

JDS International Seminar

Kyushu University, Fukuoka, Japan

Importance of Large Scale Ag. Development Schemes in Developing Countries

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<http://worldfood.apionet.or.jp>

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Why large scale ag. development important? ...

- **Small scale developments would not develop agriculture in the country so easily.**
 - Slow increases would never catch up.
 - Slow increases in ag., slow increases in income.
 - Poverty and malnutrition tend to continue.
- **Large scale ag. development...**
 - Suitable for large-land with small population,
 - Historically great chance for ag. to develop,
 - Ag. business is important for devlpg. country,
 - Chance to catch up with the rest of the world.

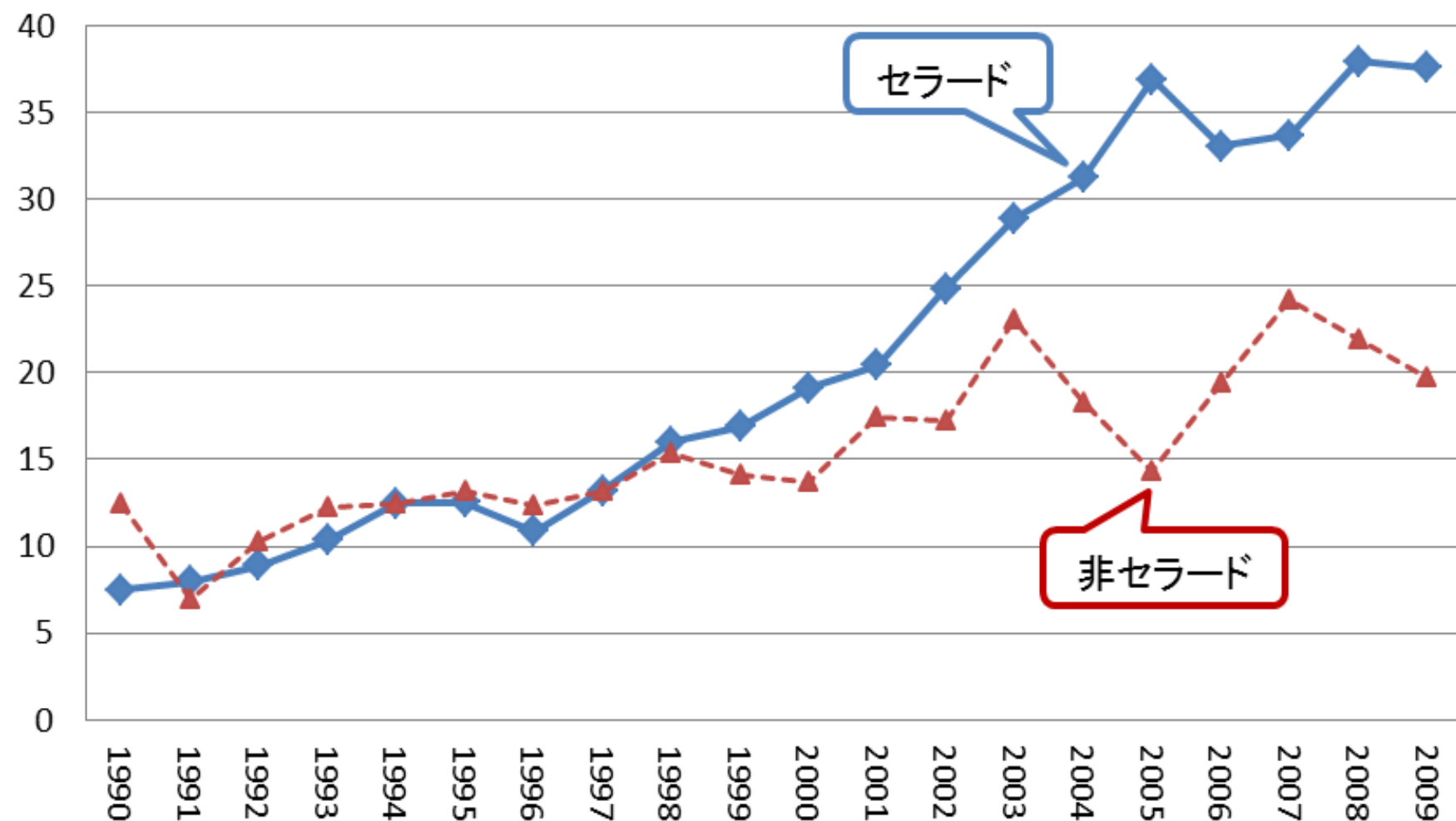
Large increases in production ...

- ***Benefits not only the country but the importers, donors, etc...***
 - ***Shifts supply curve outward and lower prices,***
 - ***Large benefits for food importers.***
 - ***More competition in export markets,***
 - ***Greater food security level.***

Case Study of Brazil: Serrado

- **Large scale development...**
 - **A few thousand ha farms, new,**
 - **Soybeans, cotton, corn, coffee, etc.,**
 - **Fast increases in ag. production,**
 - **Now, 200,000 ha farms,**

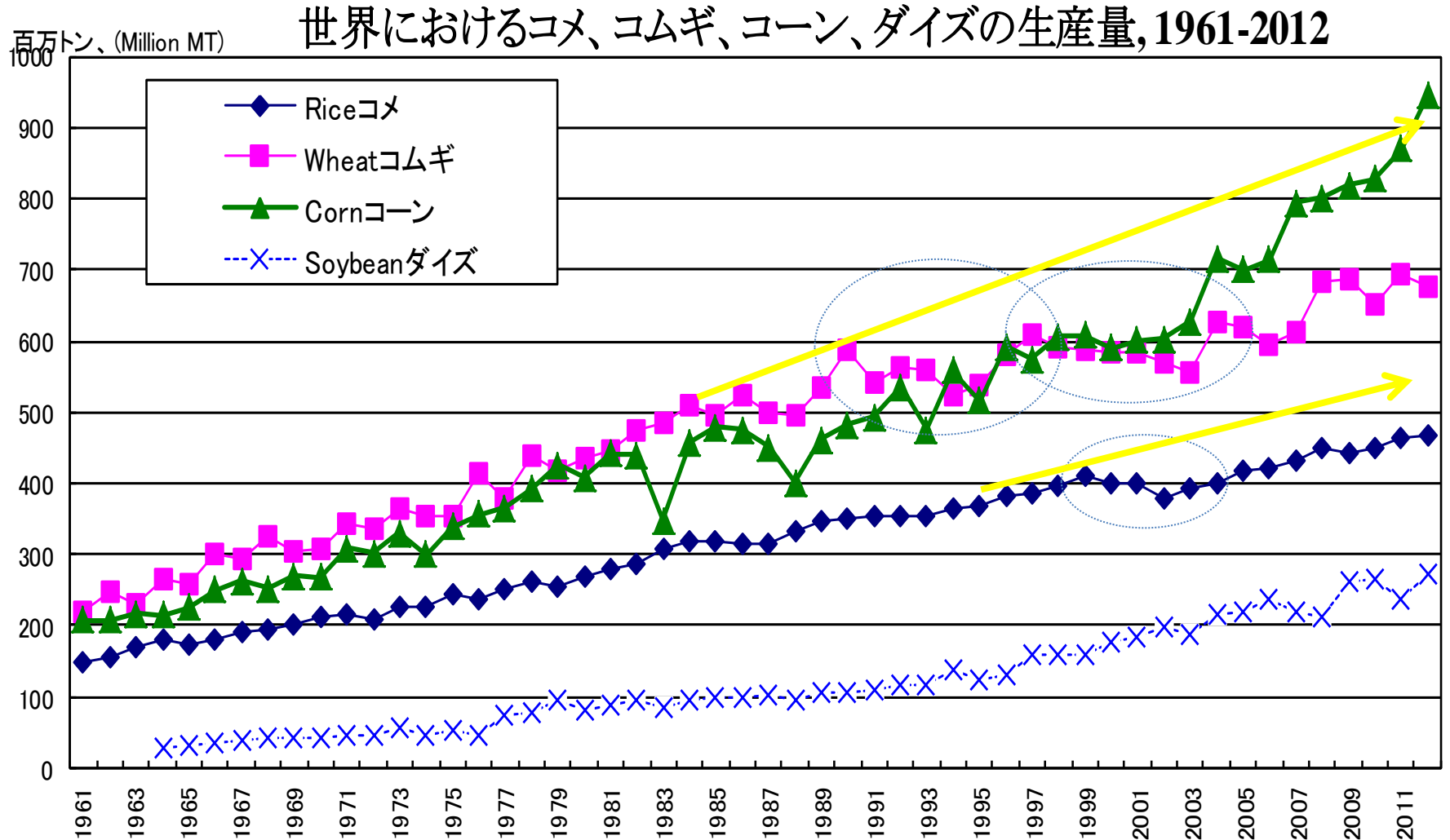
図2. ブラジルのセラード及び非セラード地域におけるダイズの生産量の推移、
1990～2009（単位：百万トン）



データソース：ブラジル地理院(Instituto Brasileiro de Geografia e Estatística, IBGE)

<http://www.sidra.ibge.gov.br/> (2011年8月5日閲覧)

Fig. 16. Evolution of world total production for rice, wheat, corn and soybeans, '61-'12



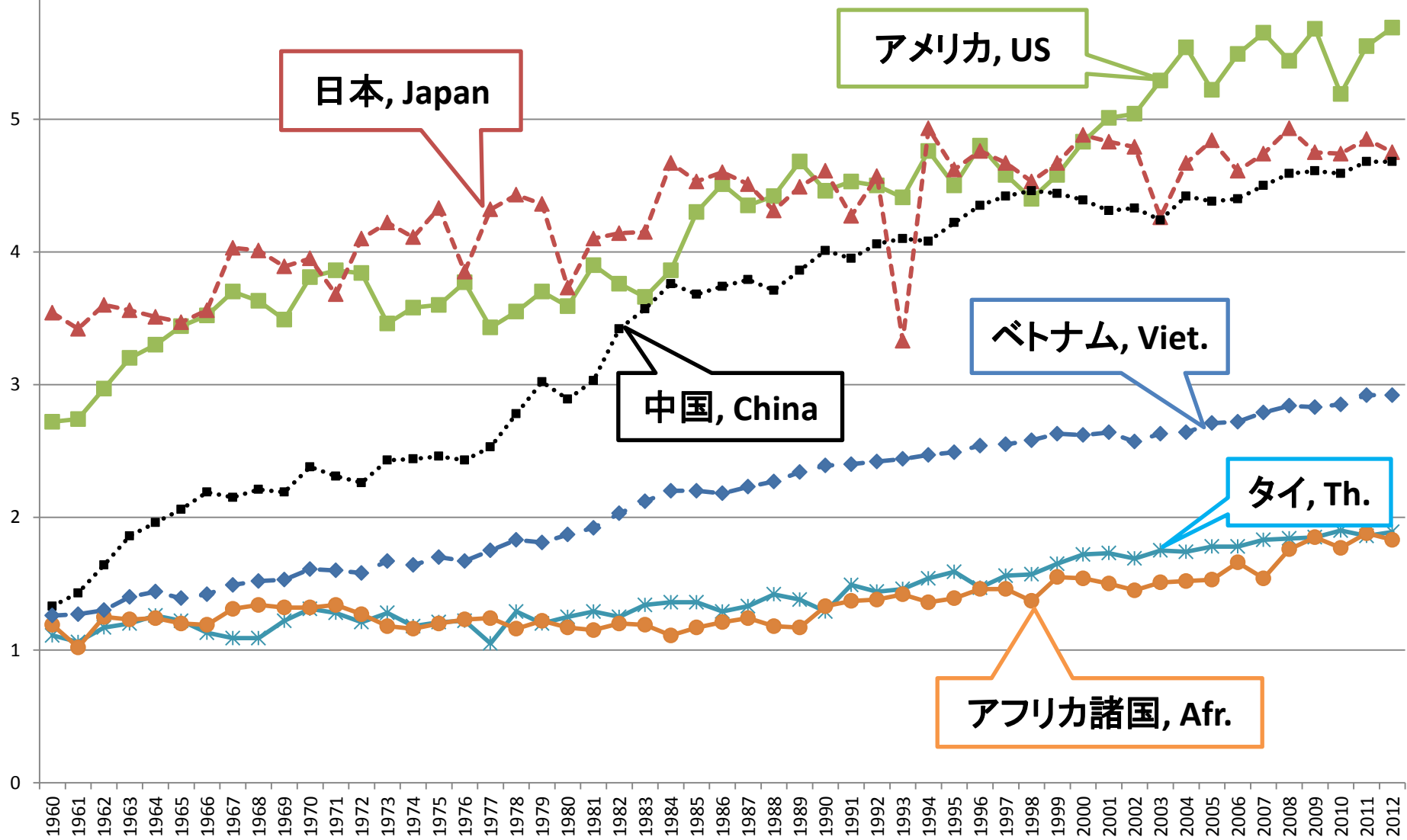
Source: S. Ito; World Food Statistics and Graphics (<http://worldfood.apionet.or.jp>), Kyushu University, Japan May 2012. (Original sources are from ERS/USDA; PSD Online, August 2007). Note: Rice is milled basis.

ソース: 伊東正一 「世界の食料統計」<http://worldfood.apionet.or.jp/graph/index.html>, May 2012

Yields for rice in Japan, US, China, Vietnam, Thailand and Africa, MT/ha (1960-2012)

(MT/ha)

(トン/ha)

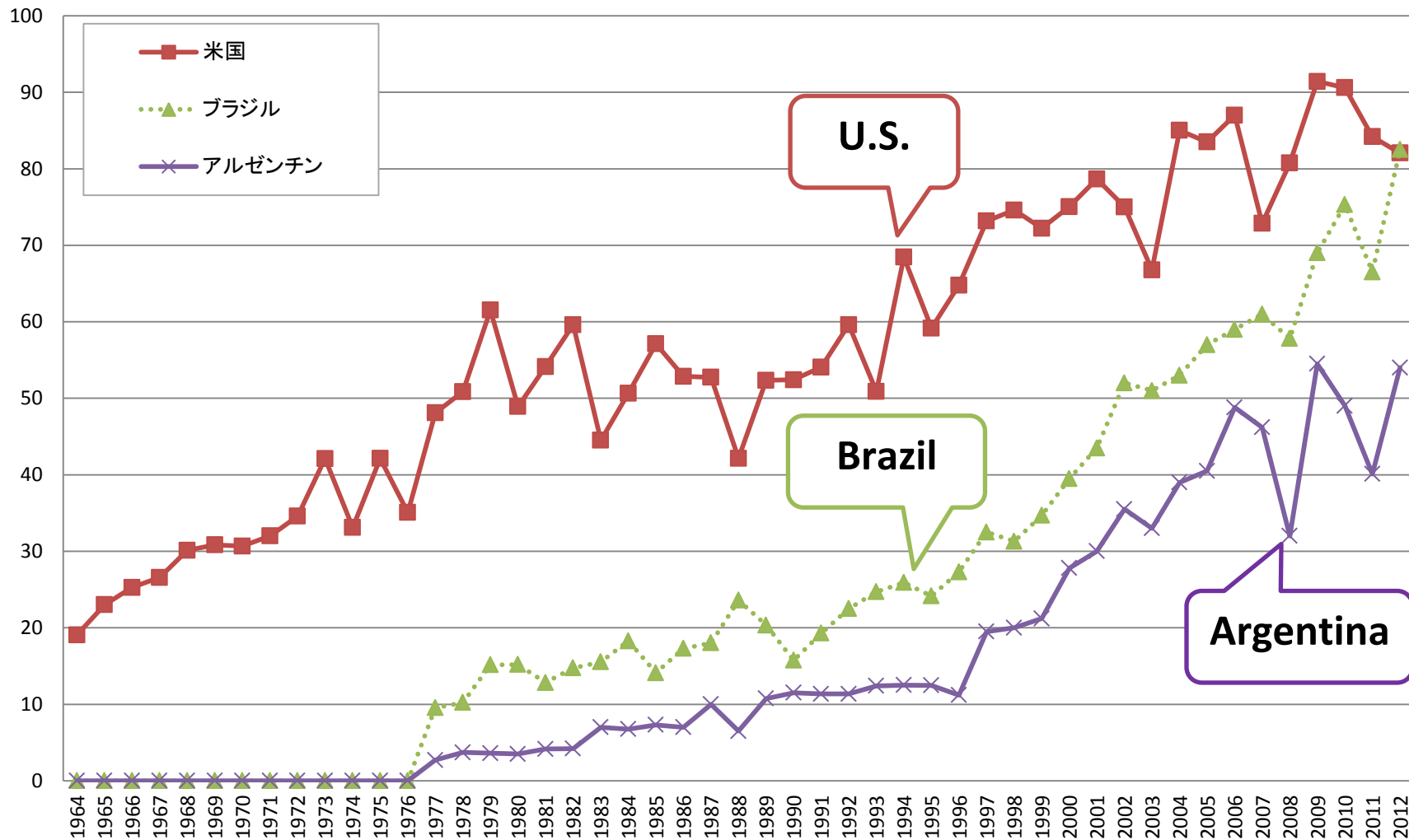


ソース: 伊東正一「一緒に世界をみませんか・・・」 <http://worldfood.apionet.or.jp/>, May 2012.

Fig. 1. Production of soybeans in the US, Brazil and Argentina, 1964 - '12

図1. 米国、ブラジル、アルゼンチンにおけるダイズ生産量の推移

Million MT

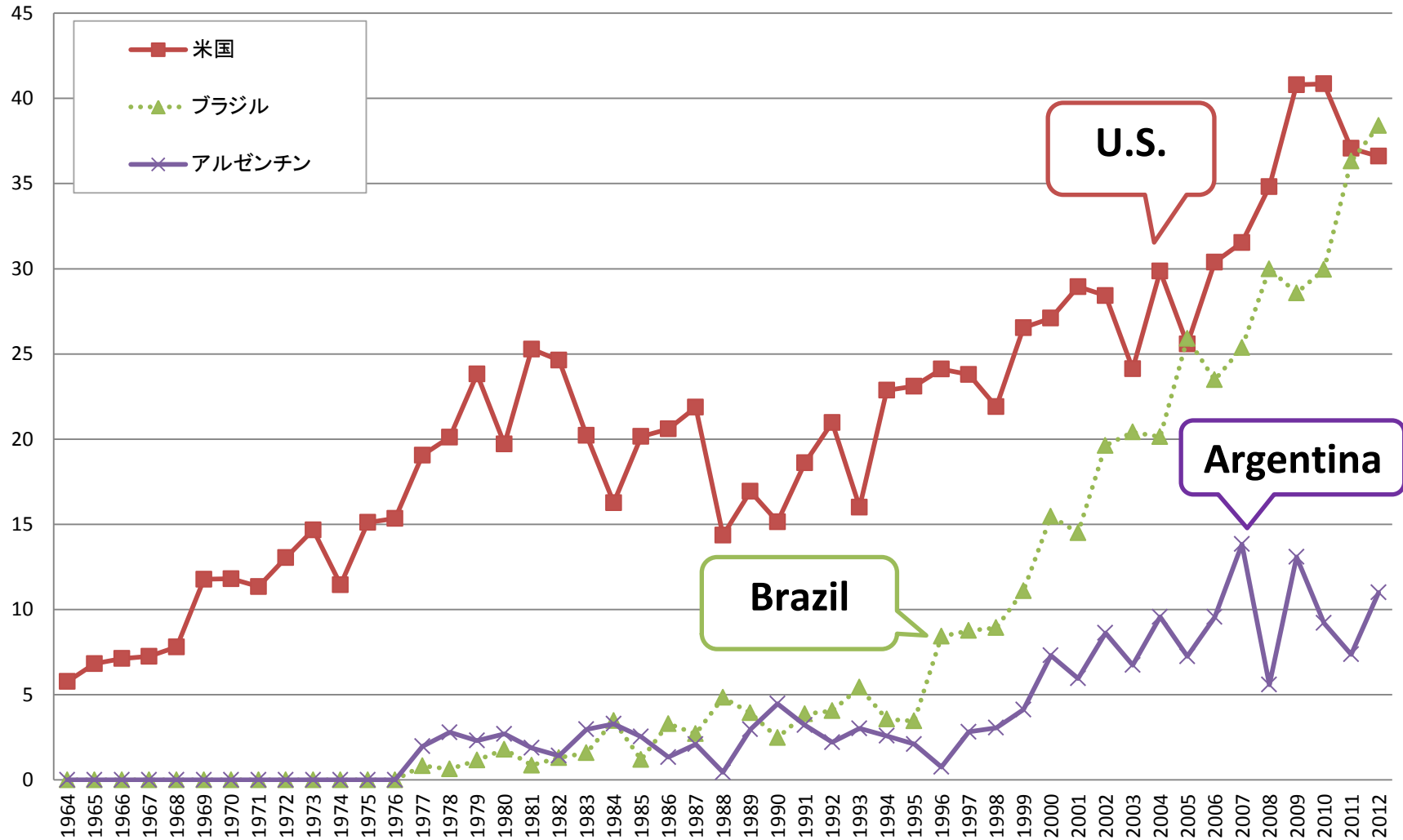


Source: Ito (2013): World Food Statistics and Graphics (<http://worldfood.apionet.or.jp/>), Feb. 2013

Fig. 2. Exports of soybeans in the US, Brazil and Argentina, 1964 - '12

図2. 米国、ブラジル、アルゼンチンにおけるダイズ輸出量の推移

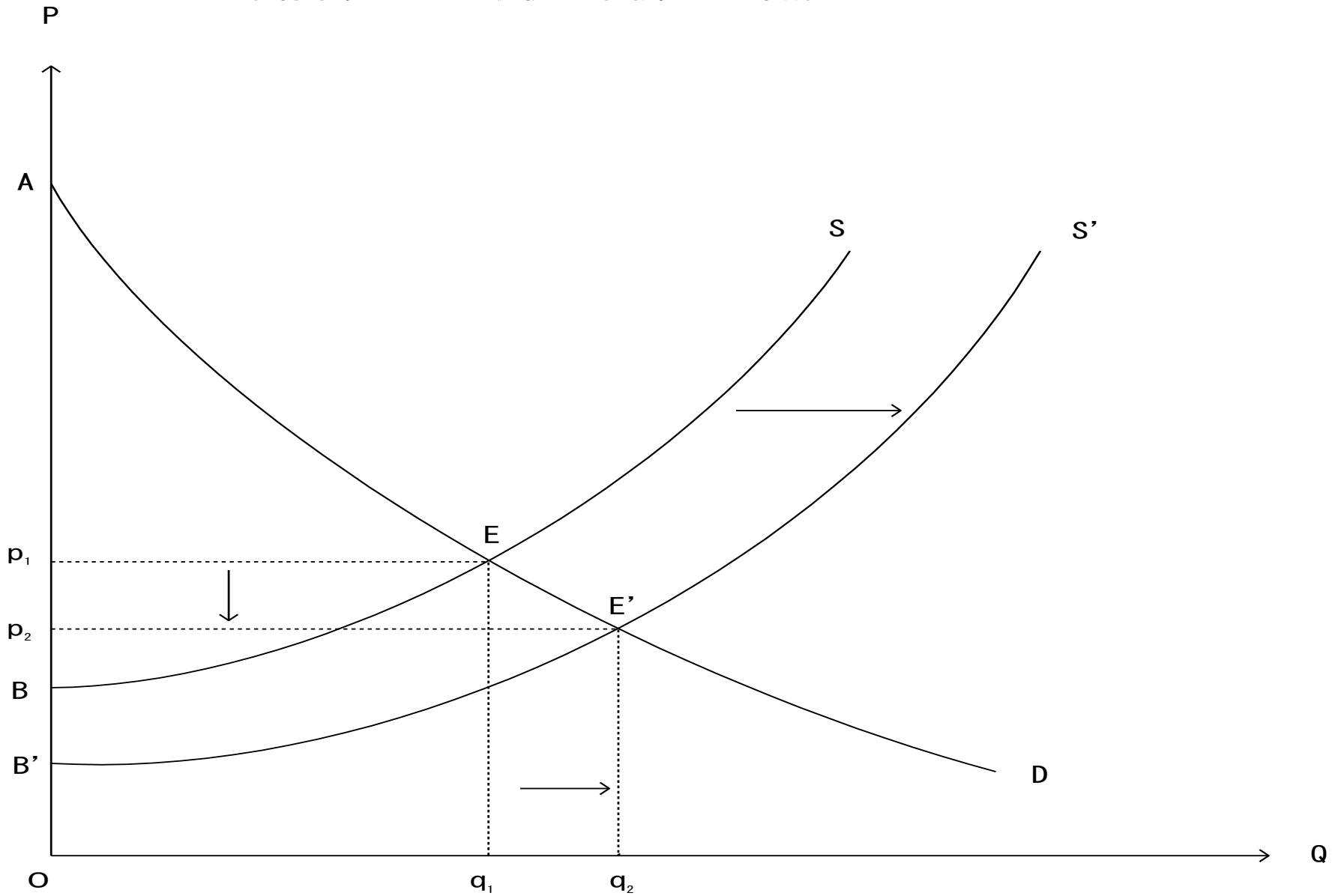
Million MT



Source: Ito (2013): World Food Statistics and Graphics (<http://worldfood.apionet.or.jp/>), Feb. 2013

Fig. 3 Impacts of shift in supply curve.

図3. 国際市場における生産拡大と価格変化との関係



Case Study of Brazil: Serrado

Seemingly Unrelated Regression

$$P_{it} = f(Qs_{it}, PO_t, X_{it}, \dots) \dots\dots\dots (8)$$

Where,

P_i = World prices for the i-th commodity, \$/ton, deflated by CPI to make them real prices; 農産物(i)の国際価格(シカゴ相場の実質価格、ドル/トン),

Qs_i = World total production of the i-th commodity, 1000 tons; 農産物(i)における世界の総生産量、1000トン,

PO = Crude oil prices (WTI), \$/barrel, also deflated by CPI for real prices; 原油価格(WTI, 実質価格)、1バレルあたりドル、

X_i = Other variables; その他の変数、

i = 1,2,...n, commodities; 農産物の品目(ダイズ、トウモロコシなど)、

t = 1980-2010, annual time series data; 1980年から2010年までの年次データ。

Table 1. Estimated coefficients for prices w.r.t. changes in supply of crops in the world using the SUR analysis.

	Soybeans	Corn	Wheat	Cotton	Soybean meal
Constant	14.4 (13.6)	18.8 (7.96)	31.2 (8.84)	20.7 (4.85)	12.1 (9.20)
Production	-0.715 (-8.04)	-1.03 (-5.78)	-1.94 (-7.29)	-1.15 (-3.07)	-0.550 (-4.85)
Oil price	0.060 (3.81)	0.0555 (2.93)	0.0434 (2.95)	-- --	0.0445 (2.80)
Dummy	-- --	0.365 (2.21)	0.419 (2.68)	-- --	-- --
R ²	0.61	0.51	0.58	0.25	0.35
No. of Obs.	31	31	31	24	24

Note1: The dependent variables are commodity prices. Numbers in parentheses are t-values.

Note2: Oil prices are used for the period from 2006-2010 to reflect the use of grains and soybeans for energy. Dummy variables are for the year 2008 when the global food prices surged.

Data sources: IMF (2011): <http://www.imf.org/external/np/res/commod/index.aspx>, Ito (2011): <http://worldfood.apionet.or.jp/>, Indexmundi (2011): <http://www.indexmundi.com/>.

Table 2. Estimated coefficients for prices w.r.t. changes in supply of meats in the world using the SUR analysis.

	Beef	Pork	Broiler
Constant	46.6 (10.53)	34.5 (17.9)	11.0 (18.0)
Production	-3.55 (-8.70)	-2.38 (-13.9)	-0.329 (-5.80)
Oil price	0.0475 (3.10)	0.0347 (2.16)	-- --
R²	0.71	0.88	0.56
No. of Obs.	31	31	21

Note1: The dependent variables are commodity prices. Numbers in parentheses are t-values.

Note2: Oil prices are used for the period from 2006-2010 to reflect the impacts from grains and soybeans being used for energy.

Data sources: IMF (2011): <http://www.imf.org/external/np/res/commod/index.aspx>, Ito (2011): <http://worldfood.apionet.or.jp/>, USDA(2011): <http://www.ers.usda.gov/Data/MeatPriceSpreads>.

Table 3. Estimated coefficients for prices w.r.t. changes in supply of coffee beans in the world using the SUR analysis.

	Coffee
Constant	47.3 (8.73)
Production	-3.38 (-7.22)
Oil price	0.100 (3.78)
R²	0.61
No. of Obs.	30

Note1: The dependent variables are commodity prices. Numbers in parentheses are t-values.

Production data are one year lag in regression.

Note2: Oil prices are used for the period from 2006-2010 to reflect the impacts from grains and soybeans being used for energy.

Data sources: IMF (2011): <http://www.imf.org/external/np/res/commod/index.aspx>, Ito (2011): <http://worldfood.apionet.or.jp/>.

Table 3.2.4. Share of ag. production in Brazil and Serrado, 2009

	Shares of Serrado in Brazil /1	Global production /2 1,000 MT	Production in Brazil /2 1,000 MT	Shares of Brazil	Shares of Serrado to the world
Soybeans	66%	260,854	69,000	26%	17%
Sybn Meal/3	66%	165,249	26,120	16%	10%
Corn	53%	819,607	56,100	7%	4%
Wheat	5%	684,306	5,026	1%	0%
Cotton	98%	101,337	5,450	5%	5%
Beef /4	56%	57,148	8,935	16%	9%
Pork /4	56%	100,405	3,130	3%	2%
Broiler /4	56%	74,308	11,023	15%	8%
Coffee Beens	62%	133,623	53,300	40%	25%

Data sources: /1: IGBE in Brazil.

/2: from USDA: [PSD Online](#) for 2009.

/3: Same rate as the soybeans.

/4: Weighted average between soybean meal and corn for meats due to feeding.

Table 3.2.5. Economic impacts of agricultural development in Serrado, Brazil and benefits to Japan

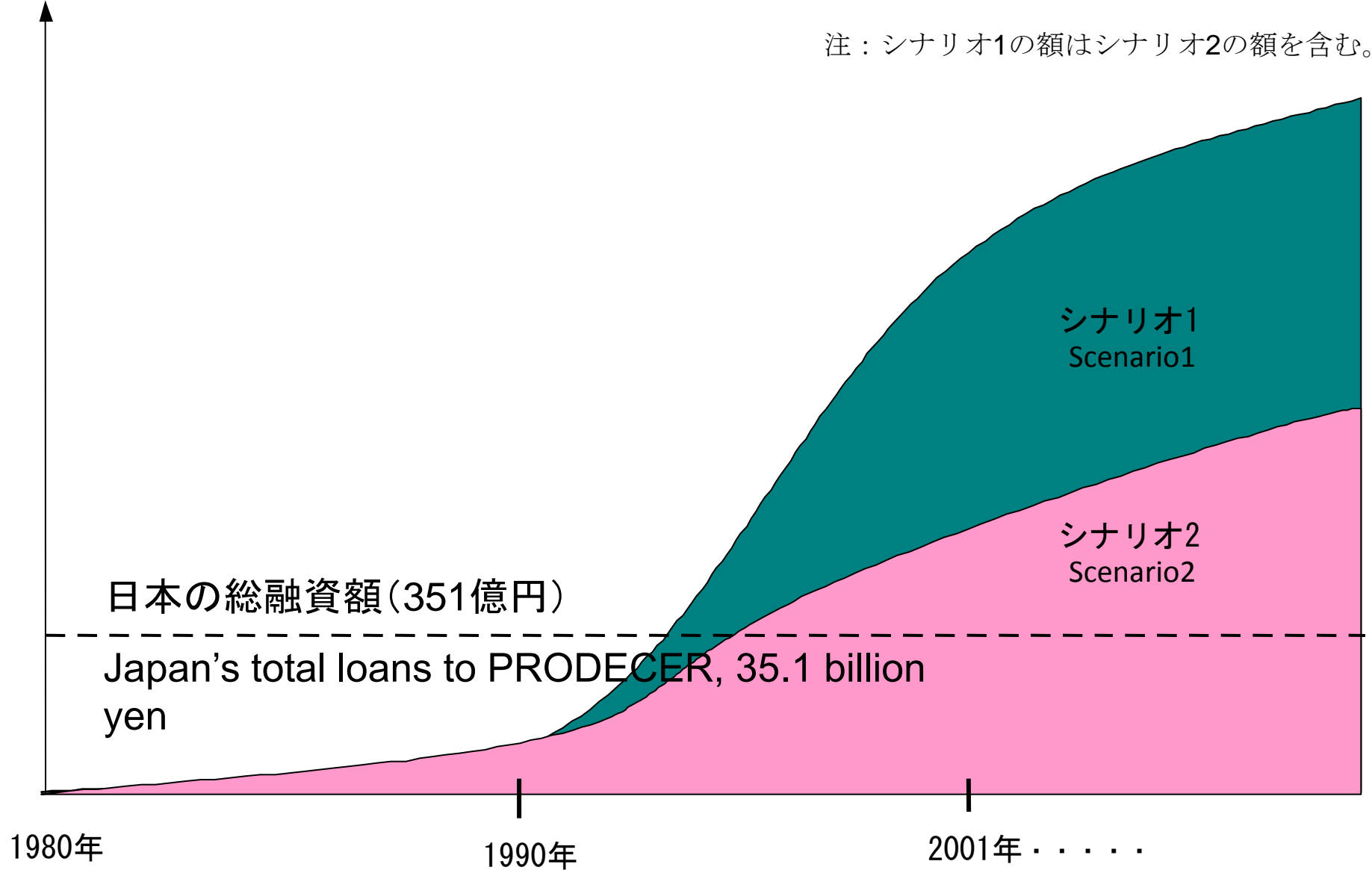
	Soybn.	Corn	Wheat	Cotton	SybnMeal	Beef	Pork	Broiler	CoffeeBn.
Estimated elasticities	-0.715	-1.03	-1.94	-1.15	-0.55	-3.55	-2.38	-0.329	-3.38
Shares of products in Serrado	17%	4%	0%	5%	10%	9%	2%	8%	25%
Global prices in 2009, \$/MT	385	167	227	1408	366	2684	1251	1921	3177
Increases in global prices if no production in Serrado, %	12%	4%	0%	6%	6%	31%	4%	3%	83%
Increases in global prices if no production in Serrado, \$/MT	47.72	6.28	0.18	85.48	20.85	840.02	52.34	52.87	2,648.41
Imports to Japan, 1,000MT	3,401	15,979	5,502	304	2,106	697	1,138	645	390
Gains to Japan from ag. development in Serrado, \$ Million	162.3	100.3	1.0	26.0	43.9	585.5	59.6	34.1	1032.9
Ditto, in Japanese yen, billion yen, 80 yen/USD	13.0	8.0	0.1	2.1	3.5	46.8	4.8	2.7	82.6

Fig. 4. Japan's accumulated merits from ag. Development ODA in Brazil

図 4. ブラジル農業開発支援による日本への累積メリット

Accumulated benefits

注：シナリオ1の額はシナリオ2の額を含む。



日本の総融資額(351億円)

Japan's total loans to PRODECER, 35.1 billion yen

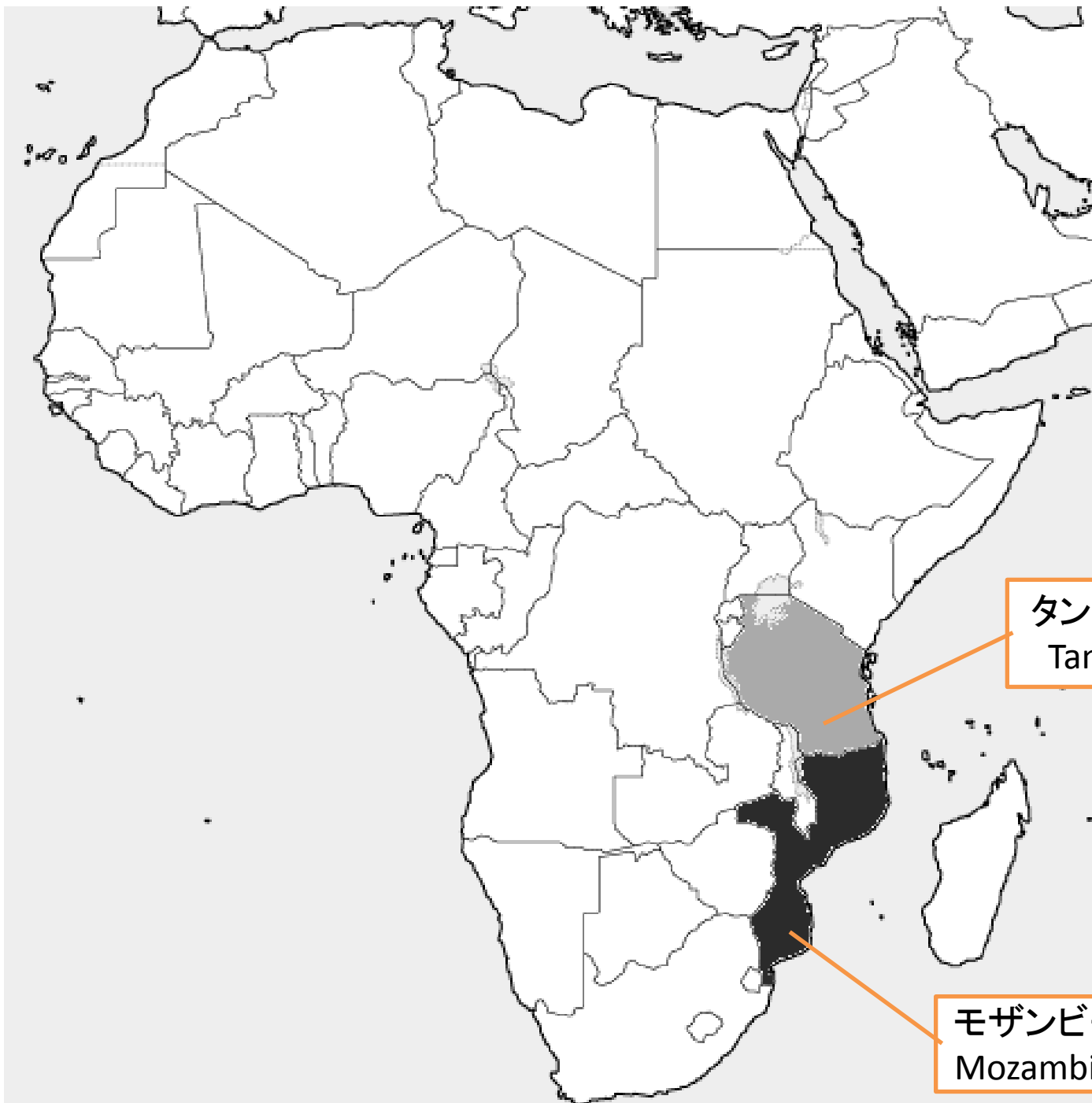
シナリオ1
Scenario1

シナリオ2
Scenario2

1980年

1990年

2001年



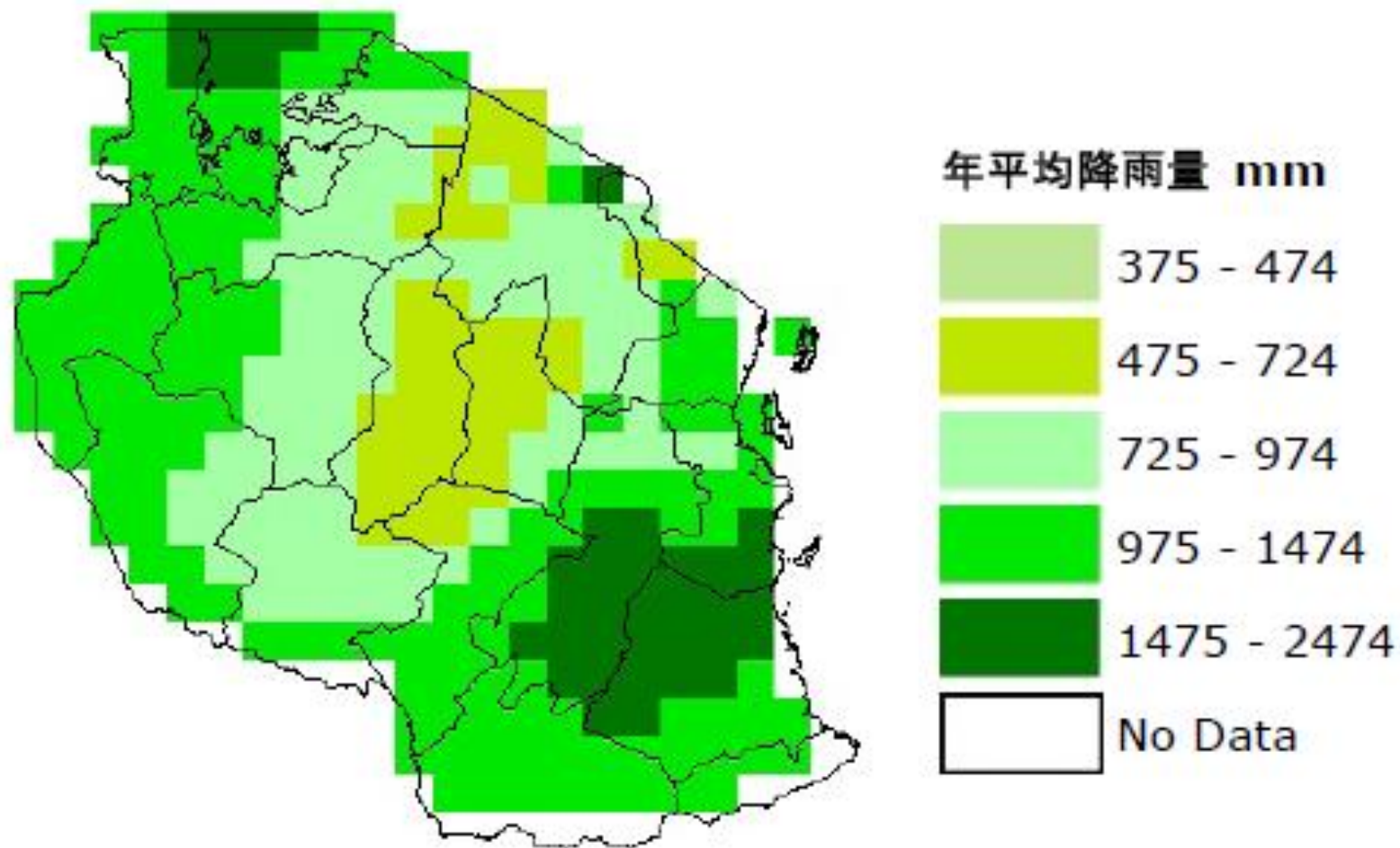
タンザニア
Tanzania

モザンビーク
Mozambique

表4.2.1 タンザニアにおける農業資源の統計

Land resources in Tanzania million ha

LAND RESOURCE	百万ha
国土面積(Total land)	95.5
農業用適地(Arable land)	44.0
放牧・牧草可能地(Rangeland)	50.0
放牧地(Land under livestock)	24.0
ツエツエバエ対処地(Tsetse invested area)	26.0
耕作地(Cultivated land)	10.1
水利可能地(Area suitable for irrigation)	29.4
- 高い可能地(high potential)	2.3
- 中位可能地(medium potential)	4.8
- 低い可能地(low potential)	22.3
Population (million)	42.8



出所：FAO ウェブサイト

図 3-1 タンザニア年平均降雨量

Mean Annual Rainfall in Tanzania

モザンビークの農業潜在性

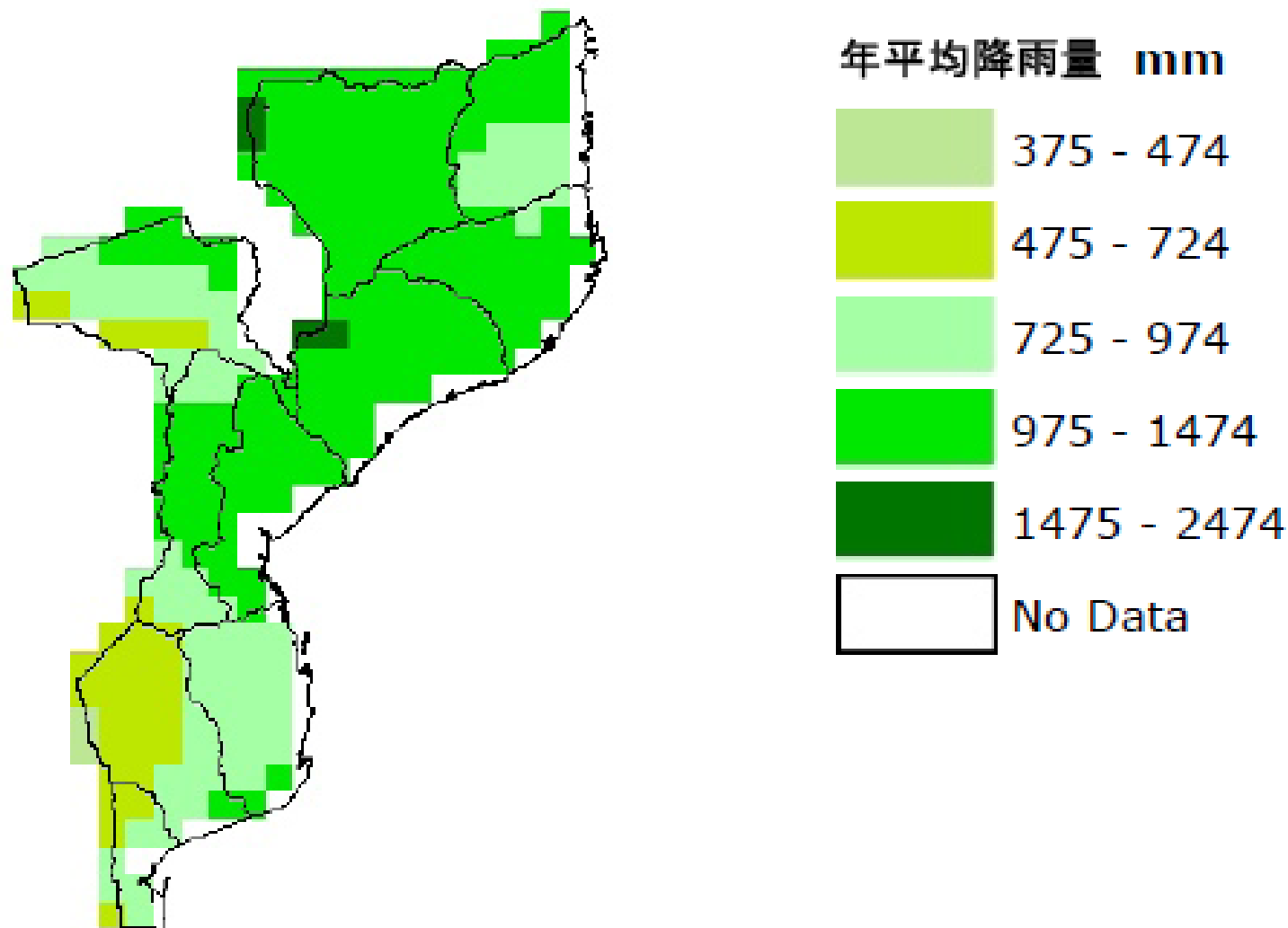
Potential for agricultural production in Mozambique

国土面積 Total land (mill. ha) 80 (百万ha)

可耕地 Potential arable area (mill. ha) 40 (百万ha)

耕作地 Area under agriculture (mill. ha) 3 (百万ha)

人口 Population, mill. 20 (百万人)

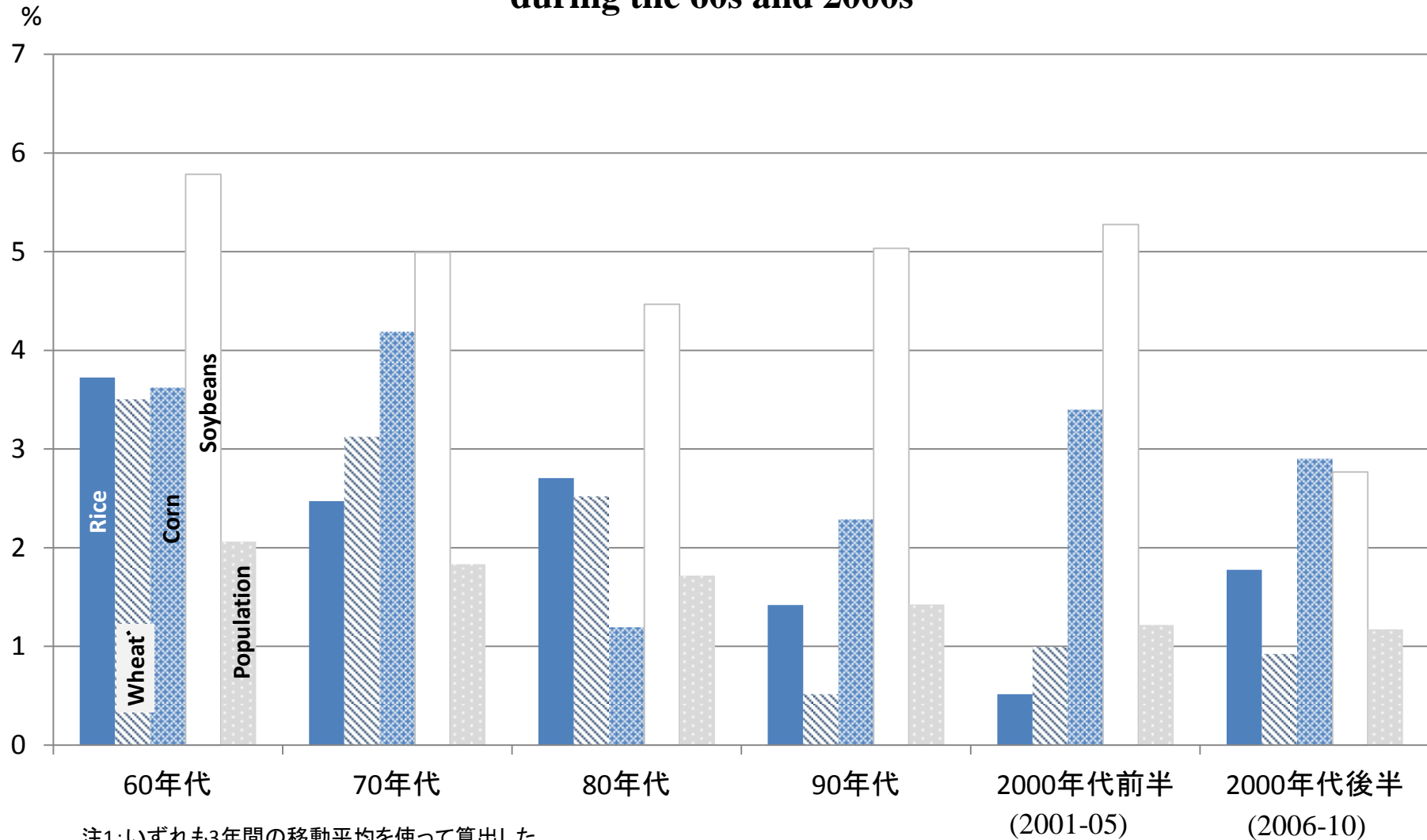


出所：FAO ウェブサイト

図 4-3 モザンビーク年平均降雨量

Mean Annual Rainfall in Mozambique

Fig. 1-2 Annual growth rates in rice, wheat, corn and soybeans production during the 60s and 2000s



注1: いずれも3年間の移動平均を使って算出した。

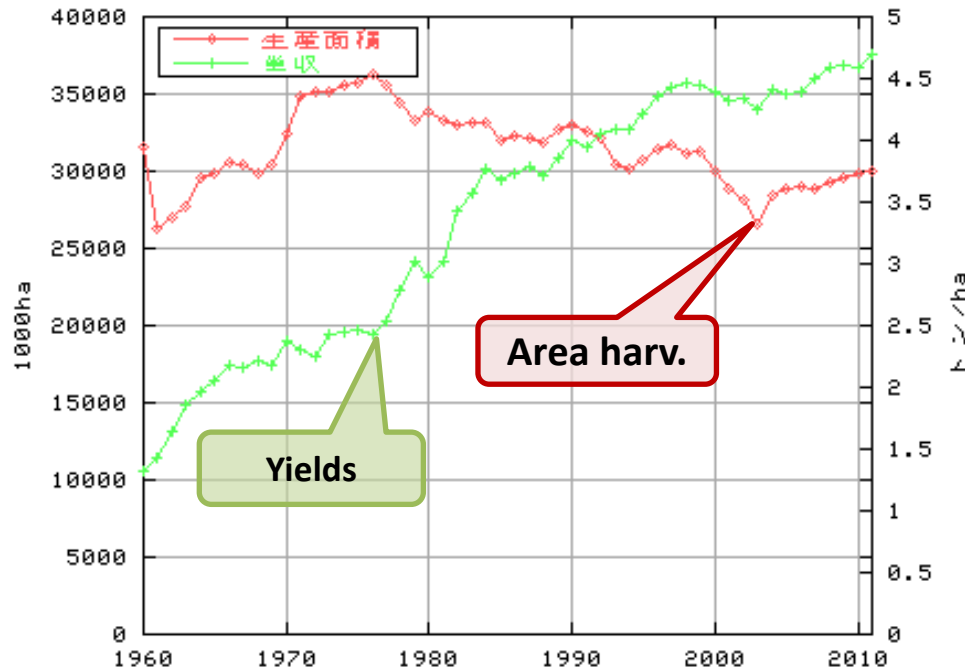
ただし、2000年代の最後の5年間におけるは2010年のデータは2010年の生産量予測をそのまま使用した。

注2: データはUSDA(米国農務省)のPSD Online, November 2010のデータから引用した。

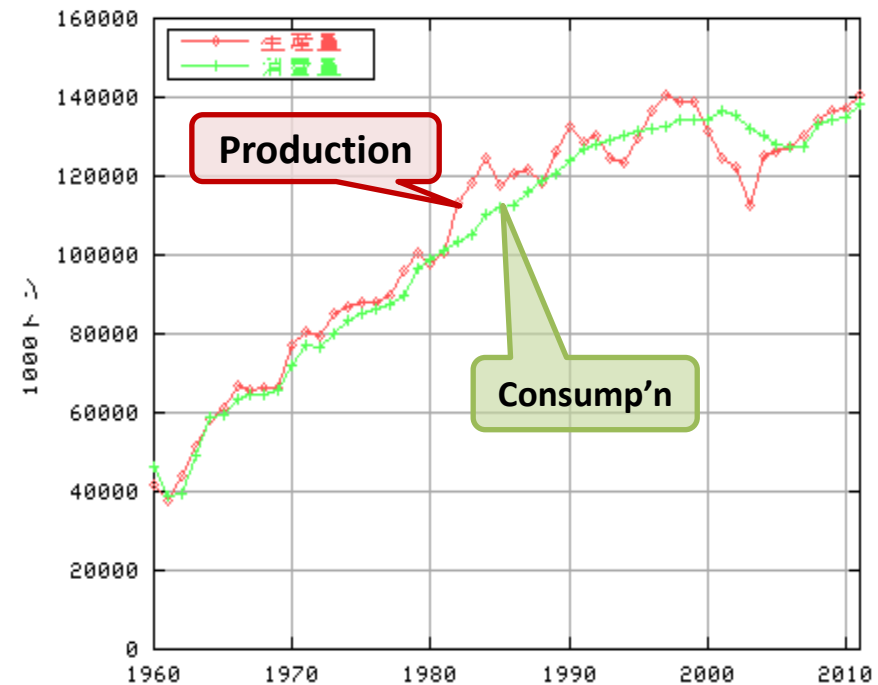
九州大学農学研究院農政学教室 (代表: 伊東正一)

Rice production and consumption in China

生産面積と単収（精米換算）



生産量と消費量（精米換算）

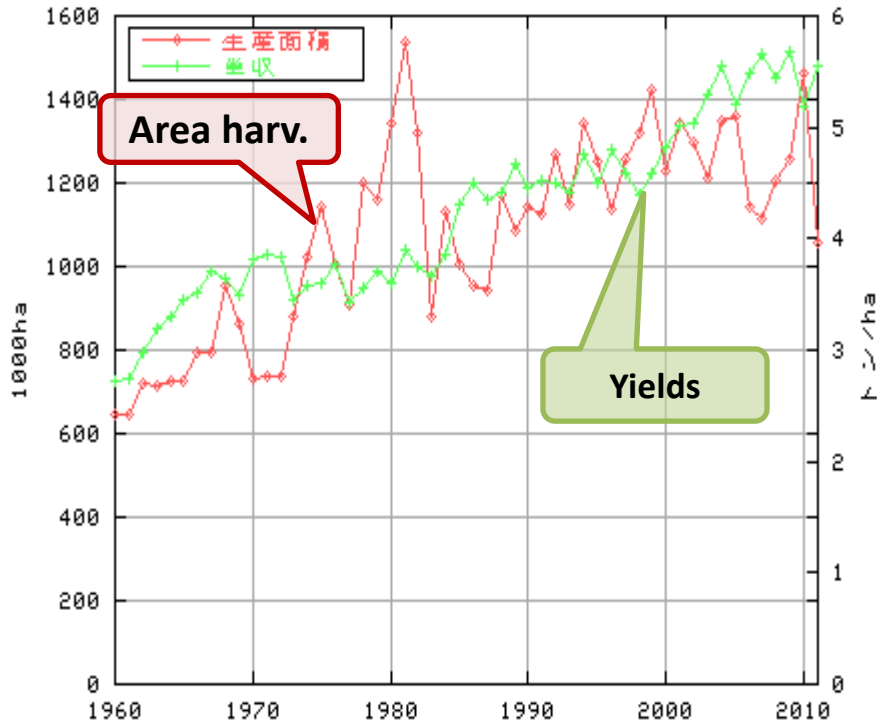


Area harv. increased by 1 million ha. from '06 to '11

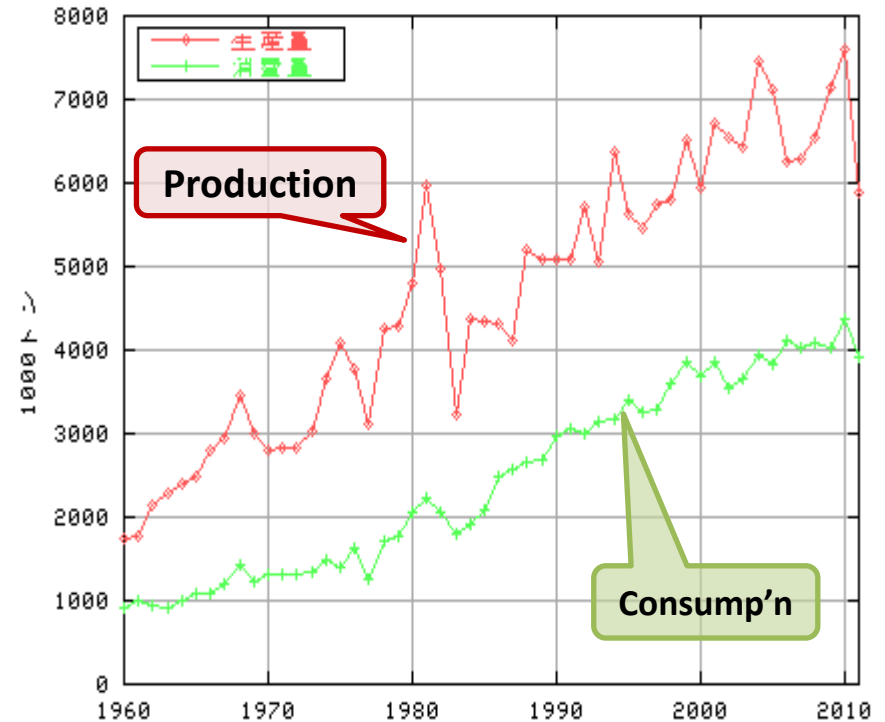
Sources: 伊東正一: 世界の食料統計、<http://worldfood.apionet.or.jp/graph/index.html>
 元データ: USDA: PS&D Online February 2012;
 USBC: International Data Base, July 2003.

Rice production and consumption in U.S.

生産面積と単収（精米換算）



生産量と消費量（精米換算）

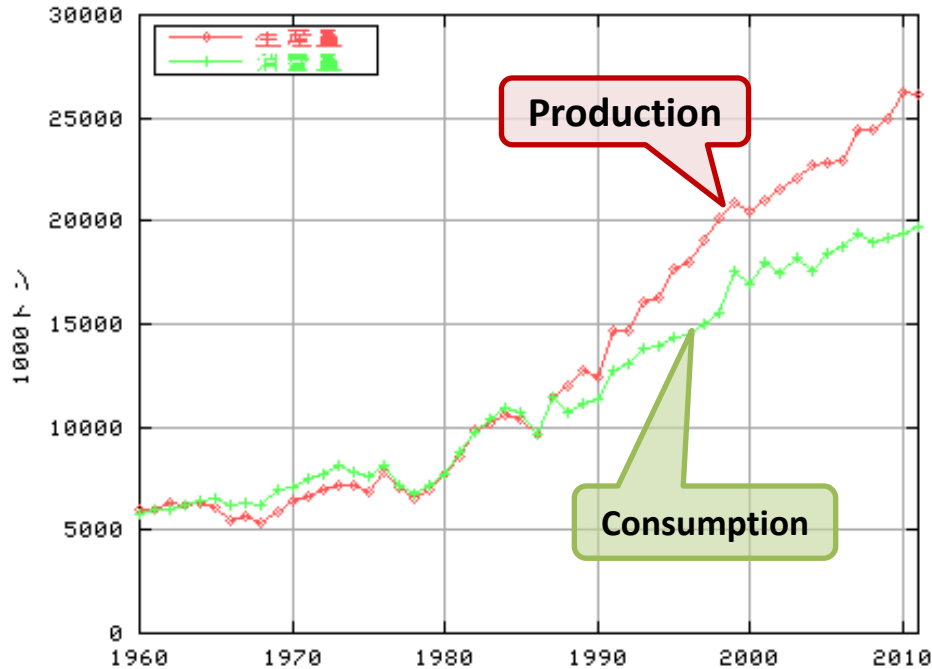


Area harv. was the largest in 1981.

Sources: 伊東正一: 世界の食料統計、<http://worldfood.apionet.or.jp/graph/index.html>
元データ: USDA: PS&D Online February 2012;
USBC: International Data Base, July 2003.

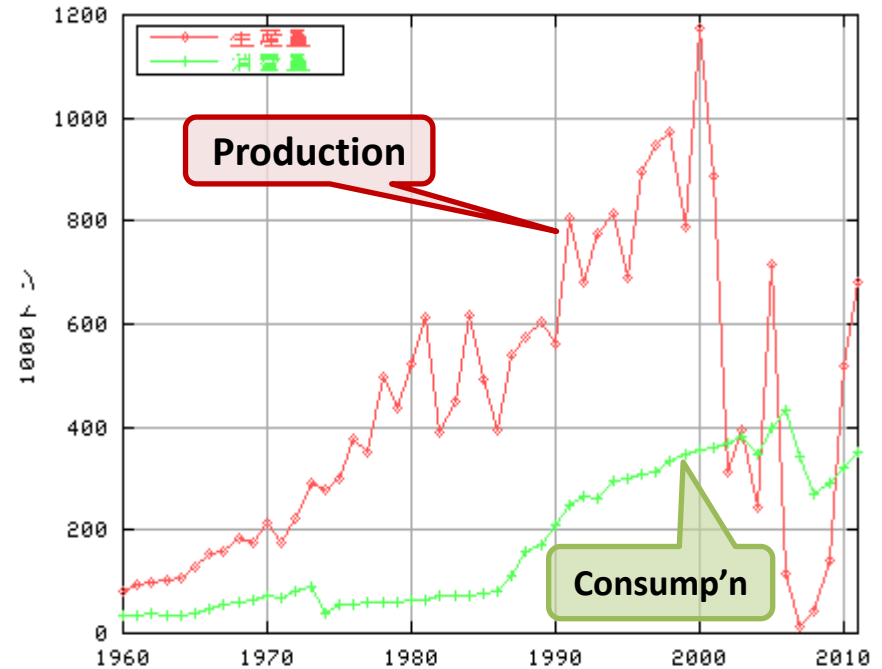
Rice production and consumption in: Vietnam

生産量と消費量（精米換算）



Australia

生産量と消費量（精米換算）



Sources: 伊東正一: 世界の食料統計、<http://worldfood.apionet.or.jp/graph/index.html>
 元データ: USDA: [PS&D Online](#) February 2012;
 USBC: [International Data Base](#), July 2003.

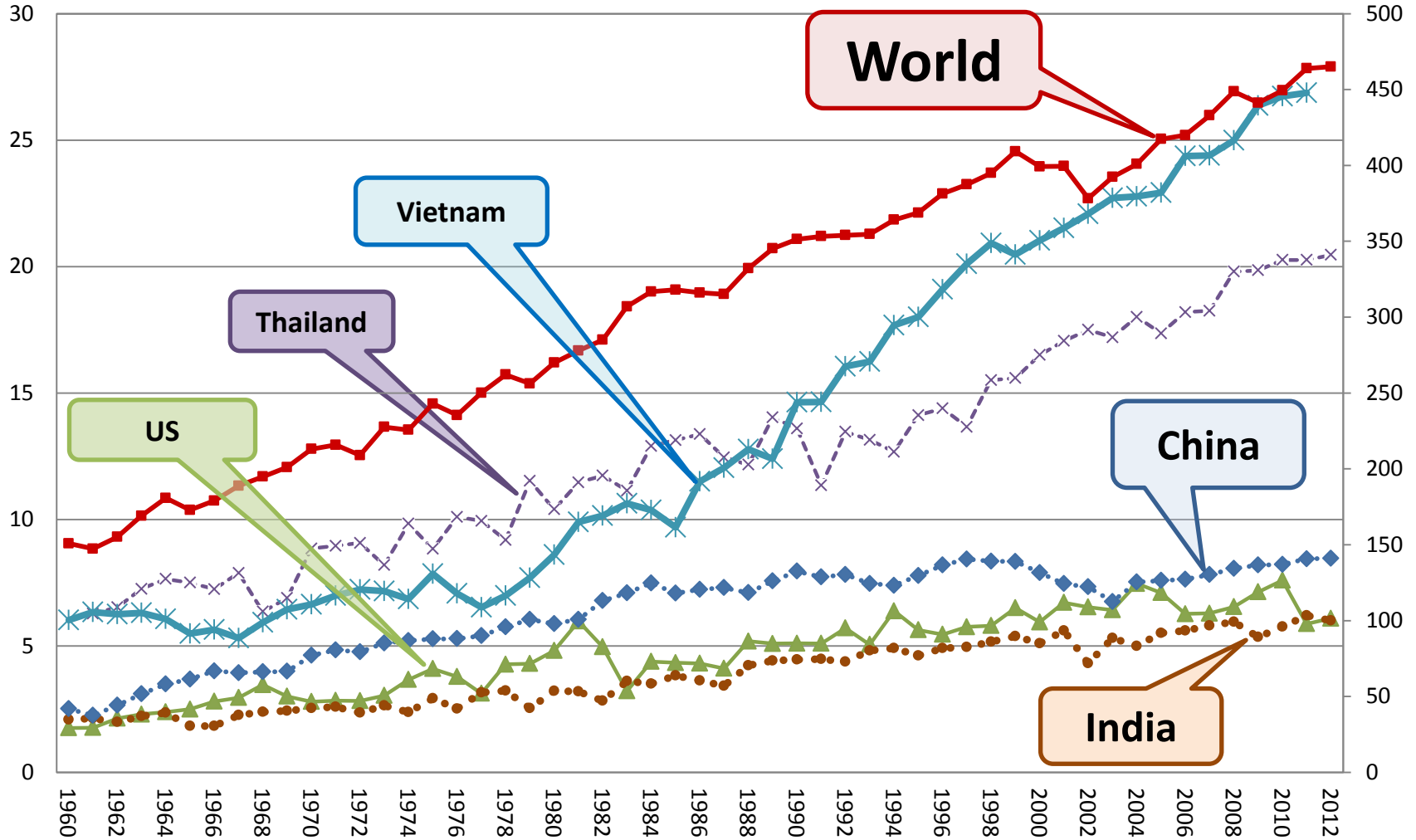
***Large potential to increase
rice production!!***

世界的コメ増産の潜在性は大！！

Fig. 8.3 Global rice production in the major countries
(Milled basis, 1960-2012)

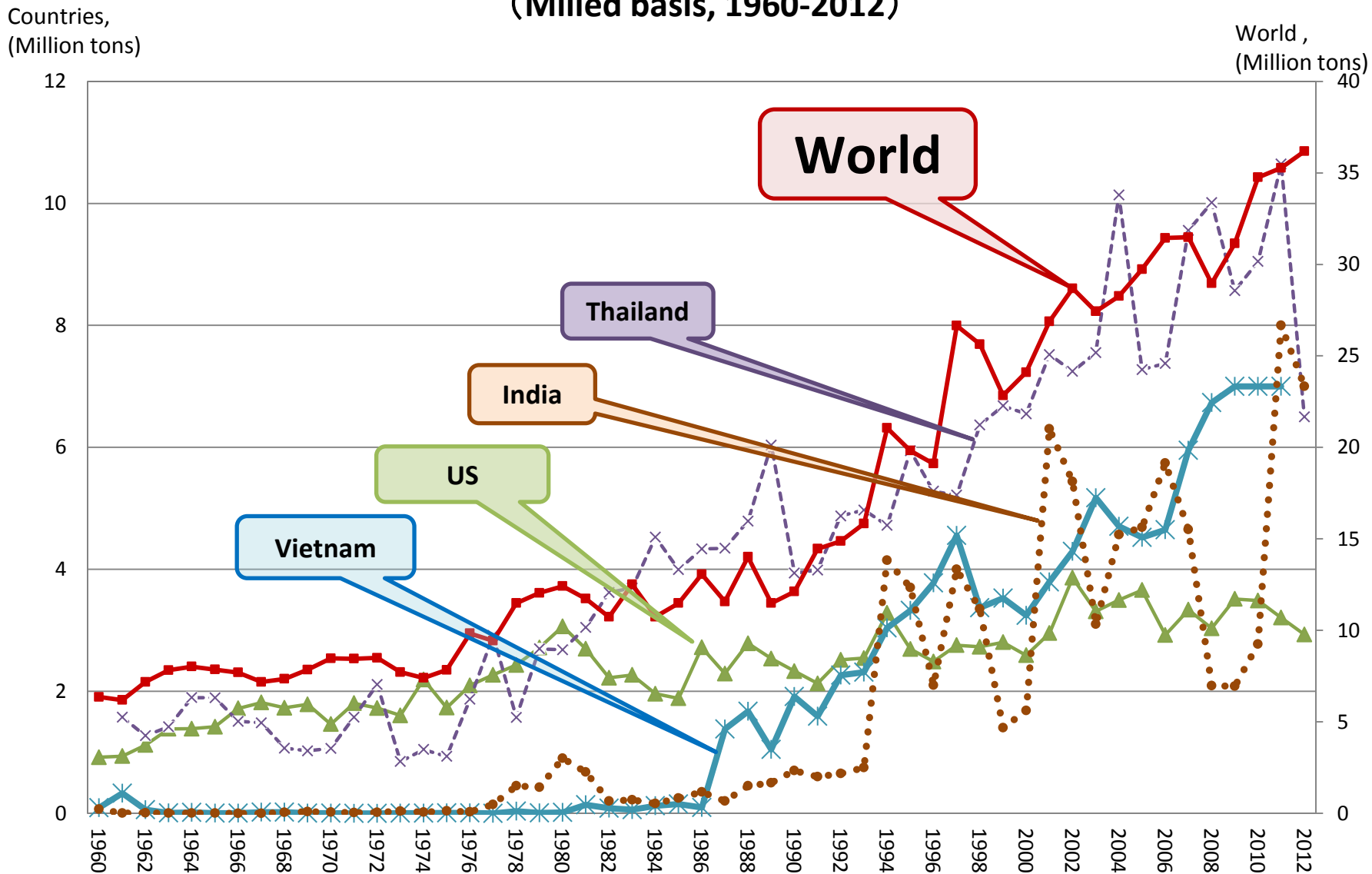
Vietnam, Thailand, US
 (Million tons)

World, China, India
 (Million tons)



ソース: 伊東正一「一緒に世界をみませんか・・・」 <http://worldfood.apionet.or.jp/> July 2012

Fig. 8.2 Global rice exports from the major countries
(Milled basis, 1960-2012)



ソース: 伊東正一「一緒に世界をみませんか・・・」 <http://worldfood.apionet.or.jp/> July 2012

1. Global Rice Supply, Demand, and Trade

Rice Production in the world and in the major producing countries

Rice consumption patterns in Asian countries and the rest of the world

Rice trade evolution in the world during the recent years

2. Global Grain Price Movement Mechanism, focusing on Rice

How has it been changed since 2007?

What are the key factors for the global rice price movement in the world?

What should we expect for the future?

3. Global Indica/Japonica Rice Price Movement

Historical price movements of Indica/Japonica rice prices

The big difference between the two in the contemporary global markets

The rice market prices in Japan

4. Rice Policies in the Major Rice Producing/Consuming Countries

For domestic production

For consumption

For exports and imports

5. Key Points of the Rice Production Development Policies in the Global Markets

Understanding the increases in demand for grains

Global potential for increases in rice production

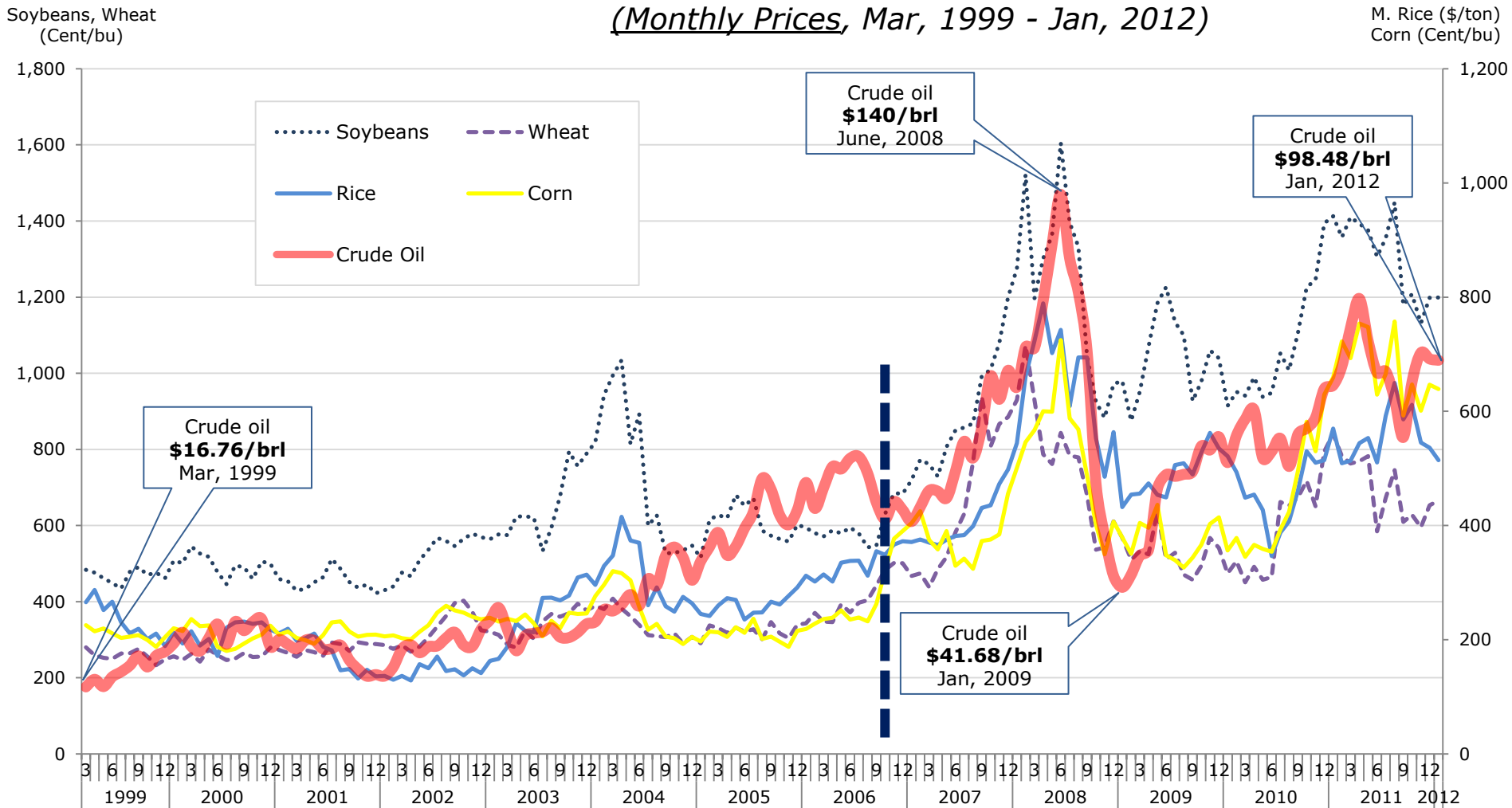
Great competition in rice production and exports

Importance of development of large scale farms and plantations

Importance of self-governance spirit for the **small scale farms**

Monthly Price Movements of Oil, Rice, Wheat, Corn and Soybeans in the U.S

(Monthly Prices, Mar, 1999 - Jan, 2012)



Rice prices are reported on original website in the rough rice basis in unit of US\$/cwt. Milled rice price data were calculated from equation: Original data multiplied by $1000/(45.36 \times 0.6)$ for 1 ton, which implies approximately equivalent to 4-percent-broken milled-rice package for U.S. No.1.

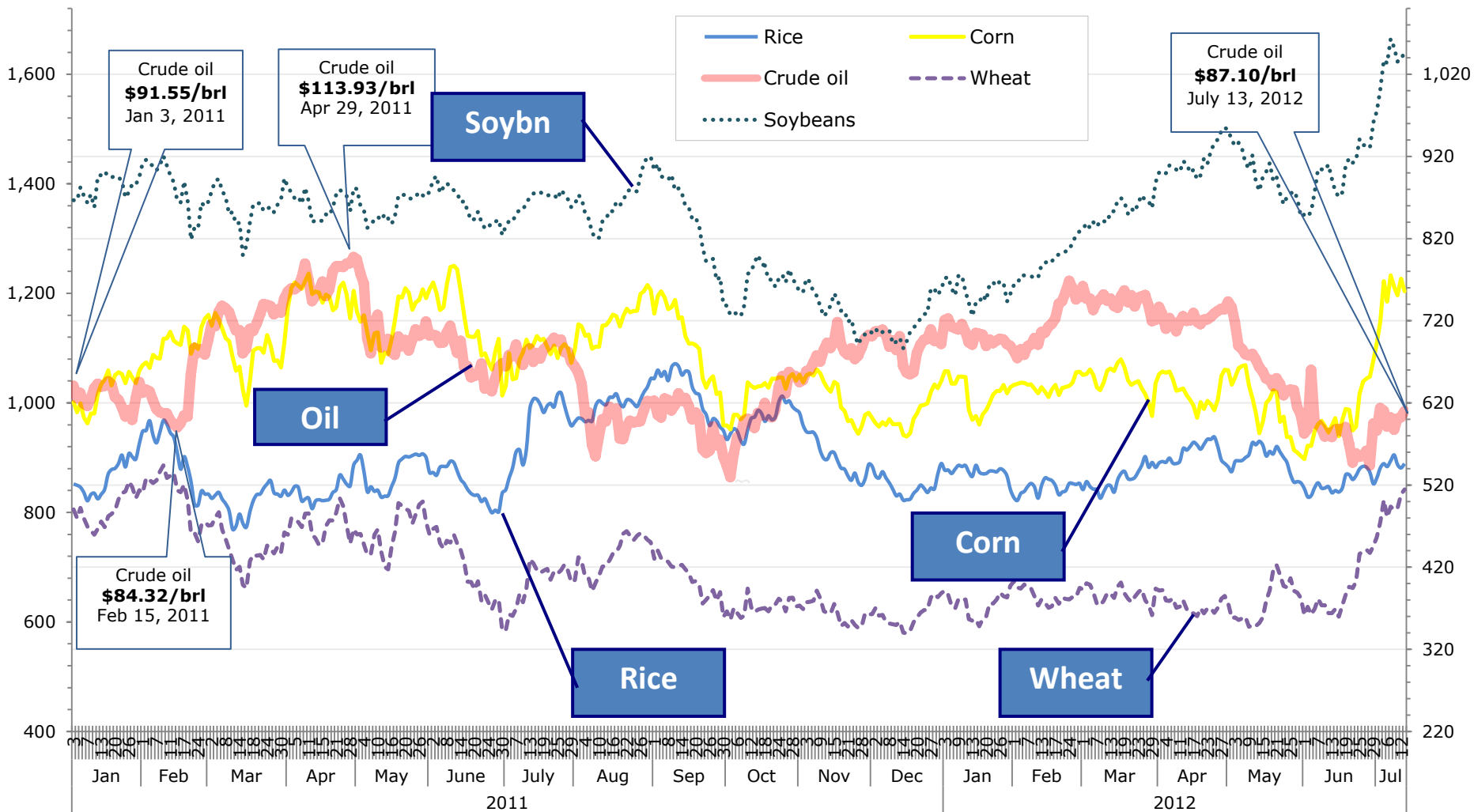
Source: GFT - Online Futures Trading, <http://futures.tradingcharts.com>

Daily Price Movements of Oil, Rice, Wheat, Corn and Soybeans in the U.S

(Daily Prices, Jan 3, 2011 - July 13, 2012)

Soybeans, Wheat
(Cent/bu)

M. Rice (\$/tone)
Corn (Cent/bu)



Rice prices are reported on original website in the rough rice basis in unit of US\$/cwt. Milled rice price data were calculated from equation: Original data multiplied by $1000/(45.36 \times 0.6)$ for 1 ton, which implies approximately equivalent to 4-percent-broken milled-rice package for U.S. No.1.

Source: GFT - Online Futures Trading, <http://futures.tradingcharts.com>; <http://finance.yahoo.com>

Estimates for price movements of crops

$$P_{it} = f(P_{oil,t}, X_{si,t})$$

where,

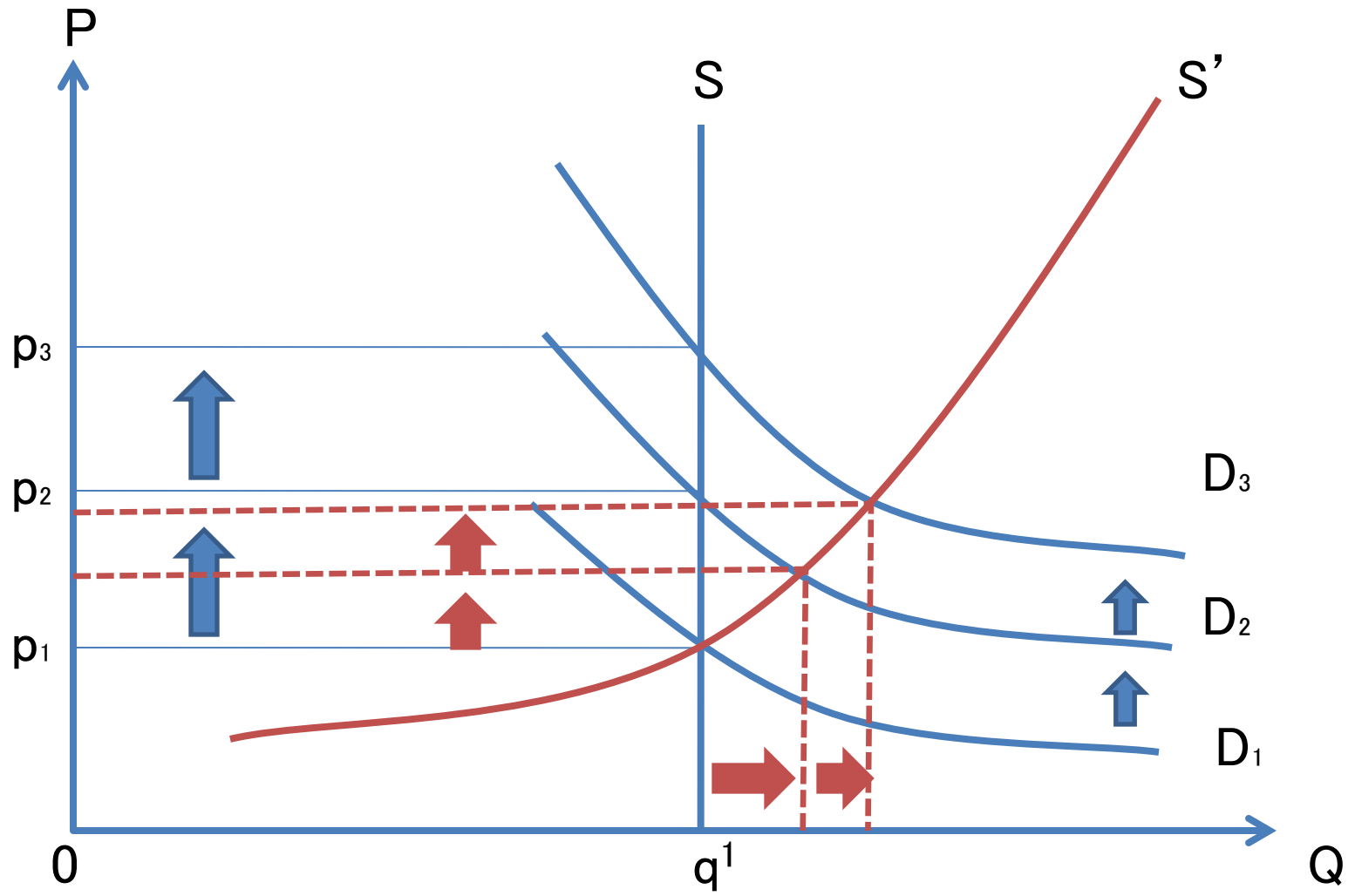
- P_i :** Daily prices of food commodities,
US\$/cwt for rice,
US\$/bu for corn, wheat and soybeans;
- P_{oil} :** Daily oil prices, US\$/barrel;
- X_{si} :** Other variables, such as dummy and
trend variables;
- i :** Food commodities; and
- t :** Period from July 2, 2007 to August 4,
2008.

Table 2. Results of the regression analysis of rice, corn, wheat and soybeans prices relative to oil prices (Daily data basis)

Variable	Rice	Corn	Wheat	Soybeans
POIL	0.180 (0.00)***	5.15 (0.08)***	4.41 (0.56)***	10.1 (0.18)***
RTDRICQ	-0.341 (0.06)***			
SDVXB	0.0340 (0.00)***			
DTHS	3.33 (0.31)***			
SDCRNQ		-0.700 (0.05)***		
DJAN1_415		67.7 (3.97)***		
RTDWHTQ			-26.3 (3.30)***	
SDJL07			-2.00 (0.25)***	
SDA_S07			0.440 (0.23)*	
SDJ_MR08			1.81 (0.12)***	
DEXRSTR			156 (28.67)***	
SDSBNSQ				1.99 (0.10)***
Intercept	-4.06	-20.5	490	122
R-squared	0.917	0.950	0.757	0.923
Adjusted R-squared	0.915	0.950	0.752	0.922
No. observations	276	276	276	276

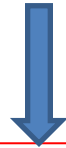
Source: Ito, et al. (2009)

Fig. 2-4 Mechanism of price hikes in speculation

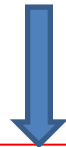


**Nowadays, *grains* are “substitutes”
for *crude oil***

Grains (Soybn.)

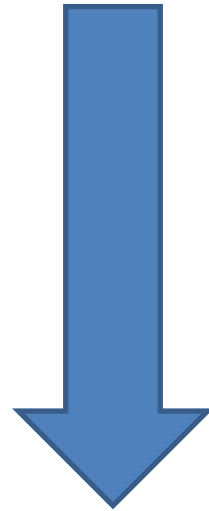


Ethanol, Diesel



Grains: Ethanol, Diesel
Crude Oil: Gasoline, Diesel

**Therefore,
If Crude Oil Prices Drop, then**



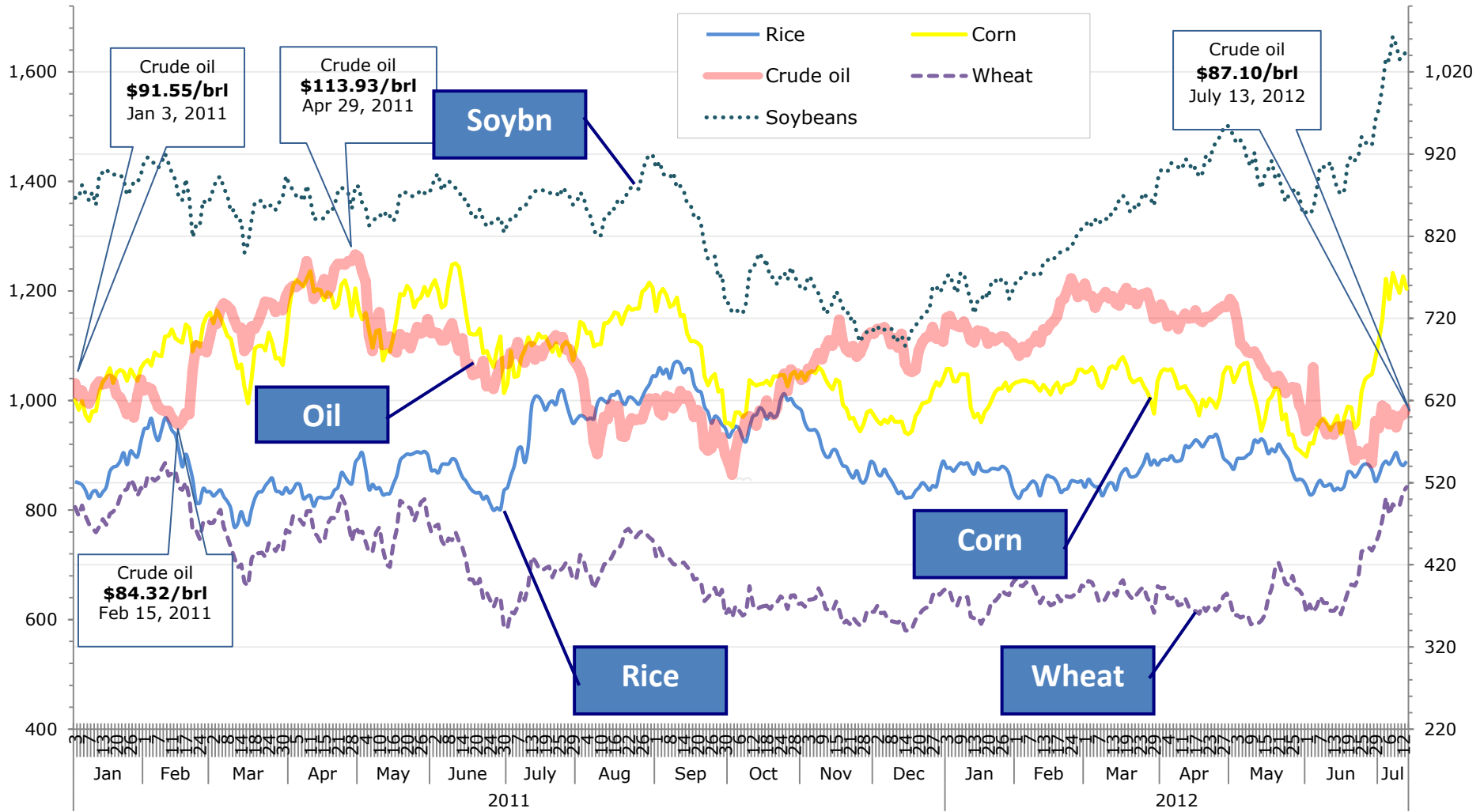
**Grain Prices Drop!!
(Corn, Soybeans, Wheat, Rice)**

Daily Price Movements of Oil, Rice, Wheat, Corn and Soybeans in the U.S

(Daily Prices, Jan 3, 2011 - July 13, 2012)

Soybeans, Wheat
(Cent/bu)

M. Rice (\$/tone)
Corn (Cent/bu)



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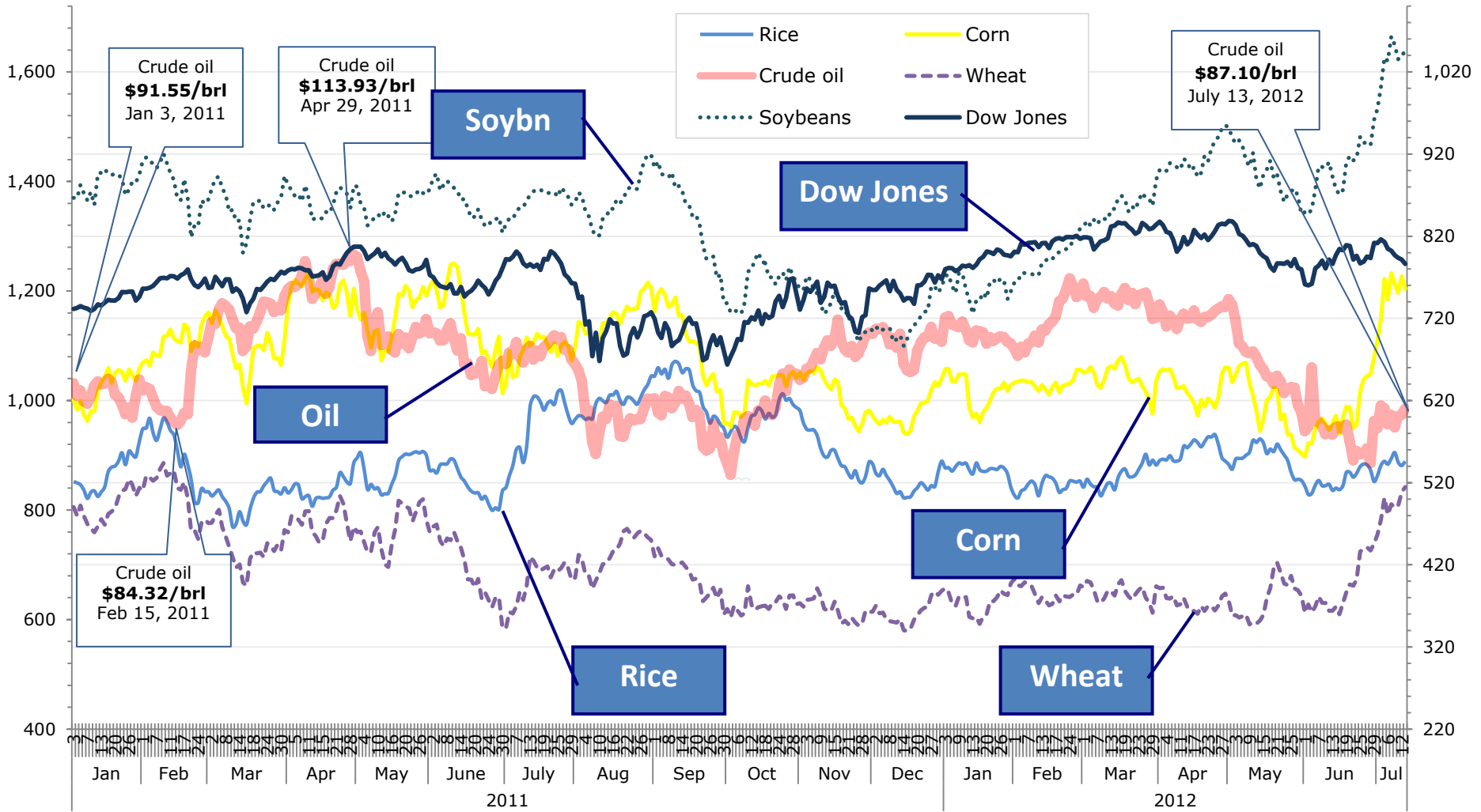
Source: GFT - Online Futures Trading, <http://futures.tradingcharts.com>; <http://finance.yahoo.com>

Daily Price Movements of Oil, Rice, Wheat, Corn and Soybeans in the U.S

(Daily Prices, Jan 3, 2011 - July 13, 2012)

Soybeans, Wheat
(Cent/bu)

M. Rice (\$/tone)
Corn (Cent/bu)



Rice prices are reported on original website in the rough rice basis in unit of US\$/cwt. Milled rice price data were calculated from equation: Original data multiplied by $1000/(45.36 \times 0.6)$ for 1 ton, which implies approximately equivalent to 4-percent-broken milled-rice package for U.S. No.1.

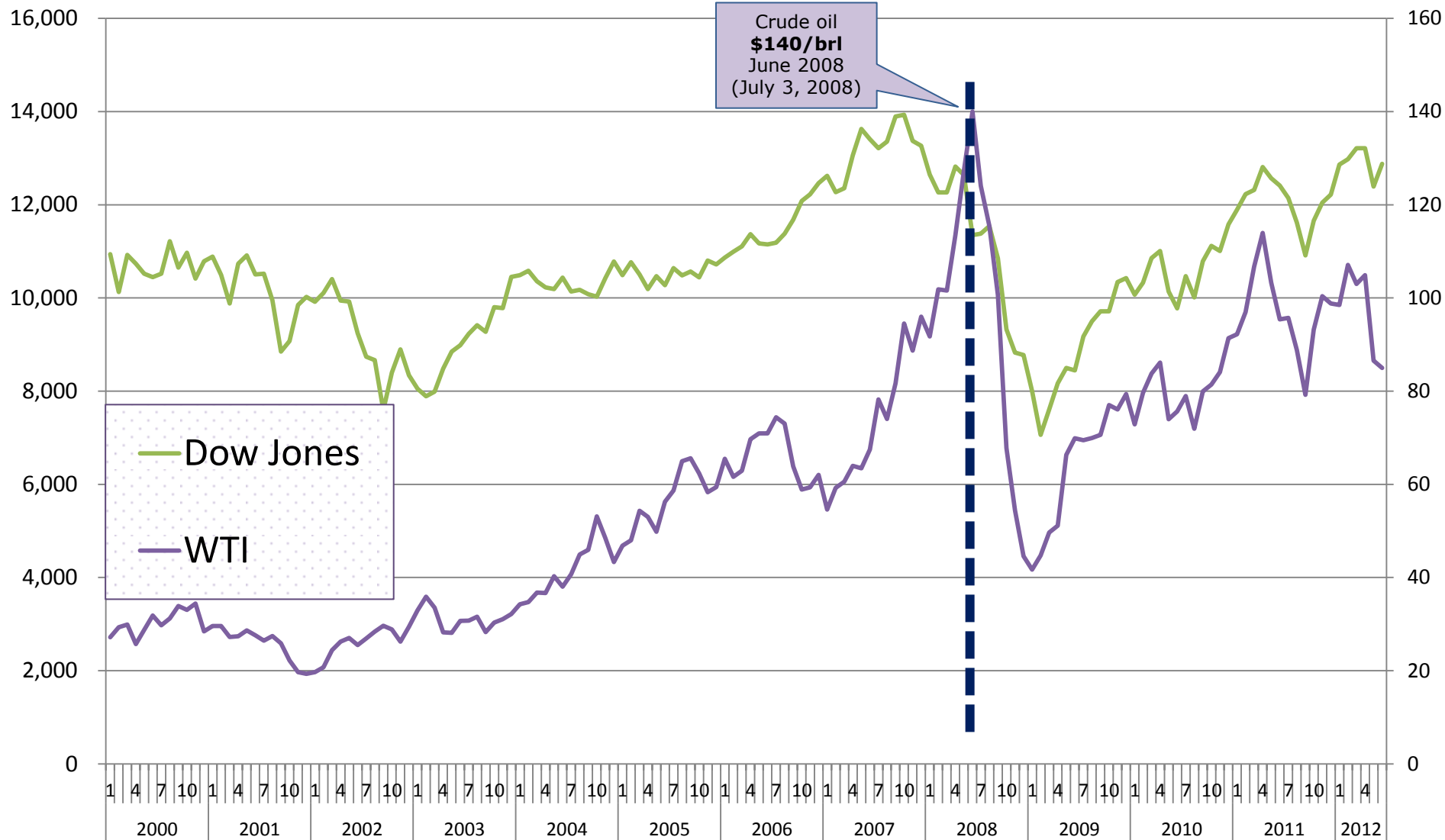
Source: GFT - Online Futures Trading, <http://futures.tradingcharts.com>; <http://finance.yahoo.com>

Monthly Price Movements of Dow Jones and oil (WTI) in the U.S

(Monthly Prices, January 2000 - June 2012)

Daw Jones

Oil (WTI)



Contemporary Global Grain Price Movement Mechanism

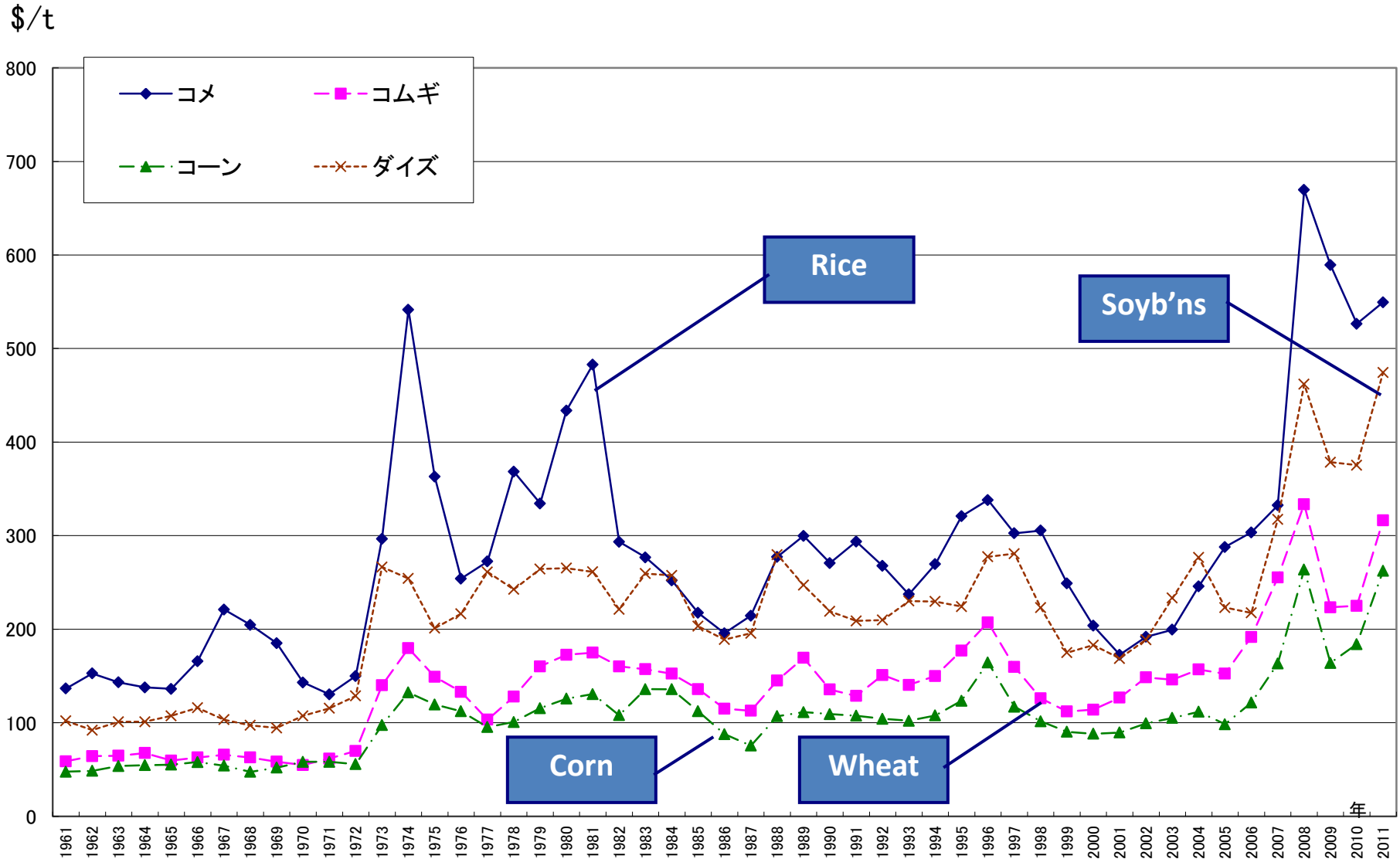
Dow Jones

```
graph TD; A[Dow Jones] --> B[Crude Oil]; B --> C["Grains (Corn, Soybeans, Wheat, Rice)"]
```

Crude Oil

**Grains
(Corn, Soybeans, Wheat, Rice)**

Nominal world prices of rice, wheat, corn and soybeans (Annual since 1961)



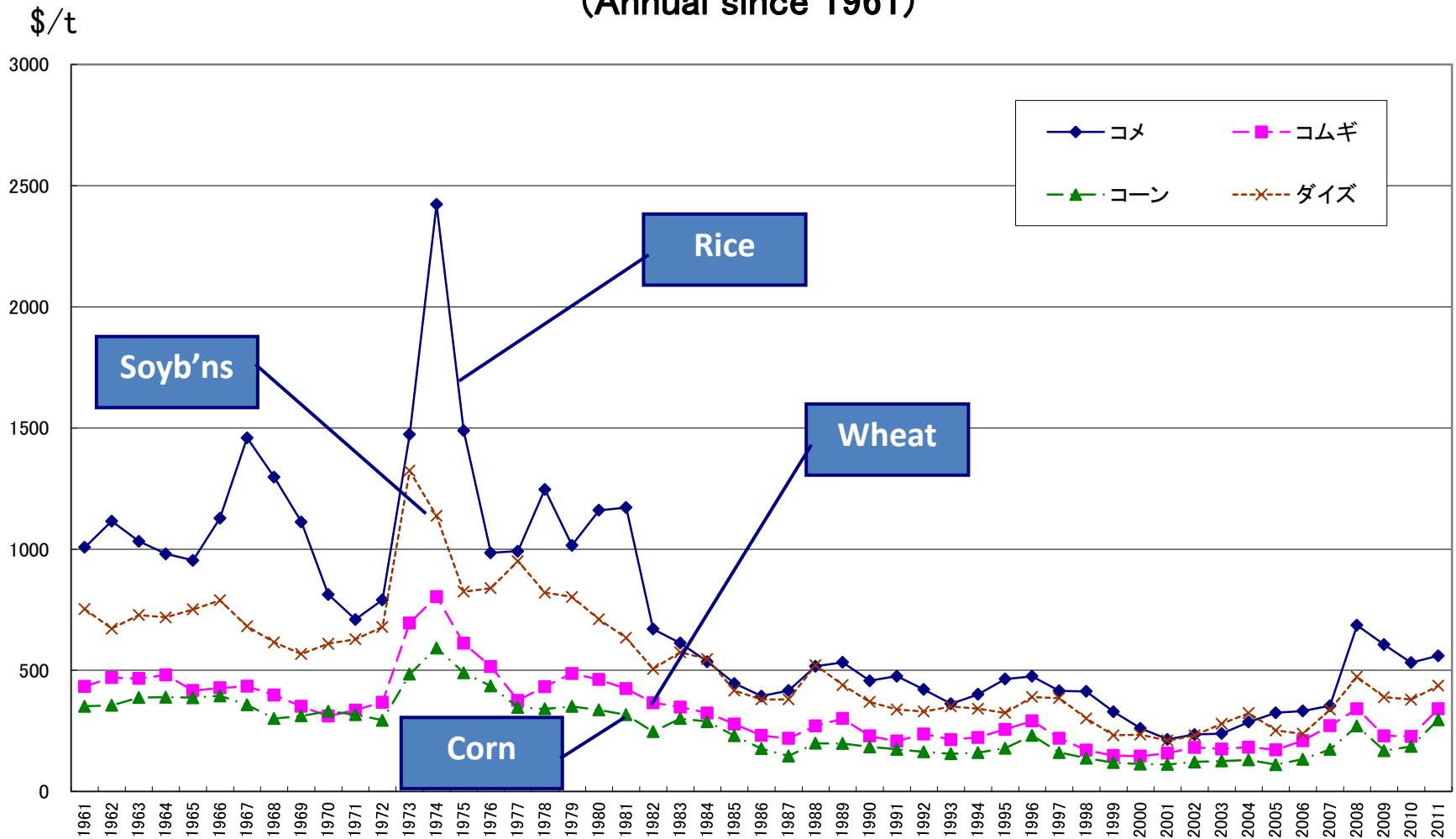
ソース: IMF: International Financial Statistics (IFS) の年次データを直接使用している (<http://ifs.apdi.net/imf/>)

注1: 最近年のデータは、月次データの平均値。但し、現時点の2ヶ月前までのデータ。

注2: コメ: Bangkok, 5% broken, milled. コムギ: No.1, Hard Red, US Gulf. コーン: Yellow No.2, Gulf. ダイズ: U.S. c.i.f. Rotterdam.

注3: Calendar year.

Fig. 6.2 Real world prices of rice, wheat, corn and soybeans
(Annual since 1961)



ソース: IMF: International Financial Statistics (IFS) の年次データを直接使用している (<http://ifs.apdi.net/imf/>)

注1: 最近年のデータは、月次データの平均値。但し、現時点の2ヶ月前までのデータ。

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注3: Calendar year.

2008年の世界の全穀物の 増産率は...

Global grain production rate in 2008?

5.1% 増up

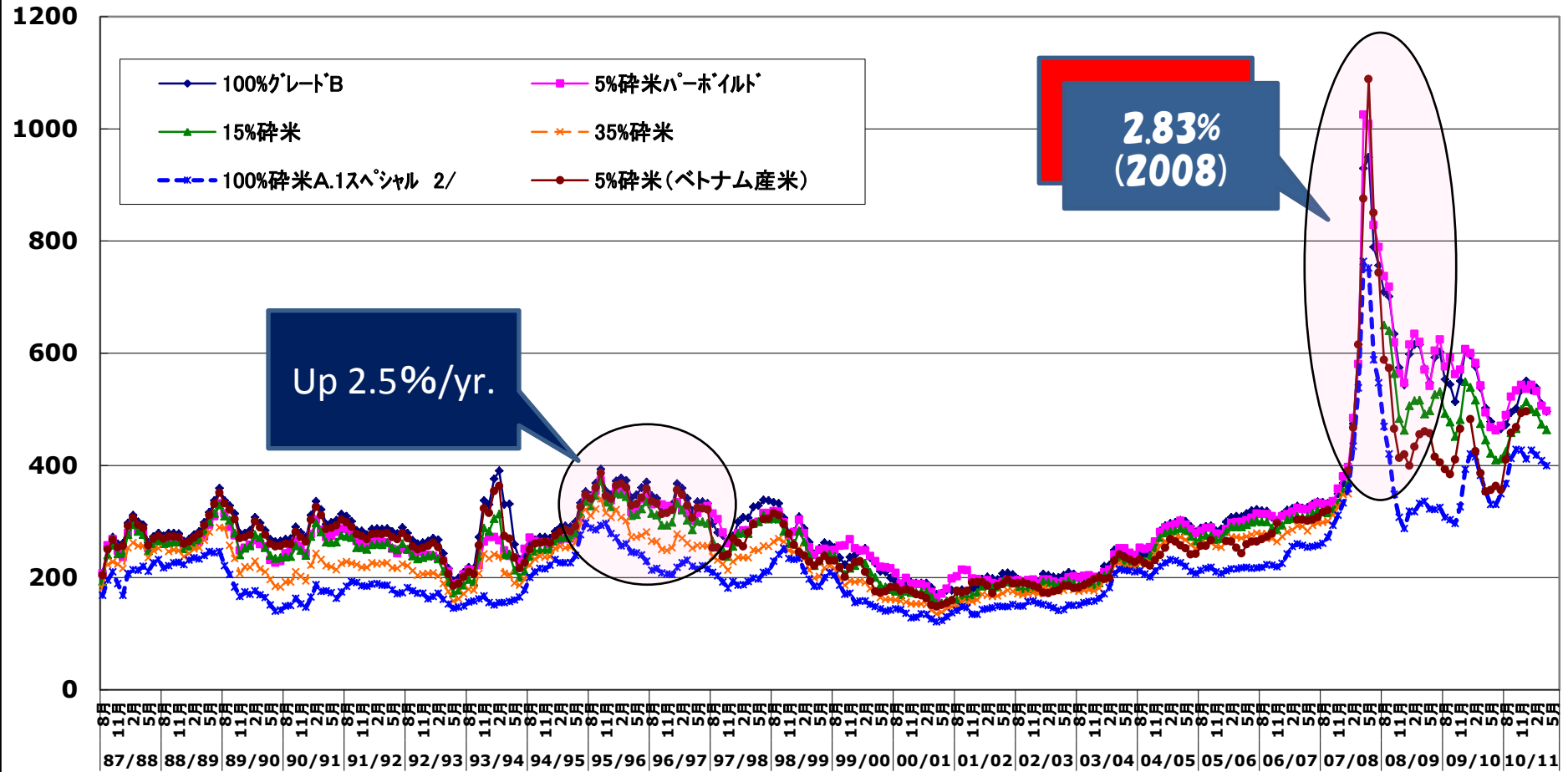
USDA: WASDE, Oct 12, 2009

USDA: World Agricultural Supply and Demand Estimates, Oct 12, 2009

Fig. 3-5a. Rice export prices at Bangkok and Vietnam

(monthly, August 1987 – April 2011, milled, \$/ton, FOB) 1/

\$/ton



NA=Not available. 1/ Simple average of weekly price quotes. Includes cost of bags. 2/ 100-percent broken.

Source: Thailand Grain and Feed Weekly Rice Price Update, U.S. Embassy, Bangkok. Last updated February 17, 2007,

注) 最近月は、Preliminary.

ソース: 1997年8月～2004年7月までのデータは、米農務省(USDA): Rice Situation and Outlook Yearbook

2004年8月からのデータは、Rice Apr. 11, 2011

Growth of food prodn. faster than popln.

(Caused low prices of food products.)

**人口増加率を上回る速さで穀物増産
(技術革新により過剰気味に増産されてきた)**

Now, food becomes fuel: They are substitutes.

それが、穀物のバイオ燃料化で大変化！

(穀物と原油が「間接的代替財」)

So, Food Prices fluctuate with Oil Prices!

(Demand for food expanded greatly!)

つまり、原油価格と一緒に穀物価格が変化する！

(農産物の需要が拡大した！)

But, with only small change in Prices!

Are they true?....

Causes of ag-inflation...

- BRIC's ~~greater~~ demand for food....

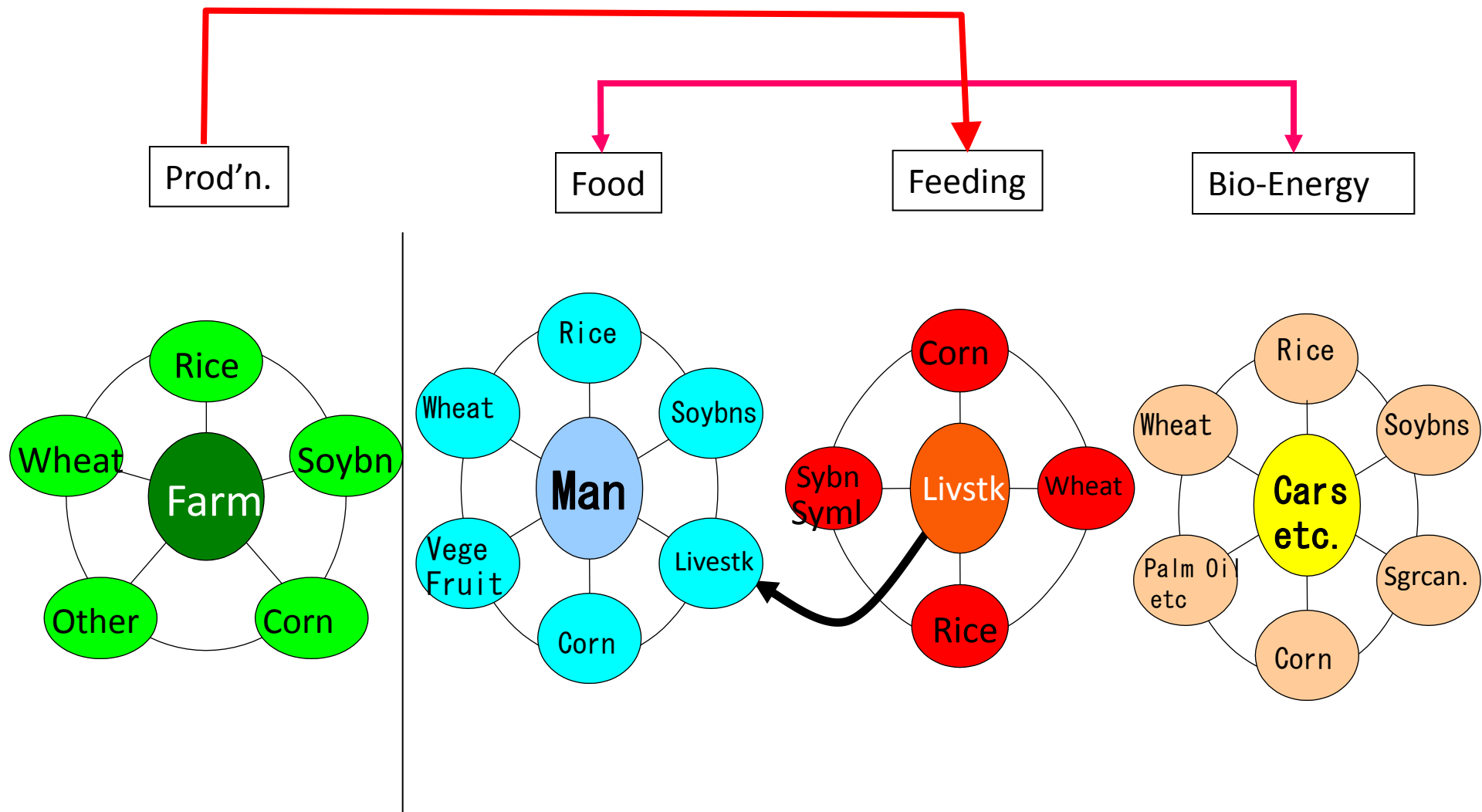
China 's soybean imports increased to 60 mmt. in 15 yr. but prices dropped.

- Aussie's ~~crop~~ failures....

Aussie's crop failures not new, but started in '94, '03, '06, '07.

- Speculative investment for oil....
 - Grains for ethanol

Fig. 2-5 Competitiveness/Substitute among crops and increases in demand..

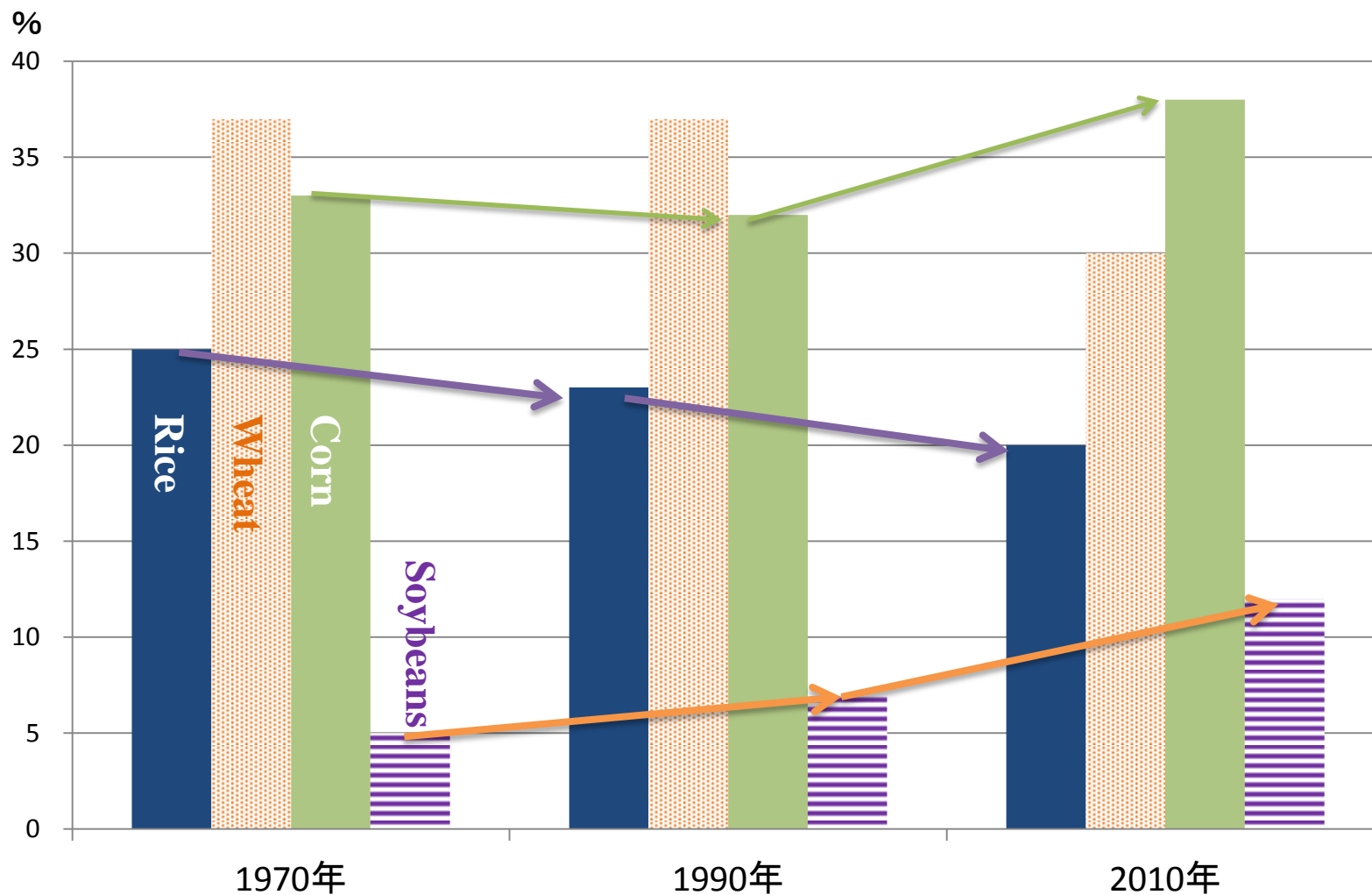


An increase in demand is good for the products.

International grain prices...

- **Prices of crude oil: stable at high**
 - **Bio-energy production**
 - **Grains-Oil “indirect substitutes”**
 - **Oil prices lead grain prices**
- **Large incentives of grain production**
 - **Rice 1.80% / yr (2005-11)**
 - **Wheat 1.47% / yr (2004-11)**
 - **Corn 2.74% / yr (2004-11)**
 - **Soybn. 2.14% / yr (2004-10)**

Shares in global production of rice, wheat, corn and soybeans in 1970s, 1990s, and 2010s.

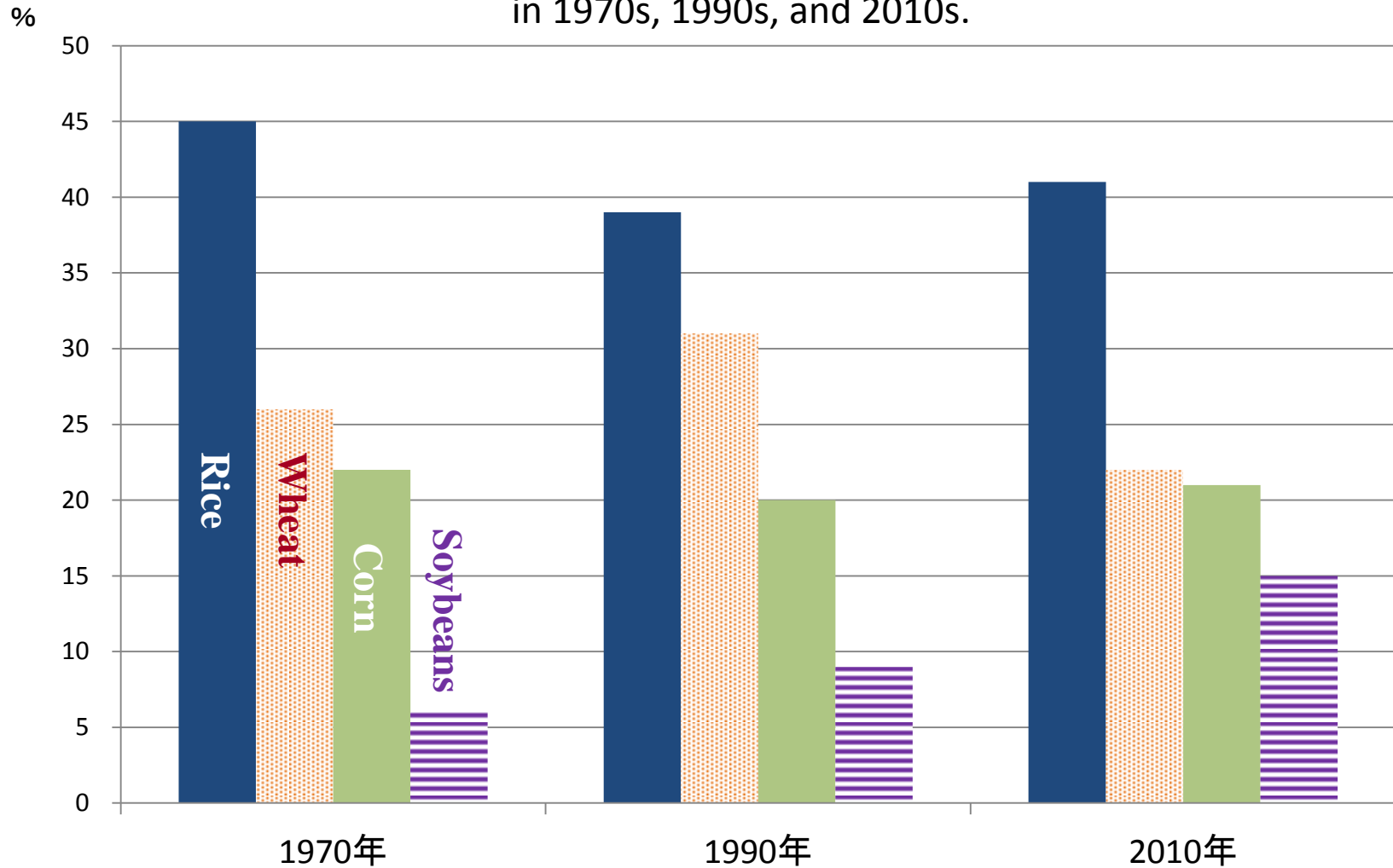


注1: いずれも3年間の移動平均を使って算出した。ただし、2010年は2009年と2010年の平均とした。主要4品目の合計を100%場合のシェア。

注2: データはUSDA(米国農務省)のPSD Online, August 2011のデータから引用した。

九州大学農学研究院農政学教室(代表: 伊東 正一)

Shares of global production value of rice, wheat, corn and soybeans in 1970s, 1990s, and 2010s.



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注2: データはUSDA(米国農務省)のPSD Online, August 2011のデータから引用した。

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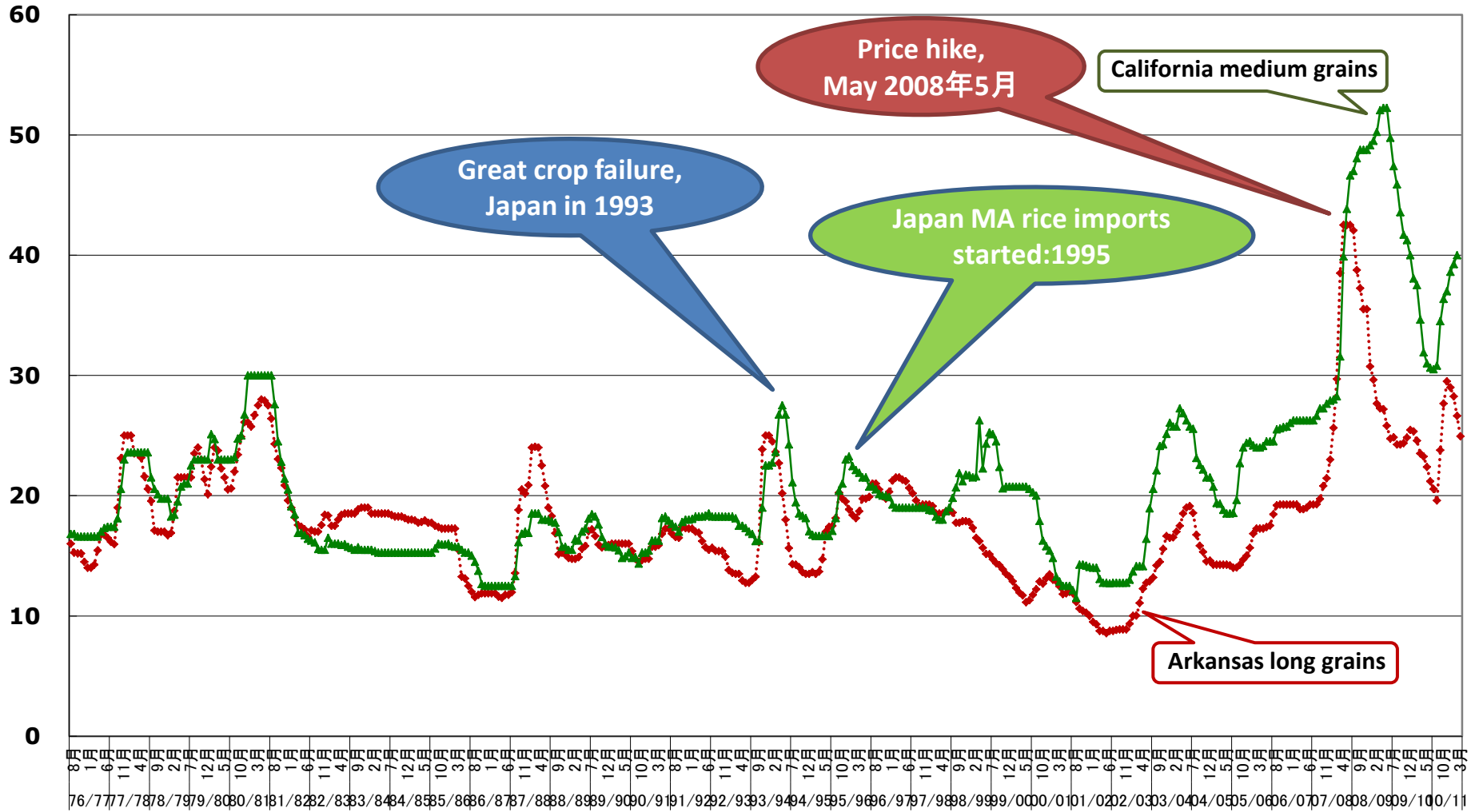
Importance of self-governance spirit for the small scale farms

Indica vs. Japonica Rice Prices

How have Japan MA rice imports changed the global Japonica rice prices ?

Monthly rice prices in the U.S. (Arkansas vs. California, FOB milled) (Aug. 1976 – Apr. 2011, milled, 年4月, 精米100ポンド袋詰め)

(\$/cwt, bagged)

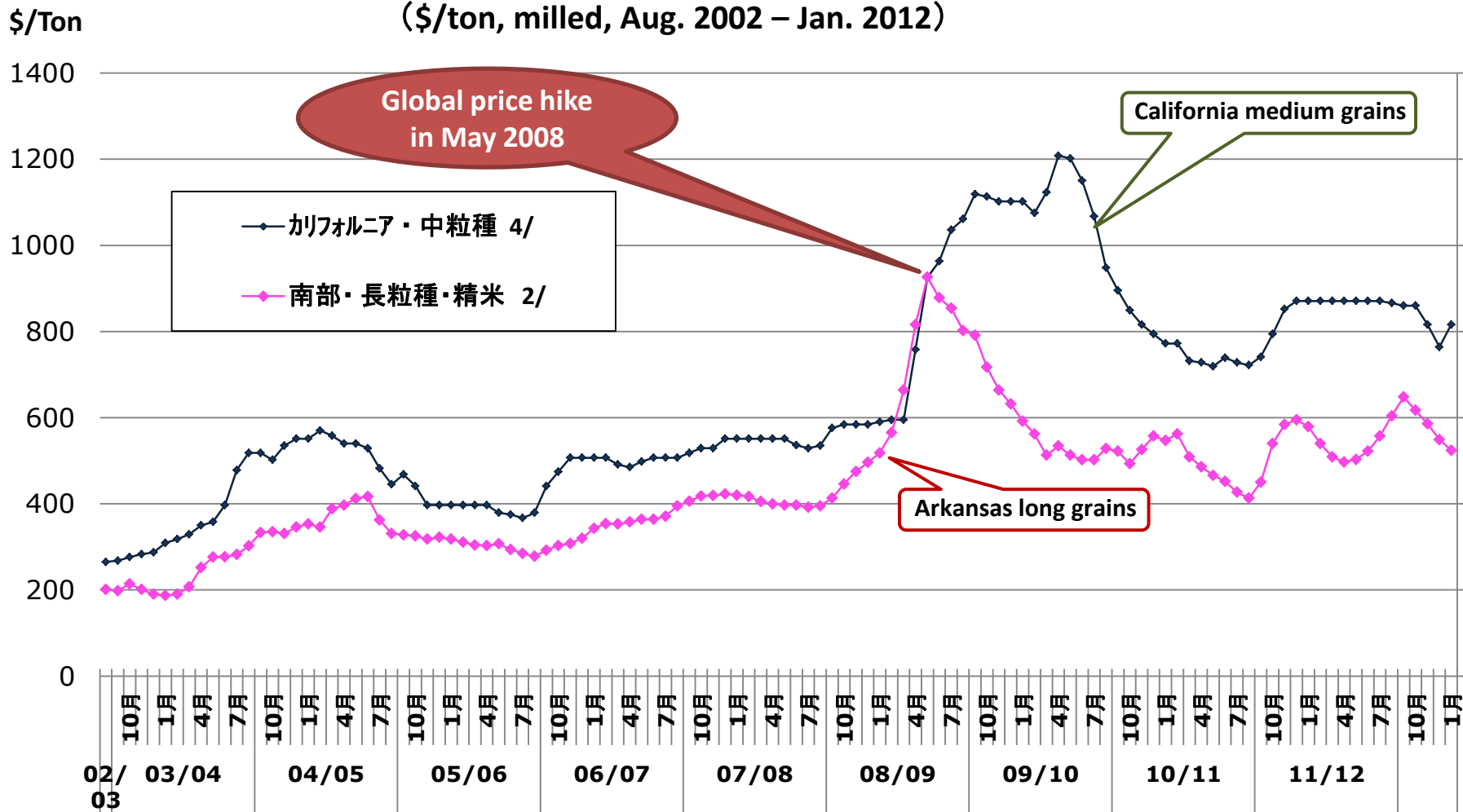


ソース: Rice Yearbook : Dataset 2011, USDA, Agricultural Marketing Service, Rice Market News.

九州大学農学研究院農政学教室 (代表: 伊東正一)

Differences in Indica/Japonica rices

(\$/ton, milled, Aug. 2002 – Jan. 2012)



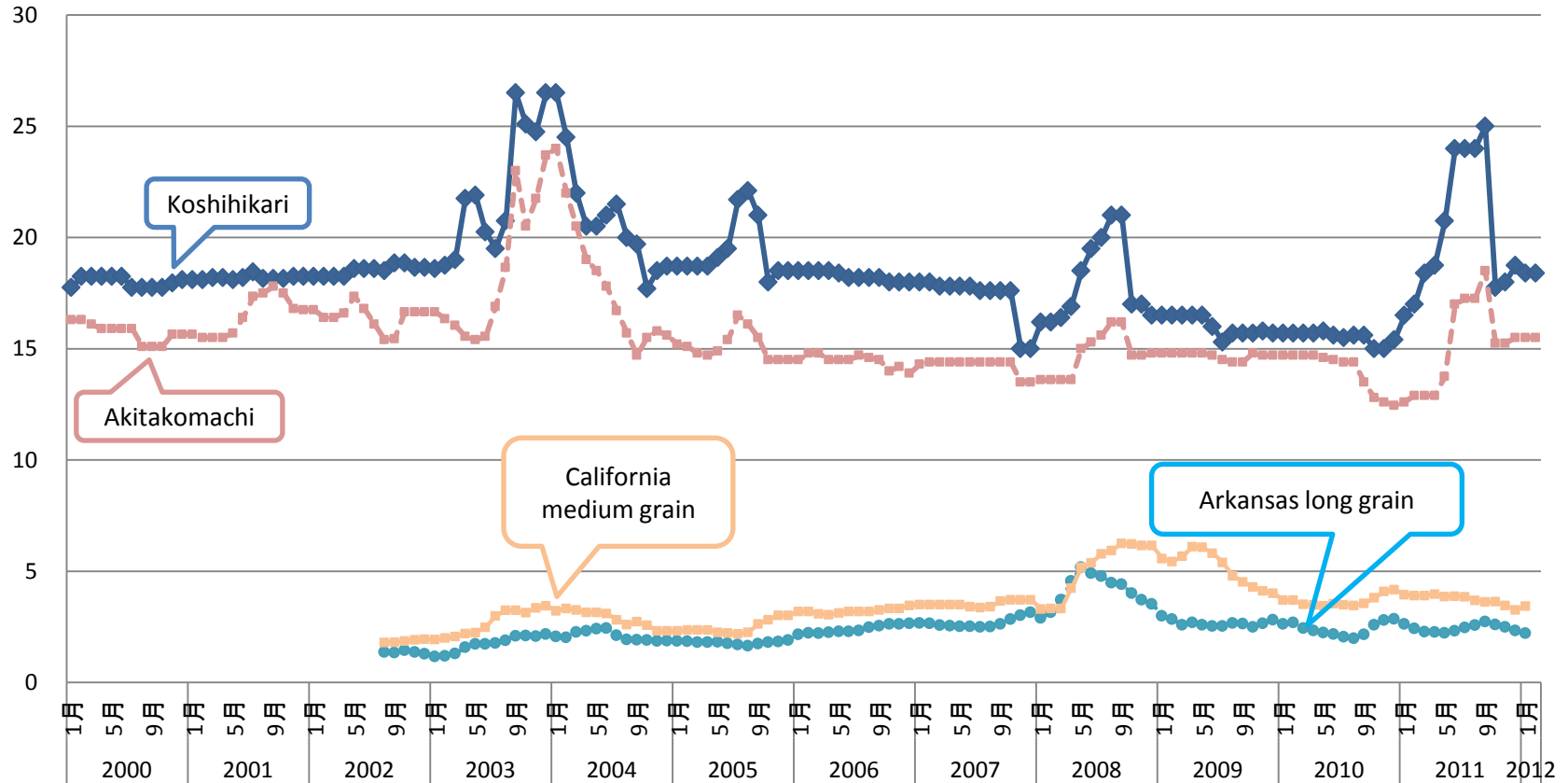
ソース：米国農務省(USDA): Rice Situation and Outlook Yearbook.

2005/06年以降のデータは Rice Outlook, 10, Jan. 2012/USDAのWASDE, 10, Jan. 2012より算出した。

九州大学農学研究院農政学教室 (代表：伊東正一)

Difference in rice prices in Japan and the U.S. 、 Brown rice, yen/60kg, (Jan. 2000 – Feb. 2012)

(1000 yen/60kg)

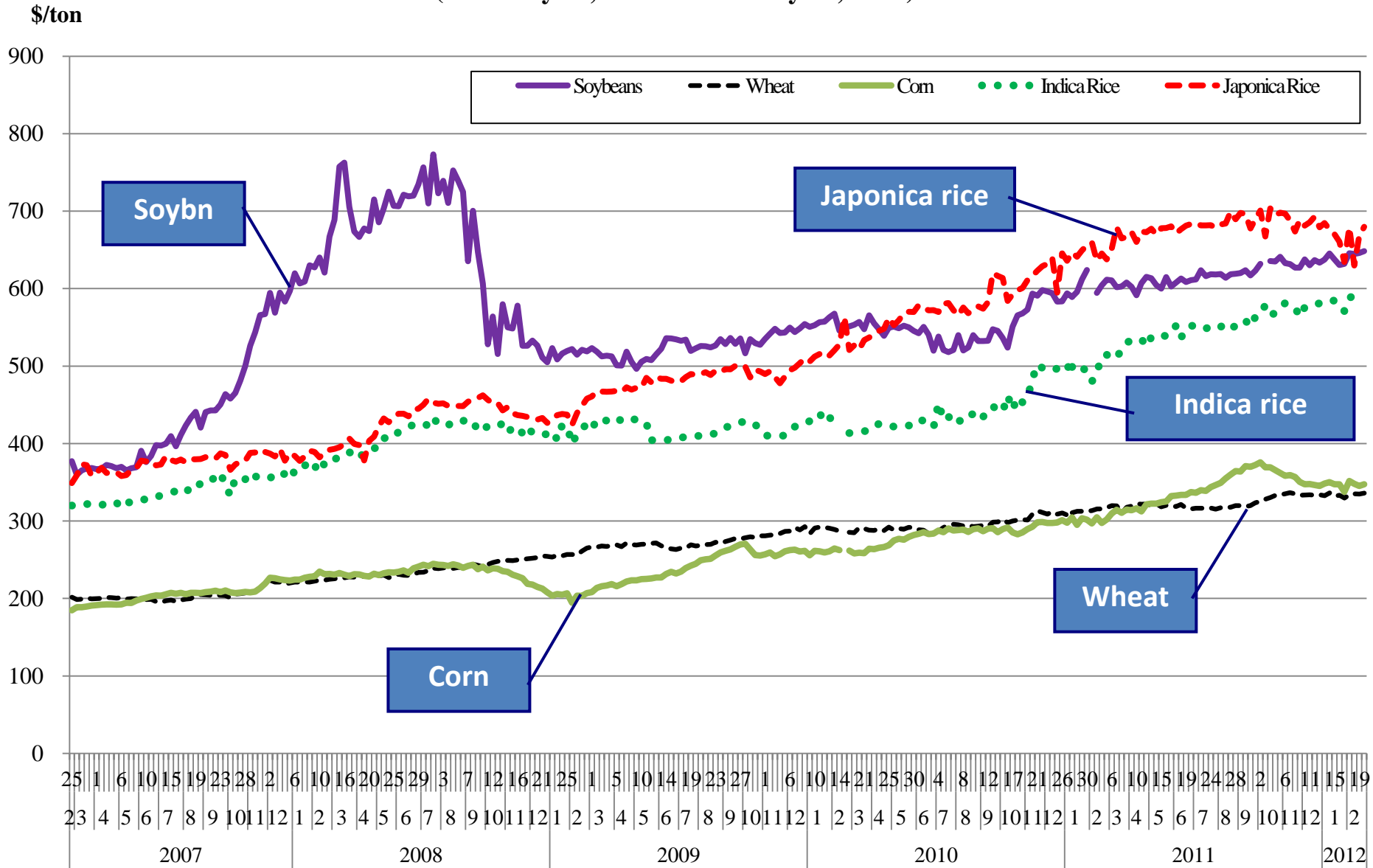


ソース: 米国農務省(USDA)及び日本経済新聞

九州大学農学研究院農政学教室 (代表: 伊東正一) <http://worldfood.apionet.or.jp/riceprice/ricepriceJ.htm>

注: 為替レートは、三菱UFJリサーチ&ファイナンシャルの年平均から引用した。 http://www.murc.jp/fx/year_average.php

Weekly Wholesale Market Prices of Rice, Wheat, Corn and Soybeans in China (February 25, 2007 -- February 26, 2012)



Source: Data during 1979-2010: China Statistical Yearbook

Area Harvested(2011): China National Rice Research Institute, <http://www.chinariceinfo.com/news/market/201108/5849.html>

Paddy Production(2011): Heilongjiang Agricultural Information Center, http://www.hljagri.gov.cn/fxyc/sc/201201/t20120117_422631.htm

Note: Milling rate of rough rice is assumed to be 70%.

Japonica rice prod. in China:
About 40% of all,
about 55 million tons in 2011.

(Author's estimate based on Li & Ishitani, 2009:)

Key points...

- **Global japonica rice production?**
- **The current japonica rice trade?**
- **Prices of japonica rice vs. indica rice?**
- **If TPP / FTA, then rice production in Japan?**
- **Food security in Japan?**

Potential of japonica rice production...

- **U.S.**
 - **California:**
 - *Less water use technology for more production*
 - *More land for rice in Sacramento Delta: 0.2 million ha*
 - **In the southern states:**
 - *High quality of Koshihikari already being produced*
 - *Similar weather to Japan*
 - *6 times areas as large as California*
 - *GIS indicates rice possible up to southern Wisconsin*
- **Vietnam**
 - *Already being produced in Mekong Delta*
 - *More suitable for japonica rice in the northern areas*
 - *Out of 25 million tons of rice, much can be switched to japonica.*
- **Australia**
 - *Production recovering: 0.7 mill. tons in 2012*
 - *Water saving technology to be progressed*

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Rice Policies in Major Countries

- **Production**

- **US: Minimum prices, direct payments,**
- **China: Production subsidies for seeds, fertilizers, chemicals, etc.,**
- **Thailand: Minimum prices,**
- **Japan: Production control, subsidies,**
- **India: Minimum prices, ?**

- **Exports/Imports**

- **Japan: Minimum Access (767,000 tons/yr),
Import tariff at 341 yen/kg (\$4,400.00/ton)**
- **S. Korea: Minimum Access only (500,000 tons/yr),**
- **Indonesia: State imports (1 million tons)**

Impacts of export control

The fact in 2008...

- **India, China, Vietnam**
 - impose rice export controls**
 - Make the importers worry, rush to rice,
 - Make exporters hoard,
 - Make the international prices soar.
- **Who benefits from export controls?**
 - Consumers?
 - Government regime?

In East Asia Cambodia, China, Indonesia and Vietnam have joined India and Egypt in announcing restrictions on rice exports or raising export taxes. As discussed earlier, rice export restrictions in one country have fostered competitive export restrictions by others, contributing largely to the massive recent rice price increases in the thinly traded world rice market, sharply increasing food costs in countries that depend on rice imports.(Brahmbhatt and Christiaensen (May 2008))

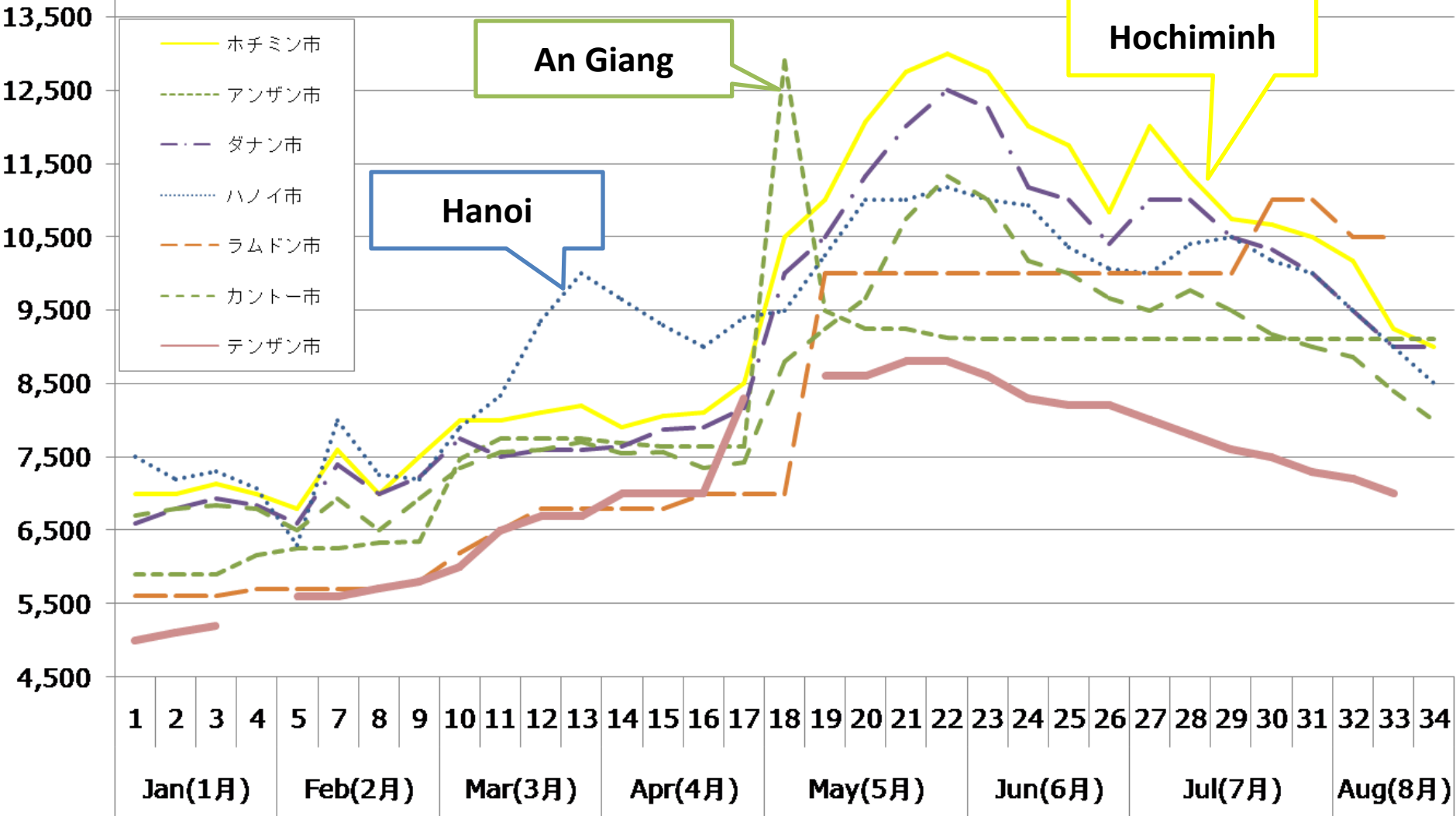
After all, Nobody benefits...

***Too much manipulation by
the governments...***

Vietnamese case in 2008

Retail prices for ordinary rice in Vietnam, weekly average, January-August, 2008, VND/Kg

価格(ドン/kg, 精米)



Source: Vietnam Ministry of Finance; IPSARD, <http://www.agro.gov.vn>

注: 週番号1~33は2008年1月第1週から同8月第3週までを示す。

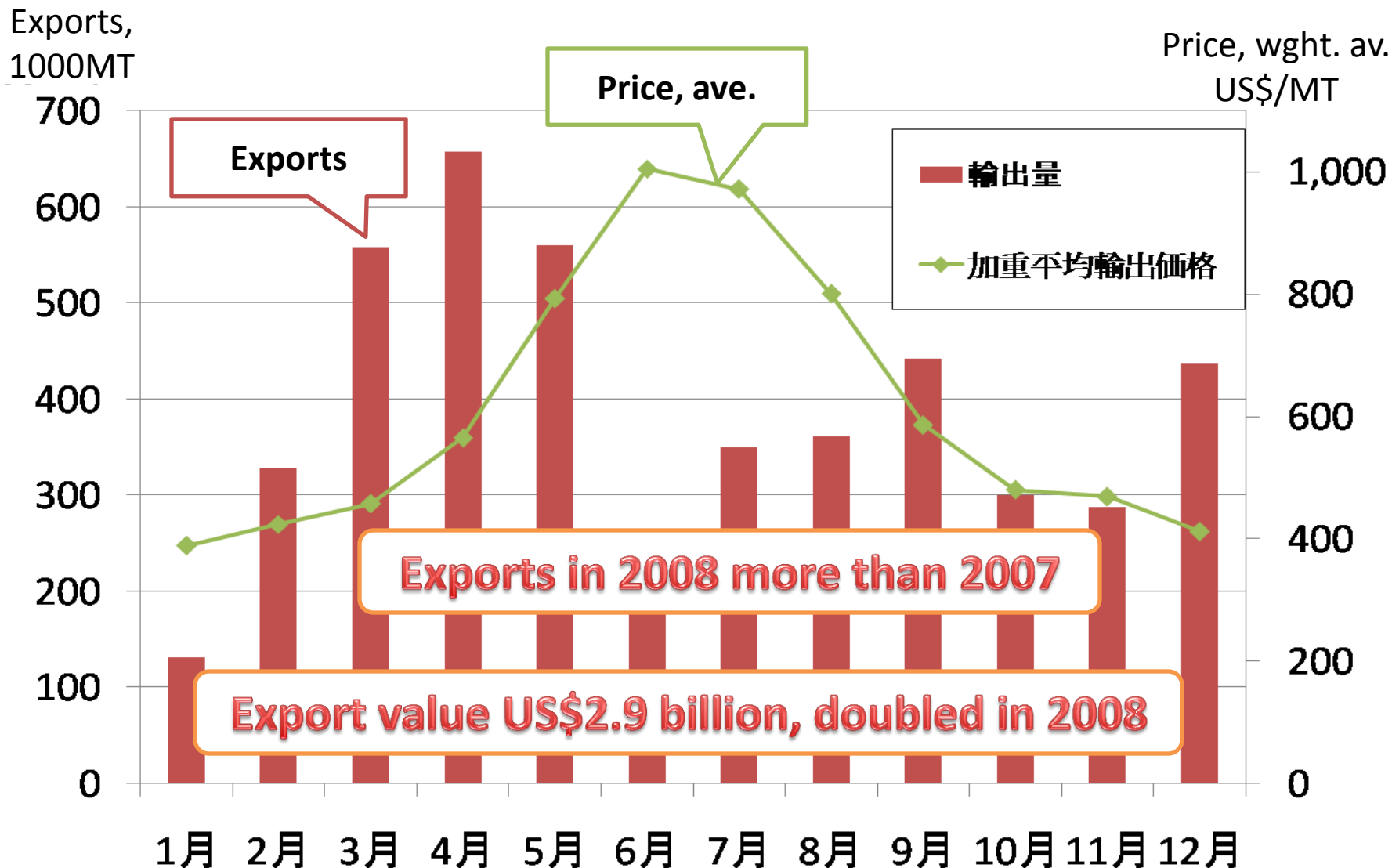
***Vietnamese government actions
for rice exports...***

Export ban of

PRIVATE exports,

Only State Corp. allowed

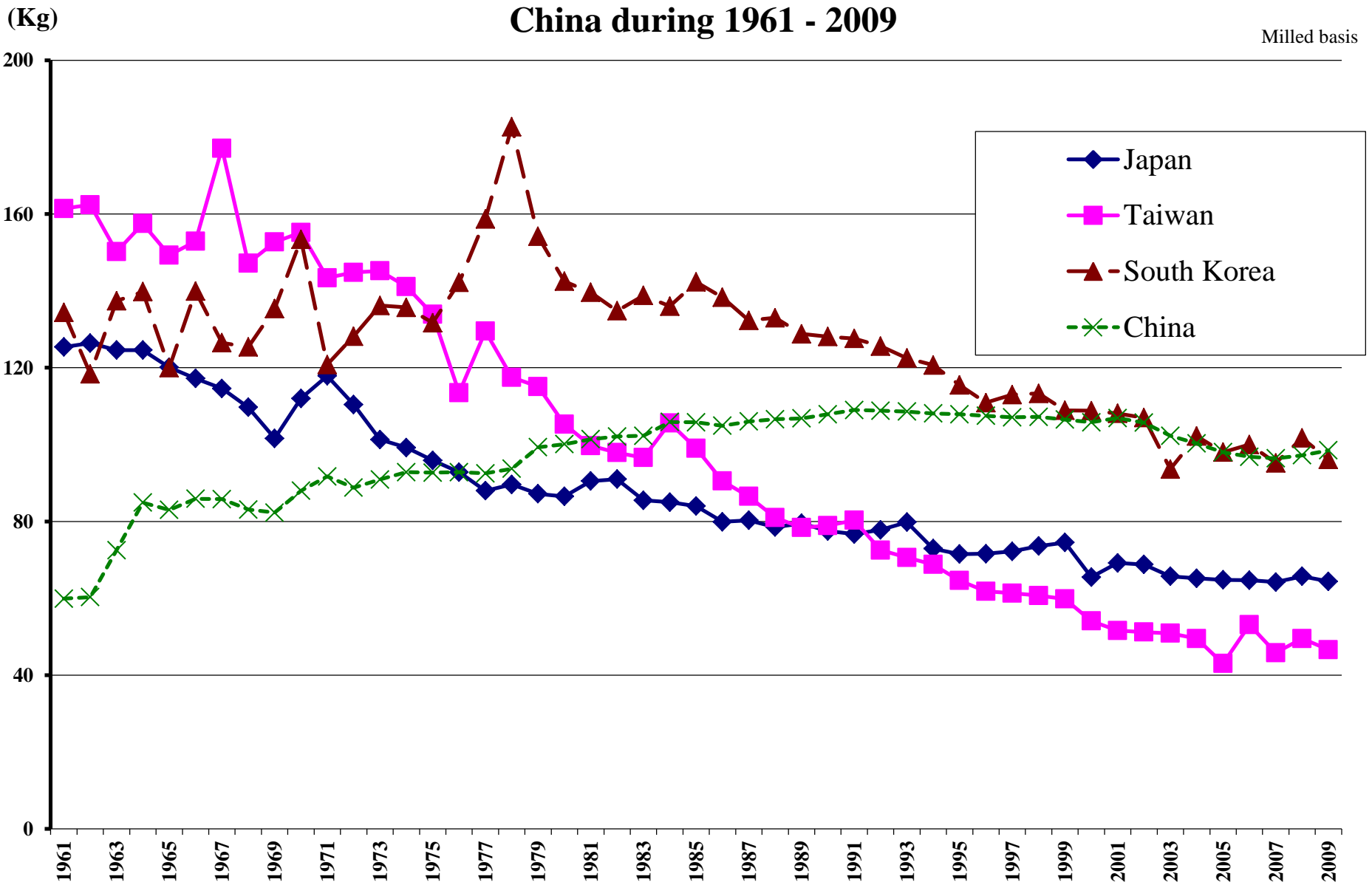
Vietnam's monthly rice export and prices, January-August, 2008, VND/MT



ソース: General Department of Vietnam Customs

Fig.1. Per capita consumption of rice for Japan, Taiwan, South Korea and China during 1961 - 2009

Milled basis



Source: S.Ito, World Food Statistics & Graphics (<http://worldfood.apionet.or.jp>)
 Original data sources: USDA: PSD Online, Aug.2009; USBC: International Data Base, August 2006.

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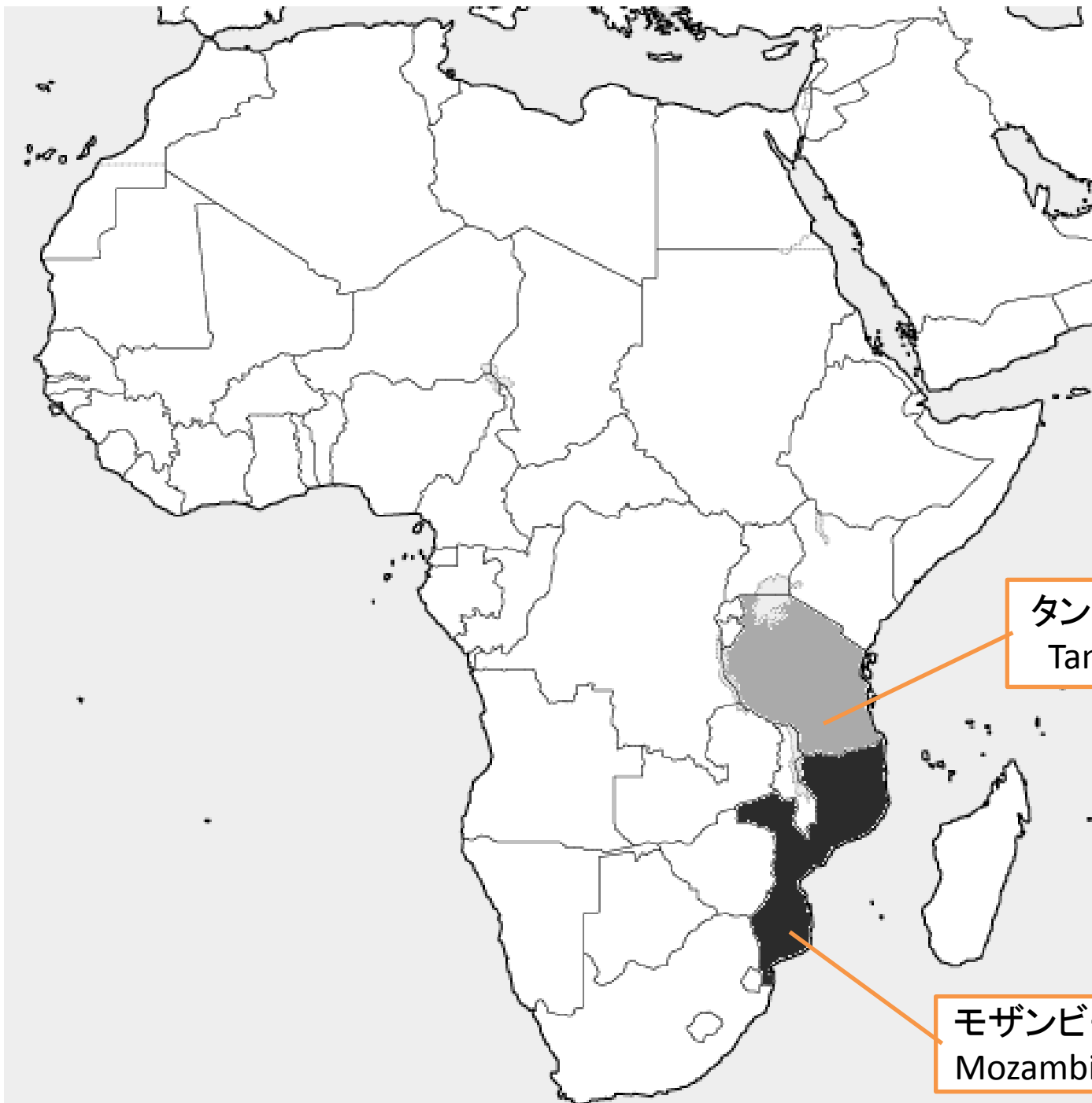
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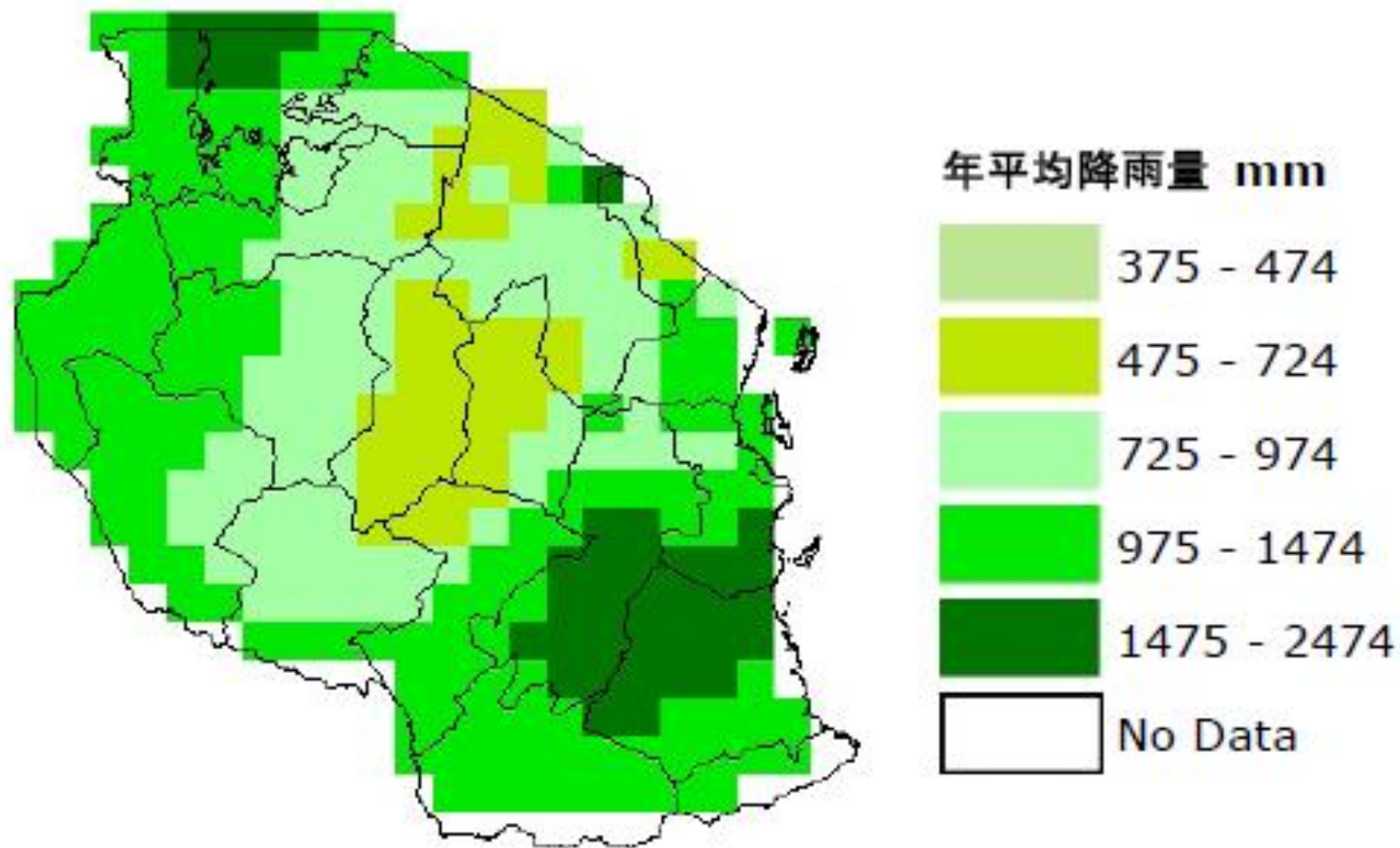
タンザニア
Tanzania

モザンビーク
Mozambique

表4.2.1 タンザニアにおける農業資源の統計

Land resources in Tanzania million ha

LAND RESOURCE	百万ha
国土面積(Total land)	95.5
農業用適地(Arable land)	44.0
放牧・牧草可能地(Rangeland)	50.0
放牧地(Land under livestock)	24.0
ツエツエバエ対処地(Tsetse invested area)	26.0
耕作地(Cultivated land)	10.1
水利可能地(Area suitable for irrigation)	29.4
- 高い可能地(high potential)	2.3
- 中位可能地(medium potential)	4.8
- 低い可能地(low potential)	22.3
Population (million)	42.8



出所：FAO ウェブサイト

図 3-1 タンザニア年平均降雨量

Mean Annual Rainfall in Tanzania

モザンビークの農業潜在性

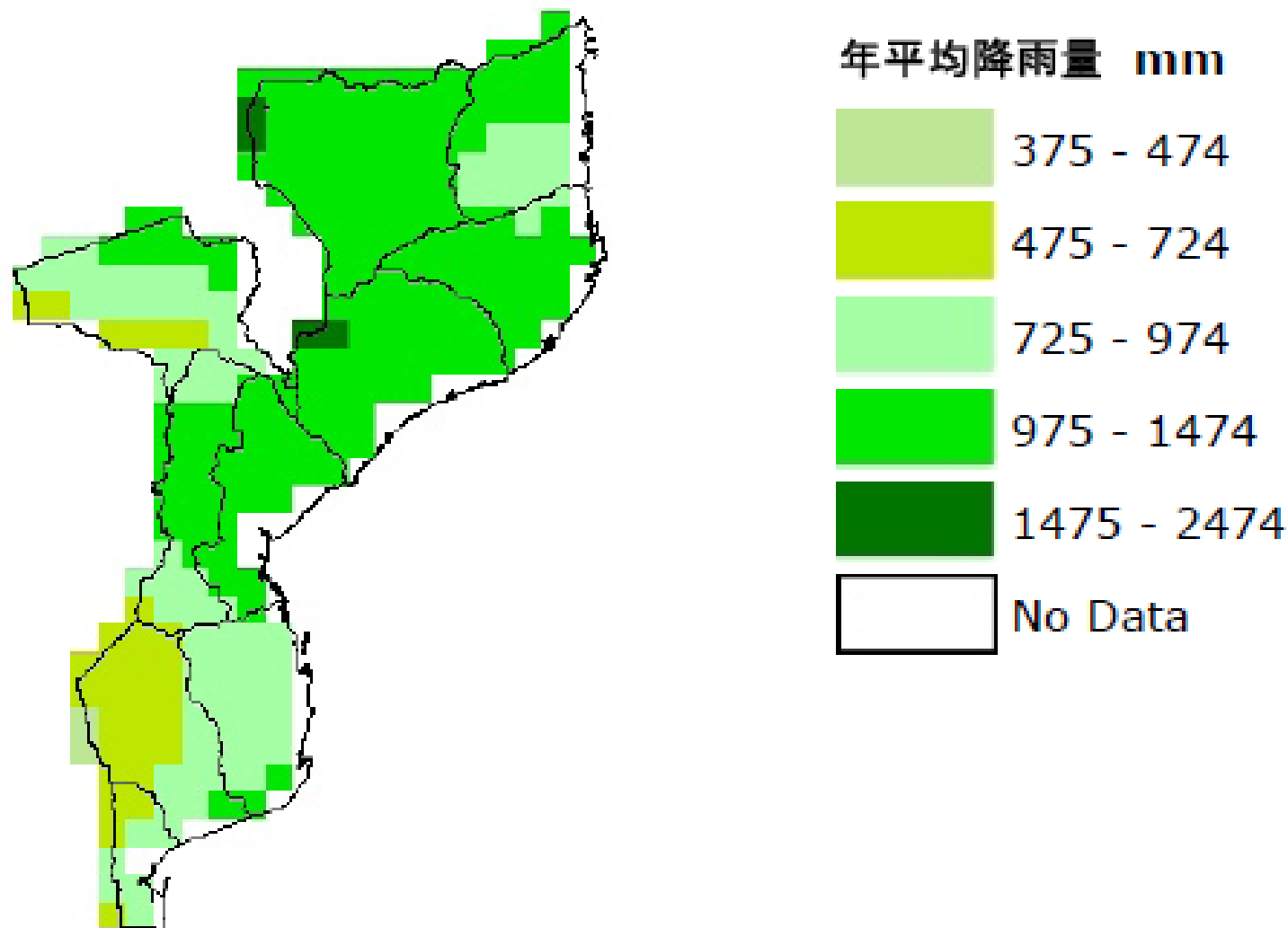
Potential for agricultural production in Mozambique

国土面積 Total land (mill. ha) 80 (百万ha)

可耕地 Potential arable area (mill. ha) 40 (百万ha)

耕作地 Area under agriculture (mill. ha) 3 (百万ha)

人口 Population, mill. 20 (百万人)



出所：FAO ウェブサイト

図 4-3 モザンビーク年平均降雨量

Mean Annual Rainfall in Mozambique

Potential of increases in global rice production...

- **New areas for rice**

- South America: Brazil, Argentina, Paraguay, Uruguay...

- Africa: Mozambique, Tanzania...

- More areas:

- **Yields of rice**

- Examples of sharp increases in China,

- High yields in the U.S.,

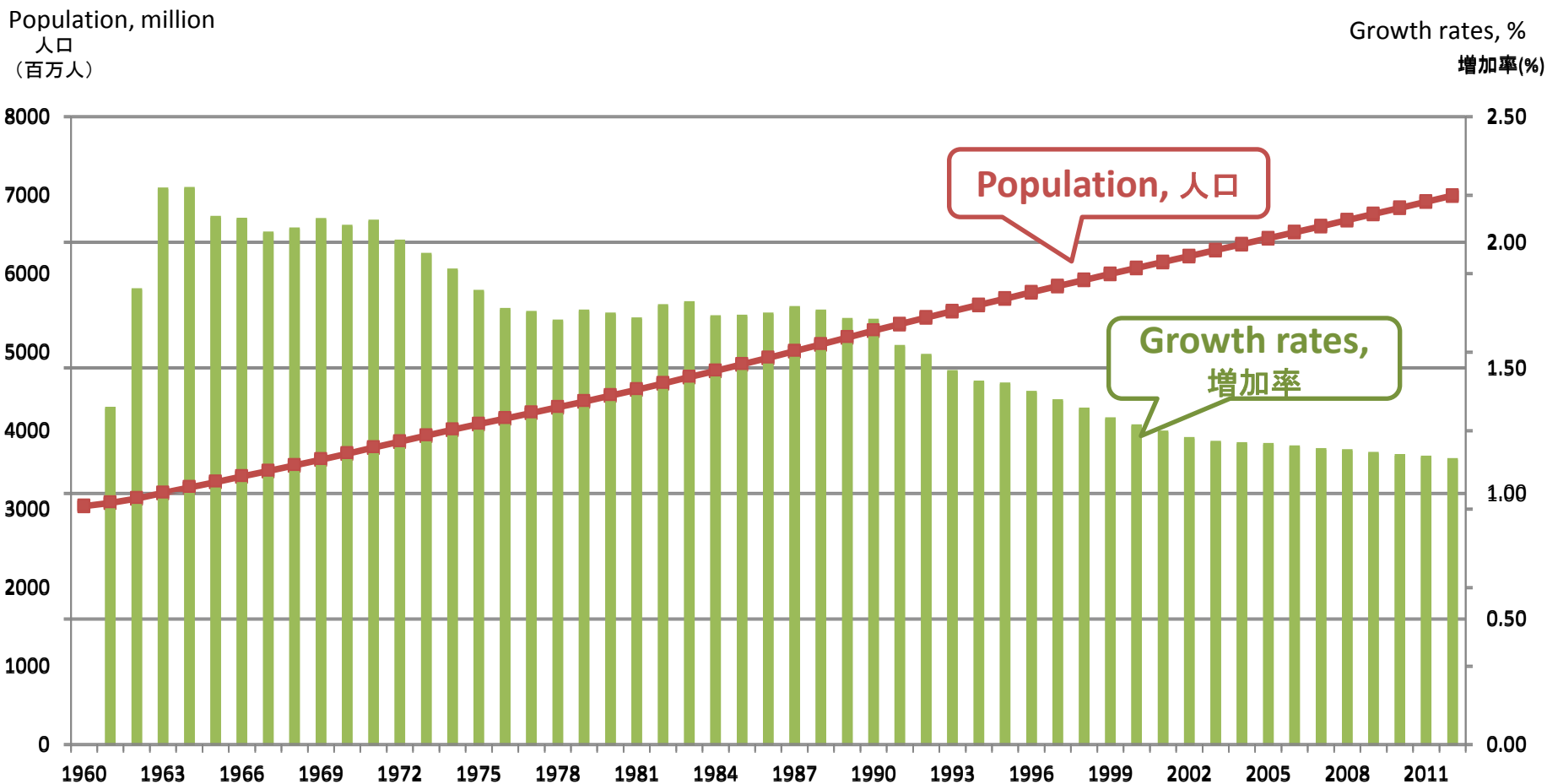
- Other countries can follow...

No population explosion!!

人口爆発は来ない！！

Global population and grow rates, 1960-2012

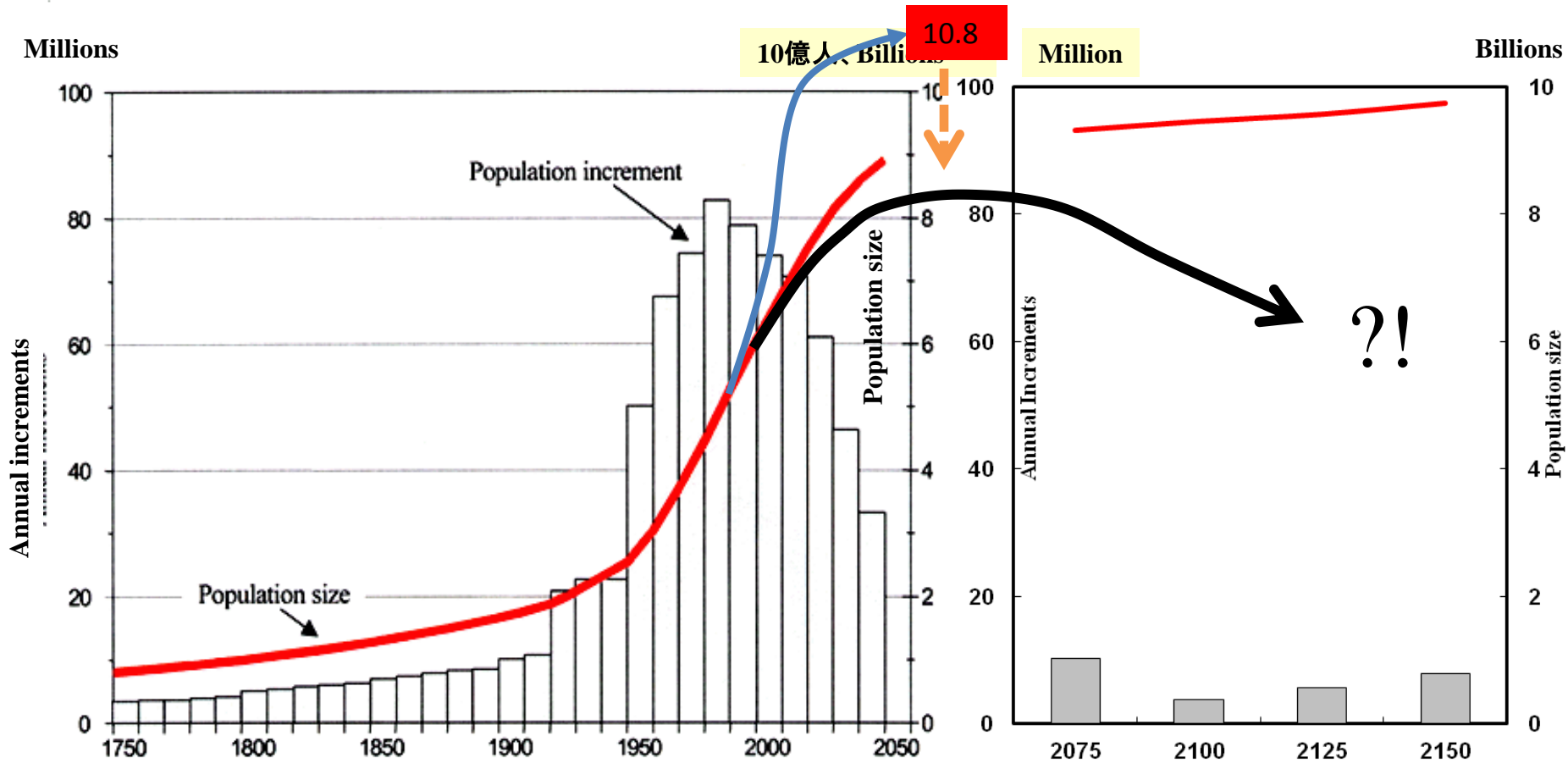
世界の人口と増加率の比較(1960-2012)



ソース:伊東正一「世界の食料統計」 <http://worldfood.apionet.or.jp/graph/index.html>, May 2012

Fig. 8. Long-term world population growth, 1750 to 2150

世界における人口の変化と予測, 1750 to 2150



Source: United Nation: Long-range World Population Projections: Based on the 1998 Revision, Executive Summary, (<http://www.un.org/esa/population/publications/longrange/longrange.htm>), The World at Six Billion, (<http://www.un.org/esa/population/publications/sixbillion/sixbillion.htm>)

まとめ Conclusions

世界の食糧需給の見通し

Perspectives for the global rice in the future...

1. 供給力拡大の潜在性は大きい、土地、単収
Great potential for ag. Production, land & yields.
2. よって、高価格が生産拡大を引き起こす
The higher the prices, the more the production...
3. コメの生産拡大が価格の低迷を引き起こす可能性
Rice prices may drop due to large growth in production.
4. 餌、加工、バイオ燃料向けのコメ開発が重要
Importance to develop rice for feeding, processed, energy.... **More demand for rice needed.**
5. コメの有利性を生かす
Keep benefit in rice.

What to expect in global rice economies for the future...

- **Production increases due to high prices,**
 - Increases in everywhere,
 - Low rice prices may come soon,
- **Increases in export competition,**
 - **Competition within Asia:**
 - Thailand, Vietnam, India, ...
 - Myanmar, Pakistan, China, Russia, ...
 - **Competition between Asia and Non-Asia,**
 - U.S., EU, ...
 - South America, Mozambique, Tanzania...
- **What do we need to do?**
 - Invest in production in both domestic and international,
 - Develop rice for processed, feed, and energy,
 - Keep high demand for rice as staple food.

Key to the Rice Production Development Policies in the Global Markets

- **Key Points:**

- Understanding the increases in demand for grains,
- Global potential for increases in rice production,
- Great competition in rice production and exports,
- Importance of development of large scale farms and plantations,
- Importance of self-governance spirit for the small scale farms.

Our basic mind...

God (Heaven) helps those who help themselves. by Ben Franklin, 1757; Samuel Smiles, 1859

God (Heaven) helps those who are helpless. Bible

However, God gives MORE to those who help themselves. Bible: Luke 22:18, Mark 3:25

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Estimates for price movements of crops

$$\begin{cases} P_{oil,t} = g(DJ_t, Z_{si,t}) \\ P_{it} = f(P_{oil,t}, X_{si,t}) \end{cases}$$

where,

P_{oil} : Daily oil prices, US\$/barrel;

DJ: Dow Jones;

Z_{si} : Other variables influencing P_{oil} ;

P_i : Daily prices of food commodities,
US\$/cwt for rice,

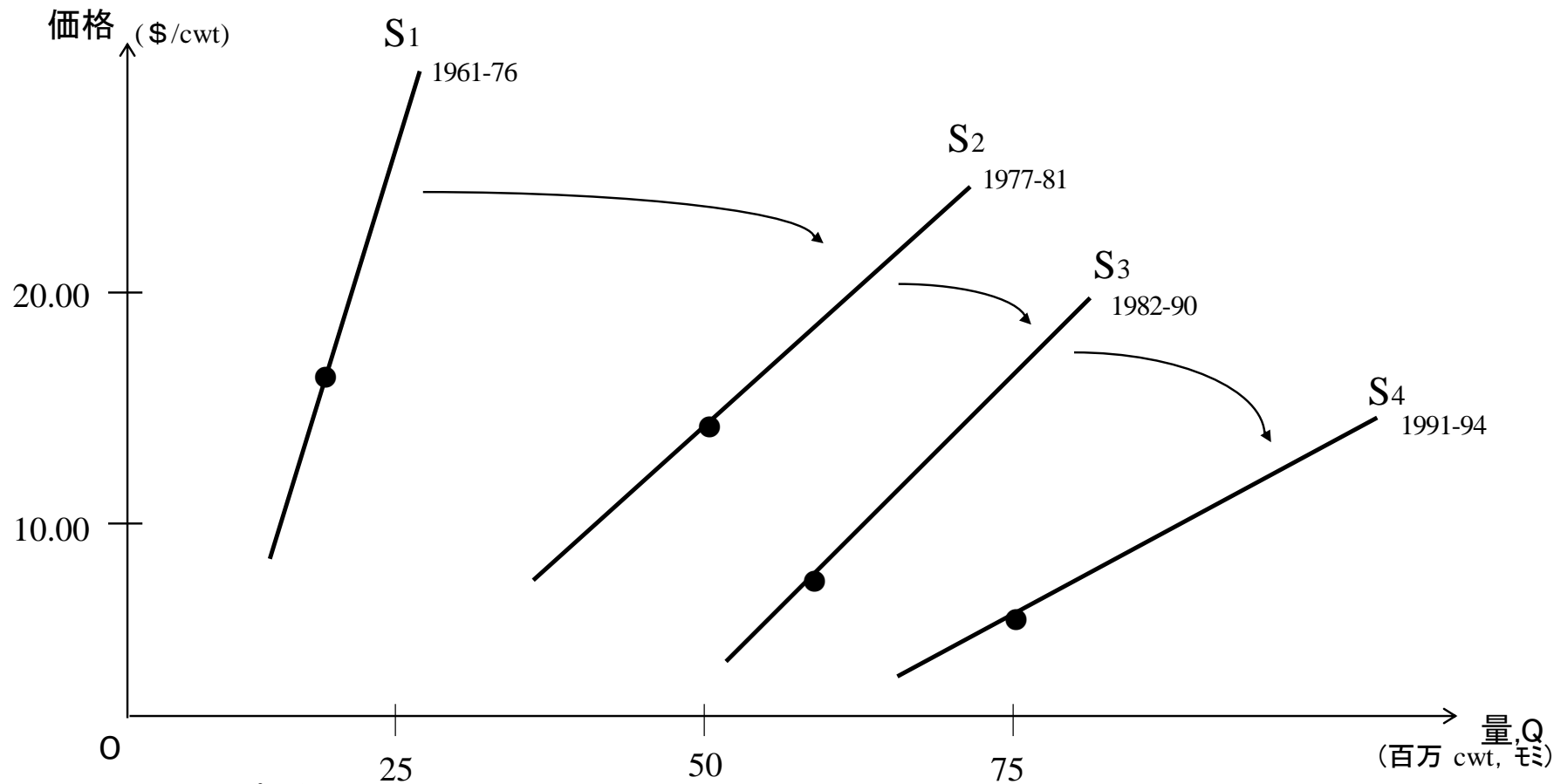
US\$/bu for corn, wheat and soybeans;

X_{si} : Other variables influencing P_i , dummy and
trend variables;

i: Food commodities; and

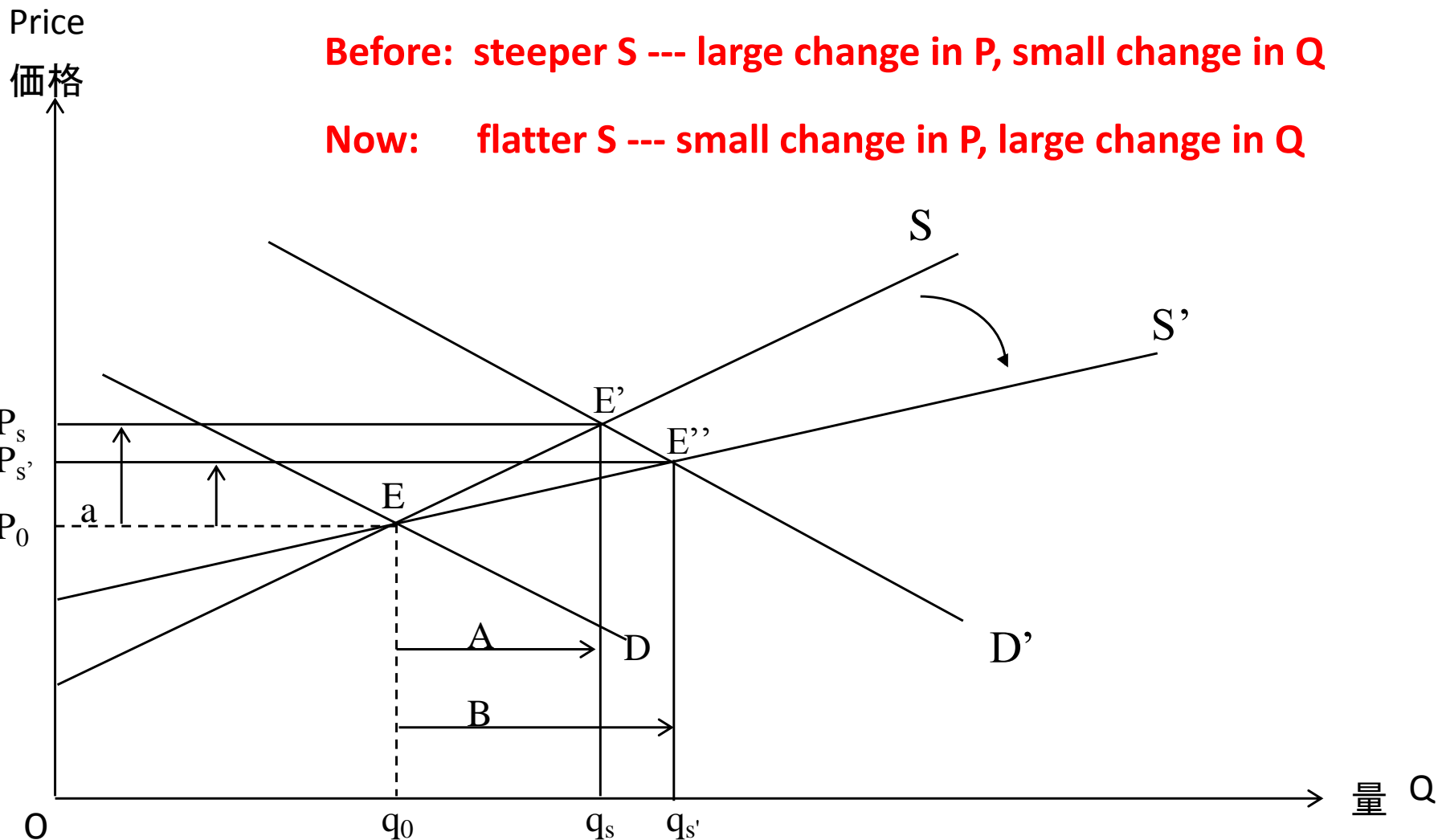
t: **Period from Jan. 1, 2011 to July 31, 2012.**

Fig 6. Outward shifts in rice supply curve in Arkansas during 1960s – 1990s:
Due to technology innovations



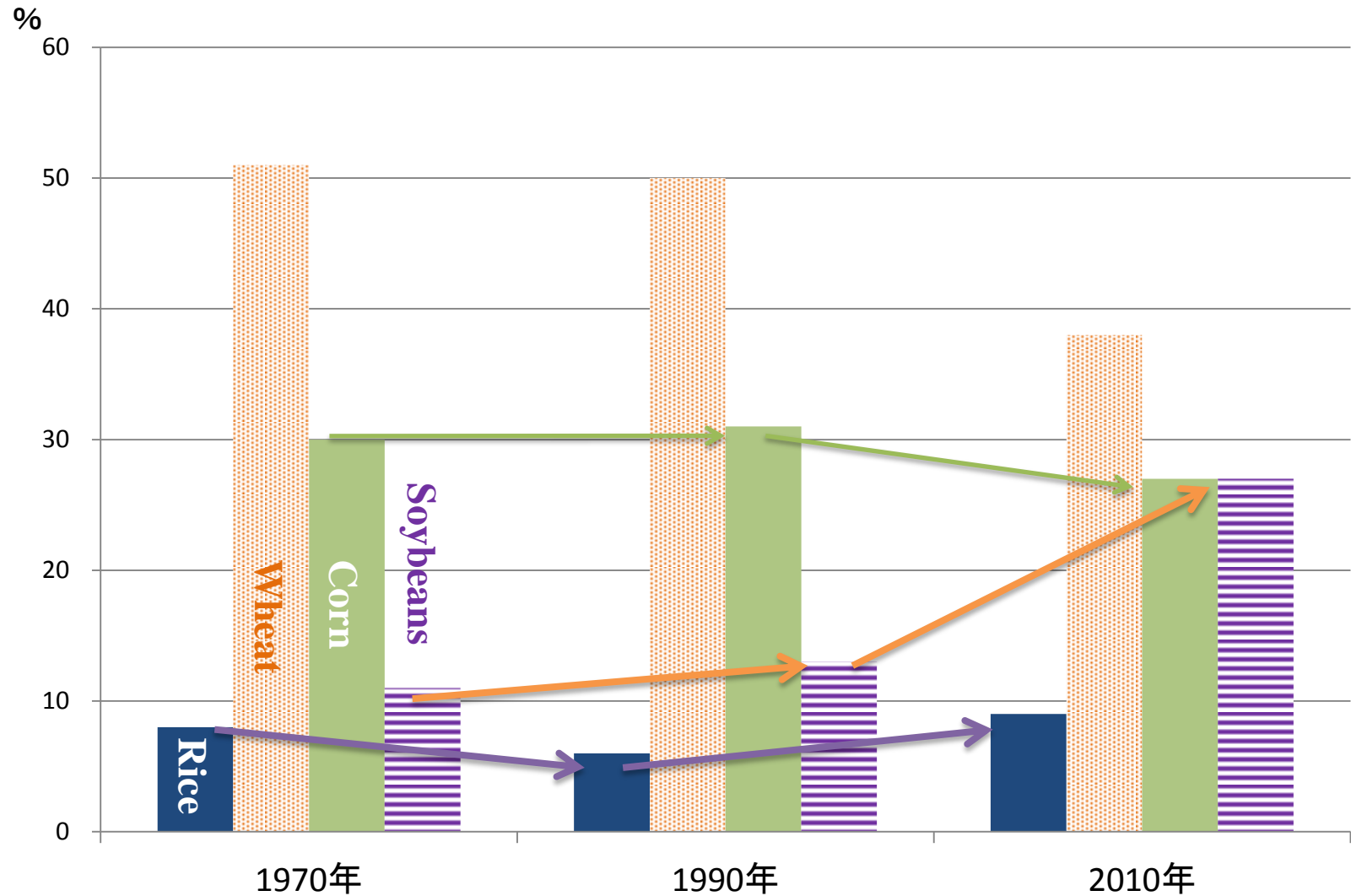
注1: cwt=100ポンド
資料: Ito, et al., 1995.

Fig. 7. Impacts of change in slope of supply curve on market prices



注釈: 供給線の傾きがより平らになりSからS'にシフトした状態では需要曲線がDからD'に何らかのショックでシフトした場合に価格の変動はSのとき,a, よりもS'のとき,b,の方が小さい。逆に供給量の変動はSのとき,A,よりS'のとき,B,の方がより多くなる。

Shares in global exports of rice, wheat, corn and soybeans in 1970s, 1990s, and 2010s.



注1: いずれも3年間の移動平均を使って算出した。ただし、2010年は2009年と2010年の平均とした。主要4品目の合計を100%場合のシェア。

注2: データはUSDA(米国農務省)のPSD Online, August 2011のデータから引用した。

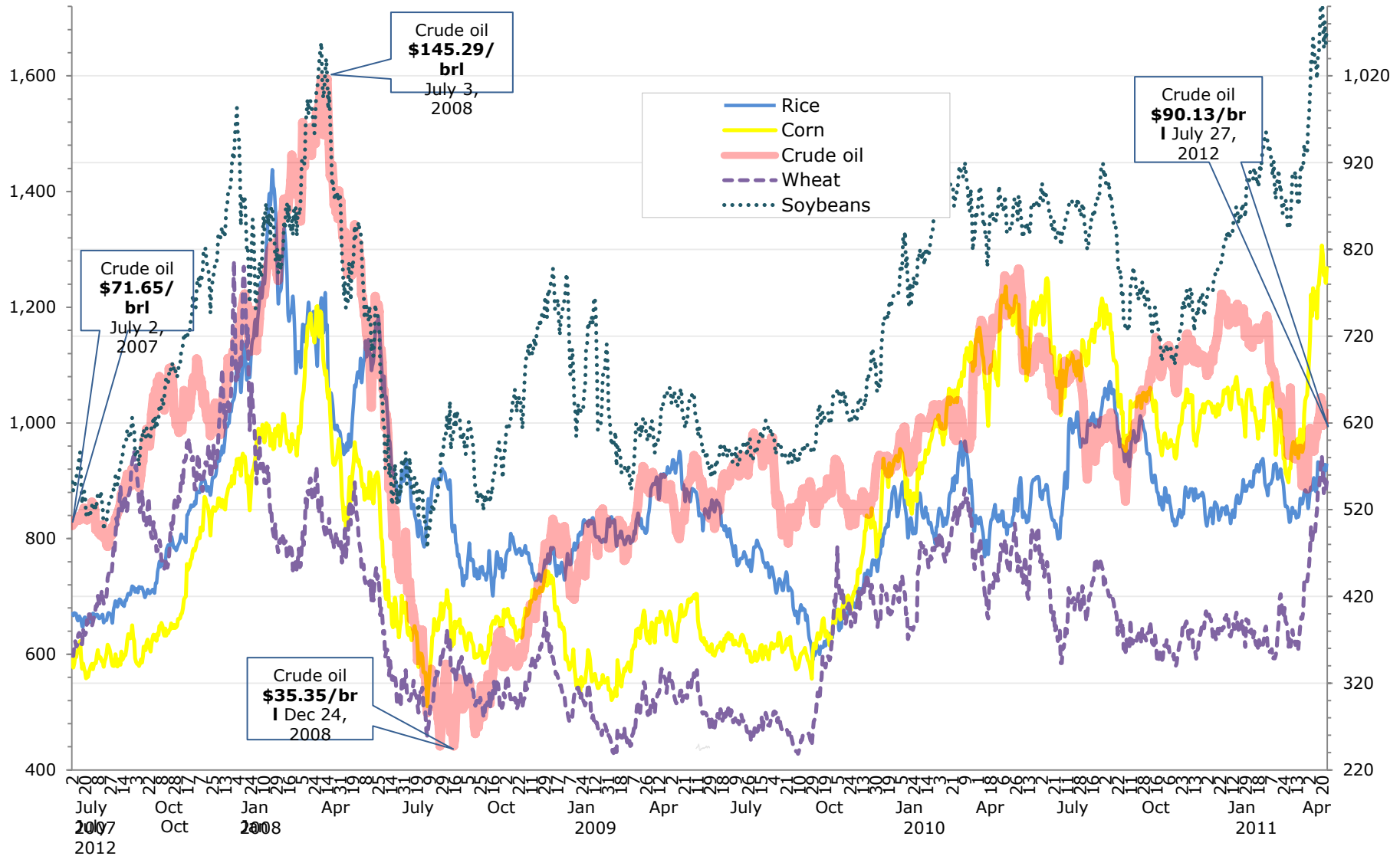
九州大学農学研究院農政学教室(代表: 伊東 正一)

Daily Price Movements of Oil, Rice, Wheat, Corn and Soybeans in the U.S

(Daily Prices, July 2, 2007 - July 27, 2012)

Soybeans, Wheat
(Cent/bu)

M. Rice (\$/tone)
Corn (Cent/bu)



Rice prices are reported on original website in the rough rice basis in unit of US\$/cwt. Milled rice price data were calculated from equation: Original data multiplied by $1000/(45.36 \times 0.6)$ for 1 ton, which implies approximately equivalent to 4-percent-broken milled-rice package for U.S. No.1.

Source: GFT - Online Futures Trading, <http://futures.tradingcharts.com>

Key to the future...

- **China and India:**
 - Huge production and potential
 - Large potential for trade
- **Other potential regions:**
 - South America: Brazil, Argentina, Uruguay
 - Excellent weather and soil