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The Wagyu Beef Value Chain in Japan

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Abstract

Wagyu is a Japanese cattle breed and wagyu beef has been recognised globally as a high-quality meat. Japanese wagyu exports have increased in recent years, but it is facing strong competition from imported wagyu in the domestic market and in other export markets. Australia is the most effective competitor for Japan in terms of its quality and price, due to free trade agreements. This paper describes the performance of the wagyu value chain in Japan and makes a suggestion to improve the value chain. This suggestion relates to transitioning from imported feed to domestic feed supply, especially rice feed. This could lead to a reduction in cost and an increase in efficiency in the value chain.

Keywords: Wagyu, value chain, Japan, performance

Introduction

Wagyu beef is one of Japan's prominent agricultural products. It is recognised for its quality and has been embraced worldwide. Due to its high quality and the continuing economic growth in Asia, the export of wagyu from Japan has been growing (Ministry of Finance Japan, 2021). However, the Japanese domestic wagyu value chain is now facing challenges regarding its competitors, especially Australia, intervening into the global wagyu market at a superior price. Understanding the wagyu beef value chain in Japan is one step towards its improvement. This paper illustrates how logistical and cross-functional drivers in the value chain are performing, identifies their constraints, and proposes a solution to these constraints in terms of efficiency, flexibility, responsiveness, and food quality.

The Japanese Wagyu Industry

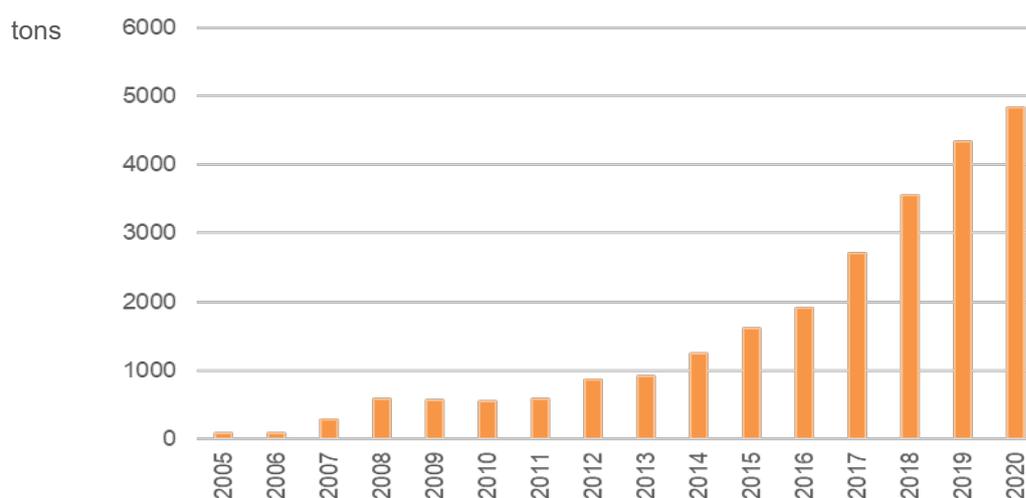
Demand for Japanese wagyu

Wagyu is well known as high-quality beef around the world. Along with its high consumer awareness and economic growth in Asia, where Japan mostly exports its wagyu (Gotoh, 2018, p. 939) (Figure 1), export of beef (mostly wagyu) from Japan has been increasing and reaching new highs every year (Ministry of Finance Japan, 2021) (Figure 2). Worldwide, consumers are willing to pay a premium for Japanese high-quality wagyu, possibly presenting an opportunity to seek higher value in the chain.

Figure 1. Japanese beef exports in 2016

		Amount (ton)	Sum (million yen)	Ratio
1	Hong Kong	659	4,017	29.6
2	Cambodia	363	2,601	19.2
3	USA	245	2,128	15.7
4	Singapore	183	1,122	8.3
5	Thailand	119	758	5.6
6	Others	340	2,925	21.6
	Total	1,909	13,552	100.0
	* Average price (1,000 yen/ton)		7,098	

Figure 2. Beef exports from Japan, 2005-2020



Source: Ministry of Finance Japan (2021)

High-quality Japanese wagyu is known primarily by its marbling (intramuscular fat), which determines meat quality, texture and flavour (Gotoh et al., 2018). In Japan, wagyu cattle take a long time to fatten,

approximately 20 months (Ministry of Agriculture, Forestry and Fisheries (MAFF), 2016), when they are fed with a high-concentrate diet twice or three times a day from 11 months to 30 months of age to accumulate more intramuscular fat (Gotoh et al., 2018). This makes Japanese wagyu rich in fat in comparison to those produced outside Japan.

Import competition

Recently, foreign countries such as Australia and the United States have developed wagyu herds and expanded production, and they are now competitors for the Japanese wagyu industry. Especially, Australia is the most effective competitor for Japan, being the largest exporter of wagyu around the world (Department of Primary Industries and Regions SA, 2017). Although Australian wagyu is not identical to Japanese wagyu in terms of genetics and quality, since “wagyu” in Australia is generally cross-bred in the early years (Oro, 2012), Australian breeders are improving its genetic quality rapidly, and now 20 per cent of Australian wagyu is full blood (Department of Primary Industries and Regions SA, 2017). Consumers can now choose Australia wagyu over Japanese wagyu, as their qualities are on par.

Furthermore, the Japanese wagyu chain is facing stiff price competition. Under the Japan-Australia Economic Partnership Agreement (JAEPA) and the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) that were signed in 2015 and 2018 respectively, tariffs on beef imported into Japan continue to decrease, reducing its price (Department of Foreign Affairs and Trade, n.d.; Department of Foreign Affairs and Trade, 2021). Together with the fact that imports of beef from Australia represent half of total Japanese beef imports (Gotoh et al., 2018) (Figure 3), competition between Japanese wagyu and Australian wagyu is expected to have continuing impacts on the wagyu value chain in Japan.

Figure 3. Japanese beef imports in 2016

	Amount (ton)	Sum (million yen)	Ratio
1 Australia	273,675	157,208	54.4
2 USA	192,128	109,730	38.0
3 New Zealand	16,408	11,303	3.9
4 Canada	13,458	5,566	1.9
5 Mexico	7,355	3,947	1.4
6 Others	1,360	1,010	0.3
Total	504,384	288,764	100.0
* Average price (1,000 yen/ton)		572.5	

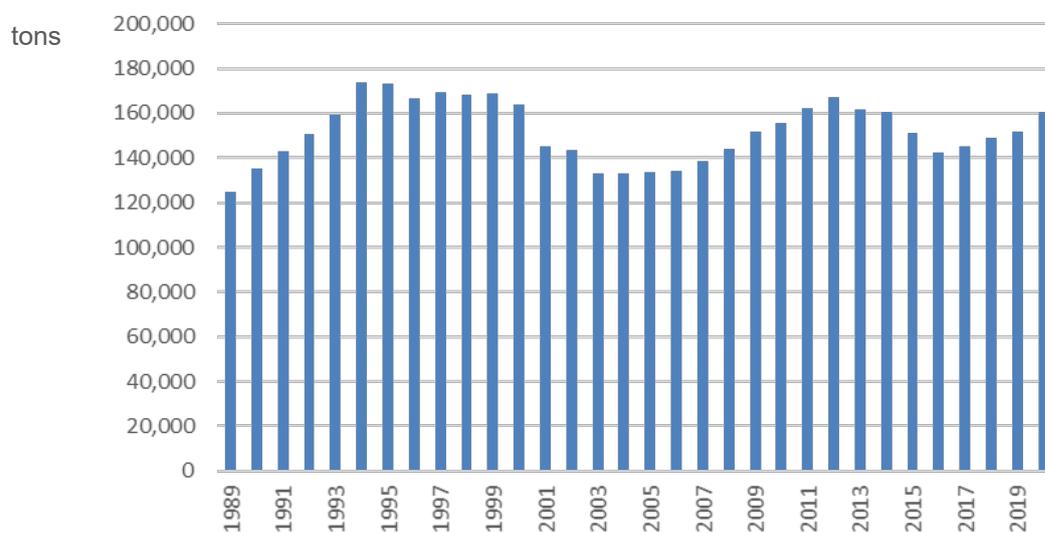
Source: Gotoh et al. (2018)

As a result, domestic consumption of Japanese wagyu has declined while exports have increased.

Overall, wagyu beef production in Japan has fluctuated over the last decade (Agriculture & Livestock Industries Corporation, 2021) (Figure 4).

Thus, with the possibilities and challenges of the value chain caused by its high global demand and the existence of strong competitors, a study of the wagyu value chain in Japan may help understand which areas could provide higher value and increase the overall value generated.

Figure 4. Wagyu production in Japan, 1989-2019



Source: Agriculture & Livestock Industries Corporation (2021)

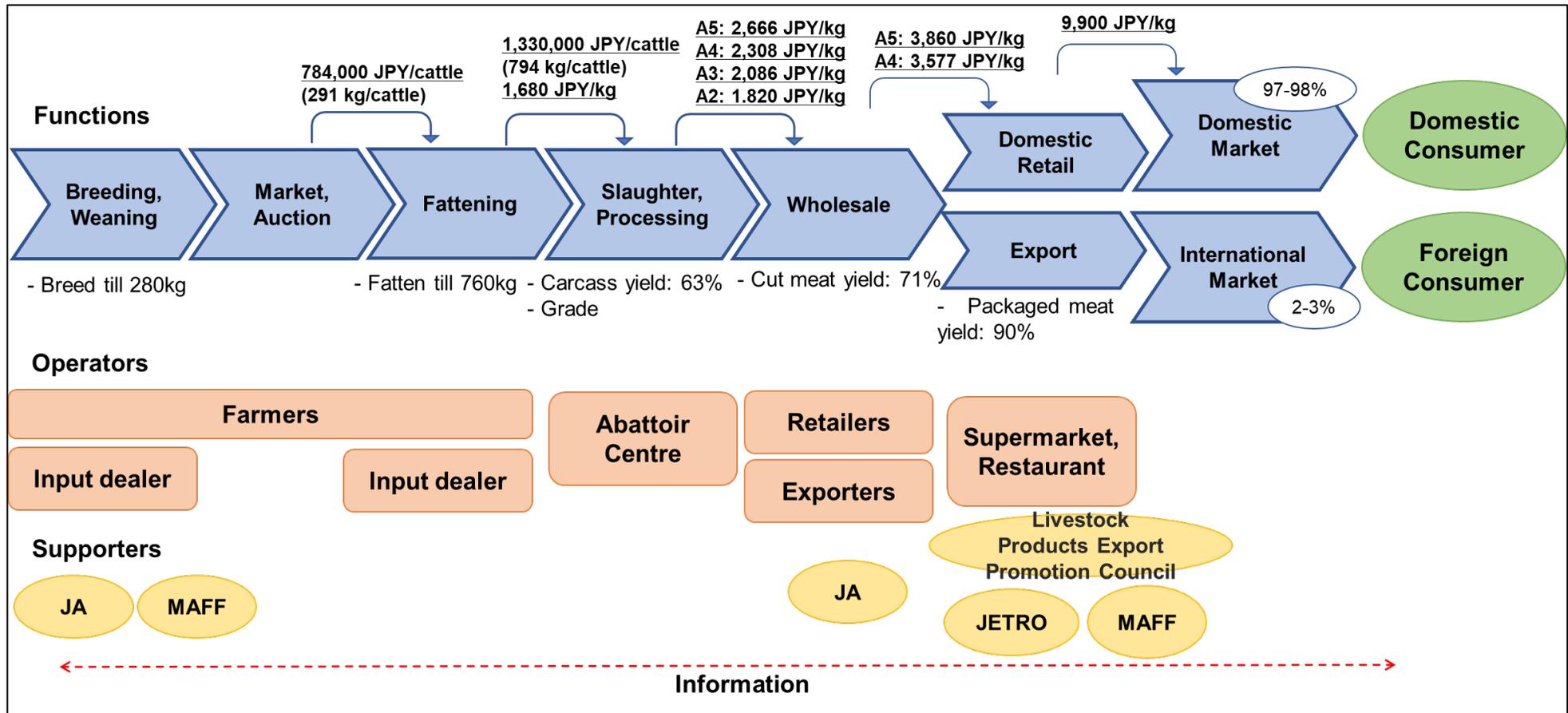
Mapping the Value Chain of Wagyu in Japan

Value chain mapping represents the whole value chain visually and identifies all the functions and linkages of operators and supporters within the value chain (Springer-Heinze, 2007). The value chain map shows the movement of wagyu product from breeding to final consumers (Figure 5). The focus is on analysing the product, value and information flows. As Chopra and Meindl (2013) state, these flows are required to create, receive and satisfy a customer request.

Product flow

In this value chain, the production phase is divided into the two main functions of breeding and fattening and each stage is managed by different farmers in most cases. The product flows firstly from breeding and, after a calf attains 280kg in weight, it is transferred to market/auction where fattening-farmers select cattle to fatten in the next stage. The cattle are fattened for around 20 months, until

Figure 5. Mapping the wagyu value chain in Japan



JA: Japan Agricultural Cooperatives
 MAFF: Ministry of Agriculture, Forestry and Fisheries
 JETRO: Japan External Trade Organization

References:
 Agricultural and Livestock Industries Corporation 2021
 Ministry of Agriculture, Forestry and Fisheries 2016
 Ministry of Agriculture, Forestry and Fisheries 2021b
 Ono 1969

they reach 760kg, after which they are moved to slaughter and processing, and then provided to wholesale and retail/export distribution channels. Finally, the product flows to final consumers through supermarkets and restaurants, both domestic and international.

Value flow

Value flows in the opposite direction to the product, from final consumers back to breeders. In this value chain, the added value is greatly affected by the grade of carcass at the slaughter and processing stage. The grading system is managed by the Japan Meat Grading Association (JMGA). In this system, all the carcass is evaluated and given a grade (Gotoh et al., 2018). The higher the grade the carcass receives, the more value is added, as wholesale and retail prices vary largely based on grade and cut. MAFF (2021b) argues that, due to the increased price of calves due to a shortage of supply, the production cost of wagyu has been high, and all carcasses need to receive the highest grade “5” to offset the cost.

Information flow

Information flows in both directions in the value chain. Information consists of data on prices, costs, facilities, inventory, transformation and customers throughout the value chain. Also, in this value chain, traceability, grading and labelling play an important role in better meeting consumer needs, regarding higher levels of product safety, quality and authenticity respectively. The information is shared with each stage of the chain, supporting supply chain coordination to maximise total supply chain profitability, which is a common goal among all the stages. As to market information, Japanese Agricultural Cooperatives (JA) and Ministry of Agriculture, Forestry and Fisheries (MAFF) manage the domestic market information, and Japan Livestock Products Export Promotion Council, Japan External Trade Organization (JETRO) and MAFF are in charge of the international market information.

Performance of the Wagyu Value Chain in Japan

In assessing the performance of an agricultural food supply chain, four main categories (efficiency, flexibility, responsiveness and food quality) can be used as indicators (Aramyan et al., 2007). Chopra and Meindl (2013) argue that firms are required to balance efficiency and responsiveness, since there is a trade-off between these two aspects of performance. In order to assess efficiency and responsiveness, the logical and cross-functional drivers of a supply chain (such as facilities, inventory, transportation, information, sourcing and pricing) need to be analysed (Chopra & Meindl, 2013).

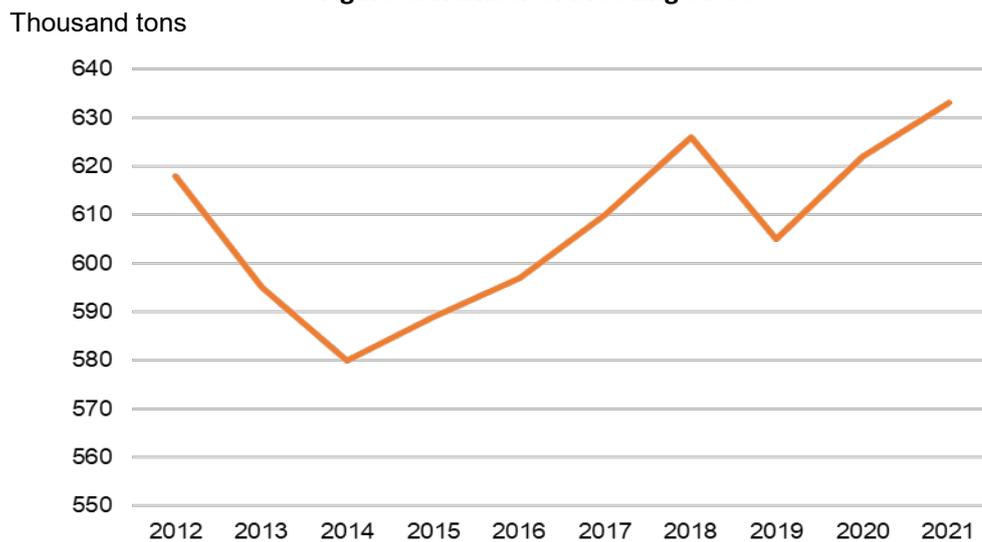
Facilities

According to Chopra and Meindl (2013), facilities are “physical locations in the supply chain network where product is stored, assembled, or fabricated” (p.41), and they function to maintain a desired balance between responsiveness and efficiency.

Capacity, which is also one of the criteria to measure performance of facilities, is defined as “a maximum amount a facility can process” (Chopra & Meindl, 2013, p.46). In this value chain, technology plays a key role for better performance. In recent years a reduction in the number of breeding cattle had meant under-utilisation of capacity (MAFF, 2021c). In response, technology was used to improve the breeding rate and reproductive performance, enabling the achievement of greater capacity utilisation. Information and Communication Technology (ICT) helps optimise the timing of artificial insemination and maximise the breeding rate by monitoring the body temperature of cattle. Also, for better reproductive performance, the utilisation of dairy cattle as breeding cattle is becoming

increasingly common. Instead of beef cattle, dairy cattle are employed as a source of breeding by transplanting a fertilised wagyu egg in dairy cattle (MAFF, 2015). Similarly, in terms of reproductive performance, research on shortening the calf-delivery interval by controlling nutrition conditions has been conducted, targeting a more than 20-day reduction in the interval and a resulting large cut in costs (MAFF, 2015). These technological innovations have led to an increase in the number of calves, more efficient flow times, and increased capacity in recent years (Figure 6).

Figure 6. Number of breeding cattle



Source: MAFF (2021c)

Inventory

An important role of inventory in the supply chain is to enable the product to be supplied when customers want it (Chopra & Meindl, 2013).

Wagyu cattle require a relatively long time to be fattened (around 20 months) to acquire the high food quality manifest in the marbling of the beef (MAFF, 2016). As a result, the production lead-time is long and thus constrains responsiveness. To recover the responsiveness, product availability, a “fraction of demand that is served on time from product held in inventory” (Chopra & Meindl, 2013, p.49), has to be maintained. Keeping cattle of varying ages to provide a high level of product availability by ensuring stable and constant supply of wagyu to the market achieves better responsiveness.

Information

In the wagyu value chain, traceability, grading and labelling are contributing to satisfy consumer demand and creating better profitability, developing product safety, quality and authenticity.

In 2001, an outbreak of BSE (Bovine Spongiform Encephalopathy) was found in Japan and it raised consumers’ concern with food safety (JETRO, n.d.). To handle this higher concern for safe food, the Japanese government introduced traceability to improve hygiene control in 2004. Cattle are now required to be traced from birth to slaughter.

The carcass grading system is also considered a vital driver of information through the value chain for the purpose of assured wagyu quality. The grading system was established in 1988 by JMGA (Gotoh et al., 2018). A carcass is evaluated based on a yield grade (A, B, or C) and a meat quality (from 1 to 5),

based on colour and brightness, marbling, firmness and texture, fat colour, lustre and quality of fat (Gotoh et al., 2018). Depending on the grade, the markets to which cuts of beef are transferred are determined, enabling the highest value gain for processors.

In addition, information can verify the authenticity of Japanese wagyu. Recently, other countries, such as the United States and Australia, have been moving into wagyu production and its global market, causing some confusion in identifying Japanese high-quality wagyu among consumers. To achieve Japanese wagyu's authenticity and its quality, Japan began to label "Universal Wagyu Mark" on each package of wagyu in 2017, proving the wagyu is produced in Japan (Figure 7) (JETRO, n.d.).

Figure 7. Universal Wagyu Mark



Sourcing

Sourcing is "the set of business processes required to purchase goods and services" (Chopra & Meindl, 2013, p.54). In this value chain, procurement of cattle feed has affected its cost efficiency.

According to data from MAFF (2020), feed cost takes up 39 per cent of the total production cost of a wagyu calf (Figure 8), and 24 per cent of fattening cattle (Figure 9). Also, in Japan, feed for cattle depends heavily on imported supplies. Grain for cattle feed, including corn, wheat, barley and sorghum - which is the main feed - heavily depends on imports from the United States, Brazil and Australia. Grain feed produced in Japan makes up only 25 per cent of the total grain feed used (MAFF, 2021a). However, due to various external events which impact the price of feed in exporting countries, such as drought, recession and increasing demand for corn for bioethanol, the feed price is quite volatile. In addition, there has been a substantial increase in recent years (Figure 10). As a result, the rising, unstable cost of imported feed is boosting the production cost of wagyu. Furthermore, food quality, from the perspective of safety, is a concern raised by the use of imported feed. Since the BSE outbreak in 2001 was triggered by feeding cattle imported meat-and-bone meal infected by BSE, the use of meat-and-bone meal as feed is prohibited today (Ministry of Health, Labour and Welfare, n.d.).

Improving the Performance of the Wagyu Value Chain in Japan

Transitioning from imported feed to domestic feed supply

As demonstrated above, the heavy dependence on imported feed is pushing the profitability of the value chain down. In response, greater utilisation of domestic feed is proposed. MAFF (2021a) states that the cost of domestic feed, including rice and grass, is relatively stable and low, compared to that of imported feed (Figure 11). It further allows for the suppression of the adverse impacts from

Figure 8: Production cost of calf

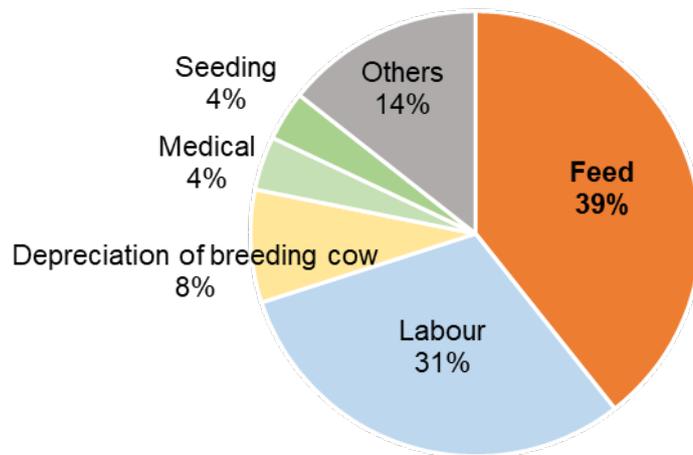
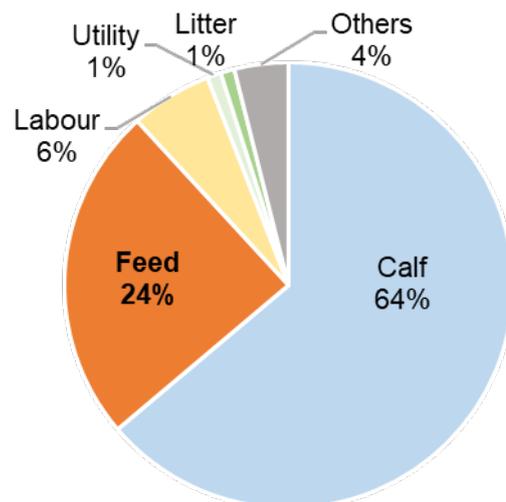


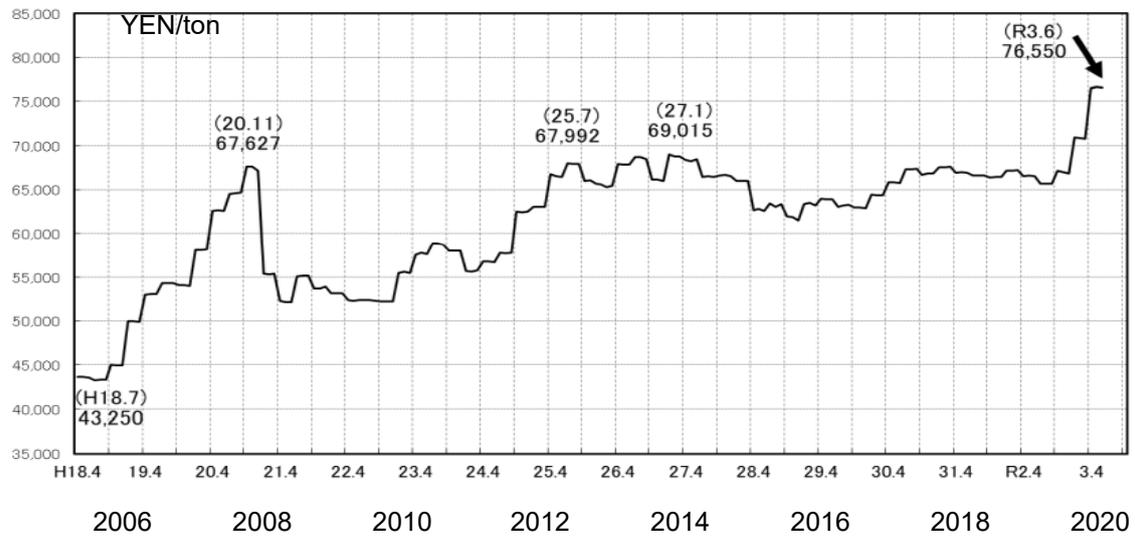
Figure 9. Production cost of fattening cow



exchange rate and transport costs. Also, using domestic feed can attract consumers from the aspect of increasing demand for safety. Moreover, it contributes to a shorter lead-time, because of shorter transport distance, thereby improving responsiveness.

Among the potential domestic feed crops, rice is a notable possibility to develop better performance in the wagyu value chain, since it possesses fewer end uses which conflict with feed use, unlike corn and ethanol. Rice is the main staple food in Japan, but the recent transformation of diet has caused substantially less demand for rice (Figure 12). Although most farmers are still growing rice as a staple food, many are converting to feed rice production (MAFF, 2021a). Therefore, producers of wagyu may be able to obtain domestic feed more cheaply in the near future. Compared to corn, rice has comparable nutrition that includes crude protein and soluble nitrogen (MAFF, n.d.).

Figure 10. Price of imported feed

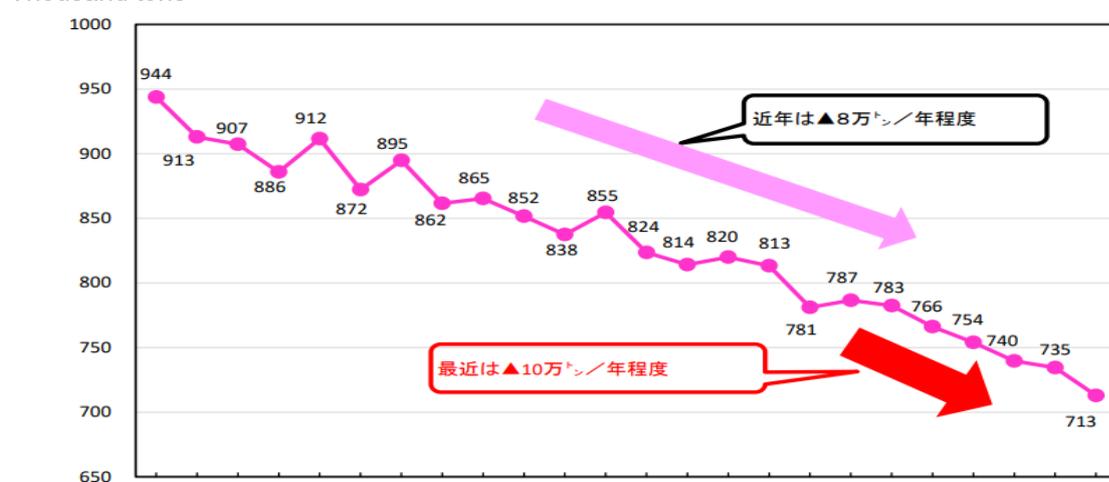


Source: MAFF (2021a)

Figure 11. Price of domestic and imported feed

	YEN/TDNkg									
Domestic feed price										
	2000	2005	2010	2013	2014	2015	2016	2017	2018	2019
Dry grass	62	57	59	61	66	63	60	73	75	78
Silage	65	64	66	64	68	65	73			
Imported feed price										
Hay cube	77	90	87	108	131	130	107	117	121	118
Dry grass	70	73	86	103	109	112	95	103	102	106
Rice straw	98	113	92	108	120	118	106	114	108	107

Figure 12. Demand of rice as staple food



1998/1999	2003/2004	2008/2009	2013/2014	2019/2020
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Source: MAFF (2021a)

Conclusion

To conclude, despite facing strong competition in global trade, Japan's wagyu beef value chain possesses the potential to achieve higher global demand. While wagyu receives high evaluations within Japan and overseas due to its high quality, its cost of production has been the most serious constraint in terms of competition between other countries where more affordable wagyu are being produced and exported. A heavy dependence on imported feed, which is relatively unstable in its price, has seen rising production costs and lower responsiveness, resulting in limiting the production of wagyu. To address this, switching from imported feed to domestic feed, especially rice, is suggested, from the perspective of reducing production cost and in particular transport cost and distance. There are also other unsolved complications that relate to the value chain, such as the impact from dietary preferences in western countries where mostly loins are consumed and the average cost to export is raised. Overall, evaluating the value chain performance is crucial to identify and suggest appropriate responses to further improve the value chain.

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