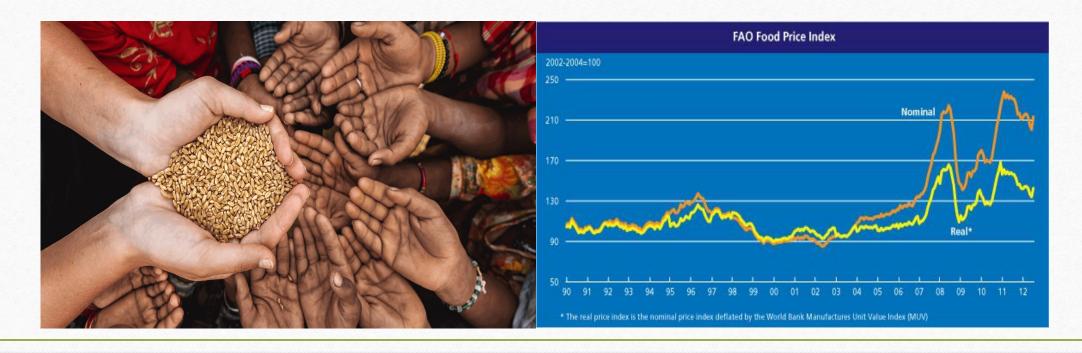
# Vulnerability in Food Supply and Food Access – Evidence from ECO Region

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### **Key Objectives**

### Identification of internal policy stance within each ECO countries in terms of how to cater to their important food requirements

- Policy of Food Independence versus Policy of Food Diversification
- Building capacity to fulfil local and international rising demand for animal protein

#### Assessment of Vulnerability to International Price Shocks

• Most prominent international price shocks post 2000 are rise in food price in 2007-08 and 2010-11, decrease in oil prices in 2015

# Importance of Food Independence versus Crop Diversification Policy within Agricultural Policy Making Paradigms

### Productionist View

- Traditionalist stress on self-sufficiency policy as tool to ensure food availability
- International Policy Think-Tanks post 2000 has advocated policy of crop diversification into cash crops both as measure of food availability but also enhancement of Food Access for poor farmer

### Market Led View

- Market based outcome
- Conflict of efficiency and equity
- Role of government as regulatory body

### Developmentalist View

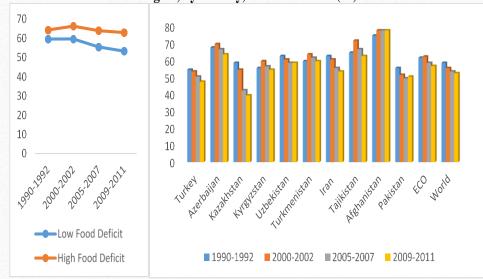
• Deals with Sustainable development goals and combines elements of all four dimensions of food security namely food availability, food access, food stability, and food utilization whereby stress has been on agricultural led growth.

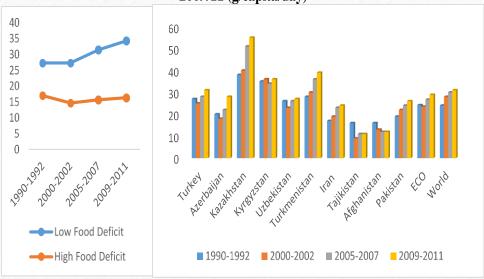
# Shift in Consumer Preferences for Dietary Calories from Staple Food toward Animal Protein

Figure 1: Share of dietary energy supply derived from cereals, roots and tubers in ECO Figure 2: Average supply of protein of animal origin in ECO Region, by country, 1990/92-2009/11(%)

Region, by country, 1990/92-2009/11(%)

2009/11 (g/capita/day)

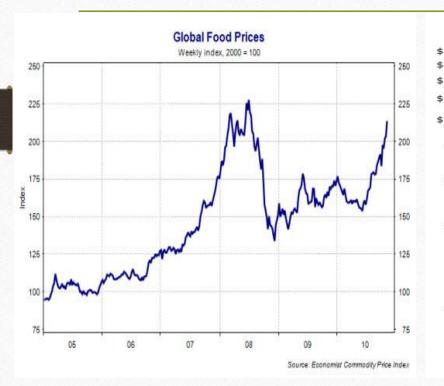


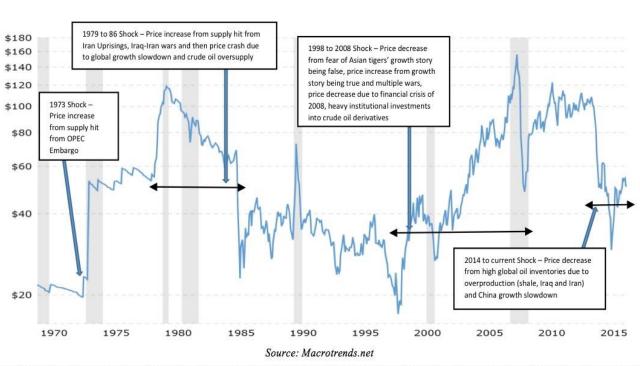


Data Source: FAOSTAT

Data Source: FAOSTAT

### International Price Shocks - Two Important Sources





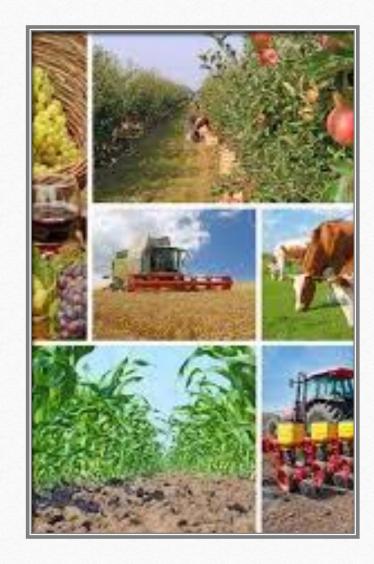
### **Data Limitations**

- Firstly we have data on food prices for only three countries that is Turkey, Iran and Pakistan and that only for merely fifteen time periods that is from 2000 to 2014.
- Secondly data on food prices is only available at aggregate level even within Turkey, Iran and Pakistan



### **Empirical Methodology**

- For crop diversification and self-sufficiency debate, we will compare net trade patterns in two primarily food items namely staple food group and cash crop group
- For catering to local and international demand for animal protein, we will compare net trade patterns in two primarily food items namely meat and fish products



### Empirical Methodology

Assessment of Vulnerability will take place at two levels:

- Assessment of Price and Inflation series ((both actual and forecasted series)
- Assessment through different indicators of stability dimension of Food security using following key variables

Indicators	Data Source	Food Insecurity Dimension As Per FAO Definition
Cereal Import Dependency Ratio (%)	FAO	Stability
Gross International Reserves (Million US\$)	IMF, ADB, WDI	Stability
Value of food imports over total merchandise exports (%) (3-year average)	FAO	Stability



Figure 3a: Production Indices for Different Food Groups across Low and High Food Deficit ECO Regions Fruits and Vegetables **Roots and Tubers** Cereal Livestock Meat Milk O O Sugar Fish Vegetable Oil O O 2000 2014 2000 2014 1990 2000 2014

Note: Blue and Red lines indicate average for low and high food deficit regions respectively;

These figure are based on production indices with base 2004-06 = 100

Source: FAO Yearbook 2015, FAOSTAT

Figure 3b: Production Indices for Different Food Groups in ECO Region (Country-wise) Cereal Fruits and Vegetables 160 250 140 120 200 100 150 80 60 100 40 50 20 **AfBNanistan** Turkmenistan ~ Silkiston Azerbaijan Kalakkstan Turkmenistan ~ sillistar Kalakkstan Uzbekistan KARATSTON Uzbekistan **Azerbailan** KARBATSTON Afglianistan 1135 **Roots and Tubers** Livestock 250 200 200 150 150 100 100 50 50 Kalakhstan Turkmenistan ~ silkistar Azerbaijan Medistan Uzbekistan **Afelianistan** Kalakhstan **Jukinenistan** ~ Silkiston **Afglishistan** Medistan Uzbekistan 1431 1130 Meat Milk 200 200 150 150 100 100 50 50 Turkmenistan Azerbaijan Kalakketan KARATSTAN Uzbekistan ~ aillistan Af Bhanistan Azerbaijan Kalakhstan Turkmenistan ~ silkistan KARANSTAN Uzbekistan Afglianistan Pakistan Juster 1 14.01 14.01 Note: Blue, Red and Grey boxes represents estimates in years 1990, 2000 and 2014 respectively; These figure are based on production indices with base 2004-06 = 100Source: FAO Yearbook 2015, FAOSTAT

Fish Vegetable Oil 3500 300 3000 250 2500 200 2000 150 1500 100 1000 500 50 Wie Artan The Nation Talketan istan katistan Tailkistan Istan Karakhstan Turkmenistan Azerbaijan KALBATSTON Uzbekistan Azerbaijan Katakhstan Turkey 1431 Luikey Sugar 300 250 200 150 100 50

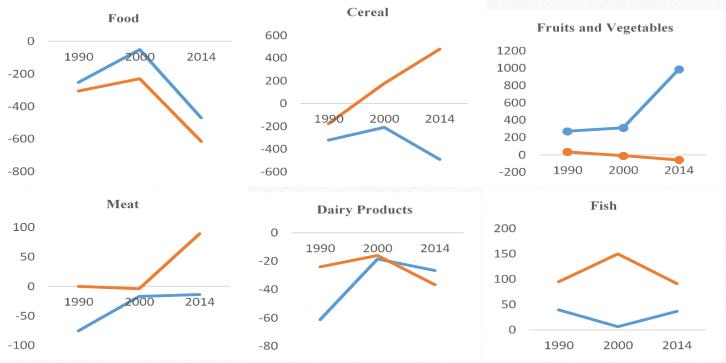
Figure 3b: Production Indices for Different Food Groups in ECO Region (Country-wise)

Note: Blue, Red and Grey boxes represents estimates in years 1990, 2000 and 2014 respectively;

These figure are based on production indices with base 2004-06 = 100

Source: FAO Yearbook 2015, FAOSTAT

Figure 4a: Net Trade (mln US\$) for Different Food Groups across Low and High Food Deficit ECO Regions



Note: Blue and Red lines indicate average for low and high food deficit regions respectively Source: FAO Yearbook 2015, FAOSTAT

Cereal Fruits and Vegetables 7000 6000 4000 5000 4000 2000 3000 2000 Lall star Pakistar Prespaint Rate Transfer Transfer of Transf 1000 0 Turknen Jubekstan -1000 et in san -2000 uter balanstan ple kalanstan kusu Wight stan -4000

Figure 5: Net Trade (mln US\$) for Cereal and Fruits and Vegetables in ECO Regions (Country-wise)

Note: Blue, Red and Grey boxes represents estimates in years 1990, 2000 and 2014 respectively Source: FAO Yearbook 2015, FAOSTAT

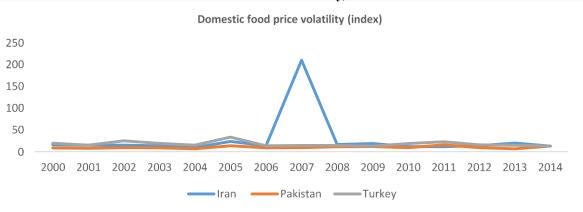
-6000

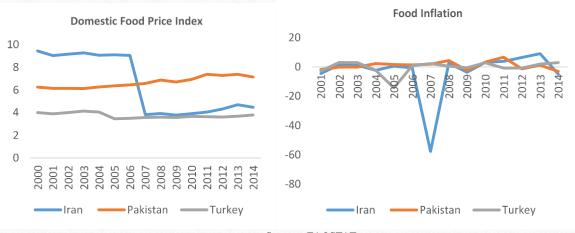
	Categorized by MDG Hunger Target Achievement	Net Trade in Cereal (US mln)	Net TradeFruits and Vegetables (US mln)	Policy View from Empirical Evidence	Traditional View from Policy Documents
Turkey	Low	519	5738	Diversification	
Azerbaijan	Low	-432	206	Diversification	
Kazakhstan	Low	2019	-840	Self-sufficiency	Food Independence
Kyrgyzstan	Low	-185	106	Diversification	Food Independence
Turkmenistan	Low		-13	not clear	
Uzbekistan	Low	-483	412	Diversification	Food Independence
Iran	Low	-4387	1305	Diversification	
Tajikistan	High	-316	26	Diversification	Food Independence
Afghanistan	High	-372	-42	not clear	Food Independence
Pakistan	High	2125	-163	Self -sufficiency	Food Independence
	Low Food Deficit Group	-491.5	987.7142857	Diversification	
	High Food Deficit Group	479	-59.66666667	Self –sufficiency	

Fish Meat 300 600 250 200 400 150 200 100 50 Pakistan Turkey Tajikistan Azerbaijan Kazakhstan<sub>■</sub> Turkmenistan Kyrgyzstan Uzbekistan Afghanistan -50 -600 **Dairy Products** 300 200 100 -100 -200 -300 -400 Note: Blue, Red and Grey boxes represents estimates in years 1990, 2000 and 2014 respectively Source: FAO Yearbook 2015, FAOSTAT

Figure 6: Net Trade (mln US\$) for Meat, Fish and Dairy Products in ECO Regions (Country-wise)

Figure 7: Evolving Dynamics in Domestic Food Prices in Iran, Turkey and Pakistan (at Level, in its Rate of Change and its Variability)





Source: FAOSTAT

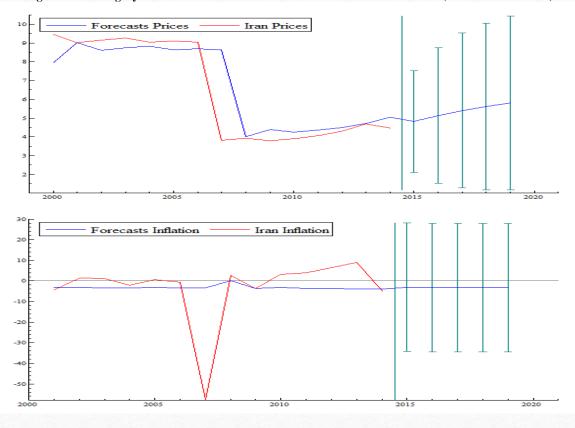
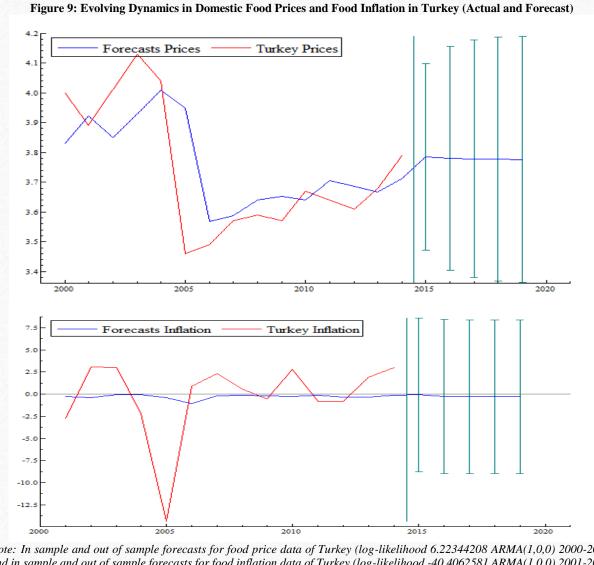


Figure 8: Evolving Dynamics in Domestic Food Prices and Food Inflation in Iran (Actual and Forecast)

Note: In sample and out of sample forecasts for food price data of Iran (log-likelihood -26.4232153 ARMA(1,0,1) 2000-2014) and in sample and out of sample forecasts for food inflation data of Iran (log-likelihood -58.3030352 ARMA(1,0,0) 2001-2014)

Source: FAOSTAT



Note: In sample and out of sample forecasts for food price data of Turkey (log-likelihood 6.22344208 ARMA(1,0,0) 2000-2014) and in sample and out of sample forecasts for food inflation data of Turkey (log-likelihood -40.4062581 ARMA(1,0,0) 2001-2014) Source: FAOSTAT

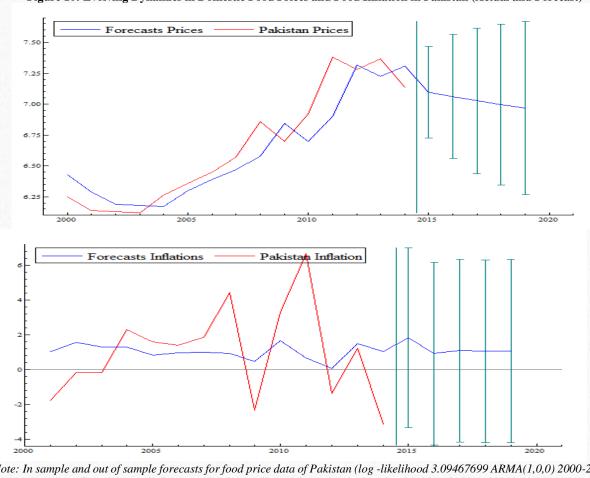


Figure 10: Evolving Dynamics in Domestic Food Prices and Food Inflation in Pakistan (Actual and Forecast)

Note: In sample and out of sample forecasts for food price data of Pakistan (log -likelihood 3.09467699 ARMA(1,0,0) 2000-2014)) and in sample and out of sample forecasts for food inflation data of Pakistan (log-likelihood -33.1399383 ARMA(1,0,0) 2001-2014).

Source: FAOSTAT

Figure 10: Assessment of Vulnerability to International Price Shock **Net Food Production index** Net Food Production index (2004-06=100) (2004-06=100)150 200 150 100 100 50 50 Turkey Azerbaijan Kazakhstan Kyrgyzstan 1990 2000 201 Low Food Deficit Group 2014 ■ Turkmenistan ■ Uzbekistan Iran ■ Tajikistan High Food Deficit Group ■ Afghanistan ■ Pakistan Net Trade in Food **Net Trade in Food** 6000 2014 4000 1990 -200 2000 0 -400 kalakhstan -600 -800 -6000 -8000 Low Food Deficit Group **■** 1990 **■** 2000 **■** 2014 — High Food Deficit Group **Cereal Import Dependency Ratio Cereal Import Dependency** Ratio 100 40 50 30 20 10 0 1990 2000 2014 -100 Low Food Deficit Group **■** 1990 **■** 2000 **■** 2014 High Food Deficit Group Source: FAO Yearbook 2015, FAOSTAT

Figure 10: Assessment of Vulnerability to International Price Shock (Continued) Gross International Reserves (Million US\$) **Gross International Reserves** (Million US\$) Kalakhstan the Area Train Low Food Deficit Group ■1990 ■2000 ■2014 ----High Food Deficit Group Value of food imports over Value of food imports over total merchandise exports total merchandise exports (%) (3-year average) (%) (3-year average) **─**Low Food Deficit Group **■**1990 **■**2000 **■**2014 → High Food Deficit Group Source: FAO Yearbook 2015, FAOSTAT

#### Categorization ECO Countries by Extent of Risk to Food Security in Face of International Price Shocks **Countries Progress MDG** \*Cereal Import **Percentage Deviation** Percentage Deviation from Regional \*Mean hunger target **Dependency** for Regional Mean for \*\*Gross for Value of food International imports over total Reserves merchandise exports No Risk Turkey fulfilled Not Dependent -85.7% 252.7% Iran fulfilled Dependent 214.7% -78.6% Moderate Risk Turkmenistan fulfilled Dependent -10.3% -95.2% Kazakhstan fulfilled Not Dependent -19.1% -90.4% Uzbekistan fulfilled Dependent -33.1% -78.6% Azerbaijan fulfilled Dependent -56.9% -92.8% Extreme risk Tajikistan Failed Dependent -98.5% 2.13% fulfilled Dependent -21.6% Kyrgyzstan -94.5% Dependent Afghanistan Failed -79.9% 603.08% Pakistan Not Dependent Failed -74.8% - 61.9 %

Data Source: \*FAOSTAT, \*\*This information has been retrieved from secondary source namely PIDE Project Report on ECO Macroeconomic Modelling; Primary data sources are IMF, ADB and WDI as per project report

#### Conclusion

- In both low and high food deficit zones, we are seeing a mix in policy practice of Food independence versus Crop Diversification. Hence there is no clear indication as to which policy path is more conducive for hunger reduction process.
- Among ECO countries only two countries Kazakhstan and Pakistan are following path of self-sufficiency in staple food production, within rest mostly there is policy practice of crop diversification towards cash crops.
- In terms of catering to increased local and international demand for animal protein, only two countries that are showing positive potential in this respect are Turkey and Pakistan.
- Finally in context of vulnerability to international price shocks we can categorize region into three sub-zones as per the extent of risk they face, however important policy note is that all high food deficit countries fall in category of those that are extremely vulnerable to international Price shocks

