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*Economic Policy Reform and
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Potential target export markets for Mongolian pet food products

June 2005
Ulaanbaatar, Mongolia

Project: Mongolia Economic Policy Reform and Competitiveness Project (EPRC)
Report Title: ***Potential target export markets for Mongolian pet food products***
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ABBREVIATION AND ACRONYMS

AAFCO Association of American Feed Control Officials (USA)

APPMA American Pet Product Manufacturers' Association

BSE Bovine Spongiform Encephalopathy

DM Dry Matter

FMD Foot and Mouth Disease

OIE World Organization for Animal Health

PFAC Pet Food Association of Canada

PFMA Pet Food Manufacturers' Association (UK)

WS Wholesale

WTO World Trade Organization

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EXECUTIVE SUMMARY

The objective of this study is to examine potential target export markets for pet food products that take advantage of Mongolia's comparative advantages in meat production. The Mongolian meat industry has suffered over the last forty years from a dependence on Russia as its sole export market. As a consequence, Mongolian meat products have not achieved the diversification required to compete in dynamic international markets. Tighter quotas and stricter import bans due to livestock epidemics have put further pressure on the Mongolian meat industry to seek new business opportunities. The study offers recommendations for further actions to be taken by the industry based on the evaluation of four markets: Japan, Korea, China and Russia.

Mongolian meat producers have their advantages. Mongolia is physically close to growing Eastern Asian markets for pet food such as Korea or China. Mongolia benefits from a surplus of inexpensive meat and meat by-products which are marketable as 'environmentally clean' and 'free range'. Unlike North America and many other beef exporting countries, Mongolia is free of BSE and thus does not suffer from BSE-related bans on its beef exports. Mongolian horse meat is particularly attractive; it is cheap and culturally acceptable in many Asian markets. It is one of the only types of livestock that do not suffer from any disease related bans.

The size of the Japanese market and the rapid growth of the Korean market make them attractive destinations for exports of pet food from Mongolia. Demand in both these markets is sophisticated, highly brand sensitive and driven by attributes such as 'healthy' and 'natural'. Mongolian companies have been able to export small amounts of pet food to both Japan and Korea with continued interest from importers. Japan has evolved into a mature market characterized by stable demand and fierce price competition. Korean demand for pet food is expected to continue to grow at rates of 20-30% per annum.

In the short term, Russia and China are less attractive for pet food exports because of the following three reasons: First, Russia and China both have highly protectionist and unpredictable policies in regards to processed food imports. Second, while both countries have high pet populations, the rate of adoption of commercial pet food versus table scraps is still low, expected to grow only at a later stage. Third, Mongolia is poorly positioned compared to dominant players in these markets. In both countries, powerful international brands such as Mars and Nestle Purina have a very strong competitive advantage with domestic manufacturing presence. They benefit from low local manufacturing costs and avoid strict import regulations.

The study recommends that Mongolian companies focus on the production of fully processed products domestically. This allows Mongolian companies to (a.) bypass stricter import regulations applicable for fresh meat, (b.) achieve lower transportation costs applicable to more shelf-stable products, and (c.) capture higher profit from value-added activities in Mongolia. Of the main three product categories – wet food, dry food and treats – examined in the study, Mongolian companies should initially focus on producing premium 100% meat canned products and dry treats made from 100% animal by-products. This allows them to capture the maximum benefit from Mongolia's competitive position using meat as a primary raw material. Higher meat content and the presence of 'real' meat chunks in a canned product are also synonymous with better quality and a premium product. The production of 'real' products, canned or dried, versus extruded or reformed meat-like products, requires simpler manufacturing technologies and lower capital investments (i.e., traditional canning technology and drying ovens). Four companies have

already produced small quantities of products in both of these categories with the available technology. Despite the fact that dry pet food represents the largest share of the market, its production is not recommended as it is a much more complex technology and uses only an average of 30% meat content in the final product.

When seeking to enter the markets, the highest priority is for Mongolian companies to develop marketing and branding power. Companies must find new ways of reaching higher commercial volume levels beyond the current test marketing stage. Technology and regulations are not the most critical factors in the short term, since a few Mongolian companies have already been able to manufacture and deliver products to both Korea and Japan. One option for Mongolian products to penetrate into sophisticated and brand-conscious markets such as Korea or Japan would be to seek partnerships with leading destination country importers and manufacturers. A more powerful option would be to seek cooperation with multinational brands interested in developing a manufacturing presence in the region and accessing Mongolia's environmentally clean agricultural resources. Only once companies have acquired a good understanding of their potential markets should they undertake new product development and investigate more advanced manufacturing technologies to achieve lower long-term cost structures.

Domestic standards and regulations for meat and for pet food need to be developed and implemented in parallel with the negotiation of bilateral trade agreements to facilitate Mongolian exports to the selected target export markets.

Areas which EPRC may chose to intervene include: (a.) facilitate dialogue between Mongolian processors and potential foreign partners, (b.) provide support to the development of relevant bilateral trade agreements between Mongolia and its target markets, (c.) assist Mongolian regulatory bodies in the development of domestic standards for Pet Food manufacturing and (d.) provide direct assistance to selected Mongolian producers in marketing efforts and in the development of new products and supporting manufacturing technologies.

The four markets analyzed in the study were selected based on a combination of three criteria: market size, growth rate and proximity. The six-week period during which this study was conducted involved significant desktop research on international markets, standards and industry trends. The technical information was obtained from a combination of online research, information supplied by a Netherlands-based professional organization (Pet Feed Innovation Services) and an extensive reference book: *Pet Food Technology* published by Watt Publishing Company. Field investigations involved meetings with the Ministry of Food and Agriculture, the President of the Mongolian Meat Association, the Mongolian National Chamber of Commerce and Industry, and regulatory agencies such as the State Inspection Agency and the Agency for Standardization and Metrology. Site visits and interviews were conducted with eight meat companies in Ulaan Baatar, Darkhan and Erdenet. The market research also involved price surveys in retail units conducted by volunteers in the four different markets.

SECTION I: INTRODUCTION

While pet ownership has stabilized in mature markets like North America and Europe, consumer spending per pet is still on the rise, particularly in dynamic markets and changing societies of Eastern Asia such as Japan or Korea. Pet food manufacturing can be a highly profitable business, especially with a growingly sophisticated demand seeking to meet all the smallest health and other ‘human-like’ needs of their companion animals.

Pet food is most often based on meat by-products, fully cooked and sterilized to control contamination risk. It is distributed in sealed packages stable at room temperature allowing for more economic transportation and longer shelf lives. Thus, pet food may be an attractive option for the Mongolian meat industry. The processed nature of pet food is likely to help Mongolian producers overcome the barriers they face when trying to export fresh meat to neighboring markets.

Many development projects have provided support to the meat industry in the past in an attempt to develop access to international markets. Few have succeeded in achieving significant impact. This can be explained by the immense challenges when trying to adopt strict livestock breeding and control systems in an extensive production environment. More stringent regulations in target markets, protectionist import quotas, and bans applied due to recent livestock epidemics have led to the stagnation and even shrinking of the Mongolian meat industry.

This report examines the feasibility of developing the export-driven pet food manufacturing in Mongolia. The report will first give a general introduction to pet food products in general. After a brief review of the Mongolian meat industry today, it takes a closer look at the specific nature of four possible markets for pet food and reviews their respective regulatory requirements. The study then examines technical production solutions and related cost structures. The report ends with proposed recommendations for the industry to foster the development of pet food products that Mongolia could export to selected target markets.

SECTION II: PET FOOD TYPES AND PACKAGING

A. Pet food types

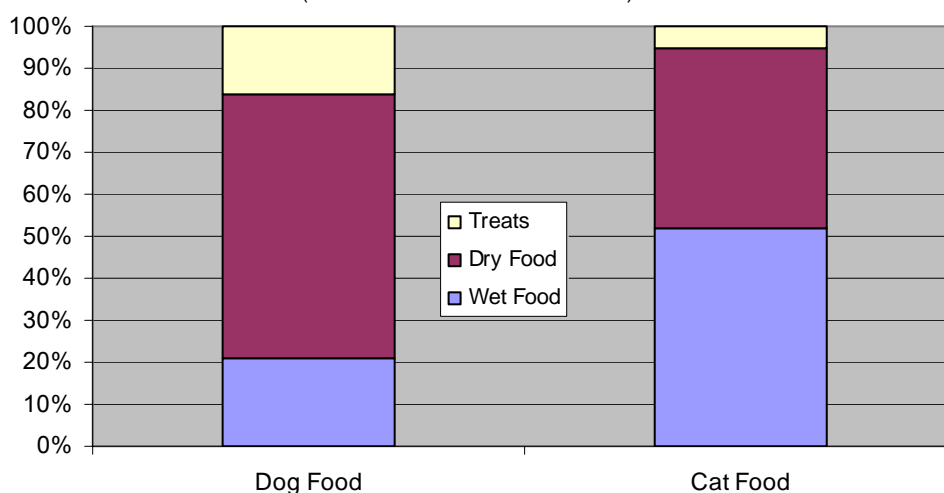
One can distinguish three types of pet food¹:

1. *Total nutritional food*: Food that is sufficient to maintain the health of the animal by feeding only the given food plus water. The product may also be specifically adapted to the age of the pets for which the product is intended (i.e. pregnancy/lactation stage, growth stage, or fully grown stage). Products that adhere to all standards can display the term “all stage” or similar wording on the product’s package.
2. *Food for special purposes*: Products intended to supplement the main diet of the pet. Examples are nutritional supplements or products intended to increase the palatability of the main meal. “Nutritional supplement”, “Calorie supplement”, “Side dish”, “Special Diet Food” or similar working can be used on the product package.
3. *Snack food, treats and mixers*: Products that are intended for use as snacks or rewards. These products must be described as snack food on the package. They typically have higher profit margins ranging around 100% compared to 20% for regular pet food².

Category 1 and 2 can also be split into wet food, dry food and possibly a less common category: semi-moist food³. Exhibit 1 presents the worldwide split in sales between wet food, dry food and treats for cats and dogs.

Exhibit 1: World sales composition of wet food, dry food and treats for dogs and cats

(Source: Euromonitor International)



Annex A of this report gives a list of the largest multinational companies, with their relevant brands and regional presence.

¹ Pet Food Fair Trade Association in Japan

² Figures applicable for Russia in 2001. Source: Overview of Pet Product Industry in Russia November 2001, US Government, <http://www.bisnis.doc.gov/bisnis/bisdoc/011203petfood.htm>.

³ Dry, semi moist and wet pet foods can be differentiated by varying moisture content: < 20%, 20-65%, > 65% as set by the AAFCO.

B. General composition and ingredients

Complete pet diets typically include the following ingredients, with indicative proportions stated here as currently required minima in the US.

- *Protein*: Typically, a 30% protein level is recommended and no less than 26%. Cats need more protein than dogs. Sources of protein include meat (lamb, beef), fish (salmon, herring), poultry (chicken, turkey, duck), animal by-products (liver, kidney, stomach, heart, blood, spleen, lung, ground bone, meat trimmings, chicken carcasses, but NO ruminant brains and spinal cord, hides, hair, hooves, or feathers). Ten essential amino acids (i.e. which are needed yet cannot be produced by the body) are required for cats and dogs (arginine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, valine). Cats, unlike dogs, have unique dietary requirements for *arginine* and *β-amino sulfonic acid taurine*. Cats and dogs also need nitrogen which can be supplied by non-essential amino acids.
- *Carbohydrates*: Complete dog foods typically contain 50% carbohydrates. Cats are known to be able to survive on carbohydrate free diets yet most cat foods typically contain 30% carbohydrates. Sources include rice, corn, wheat, sorghum, oatmeal, barley, and grain by-products. Dietary fibers are also essential as they provide physical and chemical functions for both cats and dogs (cellulose, hemi-cellulose, pectin, and gum).
- *Fats*: Typically present between 14% and 30% (high fat, high-energy diets) of dry matter (DM). Five percent minimum fat content is required for dog maintenance and 9% for cat maintenance. Cats can nevertheless tolerate levels of dietary fat as high as 64% (DM) without negative impact on their system and greater coat benefits. When tested, cats seemed to prefer 25% fat content over 10% and 50% alternatives. Dietary fats are mainly composed of triglycerides. Certain food-originated fatty acids are important for pet health. Dogs and cats have special requirements for essential fatty acids and in particular Omega6 fatty acids for structural (cell membrane components) and metabolic functions: most importantly *linoleic acid*, and to a lesser extent *γ-linolenic acids* and *arachidonic acid*. Cats have a higher requirement for *arachidonic acid* than dogs and both may also have some requirements for Omega3 acids (*α-linolenic acid*) to provide protective and therapeutic benefits. The ratio between omega 3 to omega 6 must be preferably between 1/5 and 1/10. See table below for further information. Annex B contains further information on fatty acids, their food origin and minimum requirements.

Other agricultural products such as eggs, soybean meal, dairy product, fibers, nuts and seeds, fruit, vegetable, legumes, etc. may be added to the meals to perform specific functions.

- *Vitamins*: A, D, E, K, B-complex, and vitamin C. It is important to take into account the risk of destruction of vitamins during processing. Vitamins C and E serve a double purpose as feed anti-oxidants (i.e. preservatives), thiamine hydrochloride as a palatability agent, and certain carotenoids as natural color enhancers.
- *Minerals*: Calcium (typically $\geq 0.8\%$ but not in excess), phosphorus ($\geq 0.67\%$), magnesium, sulfur, sodium, potassium, iron, copper, zinc, manganese, iodine, selenium, cobalt, chromium, etc. Optimum balances between certain nutrients can be problematic such as optimum calcium to phosphorus ratios.

- *Preservatives:* May be chemical such as BHT, ethoxyquin or propyl gallate, or natural: vitamin C, and E. Other common chemically-synthesized ingredients include: propylene glycol, BHA (butylated hydroxyanisole).
- *Enzymes:* Enzymes, usually proteases, are used both in wet and dry pet food as a basis for the production of protein hydrolysates to enhance flavor. Those enzymes are eventually destroyed by the final processing temperature and thus are considered processing aids. Other flavor enhancing ingredients include lipases, brewer yeast, yeast extracts, egg protein, spices, glucose, xylose, cystine, glutamate, thiamine, ascorbic acid and other natural and artificial flavors.
- *Food coloring:* Caramel, erythrosine, tartrazine, titanium dioxide, sodium nitrite are used but colorings are preferably avoided or replaced by natural colorings.
- *Gelling agents and thickeners:* Carob (locust bean gum), carrageenan (seaweed extract), guar gum and modified starches are used for wet foods.

In the case of wet foods, most blends of fresh and frozen animal materials provide the right quantity of protein and only need to be supplemented with vitamin and trace mineral pre-mix to ensure completeness. Viscosity is an important factor in wet pet food design and can be altered with enzyme technology as well as different quantities of water while remaining within maximum levels declared on product labels.

C. Packaging options

Traditional wet food packaging: Cans or tins.

New options in wet food packaging: Trays, rigid molded plastic containers, flexible and retorted pouches, and stand-up pouches typically containing chunk in gravy/jelly products. Pouches maintain better product quality and freshness, taste, nutritional benefits and convenience. They have a better shelf presence and, for retorted products, offer more flexible heating profiles. Pouches allow a relatively fast sterilization at lower temperatures, permitting gentle cooking compared to cans; they can be offered in single serving sizes—especially for cat food. Pouches witnessed faster sales growth in the UK but they are more expensive to manufacture and ultimately higher priced for the consumer. Downsides include poorer self sealing, more long term exposure to light and heat, possibly affecting product shelf life, and puncture risk from mishandling.

Traditional dry food packaging: Multi-wall paper bag and more recently high performance papers (UV proof technology, poly/paper laminates, metalized papers and films...). Those types of products represent 75% of dry pet food volumes. Primarily designed to handle 20 pounds (30kg) or more of product.

New options in dry food packaging: Plastic film (polymer) and gusseted pouches offer superior barrier qualities, stain resistance and graphics capabilities. It is also possible to have zip-lock/zipper closures for the bags.

Lack of local production of suitable packaging materials means that the Mongolian food processing industry has to import all packaging materials: cardboard boxes, vacuum packs, etc. from countries such as China, Japan or Korea.

SECTION III: OVERVIEW OF MONGOLIA'S MEAT INDUSTRY

A. Domestic meat production and demand

Meat production in Mongolia is done mainly through extensive livestock breeding. While this method has the advantage of low production costs and ecologically clean products, it suffers from low productivity levels and high exposure to climate risks. When questioned about the possible future domestic surplus of meat to justify investment in the Mongolian meat export capacity, meat entrepreneurs and representatives of the Ministry of Agriculture were split evenly in their positive and negative outlook on the future. Below is a rough analysis of demand/production forecasts.

The analysis below is mainly based on trends observed in 2003 and 2004, to avoid having results distorted by the dzuuds of 2000-2002. All statistics quoted below were obtained from the National Statistical Office of Mongolia.

Domestic demand

Mongolian population is growing at a gross estimate of 1.3-1.4% per annum.

Meat consumption per capita grew by 1.23% in 2003. In the context of our analysis, we may estimate this growth to be reasonably stable but adjusted upwards by to 1.5% to take into account possible higher consumption rates as incomes increase in Mongolia⁴.

Thus, we can estimate the future average domestic demand growth for meat for human consumption to be 1.4%+1.5%=**2.9%** per annum.

Domestic supply

Livestock population in Mongolia grew by 6.4% and 10% in 2003 and 2004. Those livestock growth figures need to be tempered by the fact that the fast growing goat population which is not typically raised for meat purposes plays a large role in those figures (+17% and 14.7% goat population growth in 2003 and 2004). Goats alone represented 43.7% of the total Mongolian livestock population in 2004. Between 2003 and 2004, the horse, cattle and sheep population grew by 1.6%, 2.4% and 8.4% respectively. A better representation of growth of the meat-driven livestock production in Mongolia would be to look at cattle equivalent growth figures which were equal to 5.4% in 2004.

Animal slaughter rates as percentage of total livestock reduced by 1.3% points in 2003 compared to the previous year⁵. The reduction in slaughter rates can be explained by two factors: 1) the higher share of goats in 2004—up by 1.8% points of the total livestock population from the previous year⁶ and, 2) lower Russian import quotas for meat from Mongolia and thus less slaughtering activities implemented by the major exporting companies. While these lower slaughter rates are negatively impacting meat production rates for Mongolia⁷, they should only partially affect available meat supply forecast calculations. Considering a 5.4% livestock growth rate in cattle equivalent, we still come up with a very rough and conservative estimate of over **4%** meat supply growth for Mongolia per annum.

⁴ GDP/ capita for Mongolia grew by 10.6% in 2004

⁵ Slaughter rate as % of total livestock was 24.2% and 21.1% in 2002 and 2003 respectively.

⁶ Goat population 10,648 in 2003 and 12,215 in 2004

⁷ Mongolian meat production in slaughter weight was down 25% in 2003 from the previous year

Assuming lessons learned from previous natural disasters would help mitigate the impact of future dzuuds in Mongolia and not allow any repetition of the 2000-2002 catastrophes, we can conclude that the current surplus of meat in Mongolia is relatively safe. When comparing a 4% estimate growth of supply with the 2.9% estimate growth in demand, the surplus of meat in Mongolia can even be expected to grow at a slow rate.

The analysis above is only a very rough forecast estimate of future trends. It assumes that the 2003 and 2004 consumption and production trends reported by the National Statistical Office of Mongolia are a good estimate of general future trends. Furthermore, it does not take into account the possible beneficial or negative impact of higher or lower productivity rates per livestock that might come with improved or worsened livestock production practices.

Annex C contains additional statistics on the Mongolian meat industry.

B. Export history

Fresh/frozen meat

The main export markets for Mongolian meat are the following:

- Russia (horse meat, beef)
- Arab countries: Turkey, Jordan ... (mutton, lamb)
- China (mutton, goat)
- Japan (horse meat)

Mongolian meat export revenues are very concentrated in mainly one market and one product category making Mongolia largely dependent on Russia as a main buyer. Mongolian companies export meat in the form of very low value-added products such as frozen carcasses of large animals⁸. Mongolia historically filled exported quotas of 20,000 tons p.a. in 2000-2002. In 2004, Mongolia only exported 5,000 tons of combined beef and horse meat to Russia, which can be partly explained by the delayed impact of heavy losses of cattle (50%) experienced during the recent dzuuds⁹. Today, only few meat processing companies have been allocated quotas to export meat and meat by-products to Russia. Unfortunately, the Russian Ministry of Agriculture has developed a strategy to reduce the market share of imported meat in Russia to 20% by 2010 from 30% in 2003¹⁰. Quotas for imports of beef and horse meat from Mongolia may be as low as 3,000 tons p.a. in the coming years. The strategy also predicts that the Russian production of animal products will increase by 80-90% in the next 15 years thanks to higher restrictions on imports of meat and customs tariff and non-tariff regulations and greater state overall support to livestock farmers and breeders.

The export of mutton to the Middle East faces a few challenges: among others, the necessity to slaughter younger animals (less than 2 years old) in contradiction with Mongolian customs, and the *halal* slaughtering requirements to comply with Muslim custom.

⁸ Meat exports to Russia generate an estimated net profit of \$ 10-15 cents/kg according to Makh Impex Executive Director Mr. Pyrev Ochir

⁹ Source: Mr. Khanimkhan, MoFA

¹⁰ More specifically: 51.5% of the poultry, 21.6% of pork and 18.8% of beef.

As for exports to China, Chinese bans were in place during 2004 because of last year's Foot and Mouth outbreak in Mongolia but a Chinese mission recently came to Mongolian to reinitiate trade activities.

Mongolia has a close relationship with Japan in exports of horse meat for general consumption partly thanks to the lack of known contamination risks associated with horse meat. Fresh horse meat is even exported for human consumption as "Basachi" (raw meat="meat sushi") by a wholly owned Japanese horse farm and slaughter facility based outside of Ulaanbaatar.

By-products

There are two main categories of by-products:

- Category 1: products for human consumption which may include kidney, liver, heart. Usually are sold at USD500-600/ton on the open market.
- Category 2: other products including lungs, stomach, intestines, blood... typically used for animal feed and exported at USD200/ton to Russia.

By-products produced by Mongolian meat processing companies are currently: processed into sausages and sold to restaurants, sold in the local open market, exported to Russia as feed for wildlife, zoos and circus, or sold to Chinese traders. Mongolian companies are complaining about the facts that they have to incur the expense of storing by-products in freezers all year round and only once a year or every two years off-load their stock onto Russian importers with little profit margin.

Mongolia is also exporting a certain amount of intestine (Jenjunum more precisely) to Europe. This is the only animal product which Mongolia is able to export to the EU. Those exports reached USD6.5m in 2005, over 50% to the Netherlands, 21.6% to Switzerland and 5.4% to Germany.

Annex D of this report presents a price comparison for fresh meat by country.

C. Mongolian meat companies

There are about thirty large private and joint-stock companies engaged in slaughtering and in the meat industry in Mongolia. A few have reasonably modern slaughtering equipment allowing them to meet export requirements.

At least four companies have exported pet food in small quantities to Japan and Korea in the past. Three of these have exported jerky dog treats and one exported canned horse meat. Three have up-to-date canning technology.

Nevertheless, none have been able to increase quantities past the test marketing stage (i.e. one or two containers or 3-10 tons). Yet some test marketing activities are still ongoing and importers' interest appears to be vivid.

Most companies visited expressed a high interest in developing pet food production and have already investigated production options and/or established commercial relationships.

More information on some of the key companies is available in Annex E of this report.

D. Main constraints to the meat industry

The main challenges as stated by Mongolian exporters include:

- Poor marketing power in destination country
- Trade regulations and lack of bilateral agreements recognizing Mongolian meat products
- Lack of affordable capital
- Lack of affordable domestically produced packaging material
- Work mentality and diligence in enforcing hygiene standards
- Unfavorable tax / VAT system in Mongolia
- Seasonal slaughtering patterns prevent continuous supply and operations.

E. Regulations, contamination status and international trade agreements

National regulations and regulatory bodies

The main bodies regulating the meat and food sector in Mongolia are the State Specialized Inspection Agency and the Mongolian National Agency for Standardization and Metrology.

There are no specific standards for pet food production in Mongolia and thus the same standards applied for exports of human food are generally applied to pet food by default.

The main standard requirements used by companies exporting processed meat to Korea and Japan include the following:

- Certificate of Origin issued by the Chamber of Commerce
- Sanitary/Health Certificate valid for export issued by the State Specialized Inspection Agency
- Manufacturing Certificate provided by the producer and approved by the Specialized Inspection Agency (equivalent to general export certificate)
- Certificate of Conformity issued by the National Agency for Standardization and Metrology, (equivalent to Quality Certificate)
- Veterinary examination Result Document issued by the Veterinary Inspection Control Laboratory, delivered after examining product samples
- BSE Certificate issued by the State Specialized Inspection Agency
- Invoice packing list.

In the absence specific standards for pet food, the Mongolian National Agency for Standardization and Metrology is using standards dictated by company procedures, importing country regulations or importer contracts¹¹ to issue Conformity Certificates for pet food.

Animal health and contamination

Mongolia has never had any know contamination of Bovine Spongiform Encephalopathy (BSE) which affects ruminants (beef, sheep). It does not figure on the list of 36 countries which have been affected or which present a substantial risk associated with BSE¹².

Mongolia had a break-out of Foot and Mouth Disease (FMD) in January 2004. Regulations dictate that any affected country may not consider exporting any sheep within a 12-month

¹¹ This is done in accordance with the Law on Standardization and Conformity of Mongolia

¹² More detail and April 2005 country list available at <http://www.aphis.usda.gov/NCIE/country.html#BSE>

period after the first outbreak. Mongolia does not figure on the list of 52 countries recognized to be free of FMD¹³.

The production of fully processed and sterilized products is a way to overcome the 12 month export bans following any Foot and Mouth outbreaks. According to Mrs. Naranchimeg Food Technologist for the Khantanzuikh, 50-70C temperatures are required and sufficient to overcome all Foot and Mouth disease contamination risks. On the other hand, the production of beef based jerky in raw/dried style might encounter problems if drying temperatures are not high enough.

International and bilateral trade agreements

Mongolia is a member of the OIE (World Organization for Animal Health) and of the World Trade Organization (WTO). Mongolia has veterinary quarantine agreements with Russia, Ukraine, Laos, Turkey, China. No agreements have been signed with Japan and Korea (except for an agreement on horse meat with Japan) because trade between those countries is expected to be governed under WTO and OIE regulations.¹⁴ Nevertheless, the Mongolian Foreign Ministry is attempting to develop bi-lateral agreements for meat trade with Korea. The existence of such bi-lateral agreements would facilitate the process for exporting meat and meat products from Mongolia to those countries.

Prospects for meat and meat-based pet food exports

Although not large, the surplus of meat characterizing Mongolia today is expected to remain significant enough to justify dynamic export initiatives. The meat export mix will likely include beef, mutton/lamb, pig by-products and, most importantly, horse meat. Although horse meat is not used in Western manufacturing processes mainly for cultural reasons, it is perfectly acceptable and competitive in Asian markets¹⁵. Horse meat does not suffer from any known disease and consequent bans.

With the exception of wheat, the ingredients usually recommended to accompany meat for the production of “complete and balanced” pet foods are not widely or affordably available in Mongolia (soy, corn, rice, barley, vegetables).

Meat by-products would be easy to come by at cheap prices and would provide a better alternative to the current market solution which is to store/freeze by-products all year round until Russian importers come to purchase the stock once a year or every two years to sell to zoos and as other animal feeds in Russia.

¹³ More detail and April 2005 country list available at <http://www.aphis.usda.gov/NCIE/country.html#BSE>

¹⁴ www.oie.int

¹⁵ Japanese are pig consumers of horse meat. Koreans do not consume horse meat but accept it well as pet food ingredient. Horse meats presents advantages vis a vis regulatory barriers.

SECTION IV: FOREIGN MARKETS FOR PET FOOD

A. General overview

Exhibit 2 provides key figures concerning the four countries which are the focus of the market analysis: Japan, Korea, China and Russia. Those markets were selected because of their geographical proximity, size and growth potential. Additional figures are given for the world as a whole, the US, and the UK to serve as general reference and show examples of mature markets.

Exhibit 2: Pet food market: Selected countries and world

	China (2004)	Korea	Russia (2003)	Japan (2003)	UK (2003)	US	World
Total PF sales (USD million)	194 D&C (2004)	280 (2004)	200 (2003)	2,290	2,420 (2002)	14,200 dogs: 8.9b cats: 4.5b ('04)	46,000 (2002)
Pet population	291m dogs: 150m ('05) cats: 46.9m('99)	6m pet owners (mostly dogs)	53.9m dogs: 9.4m, cats: 12.5m (1999)	19.6m C&D Dogs: 11.1m (2003) C: 8.5m ('04)	15.7m C&D dogs 6.5m ↘; cats: 9.2m ↗ (2003)	350m (2003) 135m C&D cats 75m, dogs: 60m (2004)	Dogs: 202.2m; Cats: 221.1m
% HH with pets		15%	25%		52.7%	63%	
% HH with a D	11% ('05)	~15%		20%	20.9%	35.5% ('03)	
% HH with a C	15% ('04)			12.5%	24.4%	34.5% ('03)	
Market leaders	Mars 60% P & G 10% Colgate Palmolive 5% other foreign brands hold another 15% ('03)	#1 Nestle Purina	#1Mars+ Nestle 80%	Nestle, Mars, Hills	Mars 45% Nestle 32%	Nestle 25% P&G 8.5%, Heinz 8.3%, Doane 7.3%, Hills' 6.7%, Mars 3.9% (2001)	Mars 24.6%, Nestle 24.4%
% of pet owners who rely mainly on commercial PF		35% com. PF only (2002)	Few	68%	63% dog, 71% cat (2001)		
% of calories consumed by pets from commercial PF ('98)	Dog: 1.7%; Cat: 0.3%	Dog 12%; Cat: 12.5%	Dog: 0.5%; Cat: 1.8%	Dog: 37.8%; Cat: 63%	Dog: 60%; Cat: 65% (2002)	Dog: 51.5%; Cat: 48.2%	
Main References ¹⁶	Euromonitor China Mars 2005, China Daily 04/2005	Gain Report KS 3054, ATO Seoul "What's hot" 2005	Gain Report 4050	JETRO Report	Great Britain & Beyond, PFMA	APPMA Pet Owners Survey+ Industry Statistics & Trends + Pet Food Institute Fact Sheet	*For top 10 markets (85% of global value)

HH=households, D=dog, C=cat, PF= Pet Food

¹⁶ Other references used: 1) The Pet Food Market, Strategic Marketing Institute Dec. 2003
<http://www.aec.msu.edu/product/documents/Working/1-12031.pdf> ; 2) Euromonitor report Pet Populations
<http://www.wattnet.com/Archives/Docs/PT051p14.pdf?CFID=5167101&CFTOKEN=49544602>

Sample market prices¹⁷

Exhibit 3 shows indicative average prices for selected pet foods in Japan, Korea, China, Russia, and Mongolia.

Exhibit 3: Indicative average prices for selected pet foods in selected markets

Item. Prices in US\$/kg.	Japan	Korea	China	Russia	Mongolia
Retail					
Bagged dry food for cat / dog	~7 (1.85-16.64)	~ 4.32 (2.74-6.4)	~2.03 (1.51-2.5)		3.25
Wet cat/dog food (can, pouch)	~4.31 (2.97-6.78)	~ 9.74 (2.28-17.2)	~ 2.35 (2.18-2.49)		3.94*
Wet food individual pouch	~10.77 (7.61-16.57)		~6.47 (3.39-10.03)		
Treats	Ox hide chew bone: 0.98/p	Knotted bone: 0.45-2.3 (/size)	Beef chew bone: 13.18		
	Beef jerky: 18.89	Dry meat: 7			
	Chicken/fish jerky: 21.96/47.54	Chew stick: 23.57			
	Pig ear: 1.18/unit				
Wholesale					
Dry food				~1.81 (1.35-2.38)	
Wet food			(pouch, domestic) - 2.3	~2.75 (1.12-4)	
“Jerky” / dried treat			(domestic, WS) - Chicken: 5.5-7 - Cattle by-product: 6.75-11.75 - Horse meat: ~12	cow’s ear: 1.1/u cow’s tail: 2.1/u joints: 13.6	

* Mongolian manufacturer, 200g cans of horse meat in local shop in UB. April 2005
“~” average of prices surveyed

Trends in dog and cat food

Dog food accounts for almost 70% of total volume of dog and cat food consumption world wide. The dog food sub-sector benefited from an increasing tendency of pet owners to ‘humanize’ dogs and that dogs are more responsive to treats. Cat food holds higher value share 38.9% than volume 30% and cat food is slightly outpacing dog food in terms of value growth as cats are perceived as more picky eaters.

Trends in dry and wet food

Increased interest in health has led to a move away from wet food towards dry food, especially for dogs. Dry food offers less spoilage risk after opening because of lower water content. Dry food contains a moderate degree of dietary fiber and causes less plaque and tartar than canned food.

¹⁷ Annex E presents references and breakdown by product in each market.

In the Asia Pacific region, Japan is by far the largest market segment for dog and cat food, representing 75% value share in 2003. China is in second position although it only represents 7% of value share.

Annex A presents an overview of the largest international manufacturers and regional manufacturing presence.

B. Target export market analysis

Annex F presents data on each of the four key target markets. Information includes: 1) General overview, 2) Statistics (market size and growth, pet food value consumption and pet population), 3) Main foreign supplier countries and shares, 4) Brand presence and brand awareness, 5) Consumer preferences, 6) Market prices and 7) Distribution channels. Below are summaries.

B1. Japan

Outlook: Reasonably positive for premium horse-meat-based products.

With over US\$ 2 billion spent on pet food in 2003 and a cat and dog population close to 20 million (58% dog), Japan is by far the largest neighboring market for Mongolia. It has now matured into a stable demand where prices are declining due to fierce competition among suppliers resulted in a few companies recently exiting the market. The companies that are the most successful are those that have been able to take advantage of changing market conditions by offering premium products targeting more specialized and growing market segments such as small dog owners and health conscious pet owners. In contrast, there is a declining demand for economy products. In the backdrop of recent economic crisis, pet populations have slightly decreased yet pet food consumption has continued to grow at a slow pace as pet owners more commonly use commercial foods to feed their pets. The prices of processed foods imported into Japan are generally high because of Japanese distribution and business practices such as the complicated distribution system, the random timing of contracts resulting from "high-frequency small-lot delivery" patterns. Spending on dog versus cat food is roughly proportionate to their populations, with a slightly higher share for dog food. Dry food is generally preferred to wet food and grew from 47% share of sales in 2001 to over 73% in 2003.

Domestic manufacturers are able to supply 40% of the market while imports are led by Australia, closely followed by the USA. Mars Master Foods is highly present with an approximate 20% market share and with nearby manufacturing facilities in China. Nestle Purina is the foreign manufacturer with the largest market presence.

A market opportunity for Mongolian seems to lie in the premium 100% meat product category. Japanese importers are interested in sourcing Mongolian manufactured products and are currently test-marketing products from several Mongolian companies. The product range is somewhat limited by the fact that the only meat which may currently be exported to Japan from Mongolia is horse meat.

B2. Korea

Outlook: Very positive for beef and horse-meat-based products, although strong branding and marketing strategies are needed.

The Korean market for pet food reached US\$ 280 million in 2004, growing at an annual average of 15%-20% since 2001. Korea is one of the fastest growing markets in the world

compared to European and American markets which have remained sluggish as they have matured. Annual growth is still expected to reach levels of 20-30% p.a. This is due to the combined effects of rising incomes and changing family structures which are leading to growing pet populations, low sensitivity to pricing and highly brand-driven, health-conscious customers seeking premium and custom products for their animals. Pet food penetration has room to grow as only 35% of pet owners relied solely on commercial pet foods to feed their pets in 2002. There were 6 million pet owners in Korea in 2004, most of whom owned dogs (about 77%). Although cats have traditionally been known to bring bad luck, they are slowly becoming more popular as perceptions are changing. Pet food consumption is driven by premium dry food. Wet foods only represent 10% of sales and are still perceived as a supplementary food to dry food. Koreans often mix kibble with some proportion of canned food. Although total volumes are still small, dog treats saw the strongest growth of 32% in current value terms in 2003 over the previous year.

Imports represented 50% in value terms of all pet food consumed in Korea in 2002.

This share is increasing as imported products are generally higher priced than domestically produced pet foods. The USA is the largest supplier of imported dried pet food. Australia comes in second place with the highest supply of imported canned foods. US exports of meat products to Korea have suffered in recent years with BSE-related bans on beef. The most popular foreign manufacturers include Nestle Purina (29% market share in 2002), Hill's Pet Nutrition and Mars. Importers have introduced many new foreign products but have had difficulty in successfully penetrating the solid entry barrier presented by established multinationals.

Japanese importers have shown interest in Mongolian products, in particular horse-meat-based products. There is consumer recognition of the ecologically clean characteristic of the meat in Mongolia. Yet the perception of Mongolia as being a primitive country might discourage the highly brand-oriented customer.

B3. China

Outlook: Despite reasonable long-term demand growth prospects, it is a difficult market to enter; it has high regulatory import barriers and fierce price competition, especially from foreign-owned domestic production facilities established in the country.

Despite a large pet population, the Chinese market for pet food is still an emerging market. Most owners commonly use table scraps to feed their pets. Its size, US\$ 194 million in 2004, is mainly a factor of the large human population. The adoption of commercial pet food is limited to urban coastal areas but is expected to grow along with pet ownership in general. China's pet population has grown by 20% over the last 5 years reaching 291 million pets in 2004, almost half of which are dogs. Forecasts are that the annual sale of pet food and related products in the country might grow at 15% per year and might exceed \$820 million by 2008. Although increasingly sensitive to foreign branding and health benefits, most consumers still see price as the most importing criteria in making purchasing decisions. Much of the dog and cat food for sale at local supermarkets is the dry variety and is usually sold in heavy-duty laminated paper bags.

Only since 2000 did China become a net importer of pet food. Penetration from foreign companies is uncertain as import regulations are highly protectionist and erratic and price competition from local producers is fierce. Imported pet foods may be as high as three times the price of local pet food. With domestic production facilities, Mars Co. has a significant advantage over other Western producers and is the market leader by far with 58% market share. Australia is the biggest foreign supplier followed by New Zealand.

Their position is partly due to the relationship between Mars production facilities in those countries and Mars Effem Company in China, allowing them to import certain product lines via their Chinese entity. Procter and Gamble and Colgate Palmolive hold the second and third place in the market with 10% and 5% value shares respectively. Newer local brands suffer from low brand awareness and lack of consumer trust. Despite efforts to improve product quality, they mainly cater to medium-price segments and low-end mass consumer needs. They have strong distribution but tend to produce only dry foods with very little product differentiation.

No Mongolian companies have exported pet food to China in the past and neither has there been any interest expressed by importers.

B4. Russia

Outlook: Uncertain despite good market growth prospects. Barriers on import of processed foods are high. There is strong competition from Western-standards domestic production facilities in a mainly price-driven and Russian-branding driven market.

With US\$ 200m sales in pet food estimated for 2003 and a 60 million dog and cat population in 2001, the market is expected to grow further as pets are very popular in Russia. Prepared commercial pet foods are still a fairly new business. Like China, pet food penetration is low but is expected to grow with a strong economy, rising consumer spending power and more modern lifestyles, especially in urban areas. Price remains a key determining factor in purchasing decisions. Many consumers are now showing strong interest in old and new local products bearing Russian brand names for processed food products in general. Some of the most successful new food products are produced locally but promoted using a mix of western marketing techniques and traditional Russian values/themes. Commercial cat food is more popular and commercial dog food and dry food is preferred over wet food. In 1999, cat numbers exceeded those of dogs by 30%.

Mars and, to a lesser degree, Nestle Purina both have in-country production facilities and together supply 80% of the market. Imports from mostly Western Europe and Hungary supplied 23.5% of the market in 2003 and early import figures for 2004 show sharp increase in pet food imports for that year. The US only supplied 5% of all imports in 2003. The range of domestic supply and demand for pet food products is wide, from very inexpensive commodities to the premium niche market. Despite the fact that domestic food producers are generally less efficient and offer lower quality, trade barriers and price advantages keep the domestic sector well ahead of imports.

Despite the fact that Russia is the primary export destination for unprocessed meat from Mongolia, no Mongolian companies have considered exporting pet food to Russia, justifiably so. Russian importers have a very poor payment history for imports. Entrepreneurs and the Ministry of Agriculture confirmed this repeatedly.

Besides these target markets, Mongolian companies have received expressions of interest in pet food from Taiwan (Mongema Co.), from Germany for treats (Mongema Co.), from Hong Kong for beef in general (Mongema Co.), and from the US for non-horse meat products in general (Khun Od).

SECTION V: IMPORT REGULATIONS FOR KEY MARKETS

A. Japan

Pet food is not subject to import regulations; it is not subject to the Food Sanitation Law¹⁸ of Japan,¹⁹ since it is not for human consumption and is not destined to animals for human consumption. There are no particular regulations for fresh/frozen pet food.

At least three companies have exported pet food to Japan in the past and have not had significant problems with import regulations. Mongolian companies²⁰ have told us that there is an agreement between Mongolia and Japan regulating the imports of horse-meat-based products into Japan. There is no agreement regulating beef imports into Japan and therefore there has been no export of processed beef from Mongolia to Japan. There has been a ban on beef imports from North America in 2004 which is expected to last well into 2005.²¹

There is a “Law Concerning Safety Assurance and Quality Improvement of Feed” but this law applies mostly to cattle, pigs, chicken, fisheries and does not include food for cats and dogs. Products which contain antibiotics or antibacterial agents are subject to the pharmaceutical affairs law.

The manufacturer may choose to comply with Japanese Agricultural Standards (JAS) and thus obtain the JAS label for the imported product. As an indicator, about 55% of processed meats for human consumption on sale in Japan have the JAS label²². JAS is recognized as the major standard that guarantees product quality in Japan.

As with all imports in Japan, quarantine and customs law apply as well as anti-monopoly regulations. Exporters are still expected to provide sanitary and veterinary certificates and have products undergo testing enforced under Mongolian law.

B. Korea

The general outlook for Korea as a target market for Mongolian pet food products is positive. According to a Korean pet food importer²³, Korea doesn't have independent procedures and documentation for pet food and regulations are mixed and split in various kinds of regulations. Korea does have special bilateral trade agreements with the US establishing standards and regulations for pet food imports.

At least two Mongolian companies have exported pet food to Korea in the past with no major regulation difficulties. One company is even successfully exporting processed beef for human consumption.

The Korea Food and Drug Administration (KFDA) administers imports of processed products. The Ministry of Agriculture and Forestry (MAF) administers imports of agricultural and fresh products. The MAF also regulates meat, poultry and dairy products as set forth in the Food Processing Act.

¹⁸ Copy of the Law <http://www.jetro.go.jp/en/market/regulations/pdf/food2004nov-e.pdf>

¹⁹ Source: JETRO Yumiko Yoshimura, Business Services Division BUA-REF@jetro.go.jp and Gain Report JA3702

²⁰ Mrs. Naranchimeg from Khantansuikh Impex

²¹ FAO Food Outlook April 2005

http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/007/j5051e/j5051e00.htm

²² JETRO Japanese Market Report Processed Meat March 2000.

²³ Prof. Dr. Dong-Joo Lim Maya Trading Co., Ltd www.mayapet.com, profdrjim@hanmail.net

KFDA administers regulations set under the Food Sanitation Act and the Functional Food Act legislated by the National Assembly. A Ministerial Ordinance to the Food Sanitation Act and Functional Food Act gives more detailed guidance, including forms regulating imports of foods and functional foods.

Korea applies higher tariffs on imports of unprocessed agricultural goods than on processed consumer-oriented products and has adopted similar practices as those of other developed countries in regards to special diseases like Foot and Mouth or BSE and sterilization requirements. It requires a B.S.E. (Bovine Spongiform Encephalopathy) certificates (for beef and sheep), is strict about these requirements, and has banned beef imported from the North America in the past. Bans on US beef in 2004 brought the US share of beef imports to Korea down to 2.1% relative to a 71% market share of imported consumer-oriented products during the previous year²⁴. (KS 4052) Beef imports from New Zealand have also suffered bans because of BSE risks. Korea also requires a Foot and Mouth Disease certificate.

C. China

The general outlook for China as a target market for Mongolian pet food products is negative. Regulations for imports to China are seen as erratic and unreliable; protectionism is high and foreign suppliers face restrictions on imports and distribution rights. This situation is unlikely to change any time soon.²⁵ No Mongolian companies have attempted to export pet food to China in the past.

According to a Korean importer of Pet Food, “China is making a lot of unnecessary regulations to prevent food imports from foreign countries. It is impossible to overcome those barriers without having to pay a lot of money for erratic registrations procedure even in pet food”. A similar statement was also made by Mrs. Otgonjargal at Wakamaru. Several companies mentioned difficulties with transit rights of fresh meat through China. Some importers are channeling goods through Hong Kong.

China had nevertheless demonstrated interest in importing meat from Mongolia. A Chinese mission came to Mongolia in January 2004 to end a long ban on fresh meat imported from Mongolia. Unfortunately, a break-out of Foot and Mouth disease interrupted all discussions for twelve months. Negotiations were scheduled to resume during the first quarter of 2005.

D. Russia

The general outlook for Russia as a target market for Mongolian pet food products is uncertain. Foreign companies operating in the Russian market encounter major difficulties in trade and investment, including the following:

- Ownership and jurisdictional disputes
- Problems with financial liquidity of a majority of Russian firms
- Lack of a normal commercial market
- Absence of a commercial legal framework
- High cost and general difficulty of doing business
- Severe infrastructure problems
- Payments arrears and frozen accounts
- Frequent and unexpected changes in the import and export regime and market access policy

²⁴ Gain Report KS 4052

²⁵ Euromonitor China March 2005.

Even more experienced exporters encounter problems and delays due to sudden changes in Russian import requirements or customs regulations. For this reason, it is important to always check with Russian importers or other sources to ensure that shipments have all necessary documentation prior to shipment.

Nevertheless, because of Mongolia's past history with Russia, standard documentation and certification processes are in fact fairly similar between the two countries. Mongolian companies are typically able to export fresh and frozen meat to Russia and satisfy its quality standards. The major constraint has been Russian quota levels for meat imports.

For producers of high-quality value-added food products, Russia continues to be a very difficult market in which to succeed. This is due to the import duties, tariffs and taxes applied to imports and price constraints. It has also been reported that there is a strong domestic lobby of domestic producers against imported processed foods. Large processors believe that under current Russian economic conditions the government must support local processors and producers in their efforts to develop jobs thus and foster national economic development.²⁶ Despite the fact that the country is reliant on meat imports "Food Security for Russia" has set a target date of 2010 for self-sufficiency in food production as a way of guaranteeing the safety and quality of Russian foods.

Russia is currently negotiating to join the World Trade Organization. Recent years have brought considerable liberalizing reforms, including legal, tax and customs reforms, but even more are required to open the bureaucracy to investment. Upon accession, Russian would need to make further changes in its tariffs. General improvements in procedures and import standards should be expected as part of Russia accession efforts to the WTO.

Imports from Western Europe have a significant comparative advantage when it comes to regulations because Russia shares a Partnership & Cooperation Agreement (PCA) with the European Union. The PCA facilitates trade and economic cooperation and allows for the liberalization of trade based on Most Favored Nation treatment, the elimination of quantitative restrictions, and legislative harmonization.

Shipping food products into Russia can be a bureaucratic and time-consuming process that is best handled either by a freight-forwarder or an experienced Russian importer. As a general rule goods have to travel under seal to the clearance point. All customs documentation should be provided in the Russian language. Fees are levied for customs clearance and these depend upon the regime applicable to the commodity. Clearance procedures, although formally spelled out, often appear to be applied inconsistently.

The process involves two main steps: (1) Safety, Phytosanitary and Veterinary Clearance; and (2) Customs Clearance. The following documents are required for all shipments.

- Delivery contract
- Bill of Lading
- Freight customs declaration
- Certificate of Origin
- Certificate of Conformity
- Hygiene or Veterinary Certificates, as necessary
- Manufacturer's Certificate of Quality

Annex G contains further information on each of these documents.

²⁶ Source: <http://ats.agr.gc.ca/europe/e2788.htm> Agri-Food country profile 2002

SECTION VI: PRODUCTION TECHNOLOGY AND CAPITAL REQUIREMENTS

This section provides a summary of product characteristics, manufacturing process, and capital requirements for: dry food, wet food and treats. Annex H presents more detailed information on processing options and sample production lines.²⁷ Capital investment figures are provided using Western technology for Western markets. They do not take into account the fact that, in the context of Mongolia, some of the mixing, grinding, or canning equipment might already be present in the plants and would not need to be purchased.

A. Dry pet food manufacturing

Product characteristics: The finished product is dry crunchy bits also called “kibble” typically sold in large bags of 10-50kg. It typically contains 8-10% moisture, 30% (Dry Matter) maximum of meat, which is relatively low compared to other types of pet food, 50% (DM) grains and 14-30% (DM) of fat. A single screw extruder could only handle 18% fat content during processing. Additional fat may be added at coating. A twin screw extruder would be required if higher fat contents were to be achieved during extrusion.

Manufacturing process: Extrusion is the main technology used for dry food manufacturing. It offers the highest versatility and productivity/ volume levels. The main functions of the extruder are: mixing, cooking, kneading, shearing, shaping and forming. After preliminary milling, mixing and pre-conditioning of ingredients, the extruder forces the materials along a shaft by means of screws, wherein heat and pressure cook the food along its journey in a continuous process. As it is forced out of the extruder through a die, various shapes and sizes can be formed. The product is then dried, cooled, and optionally coated with liquid (typically high fat content) and cooled again. The cooking process is done at high temperature for a short time which enables to retain heat-sensitive components better than low-temperature long time processes. However, extruders require particularly careful adjustment of quantities and maintenance in order to reach desired shapes, colors, textures.

Investment capital requirement: A pet food extrusion plant which includes a single screw extruder with pre-conditioner, dryers, cooler and coating system costs approximately (building excluded):

- US\$485-580 thousand for a smaller capacity of two-ton per hour or 12-16 tons per 8-hour shift²⁸
- US\$1 million for a 10-12 ton/hour system. (Count US\$1.5million for twin screw)²⁹

The cost breakdown of the smaller facility, exclusive of buildings, is shown below:

Item	Price US\$ (approx.)
Milling: hammer mill	32,000
Mixing: ribbon mixer, paddle mixer	26,000
Preconditioning: pre-conditioner, steam boiler or generator, pumps	
Extrusion: extruder (including dies, knives, transport...).	260,000
Drying: Counter flow cooler / belt-cooler	58,000
Coating: Coater (simple) drum. Spraying, dosing system.	9700 , mixer: 19,400
Cooling: Counter flow cooler	13,000
Packaging: Manual(min) / Automatic (max)	13,000 / 130,000
Total (depending on automation level)	485,000-580.000

²⁷ More information on plant layout and general facility requirements can be found in *Pet Food Technology*, Watt Publishing 2003 and Wattnet online articles (e.g. *Optimum Plants* at Wattnet.com).

²⁸ Quote from Feed Innovation Services €375-450 thousand (€/US\$ exchange rate of 1.294 \$/€ as of 28 April 2005).

²⁹ Source: *Pet food Technology*, Watt Publishing, First Edition 2003

B. Wet pet food manufacturing

Product characteristics: Three different product groups fall under the category of wet pet food: 1) “real” meat chunks in a gravy or jelly (premium value added), 2) meat analogs in chunks in jelly or gravy, or 3) meat and cereal loaf (lower grade). Wet foods are packaged in sterilized high integrity packages such as 200-500g cans (most common), pouches or single-serve portion trays. The product typically contains over 75% moisture, 10% protein and 4% fat. The main ingredients are meat and water. Wet pet foods, in particular loaf products, may also include small amounts of cereals such as maize flour, wheat, soy or rice.

Manufacturing process: Meat analogues or reformed meat are formed from finely ground frozen meat and animal by-products and and/or cereal proteins such as soy or wheat gluten and other gelling agents. The manufacturing of meat analogues can be done in three different ways: heat setting of meat proteins, gel setting or extrusion with textured vegetable protein. The first two involve preparing a meat emulsion which includes ground meat products and coagulating or gelling agents and spreading the emulsion flat on a conveyor belt for heating/cooking through a steam tunnel (~90°C) or setting and cutting into chunks. Extrusion is a complex and expensive process which would be justifiable in environments where cereals and alternate protein resources are more competitive than meat resources. This is not the case in Mongolia and therefore we will focus mainly on “real” meat chunk technology for the purpose of this study. The chunks may then be filled simultaneously with the gravy/ jelly into the cans or pouches or in two steps. The sealing and sterilizing are important processes in ensuring the food is free of long term contamination. Sterilization can be done in batch steam retorting or continuous hydrostatic sterilizing. Trays and pouches will require extra pressure. Sterilization times and temperatures may vary based on size and nature of the product but should typically reach at least 121°C.

Investment capital requirements: A wet pet food plant with canning facility and with a capacity to produce 16 ton per 8h shift and no extrusion equipment would cost 520,000-1.3 million USD³⁰ depending on the level of automation.

Item	Price US\$ (approx.)
Dicing Cutter or grinder	~32,300
Mixing: dosing, weighing equipment, blender	
Canning: packing unit (filling, sealing of can)	
Sterilizing: Retort	
Labeling & packing: label printers	
Total	520,000 to 1.3m (depends on automation)

³⁰ Converted from quote in Euro (400,000- 1million) at April 28th exchange rate 1.294\$/Euro.

C. Treat manufacturing

Product characteristics: Treats are the most dynamic and diverse segment of the industry. They offer the highest value-added and profit margin but are sold in lower volumes. There exists a wide variety of pet food treats and manufacturing technologies such as:

- Fried animal by-products such as snouts, pig ears, etc.
- Cooked/dried animal by-products
- Rawhide treats
- Baked and/or extruded snacks
- Co-extruded treats
- Semi-moist treats.

Most pet-food treats seen on retail shelves are either extruded or baked. Yet when applied to the context of Mongolia, those products typically have little meat content—twenty percent maximum, often none at all—and require complex manufacturing processes. Semi-moist treats also have low meat content (5-15%) and have higher shelf-life risk because of their moist nature and packaging design. Options which are more plausible in Mongolia are animal part treats which may be fried or cooked/dried. Ninety to one-hundred percent of the raw materials used are from animal origin. The technology is simple, requires little investment and is very labor intensive. Fried products are more economical than dried products in terms of energy efficiency. Nevertheless, they may present some contamination risk which can be overcome by using good quality packaging and reforming to make the product stable at ambient temperatures.

Manufacturing process for cooked and dried animal products and by-products: Animal parts are typical by-products from a meat processing facility and may include pig ears, large bones, pigs' feet, animal hooves, snouts, jerky treats, and also lamb and cattle ears. If products are frozen, they are first thawed, then trimmed, loaded into racks, cooked and dried in a batch oven/dryer at 40-90°C temperatures for as long as 48 hours. Moisture content of fresh meats is 80%. A single unit can perform both functions. Optionally, products may be coated before a final drying. Then racks are unloaded and products are packaged. Products may be treated with flavorings, anti-oxidants and preservatives before or after drying.

Manufacturing process for fried animal by-products: Those products typically include pig ears and snouts. The process is very similar and includes cutting/ trimming, followed by frying, cooling and packaging.

Investment capital requirements: A dried treat making facility producing 16 ton of fresh product per day (with on average 80% moisture content at entry) would cost between US\$195,000 and US\$775,000 depending on the level of automation. This assumes three ovens of five-ton capacity functioning on a three-day drying cycle. Other equipment needed includes tools for trimming, cutting, drying racks and package sealing equipment. Filling is done manually.

Annex I provides a rough estimate of what costs would apply (in US\$/kg) for the manufacturing and export of canned horse meat and dried horse meat jerky to Japan. The figures are only indicative and need to be verified in real manufacturing conditions.

SECTION VII: RECOMMENDATIONS

A few Mongolian companies have already taken steps towards developing pet food products for export markets and some of them have incipient relationships with pet food importers. They have been able in the past to manufacture products in accordance with buyer requirements and which satisfy target market country standards. This nascent industry can build upon these initial achievements and develop a more systematic approach to penetrate the target export markets identified in this assessment.

Specific recommendations of this assessment are as follows:

1. Target export markets: Korea and Japan offer the most promise for potential exports of Mongolian pet food products.

Examination of the demand and import regulations in four selected neighboring markets of Japan, Korea, China and Russia support this recommendation.

2. Initial pet food products: Premium one-hundred-percent meat canned pet food products, dried jerky-like and fried treats from animal by-products offer the best promise.

Analysis of production technologies, raw material availability, and final product positioning support this recommendation.

3. Target market initial entry strategy: Interested companies can work with EPRC to prepare marketing brochures, identify and contact interested buyers and distributors in the target markets and conduct an in-situ market analysis.

After the on-site market analysis to identify major distribution channels, margins, consumer preferences, pricing, purchasing of sample products, expressions of interest for Mongolian manufacturers' provision of sample products to potential buyers, manufacturers can work with assistance from the project in the preparation of sample products. The Business Development Fund which requires client co-payment can be used to identify the necessary expertise, if required, for this. EPRC can also assist interested Mongolian firms with initial placement of samples, pricing, and contract negotiations with initial buyers and distributors in the target markets as required. Similarly, if and when large orders are secured the project can assist interested Mongolian firms in preparing requisite financial statements, investment and working capital requirements, and loan applications to secure financing to fulfill orders.

4. Potential partnerships with foreign pet food manufacturers and brands: Interested companies can work with the project to gauge interest of foreign pet food manufacturers and brands in establishing production facilities in Mongolia.

These companies can bring needed markets, management know-how, and money (investment). Their marketing and branding power can be paired with Mongolian manufacturing, abundant, and *environmentally clean* and *free range* raw materials. Possible partner candidates could be companies which have entered or are seeking to enter East Asian Markets, do not already have a manufacturing presence in the region and whose branding and market strategy could include attributes such as '*premium 100% meat product*', '*environmentally clean*' or '*free range*'. Likely candidates might be: Procter and

Gamble Iam's/Eukanuba, Colgate Palmolive Hill's Science Diet/Nature's Best, or Nutro Products Max/Natural Choice³¹.

This strategy is likely to take longer to yield desired outcomes and should be pursued in parallel with the initial target market entry strategy outlined above. In the short-term, Mongolian companies should focus on placing their products in the target markets, gaining an understanding of their workings, satisfying orders on time and according to quality requirements and building long-term relationships with major distributors and buyers.

5. *Feasibility analysis of packing materials facilities:* Contingent upon success in penetrating target export markets, feasibility analyses for the establishment of facilities to produce packing materials may need to be conducted with Mongolian entrepreneurs potentially interested in such businesses.

Packaging is currently a significant cost component for Mongolian food producers who systematically import packaging material from China, Japan, or Russia. Feasibility studies to determine whether facilities to produce food standard packaging materials (cans, vacuum packs, cardboard boxes, pouches, etc.) are economically realistic given Mongolia's market size need to be conducted. Contingent upon entrepreneurs' interest, the project can assist with the conduct of such feasibility studies.

6. *Bilateral and standard agreements:* Mongolian food product manufacturers interested in exporting their products need to work with the Ministry of Trade and Industry (MoIT) to place the preparation for and negotiation of bilateral and standard agreements with Korea and Japan.

Mongolia already has a bilateral agreement with Japan for horse-meat-based products which is significantly helping business relationships and facilitating procedures between exporters and importers of the respective countries. Korea has an agreement with the USA specifically for pet food.³² This allows for clarification of procedures, "one stop-shop" regulatory information for companies and regular updates on latest bans and disease contamination levels. If and when required, the project can assist Mongolian firms and the MoIT with this process.

7. *National Standards for pet food for Mongolia:* Mongolian food product manufacturers interested in exporting their products need to work with the Mongolian National Agency for Standardization and Metrology and the State Inspection Agency to facilitate the adoption international trade norms for pet food products.

The project can assist the parties with this process as needed. The quality standard development process is the following: the Agency for Standardization and Metrology prepares and submits a proposal to a Technical Committee composed of sixty various experts/members. The Committee meets every last Thursday of the month, revises and discusses the request in detail. If the Committee accepts the request it is submitted to the Government-appointed National Council for Standardization and Metrology and the Council then decides whether to incorporate this into the official standards and laws of Mongolia.

³¹ See *Annex 1* for further information on major pet food manufacturers.

³² See extracts of this document in *Annex 9.5*.

ANNEX A: MAJOR MULTINATIONAL PET FOOD MANUFACTURERS

ANNEX A: MAJOR MULTINATIONAL PET FOOD MANUFACTURERS³³

	World market share 2003	Brands cat and dog food	Notable market presence East Asia	Pet Food Manufacturing Presence in Asia Pacific (and other)
Mars (Masterfoods, Effem China, Effem Thailand)	24.6%↑↑	Pedigree, Pal, Chum, Royal Canin, Frolic, Mac'ani, Omega Complete, Waltham, Whiskas, KiteKat, Cesar, Ronron, Sheba, Kalkan, Mealtime	China, Japan (Cesar, Pedigree, Whiskas), Korea	- China (Pedigree, Whiskas) - Australia & New Zealand (pedigree, meaty-bites, whiskas, kitekat, my dog...), - Thailand (pedigree, whiskas, cesar, kitekat) - Russia (Pedigree, Whiskas, Royal Canin)
Nestle	24.4%↓	Purina One, Pro Plan, Alpo, Bakers, Winalot, Friskies, Fido, Felix, Go Cat, Spillers, Lucky Dog, Mighty Dog, Fancy Feast, Dog Chow, Cat Chow, Vital Balance, Purina Special Care, Meow Mix, Fancy Feast	Japan, Malaysia, Indonesia, Philippines, Korea, Singapore, Thailand	Russia, New Zealand, Australia, Thailand (US, Canada, 5 in Latin America, 7 in Europe, South Africa)
Procter and Gamble	6.9%↓	Iams, Eukanuba	Japan	No presence in Asia/Pacific (US, Netherlands and Argentina only)
Colgate Palmolive	6.3%↑	Hill's Science Diet, Nature's Best, Canine, Feline	Japan, Korea, Thailand, Taiwan, Malaysia, Australia, NZ	No plants in Asia Pacific as of 2002 (USA & Netherlands only)
Delmonte Foods Co- Heinz	3.3%↓↓	Kibbles'n Bits, Pup-Peroni, Snausages, Scooby Snacks, 9 Lives, Star Kits, Recipe, Vets, Amore, Gravy Train		Closed Heinz facility in Japan
Nutro Products	1.4%↓	Max, Natural Choice		USA only
Private Label-Doane				None in A/P
Agroalimen SA	1.3%↑	Advance, Brekkies, Royal Chien, Premium, Play Dog and Play Cat, Repas Complet and Repas Equilibre		

↑/↓ : variations of up to 0.2% from previous years.
 ↑↑/↓↓ : variations of more than 0.2% from previous year

³³ For more information on main international brands, visit <http://www.wattnet.com/Archives/Docs/PT013p6.pdf?CFID=133688&CFTOKEN=83970690>

ANNEX B: ESSENTIAL FATTY ACIDS IN DOG AND CAT FOOD

ANNEX B: ESSENTIAL FATTY ACIDS IN DOG AND CAT FOODS

Essential amino acid	Source	Dog requirement ³⁴	Cat requirement
Omega6: <i>linoleic acid</i>	corn, soybean, sunflower, safflower, primrose, but also some in poultry, pork fat.	min 1%	Min 0.5%
Omega6: <i>γ-linolenic acid</i>	fish oils, canola, flax oil, walnut or soy beans.	No min.	No min.
Omega6: <i>arachidonic acid</i>	animal products only: fish oils, and to a lesser extent pork and poultry fat.	No min.	Min 0.02%
Omega3: <i>α-linolenic acid</i>	flaxseed oil and to a lesser extent soy-bean and canola oil ³⁵ .	No min.	No min.

³⁴ Source: AAFCO 1998

³⁵ Fish oil also contains Omega3 fatty acids in general.

**ANNEX C: GENERAL STATISTICS FOR MONGOLIA'S MEAT INDUSTRY AND
OTHER RELEVANT RAW MATERIAL**

ANNEX C: GENERAL STATISTICS FOR MONGOLIA'S MEAT INDUSTRY AND OTHER RELEVANT RAW MATERIAL

	2000	2001	2002	2003	2004
Domestic meat production					
Number of livestock (million heads all 5 types combined)	30.23m	26.07m	23.9m	25.4m	28m
Number of livestock (million in Cattle Equivalent Unit CEU)				7.02m	7.69m
Year to year growth of livestock population				6.4% (-2% CEU)	10% (5.8% CEU)
Number of livestock slaughtered for consumption	5.72m (24.2% of tot.)	4.84m (22.4% of tot.)	4.59m (23.3% of tot.)	3.71m (21.1% of tot.)	
Meat production (slaughter weight th. tons)	310.6	226.4	204.4	153.4	
Of which beef	113.4	66.9	60.7	43.6	
Of which mutton and goat meat	120	104.6	94.9	80.9	
Meat production per capita* (slaughter weight kg / capita)	129.9	93.4	83.1	62.3	
Industrial meat production (th. tons)			6.763	11.058	4.345
Domestic demand for meat					
Population	2.407m	2.442m	2.475m	2.504m	2.751m**
Year to year population growth		1.45%	1.35%	1.16%	9.8%
Meat consumption* kg/capita/y (per adult equivalent)		97.2kg	98.4kg		
Meat expenditure as % of overall household expenditure		8.6%	9.7%		
Exports					
Meat (processed and semi processed) (th. tons)	16.7	19.8	23.3	15.1	8.05
Share of domestic meat production which was exported (min. rough estimate ***)	5.4%	8.74%	11.4%	9.84%	
Of which frozen beef (th. tons)			15.292	9.814	4.935
Of which horse meat (th. tons)			7.136	5.112	3.112
Intestine (th. tons)	0.87	0.37	0.316	0.222	0.278

	2000	2001	2002	2003	2004
Other					
Vegetable production (kg/capita)	18.4	18.4	16.2	23.9	
Vegetable production (th. tons)	44.0	44.5	39.7	59.6	49.17
Wheat production (th. tons)	138.7	138.7	123.1	160.4	135.6
Wheat Imports (th. tons)	92.2	29.9	139.3	61.5	
Rice imports (th. tons)	13.6	10.3	36	14.8	

Source: National Statistical Office of Mongolia

* The surprising lower meat production per capita vs. consumption per capita can only be explained by a discrepancy in measurement standards and in particular by the fact that meat consumption per capita are given for adult equivalent. Average meat consumption would be lower if it was measured over the whole population including children. Of the 2.504 m people in 2003, 1.6866m were over the age of 15 and thus consumed on average 98.4kg per person that year, 166 th. T was consumed by adults that year.

** Early figures published on the CIA country profile website yet to be verified.

***This share is a very rough estimate and only indicate minimums as it is calculating all meat product exports volumes combined (including frozen carcass, semi processed and processed meat) over slaughter weight volumes.

ANNEX D: RAW MATERIAL PRICING COMPARISON

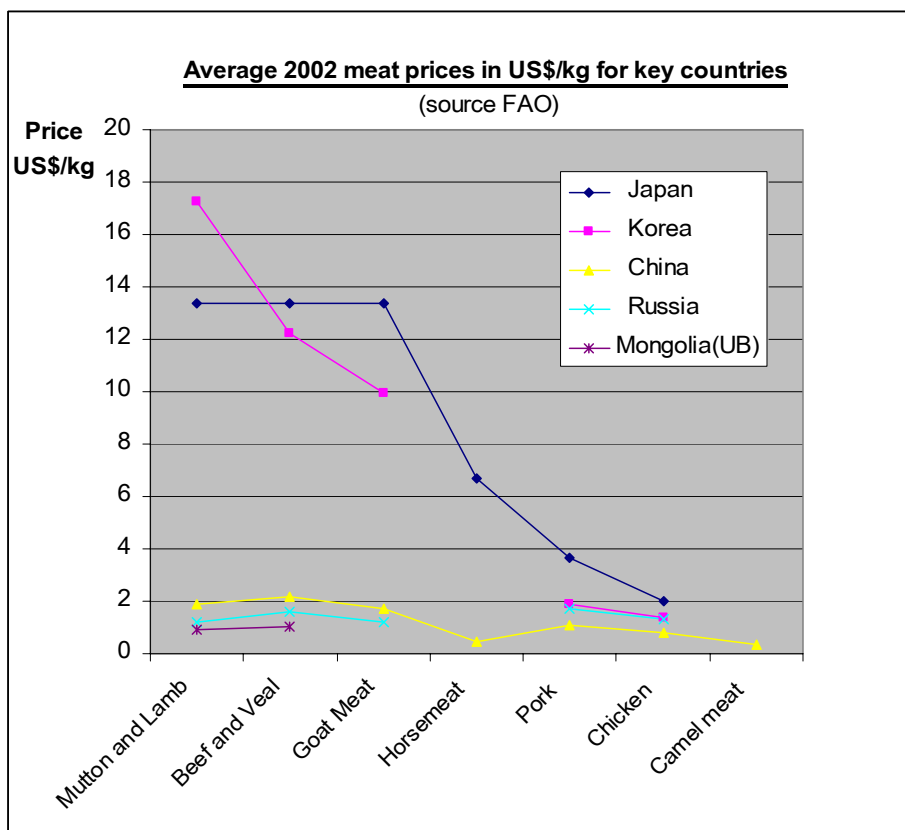
ANNEX D: RAW MATERIAL PRICING COMPARISON

Sample Prices for raw material animal product

	Mongolia MNT	Mongolia US\$	Japan	Korea	China	Russia	International
Unit	MNT/kg	US\$/kg (unless indicated otherwise)					
Horse meat	1500-1600 WS: as low as 1000	1.266-1.45 0.82 USD\$/kg* (export price '04)	\$30/kg (imported)				
Beef	1900-2200 WS: 1600-1650	1.6-1.86 WS:1.35-1.4 1 USD\$/kg * (export price '04)	3600 (imp.)- 6800 (dom) γ/kg.	30		0.8-1.1 WS: 5/carcass	WS: 2.513 (Australia)
Mutton/ lamb	1700-1800 WS: 1500-1550	1.43-1.52		22.4-39 (import* premium retail)			4.599 (New Zealand)
Goat meat	1550	1.31					
Pork							2.073 (USA)
Chicken							0.749 (USA)
Camel meat	1700	1.43					
Sources	Unless indicated otherwise, all prices are for March 2005 at Nalaikh and Emeelt Markets. *Source:National statistics office			Korean meat entrepreneur * From Australia converted at May 3 rd rate		Mr. Khanimkhan (MoFA), RS5010	FAO Food Outlook April 2005. 2004 prices

WS: "wholesale"

In Mongolia, prices for meat increased by 24% in 2003 and another 4% in 2004, slightly higher than overall food stuffs which increased by 15.2% and 2.8% in 2003 and 2004.



By-products prices in Mongolia

	MNT	US\$ ³⁶
WS cat. 2 by-products to Russia	240MNT/kg **	\$2/kg
Meat from cow head /kg	1500	1.26
Liver, kidney, heart (cow, sheep) /kg	~800(overall) heart < 900; liver~500-600; kidney ~ 400	0.675 heart<0.76; liver 0.42-0.506; kidney ~ 0.337
Cow tongue/kg	2500	2.11
Horse tongue/kg	800	0.657
Horse intestines/set	6000	5 / set
Horse intestines /kg	650	0.55
Sheep insides/ set	2500-3000	2.11-2.53
Sheep head/u	400	0.337
Goat head /u	200	0.17
Sheep empty abdomen /u	1500-2000	1.26-1.69

Unless indicated otherwise, most prices were taken in March/2005 at the Nalaikh and Emeelt Markets.

** BC Mongol price in Darkhan to Russia trader

³⁶ Assuming 1185MNT/US\$

**ANNEX E: OVERVIEW OF KEY MONGOLIAN MEAT PROCESSING
COMPANIES**

ANNEX E: OVERVIEW OF KEY MONGOLIAN MEAT PROCESSING COMPANIES

Company Name	Factory Location	Contact	Contact person	Pet Food production and exports
Kantansuikh Impex	Ulaan Baatar	Khanatnsuikh Impex Company Building. Baga Toiruu-35 Ulaanbaatar-23 PO Box 198 Phone: +976-310-305, /311-900 Fax: 976-11-311900	- N. Ulziibayar, General Director and owner namjil@mongol.net - D. Naranchimeg, Technologist and foreign trade manager mhf@mongol.net	Yes, canned dog food to Japan
SG Group/ Makh Market	Ulaan Baatar.	Meat Market Building 20 th Khoroo, Bayangol District, Mongolia Ulaabaatar-211137 PO Box- 245 Phone: +976-11-636292 Fax: +976-11-636277	Bayaraakhuu Luvsandorj, General Director meatmarket@mongol.net	Exported dried dog treats to Japan on a test marketing scale.
Khun Od	Ulaan Baatar.	CPO Box 1149, Ulaanbaatar 210613, Mongolia Phone: +976-11-631393 Fax: +976-11-633123	Mr. T. Lkhagvadorj, General Director hun-od@magicnet.mn	Exported dried dog treats to Japan on a test marketing scale.
Makh Impex	Ulaan Baatar	Makh Impex Company, Ulaanbaatar 37, Mongolia Phone: +976-11-632471, Fax: +976-11-632517	Mr. Purev Ochir, Executive Director makhimpex@mongol.net , www.makhimpex.com	None.
Darkhan Makh Expo	Darkhan.	Po Box 927, Darkhan Uul Aimag, Mongolia, 213800 Phone: (+976-01372)34534, 33326 Fax: (+976-01372)34534	Mr. Lamjav Tsedenpil, Executive Director makhexpo@mongol.net , www.makhexpo.com	Exported dry dog food to Japan.
BC Mongol	Darkhan	Baga Toiruu-210646, Ulaanbaatar, Mongolia Phone: +976-11-330211 Fax: +976-11323348	Mr. S. Deleg, Director	None.
Mongema	Erdenet	Po Box 78, Ulaabaatar 210648, Mongolia Phone: +976-11-312410 Fax: +976-11-312410	Mr. Dambal Lkhagvadorj, General Director, Mr. N. Jargalsaikhan, General Manager mongema_xxk@hotmail.com	Considering canned pet food at a later stage.
Wakamaru	Ulaan Baatar	Ulaanbaatar 46, Po Box 980, Mongolia Phone: +976-11-364005 Fax: +976-11-364005	Mrs. Mijidgombyn Otgonjargal, wakamaru99@hotmail.com	Attempted pet food production in the past through partners.

ANNEX F: INDIVIDUAL MARKET ANALYSIS

ANNEX F: INDIVIDUAL MARKET ANALYSIS

Numerous different sources were used to compile the data presented here. This explains the fact that the existence of information and the way the information was measured is not completely uniform across the four markets below.

A. Japan

A1. General

After a high growth in the 1990s, the Japanese market for pet food has now matured into a stable demand characterized by declining prices due to high competition among suppliers, a slight decrease in the pet population and a general background of economic stagnation. This has forced producers to come out with increasingly differentiated and specialized products. Many companies participating in the pet food sector have found it difficult to be profitable and two US companies (including a Heinz manufacturing entity) have withdrawn from direct participation in recent years³⁷. It would be impossible to compete without product attributes other than price and the current “survival of the fittest” era is allowing success only to those who take advantage of changing market conditions such as an aging pet population.

A2. Statistics

	2000	2001	2002	2003	2004
Pet population (million)	>18.2m****	Cat and dog: >17.3*** Dogs: 9.8 Cats: 7.5****		Dogs: 11.1 Cats: 8.1**	Cats: 8.5*
Total annual domestic spending on pet food (USD million)	2,220.5 (cat & dog) (dog: 57.75%), (cat: 42.25%)***	2,010 (cat & dog) (dog: 57.8%) (cat: 42.2%) ***	2,222 (total) 2,000(dog & cat) (dog: 58%) (cat:42%)	2,100 (total) ³⁸	
Sales of pet food ('000 metric ton)		783.24****	787.63	790 (Dog: 60.1%) (Cat: 33.4%)	
Imports of pet food (USD million)		606 (30.1% by value, 60% ³⁹ by weight)***		1,400 (62% by value, 57% by weight)	

* Pet Food and Pet Care Products in Japan Jan. 2005 www.the-inforshop.com/study/eo26269_pet_food_care.html

** JETRO Report

*** Euromonitor “Times are Lean on the Japanese Pet Food scene” 24 Jun 2002

The number of dogs and cats exceeded the number of children under 15 in 2004⁴⁰.

³⁷ Gain Report JA3702

³⁸ Sales increased but the \$ value reduction is due to higher Y/\$ exchange rates in 2003

³⁹ The big difference between the two figures can be partly explained by much lower production costs outside Japan, and thus lower values per tonnage.

⁴⁰ Pet Food and Pet Care Products in Japan Jan. 2005

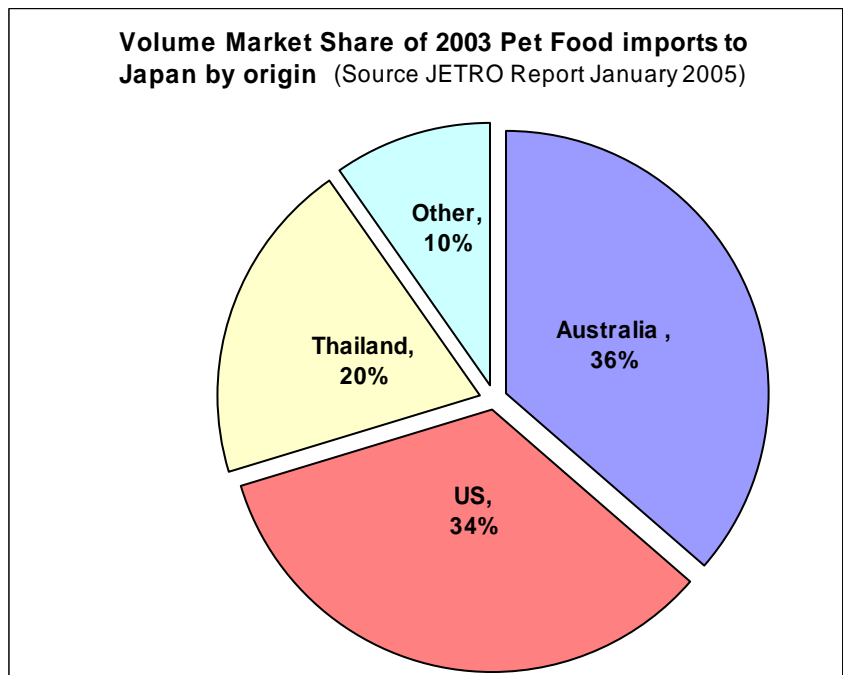
www.the-inforshop.com/study/eo26269_pet_food_care.html

Demand for pet food is forecasted to grow at 2% / year as the number of pet owners purchasing pet food rather than feeding table scraps continues to increase⁴¹. The percentage of dog and cat owners using commercial pet food *almost all the time* increased from 52% to 63% and 63% to 71% respectively between 1997 and 2001.

A3. Main foreign suppliers: market shares by origin

Imported pet food accounted for 62% of value and 57% of weight sold in 2003⁴². The share of imports in volume has been stable over the last 5 years. The US used to be the number one source of imported pet food to Japan with 45% share of imports in 2001 (mainly dry and wet dog food and dry cat food)⁴³.

During the recent Japan Pet Food Trade Fair (March 25th-27th 2005), 68% of the foreign exhibitors were from the US, 17% from Italy, and 5% each for Canada, Great Britain and Germany⁴⁴.



A4. Brand presence and brand awareness

Among foreign brands, Mars-Master Foods was ranking first and second in total domestic market share for dog and cat food respectively in 2001 (20.9% of dog food and 18.5% of cat food consumption). Nestle Purina and Hills Colgate are the next biggest foreign suppliers of pet food to the Japanese market. Although it has a small share of the market, Iams has observed good sales growth due to specific products targeted to older animals.

The biggest domestic producers are Nippon Pet Food, Nisshin Pet Food, and Maruha.

Manufacturer and brand does not seem to play a major part in the decision making of customers. A survey conducted by the Japan Pet Food Manufacturers Association shows that manufacturer and brand only came in 5th and 8th positions as criteria affecting purchase decision after pet preference (#1), price (#2), safety (#3), quality (#4), taste (#6), and volume (#7)⁴⁵.

A5. Consumer preferences and product split, dry/wet, cat/dog/other

⁴¹ Gain Report JA3702

⁴² JETRO Report www.jetro.go.jp/market/trend/market/docs/2005_01_petfood.html

⁴³ JETRO Report

⁴⁴ <http://www.jpjppma.or.jp/jpf-hp/index2.html>

⁴⁵ Gain Report JA3702

Dog/Cat/Other

Dog food and cat food accounted for 60.1% and 33.4% of total sales volumes in 2003, the remaining 6.5% split between bird food, aquarium fish food and other animals⁴⁶. This split has been relatively stable over the last 5 years. The cat population is growing particularly fast from 8 to 8.5m between 2003 and 2004⁴⁷. Cat food found in supermarkets typically contains chicken or fish but rarely does it contain meat. Red meat is perceived as less healthy for cats.

Dry/Wet/Treats

Dry food constituted 73.5% of the dog food and 58% of the cat food sold in 2003 (in volume).⁴⁸ There is a growing tendency to purchase dry food as evidenced by the table below for dog food.

DOG FOOD	Water content	2001 share**	2003 share ***
Dry food	10%	46.9%	73.5%
Semi moist	25%-35%	17.2%	16.1%
Wet food	75%	24%	7%
Other: treats, gum, jerky, bone		12%	3.4%
TOTAL		100%	100%

** Gain Report JA3702 2003

***JETRO Report 2005

A similar trend can be observed for cat food where the share of dry and wet food respectively increased and decreased by 16% between 2001 and 2003.

Japan is one of the strongest markets for treats along with North America and Europe. The share of treat sales for cats was fairly insignificant in 2001 (less than 1%). Dog treats is less negligible as seen in the tables above. The reduction in share of sales between 2001 and 2003 as seen in the table above should not be taken into account too closely as the information sources for each year are different and therefore might adopt different definitions for this category.

Other characteristics:

The Japan pet population, mainly dogs and cats, is characterized by small and older animals. There has been a boom of small dog population in Japan (10% growth between 2003 and 2004) due to television programs and other advertising channels. The Pet Food Manufacturers Association of Japan estimates that 40% of dogs and cats in Japan are above the age of seven, equivalent to about 60 to 80 year old in terms of human age⁴⁹. Manufacturers are taking advantage of such trends this by differentiating their products as premium and mid-priced food products that target small dogs with smaller size kibble and special breed-specific advertising schemes (Chihuahuas, Shih Tzus, Miniature Dachshunds, Toy poodles, Papillons...) or old dogs with special nutrients to relieve ailments or to prevent any age-related diseases. The demand for such products is continually showing double digit growth and accounted for 16.4% of total sales (in value) in 2003⁵⁰, in contrast with the declining demand for economy products.

⁴⁶ JETRO Report

⁴⁷ Pet Food and Pet Care Products in Japan Jan. 2005

⁴⁸ JETRO report www.jetro.go.jp/market/trend/market/docs/2005_01_petfood.html

⁴⁹ Pet Food and Pet Care Products in Japan Jan. 2005

www.the-inforshop.com/study/eo26269_pet_food_care.html

⁵⁰ JETRO report

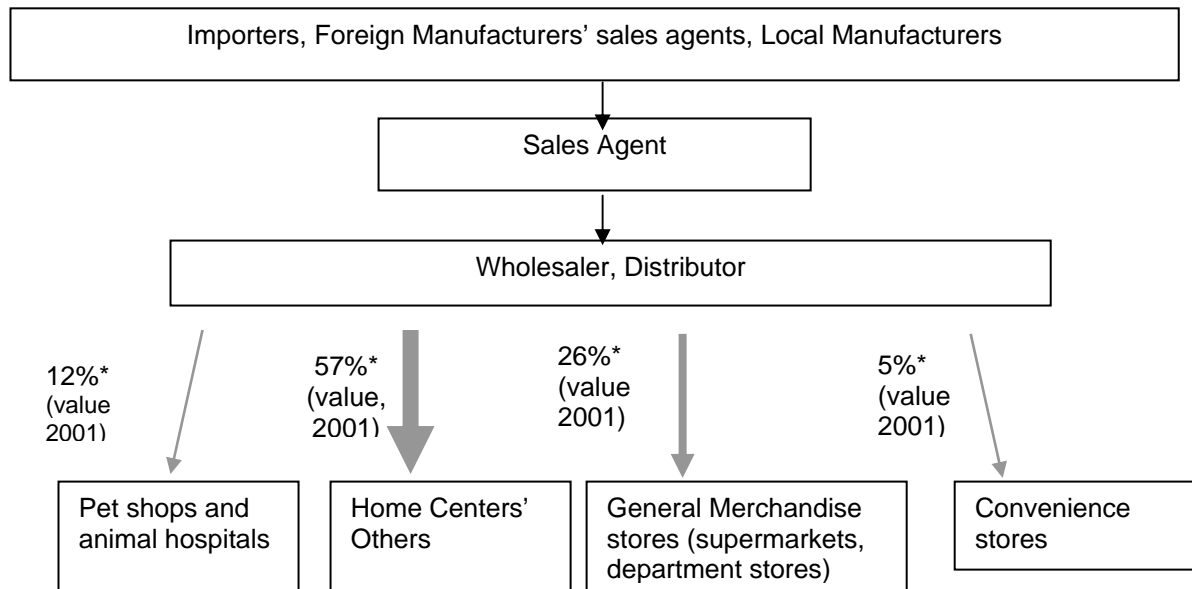
Although small size products have been the tradition in Japan, large package sizes, especially in home centers, are becoming more popular as consumers seek to reduce costs for pet food.

A6. Market prices

Price US\$/kg	Ingredients	Pack size	Retail unit	
			Supermarket (Kyoto+Osaka)	Online store
Dry Foods				
Pedigree dog	cereals, chicken, beef, vegetables	8kg	1.85	2.83
Inaba dog		0.5kg		5.42
Purina dog		1kg		10.46
Cesar dog		240g		16.64
Iris Oyama “Meat and fish mix” cat	Small fish dried, wheat, chicken	2.5kg	2.38	
Friskies (cat, Purina)		1.5kg		3.79-3.97
Friskies kitten	Chicken, cereals, vegetable protein, seafood powdered milk	1.2kg	4.97	
P&G Iams Cat		1kg		7.45
Colgate Hill’s Nature’s best adult cat	Corn, animal oils and fat, chicken, fish white meat, wheat eggs	2.5kg	9.81	
Royal Canin		2kg		11.17
Wet Foods				
Pedigree can dog + puppy	Chicken, beef, rice, vegetables	400g	3.19	2.97
DBF dog		5.76kg		6.78
Nestle Purina cat	beef	85g	7.61	
Friskies pouch cat		80g		8.44
Kalkan		85g*12		8.63
Mon Petit		85g		9.51
Inaba (tray dog)		85g		12.08
Inaba Pet Foods cat	Chicken, tuna, green peas, carrot OR tuna, tuna extract	85g-70g	12.3-16.57	14.65
Treats				
Beef jerky for dog		150g		18.89
Shirata Co Roy Pets Chicken	chicken	2 kg	14.18	
Gonta chicken jerky	Chicken	400g (50 sticks)	21.96	
Chew bone	Ox hide	10p. bag	0.98/p	
Pig ear (fried)		10p. bag		1.18/p.
Fish jerky for cat		20g		47.54

A7. Distribution channels

Large scale retail outlets and home centers have developed throughout Japan and see their value-share of distribution continually increasing as they carry more premium foods, while local pet shops have been forced to close down or struggle to compete by diversifying into niches.



* Gain Report JA3702

Sample leading wholesaler of pet food: Wayne Company.

The prices of processed foods imported into Japan are generally high because of Japanese government regulations like labeling regulations, Japanese distribution and business practices such as the complicated distribution system, the random timing of contracts resulting from "high-frequency small-lot delivery", and the risk of leftover products resulting from the setting of specific delivery dates⁵¹.

Note: Compared to the U.S. and Europe, Japanese consumers are extremely sensitive about "best before" dates, and retailers often set delivery deadlines substantially earlier than the "best before" date on the merchandise label. It is pointed out that such setting up of early delivery dates may become a barrier to market entry for imports of which the sales period is shortened because of the longer time period necessary to transport them to Japan

B. Korea

B1. General

The pet food market is expected to grow at 30% per year⁵² making it one of the fastest growing markets in the world, while American and European markets have remained stagnant as they have matured. Market growth due to rising incomes, more pets owned by Koreans and purchase of higher quality pet food. The pet food demand is highly dominated by dog. Additionally, the trend towards smaller families, an aging society, the declining birth rate and rising incomes are factors which lead to increased pet ownership.

⁵¹ http://www.jetro.go.jp/en/stats/survey/access/processed_foods.html

⁵² www.atoseoul.com "What's Hot" 01/2005

B2. Statistics

	2000	2001	2002	2004
Pet population (million)			2.9 pets (mostly dog)*	6m (pet owners)
Total annual domestic spending on pet food (USD million)		192*	250*	280**
Sales of pet food (metric ton)			118,000*	
Imports of pet food (USD million)	14	20 *	36* (border value, including distributor margin would bring share of imports to 50%. Imports represent 30% in volume of all commercial pet foods consumed)	50** (border value, including distributor margin would bring share of imports much higher)

* KS 3054 (Note: pet food volumes include table scraps. Value should be ~94,000t if considering commercial pet foods only).

** ATO Seoul "What's Hot" January 2005

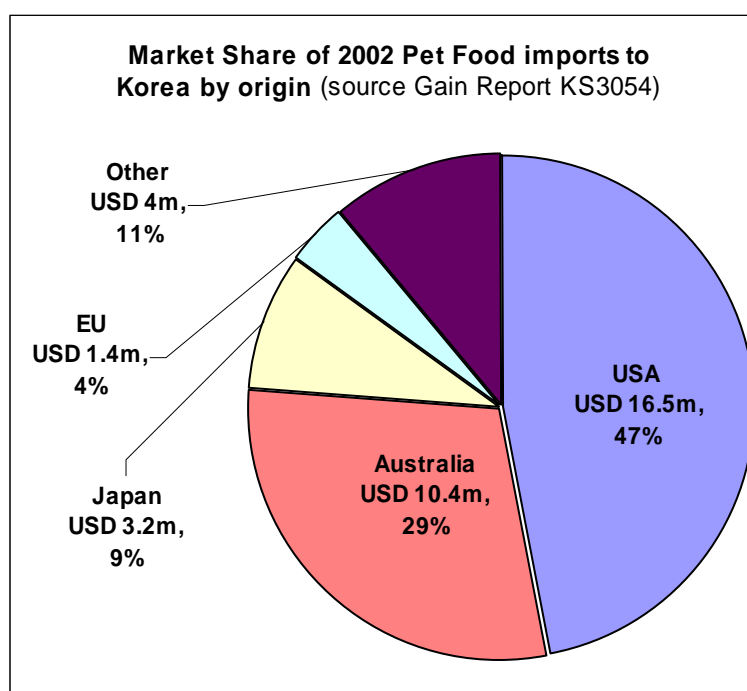
About 35% of all pet owners in Korea feed their pets commercial food wholly. Other pet owners feed commercial food and/or table scraps⁵³.

B3. Main foreign suppliers: market shares by origin

While the USA is the number one supplier of dry pet food, Australia is number 1 supplier of canned pet food and Japan is the major supplier of pet treats and snacks. The US's share of imported pet foods went down from 64% in 2000 to 47% in 2002⁵⁴ and further to 45% in 2004 with US\$21.2m value⁵⁵.

The entire product line for super premium pet food and half of the premium pet food products were imported in 2002⁵⁶.

During the recent Kopet Fair (September 19th-21st 2003), 26% of the 27 foreign exhibitors were from the US, 19% from the UK, 15% from each Germany and Japan, % each from Italy and Russia. The rest were from France, Taiwan and China⁵⁷.



⁵³ KS3054

⁵⁴ <http://www.fas.usda.gov/info/agexporter/2001/dec/page19.pdf>

⁵⁵ ATO Office Seoul "What's Hot" 2005

⁵⁶ KS3054

⁵⁷ http://www.kopet.com/2004/e_2003.htm

B4. Brands and brand awareness

Korea consumers are extremely brand aware⁵⁸ and are not very price sensitive when it comes to purchasing pet food⁵⁹, in particular of foreign brands such as Nestle (Purina Pro Plan, Alpo, One), Hill's Pet Nutrition (Science Diet), Mars (Pedigree), Nutro, and Eukanaba. The main local, and slightly less visible, product brands are Daehan and Jerony.

Purina Co Ltd is the most powerful player in pet food in 2002 with 29% share of dog and cat food sales, although down from 31% market share in 2001. The loss of share is the result of strong performance by Hill's Pet Nutrition in cat food. There were many new foreign products presented by importers, but most ended up being a one-off import and could not successfully penetrate the solid entry barrier presented by established multinationals⁶⁰.

B5. Product preferences and split, dry/wet, cat/dog/other

Dog/Cat/Other

Dogs are by far the most popular pets, accounting for 77% of the pet population in 2003⁶¹. The ratio of dog food to cat food sales is over 15:1⁶². South Korean pet food and pet care products are heavily oriented towards dog-related products. Only recently did cats become acceptable as household pets and is growing rapidly especially among the younger generation. The food market for other animals is very small compared to dog and cat food.

Dry/Wet/Treats:

Wet pet food sales vs. dry are relatively smaller (less than 10% of total in value) and are still perceived as a supplementary food to dry food. Dog treats saw the strongest growth of 32% in current value terms in 2003 over the previous year, although both its total sales volume and value is very small.

Other characteristics:

The growth in pet food consumption is driven by premium dry pet food, and thus a high growth in average prices but slower growth in sales volume. Koreans often mix kibble with some proportion of canned food.

B6. Market prices

Retail prices for imported pet foods are generally higher than those for locally manufactured pet foods. Products are imported from Australia (Purina), New Zealand (Pedigree), Malaysia (Purina), Singapore (Purina), and Thailand (Petchix).

Price US\$/kg	Flavor/ ingredients	Pack size	Retail unit	
			Super-market	Online shop ⁶³
Dry Foods				
Purina (Adult dog)	Cereals, meat, chicory	8kg	2.74	
Eukanuba Maintenance		15kg		2.79

⁵⁸ Reference: Mr. Kim Ki Man, Korean Meat Industry Specialist and entrepreneur developing meat canning factory in Mongolia

⁵⁹ Gain Report KS3054

⁶⁰ Euromonitor Pet Food and Pet Care Products in South Korea

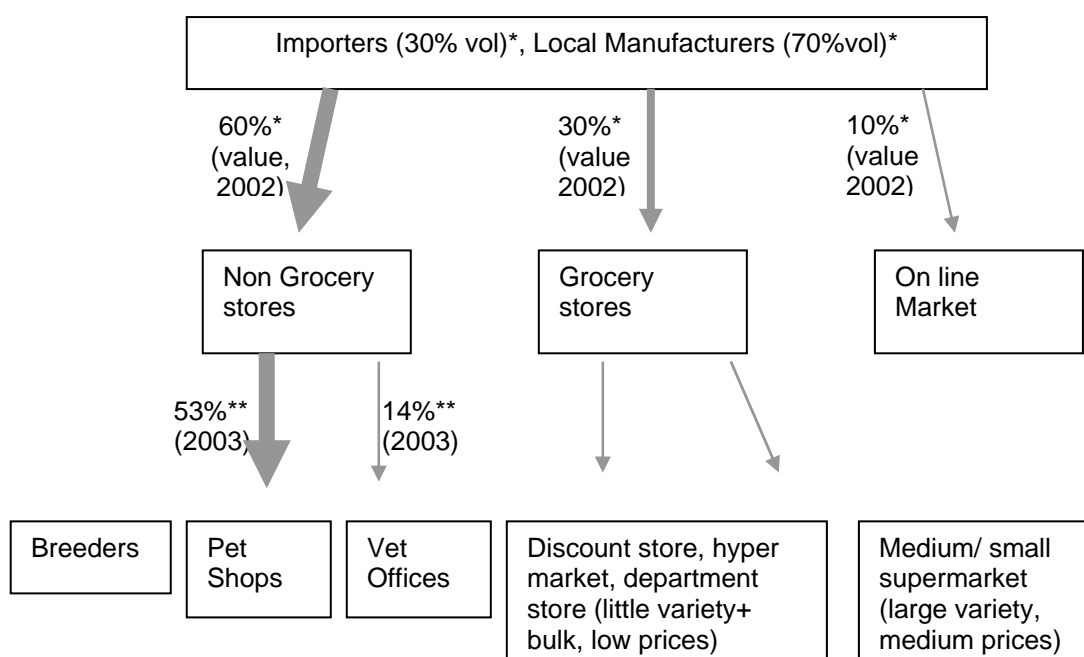
⁶¹ Euromonitor Pet Food and Pet Care Products in South Korea

⁶² KS3054 and http://www.export.qld.gov.au/information_exporters/korea_projects.shtml

⁶³ Prices as of May 3rd 2005 www.dognara.com, using May 3rd exchange rate

small breed (dog)				
The Dog Fusion, Joyful		4kg-8kg		2.35-3.4
I Nature Puppy		7.5kg		3.33-3.53
Pedigree Meaty bites (dog)	Cereals, meat, tallow	2.5kg	3.55	
Yummy Yummy (Korean, dog)		1.8	3.69	
Precept		3kg		4.3
Purina (Alpo Proven Healthy, Adult. Dog)	Wheat/ cereals, meat and byproduct,	1.5kg (plastic bag)	4.49-4.56	5.72
Purina One Growth and development for cats	Lamb, brewers rice, whole grain corn	1.5	5.72	
		3	6.61	
		0.6	6.4	
Wet Foods				
Schoke drops (dog)		325g		17.2
Purina lucky dog "Beef", "Chicken Dinner", "Wan Petit"	Beef, chicken	700g	2.28	
Treats				
Knotted Bone chew		10.5 inch		1.9-2.3 /u
Knotted Bone chew (Petchix)		3*4-5 inch		0.45/u
Haian Petworld Pet Snack (dry meat)		600g		7
Delistick (chew sticks)		250g		23.57

B7. Distribution channels



* KS 3054 (2002-2003 figures)

** Euromonitor Pet Food and Pet Care Products in South Korea 2003

Veterinary clinics are the second largest distributor after pet shops with a share of 14% in 2003. This is primarily due to the influence of such shops and clinics in recommending diets for the animals they sell or treat. However, veterinary clinics and traditional pet stores are losing share due to the wild growth of hypermarkets and online pet shopping malls.

There are 2000 pet shops and 1000 online stores in 2004⁶⁴. There were over 2,700 veterinarian clinics in Korea in 2003, a 35% increase from 2001 and 1000 online stores. The number of pet beauty parlors selling pet food and other pet items is also increasing.

The internet is playing a large role in the growing trend of pet-ownership with many online pet-lover communities appearing and with it countless pet foods and pet care products. We have also seen the appearance of “Dog Cafes” where pet owners can bring their pets and where pet foods and snacks are sold.

C. China

C1. General

China is very much an emerging market. As individual families gain more wealth, there's a greater trend toward keeping pets⁶⁵

Although the current market for pet food in China is rather small, China's pet population has grown a remarkable 20% in five years mainly due to the growing number of one child households who have the need for an extra companion, fashion trends, higher disposable incomes in coastal urban areas such as Beijing, Shanghai and Guangzhou, and more flexible regulations which cut pet registration and management fees by over 75%⁶⁶. As a result, the number of licensed dogs has grown drastically, from 130,000 to the current 410,000.⁶⁷

Only since 2000 did China become a net importer of pet food. The outlook is positive for market growth although penetration from foreign companies who have not invested in local manufacturing facilities is uncertain as import regulations are highly protectionist and erratic and price competition from local producers if fierce.

C2. Statistics

	1998 *	1999	2003	2004 **
Pet population (million)	dogs: 19m cats: 45m	240.8 dogs: 19.4m, cats: 46.8m		291.31 dogs: 150
Total annual domestic spending on pet food (USD million)			172	194 (99.76% are dog & cat food)
Sales of pet food ('000 metric ton)				N/A
Imports of pet food (USD billion)				N/A

*Source: Pet Food Industry Magazine 2000

Experts predict that the annual sale of pet food and related products in the country might grow at 15% per year and might exceed \$820 million by 2008.

⁶⁴ Austrade Seoul 2004

<http://www.austrade.gov.au/publications/PresWellbeingKoreaMasamune.pdf?1097733425418>

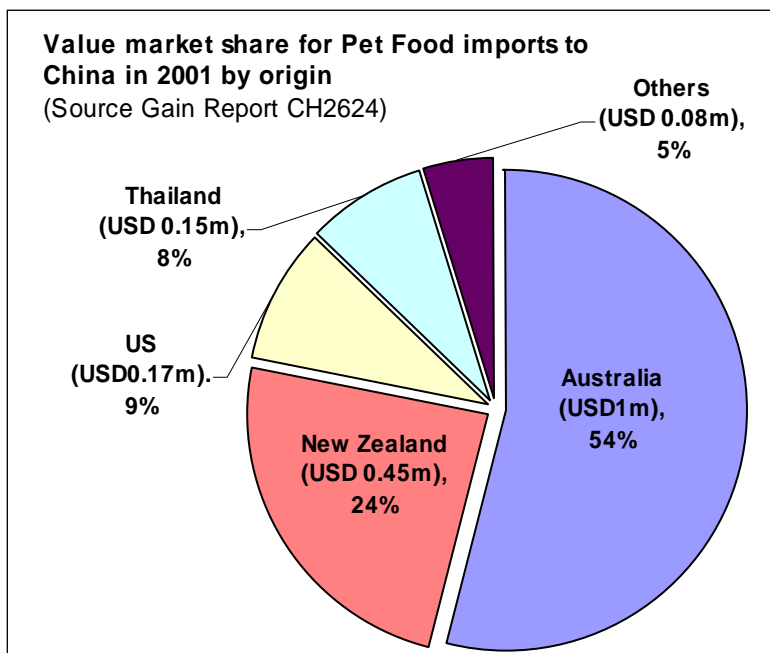
⁶⁵ Quote from Mike Cusack, a director at Rudducks, an Australian maker of specialized pet products

⁶⁶ China Daily http://www.chinadaily.com.cn/english/doc/2004-11/09/content_389963.htm

⁶⁷ China Daily

C3. Main foreign suppliers: market shares by origin

Number 1: Australia (2002)⁶⁸ mainly through its manufacturing relationship through Effem under Mars company.



C4. Brand and brand awareness

Multinational pet food companies such as Mars (58% market share of retail value sales of dog and cat food in 2004) have a strong presence in supermarkets and hypermarkets in major cities and aggressive pricing to fight off local manufacturers. Those companies have established strong presence in China and investing in production facilities: Mars' brands are owned by Effem Foods in Beijing, the largest supplier in China. Mars/Effem doesn't produce all of its sales in China but also imports from its other factories in Australia, New Zealand or Thailand. Procter and Gamble and Colgate Palmolive hold the second and third place in the market with 10% and 5% value shares respectively⁶⁹. Heinz is another international manufacturer present in the market, but with a smaller presence. Nestle is surprisingly quite absent from the Chinese market.

Local brands many of which entered the market since 2000 attracted by the growing demand, suffer from low brand awareness and lack of consumer trust affected by the recent SARS outbreak. Despite efforts to improve product quality, mainly cater to medium price segment and low-end mass consumer needs⁷⁰. Nevertheless, they are at a significant price advantage over foreign producers who have to face restrictions on import and distribution rights and local rampant protectionism. The larger local players are Chengdu Care Pet Food Ltd., Zhangjiagang Lianfeng Pet Food Co Ltd., and Changai Nory Pet Food Co Ltd (China Norway JV). They have a strong distribution and good presence in mass retail outlets although they tend to produce only dry foods in very little product differentiation.

Aside from particular exceptions such as Hong Kong, the selection of products is still very poor as pets are still a novelty. Although increasingly sensitive to foreign branding and health benefits, most consumers still see price as the most important criteria in making purchasing decisions. One positioning strategy could be to focus on the 'purity' (real or imagined) of Mongolia and its products. Most Chinese only have a vague notion of where Mongolia is but

⁶⁸ Gain Report CH2624

⁶⁹ Face to Face Pet Food Forum 2004, Petfood Industry Magazine Feb 2004

⁷⁰ The Infoshop Pet Food and Pet Care Products in China Feb 2005

perceive it as open fields of green. Some Inner Mongolian dairy firms have used such attributes in their marketing campaigns and are apparently successfully distributing all the way to Yunnan Province.

C5. Product preferences and split: dry/wet, cat/dog/other

Dog and cat food dominate the market. There are twice as many cats as there are dogs in China.

Much of the dog and cat food for sale at local supermarkets is the dry variety and is usually sold in heavy-duty laminated paper bag.

C6. Market prices (of input and finished product)

Market prices for pet food are still perceived as extremely high for most Chinese who could easily buy human food for the same prices. A lot of pets in China are not pets in the Western meaning of it but more often are there to perform a function such as guarding or chasing mice.

Wholesale prices for jerky by domestic manufacturers:

Chicken “jerky” or dried chicken (14-20% moisture content) was quoted at a wholesale price of \$5.5-\$7/kg⁷¹. Dried Cattle by-product at 6.75-11.75 US\$/kg and Dried Horse meat at about 12US\$/kg and are sold in 100-200g packages.

Imported pet food may be some times three times as expensive as locally made pet food⁷².

Sample Beijing retail prices⁷³:

Price US\$/kg	Flavor/ ingredients	Pack size	Retail unit			
			Park'n shop (HK hypermarket chain)	Hypermart foreign owned Carrefour	Local super-market	Chinese market (Xinshui Shichang)
Dry Foods						
Pedigree dry dog food	Chicken or meat with milk,	10kg		1.51		
Pedigree dry dog food	chicken or beef, ham, “adult meaty bites”	1.8kg	2.15	2.08 (meaty bites)		1.54-1.98
Purina dry Dogchow/ Puppychow	Beef, chicken or beef with liver	1.8kg				1.8
Whiskas dry cat food	Chicken or meat with milk, beef, beef and veg, chicken, tuna & salmon	1.5kg-1.8kg	2.17	2.5	2.5	1.54-1.75 (beef cheapest)
Friskies dry cat food	Beef and liver	1.5kg		2.26		
Wet Foods						
Pedigree canned dog	Chicken or beef	400g	2.49			2.27

⁷¹ Source: quotation Qingao Sanjia Foodstuffs Co. Ltd.

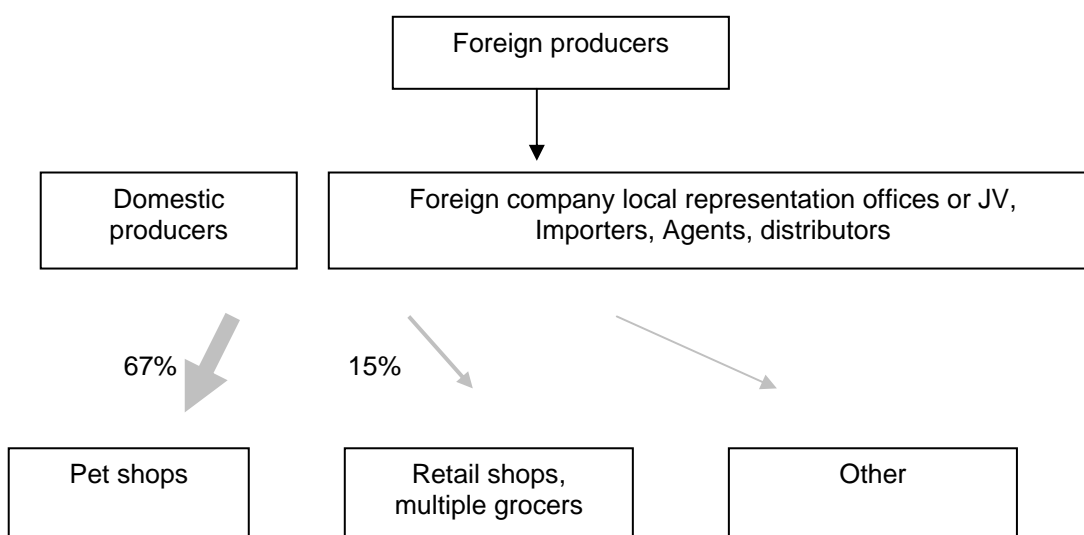
⁷² China Daily 2004 www.chinadaily.com.cn/english/doc/2004-11/06/content_389184.htm

⁷³ Source: onsite observation. April 2005. 8.27 Yuan/US\$

food						
Price US\$/kg	Flavor/ ingredients	Pack size	Retail unit			
			Park'n shop (HK hypermarket chain)	Hypermart foreign owned Carrefour	Local super-market	Chinese market (Xinshui Shichang)
Whiskas canned cat food	Mackerel, tuna, beef and liver	400g	2.48 (meat)			2.18 (fish)
Cesar canned dog food	Chicken, beef (+veg), liver, lamb,	100g	10.03		10.03	
Pedigree wet pouch dog food	beef	100g	3.5			
Whiskas wet pouch cat food	Beef and vegetable, tuna and prawn	85-100g	8.39 (seafood)			3.39
Friskies wet pouch cat food	Chicken, meat, fish	100g		3.5		
Treats						
LLSpk Beef chew bone (dog)		100g		13.18		

C7. Distribution channels

Pet shops dominate the retail distribution with 67% value share, while multiple grocers record the second best performance with 15% value shares⁷⁴.



⁷⁴ Petfood Magazine Feb 2004

D. Russia

D1. General

Prepared commercial pet food is a fairly new business in Russia but has significant potential as pets are very popular in Russia and a strengthening economy and with it consumer spending power due to high oil export revenues. There are good growth prospects as most pet owners still do not purchase pet food and rather prepare pet meals using their own ingredients. This is expected to change as more and more households have less available time at home to perform such duties. Reliance on pet food is increasing especially in urban areas: 70% of the 960,000 pet cats and dogs in Moscow consumed manufactured pet food in 2001.

The range of domestic supply and demand for pet food products is wide, from very inexpensive commodities to the premium niche market.

D2. Statistics

	1998	1999	2000	2001	2002	2003	2004
Pet population (million)	45.9** (C&D) dogs: 20.7, cats: 25.2	dogs: 9.4, cats: 12.5 ***		60 D&C ****			
Total annual domestic spending on pet food (USD million)				100-180****	206*	200*	
Sales of pet food ('000 metric ton)							
Imports of pet food (USD million)			14* (D&C)	18*	21.7*	47* (23.5% from RS5302)	70-90* (estimate)

* Gain RS4050, Gain RS4301

**http://www.afma.co.za/AFMA_Template/1,2491,6552_1645,00.html

*** Pet Populations, Euromonitor 1999

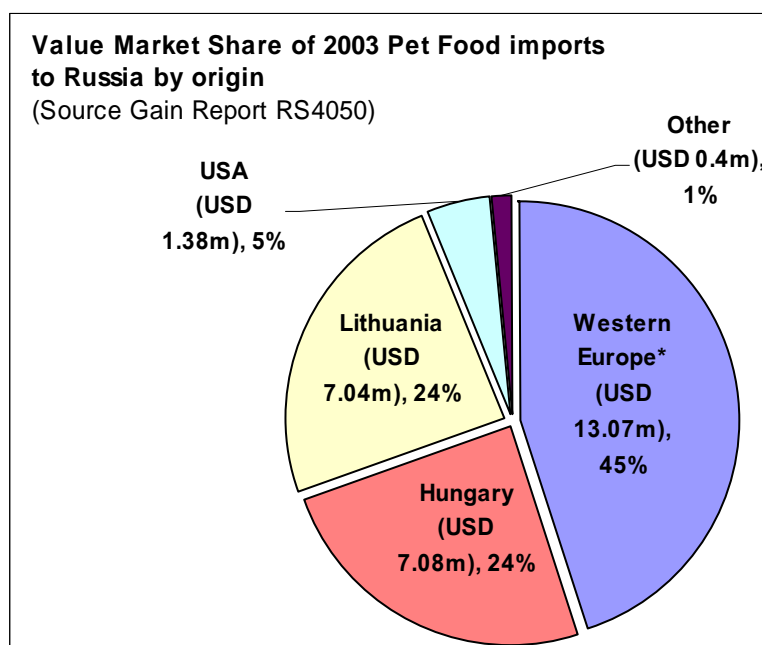
<http://www.wattnet.com/Archives/Docs/PT051p14.pdf?CFID=5167101&CFTOKEN=49544602>

**** <http://www.bisnis.doc.gov/bisnis/bisdoc/011203petfood.htm>

The pet population sharply decreased in the years leading up to 2000. Ownership levels of most types of pets in Russia were affected by difficult economic conditions. Early import figures for 2004 show sharp increase in pet food imports for that year. For example, imports of pet food from the US jumped to USD2.4m in 2004⁷⁵ from USD1.38m in 2003.

⁷⁵ Gain Report TR 5013, US Census Bureau, USDA FAS, Trade Database

D3. Main foreign suppliers: market shares by origin



* Western Europe includes by rank France (4.38%), Austria (3.99%), Netherlands (1.87%), Germany (1.41%), Denmark, and Italy.

D4. Brand and brand awareness

Mars (Chappi, Pedigree, Whiskas, Kitekat, Frolic, Royal Canin brands), and Nestle (Friskies, Spillers, Darling, Purina) control about 80% of the market. Mars is the market leader with 65% market share in 2001⁷⁶, and has invested significantly in dry food (Whiskas and Pedigree) manufacturing facilities in country (factory in Stupino built in 1995 and Novosibirsk in 2001). Nestle also owns a local production facility (Friskies and Darling brands). Other international brands present are Proctor and Gamble (Iams), Hill's and Heinz Co. HJ.

Domestic producers also have a niche in the market competing by a low price factor but often lack quality⁷⁷. Major national brands include Arovit, Oskar, Novgorodsky Myasnoi Dvor, RK PSS, Zolotaya Ribka, Raisio Feed Ltd., Novgorodsky, Myasnoi Dvor. Their share of the market temporarily increased during the 1998 financial crisis.

Product price continues to be an issue in Russia as price remains a key determining factor in purchasing decisions. One of the main pressures on product pricing is the devaluation of the rouble. Despite the fact that domestic food producers are generally considered behind western producers in technology, food safety and productivity, trade barriers and price advantages keep the domestic sector well ahead of imports. The domestic industry was also greatly aided by the financial crisis. The crisis, despite all of its negative effects, aided in the development of some areas of the domestic food sector. Many of the product voids left in the absence of imports were quickly and successfully filled by domestic producers.

Concerning branding, after a favorable trend to importer consumer oriented which characterized the early 1990's, many consumers are now showing strong interest in old and new local products bearing Russian brand names. Even some foreign food processors have taken advantage of this trend by introducing new products with typically "Russian" brand

⁷⁶ Includes Royal Canin purchased later. Source: Overview of Pet Product Industry in Russia November 2001, US Government, <http://www.bisnis.doc.gov/bisnis/bisdoc/011203petfood.htm>

⁷⁷ Source: Overview of Pet Product Industry in Russia November 2001, US Government.

names. In fact, some of the most successful new food products are produced locally but promoted using a mix of western marketing techniques and traditional Russian values/themes⁷⁸.

D5. Product preferences and split: dry/wet, cat/dog/other

Cat/Dog/Other

Commercial cat food is more popular and commercial dog food. In 1999, cat numbers exceeded those of dogs by 30%.

Contradiction: Saint Petersburg: According to the Association of Pet Products Companies, 70-75% of the pet food sales in Saint Petersburg in 2000-2001 is for dogs, and 25-30% for cats⁷⁹.

Dry/Wet/Treats

Dry food is preferred over wet food.

D6. Market prices

Price US\$/kg	Flavor/ ingredients	Pack size	Online wholesaler
Dry Foods			
Pedigree adult dog	Assorted meats	13kg	1.35
Chappi Purina Dog Chow Adult	meat	15kg	1.73
Whiskas cat food	beef	2.4	2.38
Katinka (Russian)	Beef	400g	2
Lapka (Russian)	Beef	10kg	1.63
Wet Foods			
Gav (Russian)	beef	650g	1.12
Myau (Russian) can cat	liver	350g	1.43
Chappi canned dog food	beef	400g	2.53
Pedigree tin for puppies	beef	100g	3.2
Whiskas ragout can cat		400g	3
Whiskas can for cat	Beef and liver	100g	4
Freeskas can for cat	beef	100g	4
Treats			
Titbit cow's ears	cow ear	1 unit/bag	1.1/unit
Titbit cow's tail	cow tail	1 unit/bag	2.1/unit
Karli joints	joints	2x70g	13.57
T-Bones		150g pack	11.2

D7. Distribution channels

Russia's retail sector is developing, with the introduction of grocery stores and the increasing popularity of discounters, supermarkets and hypermarkets some of which operated by foreign chains such as Auchan (France), Metro (Germany) or Spar (Netherlands). Grocery stores are comparable in size to large convenience stores and compete directly against small kiosks for value-added food sales. Between 1999 and 2003, the Russian retail infrastructure in general experienced a dynamic development. The share of trade conducted through informal channels reduced from over 50% of total value sales in 1999 to less than 25% in 2003.

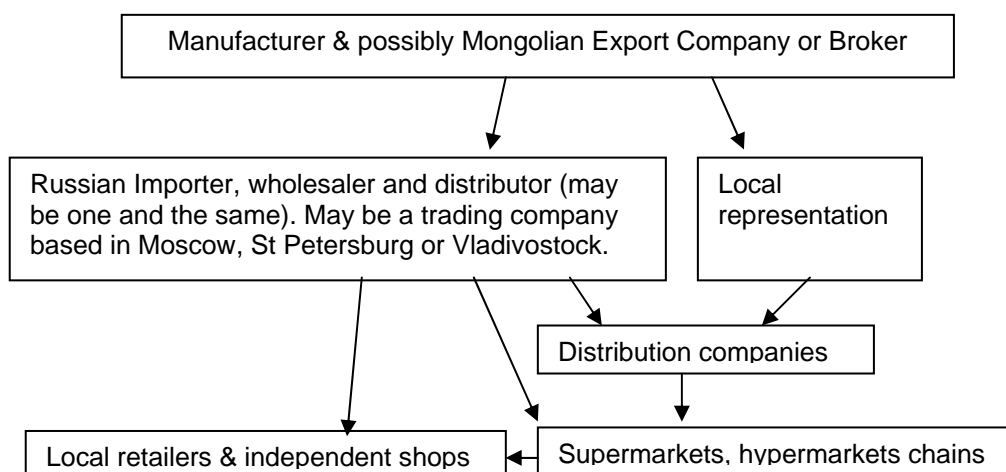
⁷⁸ Gain RS4301

⁷⁹ Source: Overview of Pet Product Industry in Russia November 2001, US Government, <http://www.bisnis.doc.gov/bisnis/bisdoc/011203petfood.htm>

The young and developing commercial distribution is characterized by small but reliable and permanent companies operating within each food group. They offer both continuity of supply and loyalty to chosen brands. Alongside these are distribution companies which will buy whatever is cheapest on the international markets, import and distribute these products⁸⁰. It is imperative to meet with several importer/distributors before choosing the right partner. Foreign suppliers can choose from a small but growing number of existing Russian distributors. Business relationships in Russia are usually built through personal contact. Communication by telephone, fax and e-mail is reliable, but dealing with new potential business partners is still best done face-to-face⁸¹.

A local importer which could also be a distributor will serve as a conduit for products into Russia and can deal with the numerous barriers to bringing a new product into the country handling customs and transportation matters and even conducting advertising campaigns. It can help foreign suppliers by placing its products on store shelves. One inherent risk is the bad reputation Russian buyers have for making timely payments, particularly relevant to the history of Mongolian meat exported to Russia. Credit reporting is still a relatively new practice in Russia, and credit-reporting agencies may not have complete information on potential business partners. Another challenge in dealing with importers is the availability of working capital. Some importers simply cannot afford to hold large stocks. They may also be limited in their ability to offer terms to retailers, which has become a very common practice with the larger retailers.

An alternative to working with a Russian importer/distributor would be to establish one's own import and distribution facilities in Russia. If the decision is made to establish local representation, this office should be located in Moscow and run by an experienced Russian national to ensure the greatest market coverage. A foreign company, operating on its own will generally pay higher customs fees, face more difficult inspection procedures, and be forced to contend with more administrative delays than would a local importer. A model employed by many successful exporters is to use a Moscow or St. Petersburg based trading company to act as primary customer and facilitator of imports. Most imported products pass through Moscow and/or St. Petersburg or Vladivostok.



Russian importers have a very poor payment history for imports. This was mentioned repetitively by Mongolian companies and the Ministry of Agriculture.

⁸⁰ Source: <http://ats.agr.gc.ca/europe/e2788.htm> Agri-Food country profile 2002

⁸¹ Gain RS4301

ANNEX G: COUNTRY LABELING AND CUSTOMS REGULATIONS

ANNEX G: COUNTRY LABELING AND CUSTOMS REGULATIONS

A. JAPAN

Labeling

Labeling standards applicable to pet food are a set of labeling codes and fair competition regulations.

The labeling code has three parts:

- mandatory labeling information for pet food,
- standards for representing pet food as total nutritional food and,
- labeling restrictions to prevent unjust representation.

Mandatory labeling information⁸²:

- Statement that product is intended for use as dog or cat food
- Purpose of pet food: “total nutritional food”, “snack food” or “food for special purpose”
- Net weight
- Method of feeding
- Date of manufacture or use by date
- Component analysis
- Raw materials
- Country of origin
- Name and address of manufacturer, distributor or importer.

Customs documentation

A person wishing to import goods must declare them to the Director-General of Customs and obtain an import permit after necessary examination of the goods concerned.

The Import Declaration steps are as follows⁸³:

Complete Import Declarations which describe the quantity and value of goods and other relevant particulars. Import declarations must be made by the person importing the goods, i.e. usually a customhouse broker files the declaration as a proxy for importers. A customs duty payment declaration form (Customs Form C 5020) must be prepared in triplicate and submitted to Customs with the following:

- a. Shipping documents such as a commercial invoice and packing list in the case multiple packages are shipped and are not figured in detail on the commercial invoice.

Commercial Invoice requirements (several copies are required):

- place and date of issue
- names and addresses of importer and exporter
- detailed description of the merchandise, quantities (in international units), numbers, varieties, proportions
- method of shipment
- signature of responsible officer, along with name and title
- all insurance and freight charges

⁸² Japan Pet Food Fair Trade Association

⁸³ Canadian website for Hay/general feed import regulations In Japan <http://atn-riac.agr.ca/asia/e3172.htm>

- shipper's invoice number and customer's order number
- container number
- seal number

Packing list (4 to 7 copies required):

- number of packages within one case or unit
 - the net, gross and legal weights of each case, and of the total shipment
 - volume of individual packages, as well as of the whole shipment
- b. Bill of lading or air waybill (3 copies min: for on-file, importer and customs broker)
- description of the product
 - weights and measurements of the packages and their types
 - ports of origin and destination
 - names and addresses of shipper, importer and customs broker
 - any freight or other charges incurred
 - number of bills of lading in the full set
 - carrier's acknowledgment of receipt "on board" of the goods for shipment
- c. A Certificate of Origin- available at the local Chamber of Commerce of the country of origin
- d. Freight accounts, insurance certificates, etc. (where necessary)
- e. Phytosanitary certificate
- f. Export Declaration form (applicable for Canada, uncertain for Mongolia)
- g. If applicable, a detailed statement on reductions of, or exemption from customs duty and excise tax.
- h. Authentication of Documents - certificates of sale and letters authorizing local agents or importers to act on behalf of the exporter.

Additional information is available on the Japan Customs and Tariff Bureau website⁸⁴.

B. Korea

Labeling

Korean importer must register the ingredients listed below in the proper format to Provincial Government or City Government offices in order to sell pet food in Korea.

Some of the documentation required includes the following.

- a. To register, "Annex Form 5" of the application for registration of feed ingredients must be submitted. Item 14 of "Annex Form 5" requires a listing of ingredients in decreasing order of predominance by weight in the final product.
- Crude Protein
 - Crude fat
 - Crude ash
 - Crude fiber
 - Calcium
 - Phosphorus
- b. "Annex Table 4" must also be submitted. Item 3 of annex Table 4 requires a listing of the "volume of registered ingredients", including the minimum and maximum

⁸⁴ <http://www.mof.go.jp/english/tariff/tariff.htm>

percentages of each ingredient as exemplified below. Ingredient information must be registered in Korean in accordance with labeling requirements.

1. Product registered number
2. Product name
3. Product type
4. Volume of registered ingredients
 - a. Crude Protein (40% or more)
 - b. Crude fat (20% or more)
 - c. Crude ash (15% or less)
 - d. Crude fiber (10% or more)
 - e. Calcium (10% or more)
 - f. Phosphorus (5% or less)
5. Manufactured date
6. Expiration date
7. Importer's name
8. Manufacturer's name
9. Names of feeds and or grains used
10. Country of origin
11. Details if medicine is used
12. Usage of feed
13. Net weight (kg or MT)
14. Describe if package locally
15. Warning clause, if any

C. Russia

Labeling

Retail food products imported into Russia must bear labels in Russian that specify:

- Name of the product
- Type, grade or category of the product
- Name, country, legal address of producer, packer, exporter and importer of the product
- Legal address of the producer
- Weight (net and gross) or volume of the product
- Food contents (basic ingredients and additives listed by decreasing weight)
- Nutritional value (calories; vitamins cont. or if product intended for medical & dietary use)
- Conditions of storage
- Date of production/processing and shelf life (or Expiration date)
- Warning information on any restrictions and side effects terms and conditions of use
- Conformity stamp (RST) and certification code

Currently, importers are allowed to place labels with this information in the Russian language after the product reaches Russia. The current law also states that, if the package is small or the label cannot include all the necessary text, this information may be printed separately and enclosed with each unit of the product.

Customs documentation

Certificate of Conformity

All foods and beverages which are imported into the Russian Federation must be accompanied by a Certificate of Conformity (called GOST-R) issued by The Russian Research Institute for Certification (VNIIS) or a laboratory accredited by the Russian State Committee on Standardization, Metrology, and Certification (GOSSTANDART). This certificate is issued after samples of these products have been tested in accredited laboratories, and test results indicate that they conform to Russian food safety standards.

GOSSTANDART (State Standards Committee) is the national body responsible for the certification of goods. A complete schedule of goods subject to mandatory certification is published and includes foodstuffs and beverages of local and foreign origin, which is issued by the Russian Research Institute for Certification (VNIIS).

Hygiene/Sanitary Certificate

Goskomsanepidemnadzor, the State Committee on Sanitation and Epidemic Control, is responsible for sanitary and hygiene regulations.

A hygiene certificate is required for all food products, additives, and preservatives. The Goskomsanepidemnadzor issues the certificates for children's foods, food additives, non-traditional forms of unprocessed food, as well as food products purchased under international agreements. It issues Hygiene (Sanitary) Certificates through its Moscow certification laboratories. This committee also works closely with the Institute of Nutrition that operates under the supervision of the Russian Federation's Academy of Medical Science. The Hygiene Certificate may also be handled through accredited laboratories abroad.

*Veterinary certificate*⁸⁵

Imports of commercial pet food require a *veterinary certificate* in which the producer either certifies in writing that the pet food contains no genetically modified organisms (GMOs) or provides proof that any GMOs contained in the pet food have been approved by the Russian government. Genetically modified foods are not well received in Russia. Russian consumers and government have been reluctant to accept any meat raised on hormones or antibiotics, which has resulted in strict inspections of the products⁸⁶.

Processing/Packing Plant Certification

Fully cooked pork products, pork casings, beef and beef products, fully cooked poultry products, and heat-treated but not-fully-cooked poultry products can originate from any facility inspected by an official of the Russian Ministry of Agriculture. Establishments are inspected at their own expense.

According to Resolution #1 dated January 18, 2005, the Federal Service for Health and Protection of Consumer Rights (RosPotrebNadzor) has banned the importation of food products into the Russian Federation that have been processed or manufactured using the preservatives E216 (propyl p-hydroxybenzoate (propyl paraban)) and E217 (sodium propyl p-hydroxybenzoate). According to the Resolution's preamble, this measure follows

⁸⁵ Updated information on products approved for feed use can be obtained at the following site

www.mcx.ru/index.html?he_id=464&doc_id=2740

⁸⁶ Gain Report RS4050

changes in European Union (EU) regulations (HP 95/2/EC) that prohibited the use of these food preservatives in the EU starting on January 1, 2005 for confectionary products and in meat production⁸⁷.

The *Russian Testing and Certification Center (ROSTEST)* also provides a full range of quality control and inspection facilities in Russia.

Note: customs duties and VAT must be paid before the product will be cleared by Russian customs authorities unless the product is shipped, under the seal, to a Russian bonded, customs-approved warehouse.

D. USA labeling regulations (AAFCO)

In the US, pet food is one of the most regulated of all products. Pet Food is regulated by Food and Drug Administration (FDA), the states through their feed laws and the Association of American Feed Control Officials, and the US Department of Agriculture.

In addition to providing the product name and specification whether the product is for dogs or cats, pet food labels are also required to describe the product, list the ingredients and the guaranteed analysis⁸⁸ of the product. Ingredients must be listed in descending order of weight from largest to smallest.

Specific rules govern the names the product may be given based on its contents:

Product nomenclature	Quantity implications
“X Food”, “Y+Z Food” ex: Chicken Food	At least 95% content of X, Y+Z, or Chicken
“X nuggets”, “X platter”, “X dinner”, “X entrée”, “X formula”....	At least 25% content of X
“ with X”	At least 3% content of X
“ X Flavor”	No min. requirements, may be 100% artificial.

Below is more detailed information on import tariffs and other fees applicable when importing pet foods to the four major markets discussed in the report. Unfortunately, not all figures were easily available for the different markets.

	Japan	Korea	China	Russia
<i>Import Tariff</i>	None. (for products with <10% lactose content)	5%	15%	20%
<i>Inspection fees and customs brokers fee</i>	1-3% shipment value.			1.25%
<i>Cargo unloading, transport, storage</i>	3-5% shipment value.			
<i>Consumption tax /VAT</i>	3%		13%	18% levied at point of entry
<i>Distributor markup: Importer</i>	5-10%			
<i>Distributor markup: Sales agent</i>	50-70%			

⁸⁷ Source Gain Report RS 5004 Russia Prohibits Several Food Additives 2005

⁸⁸ regulatory requirement to indicate minimum and maximum values of key nutrients, such as minimum protein and fat, as well as maximum fiber and water content.

	Japan	Korea	China	Russia
<i>Distributor markup: Wholesaler/distributor</i>	15-25%			12-15%
<i>Distributor markup: Retailer</i>	30%			35% or more
<i>Advertising</i>	May reach 15-20%		Not necessary. Only Effem Foods advertises because costs are prohibitive and target market impact rate is low.	A lot of TV advertising required, very dynamic sector yet affordable
<i>Promotion</i>	May reach 10-15%			Popular, often initiated by the distributor
<i>Profit tax</i>				39% of gross margin
<i>Source</i>	Gain Report	APEC	TDCtrade.com	Gain RS4301

ANNEX H: PET FOOD PRODUCTION TECHNOLOGY

ANNEX H: PET FOOD PRODUCTION TECHNOLOGY

A. Dry food (“Kibble”)

Production Technology	Equipment
<p>1. Milling, mixing, pre-conditioning: can be batch mixing (appropriate for smaller volumes as large volumes require longer batch cycles which might affect quality) or continuous mixing which is typically done as part of the extrusion process. Ingredients are mixed in a pre-conditioner typically with steam and liquids before entering the extruder. Continuous mixing consists in a mixer being fed by dry and wet product feeder pumps with appropriate dosage.</p> <p>2. Extrusion (cooking, dehydration, sterilization, expansion): The extruder forces the materials along a shaft by means of screws, wherein heat and pressure cook the food along its journey. As it is forced out of the extruder through a die, various shapes and sizes can be formed. In single or twin screw, maximum levels of fresh meat added to a premium dry pet food cannot exceed 30% (for single extruder) or 35% (twin) because the high moisture and fat content of meat by-products lower the viscosity of the extrudate making conveying difficult in the extruder barrel and preventing the exiting product from holding its shape. Dry pet food exit the extruder at 22-26% moisture. Optional enhancement: prior to extrusion, the meat may be treated by rendering (cooking) which removes most of the fat but affects product quality and adaptability OR, for meat with significant muscle content, by “concentration” process (proprietary technology) that reduces fat and moisture content from (sample) 7-25% to 5% and 68% to 55% respectively. This allows for higher levels of meat with higher protein concentrations to be processed through the extruder. This allows addition of 40% “concentrated” meat levels (higher fresh meat equivalent) to be added into the extruder.</p> <p>3. Drying and cooling: to reduce moisture that contributed to spoiling of products through the growth of yeast and mold, to control or eliminate microbial pathogens, achieve consistent moisture contents, to reduce transportation cost and avoid clumping of dry products.</p> <p>4. Liquid coating: of individual kibbles with high fat content liquids (up to 15%). This is usually done by use of a spray in a rotating drum. Can be done with vacuum technology which allows, through vacuum, to remove all gases from within the kibble before coating and then releasing the gases and pressure after coating to push the fat into the kibble. The final moisture content is typically 8-10%. The enrobing process allows for much higher concentration of fat otherwise allowed through the extruder, providing both added calories and flavor.</p> <p>5. Second cooling: A cooling after the coating process allows the production of more sophisticated pet foods and risk-free products.</p> <p>6. Conveying: To connect the different processes such as the dryer to the coater, the coater to the cooler, and the cooler to the packaging bins. Many conveying devices are available on the market, such as conveyor belts, drag conveyors, horizontal/vertical bucket conveyors, newer Low Pressure Conveying Dense Phase (LPCDP).</p> <p>7. Packaging</p>	<p>1. Hammer mill, batch or ribbon mixer, pre-conditioner part of the extruder.</p> <p>2. Extruders: Single or twin screw technology. Twin screw has more positive pumping action and can handle higher fat content but is more expensive.</p> <p>3. Dryers: Can be done through a horizontal dryer which can maximize drying capacity, uniformity and efficiency, or a more traditional vertical dryer technology which presents many more advantages such as being very clean, less contamination risk, good drying efficiency and moisture uniformity, more efficient use of plant floor space, lower air temperatures leading to better product quality, possible operation at partial capacity. A new option is through microwave drying which offers the advantage of more uniform moisture profiles, better energy efficiency, no transition heating and cooling times, low maintenance and less floor space requirement. Microwave can also be used as pre- or post- regular during to enhance performance.</p> <p>4. Liquid coaters.</p> <p>5. Coolers: vertical or horizontal technology, the vertical technology presenting more advantages (sanitary, operator).</p> <p>6. Conveyors.</p>

Sample line 1: Dry food (= “kibble”) by extrusion

Source: Feed Innovation Services (Netherlands)

Assumptions:

- 2 ton / h production of the line in two batches of 1 ton per 30 minutes. Take into account that the actual processing capacity is STRONGLY dependent on the formulation, fat- and water content.
- Single screw extruder suffices (fat content < 18% in the formulations); if formulation requires higher fat-contents consider twin-screw extruder
- Process steps (excluding storage and dosing of raw materials) including milling, mixing, preconditioning, extrusion, drying, coating, cooling, and packaging.
- No transport & buffer bins are included. It is assumed that these can be made / purchased locally.
- Building, ground works etc. not included.
- No blending of ready products occurs after manufacture (multi-colored feeds...)
- Labor requirements: for an extrusion line generally one skilled operator for the extruder and one skilled person to take care of dosing, milling and mixing suffices in a half-automated factory. Packing / general works require an additional one/two persons. This is strongly dependent on the size of the packing; w. smaller packing requiring more (unskilled) labor.

Composition ⁸⁹	
<p>Sample Dog food:</p> <ul style="list-style-type: none"> - 30% animal by products: chicken meal⁹⁰ (preferable low ash quality), meat and bone meal (max 5%), Greaves⁹¹ (min. 7.5%), lamb/mutton meal, fishmeal (max 10%). - 50% Cereals and cereal by products; rice (min 10%, max 30%) corn (min 15%, max 30%) wheat (max 20%), wheat bran (max 10%), rice bran (max 10) - soy max 10% - animal fats (pig / cow / fish) - whole egg powder (min 1% in puppy feed and premium feeds) - linseed min 1% - sugar beetpulp min 3 , max 4% - brewers yeast (sach. cer.) min 1.5% - digest - minerals / vitamins / dl-methionine - additives (flavoring, coloring, surfactants...) <p>Note: also have Water + Lubricants + Humectant to a total of 25-35%</p>	<p>Sample Cat food:</p> <ul style="list-style-type: none"> - 30% animal by products: chicken meal (preferable low ash quality max 30%), lamb meal, fishmeal (min 5%, max 15%) - 50% Cereals; rice (min 25%) corn (min 10%, max 20%) wheat (min 5%, max 40%), soy max 10% - maize gluten meal (min 5%, max 10%) - animal fats (poultry / pig / cow / fish) - whole egg powder (min 2%) - sugar beet pulp 2% - brewers yeast (sach. cer.) min 4% - digest - minerals / vitamins - additives (flavoring, coloring, surfactants...) <p>Note: also have Water + Lubricants + Humectant to a total of 25-35%</p>

⁸⁹ Compositions are mainly restricted by the need to achieve analysis suitable for dog/cat, good palatability and proper mix viscosity to be processed through the extruder. There is plenty of flexibility to alternate different products within a same family.

⁹⁰ “Meal” is a mixture of by-products from a specific animal which are processed into a dry powder-like product by grinding, fat extraction, sterilizing and drying.

⁹¹ Greaves are the remaining high protein product left from melting fats. They are typically added for palatability enhancement.

Dry pet food by extrusion	Process name & description with specifics	Timing of each step (estimate)	Equipment required with productivity indication	Sample equipment supplier	Other equipment supplier
Step 1 Milling	SME ⁹² 25 – 40 kwh / metric ton	2 ton / hours (2 batches / 30 minutes)	Hammer mill with 1.75, 1.5 or 1mm screens (based/prod)	Wijnveen, Ottevanger, Tietjens, Bepex ~ €25.000	
Step 2 Mixing		2 batches /h. (1 ton/batch)	Ribbon mixer, paddle mixer, etc.	Wijnveen, A&J, Buhler... ~€20,000	
Step 3 Pre-conditioning (mixing with steam and liquids)	- Constant quality steam required - Dry - STE ⁹³ 20–50kWh/t. - Temp. depends on formula 60°-95°C	30s. – 1.5 minutes residence time.	Pre-conditioner, Steam boiler, Pumps,	Pre-conditioner, Steamboiler or generator w/ ~120kg/ h steam gen. capacity. Pumps (fat, water) according to requirements (15-35% of cap.)	- Extru-tech Conical Co-Rotating Twinscrew Extruder C ² TX (less complex and cheaper); - InstaPro International (single screw dry extruder); - IP 2000W Food extruder (ISolutions UK made in India) 400-600kg/h of output product, US\$40,000; - Anderson International (single screw wet extruder).
Step 4 Extrusion	SS-extr. 1 or 2 heated zones, possibility of cooling on the head (optional) 20-50 kWh/ton	2.5 ton / hour capacity (capacity strongly depends on formulation)	Peripherals required: - die-inserts - rotating knife - temperature controllers	Wenger (US) Almex (Dutch), various others Including frame, engine, knife, transport from the extruder. ~€200.000	- Extru-tech Air flow II (AFII) (horiz.); - Geelen Cascade(vert.)
Step 5 drying	Gas-fired, steam h.e. preferred, or oil-fuelled (although contamination risk).	800 kg / h water evaporation (max)	Counter flow cooler / belt-cooler	Wenger, Aeroglide, Heynen... ~ €45.000	- Extru-tech Air flow II (AFII) (horiz.); - Geelen Cascade(vert.)
Step 6 Coating	Liquid coating or powder coating	0.5 – 3 % of coating (60 kg per 2 ton max)	Coater (pan, belt, drum, paddle mixer),	(simple) drum / belt incl. Spraying / dosing system ~ €7500 (mixer): €15.000	Vacuum coating: A&J (Phlauer line continuous & batch. Cap. 6-35MT/h).
Step 7 Cooling	Reduce temperature to within 5°C of environmental temperature	10-15.000 m3 drawn air for cooling (dep. on climate)	Counter flow cooler	Geelen €10.000	Extru-tech vertical cooler. Capacity 1-15 T/h.
Step 8 Packaging	2- 5, 10, 25 kg bags	2 ton / hour	Manual/automatic (advise manual)	Manual: ~€10.000 Aut: up to ~€100.000	
Automation	Depending on requirement: no/ half/full automation		Preferred mode of operation: half-automated.	KSE (Dutch) Cost depends on level of automation.	Conveyor:MAC Equipment, Inc. LPCDP capacity 1.5-20 T(US)/h.
TOTAL and OUTPUT	Final product: Moisture: 8-10% Bulk density: 300-450 kg/ m ³ Size 0.5–3 cm. Shape based on insert.	Total production time + vol.: 12-16 t./8 h. shift ~ 30-40m ³ storage cap.		Total capital investment estimate: ~ €375-450 th. (excluding buildings, etc.)	

⁹² SME is specific mechanical energy (e.g. motor load)

⁹³ STE is specific thermal energy (e.g. heat included by steam)

Sample line 2: Dry food alternative process

Source: Feed Innovation Services (Netherlands)

Assumptions:

- As in sample line 1. except:
- Dry materials are mixed and milled (as usual)
- All fresh meat is worked up to a slurry and pumped straight into the extruder, depending on formulation 50-75% of slurry can be used in formulation.
- Process: milling & mixing of dry ingredients. On a separate line: cutting of frozen meat, mixing with water, pumping of slurry into the extruder. For the rest see sample line 1.
- Labor: see sample line 1.

Composition	As in sample line 1; recalculated to standard moisture content			
Dry food alternative process	Process name & description with specifics	Timing of each step (estimate)	Equipment required with productivity indication	Sample equipment supplier and price
Step 1 Milling	SME 25 – 40 kwh/ton	As 1.) lower capacity possible depends/ formula	Hammer mill w/1.75, 1.5, 1mm screens (depends on product)	Wijnveen, Ottevanger, Tietjens, Bepex ~ €25.000
Step 2 Mixing (dry materials)		2 batches /hour (1 ton batch)	Ribbon mixer, paddle mixer, etc.	Many (Wijnveen, A&J, Buhler...) ~€20.000.
Step 3 Preconditioning (mixing with steam and liquids)	- Constant quality steam required - Dry - STE 20–50kWh/t. - Temp. depends on formula 60°-95°C	30 s. – 1.5 minutes residence time.	Pre-conditioner, Steam boiler, Pumps,	Pre-conditioner ~ €7500, Steam boiler/ generator ~120kg/h steam generation capacity ~ €25.000 Pumps (fat, water) based on requirement (15-35% of cap.)
Step 4 (frozen) Meat grinding	10-25 kWh /ton (no bones)	Depending on formulation 1-1.5 ton / hour	Cutter / meat grinder	Various, Hobart, Kilia, Havantec, €40.000
Step 5 Pumping in extruder barrel	During pumping, water and liquids may be added	Depending on formulation up to ~1.5 ton / hour	Pump for water/ meat mixtures. Must be able to pump into pressure gradient of extruder (piston-type or similar)	Various €15.000
Step 4 Extrusion	SS-extrusion, 1 or 2 heated zones, <u>Mixing zone on extruder screw/barrel.</u> 20-50kWh/ton	2.5 ton / hour capacity (capacity is strongly dependent on formulation)	Peripherals required: - die-inserts - rotating knife - temperature controllers	Wenger (US) Almex (Dutch)... Includes frame, engine, knives, transport from the extruder to dryer: ~€200.000
Step 5 drying	See sample line 1.			
Step 6 Coating				
Step 7 Cooling				
Step 8 Packing				
Automation				
TOTAL and OUTPUT	Final product: 8-10% moisture BD:300-450 kg/m ³ Size: 0.5 – 3 cm. Shape per insert	Total production time + vol.: 12-16 ton / 8 h. shift ~ 30-40m ³ storage cap.		Total investment: see sample line 1.

B. Wet food

Production Technology	Sample equipment
<p>1. Forming and cooking:</p> <ul style="list-style-type: none"> - Real meat chunks. Super premium but cost prohibitive. The more the products are based on animal materials alone (meat and meat by-products), the more they are likely to fall into the “high palatability”/premium products category. - Traditional “reformed-meat” technology (chunks with pate like appearance and without the striated texture of muscle meat): - Heat setting / Oven forming process using ground meat by-products mixed in slurry with binding materials, laid on flat conveyor belt, baked and later cut into chunk looking pieces. OR, - Gel setting OR, - Chunk using extrusion: texturized meat using meat by-products and vegetable protein by extrusion transforms the various ingredient components into one homogeneous formed product. Requires extrusion cookers (single or twin screw). Single and twin screw require 216kW and 300kw respectively to produce 2T/h of soy-based product and is capital intensive. Extruders produce texturized chunks in dry state (18-20% moisture) which need to be re-hydrated and optionally refrigerated at 4C until canning time. <p><i>Optional production enhancement (&MAP technology):</i> to increase meat cohgntent levels and texture: prior to extrusions, the meat may be treated by rendering⁹⁴ (cooking) which can remove most of the fat but affects product quality and adaptability OR, for meat with significant muscle content, by “concentration” process (proprietary technology) that reduces fat and moisture content from (sample) 7-25% to 5% and 68% to 55% respectively. This allows for higher levels of meat with higher protein concentrations to then be processed through the extruder (up to 40%). The fat and water extracted from the concentration process can be sold separately or reincorporated post-extruder to re-hydrate the chunks. Reincorporation could bring “meat” content levels of the final product back up to 50%.</p> <p><i>Comments on texturized meat:</i> Those products have a striated high quality meat appearance but have nutritional and palatability limitations. Operation may be capital intensive, tedious and messy. Higher levels of mechanical work are required in texturized chunks (0.015kW/kg/hr) vs. dry food extruding. The higher SME (specific mechanical energy) makes it more intolerant to fat and moisture increases (ex: single screw doesn’t tolerate fat level in soy flour of more than 1.2-1.4%).</p> <p>Texturized pieces may be used in chunk in gravy as well as loaf-type products but generally at low levels: less than 10% of total chunk mass used in the product.</p> <ul style="list-style-type: none"> - Loaf type product: will use similar reformed meat chunks as above but using more by product and more starch in the chunks and gravy to help solidify into a loaf. <p>2. Capping, sealing of can</p> <p>3. Sterilization: For conventional cans: batch steam retorting (and autoclave) or continuous hydrostatic sterilizing. For trays or pouches, oven-pressure retorting or more oven-pressure hydrostatic heating may be used. Time, temperature and pressure are determined for each product or pack type. Temperatures are lower for pouches than for cans. More innovative solutions to reduce the bacteriological content exist such as irradiation, ultrasound, electric field processing, but none have been developed on a large scale.</p>	<ol style="list-style-type: none"> 1. Batch mixer/double-walled steam cooker 2. Extruders (functions include cooking, dehydration, sterilization, expansion) 3. Filling machine (can be done manually); capping/sealing machine. 4. Conveyor

⁹⁴Rendering is a process used to reclaim proteins and fats. The rendering process involves cooking ingredients at very high temperatures. At the end of the process a fine, protein and mineral rich "meal" is made. This meal is an important source of nutrition for use in pet food.

Sample line 3: Wet pet food (Canned or sterilized pouches)

Source: Feed Innovation Services (Netherlands)

Assumptions:

- 2 ton / hour batch operation
- (Frozen) meat is cuttered and blends with liquid according to formulation. Dry ingredients are mixed with other raw materials.
- Cans are filled, lids are positioned and sealed
- Cans are sterilized by steam, spraying or immersion in a retort,
- Labeled and
- Packed.
- The process is the same for pouches except that the packing and sterilization lines require a slightly different setup (according to machine and pouch manufacturer.) However, these two processes can be treated together.

Compositions	<ul style="list-style-type: none"> - 60 % meat, - 20% wheat, or wheat byproducts, or maize, - 20% water with - specific additives (carrageenan+locust bean gum), vitamins, minerals, colorants. 					
Wet food (can or pouch)	Process name & description with specifics	Timing of each step (estimate)	Equipment required with productivity indication	Sample equipment supplier	Other	Labor
Step 1 Dicing	Cutting of frozen meat into chunks or fine-grinding for paté-type feed.	According to formula. ~60% of 2 ton / hr.	Cutter or grinder	Hobart, Kilia, Havantec, etc. ~€25.000		1 or 2 persons
Step 2 Mixing	Blending of liquids, meats and dry materials (already in required grist-spectrum)	40% of 2 ton/Hr.	Dosing, Weighing equipment. Blender	Z-mixer, Hobart, Winkworth U-trough		
Step 3 Canning	Filling, flushing with N2, placing & welding lid	2 ton / hr	Packing unit	Various, Allpax, Dixie canner co.	www.ds-machine.com in Erdenet (China)	Depending on level of automation
Step 4 Sterilizing	Retort 110-130°C	0.5-1.5 hr.	Retort, steam boiler, pumps, etc.	Various, Allpax, Stock, Lubeca		Depending on level of automation
Step 5 Labeling & packing	Can labeling & packing	2 ton / hr.	Label printers,			Depends on level of automation
TOTAL and OUTPUT	Chunks or pates in cans or retort pouches. Final water content: 15-40%.	16 ton per 8h shift		Total investment: €400.000 to 1m (strongly dependent on level of automation)		Minimum 2 persons,

C. Treats

Production Technology	Equipment
<p>Baked treats (with extrusion optionally): hard dog biscuits (bone shape common), cookies, biscuits, crackers, cakes. Processing line is like a biscuit or cracker line for human food.</p> <ol style="list-style-type: none"> Mixing: dough made of mostly wheat flour, oils, flavoring, water and other minor ingredients. Dough formulation and batch consistency are critical at this stage. Shaping: by rotary molding, injection molding, or sheeting and cutting/stamping to create the product shape. Tools must be well maintained to ensure proper forming. More complex products can use extrusion and even co-extrusion (see below). Baking. Usually relatively cool ovens and long bake times. Drying. Consistent final moisture will affect shelf life. Can be followed by optional coating with additional drying. Cooling to help prevent moisture condensation in the package. Final product temperature needs to be within 5°C and 8°C of final storeroom temperature. Packaging 	<ul style="list-style-type: none"> - Dough mixer - Sheeters + stamp/cutters OR rotary moulder OR forming extruder - Oven: one single equipment may be used for baking and drying but two separate steps are preferable.
<p>Animal parts treat: pig ears, large bones, pig's feet, animal hooves, snouts, jerky treats, and also lamb and cattle ears.</p> <p>Resembles a meat processing facility. Requires two separate plant sections for wet incoming materials and dry finished products to minimize contamination. Raw materials are typically made of by-products from a meat processing facility. This is one of the fastest growing segments of the pet treat industry.</p> <ol style="list-style-type: none"> Thawing (in the case raw materials are received frozen). Fresh raw material for better finished product quality. Trimming and loading onto carts or racks. Cooking, and drying with optional coating and additional drying after the cooking step. The simplest system involves a hot room with circulating air. But this process provides little control over processing conditions leading to product variability and poor batch consistency. A more advanced option involves batch oven/dryers which provide control over temperature, airflow/retention, and humidity and offer even heat and airflow distribution throughout the batch volume. The system is more efficient and produces higher quality products. The same equipment can first act as an oven and, as the product approaches the final state, act as a dryer to bring the product to desired moisture levels. Pig ears and snouts may also be deep fried, see below. Cooling Packaging 	<ul style="list-style-type: none"> - Batch oven or dryer. - Vacuum packing machine (Darkhan Makh) - Jianlei (China) - Shindaigo (Japan) <p>Note: Darkhan Makh invested 60m MNT in facility+ dryer + tools for dry treat making excluding vacuum packing machines.</p>
<p>Rawhide treats: rawhide chips, rawhide bones, twists, rings, and ground formed products.</p> <p>A raw hide production line is similar to a rendering and leather processing operation. The later stages of the production parallel a meat processing operation. Plant must be divided into a wet and dry room. Very labor intensive and normally done manually.</p> <ol style="list-style-type: none"> Rendering or tanning animal rawhides Cutting and trimming, sorting Forming into final product shape. Formulation and raw material variability are critical at this stage. Laying in trays and carts and loading. Heating and/or Drying. Critical features include air flow, moisture levels and temperature. Heating normally is done at 70°C for a certain period of time to 	<p>Uses batch systems with very long retention times.</p>

<p>ensure pathogens are killed. Final moisture content and “water activity” i.e. amount of water that will support microbial growth (target 0.6) critically affect the product shelf life.</p> <p>6. Cooling.</p> <p>7. Visual inspection and grading and optional coating and further drying and cooling.</p> <p>8. Packaging</p>	
<p>Co-extruded treats: bone shanks, marrow bones, mini-steaks and filled products.</p> <p>Production line very similar to that of a standard pet food production line but requires two parallel conditioning and extrusion lines. The same line can produce various products by changing die shapes, dough formulas, fill materials. It requires taking into account the thermal characteristics of two-phase products. Once the two phases are joined, any additional baking, drying and cooling must take into account the parameters of each to avoid stress cracks and chips from differential shrinking.</p> <ol style="list-style-type: none"> 1. Grinding and mixing of raw materials 2. Conditioning 3. Extrusion 4. Baking 5. Drying 6. Cooling 7. Packaging <p>The cooking function can be handled either by a cooking extruder or by an oven.</p>	<ul style="list-style-type: none"> - Two parallel lines of cooking/forming extruders (cooking and forming functions can be done by a single extruder) OR, - 2 mixers + 2 heating kettles+ 2 forming extruders OR, - If baking involved, replace cooking extruder by oven and possibly dryer.
<p>Semi-moist treats</p> <p>Products of various shapes are soft and can compress in a doughy mass. Products typically contain cereal (wheat, corn ~35-55%) and soy flours (~10-20%) with some meat meals (~5-15%), humectants⁹⁵ (13-20%) such as glycerin, propylene glycol or corn syrup, poultry or tallow fat (2-8%), salts, acids, antioxidants. The addition of liquid smoke, garlic powder, fresh meats and digests gives these products a high palatability rating.</p> <ol style="list-style-type: none"> 1. Thermal cooking: ingredients are cooked either in a batch steam-injected mixer or more commonly an extruder. 2. Shaping: Shapes can be quite complicated because of the low viscosity of the extrudates that can be pumped through complicated die assemblies. They can appear like burgers or other meat products (beef-jerky strips, pepperoni, T-bone steaks, marbled meat pieces and bacon strips). 3. Cooling and packaging: Require very high quality packaging with effective moisture barrier to prevent drying out and formation of surface dust. 	<ul style="list-style-type: none"> - batch steam injected mixer+ forming machine - Cooking/ forming extruder (separate or together in one) OR - mixer+ heating kettle + forming extruder
<p>Fried snacks: pig ears, pig snouts</p> <p>Advantages are that frying is much more economical than drying in terms of energy costs, although there are concerns as to the limited shelf life due to the oils involved in processing. This leads to the need for refrigeration or, as an alternative, to reform the substrate material so that it is stable and ambient temperatures.</p> <p>Frying can also come as a finish processing after extrusion or baking.</p> <ol style="list-style-type: none"> 1. Cutting, trimming 2. Frying 3. Cooling 4. Packaging 	<ul style="list-style-type: none"> - Fryer - Cooler
<p>Birdseed sticks are formed of birdseed and some binder. Freeze-dried snacks are very expensive to process.</p>	

⁹⁵ Humectants: added ingredients which control/ limit the water activity or availability of water which ultimately affects microbial activity and mold growth and thus product shelf life.

Sample line 4: Dog treat: meat jerky, pig ear ...

Source: Feed Innovation Services (Netherlands)

Assumptions:

- It is assumed that the base material here is fresh meat, which is treated with flavorings, anti-oxidants, preservatives etc. (either before or after drying)
- 2 ton fresh product / hour @ start
- Batch drying operation
- This can be the most labor intensive process due to labor requirements for loading / unloading and packing of trays / drying chamber.

Compositions	>90 % (dried) meat, flavorings, anti-oxidants, preservatives				
Dry food alternative process	Process name & description with specifics	Timing of each step (rough estimate)	Equipment required with productivity indication	Sample equipment supplier and price	Labor
Step 1 cutting	Obtaining the desired shape and weight of the product, fresh meat 60-85% dry matter	2 ton / hr			Manual labor, 10-24 persons (estimate)
Step 2 Loading trays	Loading in trays, loading of trays in DC	2 ton / hr			Manual, semi-automatic
Step 3 Drying	Drying chamber (3), gas fired Temperature controlled 40-90°C.	16 ton / day 3 day drying cycle (this can be optimized) water evaporation capacity ~5 ton/day	(3) drying chambers for a typical 3-day drying period	Local suppliers of materials, burners. Heat-exchangers	Semi-automatic, automatic temperature control.
Step 4 unloading	Tray removal	16 ton / day		...	
Step 5 Packing	Packing	16 ton / day	Manual packing (sealing equipment required)	Local suppliers, packaging firms.	Depending on level of automation. 1-10
TOTAL and OUTPUT		See above:		Total investment: 150.000 Euro to 600.000 Euro (Much depends on labor needs and level of automation at cutting, loading and unloading).	

Sample line 5: Other cat or dog treat

Source: Feed Innovation Services (Netherlands)

Assumptions:

- Process based on manufacture of treats (all sorts of fancy figures) w. injection molding equipment
- Dried and ground meat & meat and bone meal is available
- Capacity (free) depends on machine type, number of machines etc.
- The formulations require specific (non-meat) products/machines of which the possibility of purchase locally, or import in Mongolia requires investigation.
- Skilled operators are required. This is the most ‘high-tech’ application of all of the 5 processes listed.

Compositions	<ul style="list-style-type: none"> - 50-70% dried and ground meat or meat and bone meal - 10-25% (pre-gelatinized) starch / wheat meal - 0-10% Ca and P-carriers (or MBM). - 5-15% Lubricants - 0-10% Casein, - 0-10 % Water <p>Actual formulations dependent on required characteristics.</p>				
Other treat type	Process name & description with specifics	Timing of each step (rough estimate)	Equipment required with productivity indication	Sample equipment supplier and price	Labor
Step 1 Mixing	Blending according to formulation	Dependent on process capacity	Preferably High shear mixer, otherwise ribbon, planetary etc. mixer.	Various	1 person
Step 2 Injection molding	<ul style="list-style-type: none"> - Injection-mold (modified from plastic’s industry) - Heaters for lance should be included, - Die’s with various shapes 	<p>20-60 s. for one shot (extruding, filling of die, discharge)</p> <p>Depending on die-size; shot-volume between 100 – 1000 ml typically</p>	<p>Injection-mold, Dosing equipment for IM.</p> <p>Heaters/Cooling equipment</p>	Battenfeld, Various	1 person
Step 3 Drying	See process 5.) (modify capacities according to requirement)				
Step 4 Packaging					
TOTAL and OUTPUT	Final product:	Total production time and vol.: 500 – 2000 kg per 8 h shift of shaped pieces.		Total capital investment estimate: Depends on the number of IM’s. When using a second-hand IM. For 1 IM: 50.000 Euro + add. Money for Dies.	1 Skilled operator and 1 blender (can be the same person.)

ANNEX I: SAMPLE VALUE BREAK DOWN FOR TWO EXPORTS TO JAPAN

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Finished product	Horse meat in sauce (200g can)		Dried horse meat jerky (80g pack)	
	Cost US\$/kg of finished product	Assumptions	Cost US\$/kg of finished product	Assumptions
Raw material	0.85	Estimate wholesale price for horse meat 1000Tg/kg. 100% mass is maintained.	2	Manufacturer estimate.
Packaging	N/A (assume 0.25)	Assume 5 cents/ 200g can.		
Operating, financing cost & manufacturer's profit	N/A (assume 0.5)			
Transport ⁹⁶ to Japan	0.15	\$1,600 for containers containing 54000 cans of 200g. Total value so far: 1.75	0.08	US\$1,600 for containers carrying 20T of product.
Import tariff Japan	0	No import tariff on pet food in Japan	0	No import tariff on pet food in Japan
Customs fees and cargo unloading fees (Japan)	0.105	2+4=6% of shipment value (1.55). Assuming 6% of 1.75	0.125	6% of 2.08
VAT Japan	0.0525	3% of 1.75	0.0624	3% of shipment value (2.08)
Distributors mark-up (absolute)	3.234	$(1.75+0.105+0.0525)*(1.08*1.6*1.2*1.3-1)=$ (importer8%+wholesaler60%+distributor20%+retailer 30%)	3.85	$(2.08+0.125+0.0624=2.2674)*(1.08*1.6*1.2*1.3-1)$
Advertising and promotion	1.0283	20% of $(1.75+0.105+0.0525+3.234=5.1415)$	1.223	20% assuming applied to value after distributor mark up or 6.117
Total retail value	6.17 US\$/kg		7.34 US\$/kg	

⁹⁶ Transportation of a 20ft container to Japan and Korea costs \$1,600 and US\$1,200-US\$1,500 . The transportation time is about one week. Railway prices were supposed to increase on April 1st 2005. For Japan and Korea, the most economic means of transport is by rail through China and board ship in Chanjin to Korea or Japan. There are no major difficulties in obtaining transit licenses from China for fully processed food.

RESEARCH ACTIVITIES

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- Desk online research: Market reports from USDA Trade Support, online Pet Food Magazine articles, Government trade and import regulations, other.
- Market prices: in-store investigation in China and Korea. Online shop research for Japan.
- Email contact with pet food importers and manufacturers
- Netherlands based Feed Innovation Services and book purchase of Pet Food Technology
- Met with 8 Mongolian meat companies in UB, Darkhan and Erdenet (list below)
- Met with the Mongolian Meat Association, State Inspection Agency and (still to do) the Standardization Office.
- Investigated prices directly in shops in Seoul, Beijing and Moscow. Investigated online prices for Japan and Korea.

People interviewed

Meat processing companies:

- Khantansuikh Impex - Mrs. Ulziibayar, General Director, Mrs. Naranchimeg Technologist and Foreign Trade Manager;
- Wakamaru Co. Ltd - Mrs. Mijidgombyn Otgonjargal;
- Makh Impex - Mr. Purev-Ochir, Executive Director;
- Hun Od - Mr. Lkhavadorj, General Director, Mrs. Tuul, General Manager;
- Meat Market (SG) - Mr. Bayaakhuu Luvsandorj, General Director;
- Mongema/Mine and Field Korea Co. Ltd - Mr. Kim Ki Man, President, Mr. Lkhagvadorj, General Director; Mr. Davaaniam, Erdenet Plant;
- BC-Mongol Ltd. Darkhan - Mr. Amarbayar, Vice Director;
- Makh Expo - Mr. Lamjav Tsendenpil, Executive Director.

Mongolian Meat Association:

- Mongolian Meat Association and BC Mongol - Dr. Deleg, President

Chamber of Commerce:

- Mrs. Oyunchimeg, Head of Business Investment Support Center, MNCCI
- Mrs. Lkhagvasuren, Officer, MNCCI

Ministry of Food and Agriculture:

- Mr. Khanimkhan
- Ask him about inviting meat industry/livestock exports from the MoFA.

Regulating agencies:

- State Specialized Inspection Agency of Mongolia, Mr. Enkhbayar Chultemjamts, Director of Inspection, Department of Industry, Service and Agriculture; Mr. Zard-Ochir, Senior Inspector for Meat Exports; Mr. Surenjargal, Chief of the Agricultural Division; Mr. Ganzorig, Chief of Veterinary Division.
- National Agency for Standardization and Metrology: Mrs. Davaasuren (Development of Standards for food products), Mrs Tsetsegmaa (Head of Certification Office).

REFERENCES

REFERENCES

- Korea Food and Drug Administration <http://www.kfda.go.kr/>
- AAFCO Association of American Feed Control Officials www.aaeco.org
- Agricultural Trade Office US Embassy in Korea and Japan www.atoseoul.com, www.atosaka.com, www.atotokyo.com
- Japan JETRO Business Services Center. Mr. Yumiko Yoshimura, <http://www.jetro.go.jp>
- China Council for Promotion of International Trade CCPIT <http://www.ccpit.org/>
- Gain Attache Reports http://www.fas.usda.gov/scriptsw/attacherep/attache_lout.asp
- Technology presentation <http://www.fda.gov/ohrms/dockets/dailys/03/Nov03/111203/03n-0312-ts00004.ppt>
- Pet Food Institute www.petfoodinstitute.org
- American Pet Product Manufacturers Association <http://www.appma.org/>
- Step by Step guide for Exporting forages to Japan <http://atn-riac.agr.ca/asia/e3172.htm>
- Japan Customs <http://www.customs.go.jp/>
- Wattnet Pet Food Industry Magazine archive articles <http://www.wattnet.com/Archives/Docs/PT081p4.pdf?CFID=5167101&CFTOKEN=49544602>,
- British Pet Food Manufacturers' Association (PFMA) <http://www.pfma.com/public/Text%20files/agmpressrelease.doc> , http://www.pfma.com/public/petownership_stats.htm
- Regulations Governing Meat Inspection in Mongolia (State Food Safety and Agricultural Inspection Agency, April 2001):
 - Horse meat. MNS 0406-82 /approved in 07 April, 1982/
 - Meat and Meat Products General requirements for hygienic safety (Standard of Mongolia MNS 5023:2001 / Approved in 2001 unofficial translation).
 - Horsemeat and beef prepared by cutting into pieces for export (MNS 3514-83 /approved in 1983/)
- Sample Mongolian Sanitary certificate forms (hard copy only) (Issued by the State Specialized Supervision/ Inspectorate/ Agency)
 - Sanitary certificate for animal food and raw products
 - Sanitary certificate for meat and meat products
 - Animal Health certificate of the bovine, equine, ovine, caprine, porcine species and domestic animals
- Certificate requirement to Import Pet Food from USA to Korea http://www.aphis.usda.gov/vs/ncie/iregs/products/pr_ks_pf9.pdf.