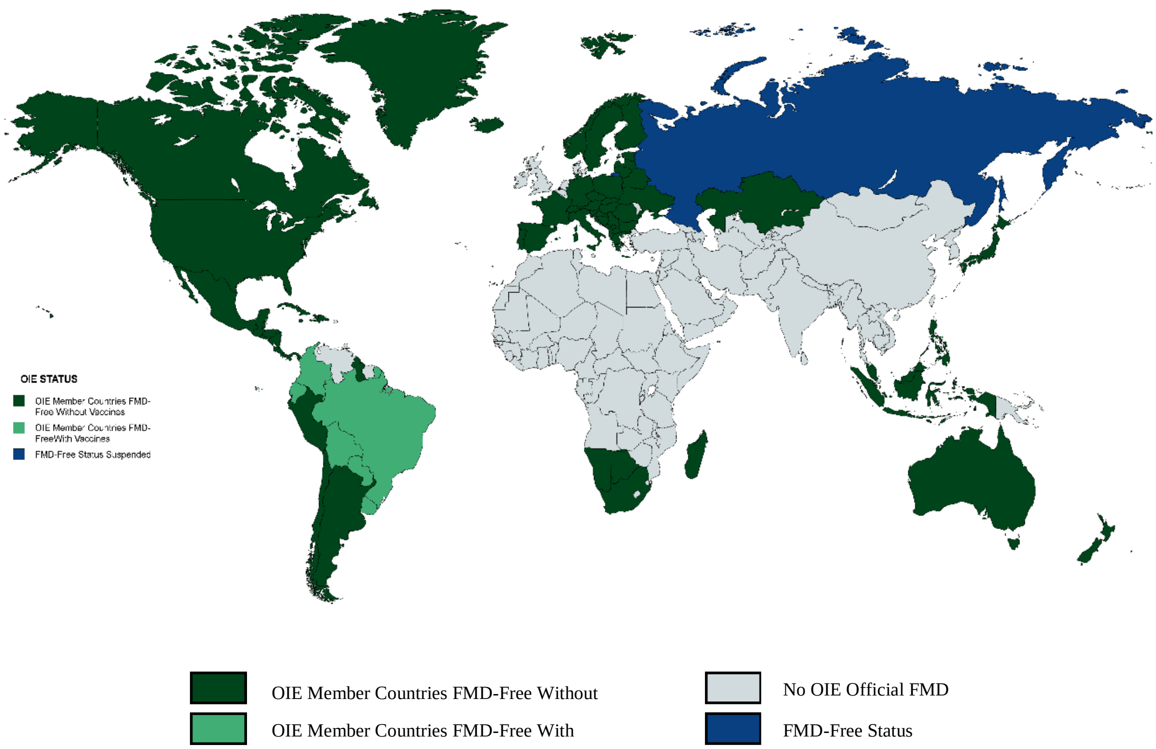
soaring. Yet formidable obstacles remain before Mongolia can realize these opportunities in full. Currently, Mongolia's meat exports fall far short of potential as it exported approximately 5,000 tons of meat through state-approved processing facilities in 2015. Numerous leading industry experts suggest that Mongolia's short-term potential capacity is, with its existing infrastructure, 40,000 to 60,000 tons.

IV. INDUSTRY BARRIERS

So what is preventing Chinese or Russian shoppers from seeing Mongolian meat in their supermarkets? A wide range of technical and infrastructure problems limit Mongolia's ability to export, including the lack of infrastructure, rural storage facilities and high-quality scientific labs. Bureaucratic red-tape has also proven to be a recurring problem — the approval process for export companies requires 5 separate agencies and takes 2 to 3 weeks to export individual products. Nevertheless, foreign countries' disease bans ultimately constitute the core challenge.

Chief among disease concerns is the highly contagious Food and Mouth Disease (FMD), which motivates the majority of export bans. FMD affects all cloven-hoofed livestock and according to the World Organization for Animal Health (OIE), is one of the most contagious diseases in the world. It can devastate even well-developed industries and countries. For instance, the 2001 United Kingdom FMD outbreak cost US$ 16 billion, required the slaughtering of over 10 million livestock, and stigmatized UK beef. Generally, regional eradication requires well-planned management and expensive investments. FMD affects growth rates and animal productivity. A positive FMD status severely impedes international meat trading: "clear" status is specially designated by the OIE and is considered the gold standard of quality. Figure 6 depicts the countries that have the FMD-free status and are registered with the OIE. Every major supplier of Chinese meat, as presented in Figure 5 has recognition from the OIE as a FMD-free country.

Figure 6.Map of Countries with OIE-Recognized FMD Status, 2016



Source: OIE, "Official Disease Status: FMD"

Increasing meat exports and developing the industry requires the eradication of FMD in Mongolia. Since the collapse of the Soviet Union, Mongolia has struggled to contain FMD outbreaks throughout the country — dozens of countries, including China, have enacted bans in response to these outbreaks. Bilaterally, the Government of Mongolia has negotiated certain disease-free regions within Mongolia that can export to specific countries. Moreover, heat processing meat sanitizes the product and certain countries like Russia allow their importation. These stop-gap measures allow for some degree of exports, but the existence of FMD in Mongolia severely impairs the industry's development.

Two main solutions to the FMD crisis have emerged: instituting upstream industrial meat practices and improving downstream disease controls. Both strategies are important steps for Mongolia's future. In the short term, however, downstream health improvements should be prioritized over infrastructure investments like slaughterhouses. Upstream investments do not effectively address the country-wide disease bans — expunging FMD at the source will best advance the OIE accreditation process.

a. Lack of Modern Processing is Not a Factor

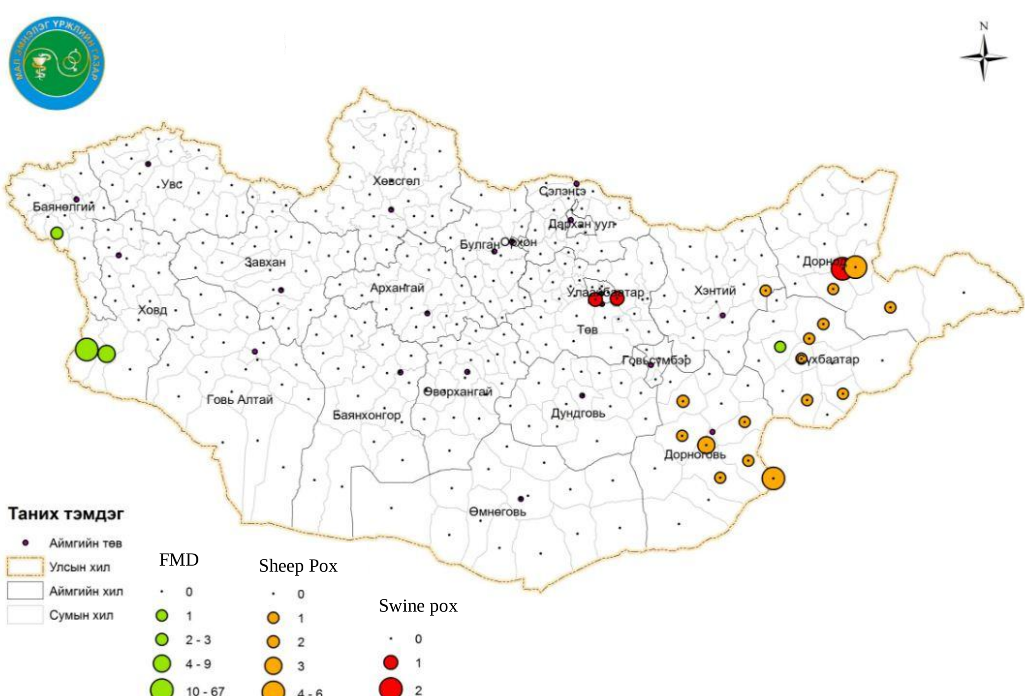
Mongolian Meat Association members and ministry officials have identified modernizing domestic slaughtering capabilities as a potential solution to the disease bans. Currently, 3-7% of Mongolia's meat is processed through abattoirs built during the Soviet era. Advocates of this approach argue that if more livestock is slaughtered in modern facilities, foreign countries will be more willing to lift export bans. Centralizing the meat production system may not yield any sizeable reduction in the overall number of livestock with FMD, but it will allow for clear tracking, accountability and measuring. Visits by foreign state health officials from China, Russia and Vietnam have led to the approval of numerous meat facilities for export. 16 companies can now export to Russia and 6 companies to China. The facility-by-facility approach has led to clear increases in the amount of export-approved companies and presumably the quantity of exported meat.

While modern processing facilities may allow Mongolia to circumvent some foreign import bans, the traditional slaughtering methods are not necessarily an obstacle to meat exports. Appendix A depicts the current distribution channels of Mongolian meat industry. Herders raise and slaughter the vast percentage of all livestock. Proponents of a more industrialized industry argue that Mongolia can never have complete export approval so long as it relies on the traditional slaughter methods — and that new slaughter-houses need to be built. However, the Ulaanbaatar abattoirs are currently under capacity. Only 20 of the 50 total facilities are fully utilized. Even if more livestock were slaughtered in standardized houses, it still would not change the root problem: the prevalence of FMD. Upstream investments may allow for piece-meat improvements, but do not solve the underlying structural problem. While industrial slaughtering enhances efficiency, downstream health investments offer a more direct method for combatting FMD.

b. Vaccines and Health Reforms

Given that supply chain tweaks do not address the underlying problem, a comprehensive strategy for eradicating FMD must be implemented in order to achieve the meat market's full potential. Currently, the Government of Mongolia spends approximately US$ 4 million annually on

Figure 7.Outbreaks of FMD and other Livestock Disease in Mongolia, 2015



Source: Mongolian Veterinary Department, 2015 vaccination designed to limit further spread of FMD and other infectious diseases. Vaccine quality varies depending on the supplier but the most common vaccines cost approximately US$ 0.11 a dose and require 6 vaccinations over the course of three years. Vaccinations are given strategically in accordance with the existing FMD quarantine areas. Today, 32 zones in 12 provinces are under quarantine for FMD. The current strategy has yielded certain zones which are tentatively disease free and factories that, upon inspection, can export meat. However, FMD and other diseases continue to spread and prevent full OIE status. As Figure 7 depicts, livestock disease remains quite prevalent across Mongolia. 2015 witnessed eight FMD outbreaks that infected over 1,000 livestock, as well as numerous outbreaks of sheep pox and other infectious diseases.

The nature of FMD import bans requires a higher standard of disease control than is currently available. In order to be declared an FMD-free region, there cannot be an outbreak for three years. Having weak quarantine, vaccination, or veterinary procedures increases the likelihood of outbreaks and delays the approval process.

The solution to controlling FMD and other livestock disease — and obtaining OIE accreditation — is to augment downstream health investments which will be repaid through taxes on increased exports. Mongolia needs to implement a more centralized veterinary authority and expand its existing vaccination program. US$ 4 million is spent annually on a program that has failed to garner OIE accreditation and the benefits of enhanced livestock productivity. Animals are treated with low quality vaccines that are not effective. Full vaccination of every animal with higher quality products has a demonstrated track record of success. These higher quality vaccines cost approximately US$ 0.35 per dose. The estimated cost of a three-year, highly focused eradication program is estimated to be US$ 30 million annually for three years, or US$ 90 million total.

While this upfront health investment may seem expensive, enhanced international trade will quickly repay the incurred government debt. If meat exports climb anywhere near that of New Zealand, a small excise tax will offset the vaccine investment and provide much needed future revenue to the government. Furthermore, improving health standards for the entire livestock population will yield strong positive externalities that, while beyond the scope of this report, offer alternative streams of revenue. For example, the skin of Mongolian animals is not of high enough quality to be used by large-scale car manufacturers. Downstream investments in vaccines and other parasite medication will ameliorate quality issues and create entirely new domestic industries. Mongolia should thus prioritize these health investment over all other strategic actions.

V. CONCLUSIONS

FMD bans are the primary obstacle threating the expansion of Mongolia's meat export industry. New Zealand's own industry suggests that Mongolia has the potential to produce over 700,000 tons from its livestock endowment. And given its geographic proximity to robust markets like China and Russia, it has the potential to become a major player.

MICC believes that, while infrastructure improvements will increase Mongolia's capacity for export, slaughterhouses investments are not yet necessary as current capacity will satisfy any short-term increases in demand. Countries like China are not imposing import bans because of

Mongolia’s slaughtering techniques, but rather because of the presence of a disease that should be addressed further down the supply chain, at the herder level, through the centralization of the veterinary services and the expansion of the vaccine program. The recent export approval for select facilities and requests for import from China are promising signs for the future of the industry. Overall though, critical downstream health investments, more reliable vaccination programs, herder education, centralized veterinary services and laboratory investments should be prioritized over new investments in modern industrial slaughterhouses.

Finally, the development of any international expansion will undoubtedly require an extensive marketing effort on the behalf of Mongolian export companies. The branding opportunity afforded by Mongolia’s herder-slaughtered meat may outweigh the future benefits of transitioning to modern industrial practices. Mongolian livestock are raised with non-GMO feed, allowed to roam the vast steppe and are slaughtered humanely by their herders. While slaughter houses may provide greater processing scale, many foreign customers will pay a higher premium for meat that is raised in the traditional manner. Mongolian meat has strong brand potential that, if properly developed, may allow it to become a well-respected international player. The tradeoff between efficiency and branding opportunities should be subject to further study. Reformers and investors would do well to focus in the short term on improving downstream livestock health outcomes

VI. APPENDIX A

Figure 8. Meat Channel Distribution