

**The Trans-Pacific Partnership and Its Potential Impact on the Rice Market:
Implications for Japan and the Partners**

TPPにおけるアメリカのコメ生産・輸出変化

Alvaro Durand-Morat

Eric J. Wailes¹

(アーカンソー大学 教授)

1. Introduction

The Trans-Pacific Partnership² (TPP) includes important countries in global rice markets. On the export side, the U.S. and Vietnam are top-five exporters, each accounting for roughly 12% and 20% of global trade in 2009, respectively. On the import side, Malaysia, Singapore, and Japan are also important in global rice markets, and in the case of Japan and Malaysia, these countries present great potential to expand imports if trade liberalization is achieved.

Table 1 shows that members of the current TPP negotiations exported nearly 9.5 million metric tons (mmt) or 32% of global trade in 2009 and imported 3.3 mmt (11% of trade). Intra-TPP rice trade amounts to roughly 1.5 mmt or 5% of global rice trade. The primary intra-TPP trade flows are from Vietnam to Malaysia and Singapore, and from the U.S. to Japan.

Table 2 provides more details about the intra-TPP rice trade flows by rice type and degree of milling. Medium grain rice accounts for 19% of trade, with the remaining 81% long grain. Brown rice accounts for only 1% of trade flows and white rice dominates at 99%.

In terms of trade policy, rice imports in Australia, Brunei, New Zealand, Peru, and Singapore are completely liberalized. Chile applies a low 6% import tariff on rice. The USA applies fixed import tariffs of USD 18/mt for paddy rice, USD 21/mt for brown rice, and USD 14/mt for milled rice. Vietnam maintains ad-valorem import tariffs of 20% for imports of paddy rice, and 40% for brown and milled rice imports. Malaysia applies a high ad-valorem import tariff of 40% on all rice imports. Japan maintains a tariff-rate-quota (TRQ) on rice whose ad-valorem equivalents, estimated as the

¹ Research Associate and L.C. Carter Distinguished Professor, respectively, Division of Agriculture, Department of Agricultural Economics and Agribusiness, University of Arkansas.

² The five original signatory countries of Brunei, Chile, New Zealand, Singapore, are currently negotiating with Australia, Malaysia, Peru, U.S., and Vietnam for a potential expansion into a 9-region TPP. Japan announced in November its desire to join.

Table 1. Rice trade by TPP member, 2009. (thousand MT)

	Exports		Imports	
	Total	Intra-TPP	Total	Intra-TPP
Australia	30	10	205	37
Brunei	0	0	38	6
Chile	0	0	126	1
Japan	90	0	759	405
Malaysia	0	0	879	634
New Zealand	0	0	37	14
Peru	45	0	85	8
Singapore	0	0	556	341
USA	3,459	441	591	41
Vietnam	5,864	1,036	23	0
Total	9,487	1,487	3,299	1,487

Source: UN Comtrade.

Table 2 Intra-TPP rice trade by type of rice and milling degree, 2009.

Type	Milling	Exporter	Importer	Volume (mt)
MG	brown	Australia	New Zealand	813
MG	white	Australia	New Zealand	6,661
MG	white	Australia	Singapore	2,253
LG	white	USA	Australia	19,392
LG	white	USA	Japan	142,260
LG	white	USA	New Zealand	5,126
LG	white	USA	Singapore	2,099
MG	brown	USA	Japan	12,543
MG	white	USA	Australia	9,128
MG	white	USA	Chile	442
MG	white	USA	Japan	246,082
MG	white	USA	New Zealand	1,757
MG	white	USA	Singapore	1,648
LG	white	Vietnam	Australia	8,252
LG	white	Vietnam	Brunei	5,880
LG	white	Vietnam	Japan	4,166
LG	white	Vietnam	Malaysia	633,505
LG	white	Vietnam	Peru	7,496
LG	white	Vietnam	Singapore	334,935
LG	white	Vietnam	USA	41,277
Total				1,485,715

Source: UN Comtrade; GATS, USDA .

value of the quota rent relative to the c.i.f. import price³, are extremely high (Table 3).

Table 3 Ad-valorem equivalent (AVE) of the Japanese TRQ by rice trade flow

Type	Milling	Exporter	AVE TRQ	Volume (mt)
MG	brown	China	291%	8,700
MG	white	China	272%	73,972
FR	white	Pakistan	279%	577
LG	white	Thailand	582%	267,424
FR	white	Thailand	435%	3,356
LG	white	USA	243%	142,260
MG	brown	USA	238%	12,543
MG	white	USA	233%	246,082
LG	white	Vietnam	701%	4,166

2. Methodology

The RICEFLOW model, calibrated to calendar year 2009, is used as a framework of analysis (Durand-Morat and Wailes, 2010). The supply side of the model entails a double-nested production function for the production of each one of the 9 commodities included (resulting from the combination of three rice types, namely, long grain, medium/short grain, and fragrant rice, and three milling degrees, namely, paddy, brown, and white rice). For primary rice production (long grain paddy, medium/short grain paddy, and fragrant paddy rice), Leontief technologies are assumed at both levels of the production function, which means that output supply becomes constrained only by the assumption about factor and intermediate input markets and the production cost.

Factors of production (land, labor, and capital) and intermediate inputs are assumed to have perfectly elastic supplies; in other words, their prices are exogenous. For land, this assumption means that rice land is perfectly substitutable into the production of other crops and vice versa.

On the demand side, imported and domestic rice are inputs to the production of a composite commodity subject to milling (for instance, long grain paddy composite for primary milling into brown rice, and long grain brown composite for final milling into white rice) or final consumption (for instance, long grain milled rice composite for final consumption). Final consumption is specified as a double-log function of prices (own price as well as cross prices) and income. Final demand

³ The value of the quota rent per mt is estimated as the difference between the c.i.f. value of imports by source and the wholesale value of domestic rice in the Japanese market. This method of estimation implies that domestic and imported rice are perfect substitutes and that no other import duties apply to imported rice. These assumptions may be challenged and, therefore, the value of the quota rent may change, with further information on substitutability between domestic and imported rice in Japan, as well as other duties or non-tariff barriers in addition to the TRQ that apply on rice imports.

elasticities are taken from the Arkansas Global Rice Model and Food and Agricultural Policy Research Institute (FAPRI) and presented in the table below. Cross-price elasticities are set at half the absolute value of own-price elasticities.

Domestic and imported rice are inputs into the production of each of the 9 composite commodities specified in RICEFLOW (combination of 3 types and 3 milling degrees). Substitution between domestic and imported rice is dictated by an Armington elasticity of substitution. Armington elasticities for all countries are calibrated to 4.98, the value actually estimated for the Philippines. This means that for a 1% decrease in the price of composite imports vis-à-vis the price of the composite commodity, demand for composite imports increases by 4.98%. The same reasoning applies to the derived demand for domestic rice. For Indonesia, the Armington elasticity is estimated and calibrated at 4.13.

In order to account for the strong consumer preferences for domestic rice in Japan and South Korea, their Armington elasticities are set to a very low value of 0.25.

Table 4 Description of final consumption behavior for selected TPP countries

Country	Own-price Demand Elasticity	Income Demand Elasticity
Australia	-0.07	0.43
Brunei	-0.03	0.09
Chile	-0.30	0.11
Japan	-0.11	-0.26
Malaysia	-0.30	0.09
New Zealand	-0.07	0.43
Peru	-0.10	-0.05
Singapore	-0.11	-0.03
USA	-0.01	0.34
Vietnam	-0.20	-0.23

Source: Arkansas Global Rice Model/FAPRI.

The impact of free trade under TPP depends greatly on whether or not Japan is included in the agreement and on the treatment of rice import policies by Malaysia and, more importantly, Japan (whether rice policies will be subject to complete or partial removal by the end of the implementation period, or whether rice policies will be excluded outright from the negotiation).

This preliminary analysis of the impact of TPP on the rice market assumes that rice trade among TPP members will reach complete liberalization at the end of the implementation period. Three scenarios are defined based on the inclusion/exclusion of Japan from the agreement on rice:

1. TPP+JAPAN: a one-time removal of import barriers among all TPP members.
2. TPP+JAPAN_LR: a one-time removal of import barriers among all TPP members and a long-run assumption about the substitution of domestic for imported rice in Japan, namely, that the Armington elasticity in Japan reaches the levels observed in the reference country Philippines.
3. TPP-JAPAN: a one-time removal of import barriers among all TPP members except Japan.

3. Results

3.1 Trade

As expected, to a large extent the impact of TPP on rice markets depends on the inclusion/exclusion of Japan. Table 5 below shows that rice trade liberalization among all TPP members excluding Japan has the potential to increase intra-TPP by roughly 50% (760 tmt), and that the inclusion of Japan could boost intra-TPP trade even further by 110% (1.64 mmt) from the baseline. More strikingly, if we assume that in the long run Japanese consumers will match the level of domestic/imported substitutability observed in the Philippines, then intra-TPP trade increases almost three times or 6.5 mmt. Japanese imports of medium grain rice from the USA will increase sharply, actually making Japan the largest importer in the world and the USA the largest exporter.

As presented in Table 6, rice imports in Japan are estimated to increase sharply by slightly over 500 tmt or 70% from the baseline as a result of TPP, with the USA and Vietnam benefiting the most from the liberalization, primarily at the expense of China and Thailand. As already discussed above, in the long-run TPP scenario Japan becomes the largest rice importer, benefiting on the export side the USA and Vietnam.

The removal of the Japanese TRQ on rice as part of the TPP agreement generates very large drops in the market price of imports, which together with the changes in trade volumes already reported above lead to significant decreases in the market value of Japanese rice imports (Table 7). In the long run TPP scenario, however, despite the sharp decrease in import prices, the total value of Japanese rice imports increases significantly by 150% as a result of the dramatic increase in the volume of rice imported.

Table 5 Impact of TPP on intra-TPP rice trade

Type	Milling	Exporter	Importer	Volume of Trade (mt)						
				BASELINE		TPP-JAPAN		TPP+JAPAN		TPP+JAPAN_LR
				Initial	% Change	Final	% Change	Final	% Change	Final
LG	white	USA	Australia	19,392	0.0%	19,392	0.0%	19,392	0.0%	19,392
MG	white	USA	Australia	9,128	0.0%	9,128	0.0%	9,128	0.0%	9,128
LG	white	Vietnam	Australia	8,252	0.0%	8,252	0.0%	8,252	0.0%	8,252
LG	white	Vietnam	Brunei	5,880	0.0%	5,880	0.0%	5,880	0.0%	5,880
MG	white	USA	Chile	442	0.0%	442	0.0%	442	0.0%	442
LG	white	USA	Japan	142,260	0.0%	142,260	95.7%	278,403	90.4%	270,863
MG	brown	USA	Japan	12,543	0.0%	12,543	134.8%	29,451	2674.0%	347,943
MG	white	USA	Japan	246,082	0.0%	246,082	71.2%	421,292	2207.0%	5,677,112
LG	white	Vietnam	Japan	4,166	0.0%	4,166	13273.0%	557,119	12913.0%	542,122
LG	white	Vietnam	Malaysia	633,505	119.9%	1,393,077	119.9%	1,393,077	119.9%	1,393,077
MG	brown	Australia	New Zealand	813	0.0%	813	0.0%	813	0.0%	813
MG	white	Australia	New Zealand	6,661	0.0%	6,661	0.0%	6,661	0.0%	6,661
LG	white	USA	New Zealand	5,126	0.0%	5,126	0.0%	5,126	0.0%	5,126
MG	white	USA	New Zealand	1,757	0.0%	1,757	0.0%	1,757	0.0%	1,757
LG	white	Vietnam	Peru	7,496	0.0%	7,496	0.0%	7,496	0.0%	7,496
MG	white	Australia	Singapore	2,253	0.0%	2,253	0.0%	2,253	0.0%	2,253
LG	white	USA	Singapore	2,099	0.0%	2,099	0.0%	2,099	0.0%	2,099
MG	white	USA	Singapore	1,648	0.0%	1,648	0.0%	1,648	0.0%	1,648
LG	white	Vietnam	Singapore	334,935	0.0%	334,935	0.0%	334,935	0.0%	334,935
LG	white	Vietnam	USA	41,278	0.0%	41,278	0.0%	41,278	0.0%	41,278
Total				1,485,715	51.1%	2,245,288	110.4%	3,126,502	286.5%	8,678,276

Table 6 Impact of TPP on the volume of Japanese rice imports

			BASELINE	TPP-JAPAN	TPP+JAPAN		TPP+JAPAN_LR		
			Volume of Trade (mt)						
Type	Milling	Exporter	Initial	Change	Final	Change	Final	Change	Final
MG	Brown	China	8,701	0.0%	8,701	-99.5%	44	-93.6%	557
MG	White	China	73,972	0.0%	73,972	-99.6%	296	-94.2%	4,290
FR	White	Pakistan	577	0.0%	577	-6.4%	540	-8.9%	526
FR	White	Thailand	3,356	0.0%	3,356	-6.4%	3,141	-8.9%	3,057
LG	White	Thailand	267,424	0.0%	267,424	-99.6%	1,070	-99.6%	1,070
LG	White	USA	142,260	0.0%	142,260	95.7%	278,403	90.4%	270,863
MG	Brown	USA	12,543	0.0%	12,543	134.8%	29,451	2674.0%	347,943
MG	White	USA	246,082	0.0%	246,082	71.2%	421,292	2207.0%	5,677,112
LG	White	Vietnam	4,166	0.0%	4,166	13273.0%	557,119	12913.0%	542,122
Total			759,081	0.0%	759,081	70.1%	1,291,356	802.1%	6,847,539

Table 7 Impact of TPP on the market value of Japanese rice imports

			BASELINE	TPP-JAPAN	TPP+JAPAN		TPP+JAPAN_LR		
			Market Value of Imports (USD million)						
Type	Milling	Exporter	Initial	Change	Final	Change	Final	Change	Final
MG	Brown	China	33.4	0.0%	33.4	-99.4%	0.2	-93.7%	2.1
MG	white	China	283.2	0.0%	283.2	-99.6%	1.2	-94.1%	16.7
FR	white	Pakistan	2.2	0.0%	2.2	-4.5%	2.1	-4.5%	2.1
FR	white	Thailand	13.1	0.0%	13.1	-6.1%	12.3	-9.2%	11.9
LG	white	Thailand	1024.0	0.0%	1024.0	-99.6%	4.3	-99.6%	4.2
LG	white	USA	545.2	0.0%	545.2	-43.0%	311.0	-44.5%	302.6
MG	brown	USA	48.0	0.0%	48.0	-30.6%	33.3	718.8%	393.0
MG	white	USA	942.4	0.0%	942.4	-48.6%	484.5	592.7%	6528.0
LG	white	Vietnam	16.0	0.0%	16.0	1564.4%	266.3	1519.4%	259.1
Total			2907.5	0.0%	2907.5	-61.6%	1115.2	158.6%	7519.7

The extent to which TPP affects global rice trade depends critically on whether or not Japan joins the agreement, and on the Armington assumption about Japanese consumer preferences (Table 8). If Japan does not join the TPP, global rice trade is expected to increase by 500 tmt or 1.7%. In this scenario, Vietnam accounts for all the increase in trade, partially at the expense of India and Pakistan, other important suppliers to the Malaysian market.

If Japan is part of the agreement, TPP is to increase global rice trade by 1.2 mmt or around 4% above the baseline. Vietnam is expected to account for most of the expansion in long grain rice trade, whereas the USA is predicted to supply most of the expansion in the medium grain segment of the market. China and to a lesser extent Thailand are expected to worsen their trade position as a result of a TPP agreement that includes Japan.

In the extreme case where there is strong substitutability in domestic and imported rice, in the long-run where Japan joins the TPP, global rice trade is likely to increase dramatically by around 7.7 mmt or 22%. We can expect significant changes in the regional composition of exports. As previously commented, the USA becomes the largest exporter of rice, primarily as a result of the dramatic expansion of medium grain trade, a market the USA already dominates in the baseline.

Table 8 Impact of TPP on rice trade by major exporters

	BASELINE		TPP-JAPAN		TPP+JAPAN		TPP+JAPAN_LR
	Initial	% change	Final	% change	Final	% change	Final
Volume of Trade (mt)							
China	826,431	0.0%	826,431	-10.4%	742,125	-10.1%	744,168
LG	348,159	0.0%	348,159	0.1%	348,507	0.0%	348,159
MG	478,272	0.0%	478,272	-17.7%	393,618	-17.2%	396,009
India	2,484,376	-0.1%	2,479,736	-0.1%	2,479,736	-0.2%	2,479,515
FR	2,263,390	0.0%	2,263,390	0.0%	2,263,390	0.0%	2,263,390
LG	220,986	-2.1%	216,346	-2.1%	216,346	-2.2%	216,125
Pakistan	3,202,644	-0.9%	3,174,322	-0.9%	3,174,322	-0.9%	3,171,962
FR	842,516	0.0%	842,516	0.0%	842,516	0.0%	842,516
LG	2,360,127	-1.2%	2,331,806	-1.2%	2,331,806	-1.3%	2,329,446
Thailand	8,428,782	-0.4%	8,398,565	-3.4%	8,131,378	-3.4%	8,124,698
FR	1,749,109	-0.2%	1,745,611	-0.2%	1,745,611	-0.2%	1,745,611
LG	6,679,673	-0.4%	6,652,954	-4.4%	6,385,767	-4.5%	6,379,088
USA	3,458,716	0.0%	3,458,715	13.8%	3,832,052	286.7%	9,636,643
LG	2,941,062	0.0%	2,941,062	5.9%	3,114,585	5.5%	3,102,820
MG	517,653	0.0%	517,653	38.6%	717,468	1162.2%	6,533,822
Vietnam	5,864,053	13.0%	6,626,380	22.4%	7,177,600	22.1%	7,160,008
LG	5,864,053	13.0%	6,626,380	22.4%	7,177,600	22.1%	7,160,008
Grand Total	24,265,002	2.9%	24,964,149	5.2%	25,537,214	25.4%	31,316,994
World Total	29,658,589	1.7%	30,162,785	3.9%	30,815,274	21.8%	36,124,161

3.2 Production

With or without Japan joining the TPP, Malaysia can expect a large shock on production, where, as a result of increasing competition from imports from Vietnam, Malaysia's rice production shrinks by more than half. This means that, at constant yields, rice acreage decreases dramatically from 672,000 to 276,000 hectares.

With Japan joining TPP, rice production in Japan is affected from increasing import competition, but the extent of production effect is determined primarily because of the strong preference for Japanese produced rice by Japanese consumers (reflected in the inelastic Armington elasticities in RICEFLOW). In the long run and after imports become more of a constant in the Japanese market, we can expect the preferences of Japanese consumers will shift towards more acceptance of imported rice, which can have striking effects on the domestic rice sector, shrinking Japanese rice production by almost 94% (Table 9).

Production of medium grain rice in the USA will expand significantly by 11% if Japan joins the TPP; however, with the change in Japanese consumer preferences in the long run, USA medium grain rice production could expand even further at more than three times the level produced in 2009, assuming no land and water constraints. This expansion is highly unlikely unless medium grain rice production expands in the Delta region, given that rice land and water resources in California are already constraining the expansion of the Californian rice sector. Long grain production in the USA is expected to slightly improve as a result of TPP in both the short and long run. Finally, Vietnam will experience an expansion in long grain rice production of around 2 mmt or 5.2% in the event Japan joins the TPP, and of 1.2 mmt or 3.0% if the TPP is implemented without the inclusion of Japan. Globally, TPP is expected to have no impact on the level of rice production but rather on a shift in the location of production.

Table 9 Impact of TPP on rice production (paddy) in selected countries

		BASELINE	TPP-JAPAN		TPP+JAPAN		TPP+JAPAN_LR	
		Volume of Production (mt)						
Type	Country	Initial	% Change	Final	% Change	Final	% Change	Final
MG	Japan	10,592,500	0.00%	10,592,500	-6.90%	9,861,618	-93.80%	656,735
LG	Malaysia	2,510,000	-59.40%	1,019,060	-59.40%	1,019,060	-59.40%	1,019,060
LG	USA	7,550,973	0.00%	7,550,973	2.50%	7,739,747	2.40%	7,732,196
MG	USA	2,421,257	0.00%	2,421,257	11.00%	2,687,595	331.00%	10,435,618
LG	Vietnam	38,895,500	3.00%	40,062,365	5.20%	40,918,066	5.10%	40,879,171

3.3 Consumption

Impacts of TPP on rice demand for final consumption are expected to be small because of the inelastic nature of rice demand in most regions around the globe and, more specifically, in Japan and Malaysia, the two countries where import prices are expected to change the most. In Table 10 below we show the results only for Japan and Malaysia, since results for all other countries are negligible. Despite the sharp drop in consumer prices in the long run TPP scenario, total rice consumption in Japan is expected to remain fairly unchanged as a result of achieving free trade with other TPP members (Table 11).

The welfare of Japanese consumers is expected to improve significantly, since they will have to spend less than half their current expenditure on rice.

Table 10 Impact of TPP on volume of final consumption of rice for selected countries

		BASELINE	TPP+JAPAN		TPP+JAPAN_LR	
		Volume of Consumption (mt)				
Type	Country	Initial	% Change	Final	% Change	Final
LG	Japan	413,849	12.7%	466,408	12.7%	466,408
MG	Japan	7,977,251	-5.2%	7,562,434	0.1%	7,985,228
FR	Japan	3,933	-6.4%	3,681	-8.9%	3,583
LG	Malaysia	2,411,214	5.9%	2,553,476	5.9%	2,553,476

Table 11 Impact of TPP on the consumer price of rice for selected countries

		BASELINE	TPP+JAPAN		TPP+JAPAN_LR	
		Consumer Price (USD/mt)				
Type	Country	Initial	% Change	Final	% Change	Final
LG	Japan	3,830	-67.4%	1,249	-67.4%	1,249
MG	Japan	3,830	-7.3%	3,550	-43.6%	2,160
FR	Japan	3,894	0.0%	3,894	0.0%	3,894
LG	Malaysia	451	-17.3%	373	-17.3%	373

3.4 Limitations of this preliminary analysis

The analysis presented in this paper reflects an initial

1. One time shock to trade policies, without accounting for potential changes in the evolution of the macroeconomic environment until full implementation is reached.
2. Exogenous changes in per capita consumption other than those generated by price and income effects are neglected. For Japan this is quite important given the downward trend in per-capita consumption observed over the last decades.

3. All the adjustment in production falls on volume rather than prices, since we are assuming all factor and intermediate inputs are perfectly supplied.

4. Conclusion

This paper provides a preliminary assessment of the potential global and regional impacts of the inclusion of Japan in a Trans-Pacific Partnership trade liberalization of the rice sector. A 2009 baseline of the RICEFLOW model was used to evaluate bilateral trade flows, price, production and consumption effects. The study presents three scenarios:

1. TPP trade liberalization in rice without Japan
2. TPP trade liberalization in rice with Japan, with low substitution between domestic and imported rice
3. TPP trade liberalization in rice with Japan, with a higher rate of substitution between domestic and imported rice.

Rice trade liberalization, without Japan, increases among TTP members by nearly 800 thousand mt or 51 % above baseline levels. The major trade flow change is between Vietnam and Malaysia. Trade creation exceeds diversion among major rice exporters by 2.9% and by an increase in global rice trade of 1.7%. Increased exports from Vietnam come at the expense of India, Pakistan, and Thailand.

The inclusion of Japan, assuming low levels of substitution between domestically produced rice and imports, results in an increase in intra-TPP rice trade of 110% or 1.6 mmt. The change in intra TPP rice flows includes more trade between Vietnam and the United States with Japan. Trade expansion exceeds diversion by 5.2 % among major exporters and globally by 3.9%. Imports by Japan increase by 532 thousand mt or 70%. This level of trade liberalization provides a reduction in the cost of rice in Japan of USD 1.8 billion and a reduction in rice production by 6.9%

The third scenario, which assesses a longer-run impact of trade liberalization including Japan with a higher degree of substitution between domestic and imported rice, suggests that intra TPP rice trade expands by 286% or 6.2 mmt above baseline. The major expansion in trade is between Japan and the United States, which assumes that production constraints in the United States are not limiting. The trade creation effect benefits Japan, Vietnam and the United States, with most rice trade diversion for China and Thailand. Trade from major exporters increases by 25% and at the global level by nearly 22%. The cost of final consumption of rice in Japan is reduced by more than USD 4.6 billion; however, rice production would decline in Japan by nearly 94%.

This analysis makes clear that the impact on Japan of rice trade liberalization with the TPP framework is highly dependent upon the willingness of Japanese consumers to substitute domestically produced rice for less expensive imported rice. We have presented two extreme assumptions about this substitution and find that benefits to Japan ranges between USD 1.8 billion and USD 4.6 billion, while the impact on rice production ranges between a 7% to 94%.

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