Bilateral Trade and Food Security

Food Security in Asia and the Pacific Symposium
University of British Columbia
17 September 2012

Douglas H. Brooks
Benno Ferrarini
Eugenia Go

ADB

Outline

- Trade and food security nexus

- BIPI and mapping food trade

- Import source diversification – addressing food trade vulnerability

ADB

Trade and Food Security Nexus

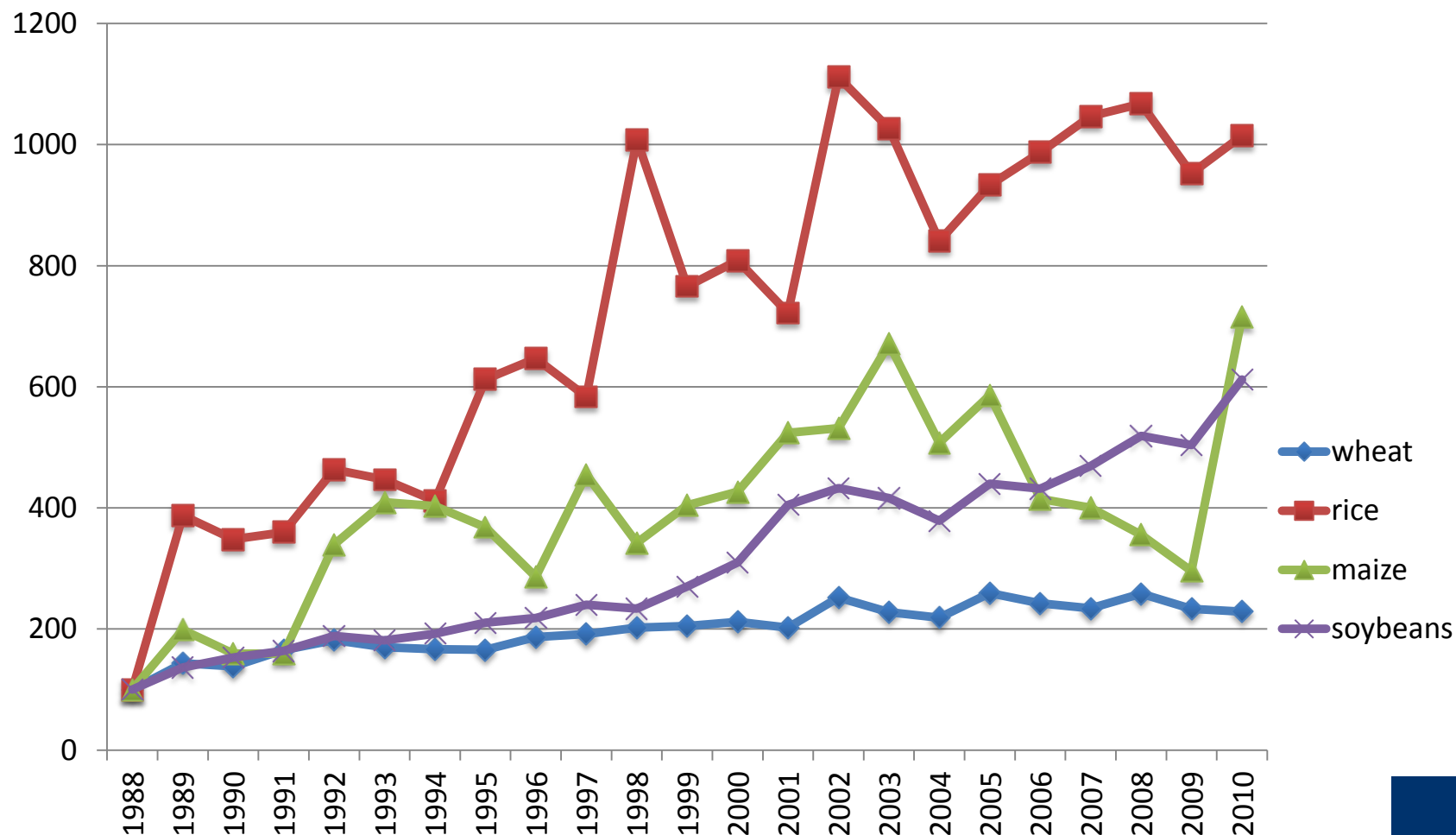# The debate on self-sufficiency and self-reliance continues …

Self-sufficiency

- national concept
- Emphasis on domestic production

Self-reliance

- Spatial aspects of access and distribution
- Emphasis on consumption

ADB

But trade can potentially complement domestic food sources

Volume Index of Trade in Staple Food 1988-2010

Several countries in Asia are dependent on imports for a large part of domestic consumption

Total Import Penetration as % of Domestic Supply , 2006-2010

Rice	Wheat	Maize	Soybeans
BRN (97)	KOR (100)	FJI (100)	ARE (100)
AZE (85)	THA (100)	JPN (100)	KGZ (100)
KGZ (64)	GEO (88)	MYS (95)	MYS (100)
TLS (63)	JPN (85)		NZL (100)
AU (53)	BGD (76)		PAK (100)
	ARM (63)		PHL (99)
	AZE (52)		JPN (95)
			KOR (91)
			THA (88)
			CHN (71)
			IDN (70)
			AUS (60)

Note: 1. Estimates were not made for countries without domestic supply data from FAO

2. Export data favors importers' records

Source: Estimates using Comtrade and FAO Food Balance Sheets

ADB

But aside from physical availability, trade also facilitates food security through…
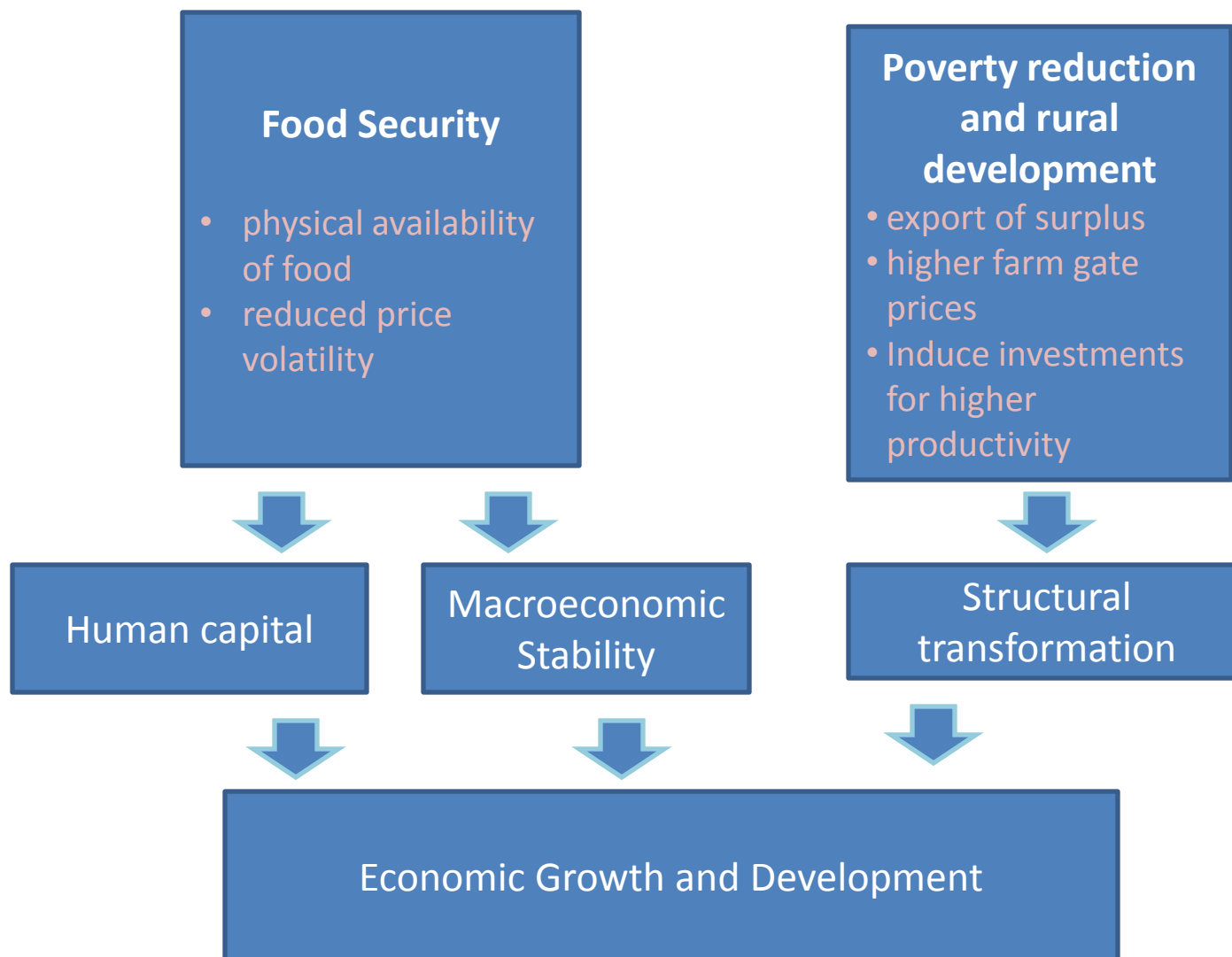
- Market expansion

- Reduced price volatility

- Competition

- Effectiveness of macroeconomic tools

- Fiscal burden and opportunity costs

- Environmentally sustainable food production

ADB

Aside from physical availability, trade also facilitates food security through…

Price transmission and market integration

- Getting the signals right
- Productivity and technology adoption
- Planning food relief operations

From an even broader perspective…

Food Security

- physical availability of food
- reduced price volatility

Poverty reduction and rural development

- export of surplus
- higher farm gate prices
- Induce investments for higher productivity

Human capital

Macroeconomic Stability

Structural transformation

Economic Growth and Development

ADB

A number of frameworks have been used to study the links between trade and food security

- **Price transmission and volatility**

- **Gravity**

- **Partial equilibrium and CGE models**

- **Estimation of distortions**

ADB

BIPI and Mapping Food Trade

There are a number of food security indices out there

- Global Hunger Index – IFPRI
- Food Security Vulnerability Indices – IFPRI
- Food Price Index – FAO, World Bank
- Maplecroft
- EIU Food Security Index – Economist Intelligence Unit (DuPont)

ADB

Bilateral Import Penetration Index (BIPI)

$$BIPI_{ij} = \frac{M_{ij}}{\sum\limits_{j=1}^{n}(X_{ij} - M_{ij}) + P_i} = \frac{M_{ij}}{\sum\limits_{j=1}^{n} M_{ij}} \underbrace{\frac{\sum\limits_{j=1}^{n} M_{ij}}{\sum\limits_{j=1}^{n}(X_{ij} - M_{ij}) + P_i}}$$

$$TIPI_i = \frac{\sum\limits_{j=1}^{n} M_{ij}}{\sum\limits_{j=1}^{n}(X_{ij} - M_{ij}) + P_i}$$

Where:

M_{ij} Imports of j from country i

X_{ij} Exports of country j to country i
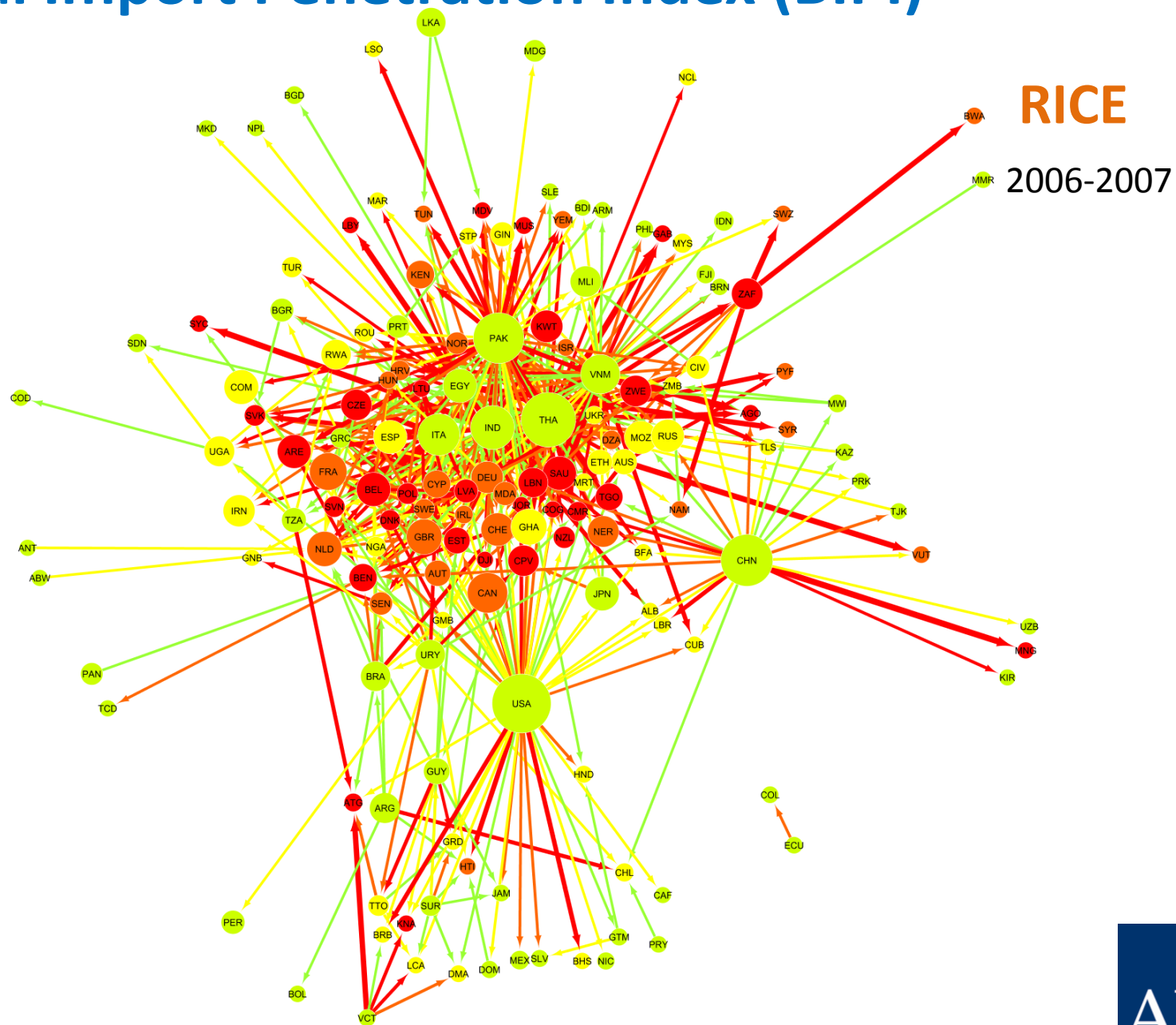
P_i Production in country i

Computed BIPIs for rice…

Importer		Partner		BIPI	Volume '000 Tonnes		
Code	Country	Code	Country		Bilateral Imports	Total Imports	Domestic Supply (Production + Imports - Exports)
AGO	Angola	VNM	Viet Nam	1.000	297	514	249
MNG	Mongolia	CHN	People's Rep. of China	0.851	47	47	46
GAB	Gabon	THA	Thailand	0.850	76	105	75
BEN	Benin	THA	Thailand	0.842	487	1081	485
SVN	Slovenia	ITA	Italy	0.802	14	23	15
COG	Republic of Congo	VNM	Viet Nam	0.800	128	249	134
SYC	Seychelles	IND	India	0.800	11	12	12
VUT	Vanuatu	AUS	Australia	0.754	21	22	23
CZE	Czech Republic	ITA	Italy	0.742	96	125	108
DJI	Djibouti	IND	India	0.733	73	89	84
KWT	Kuwait	IND	India	0.728	348	454	401
SWZ	Swaziland	ZAF	South Africa	0.724	38	41	44
LBY	Libya	EGY	Egypt	0.709	252	316	298
ATG	Antigua	VCT	St. Vincent & the Grenadines	0.674	2	3	2
SYR	Syria	EGY	Egypt	0.655	388	411	497

Resulting BIPIs can be translated into maps

- Summarizing relationships between country pairs
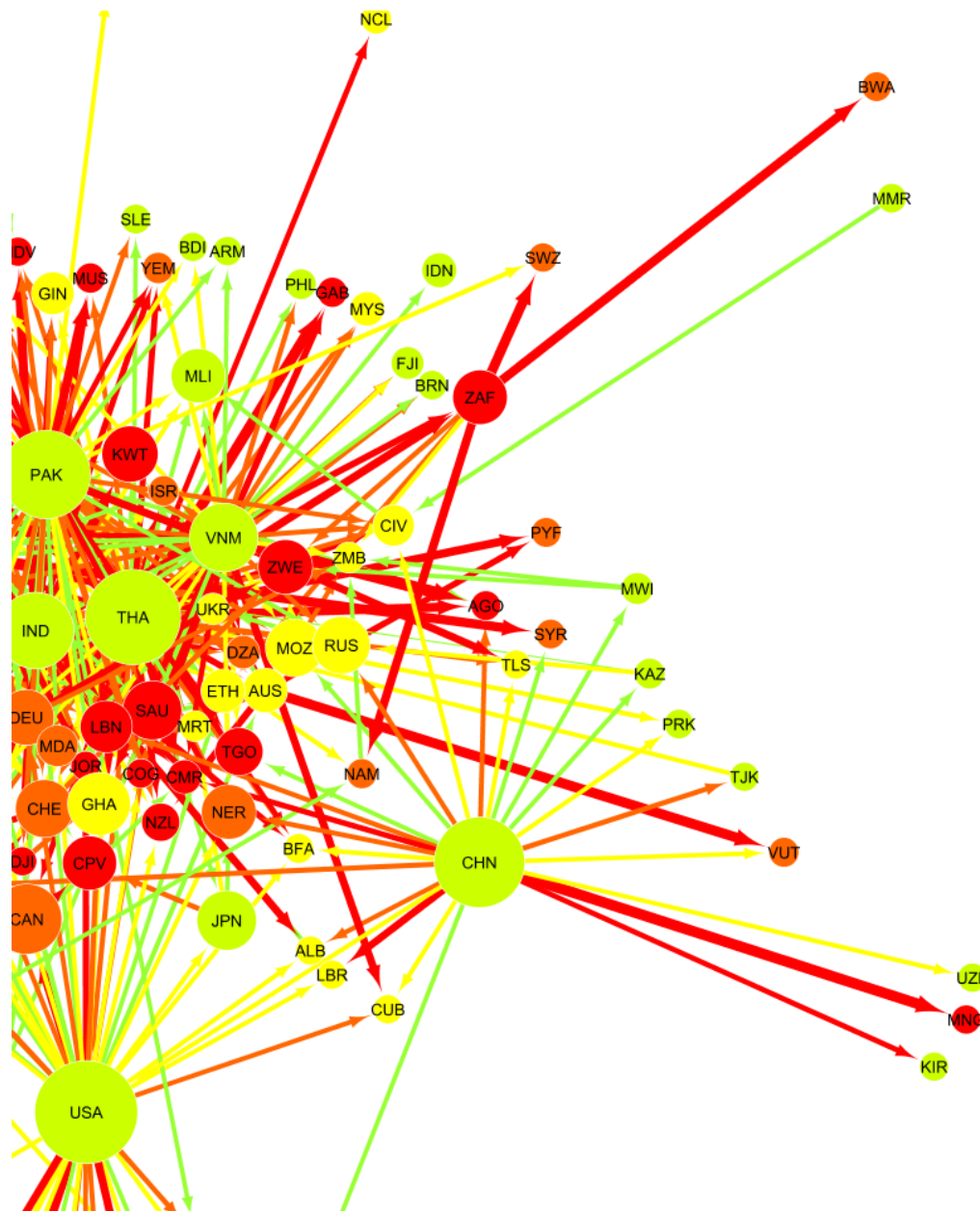- Network mapping software
- Force directed algorithm

ADB

Bilateral Import Penetration Index (BIPI)

RICE

2006-2007

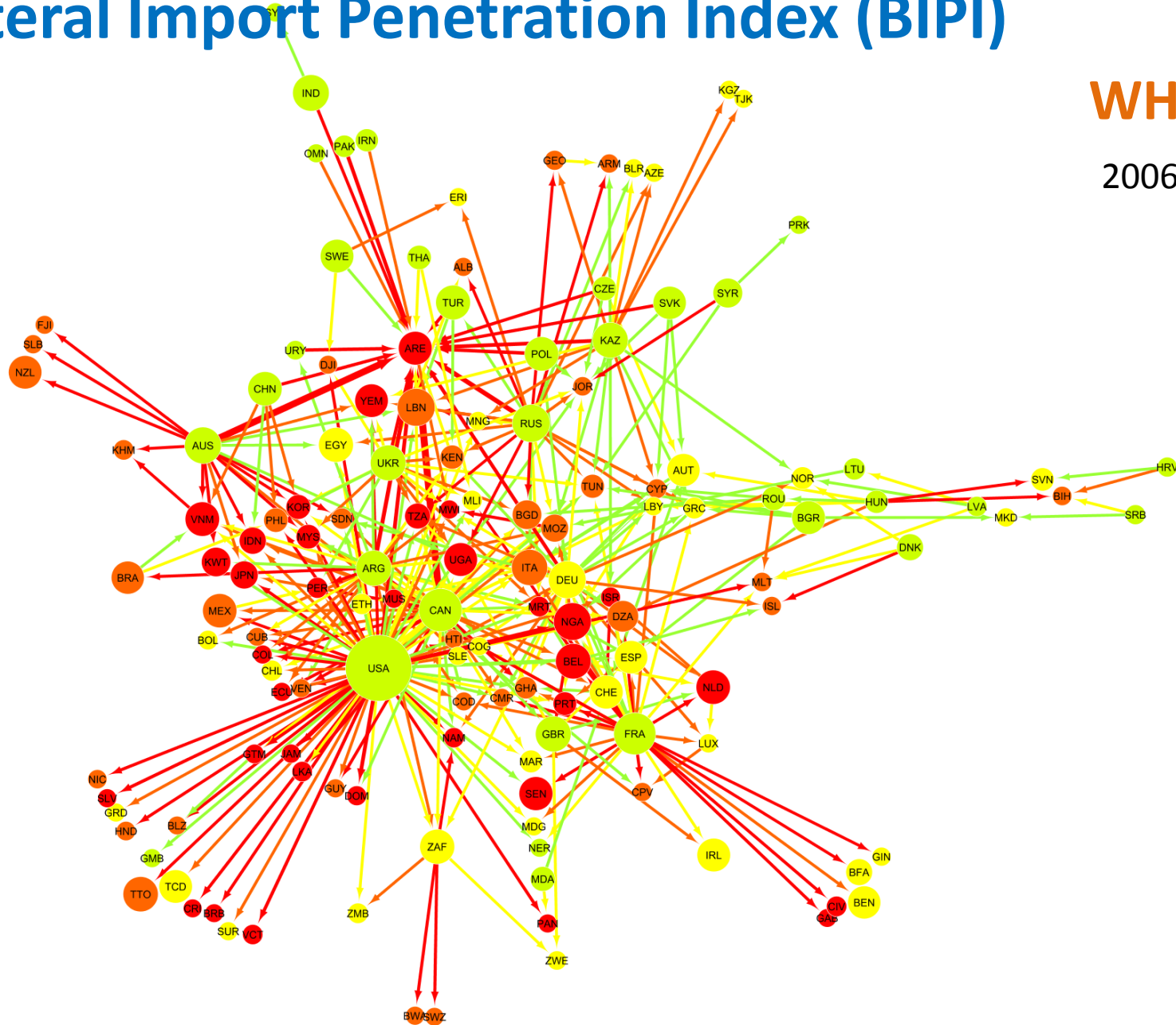# Bilateral Import Penetration Index (BIPI)

RICE

2006-2007

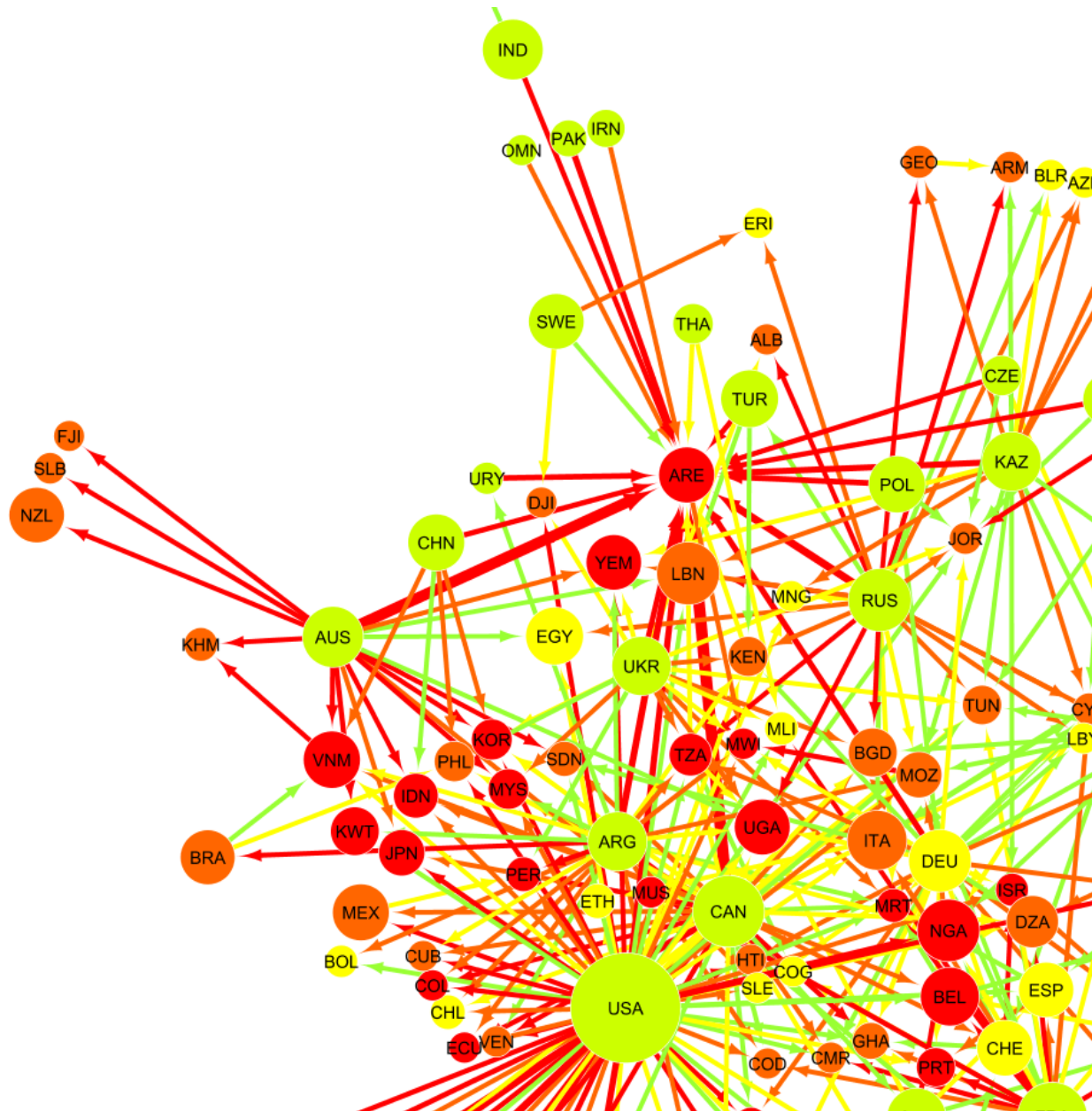# Bilateral Import Penetration Index (BIPI)

WHEAT

2006-2007

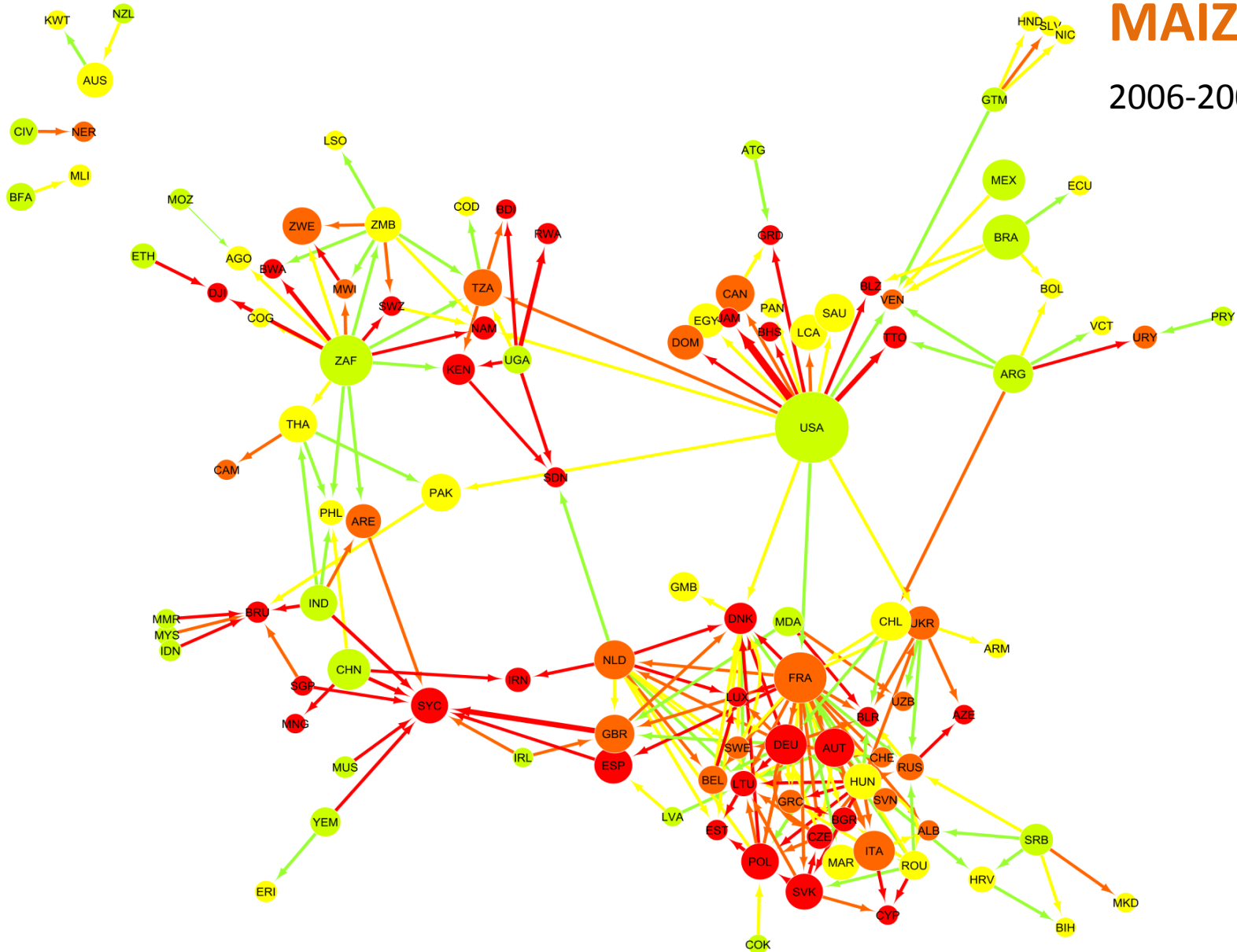# Bilateral Import Penetration Index (BIPI)

WHEAT

2006-2007

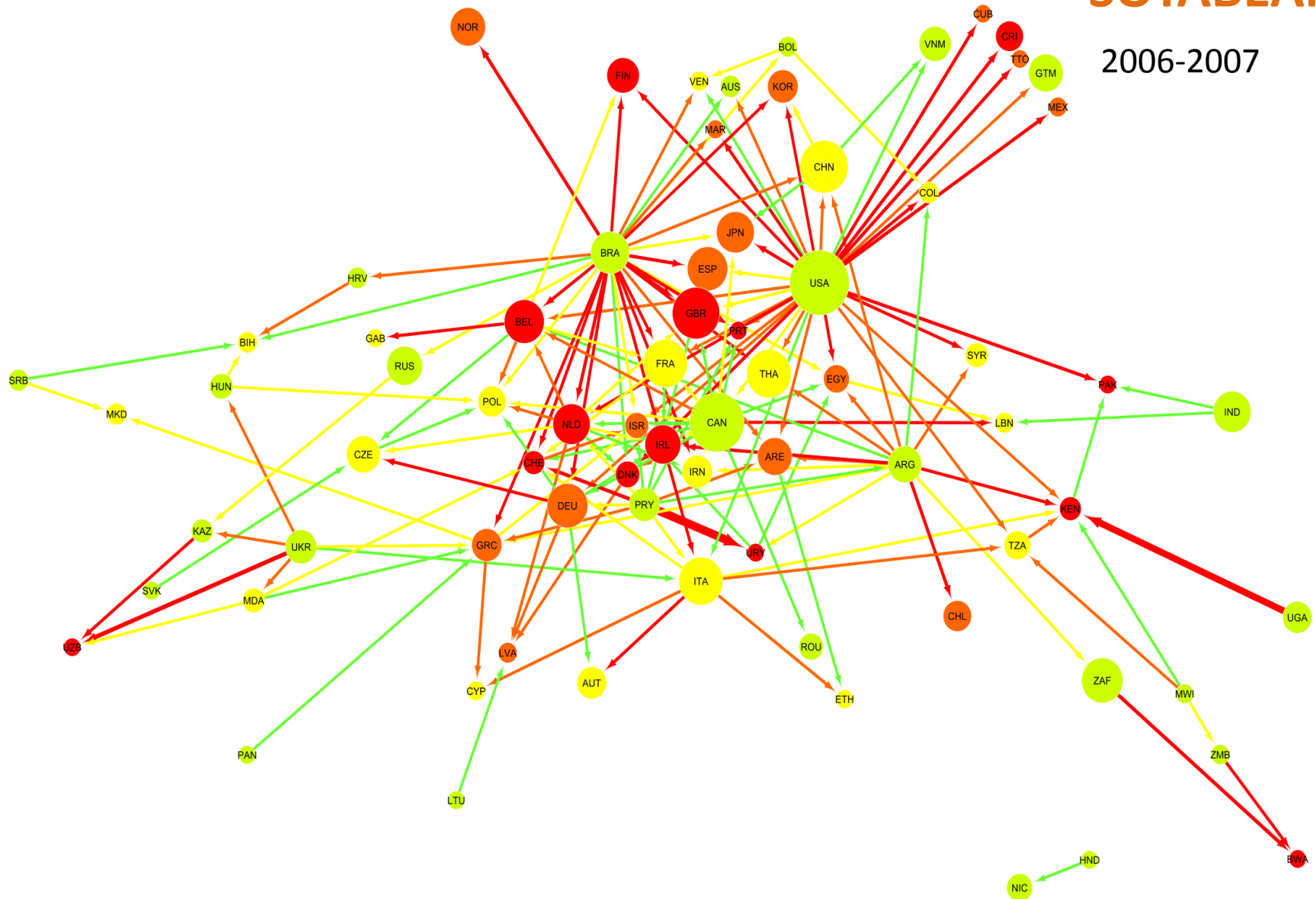# Bilateral Import Penetration Index (BIPI)

MAIZE

2006-2007

Bilateral Import Penetration Index (BIPI)

SOYABEANS

2006-2007

Import Source Diversification: Addressing Food Trade Vulnerability

Addressing bilateral food trade vulnerabilities

- Infrastructure
- Preferential trade agreements and other regional initiatives
- Trade policies and market institutions

ADB

Addressing bilateral food trade vulnerabilities

INFRASTRUCTURE

- **General infrastructure**

  ability to receive and store supplies and ability to export surpluses

- **Food as a special commodity**

  o *specialized infrastructure for food handling*

  o *sensitive to length of transport, unexpected delays*

  o *special protocols and procedures in handling and transport*

- **Prices**

  Low value to bulk ratio - products sensitive to increased logistics costs

Addressing bilateral food trade vulnerabilities

PREFERENTIAL TRADE AGREEMENTS

- Preferential trade agreements
- ASEAN plus three Rice Reserve System

ADB

Addressing bilateral food trade vulnerabilities

TRADE POLICIES AND MARKET INSTITUTIONS

- o Role of parastatals
- o Private sector participation
- o Market access tools
- o Export subsidies, food aid
- o Domestic subsidies

Summary

- Traditional methods of analyses tend to find that trade facilitates food security, though results of country level studies tend to be more nuanced

- Analysis of trade-food security nexus can be enriched by examining bilateral trade trade vulnerabilities through the BIPI

- The BIPIs lend itself to network analysis and can be mapped according to the strength of relationship between country pairs

- Resulting maps inform on the sources of vulnerabilties, countries immediately affected by supply disruptions from a particular supply linkage, and possible alternative suppliers

- Diversification of import supply sources - infrastructure, PTAs and concomitant arrangements, and market institution reforms – can reduce vulnerabilties from bilateral sources

ADB

Thank you

dbrooks@adb.org