

# Japan Dairy Farming

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## 1. About dairy cows

### ■ Breed of dairy cows



#### Holstein

Holstein is a typical dairy cow, and 99% of dairy cows in Japan are Holsteins. They are originally from the Netherlands and Holstein region of Germany. They are big built and have large udder with high production yield of milk. They are the most common dairy cows in the world. They have mild temper and good tolerance with cold weather but not good with heat. They are not

only black and white in colour but also brown and white.



#### Jersey

Jersey is the second popular breed in Japan after Holstein and originally from Jersey island in the English Channel. They are rather small and soft brown in colour. Their production yield is not as good as Holsteins', but milk fat content is higher.



#### Brown Swiss

Brown Swiss is the third popular breed in Japan and native to Switzerland. They are famous Alpine breed with very rich milk which is suitable for natural cheese. They are large in dark brown to silvery brown colour and mild in temper.

## ■ Lifecycle

From conception to birth (artificial insemination and birth)

Currently, at most Japanese dairy farms artificial insemination (AI) is used for cows' reproduction. However, there is no guarantee of conception. Life cannot be created just with human efforts and powers.

After about 10 months in pregnancy, the waters break and delivery starts. More than 90% of calves come out with their head first. In case of a difficult delivery, a mother receives helps by human's pulling ropes tied on calf's legs in time with mother's pushing.

Cow's birth ends in 30-40 minutes. Mother removes amnion from her calf with her mouth and licks her calf's body with her long tongue. Calf tries to stand up within 30 minutes of being born. How soon they can get up and start walking, this is an important condition for the animal to determine whether they can survive or not.

## Nursing

Calves are separated from their mothers as soon as they are born, and they are nursed in the barns dedicated to them. For the first week, they are given mothers' colostrum. Just like human's, bovine colostrum contains plenty of protein and vitamins which are easy to digest as well as components to prevent them from catching illness (immunity).

## Breeding

Calves from the period of weaning (2months old) till the first mating (about 18 months old) are called breeding cows. Sometimes they are brought up grazing in the designated breeding field in order to gain healthy and strong body.

## Milking

After cows give birth, they start producing milk as mothers do. Cows continue to produce milk for about 300 days. Milk production yield peaks at around the second and the third month after calving, and it gradually starts to get reduced.

## Dry

After about 280-300 days of lactation, cows stop milk production and have a break for 2-3 months to prepare for the next calving. They are called dry cows.

12-15 months cycle being repeated 3-4 times

Average life of cows is about 12 years in their natural life, but dairy cows are required to produce a lot of milk. After repeating 3-4 cycles of 12-15 months period each, they retire from their duty in about 5-6 years and are sold for meat.

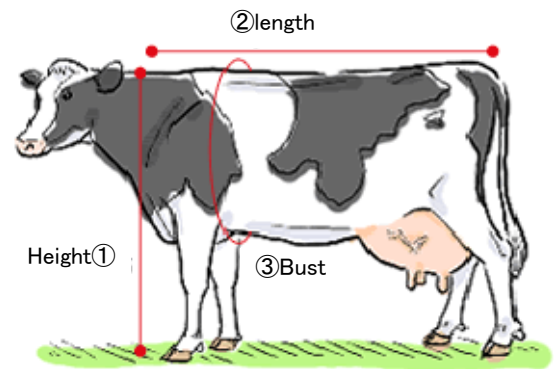
## ■ Body structure of dairy cattle (cow)

### Height

Height is about 140-150cm from the ground to their shoulders when standing

### Length (horizontal length)

Length is normally measured from the shoulders to the base of their tails. Cows are about 170cm long.



### Bust

It is measured in the same way as human beings, and in the case of cows it is the circumference of their chest from the base of their front legs. It is normally over 200cm.

### Weight

Cows weigh about 600-700kg.

### Muzzle pattern

Wrinkles on their noses are called muzzle pattern, and these are different from each individual just like human fingerprint.

### Tail

It is used to keep flies and mosquitos away instead of hands and also keeps the balance of the body.

### Hoof

A long, long time ago, the animal ancestral to both cattle and horses had 5 toes. During their evolution, horses had developed their middle toes and ended up with one hoof, and cows had developed their middle and ring toes which had evolved to two hooves, and they become family of even-toed ungulates (artiodactyla).

Cows hooves are known to grow about 3-10 cm per month. If they stay inside the barns too much and have not enough exercises, their nails grow too long which could cause them of developing hooves diseases. Therefore on farms, they have their hooves cut roughly twice a year.

### Tooth

Ruminants like cattle have their characteristics of not having upper front teeth.

## Spots

Holsteins' spots (patterns on their body) are different on each cow just like human fingerprints and never change from their birth till their adulthood.

## Horns

Their horns are often cut within 3-5 months of their birth in order to prevent them from getting into fights with other cattle and also to keep their careers' safety.

## Skeleton

Cows' ribs and bones are projected conveniently to support their big body and firmly developed. Their hind leg bones (metatarsal) are well developed to support their heavy udder.

## Dung and urine

The output of dung is 20-40kg per day, and of urine is 6-12 litres per day.

## ■ Ruminant and mechanism of milk production

### Stomach

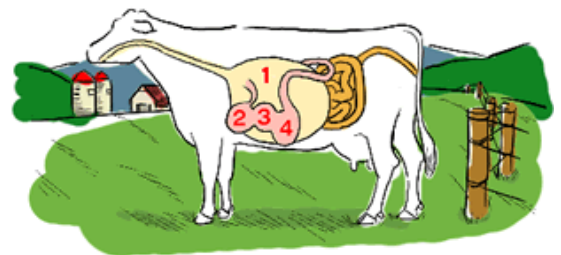
Cows' stomach occupies three quarters of their abdomen and divided into 4. The first and largest stomach (rumen) has a volume of 160 litres. What cows eat through their mouth such as grass first comes into this stomach. Here numbers of microorganisms decompose fibre and ferment food by propagating microorganisms.

After repeating rumination, fibre gets decomposed even finer in the second stomach (reticulum) & the third stomach (omasum) and get digested in the fourth stomach (abomasum). Here in the fourth stomach, cows digest microorganisms grown in the second and third stomachs and take in all the nutrients both from food and microorganisms. It is their characteristics to have their own fermenting factory in their stomach.

### Rumination

In order to digest food, cows regurgitate cud from the first stomach to the mouth and slowly grind them. This is called rumination.

They ruminate for 6-10 hours a day and chew food 40-60 times every minute. This is why cows are always moving their mouth. Saliva is secreted as they chew food, which wets food to make it easy to swallow and also activates microorganisms in the stomach to help digestion. Cows secrete 90-150 litres of saliva every day.



## Udder

Udder is an important organ to produce milk. The actual milk producers are mammary glandular cells in the udder. Here, various nutrition transported through blood are made into components of milk. To produce 1 litre of milk, 400-600 litres of blood circulation is required. Cows with high milk production yield at 45kg a day have 22.5 tonnes of blood circulating their breast.



## 2. History of dairy farming and milk

### ■ the origin of the cattle domestication

Estimating from the numbers of ruins, the first animals human has kept for the purpose of milk would have been probably goats and sheep which were mild in temper, available in big numbers and with higher milk production yield.

The Aurochs (ancestral to cattle) having been domesticated in the Neolithic eras (6000-7000 BC) was said to be the origin of the livestock cattle. Also the drawing on the slate of the time was found as an evidence of Methopotamians using milk already in 4000 BC.

Milk drinking habit was thought to have spread through two routes, one with Aryans towards India through Middle East, and the other with Germanic people towards Northern Europe through Central Europe.



### ■ The origin of dairy farming in Japan

In Japan, bones of domesticated cattle were discovered from the ruins of Yayoi era 400 BC. The cattle which were kept in Japan at that time were thought to have been brought by the travellers from Asia where mainly in China cattle were domesticated.

Milk was introduced to Japan in Asuka era. According to the records from early Heian era, Fukujo who had become Japanese after traveling from Kudara (South Korea) has presented processed milk "So" to the Emperor Kotoku (644-654). The Emperor was very pleased and gave him the surname "Yamatokusurinoomi" and the job title "Chichiosanokami". After this event, Nyugyuin (the Department of dairy cows) was established in the capital, and milk produced there was presented to the Imperial Court.

In Japanese, the word "Daigomi" is used to express deep flavour and real pleasure. "Daigo" was the name given to the premium dairy product in ancient times, which was meant the best of 5 tastes in Buddhism. In the dictionaries of Heian era, "Raku" was explained to have been produced by boiling milk, and "So" was made of "Raku" and became "Daigo" and "Nyubei". "So" was thought to have been condensed milk and "Daigo" and "Nyubei" were probably cheese. Those days, milk and cheese were mainly consumed by aristocrats, but this habit has eventually disappeared as livestock consumption became prohibited with the influence of Buddhism.

Modern dairy farming was known to have originated from three white cows imported by Yoshimune Tokugawa, 8th Shogun of Tokugara in 1727 (Kyoho 12, Edo era) which were bred in Mineoka farm of Awanogo(Chiba pref. present).



"Hakugyuraku" which was made with milk produced there by adding sugar, boiling and drying was treated very important as medicine and nutritious food, but milk was still for people of high ranks.

## ■ Extension of milk and change of diet

Milk became a drink for the common people only in Meiji era after the westernisation. In 1863 Mr. Tomekichi Maeda studied the technique of milking and treatment from the Dutch man Mr. Pero, and he started the first Japanese milk processing and retail business in Yokohama. Meiji government promoted the nutritious value of milk as dairy farming was considered as one way of developing Hollaido.

The popularization of milk was accelerated during Sino-Japanese War and Russo-Japanese War, because injured soldiers drank milk as a nutrient.

In the beginning, milk was sold out of sodden barrels by measures such as a scoop. Eventually milk was sold in tin cans and in glass bottles and became widespread.

During the post war period with shortage of food, potatoes and vegetables were main diet. This weight has gradually shifted towards beans and animal foods such as dairy products, eggs and meat. As a result, dietary pattern and the balance of nutrition got better providing full energy. School lunch has started at primary schools around this time. School lunch with milk, bread, margarine and 1 or 2 side dishes can be said as the first step towards westernised diet.

During the period of rapid economic growth which lasted nearly 20 years from 1955, intake of European and American style food products such as milk, butter, cheese, meat and eggs has increased. With more and more food being imported, market was flooded with diversified and internationalized food, and Japanese dietary habit was quickly being matured.

From 1970 when quantity and quality of food was getting satisfied, Japan hit the time of so-called satiation, and consumption of dairy and meat products grew fast by drawing an upward steep curve.

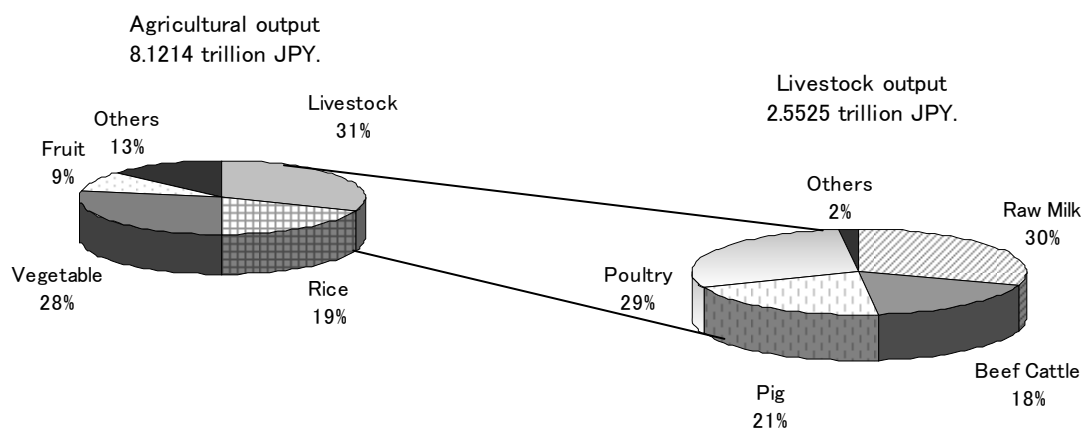
Also at this time, the changes in eating style were noticed, and European and American style restaurants such as family restaurants and hamburger shops were expanded in the national scale. We can eat any food at any time in anywhere, but health disorders such as obesity and high blood pressure and adult diseases among young people are becoming a big concern.

### 3. Current situation of Japanese dairy farming

#### ■ Japanese dairy farming with the advance of intensification and expansion

The Japanese agricultural production in 2010 was approximately 8 trillion jpy, of which milk production was accounted for around 10%. **Fig 1**

**Fig. 1: Agricultural production / output (2010)**



Resources : Production agriculture income statistics by Ministry of Agriculture, Forestry and Fisheries.

Commercial dairy farming had started about 100 years ago in Japan, and it started developing in full scale when school lunch was introduced in primary schools.

Compared to the rice and vegetable growing, dairy farming had a benefit of generating income monthly and consistently despite of the weather conditions. For those reasons dairy farming grew its popularity rapidly, however, in those days farmers still grew rice and vegetables and kept a smaller herd of just 2-3 cows. In 1965 average herd size per farm was only 3.4 cows, and annual production yield was 3.84 millions tonnes.

With Japan's economical growth, many young people had moved from the countryside to cities. This has resulted in the shortage of successors, agriculture as a whole had to advance towards rationalization, intensification and expansion in their size. Dairy was no different.

In 1963 at its peak, there were 418,000 dairy farms in Japan, but since then the numbers had declined rapidly to about 160,000 in 1975 and only 82,000 in 1985. With this trend continuing, about 4-5% dairy farmers leave farming every year, and in 2012 there were only 20,000 farms left which was only one twentieth of the numbers at its peak time.

On contrary, the herd size continued to be increased, the scale of Japanese dairy farms became almost equal to the EU member states which are the leading dairy countries. **table 1** In 2012 the average herd

size of Japanese farm was 72.1, and annual raw milk production was 7.53 million tones. **table 2**

With this increased herd size securing its supply, raw milk is used approximately 54% for drinking milk and 45% for processed dairy products such as cheese and butter. **table 3**

**Table 1: International Comparison of Dairy Farming (2010)**

Classification		Unit	Netherlands	France	Germany	Denmark	UK	Canada	USA	Australia	NZ	Japan	Hokkaido
Number of parous cows		1000	1,479	3,729	4,182	573	1,847	987	9,117	1,600	4,397	933	480
Number of Farms		1000	20	82	90	4	16	13	63	7	12	21	8
Number of parous cows per farm			75	45	46	133	117	76	146	230	386	44	64
Raw Milk Production Cost		1000t	11,941	24,000	29,610	4,965	13,935	8,434	86,769	9,374	17,859	7,631	3,897
Average production yield per cow		kg	7,440	6,657	7,113	8,589	7,501	9,768	9,517	5,871	3,944	8,046	8,045
Volume of Dairy Products	cheese	1000t	753	1,756	2,169	292	335	349	4,742	333	282	123	18
	butter	1000t	181	409	449	33	119	83	709	132	478	82	69
	SMP	1000t	64	320	261	27	66	72	824	244	363	170	144
Consumption per person	Drinking milk	kg	59.6	58.5	53.0	91.4	107.0	80.3	79.9	105.0	79.7	32.7	-
	Cheese	kg	21.2	25.6	22.8	16.2	11.2	12.7	15.0	11.9	6.1	1.9	-
	Butter	kg	3.4	7.5	6.0	1.8	3.2	2.6	2.2	3.8	3.8	0.6	-
Farm-gate price of raw milk		JPY/kg	44.4	38.4	39.6	44.3	36.0	60.4	34.1	30.5	43.3	88.2	77.2

Resources : IDF 『World Dairy Situation』、AMI 『Marktbilanz Milch 2011』、CDC 『ANNUAL REPORT』、USDA 『Milk Production』、『Farms, Land in Farms, and Livestock Operations』 DairyAustralia 『Australian Dairy Industry In Focus 2011』、LIC 『Dairy Statistic 2010/2011』、Livestock Statistics, Milk Products Statistics, Statistics of Agricultural Products prices by Ministry of Agriculture, Forestry and Fisheries.

Note: Figures for Hokkaido Japan is of 2010. Currency exchange rate by Mitsubishi Tokyo UFJ Bank (TTS Market) is used For Raw Milk production and Average production yield per cow, figures were calculated using 1 pound=0.45kg for USA, 1 litre=1.03KG for Australia and NZ.

**Table 2: Number of dairy farms and cows by year**

Year	Numbr of Farms	Number of cows						Number of cows per farm	change from previous	
		Total	Over 2 years old				Under 2 years old		Number of farms	Number of cows
			total	Parous cows		Dry cow				
				subtotal	Milking cow					
1963	417,640	1,145,370	729,170	636,240	538,310	...	416,200	2.7	100.5	114.3
1970	307,600	1,804,000	1,198,000	1,060,000	884,900	174,900	606,600	5.9	94.8	108.5
1975	160,100	1,787,000	1,235,000	1,111,000	910,000	200,900	549,700	11.2	89.6	102.0
1980	100,032	1,829,343	1,324,911	...	...	...	504,432	...	81.1	88.5
1985	82,400	2,111,000	...	1,322,000	1,101,000	...	648,600	25.6	94.3	100.0
1990	63,300	2,058,000	...	1,285,000	1,081,000	204,700	...	32.5	94.9	101.3
1995	44,300	1,951,000	1,342,000	1,213,000	1,034,000	178,700	609,700	44.0	93.1	96.7
2000	33,600	1,764,000	1,251,000	1,150,000	991,800	157,900	513,200	52.5	94.9	97.1
2001	32,200	1,725,000	1,221,000	1,124,000	971,300	153,100	504,700	53.6	95.8	97.8
2002	31,000	1,726,000	1,219,000	1,126,000	966,100	160,300	506,700	55.7	92.3	97.8
2003	29,800	1,719,000	1,210,000	1,121,000	964,200	156,400	508,900	57.7	96.1	99.6
2004	28,800	1,690,000	1,180,000	1,088,000	935,800	152,000	602,600	58.7	96.6	98.3
2005	27,700	1,655,000	1,145,000	1,055,000	910,100	144,900	510,200	59.7	96.2	97.9
2006	26,600	1,636,000	1,130,000	1,046,000	900,000	146,100	505,300	61.5	96.0	98.8
2007	25,400	1,592,000	1,093,000	1,011,000	871,200	140,100	499,600	62.7	95.5	97.3
2008	24,400	1,533,000	1,075,000	998,200	861,500	136,700	458,000	62.8	96.1	96.3
2009	23,100	1,500,000	1,055,000	985,200	848,000	137,200	445,100	64.9	94.7	97.8
2010	21,900	1,484,000	1,029,000	963,800	829,700	134,100	454,900	67.8	94.8	98.9
2011	21,000	1,467,000	999,600	932,900	804,700	128,200	467,800	69.9	95.9	98.9
2012	20,100	1,449,000	1,012,000	942,600	812,700	129,900	436,700	72.1	95.7	98.8

Resources: Livestock statistics, Annual Statistics on dairy farms and cows

**Table 3: Milk Products Statistics**

Classification	actual number								
	raw milk production	component ratio	Processed amount by uses					Others	component ratio
			For Drinking milk, etc.	component ratio	For Dairy products	component ratio			
2009	7,881,390	100.0%	4,218,563	53.5%	3,586,821	45.5%	76,006	1.0%	
2010	7,631,304	100.0%	4,109,761	53.9%	3,451,217	45.2%	70,326	0.9%	
2011	7,533,851	100.0%	4,082,808	54.2%	3,387,420	45.0%	63,623	0.8%	

Resources: Milk Products Statistics, by Ministry of Agriculture, Forestry and Fisheries.

## ■ Family run business

Unlike corporate managed beef cattle, pig and poultry farms, the characteristics of Japanese dairy farm management is its heavily reliance on family labour. About 85% of dairy farmers are not company registered (unincorporated), [table 4](#) and about 80% employ no full time workers, [table 5](#). These figures clearly show that dairy farms in Japan heavily rely on family labour. Cows have very delicate nerves like humans, so farmers have no choice but work along with their physiology. Such 24 hours 365 days care could have been only available by family run business. This trend is a feature seen not just in Japan but also in all other leading dairy countries.

**Table 4: Management Style**

Unit : %

		Number of Dairy farms	1Corporation per farm	Joint Corpopration	Not company-registered	Non-response	Corporation Management
Total		2,696	12.2	0.7	85.2	1.9	12.9
B l o c k	hokkaido	933	12.1	1.5	84.5	1.9	13.6
	tofuken total	1,763	12.3	0.3	85.6	1.8	12.6
	tohoku	435	10.1	0.5	87.6	1.8	10.6
	kanto	548	10.2	0.2	88	1.6	10.4
	hokuriku	65	9.2	1.5	89.2	-	10.7
	tokai	144	14.6	-	82.6	2.8	14.6
	kinki	95	7.4	1.1	89.5	2.1	8.5
	chugoku	101	11.9	-	88.1	-	11.9
	shikoku	77	14.3	-	83.1	2.6	14.3
	kyushu	298	19.8	0.3	77.5	2.3	20.1
2009 Researcg Total		2,635	10.6	0.8	86	2.6	11.4

**Table 5: Number of employees outside family**

Unit : Number,%

Number of Dairy Farms		0	1	2	3	4	5~9	Over 10	Non-response	Total excluding 0 and non-response	Valid response including 0	Average without 0
Total		2,696	80.3	8.3	3.3	1.4	1.1	1.4	0.5	3.7	16.0	2.6
B l o c k	hokkaido	933	70.7	10.9	4.4	1.8	1.4	1.4	0.5	8.8	20.4	2.4
	tofuken total	1,763	85.3	6.9	2.7	1.2	1.0	1.4	0.5	1.0	13.7	2.7
	tohoku	435	88.3	5.1	2.1	0.9	0.5	0.5	0.5	2.3	9.6	2.3
	kanto	548	84.9	7.1	3.3	1.1	1.1	1.8	0.2	0.5	14.6	2.6
	hokuriku	65	80.0	15.4		1.5		0.1			20.0	2.2
	tokai	144	74.3	9.7	2.8	4.2	2.1	2.8	2.1	2.1	23.7	3.5
	kinki	95	86.3	4.2	2.1		3.2	2.1	1.1	1.1	12.7	5.4
	chugoku	101	92.1	3.0	2.0		1.0	1.0	1.0		8.0	4.5
	shikoku	77	83.1	9.1	3.9			2.6		1.3	15.6	2.0
	kyushu	298	86.2	7.4	3.0	1.7	1.0	0.7			13.8	1.9
2009 research total		2,635	86.2	6.2	3.0	1.3	0.5	1.2	0.3	1.3	12.5	2.5

Resources: National Basic Research of Dairy Farming

## ■ Facilities on the farm

### Barn

There are two major methods to keep cattle on the farm, by tying them up or by loose-housing, and barn plans are different accordingly.

#### Stall barn

A stall is the space allocated for each cow, and in the stall barn each cow is tied up in a stall. A stall barn does not require big space, and majority of Japanese farms use this system. This might be a little cramped for cows, but there are some benefits also as farmers do not have to worry about cows fighting with each other, they can pay attention to individual animal, and it is easier to check their health.

On the other hand, cows cannot move about by themselves, so it requires more labour in milking and feeding. In this style, the herd size is generally around 50 cows.



Stall barn

#### Free stall barn

In this barn, cows are not restrained and are free to move around in a resting area called freestall. A stall provides a separate space per animal, and cows spend most of the time here. It is easier to feed and water them as they were given in allocated feeding area and water basins, but there can be a problem among cows fighting for food. Milking can be carried out efficiently as cows go in to the milking parlours by themselves.



Free stall barn

#### Pipeline milker

This milker (milking machine) is designed to deliver raw milk suckled from cows directly to the milk processing room through pipes. They cut the labour of delivering raw milk and are used in middle to large size farms. There are two types of pipeline milkers, Cow Shed Pipeline Milker is used in the barns, and Milking Parlour Pipeline Milker is used in the designated milking areas..



Pipeline Milker

#### Waste treatment facility

If mishandled, animal waste (feces and urine) can incur problems such as odours and water pollution. In order to resolve such problems, farmers are currently undergoing some original and inventive ideas such as improved manure production.

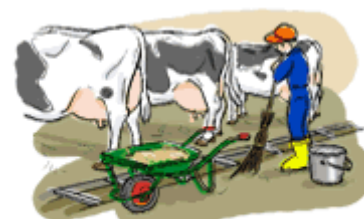
## ■ Dairy farmers' work (typical day as a farmer)

5:30–8:00

A day starts with cleaning cows' feces and urine. It is important to keep barns clean for cows and for their milk.

When cleaning is done, it is time to feed cows. First, mixed grass such as green grass, hay and silage (fermented hay) are given, then grains and composite feed are distributed by bait car.

At the same time as distributing feed, milking is prepared, and raw milk is collected using milkers. Milk suckled in the morning and evening before is put together and collected by the tank lorry. At the time of collection, milk is weighed, and its sample is tested.



Cleaning cow's feces and urine



To feed cow

8:00–17:00

Once all the morning tasks finished, farmers can have breakfast, then until the evening farmers can spend their time in so many different ways. Some may check health of their cows, make manure, work on the maintenance of their barns. If farmers own grazing fields, they may take care of them. Some also use this time to take a brief break.

17:00–19:30

Evening care of the cows begins. Just as in the morning, they start with cleaning barns, feed the cows and collect milk. Milking is normally carried out twice a day in the morning and in the evening.

(There may be pregnant cows on farm.) Cows' delivery is just like human birth, a calf can be born at any time. So when cows are in labour, farmers have to keep their eyes on them 24 hours a day.



Collect milk



## ■ Cost of milk production

The breakdown of the costs in raw milk production shows that the feed cost takes up a large share at about 46% in the 2010 fiscal year. Within this feed cost, distributed feed cost (purchased feed cost) was accounted for the great part accumulating up to 36% of total production cost. Japanese dairy depends on imported feed from other countries, and the cost of production is hugely influenced by the international grain market situation and currency exchange rates. It is a big challenge for Japan to improve self-sufficiency in animal feed. **table 6**

**Table 6-1: Production cost per cow (2010)**

Item	Amount	proportion
Feed	329,594	46.0 %
Commercial Feed	257,148	35.9 %
Others	72,446	10.1 %
Depreciation of cows	107,764	15.0 %
Other property expenses	147,317	20.6 %
Labour	161,632	22.6 %
Family Labour	146,896	20.5 %
Employment Labour	14,736	2.1 %
By-Product	-71,281	-9.9 %
Ground rent	18,538	2.6 %
Capital Interest	22,965	3.2 %
Production cost	716,529	100.0 %

**Table 6-2: Production cost per 1kg of raw milk (2010)**

Item	Amount	proportion
Feed	40.9	46.0 %
Commercial Feed	31.9	35.9 %
Others	9.0	10.1 %
Depreciation of cows	13.4	15.1 %
Other property expenses	18.3	20.6 %
Labour	20.0	22.5 %
Family Labour	18.2	20.5 %
Employment Labour	1.8	2.0 %
By-Product	-8.8	-9.9 %
Ground rent	2.3	2.6 %
Capital Interest	2.8	3.1 %
Production cost	88.9	100.0 %

Resources: Research on Raw Milk Production Costs, Ministry of Agriculture, Forestry and Fisheries

## ■ Environmental conservation and dairy farming

It is a mission of dairy farmers to produce safe and tasty milk and to contribute towards consumers' diet. In recent years, the natural rotation cycle of the dairy farming has attracted some attention as it is beneficial to the protection of environment and land and to organic farming.

### Environmental conservation

Grass and trees purify air. Forests and rice pads prevent natural disasters such as floods and mud slides, and also purify and protect water resources. However, right now the forests in the middle and mountaineous regions are devastated without enough caring hands due to declining population, and fields of rice and other crops are increasingly not used due to the ageing farmer population, lack of successors and with regulated reduction of cultivated land. Under these circumstances, dairy farmers are renting such unused land to graze cows and grow grass and feed. Such dairy farming activities are preventing forests from getting devastated and soil from becoming sterile. They are also helping to keep green scenery.

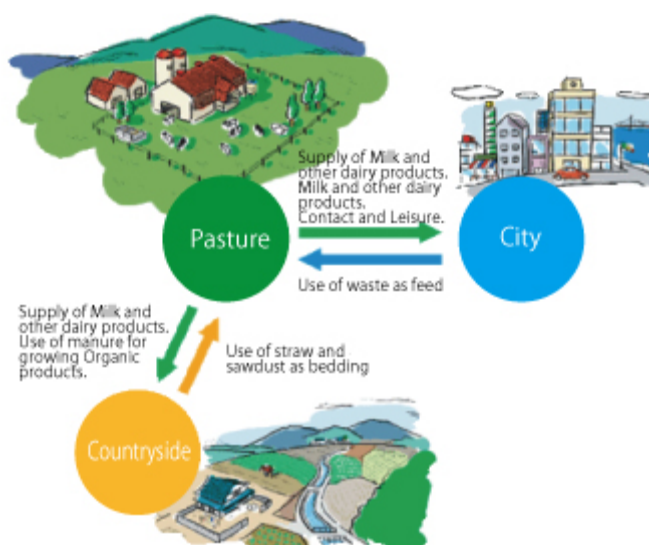
### From the cities to the farms

Life in the cities is very convenient but lacking the satisfaction of sensing nature and seasons. Dairy farms are where nature, people and animals live and work together. More and more urban people are visiting farms to refresh their mind through being in contact with nature and animals.

Meanwhile, part of waste come out of cities (soya bean meal, coffee grounds, brewer's grain, bean curd lees, oil cake etc.) are efficiently utilised to feed the cows.

### Dairy farming to organic farming

On farms, manure is produced mixing cows urine and feces with bedding straw and sawdust. This manure makes soil healthy and is a strong ally of organic farmers. Dairy farmers also exchange manure for rice straw with rice growers and use them as bedding for cows. This exchange is not only useful for both farmers but also beneficial to the environmental protection.



## ■ Comparison with the world

Dairy farming in Japan has a handicap of small national land with large mountaineous areas compared to Europe and US. In order to overcome this condition and to respond to the growing consumption, the priority has been made to improve production yield.

In 1985, average production yield per cow was approximately 5.6 tonnes. In contrast, in 2010 the average was 8.0 tones.

These figures show the improvement of production yield. Also with this average figure, Japan has already surpassed France, UK, Australia and New Zealand and is getting closer to Canada, the country with the highest yield (9.8 tones). [table 7](#)

Current consistent supply is the result of efforts to improve the production yield as well as to expand the scale of management.

**Table7: Change of Raw Milk Production Yield per cow in the world**

Countries	1985	1990	1995	2000	2005	2006	2007	2008	2009	2010
Belgium	3,930	4,082	4,800	5,409	5,408	5,554	5,700	5,585	5,787	6,018
Denmark	5,622	6,107	66,153	7,123	8,060	8,292	8,323	8,226	8,386	8,589
Germany	4,629	4,739	5,427	6,122	6,761	6,849	6,944	6,827	6,977	7,113
Greece	3,200	3,230	3,690	4,725	4,984	5,024	5,100	5,112	5,193	5,241
Spain	3,382	3,369	4,381	4,964	4,984	6,500	6,700	6,934	7,328	7,328
France	4,159	4,555	5,554	5,496	6,214	6,220	6,381	6,398	6,356	6,657
Ireland	3,926	3,953	4,437	4,362	4,546	4,787	4,846	4,699	4,540	4,900
Italy	3,537	3,682	4,780	4,912	5,859	5,966	5,998	5,730	6,051	6,057
Luxemburg	4,401	4,604	5,527	5,991	6,575	6,521	-	6,593	6,745	6,998
Netherlands	5,330	5,861	6,613	7,296	7,568	7,744	7,879	7,322	7,544	7,674
Australia	3,817	-	4,217	5,215	5,789	5,889	5,935	6,038	6,060	6,101
Portugal	3,021	3,045	4,800	5,787	5,494	5,509	5,859	6,051	6,218	6,909
Finland	4,956	-	6,161	6,900	7,491	7,554	7,460	7,873	8,023	8,023
Sweden	5,748	-	6,853	7,829	8,055	8,175	8,265	8,160	8,280	8,201
United Kingdom	4,888	4,950	5,541	6,066	6,802	7,168	7,175	7,207	7,290	7,501
Average of 15 EU Member stat	4,435	-	5,351	5,800	6,374	6,494	6,644	6,573	6,673	6,872
Average of 25 EU Member State	-	-	-	-	6,140	6,250	6,350	6,400	6,407	6,557
Average of 27 EU Member State	-	-	-	-	-	5,950	6,060	6,060	6,192	6,373
USA	5,908	6,416	7,462	8,256	8,879	9,050	9,193	9,260	9,333	9,517
Canada	4,654	5,689	6,207	9,152	9,422	9,481	9,481	9,642	9,592	9,768
Australia (1/cow)	3,337	3,614	4,846	5,146	5,108	5,163	5,231	5,691	5,445	5,700
New Zealand (1/cow)	3,170	3,056	3,489	3,700	3,531	3,876	3,791	3,710	3,642	3,829
Japan	5,640	6,380	6,986	7,401	7,893	7,864	7,988	8,011	8,088	8,046

Resources: EU: ZMP 「Dairy Review」 till 2007 and AMI 「Marktbilanz Milch 2011」 from 2008, USA : USDA 「Milk Production」、Canada : CDC 「Annual report」、Australia : DA 「Australian Dairy Industry In Focus」、NZ: LIC 「Dairy Statistic」, Japan: 「Livestock Statistics」, 「Milk Products Statistics」 by Ministry of Agriculture, Forestry and Fisheries

Note: In USA, 1 pound = 0.45kg

## 4. Government measures

### ■ Subsidy and production cost

In Japan, under the "Temporary Act for Compensation Price for Producers of Milk for Manufacturing Use" (deficiency payment), for the purpose of securing reproduction of raw milk in the "raw milk for processing use region" where more than half of milk produced are used for processing, such farmers producing milk for processing use are subsidised. "Raw milk for processing use region" refers to the area where more than half of milk produced is traded with processing plants (currently only Hokkaido). "Raw milk for processing use" refers to milk used to produce 1 butter, 2 skimmed milk powder, 3 sweetened condensed whole milk, 4 sweetened condensed skimmed milk, 5 whole milk powder, 6 sweetened milk powder, 7 unsweetened condensed whole milk and 8 skimmed milk powder for animal feed.

### 1966-2000

From 1966, when Deficiency Payment Act was implemented, till 2000, producers were subsidised by the government for the difference between the estimated production cost per 1kg of raw milk in the raw milk for processing use region and actual market price of raw milk for processing use set by the government (standard market price).

Producers were ensured by the government total of standard market price and subsidy (=guaranteed value) as milk price receivable.

### From 2000 to the present

In May 2000, Deficiency Payment Act was reviewed and re-enforced in 2001, guaranteed value set by the government and standard market price were removed, therefore subsidy as a deficiency payment was abolished.

New formula for subsidy calculation is to take average production cost and production yield for the last three years, work out the rate of variability and multiply this rate to the subsidy unit price from the previous year.

Standard market price was abolished, so the raw milk price for processing use is determined by the negotiations between designated milk producer groups and dairy processors. The unit price for subsidy in 2011 was 11.95 yen/kg, and in 2012 - 12.20 yen / kg.

Maximum amount claimable of raw milk for processing use, which was regulated at the time of subsidy was introduced, has not been changed before and after the review.

Under the new act, there is a possibility that raw milk price for processing use, which is decided in free trade between designated milk producers groups and dairy processors, could face a big decline due to the unexpected change in supply and demand balance. In order to take measures to mitigate such drastic situation, the new fund was established with its financial resources from producers' own contribution (0.40 yen per 1kg of raw milk for processing use) and support from the government (0.20 yen per 1kg of raw milk for processing use), and in the case of the raw milk price for processing use (exclusive of the government subsidy) falls lower than the standard price for compensation (=average of the last three years' average market prices), 80% of the difference is to be supplemented by the fund. For the reference, the standard price for compensation in 2011 was 69.12/kg **table 8 Fig2, 3, 4**

**Table 8: Regards to Compensation Price for Producers of Milk for Manufacturing Use**

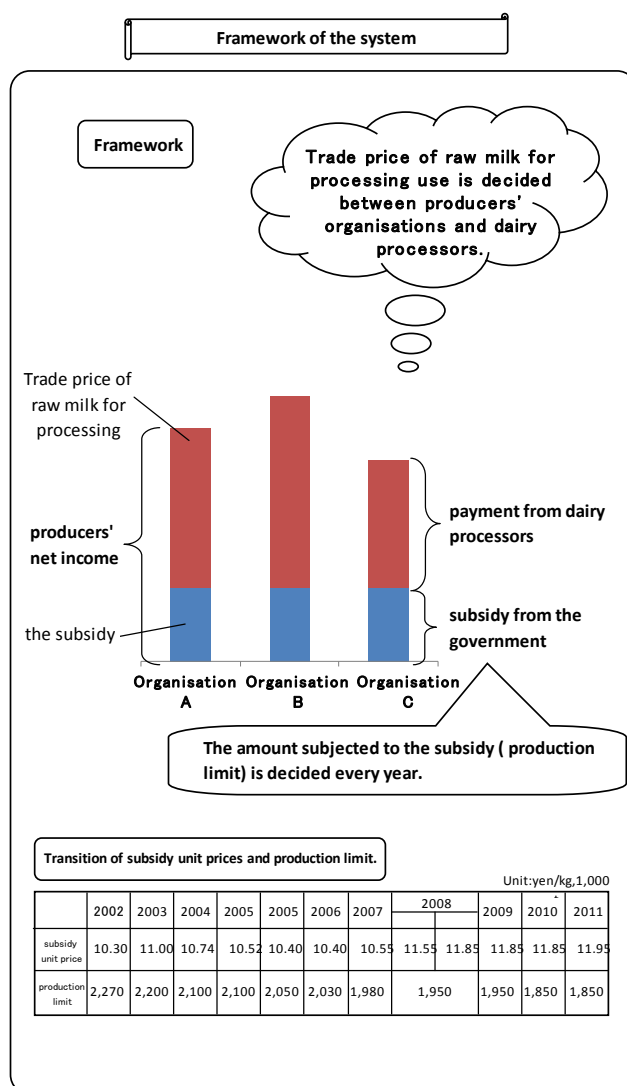
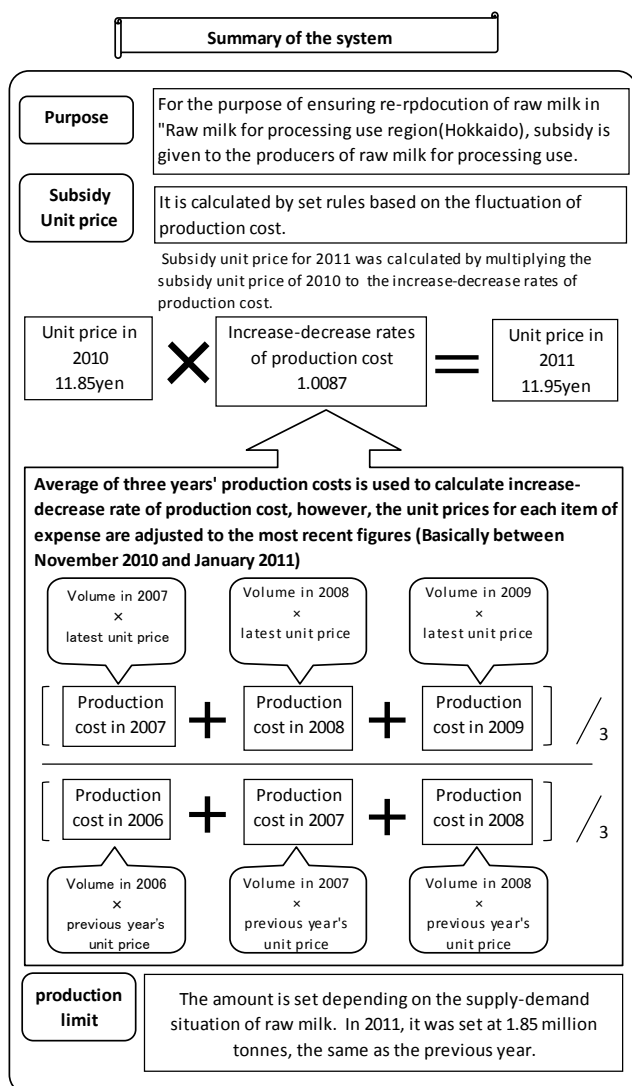
Classifications	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008		2009	2010	2011	2012
	JPY	JPY	JPY	JPY	JPY	JPY	JPY	JPY	JPY	JPY	JPY	JPY	JPY	JPY	April-June JPY	July (afterwards) JPY	JPY	JPY	JPY
Guaranteed Value	75.75	75.75	74.27	73.86	73.36	72.13													
Standard Market Price	64.26	64.26	63.40	63.02	62.56	61.83													
Tax excluded		62.39	60.38	60.02	59.58	58.89													
standard price for compensation※1							61.83	61.83	61.83	61.88	61.37	60.54	59.51		59.35	61.95	65.94	69.12	
Average Market Price※2							61.83	61.83	61.99	60.31	59.33	58.91	59.82		67.12	70.88	69.37		
S t a b l e I n d e x	a. Butter as ingredients	993	993	965	955	931	910												
	Tax excluded (JPY)		964	919	910	887	867												
	b. SMP	12,841	12,841	13,090	13,090	13,090	13,090												
	Tax excluded (JPY)		12,467	12,467	12,467	12,467	12,467												
	c. sweetened condensed whole milk	8,065	8,065	8,211	8,211	8,211	8,211												
	Tax excluded (JPY)		7,820	7,820	7,820	7,820	7,820												
	d. sweetened condensed skimmed milk	7,193	7,193	7,333	7,333	7,333	7,333												
	Tax excluded (JPY)		6,983	6,983	6,983	6,983	6,983												
	e. (Whole Milk Powder)	(18,112)	(18,112)	(18,464)	(18,464)	(18,464)	(18,464)												
	Tax excluded (JPY)																		
	f. (Butter for home use)	(1,081)	(1,081)	(1,051)	(1,040)														
	Tax excluded (JPY)																		
production limit (1,000 tonnes)	2,300	2,300	2,400	2,400	2,400	2,400	227	220	210	210	205	203	198		195	195	185	185	183
Subsidy unit price (JPY)	11.49	11.49	10.87	10.84	10.80	10.30	10.30	11.00	10.74	10.52	104.00	10.40	10.56	11.55	11.85	11.85	11.85	11.95	12.20
Subsidy Total (Actual)	264.27	264.27	260.88	260.16	259.20	247.20	233.81	242.00	225.54	220.92	213.20	211.12	208.89	59.48	170.05	231.08	219.23	221.08	223.26
Unit price for Compensation										1.26	1.63	1.30							

Note: () = unit

From 2001, with new system introduced, Guaranteed Value, Standard Market Price and Stable Index Prices were abolished.

Note: ※1 and ※2 are average market price and Unit Price for Compensation relevant to Measures for stable management of producers of milk for processing use.

**Fig 2: Summary of the "Compensation Price for Producers of Milk for Manufacturing Use" System**



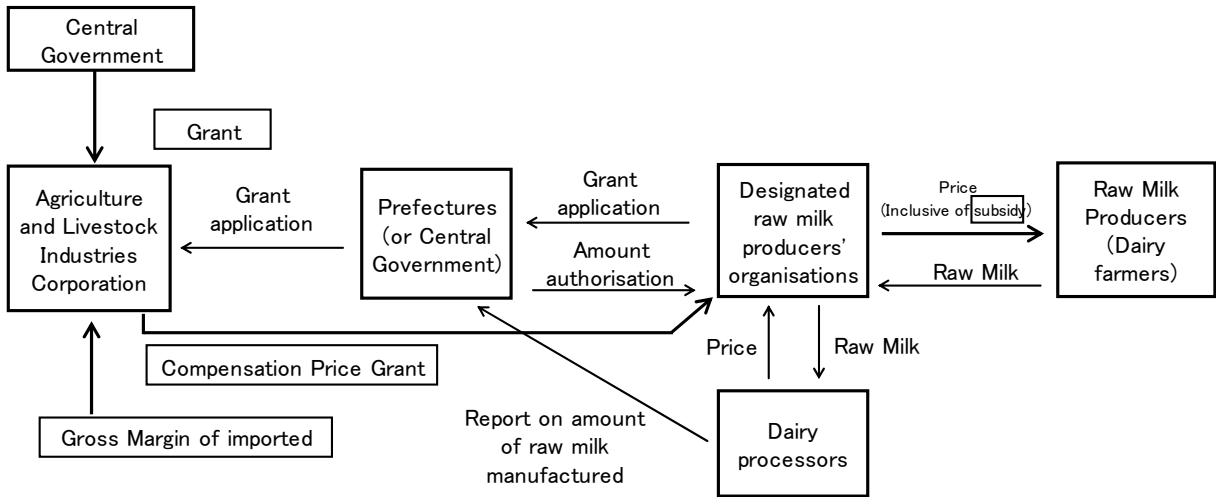
**Fig 3: Summary of "Temporary Act for Compensation Price for Producers of Milk for Manufacturing Use"**

**(1) Producer Subsidy for Compensation price on raw milk for manufacturing use**

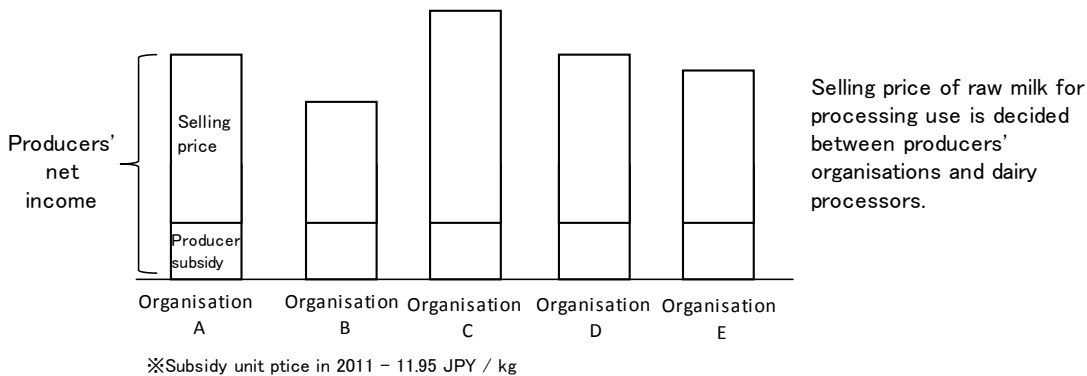
• Corporation gives Compensation Price Grant to designated producers' organisations in order to cover the subsidy payment they give to producers.  
 Subsidy unit price is decided every year by the Minister of Agriculture, Forestry and Fisheries, considering the economic situation such as raw milk production costs and for the purpose of ensuring reproduction of milk.

(Mechanism of Compensation Price for Producers of Milk for Manufacturing Use System)

• Compensation Price Grant = Subsidy Unit Price x authorised amount Maximum limit is set by the Minister of Agriculture, Forestry and Fisheries



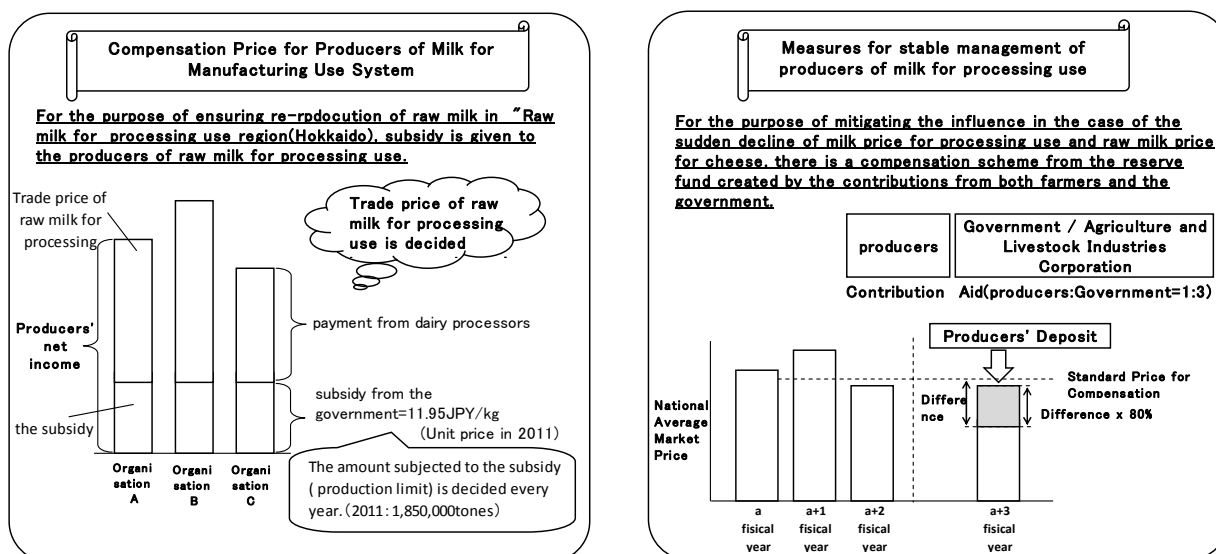
(Method of producer subsidy)



**(2) The import of designated dairy products**

1. Corporation imports and sells designated dairy products (butter, Skimmed Milk Powder, etc.), which amount is set and notified by the Minister of Agriculture, Forestry and Fisheries according to the international agreement.
2. Corporation executes imports and sales of designated dairy products of various countries in case that prices of such products rise or are possible to rise.
3. Under the Customs Law, it is regulated that the importers of designated dairy products must sell the relevant designated dairy products to the Corporation, and Corporation must sell back such products to the importers.

Fig. 4 : Measures to stabilise management of dairy farming and the relative industries (2012)



■ Planned production of raw milk

Following the establishment of the Deficiency Payment Act in 1966 which was set to ensure the supply of raw milk, the government has also decided to lay down the maximum amount for the raw milk production in order to prevent the unstable market price caused by the surplus production.

With these acts and regulations, institutional measures have been taken to ensure the consistent supply. In 1979, producers themselves also have started voluntary planned production based on the market demands in order to protect their business from the supply - demand imbalance and depreciation. This arrangement is not legally binding, and some producers, who are called outsiders, prefer not to abide by. (The producers who abide by this agreement are called insiders). However, such outsiders are only 3% of total producer numbers, and for such voluntary measures the level of participation is extremely high.

Every year, Japan Dairy Council sets out the annual target figure of possible production and dispatch in the country by examining estimated demands for the year. This target quota is divided using approved formula, and JDC passes allocation to the designated groups in 9 regions. Each group then gives their allocated quota to individual organisations such as unions within their region, and finally each organisation passes quota to individual farmers. [table 9](#)

**Table 9: Amount of milk sold on consignment and stock**

Unit : 1,000t

	Amount of milk sold on consignment	Stock amount	
		Butter	SMP
1988	7,207	16.0	18.0
1989	7,615	17.0	33.0
1990	7,691	11.9	19.8
1991	7,844	21.0	33.0
1992	8,111	37.0	54.0
1993	8,053	53.0	60.0
1994	7,846	38.5	34.2
1995	7,938	29.7	38.0
1996	8,134	27.4	45.3
1997	8,107	26.0	51.7
1998	8,049	32.0	47.0
1999	8,016	38.2	44.1
2000	7,940	35.1	53.4
2001	7,890	27.5	75.0
2002	7,990	23.7	80.8
2003	8,042	26.8	93.2
2004	7,931	25.8	88.0
2005	7,946	31.0	75.3
2006	7,747	23.2	68.3
2007	7,694	19.4	42.8
2008	7,626	28.1	43.1
2009	7,586	32.6	69.7
2010	7,334	20.6	58.7
2011	7,249	19.1	47.6

Resources: Sales performance by usage



## 5. Supply chain

### ■ Dairy processing plants in Japan

210,000 dairy farmers with 1.467 million cows produce 7.534 tonnes of milk a year (2011). About 54% is destined to be used for drinking milk, and about 44% is processed to other dairy products such as cheese, butter, skimmed milk powder, ice cream.

As freshness being so important for milk and other dairy products, conventionally they were processed as close as possible to where they were produced.

However, in recent years with improved persterisation and processing technique as well as developed distribution network, some dairy processors are building large plants in the producing area. In 2010, there were 655 raw milk processing plants in the country.

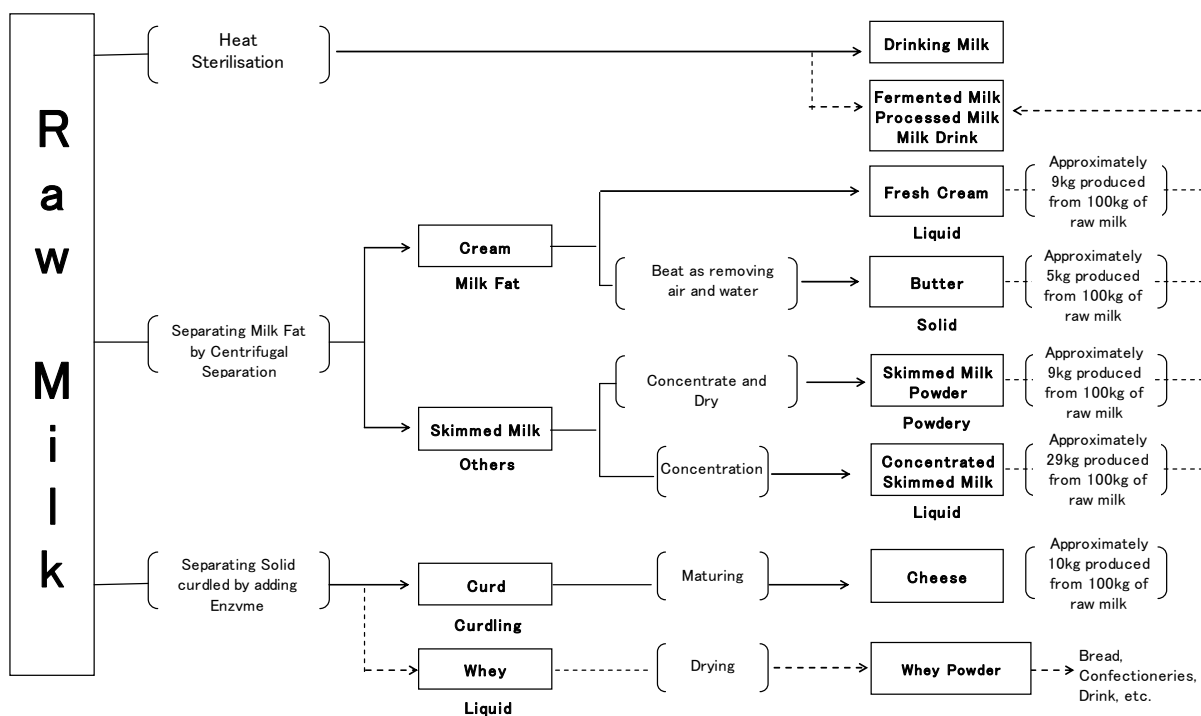
Following the trade liberalisation of dairy products, imports of various products from overseas continue to be increasing, and now the importance of the continuous supply of fresh, safe and reliable milk and dairy products is being recognised by many consumers again. For the future development of Japanese dairy farming and dairy processors, it is undoubtedly important to deepen the working relationship between producers and processors. **table 10 Fig 5**

**Table10: Number of plants and treatment facilities by daily capacity (31/12/2010)**

National Agricultural Region Prefectures	Total	Number of Milk Processing Plants (For drinking milk etc. ≥ For other dairy products)						
		Subtotal	2 t Less	2 ~ 4	4 ~ 10	10 ~ 20	20 ~ 40	40 t ~
<b>Whole Country</b>	<b>655</b>	<b>467</b>	<b>237</b>	<b>31</b>	<b>31</b>	<b>41</b>	<b>40</b>	<b>87</b>
(National Agricultural Region)								
hokkaido	111	37	23	3	1	2	1	7
tohoku	78	61	32	6	4	7	6	6
hokuriku	51	48	32	3	3	4	4	2
kannto	127	91	33	6	5	11	7	29
toyama	33	19	13	-	1	-	2	3
tokai	67	59	30	3	3	6	5	12
kinki	64	50	28	4	3	1	3	11
chugoku	45	39	19	-	3	5	5	7
shikoku	11	11	4	-	2	-	2	3
kyushu	57	41	16	6	5	4	3	7
okinawa	11	11	7	-	1	1	2	-

Resources: Milk Products Statistics by Ministry of Agriculture, Forestry and Fisheries

Fig 5: Manufacturing process of milk and other dairy products



■ Distribution of milk and other dairy products

About 98% of raw milk produced by dairy farmers is sold to dairy processors through the milk producer organisations designated by the Minister of Agriculture, Forestry and Fisheries or the governors of prefectures by law. At the factories, purchased raw milk is processed to drinking milk and other dairy products, then sold to wholesalers / retailers or to bread baking factories and drink manufacturers.

During post war period, school lunch was introduced at primary schools, and children started drinking milk. Milk consumption at homes also started to grow, and its main distribution was through door step delivery by specialist milk retailers.

From around 1965, supermarkets were established especially in urban areas, and they started selling milk. Around 1975, convenience stores, which are open for 24 hours, have also joined in the milk sales competition, resulting the declining share of specialist milk retailers. **table 12**

About 50% of milk containers were glass bottles in 1976, but cartons were introduced and spread rapidly. In 2011 only 8% of containers were glass bottles, instead cartons have increased to 85%.

As these figures show, the increased sales at supermarkets and convenience stores are very much linked to the increase of cartons usage. **Fig 6 table 11**

Fig. 6: Distribution of Milk and other dairy products

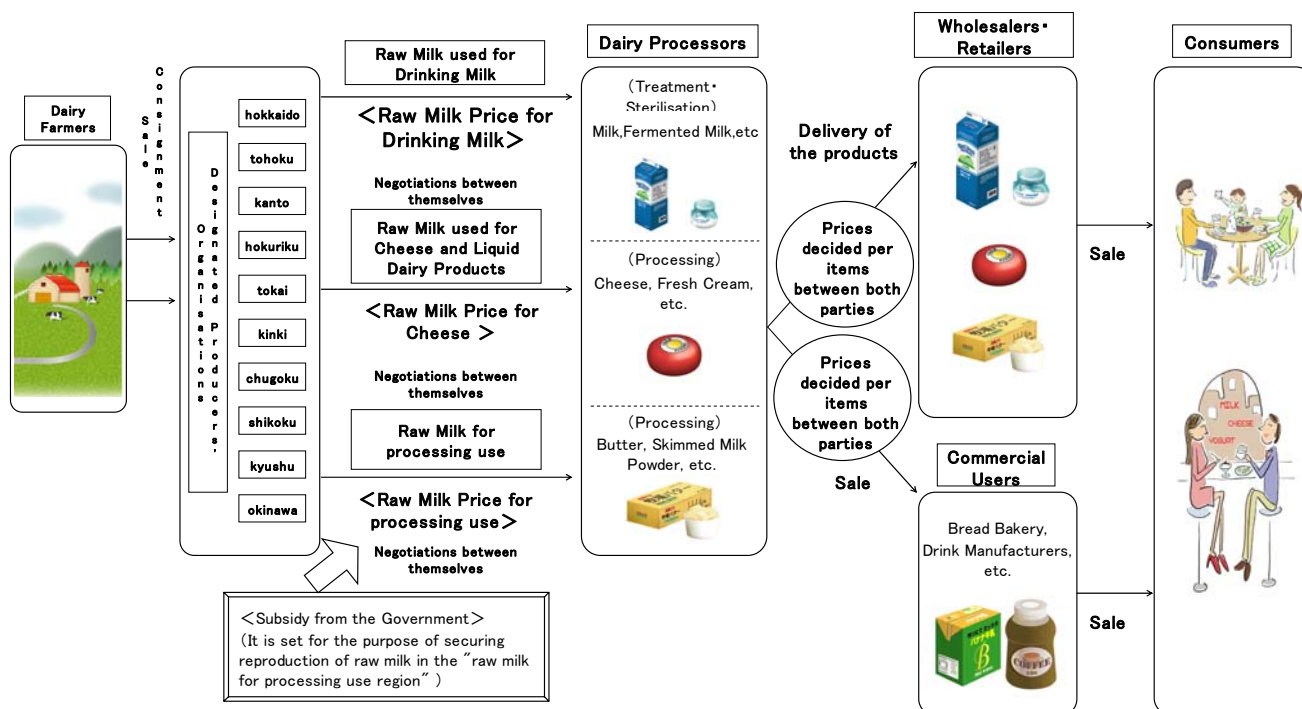


Table 11: Amount of milk production by containers

Unit : kl

	total	Glass bottle		Polyethylene coated paper		others
		less than 500ml	over 500ml	less than 500ml	over 500ml	
1976	220,808	95,863	2,437	16,203	102,222	4,083
2010	269,517	15,959	5,696	42,009	185,630	20,223

Resources: Milk products Statistics, Ministry of Agriculture, Forestry and Fisheries.

**Table 12: Change of Specialised Milk Retailer numbers**

Year	Shop Numbers	Employees	Per Shop	
			Employee Numbers	Monthly turnover
1961	7,514	36,228	4.8	512,400
1963	9,751	41,707	4.3	577,000
1965	15,360	60,283	3.9	564,300
1967	17,912	67,875	3.8	661,600
1969	19,540	71,429	3.7	721,100
1971	20,104	69,919	3.5	804,297
1973	20,971	66,452	3.2	973,467
1975	21,008	59,938	2.9	1,195,957
1978	19,410	52,195	2.7	1,393,096
1981	17,905	46,069	2.6	1,496,844
1984	15,003	39,327	2.6	1,773,262
1987	14,252	37,533	2.6	1,767,921
1991	12,995	33,931	2.6	2,042,446
1994	11,435	32,268	2.8	2,198,870
1997	10,982	34,528	3.1	2,381,071
1999	10,058	36,760	3.7	2,223,156
2002	10,326	40,443	3.9	2,077,910
2007	9,045	38,110	4.2	2,221,476

Resources: Commercial Statistics by Ministry of Economy, Trade and Industry

## 6. Current situation of consumption

### ■Types of milk

Currently, there are six types of drinking milk sold in Japan, gyunyu = cow's milk / whole milk (component not adjusted), low fat milk, fat free milk, milk with adjusted component, processed milk, milk drink. These labelling and component standards are regulated by " Ministerial Ordinance concerning the ingredient standards for milk and dairy products " under the Food Hygiene Law, and in regards to the labeling the detail is set out by the dairy industry's voluntary regulation "Code of Fair Competition Concerning Labeling of Drinking Milk ".

#### Whole milk

It is 100% pure cow's milk which is just sterilised with heat. It is prohibited to mix anything but raw milk, and milk fat to be over 3%, and non-fat milk solids (components excluding milk fat and liquid) to be over 8%. Half moon shape notch can be found on top of many cartons for visually impaired people to recognise milk easily.

#### Low fat milk

It is milk with milk fat excluded. Milk fat is reduced to 0.5-1.5%. Non-fat milk solids level is the same as whole milk at over 8%. Only raw milk is used with no other ingredients.

#### Fat free milk

It is milk with milk fat to be reduced under 0.5%. Non-fat milk solids level is the same at over 8%, and only raw milk is used without any other ingredients.

#### Components adjusted milk

Specific components only are excluded from raw milk. Again, only raw milk is used without any other ingredients. For example, milk adjusted with milk fat at 1.5-3.0% and non-fat milk solids at over 8% is classified in this category.

#### Processed milk

Raw milk mixed with butter, cream and/or skimmed milk powder. Non-fat milk solids is at over 8%.

#### Milk drink

Dairy products such as raw milk, butter, cream and skimmed milk powder mixed with non-dairy products normally not found in milk such as coffee extracts, fruit juice, minerals like iron, calcium and vitamins.

**Fig 7**

Fig. 7: Type of Milk

Standards of Milk products

Type	Standard of element		Hygiene Standards	
	Milk Fat	Non-Fat Milk Solids	Bacteria Count (in 1ml)	Escherichia coli count
Milk	3.0% over	8.0%over	50,000 less	Negative
Milk with adjusted component				
Low Fat Milk	0.5%over1.5%under			
Fat Free Milk	0.5%under			
Processed Milk				
Milk Drink	Milk Solids 3% or more(Under Fair Competition Codes)		30,000 less	Negative

## ■ Amount of milk and other dairy products consumption

Milk and other dairy products consumption in Japan was about 38kg of raw milk weight per capita per year in 1965, but in 2010 it was about 86kg, increased by almost 2.3 times. Total consumption of milk and other dairy products is about 11.63 million tonnes, which is bigger than rice consumption (9.02million tonnes) and is the second most demanded products next to vegetable in the country.

However, consumption per person is still low compared to the Western countries..

Consumption of drinking milk is about 32.7kg per person per year, and this is only about one third of UK, Denmark and Australia, and less than half of USA.

As for other main dairy products, consumption of butter is 0.6kg per person per year, which is 1/5 of UK, and 1/12 of France who consumes the most. Cheese is consumed about 1/5 of UK and 1/12 of France. For the products which reflect the westernised diets in the post war Japan, consumption is said to be rather small.

Japanese method of consumption is mainly as milk to drink, butter on bread, cheese as accompaniment to alcohol or on pizza. Unlike the Western countries, dairy products are not really used in cooking, therefore potential needs for milk and other dairy products could be pretty high. **Table13, 14**

**Table 13: Change of milk and other dairy products consumption (amount destined to consumption) per person per year**

Unit : kg ,%

Year	Raw Milk						Dairy Products		
	Milk and other dairy products						SMP	Butter	Cheese
	Liquid drinking		Other dairy products						
	Rate of change from previous year		Rate of change from previous year		Rate of change from previous year				
1965	37.5	5.9	18.4	8.2	17.7	2.9	0.8	0.2	0.3
1970	50.1	5.9	25.3	4.1	23.7	8.7	0.8	0.4	0.4
1975	53.6	3.5	28.1	4.5	24.8	2.9	1.0	0.5	0.5
1980	65.3	0.9	33.9	1.8	31.0	0.6	1.2	0.7	0.6
1985	70.6	▲ 1.0	35.2	▲ 1.1	35.0	▲ 0.8	1.5	0.8	0.7
1986	71.3	1.0	35.3	0.3	35.5	1.4	1.5	0.9	0.7
1987	75.8	6.3	37.2	5.4	38.1	7.3	1.5	1.0	0.7
1988	81.3	7.3	38.9	4.6	42.0	10.2	1.6	1.2	0.7
1989	80.6	▲ 0.9	39.8	23.0	40.5	▲ 3.6	1.5	1.1	0.7
1990	83.2	3.2	40.8	2.5	42.1	4.0	1.7	1.1	0.7
1991	84.8	1.9	40.8	0.0	43.6	3.6	1.7	1.2	0.7
1992	83.5	▲ 1.5	40.6	▲ 0.5	42.6	▲ 2.3	1.7	1.3	0.7
1993	83.5	0.0	39.9	▲ 1.7	43.3	1.6	1.7	1.4	0.7
1994	89.8	7.5	41.6	4.3	47.9	10.6	1.8	1.4	0.7
1995	91.2	1.6	40.6	▲ 2.4	50.4	5.2	1.8	1.5	0.7
1996	93.3	2.3	40.8	0.5	52.1	3.4	1.8	1.6	0.7
1997	93.2	▲ 0.1	40.2	▲ 1.5	52.8	1.3	1.8	1.6	0.7
1998	92.4	▲ 0.9	39.3	▲ 2.2	52.8	0.0	1.8	1.7	0.7
1999	93.0	0.6	38.6	▲ 1.8	54.3	2.8	1.7	1.8	0.7
2000	94.2	1.3	39.0	1.0	55.0	1.3	1.5	1.9	0.7
2001	93.0	▲ 1.3	38.1	▲ 2.3	54.7	▲ 0.5	1.4	1.9	0.7
2002	92.9	▲ 0.1	39.2	2.9	53.5	▲ 2.2	1.4	1.8	0.7
2003	93.0	0.1	38.5	▲ 1.8	54.4	1.7	1.4	1.9	0.7
2004	93.9	1.0	38.0	▲ 1.3	55.7	2.4	1.4	2.0	0.7
2005	91.8	▲ 2.2	36.7	▲ 3.4	54.9	▲ 1.4	1.5	1.9	0.7
2006	92.2	0.4	35.8	▲ 2.5	56.3	2.6	1.4	2.0	0.7
2007	93.3	1.2	34.9	▲ 2.5	58.1	3.2	1.5	2.1	0.7
2008	86.3	▲ 7.5	34.2	▲ 2.0	51.8	▲ 10.8	1.2	1.7	0.6
2009	84.8	▲ 1.7	32.7	▲ 4.4	51.9	0.2	1.2	1.9	0.6
2010	86.4	1.9	31.8	▲ 2.8	54.5	5.0	1.3	1.9	0.7

Resources: Food Balance Sheet by Ministry of Agriculture, Forestry and Fisheries



**Table 14: International Comparison of Dairy Farming (2010)**

Classification	Unit	Netherlands	France	Germany	Denmark	UK	Canada	USA	Australia	NZ	Japan	Hokkaido	
Number of parous cows	1000	1,479	3,729	4,182	573	1,847	987	9,117	1,600	4,397	933	480	
Number of Farms	1000	20	82	90	4	16	13	63	7	12	21	8	
Number of parous cows per farm		75	45	46	133	117	76	146	230	386	44	64	
Raw Milk Production Cost	1000t	11,941	24,000	29,610	4,965	13,935	8,434	86,769	9,374	17,859	7,631	3,897	
Average production yield per cow	kg	7,440	6,657	7,113	8,589	7,501	9,768	9,517	5,871	3,944	8,046	8,045	
Volume of Dairy	cheese	1000t	753	1,756	2,169	292	335	349	4,742	333	282	123	18
Products	butter	1000t	181	409	449	33	119	83	709	132	478	82	69
	SMP	1000t	64	320	261	27	66	72	824	244	363	170	144
Consumption per person	Drinking milk	kg	59.6	58.5	53.0	91.4	107.0	80.3	79.9	105.0	79.7	32.7	-
	Cheese	kg	21.2	25.6	22.8	16.2	11.2	12.7	15.0	11.9	6.1	1.9	-
	Butter	kg	3.4	7.5	6.0	1.8	3.2	2.6	2.2	3.8	3.8	0.6	-
Farm-gate price of raw milk	JPY/kg	44.4	38.4	39.6	44.3	36.0	60.4	34.1	30.5	43.3	88.2	77.2	

Resources : IDF 『World Dairy Situation』、AMI 『Marktbilanz Milch 2011』、CDC 『ANNUAL REPORT』、USDA 『Milk Production』、『Farms, Land in Farms, and Livestock Operations』 Dairy Australia 『Australian Dairy Industry In Focus 2011』、LIC 『Dairy Statistic 2010/2011』、Livestock Statistics, Milk Products Statistics, Statistics of Agricultural Products prices by Ministry of Agriculture, Forestry and Fisheries.

Note: Figures for Hokkaido Japan is of 2010. Currency exchange rate by Mitsubishi Tokyo UFJ Bank (TTS Market) is used For Raw Milk production and Average production yield per cow, figures were calculated using 1 pound=0.45kg for USA, 1 litre=1.03KG for Australia and NZ.

## ■ Trends of milk retail prices

Milk retail prices have a tendency of declining over the years. Looking at the prices of 1 litre carton of milk sold at supermarkets, milk sold at under 160 yen was only 19.5% in 2001, but in 2007 the ratio went up to 56.6%.

However, since 2006, following increased demands the prices of crops in the international market has been kept very high. This has led to the increase of the raw milk prices for drinking milk use for two years, and relatively the retail prices were raised, too. As a result, in 2008 milk sold under 160 yen was decreased to 29.2%, and also in 2009 down to 10.5%.

For price setting at supermarkets for 1 litre container of milk, it is average retailed at 213.7 yen. Average purchased price is 177.9 yen, so it works out the profit level at 16.7%. **Table15, 16**

**Table 15: Change of distribution ratio of milk by price range (percentage of amount of milk in 1 liter carton sole at supermarkets by price range)**

Unit : %

data price (yen)	2001 September	2002 September	2003 September	2004 September	2005 September	2006 September	2007 September	2008 September	2009 September
~150	8.0	8.6	15.2	19.4	29.1	24.4	36.9	8.4	-
151~160 (under160yen)	11.5 (19.5)	9.4 (18.0)	19.6 (34.8)	18.9 (38.3)	13.7 (42.8)	19.3 (43.7)	19.7 (56.6)	20.8 (29.2)	10.5 (10.5)
161~170	14.4	15.7	16.1	13.3	17.3	13.5	9.0	25.8	30.5
171~180 (under180yen)	20.6 (54.5)	12.2 (45.9)	14.8 (65.7)	17.2 (68.8)	9.5 (69.6)	9.3 (66.5)	10.7 (76.3)	10.9 (65.9)	4.7 (45.7)
181~190	13.8	16.5	7.5	9.4	8.5	7.3	5.8	9.0	15.0
191~200 (under200yen)	21.9 (90.2)	16.5 (78.9)	14.5 (87.7)	6.4 (84.6)	8.2 (86.3)	12.2 (86.0)	6.0 (88.1)	5.1 (80.0)	20.0 (80.7)
201~210	2.1	7.7	1.3	4.4	5.3	3.7	5.3	9.7	2.2
211~220 (under220yen)	2.9 (95.2)	1.9 (88.5)	2.2 (91.2)	2.0 (91.0)	3.2 (94.8)	3.2 (92.9)	2.7 (96.1)	4.0 (93.7)	4.8 (87.7)
221~230	1.5	3.2	3.3	4.0	2.7	3.6	1.2	2.9	3.0
231~240 (under240yen)	1.4 (98.1)	5.6 (97.3)	3.3 (97.8)	1.3 (96.3)	1.5 (99.0)	1.3 (97.8)	1.5 (98.8)	1.4 (98.0)	5.5 (96.2)
(over240yen)	(2.0)	(2.8)	(2.1)	(3.6)	(0.9)	(2.3)	(1.2)	(2.0)	(3.8)
241~250	0.8	1.3	1.0	3.2	0.3	1.5	0.5	1.0	1.9
251~	1.2	1.5	1.1	0.4	0.6	0.8	0.7	1.0	1.9
total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Resources: Research on milk price trends by the Food Marketing Research and Information Center

Note1 : Total may not add up equal due to the figures being rounded up.

Note 2: Exclusive of Consumption Tax

Note 3: Data up to September 2009 without any further data available following the end of the research on milk price trends.

**Table 16: Gross profit of milk (1000ml) at supermarkets by price range (2009)**

Milk 1,000ml Carton				
price range (yen)	cost (yen)	gross profit (yen)	retail price (yen)	rate of gross profit (%)
average	177.9	35.8	213.7	16.7
~150				
151~160	149.3	9.8	159.0	6.1
161~170	161.1	6.5	167.6	3.9
171~180	155.7	21.3	177.0	12.0
181~190	162.4	26.0	188.4	13.8
191~200	167.4	30.7	198.1	15.5
201~210	173.1	34.5	207.6	16.6
211~220	179.5	38.0	217.5	17.5
221~230	183.1	44.3	227.4	19.5
231~240	192.1	45.4	237.5	19.1
241~250	196.0	51.8	247.9	20.9
251~	214.0	57.9	271.9	21.3

Resources: Research on milk price trends in 2009 by the Food Marketing Research and Information Center

## 7. Educational dairy farms and their activities

In recent years, there is a strong movement in Japan to reconsider the diverse functions held by agriculture, and growing numbers of farmers are opening their farms and fields to the public.

Out of all, activities on the educational dairy farms are increasingly popular where various resources on the farms/fields can be put in use for educational purposes. Such farms can also provide suitable condition for "comprehensive learning" and "developing children's mind and zest for living programme" which were introduced to schools in 2002. They are receiving high praises especially among teachers.

Given such trend of the time, in July 1998 under the proposal by the JDC, "Educational dairy farms promotional committee" was established with the cooperation of educators and dairy farmers for the purpose of expansion of educational dairy farms in Japan.

After the establishment, the committee has conducted researches on the works of the European countries, which were leading the world with their educational farms activities. They have also collected and studied the examples of experiences on the farms in Japan. In January 2001, the "Educational Dairy Farm Certification System" was introduced to certify the farms with appropriate levels of safety, hygiene and ability to provide good educational opportunity.

At the beginning in 2000, there were only 116 certified farms, but over the years the number has grown, and in 2011 there expanded to 309 certified farms in the country. In 2008, the committee has also introduced certification system for facilitators, who carry out educational farm activities. There were 556 certified facilitators in 2011.

Approximately 30 years behind the leading European countries, Japan has finally seen the first educational farms. However, this "Educational Dairy Farms Certification System" was the first of its kind in Japan in advance of any other agriculture, and it is attracting a lot of attention and high expectation.

Moreover, educational dairy farms being widely accepted by the public can increase the opportunities to promote the dairy farming as a job and the greatness of the dairy products generated from there.

If people can enrich their mind through visiting farms, dairy farming's contribution to the society can be recognised, and farmers can take even more pride in their work with more incentives to carry out daily tasks.

In the educational circles, there are continuous process of the trials and errors to find ideal education. We think that this certification system can possibly promote one style of education, which is essentially necessary for the children of the present day.

In the future, managements of dairy farms will be increasingly individualised and diversified, and the diverse functions of agriculture will get socially recognised, it is our belief that more and more farms will aim to become educational dairy farms.

