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Current Status of Supply and Demand of Rice and Stabilization Measures

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◇ Abstract ◇

○ Since 2000, rice markets have been structurally oversupplied, and as harvests have been abundant for the recent few years, the stock of rice as of the late 2016 crop year is estimated to be 1.7 million tons.

○ The authorities announced that the rice yield was expected to reach 4.202 million tons in 2016, but the final total yield is assumed to be lower than the estimated figure due to the viviparous germination in the southern regions of the country.
- Statistics Korea said on October 7 that the rice production of this year would be 540kg/10a, with the total yield of 4.202 million tons, a 2.9% (125,000 tons) decrease from the previous year.
- After Chuseok (Korean Thanksgiving Day), however, frequent rainfall and hot weather caused viviparous germination in 14,823 ha of rice paddy (as of Oct. 24).

○ For stabilizing the supply and demand of rice in the harvest season, the government purchased in advance 250,000 tons of rice surplus exceeding the demand for newly harvested rice, and the bumper supplies from the previous year were kept off the market to stabilize the price of rice in the harvest season.
- The total rice yield of this year is forecasted to be lower than the estimated figure due to the damage caused by viviparous germination. The supply of rice in the market is also predicted to decrease from the estimated figure, considering the government's purchase of 250,000 tons of surplus of newly harvested rice and old rice stocks withheld from the market.

○ In Japan, the government decided to abolish in phase the direct payment system for rice farming to address the oversupply of rice, and strengthen the support for rice production for feed and flour for which demand is expected to be on the rise.

○ In order to correct imbalanced supply and demand of rice, it is necessary to implement the production reduction policy, including the temporary production adjustment system, and divide responsibilities for oversupply.
- It will be desirable to promote the temporary production adjustment system until rice stocks decrease to the adequate level, and then reduce the cultivation area of rice for food by easing the requirements for the variable direct payment system (decoupled).
- Upon the government's involvement including the withholding of old rice stocks, it is crucial to encourage other stakeholders to cooperate in implementing the policy to reduce rice production by allocating the expenses to local governments and producers.

○ Mutual cooperation with large companies and certification granted by the government are needed to develop processed rice products and improve the reliability of such products, considering the rice consumption trend.
- Rice and processed rice food customized for demand should be developed with consideration for the current consumption trend, including the increase in single-person households and the elderly population and growing demand for healthy diet following the well-being trend.
- The authorities should help combine the production capacity of rice processing companies and the marketing capacity of large companies, and provide the certification to small- and medium-sized companies producing safe products so that consumers can purchase such products with no worries.

○ Medium- and long-term plans for supply of rice should be designed. For instance, rice with no value as food can be utilized as feed for livestock, increasing the demand for rice.
- According to a survey, a large number of feed producers are using or willing to use rice as feed.

1. Current Status of Supply and Demand of Rice and Cause of Oversupply

1.1. Structure of Supply and Demand of Rice

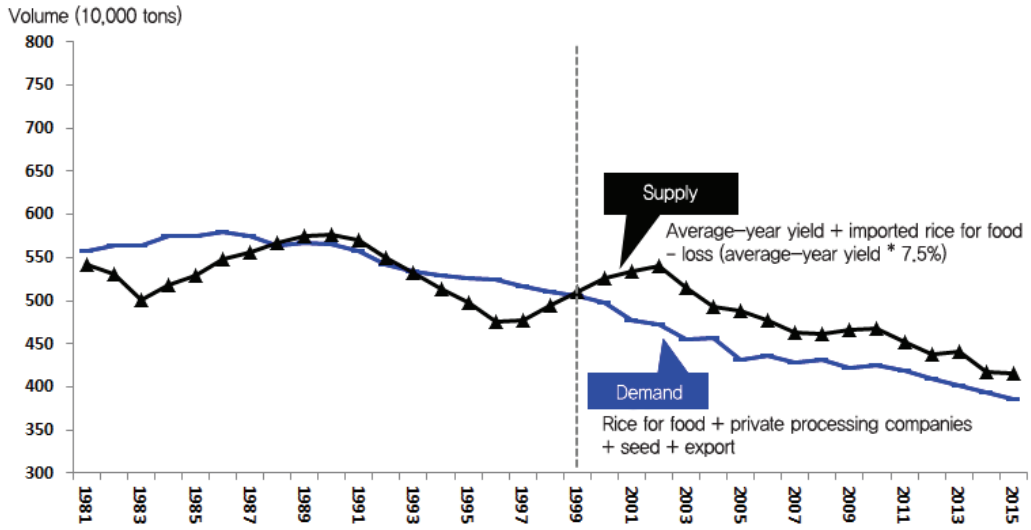
○ For the past 35 years, the demand for rice was mostly higher than its supply except for the period around 1990, while the trend of oversupply has continued since 2000.

- According to the data of annual oversupplied amount of rice for the recent decade (2006-2015), an annual average of 320,000 tons of rice were oversupplied based on the yield of the year.
- Considering that rice production fluctuates depending on crop situations, it is assumed that 280,000 tons of rice were oversupplied each year, excluding the impacts on crop situations (and applying the yield per unit area of the average year).

○ Both production and consumption of rice are on the decline, but consumption is decreasing more sharply than production, resulting in a growing mountain of rice stocks.

- For the recent decade (2016-2015), per capita rice consumption fell by an average of 2.5% every year, while yield and cultivation area decreased by 1.3% and 2%, respectively.

Figure 1. Changes in Annual Supply and Demand of Rice



Source: Statistical Yearbook, Ministry of Agriculture, Food and Rural Affairs (MAFRA).

○ Given the recent trend in the supply and demand of rice, oversupply will continue unless the government intervenes the market.

- If the current pattern of the production and consumption of rice carries on without the government intervention, the following decade (2016-2025) will record 0.3-0.32 million tons of oversupplied rice on average each year.

□ **Despite the reduction in rice cultivation area, the decrease rate of rice production is stagnant due to the increase in the yield per unit area.**

○ The rice cultivation area slightly increased until the early 2000s due to the rice production expansion policy implemented in the mid-1990s, but since then it has gradually reduced.

- 1,240,000 ha (1985) → 1,050,000 ha (1996) → 1,080,000 ha (2001) → 1,050,000 ha (2002) → 779,000 ha (2016)

○ The decrease rate of rice cultivation area has been on the rise in the recent years.

- The annual average decrease rate of rice cultivation area was 1.4% in the past (1985-2015), but it increased to 2.0% for the recent decade.
- In 2016, the rice cultivation area decreased by 2.6% from the previous year as the government encouraged the cultivation of other types of crops.

○ The rice yield per unit area is on the rise, although it is highly fluctuant depending on weather conditions.

- The yield per unit area has gone up for the past three years, exceeding 500 kg per 10a.

※ 508kg/10 ha (produced in 2013) → 520kg/10 ha (produced in 2014) → 542kg/10 ha (produced in 2015)

□ Per capita consumption of rice for food has been on the decline, and its decrease rate has gone up for the last three years.

○ With a growing number of single-person households and the increase in the consumption of alternative food for rice, the per capita consumption of rice for food has dropped by an annual average of 2.3% since 1985 to the recent years.

- The per capita rice consumption halved from 128.1 kg in 1985 to 62.9 kg in 2015.
- Since 2013, the decrease rate of the per capital rice consumption has been above 3% and the consumption is going down more sharply.

※ Decrease rate of per capita rice consumption (compared to the previous year): -3.7% (2013) → -3.1% (2014) → -3.4% (2015)

○ Among the major causes for the reduction in rice consumption are a variety of alternative foods for rice.

- According to the consumer panel survey,[1] 64.5% of respondents said that rice consumption is decreasing mainly because there are a plenty of alternative food out there, while 16.5% and 15.6% blamed insufficient time for cooking and preparation and the negative effect of rice on health, respectively.[2]

1.2. Changes in Rice Stocks

○ Rice stocks have rapidly accumulated since 2013.

- Given the structural oversupply of rice, the government's action for reducing rice stocks to the adequate level through inventory handling has no long-term effect because the stocks accumulate again due to the withholding of rice from the market. Such an issue of excessive stocks emerges every eight to ten years.
- Even after the enforcement of rice tariffication, 409,000 tons of rice (about 9% of the yield in 2015) are imported as the mandatory import quota in return for the grace period. This serves as another reason for accumulated rice stocks.

※ 51,000 tons (1995) → 205,000 (2004) → 409,000 tons (2014) → The same applies in the following years.

- Rice stocks, which seemed to decrease from 2010, have rapidly increased again from 2013 due to the continuous bumper crops.

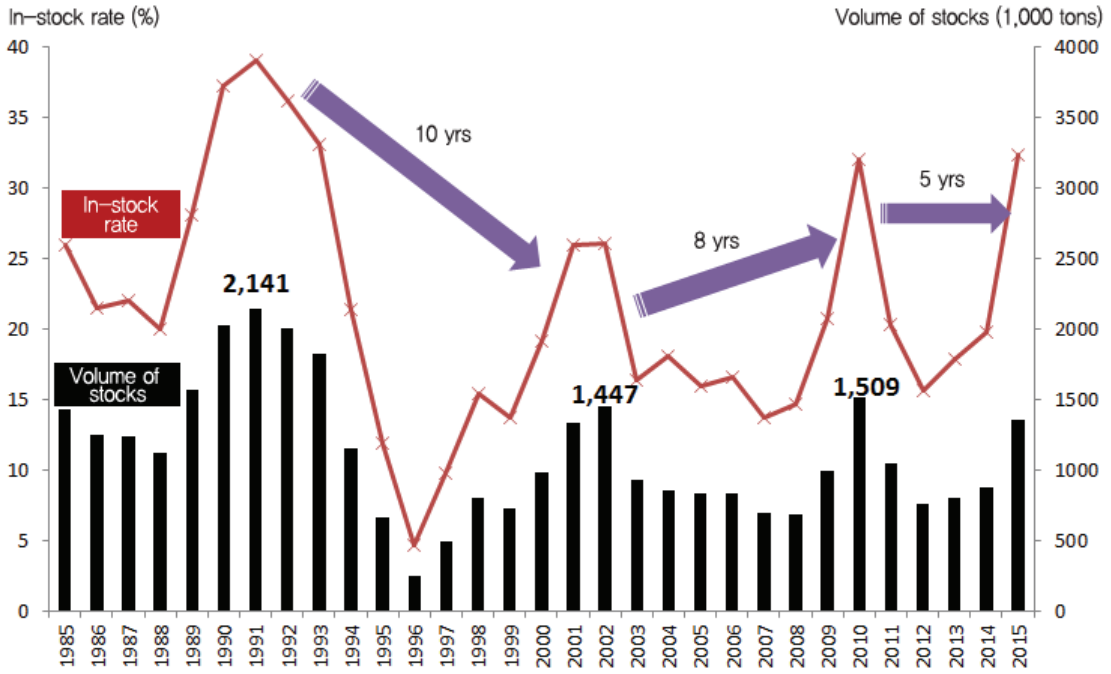
○ Rice stocks are expected to reach around 1.7 million tons in the late 2016 crop year.

1) The result of the survey of a panel of 727 consumers, conducted by the Korea Rural Economic Institute (KREI) from Sep. 30 to Oct. 4, 2016.

2) Only 1.3% and 0.7% of the respondents pointed out the high price and bad taste of rice as the main causes for the decreasing rice consumption, respectively, implying that the taste and price of rice have an insignificant effect on the decline in rice consumption.

- The stocks are growing with the supply on the rise due to straight several years of bumper crops and the absence of large-volume rice support for North Korea.

Figure 2. Changes in Rice Stocks and In-stock Rate



Source: Statistical Yearbook, MAFRA.

1.3. Causes for Oversupply of Rice

○ Agricultural policies are focused more on rice than other crops, keeping rice production from dropping.

- When continuous bumper years boost the supply of rice and accordingly the price of rice in producing areas goes down, the government keeps rice off the market to stabilize the supply and demand.
- While there is no particular policy for the price fall of other agricultural products, rice-growing farmers can be granted 85% of

the difference between the target price and the actual price under the direct payment system.

Table 1. Direct Payment for Rice by Production Year

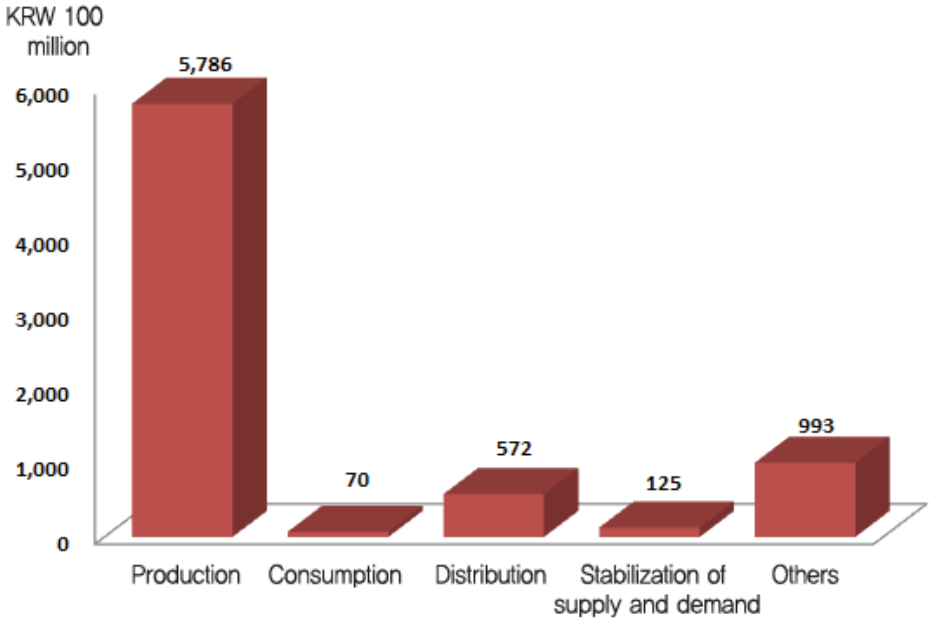
Production year	Total payment (KRW 100 million)		
	Fixed direct payment	Variable direct payment	Total
2015	8,422	7,257	15,679
2014	7,560	1,941	9,501
2013	6,866	-	6,866
2012	6,101	-	6,101
2011	6,174	-	6,174
2010	6,223	7,501	13,729
2009	6,328	5,945	12,330
2008	7,118	-	7,118
2007	7,120	2,791	9,912
2006	7,168	4,371	11,539
2005	6,038	9,007	15,045

Source: Statistical Yearbook, MAFRA.

○ Aside from the central government, local governments also have their own policies to support rice-growing farms, reducing the effect of the central government's policy to alleviate the imbalance between the supply and demand of rice.

- As of 2015, the budget of local governments for rice farming was approximately KRW 700 billion, a 6.8% increase from the previous year. The budget for rice production accounted for 76.7% in the total budget, while that for accelerating rice consumption took up a meager 0.9%.
- The policies of local governments for supporting rice production include the incentives for rice production and the support for stabilizing the management of rice-growing farms. The policies for supporting marketing and distribution include the support for delivery expenses.

Figure 3. Local Government Budget for Rice Farming (As of 2015)



Source: Internal data provided by each local government, related to the budget for supporting rice farming.

○ The profits from rice farming are relatively stable compared to other crops, and farmers prefer rice farming, which is widely mechanized, considering the aging population issue among farm households.

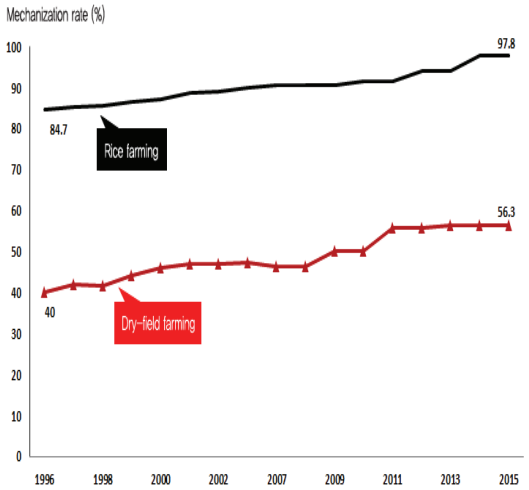
- The rate of return in rice farming[3] is less fluctuant than other alternative crops, implying that rice-growing farms can earn a stable income, although it is lower than incomes from other crops.
- The mechanization rate of rice farming is 97.8% (as of 2015) with almost all required works done by machines, while that of dry-field farming is only 56.3%.
- In terms of labor input time per 10a for each commodity (as of 2015), that of chili is 164.2 hours, while that of rice is only 10.8 hours, 6.6% of the time devoted to grow chili.

3) The rate of return was calculated by dividing (the selling price index of each commodity x yield per unit area) by management cost. There is no accurate data of profit for each commodity, so the average proportion of sales income in the management cost was considered as the rate of return.

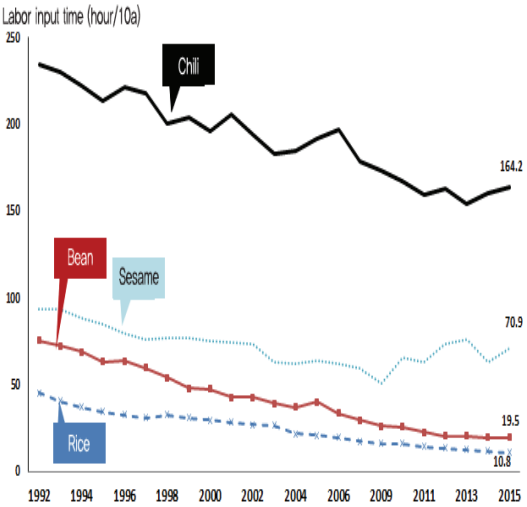
- While the rural population is more rapidly aging, those aged 60 or over take up 72.8% (as of 2015) of all rice-growing farms, doubling from 35.5% in 1991.

Figure 4. Mechanization Rate of Rice Farming and Dry-field Farming and Labor Input Time per 10a by Commodity (As of 2015)

<Mechanization rate of rice farming and dry-field farming>



<Labor input time per 10a by commodity>



Source: Statistical Yearbook, MAFRA; Statistics Korea.

2. Supply and Demand of Rice Produced in 2016 and Countermeasures in the Harvest Season

2.1. Yield of Rice Produced in 2016

□ **The total yield of rice was expected to reach 4.202 million tons this year, a 2.9% decline from the previous year.**

○ In 2016, the rice cultivation area was 779,000 ha, a 2.6% (20,610 ha) decrease from 2015. It reduced more than it did in the previous year (-2%) due to the increase in new facilities, building construction and public facilities and the government policies to encourage rice-growing farmers to shift to other types of farming.

○ According to Statistics Korea (announcement on Oct. 7), the yield per unit area is estimated to be 540kg/10a this year, with the expected total yield of rice reaching 4.202 million tons, a 2.9% (125,000 tons) decline from 2015.

- The number of grains per 1㎡ increased thanks to the desirable weather in the panicle formation and booting stages, but the bad meteorological conditions in the ripening stage, including the shortened duration of sunshine and daily temperature range, caused the slight reduction in the yield per 10a.

Table 2. Estimated Rice Yield in 2016 (According to Announcement on Oct. 7)

Category	2015 production (A)	2016 production (B)	B-A	B/A(%)
Area (1,000 ha)	799	779	-21	-2.6
Yield per unit area (kg/10a)	542	540	-2	-0.4
Yield (1,000 tons)	4,327	4,202	-125	-2.9

Source: Statistics Korea.

□ Frequent rainfall and high temperature triggered the viviparous germination of rice in the southern regions of the country.

○ After Chuseok, the viviparous germination of rice broke out in 14,823 ha of rice-farming land around the southern regions due to frequent rainfall and hot weather (as of Oct. 24).

- In particular, the damaged farmland in Jeollanam-do was 11,216 ha, taking up 75.7% of the total damaged land, which is 6.8% of the total area of rice paddy in this region (165,750 ha).
- The damaged varieties of rice were mostly *sindongjin*, *saeilmi* and *hitomebore*.

※Viviparous germination of rice: The phenomenon in which the buds of rice begin sprouting prematurely as the ears of rice are exposed to wet conditions for a long period of time due to frequent rainfall and lodging in the ripening phase. This year, the viviparous germination occurred much even without lodging.

Table 3. Farmland Area Damaged by Viviparous Germination by Region (As of Oct. 24)

	Area damaged by viviparous germination (ha)	Proportion (%)
Jeollanam-do	11,216	75.7
Jeollabuk-do	3,506	23.7
Other regions	101	0.6
Total	14,823	100.0

Source: MAFRA.

○ Rice damaged by viviparous germination is hardly edible and also unusable as seed due to undermined quality.

Figure 5. Rice Grains Damaged by Viviparous Germination in Yeongam-gun, Jeollanam-do (2016 Production)

2.2. Price of Rice Produced in 2016

□ **The price of rice produced this year has decreased by 16% from the previous year (as of Oct. 15).**

○ Since the 2007 crop year, the price of rice in the pre-harvest season (Jul to Sep) has often been lower than that in the harvest season (Oct to Dec). Such a reversed seasonal gap was found four times for the recent five years.

- Changes in the reversed seasonal gap: -2.5% (2012) → -4.5% (2014) → -4.5% (2015) → -8.1% (2016)

○ The pre-harvest season price of rice produced in 2015 decreased by 12.5% and 8.1% from the previous year and the harvest season, respectively.

- Despite the two withholding actions by the government, the price of rice slightly decreased with almost no change due to the discount offers by large-scale distributors in consuming areas and the reduction in sales of rice of distributors in producing areas.
- In addition, the rice crops are in good conditions this year thanks to desirable weather, and accordingly large-scale distributors in

producing areas are selling rice at lower price to avoid the accumulation of stocks.

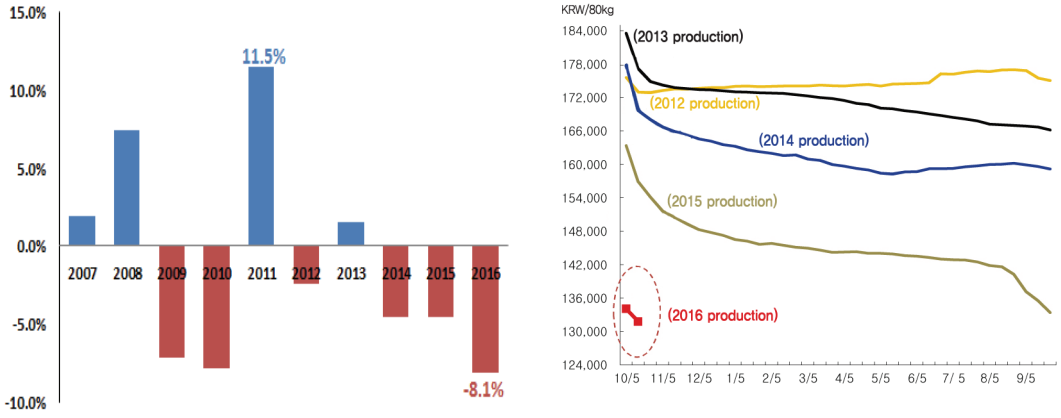
○ The continuous reversed seasonal gaps, old rice stocks of distributors in producing areas, the pre-harvest season price of rice decreased by 12.5% from the previous year, and the oversupply of rice all resulted in the decline in the price of rice in producing areas to KRW 134,076/80kg as of Oct. 5, 2016, a 17.9% decrease from 2015.

- In 2016, the price of newly harvested rice (Oct. 5) is 0.5% higher than that of old stocks (Sep. 25), the smallest gap occurring upon the shift from old stocks to new harvest for the recent decade.

※ 1.7% (2007/2006 production) → 9.5% (2011/2010 production) → 2.5% (2015/2014 production) → 0.5% (2016/2015 production)

○ As of Oct. 15, the price of rice in producing areas (KRW 131,808/80kg based on 2016 production) declined from the previous year less sharply (-1.7%) than it did in 2015 (-4%), which is still 16% lower than the price in the previous year.

Figure 6. Changes in Reversed Seasonal Gap and Price of Rice in Producing Areas



2.3. Countermeasures in the Harvest Season for Supply and Demand of 2016 Rice Production

□ **The government confirmed and released the harvest season countermeasures for the supply and demand of rice, which include the plan for withholding surplus from the market (Oct. 6, 2016).**

○ The government decided to keep the surplus exceeding the demand for newly harvested rice off the market.

- The tentative volume to be withheld is estimated upon the announcement of Statistics Korea (Oct) regarding the expected volume of harvest this year, and the actual volume to be withheld is determined upon the announcement of the actual volume of harvest (Nov).
- The rice stocks stored by the government would not be released to the market unless the supply and demand of rice become unstable or the price significantly surges.

※ The volume for satisfying the actual demand, including those for military and government-related purposes (57,000 tons) and for welfare and school meals (110,000 tons), will be normally sold.

○ The authorities will promote the smooth purchase of rice in the private sector by expanding the support for Rice Processing Complexes (RPCs) to buy rice.

- A total of KRW 3 trillion will be provided to RPCs, and the volume of rice purchased by each RPC and the introduction of the post-costing system for purchase price will be included in the evaluation of the RPC management in the following year.

○ A certain volume of rice will be purchased by the end of the year to be reserved for the public purposes (360,000 tons) and to be supported to other countries (30,000 tons).

○ Considering the current trend in the price of rice in producing areas in the harvest season, the volume of imported rice for food to be released will be reduced, or the release of it will be suspended. The distribution of domestic and imported rice mixed will be cracked down.

- The volume of imported rice for food to be released and the frequency of release will be controlled, with a special crackdown on the distribution of the mix of domestic and imported rice (Oct. 1 to Nov. 20).

○ The authorities will take special action to manage stocks by additionally supplying rice for feed and providing rice to other countries in need.

- (Feed) Expanding the use of old, inedible rice stocks as feed (2016: 101,000 tons → 2017: 250,000 tons)
- (Welfare) Providing larger discounts based on discussion between relevant government institutions and relevant research, and coming up with plans for increasing demand by changing packaging materials, for instance
- (Overseas aid) Carrying out small-scale (around 1,000 tons) aid projects for the short term first, and seeking ways to provide support through international organizations

□ **The government will first purchase 250,000 tons of rice exceeding the demand for new harvests (Oct. 18), and keep old stocks produced in 2015 off the market to stabilize the price of rice in the harvest season.**

○ Based on 4.202 million tons of the total yield of this year estimated by Statistics Korea, the authorities will make a temporary decision on the volume to be withheld (250,000 tons) and confirm the final volume to be withheld upon the announcement of the actually harvested volume of rice (mid Nov).

- The government should purchase rice from farms as soon as possible within this year to increase the effect of market stabilization, and buy rice at the same price as that of rice to be reserved for the public purposes.

○ Moreover, the authorities will also withhold 14,000 tons of rice, the missed volume in the additional withholding action taken in March.

□ **The supply of rice in the market is expected to be lower than the estimated figure due to the damage by viviparous germination and the government's withholding of old stocks and new harvests.**

○ The final yield of rice is predicted to be lower than the forecasted level due to the damage by viviparous germination. The volume of rice supplied to the market will also drop as the government will keep the surplus of new harvests exceeding demand and old stocks produced in 2015 off the market.

○ Therefore, distributors in producing areas need not be agitated over a potential decline in the price of rice.

3. Policy for Supply and Demand of Rice in Japan

□ Japan, like Korea, is dealing with the oversupply of rice.

○ The oversupply structure has maintained in Japan, like Korea, since the country failed to flexibly respond to the decline in rice consumption.
- The per capita consumption of rice as staple food decreased by more than 50% from 118 kg in 1962 to 55.2 kg in 2014.
- The Japanese government assumes that an annual average of 190,000 tons of rice were oversupplied for the past decade (2006-2015).

○ However, rice still accounts for the largest part in the country's agricultural industry as a single commodity.
- The proportion of rice in the total agricultural production volume: 30.1% (1980) → 27.8% (1990) → 25.4% (2000) → 21.0% (2013)

□ The Japanese government decided to abolish in phase the direct payment system for rice farming and shift to the autonomous production adjustment system to resolve the oversupply issue.

○ The direct payment system for rice farming, introduced in 2007, has been criticized for the enormous budget, causing the fairness issue with other industries and crops, and for its negative impact on elderly rice-growing farmers in the transfer of their businesses.
- Budget for the direct payment system for rice farming (JPY 100 million): 3,068 (2010) → 1,533 (2011) → 1,552 (2012)

○ The Japanese government is planning to gradually rescind the direct payment system for rice farming, and strengthen the support for rice

production for feed and flour, for which demand is expected to grow, thereby alleviating the structural oversupply of rice.

- The variable direct payment was already abolished from the 2014 production, while the fixed direct payment has been halved, which is planned to be repealed in 2018. From that year, the government-led production adjustment system will be reorganized to let the private sector autonomously coordinate rice production.
- In 2015, the cultivation area of rice for feed increased by 135.4% (79,766 ha) from the previous year, proving the effect of the policy. But it is hard to predict further outcome because fluctuations in the price of rice as staple food and that of imported corns for feed may affect this situation.
- The total agricultural direct payment before and after the reform of the rice direct payment system is similar to that of the average year.

※ Total agricultural direct payment granted (JPY 100 million):
7,778 (2013) → 7,536 (2014) → 7,693 (2015)

○ The Japanese government came up with supplementary measures for increasing the direct payment for the different use of rice paddies (focusing on rice for feed and flour), introducing a new direct payment system for public interest (for maintaining farmland), and expanding the potential beneficiaries of the management stabilization plan, to minimize the opposition of rice-growing farms to the abolition of the system for rice farming.

- The direct payment system for maintaining farmland is aimed at strengthening the function of farmland to satisfy public interest, but it is actually intended to maintain the production infrastructure by using the direct payment for daily shared activities, including the management of farm roads and waterways.
- In the past, a certain scale of farming (4 ha for individual farms, 20 ha for group farms) was required to benefit the management stabilization measure (aimed at alleviating the impact of declined

incomes), but the criteria was abolished in 2015. Now new starters can also be beneficiaries if they obtain the certification from local governments.

○ For the success of the reform of the direct payment system for rice farming in Japan, it is crucial to reduce the dependency on direct payments by enhancing the productivity of field crops, such as rice for feed and flour, in the long term.

- The financial authorities of the Japanese government (Ministry of Finance) forecasted that JPY 166 billion of budget is required for direct payments in 2025 to produce 1.1 million tons of rice, the production target of the year for rice for feed, pointing out excessive spending for implementing the policy to expand the rice production for feed.

○ If Korea introduces the production adjustment system, like Japan, in the form of supporting the cultivation of other crops, it is needed to reduce the dependency on direct payments by increasing the productivity of such target crops and gradually cutting down the amount of financial support.

- Even if the cultivation of other crops is facilitated to the target level by providing compensation for the income gap, farmers may return to rice farming if the provision of direct payments ceases in the future and the gap in profitability and income stability is still large between rice and other crops at the moment.
- Japan employed the system in which the unit price of direct payment goes up when the yield per unit area increases, to gradually enhance the economic feasibility of other crops.

○ Plus, a careful approach is needed since there have been concerns for the rice production adjustment system in Japan, pointing out that the

central government uniformly set the target and applied it to individual farms through local governments, which was highly inefficient.

- The uniform ratio allocation for production adjustment, which ignores the characteristics of each farm, limits the production of farms with high productivity, undermining the productivity of the entire industry.
- Therefore, the production adjustment system should be implemented based on autonomous decisions made by farm households.

4. Stabilization Measures for Supply and Demand of Rice

□ **It is essential to implement production reducing policies, such as a temporary production adjustment system, and divide responsibilities for oversupply.**

○ The production adjustment system should be introduced for a limited period of time to reduce the cultivation area of rice for food and boost the cultivation of other crops including rice for feed and beans.

- There may be negative aspects, such as an increase in target farmland areas due to the advancement of technologies and the reduction in consumption. Since rice stocks are being accumulated despite the efforts to handle them, however, it is inevitable to employ this system.

○ It is necessary to ease the requirements for variable direct payment to adjust the system to be similar to the counter-cyclical payment (CCP) system of the US.

- The requirements should be modified to grant the payment that is supposed to be provided for rice farming even when the beneficiary farm grows other crops.
- Now 100,000 ha of land of farms cultivating other crops are giving up variable direct payments. If the requirements for variable direct payment are revised, the rice cultivation area is expected to decrease annually by 30,000-40,000 ha.
- If the decoupled system is introduced, a large number of farms may turn to particular commodities, causing an imbalance between supply and demand. But according to the survey, farmers responded that they would shift to various types of crops, including medicinal herb,

pumpkin, fruit, cucumber, spring onion and blueberry (Park Donggyu et al. 2016).

○ The simultaneous implementation of the production adjustment system and the policy for easing the requirements for variable direct payment may cause double dipping. Accordingly, the production adjustment system should be temporarily enforced first, and then the requirements for variable direct payment should be eased.

○ Upon the government intervention in the market by withholding surplus and old stocks, the expenses should be shared with local governments and producers to cooperate for the production reducing policy.

- The central government has borne the burden of expenses for keeping the surplus off the market so far, but local governments that induced oversupply should also share the responsibility and expenses, thereby controlling the production encouragement policies of local governments.
- The government should purchase rice to be withheld from the market at a lower price than the market price, and sell it for feed or processing.

□ **Processed rice products should be developed and policies for boosting consumption are needed with consideration for the current rice consumption trend.**

○ Appealing to patriotism or a simple campaign promoting the significance of breakfast have limits in increasing rice consumption. The government and the private sector should work hand in hand to implement relevant policies, which should not be simple, one-time events.[4)]

4) In the consumer panel survey, 43.4% of the respondents have never seen or heard about

- The Japanese government also implements supplementary measures to increase the demand for rice by disseminating the Japanese diet focused on rice, supporting to expand school meals with rice,[5] and boosting the consumption of rice flour and to promote the excellence of rice in the nutritional aspect.

○ It is essential to develop and disseminate convenient processed rice products that can replace the consumption of wheat flour.

- According to the consumer panel survey, processed rice foods are not sufficient to replace the rice consumption. Among the respondents, 33.6% and 21.3% consume bread and fast food, respectively, in case they do not eat rice in any meal of the day, while only 8.2% consume processed rice food.
- When asked about whether they regularly have breakfast, 27.2%[6] of the respondents said they do not and eat alternative food[7] instead or have no time for breakfast at all. The reason why people do not consume processed rice food for breakfast is that it takes long to cook or it is just not as tasty as other types of food.
- Such consumption patterns imply that it is necessary to develop processed rice products that are convenient to cook and meet the taste of consumers.
- It is also important to develop rice and processed rice food customized to demands and the current consumption trends,

the campaign for boosting rice consumption.

5) In case rice is included in school meals more often and more volume of rice is needed exceeding the expected level, the government provides schools with rice free of charge using its reserves.

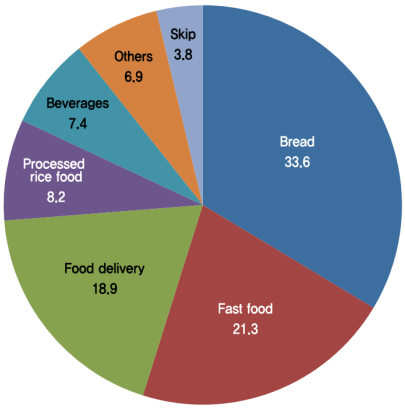
6) In the 2014 National Health and Nutrition Survey, 22.5% of those aged between 1-18 and 23.1% of those aged 19 or over skip breakfast, the result similar to that of the consumer panel survey conducted by KREI.

7) 32.2% and 31.4% of the respondents have bread and beverages (fruit juice, green vegetable juice, etc.), respectively, for breakfast, while only 7.6% consume processed rice food (crispy rice crust, rice cake, etc.).

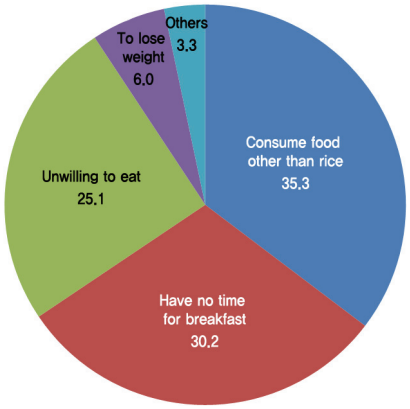
including an increasing number of single-person households and elderly population,[8] and a growing demand for healthy diet following the well-being trend.

Figure 7. Major Alternative Food Products for Rice and Reasons for Skipping Breakfast (Rice)

<Major Alternative Food Products for Rice>



<Reasons for Skipping Breakfast (Rice)>



Source: The result of the survey of a panel of 727 consumers, conducted by KREI from Sep. 30 to Oct. 4, 2016.

○ Mutual cooperation with large companies and the certification issued by the government are needed to increase the reliability of processed rice food.

- The result of the consumer panel survey shows that 79.8% of the respondents are willing to consume processed rice foods, but they are not consuming them due to inconvenience for cooking or eating, high price, and insufficient reliability for their quality.
- It will be desirable for small-scale rice processing companies and large companies to cooperate with each other, combining their production and marketing capacities.

8) The proportion of single-person households in the total households increased from 9% in 1990 to 27.1% in 2015. That of the elderly aged 60 or over also rose from 7.8% to 18.5% in the same period (Statistics Korea).

- The government can certify safe food produced by small- and medium-sized companies so that consumers are encouraged to purchase such products with no worries.

□ The rice consumption can be expanded by using inedible rice for feed.

○ Inedible old stocks of rice can be utilized for feed for livestock with an adequate policy to secure stable supply.

- According to the study on the current status of the use of old rice stocks for formulated feed mixture,[9] 75.5% and 57.5% of the companies are now using and willing to use old rice stocks, respectively, to produce feed.

※ 60% of the companies using old rice stocks for feed said the price of old rice stocks is lower than that of other grains for feed.

○ It depends on the type of livestock, but 5-30% of the raw materials for formulated feed mixture can be replaced by rice according to several studies. When applying the available mixing ratio of formulated feed mixture to each livestock, up to 2.77 million tons of rice can be used as feed.

- This figure implies the maximum volume considered possible in calculation, and the actual available volume can be smaller than this figure depending on how well feed producers accept rice as feed ingredients.
- For instance, if 10% of the total feed producers use rice, 270,000 tons of rice can be used for formulated feed mixture, which can replace imported wheat and corns.

9) From Sep. 7 to 13, 2016, the survey was conducted targeting Nonghyup Feed and 53 member companies of the Korea Feed Association to study the use of old rice stocks reserved by the government for formulated feed mixture.

- As of 2014, the rice consumption for feed in Japan reached 1 million tons.[10)]

Table 4. Estimated Available Volume of Rice for Feed by Livestock Type (2015)

Unit: 10,000 tons, %

Category	Korean beef cattle	Pig (piglet)	Pig (fattening pig)	Broiler chicken	Layer chicken	Total
Production of formulated feed mixture	457	178	431	250	239	1,555
Maximum available mixing ratio	20	30	5	30	15	-
Available volume for use	91	53	22	75	36	277

Note: The result based on the production of formulated feed mixture for each livestock in 2015.

Source: Oh Yeonggyun (2016), *The Current Status of Research on the Use of Old Rice Stocks for Livestock Feed for Replacing Imported Grains*, National Institute of Animal Science.

○ To use old rice stocks for feed, the government should guarantee the stable supply of rice, which seems possible only when the current supply price is maintained.

- This could be actualized only when the current structural oversupply of rice continues every year, so the authorities should be careful in introducing the policy for using rice for feed.

10) The Japanese government predicts that the rice consumption for feed recording around 1 million tons as of 2014 can increase up to 4.42 million tons in the future.

Category	Layer chicken	Broiler chicken	Pig	Milk cow	Beef cattle	Total
Production of formulated feed mixture (10,000 tons)	623	381	559	299	430	2,292
Available mixing ratio (%)	20	50	15	10	3	-
Available volume for use (10,000 tons)	125	191	84	30	13	442
Consumed volume in 2014 (10,000 tons)	34	31	25	6	4	100

Note: The available mixing ratio refers to the expected ratio of ingredients that can be provided without any impact on the physiology of animals and livestock products.

Source: Japanese Ministry of Agriculture, Forestry and Fisheries (2015),『米をめぐる關係資料』.

- This measure can be considered as a fundamental policy alternative only when several conditions are satisfied in the long term, including maintaining a certain farmland area (area or form of rice paddies), the income level of existing rice-growing farms, and the unit supply price of rice similar to or lower than that of corns.

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