

Global Food Price Hike

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Abstract: *This paper discusses the global food price hike and the effects of it among the poor of developing countries. Increase of food price became severe during 2007 and 2008, which was high in the last fifty years and more than half of the populations of the world affected due to this price hike. Biofuels production is one of the main causes of food price increase. Rapid increase of world population is another cause of soar of food price. Global supply and demand of food commodities, low harvest and natural calamities are also some other causes of increasing of the food prices. Soaring food prices have generated global concern about threats to food security, shaking the satisfaction created by many years of comparatively low commodity prices. Right of food is a fundamental right of every citizen of the state; unfortunately citizens of the most countries are deprived from this right. Many developing countries use food price subsidies or price controls to mitigate hunger and improve the nutrition of the poor but this is not a permanent solution to control food price hike.*

Keywords. *Child malnutrition, Biofuels, Food prices, Inflation, Poverty, Subsidies in food.*

1. INTRODUCTION

All the living organisms as well as human beings must eat to survive. So that everyone is affected to some degree when food price increases. Food price increase depends on the consumer's demand. Consumer demand is influenced by some economic factors such as own-price, the price of close substitutes, and the price of complementary items. The non-economic factors including tastes and preferences, family size, age of family members, geographic location, shopping behavior, and lifestyle choices are related to commodity price hike. The poor are more vulnerable than the rich during the period of food price hike. In June 2008 representatives of 180 countries, including many heads of state, met in Rome to express their conviction "that the international community needs to take urgent and coordinated action to combat the negative impacts of soaring food prices on the world's most vulnerable countries and populations" (FAO, 2008).

Economists call the relationship between changes in consumer income and the quantity of an item purchased an *Engel curve*. An Engel curve describes how household expenditure on a particular good or service varies with household income, which states that the lower a family's income, the greater is the proportion of it spent on food. This relationship is used by economists to classify goods as follows (Schnepf, 2012):

- For a normal goods, consumers buy more of it as their incomes increase, but at a decreasing rate such that its average budget share declines for higher income levels.
- For a luxury goods, consumers buy more of it as their incomes increase and at an increasing rate such that its budget share increases at higher income levels.
- For an inferior goods, consumers buy less of it as their incomes increase.

Choice of food varies according to age. Young children and adolescents generally need both more calories and a higher portion of protein-based calories to meet nutritional demands of rapid physical growth and high activity levels. The mothers of infants need some additional food to provide breast feeding their infants. The family spends more to buy meat and dairy products for the children and mothers. The older family members need normal foods. As a result, population demographics such as household composition, size, and age structure often play an important role in consumer price sensitivity and income responsiveness. If price of meat and dairy products

increases then the children, adolescents and mothers suffer with malnutrition if the income of the family is not increased.

During the 2008–09 period global economic crises; increased unemployment, income decreased, and lower effective household purchasing power happened globally. Increase of salary and wage of the employees is also another main reason of food price hike in developing countries.

The G20 ministers of agriculture started working together in 2011 and designed an action plan to tackle food price volatility and food insecurity. The five objectives of the G20 ministers of agriculture are as follows:

- improving agricultural production and productivity,
- increasing market information and transparency,
- reducing the effects of price volatility for the most vulnerable,
- strengthening international policy coordination, and
- improving the functioning of agricultural commodity derivatives' markets.

In the first decade of the 21st century the prices of energy has increased by a larger amount. The domestic sector was liable for 26% of final energy consumption in 2010 in the UK. Gas use is 65%, electricity is 25%, petroleum is 7% and solid fuel is 2%. This increase of energy prices influences the increase of global food prices, because energy is used to produce, packaging and carrying food.

2. GLOBAL BIOFUELS PRODUCTION AFFECTS FOOD PRICES

Biofuels are combustible materials directly or indirectly derived from biomass, commonly produced from wood, agricultural crops and products, aquatic plants, forestry products, wastes and residues, and animal wastes. In the late 19th century, Rudolph Diesel used peanut oil to power compression engines. Henry Ford was also an early proponent of biofuels. Ford built a factory that began making biofuels, but oil soon became the mainstream fuel of choice. In the 19th and the 20th centuries, fossil fuels were main source of vehicle fuel.

Necessity of biofuels has increased in response due to global environmental and economical difficulties. Gaseous biofuels include methane gas and producer gas. Methane gas is produced from the anaerobic fermentation of animal wastes, wastewater treatment sludge and municipal wastes in landfills. Current biofuels are often made from feedstock crops which also serve as food. To produce biofuels, supply of food is decreasing and many people are starving due to shortage of food, so that people of poorer countries are suffering from malnutrition and prices of foods are increasing in these countries. To produce biofuels sometimes habitats are destroyed, so that ecosystems are broken and harms high biodiversity and services which are crucial to our economies and human life.

Biofuels for transport are generally denoted according to their current or future availability as first, second or third generation biofuels as follows (International Energy Agency, IEA, 2008):

First generation biofuels are commercially produced using conventional technology. The basic feed stocks are seeds, grains, or whole plants from crops such as corn, sugar cane, rapeseed, wheat, sunflower seeds, jatropha curcas, soy or oil palm. These plants and grains were originally selected as food and most are still mainly used to feed people. Biofuels are produced from these feed stocks. The most common first generation biofuels are bioethanol, biodiesel, and biogas (CH₄ and other hydrocarbons). Biodiesel are obtained from edible oil or from animal oils which are transformed by a chemical process called transesterification. Biodiesel can be blended with fossil fuels without any motor's transformation and also can be used as pure biodiesel. Bioethanol are produced by the fermentation of sugars or starches from sugar cane, cassava, maize, potatoes, sorghum, sugar beet, wheat etc. We also find oilcake, glycerin, fertilizer etc. as by product when prepare first generation biofuels.

Second generation biofuels can be produced from a variety of non-food sources such as waste biomass, residues, non-food cellulosic (wood) and ligno-cellulosic material (freeing the sugar molecules from cellulose using enzymes), corn stover, the stalks of wheat, and special energy or biomass crops. Second generation biofuels use biomass to liquid technology, by thermochemical

conversion (mainly to produce biodiesel) or fermentation (to produce cellulosic ethanol). Many second generation biofuels are under development such as biohydrogen, biomethanol, dimethylfuran (DMF), Bio-DME (dimethyl ether), Fischer-Tropsch diesel, biohydrogen diesel, and mixed alcohols (Mohajan, 2012).

Algae fuel (oilgae) is a biofuel from algae and denoted as a third generation biofuel (International Energy Agency, IEA 2008). Algae are feed stocks from aquatic cultivation for production of triglycerides to produce biodiesel. The processing technology is basically the same as for biodiesel from second generation feed stocks. Other third generation biofuels include alcohols like bio-propanol or bio-butanol but because of production difficulties these will not be marketed before 2050 (IEA, 2008). Second and third generation biofuels are also called advanced biofuels.

World ethanol production for transport fuel tripled between 2000 and 2007 from 17 to more than 52 billion liter, while biodiesel expanded eleven-fold from less than 1 to almost 11 billion liter. These fuels together provided 1.8% of the world's transport fuel by energy value (Organization for Economic Co-operation and Development, OECD, 2008). Investment into biofuels production capacity probably exceeded \$4 billion worldwide in 2007 and increasing continually rapidly.

In Europe there has been a continuing increase in the use of biofuels in road transport over the past decade from 0.1% in 1997 to 2.6% in 2007 (European Environment Agency, EEA, 2008). New biodiesel capacity has developed throughout Europe which is about 7 billion liter per annum at the end of 2006. Plans for new biodiesel and increased palm oil and *Jatropha* plantations were announced in several countries during 2006–07. Serious commercial investment in second generation biofuels began during 2006–07 in many countries, like Canada, the USA, Japan and the EU (REN21, 2008). The world's first commercial wood-to-ethanol plant run by BioEthanol Japan Kansai Co. began operation in Osaka in 2007, with a capacity of 1.4 million liter per annum. In the USA, the first commercial cellulosic ethanol facility to convert waste wood materials into a renewable fuel went into production near Upton, Wyoming in 2008, run by KL Process Design Group. In Europe, the Dutch firm Royal Nedalco was building a \$200 million plant that would produce 200 million liter per annum from wheat chaff and other wastes by late 2008 (OECD, 2008). Global trade in fuel ethanol is estimated to have been about 3 billion liter per annum over 2006–07.

Brazil and the USA are the leaders for bioethanol production in the world generating 90% of the total production, with sugarcane in Brazil and mainly corn in the USA. It is estimated that about 90% US ethanol is obtained from maize (Schnepf, 2005). The rapidly increasing petroleum prices and uncertainties concerning its availability, growing concern of the environment and the effect of greenhouse gases (GHGs) during the last decades, has revived more and more interests in the use of vegetable oils as a substitute of fossil fuel.

A new US renewable fuels standard implies that 20% of gasoline for road transport would be blend of biofuels by 2022. In 2007, the German government proposed a national total biofuels target of 17% of energy consumption for road transport by 2020. The EU has adopted a new EU-wide binding target of 10% of transport energy from renewable sources by 2020 (EU, 2009).

By cultivating biofuels, most countries will be able to grow one or more types of crops in which they possess a comparative advantage and use them to meet either domestic or foreign demand or both. This increased demand for agriculture is expected to increase farm income and raise income for farmers, and reduce the need for subsidies for income support. These countries can produce their own fuel, and reduce their dependence on foreign sources for energy (Hazell and Pachauri, 2006).

Due to increase of biofuels production the prices all food commodities increased and stock depleted globally. From early 2007 to mid 2008 wheat prices have increased by over 40%, rice prices jumped by more than 60% and soybean prices also raised by 40% (United Nations Conference on Trade and Development, UNCTAD, 2008). Palm oil went up 200% between January 2005 and June 2008, soybean oil followed with an increase of 192% over the same period. The International Monetary Fund's (IMF's) index of internationally traded food commodities prices raised 130% between January 2002 and June 2008 and 56% between January 2007 and June 2008 (Mitchell, 2008).

At present more than two billion people in the world are suffering from hunger and more are suffering from nutritional deficits. On the other hand developed countries like the USA are using the food grains to produce biofuels. If the production of ethanol be increased continually, more than half of the people of the world will starve around 2020 and most of them will suffer in poorer nations. The developed nations must be conscious that biofuel production shall not impair food security and take steps to avoid negative impacts on biodiversity and ecosystems. They must be strict that the cultivators of biomass should not face violation of land rights, human rights or labor rights.

About two-thirds of global freshwater (non-toxic water) uses for agriculture and as a result, water labels are dropping significantly in some of the most productive areas of US farmland. To product 1 gallon of ethanol requires 1,700 gallons of freshwater both for corn production and for the fermentation processing of ethanol. Much of US farm land drains into the Mississippi River and eventually into the Gulf of Mexico. The water runoff from these farm lands already causes eutrophication in the Gulf, and the size of this dead zone is expanding. The dead zone has averaged about 4,800 square miles since 1990; the record of 8,500 square miles occurred in 2002 (Patzek, 2006). The Gallagher Review (2008) has estimated that there is sufficient land available to satisfy demand for food, feed and fuel to 2020, but this needs to be confirmed in a local and regional context before global supply of bioenergy increases significantly. Again to product these crops usually require more fertilizers and pesticides than traditional ones.

2.1 Statistics of Global Biofuel Production

The use of maize for ethanol grew rapidly from 2004 to 2007 and used 70% of the increase in global maize production. From 2004 to 2007 global maize use for food was 65% and global use increase only 1.5%. On the other hand during the same period global ethanol use increase was 36%. The USA is the largest producer of ethanol from maize and in the 2007–08 crop year it used about 81 million tons of maize for ethanol, which is 25% of its production for ethanol in 2007–08. On the other hand Canada, China and the European Union (EU) used roughly an additional 5 million tons of maize for ethanol in 2007. These 86 million tons is the 11% of global maize production (USDA, 2008a).

The largest biodiesel producers in the world are the EU, the USA, Argentina, Australia, and Brazil. These countries together use about 8.6 million tons of vegetable oils for biodiesel in 2007 compared with global vegetable oils production of 132 million tons (USDA, 2008c). About 7% of global vegetable oil supplies were used for biodiesel production in 2007. Also about one-third of the increase in consumption from 2004 to 2007 was due to biodiesel. At the same times the EU and the USA have increased significantly the imports of vegetable oils to produce biodiesel. The EU-27 increased imports from 4.4 to 6.9 million tons from 2000 to 2007 and the USA increased imports from 1.7 to 2.9 million tons.

Brazil uses about half of its sugar cane to produce ethanol for domestic consumption and exports and the rest half portion is used to produce sugar. But Brazilian ethanol production from sugar cane has not affected the recent increase in food prices. Because Brazil increased rapidly the production of sugar cane and also increased the sugar exports. It increased sugar production from 17.1 million tons in 2000 to 32.1 million tons in 2007 and exports increased from 7.7 million tons to 20.6 million tons. The EU countries aimed at replacing 5.75% of all transport fossil fuels with biofuels by 2010. Food and Agricultural Policy Research Institute (FAPRI) expressed that the EU increased the biodiesel production from 0.28 billion gallons in 2001 to 1.78 billion gallons in 2007 (FAPRI, 2008).

The USA imposed a tax credit to blenders of ethanol of \$0.51/gallon and an import tariff of \$0.54/gallon, and a biodiesel blender tax credit \$1.00/gallon. The USA mandated 7.5 billion gallons of renewable fuels by 2012 in its 2005 legislation and raised the mandate to 15 billion gallons of ethanol from conventional sources by 2022 and 1 billion gallons of biodiesel by 2012 in energy legislation passed in late 2007. Hence the new US mandates will require ethanol production to more than double and biodiesel production to triple if they are met from domestic production (Mitchell, 2008). The EU imposed a specific tariff of \$1.10/gallon and an ad valorem duty of 6.5% on biodiesel. EU member states are permitted to reduce excise taxes on biofuels (Global Subsidies Initiative, 2008).

The USA expanded its biodiesel production following legislation passed in 2004. It provides an excise tax credit of \$1.00/gallon of biodiesel made from agricultural products, which increase in biodiesel production in the USA from 0.03 billion gallons in 2005 to 0.44 billion gallons in 2007 and used 3 million tons of soybean oil and 0.3 million tons of other fats and oils. As a result soybean oil prices rose from \$354/ton in 2001 to \$881/ton in 2007, and soybean oil prices rose to \$1,522/ton in June 2008. The USA expanded maize area 23% in 2007 in due to high maize prices and rapid demand growth for maize for ethanol production. This expansion resulted in a 16% decline in soybean area which reduced soybean production, and increased 75% in soybean prices between April 2007 and April 2008.

The expansion of biodiesel production in the EU diverted land for wheat. So that it slowed the increase in wheat production which caused to keep wheat stocks higher. On the other hand food production is decreased due to weather related calamities such as draught and flood in Australia, the USA, the EU, Canada, Russia and Ukraine (Organization for Economic Co-operation and Development (OECD) and Food and Agriculture Organization of the United Nations and (FAO), 2007).

A number of countries have imposed export restrictions or even bans on grain exports to contain domestic price increases. Poor crops production in the EU and Ukraine reduced their food grains exports by an additional 10 million tons in 2007. These countries are Argentina, India, Kazakhstan, Pakistan, Ukraine, Russia and Vietnam. Rice is not using for biofuels production, but the increase in prices of other commodities effected to the rapid rise in rice prices. Global rice prices become tripled from January to April 2008. Global consumption of wheat and rice grew by only 0.8 and 1% per annum, respectively, from 2000 to 2007, while maize consumption grew only by 2.1%.

3. GLOBAL INFLATION OF FOOD

In 2007 and 2008 the global economic crisis began in various sectors and food price hike attacked the poor of the developing countries severely. Increases in global food prices have led to widespread hunger and social unrest worldwide in the human life. Almost every country has experienced of increasing price of food commodities. The world's food import bill rose in 2007 to \$745 billion (up 21% from the previous year) and more than \$233 billion of which in developing countries (FAO, 2007). Food and Agriculture Organization (FAO, 2012) expresses that from January 2007 to June 2008 the world food prices increased by more than 60%, while the world oil price increased by about 125% over the same period. The dominant causes of price increases from 2004 to 2012 were due to investor rumor and ethanol conversion. The FAO food price index increased in the first quarter of 2012. The world economists and rulers started to think for higher inflation, food security and poverty reduction. The rapid rise in food prices has been a burden on the poor in the developing countries. Higher oil prices, adverse weather conditions and strong demand from Asia have pushed global food prices up. Due to financial crisis employment, poverty, agriculture investment and social sector expenditures increased globally. von Braun (2008) showed that there is a positive correlation on the financial stability, food security and political security. Globally women and children are more vulnerable in the increase of food prices.

Lustig (2008) expressed that there are major five reasons of rising global food prices, which are as follows:

- long-term supply problems,
- rise in fuel prices,
- changes in demand due to biofuels,
- depreciation in dollar and low interest rate in the USA and tentative activities, and
- export restrictions of developing countries.

At present food grains and edible oilseeds are using to produce biofuels. That is why prices of food increase rapidly. The prices of soybean are in the highest since 2008 and are likely to rise further due to tight supplies and steady demand from China. In developing countries, like Bangladesh, the poor and extremely poor spend half or more than half of their household incomes to buy food. At the first decade of the 21st century the price of fossil fuels increases rapidly. The

developed nations are searching for the alternate fuels and biofuels are their first choice. The increased production of biofuels from food grains and oilseeds, global wheat and maize stocks have declined significantly, oilseed prices have tripled. Internationally traded food commodities prices have increased sharply since 2002, but between 2005 and 2007 the price increased very sharply. World food prices increased 130% from January 2002 to June 2008. During these period individual agricultural commodities, such as, corn, wheat, rice and soybeans prices rose up by 190, 162, 318 and 246% respectively. Since July 2008, food prices began to fall and increased significantly in 2010 and 2011. The main reasons of global price hike of the agricultural commodities are as follows:

- the devaluation of the US dollar,
- rapid growth of world population (in 2011 the populations of the world became 7 billion),
- poor harvest,
- increasing meat consumption in China and India,
- poor government policies such as bans of food grain and oil seeds export,
- imbalance in demand and supply of food commodities,
- investor rumor on commodity markets,
- natural calamities such as flood, draught, cyclone, tsunami etc.,
- long-term underinvestment in agricultural research, technology and rural infrastructures,
- growing foreign exchange holdings by major food-importing countries,
- recent policies by some exporting countries to mitigate their own food-price inflation,
- the increase cost in food production (increased prices of seed, fertilizer, chemicals, fuel, lubricants and electricity),
- high interest rate of bank loan,
- increased pressure on land and water resources,
- food grains use for the production of ethanol for biofuel,
- oilseeds use for the production of biodiesel,
- transportation cost,
- the political instability,
- the change of government, and
- higher labor cost.

Rising prices of food grains and oil seeds have caused food riots in several countries of Asia and Africa. More poor families of these regions have to starve for a long time at a stretch or live with few foods which are not making a balance diet. As a result the family members of the starving individuals become sick and in future they will be burden for their native land.

The International Monetary Fund's (IMF, 2008) index of internationally traded food commodities prices increased 130% from January 2002 to June 2008 and 56% from January 2007 to June 2008. Global stocks of food grains increased in 2004-05 crop year but declined in 2005-06 crop year, as demand increased more than production. Crop year starts with harvest and continue until the next harvest. From January 2005 to June 2008, maize prices almost tripled, wheat prices increased 127% and rice prices increased 170%. Prices of oilseeds increased parallel to the food grains prices. Palm oil prices increased 200% from January 2005 to June 2008, soybean oil prices increased 192% and other vegetable oils prices increased by similar ways. Other foods prices such as sugar, citrus, bananas, shrimp and meats increased 48% from January 2005 to June 2008 (Mitchell, 2008). The IMF estimated that the increased demand for biofuels reported that 70% of the increase in maize prices and 40% of the increase in soybean prices (Lipsky 2008).

Production costs per acre for US corns, soybeans and wheat increased 32.3, 25.6 and 31.4%, respectively, from 2002 to 2007 (US Department of Agriculture, USDA 2008b). During the 1991 to 2006 period, the US food prices were fairly stable and annual food price inflation, as measured by the Consumer Price Index (CPI) for all foods and average inflammation was 2.5%. Several economic factors appeared in late 2005 and began to gradually push market prices higher for both raw agricultural commodities and energy costs, and ultimately the US food price increased at a rate of 4% in 2007 and at 5.5% in 2008, which is the highest since 1990.

Annual food price inflation dropped to 1.8% in 2009 and 0.8% in 2010, before rising to 3.7% in 2011 driven by improving the US and global economic conditions. Record Midwest heat in 2012 sparked the worst US drought since 1956, which caused damage to major field crops. USDA forecasts that annual food price inflation will range from 2.5% to 3.5% in 2012 and rise to 3%-4% in 2013 (Schnepf, 2012). Drought in Australia in two consecutive years 2006 and 2007 and poor crops in Europe in 2007 increases prices of food grains and oilseeds. On the other hand rapid import demand increases for oilseeds by China to feed its growing livestock and poultry industry influenced to oilseed price increases (Mitchell 2008). In 2012 wheat production decreased in the USA, Russia, and Australia due to draught, but biofuel production from wheat is not decreased. As a result there is a probability of price hike of wheat in 2013.

The rising food grains and oil seeds prices have increased 41 million hungry in Asia and 24 million hungry in sub-Saharan Africa (SSA). Economic growth in SSA since the late 1990s increased the demand for meat, milk, wheat and rice for the citizens. Similarly economic growth in Asia increased demand for wheat, meat, milk, oils and vegetables. As a result the food prices increase in these regions.

Researchers at International Food Policy Research Institute (IFPRI), (von Braun, 2008) have conducted a study in which they compare the real prices for a number of grains over the period 2000 to 2007 to simulated prices under a number of scenarios. The sharp change in biofuel production, largely caused by policy-driven demand, accounted for 30% of the actual increase in production-weighted average real price for grains over the seven years period. The real grain price is the production weighted average of rice, wheat, maize and other coarse grains. The percentage share is calculated as follows (Gerber, 2008):

$$\text{Percent of share, } P_{\text{Share}} = \frac{P_{2007}^{\text{actual}} - P_{2007}^{\text{simulated}}}{P_{2007}^{\text{actual}} - P_{2000}^{\text{actual}}} \times 100, \quad (1)$$

where $P_{2007}^{\text{actual}} > P_{2007}^{\text{simulated}} > P_{2000}^{\text{actual}}$.

These simulations were conducted using the same IFPRI model used to project agricultural production and prices in the future.

The expanding biofuel sector is estimated to have increased the aggregate real grain price by approximately 12% by 2007. This number is simply the percentage difference between the actual and simulated price in 2007 and was computed from the data presented in Rosegrant (2008) and is calculated as follows:

Percentage difference between the actual and simulated price in 2007,

$$P_{\text{Difference}} = \frac{P_{2007}^{\text{actual}} - P_{2007}^{\text{simulated}}}{P_{2007}^{\text{actual}}} \times 100. \quad (2)$$

By (1) and (2) the calculation of the real price increases 39% for maize, 21% for rice and 22% for wheat over the whole period due to biofuel production.

A consultant report to the US food industry has shown that even with an impact of the US ethanol sector causing the US price of maize to increase by 60% between 2006-07 and 2008-09 (Collins, 2008).

Rosegrant et al. (2006) provided the three following proposals to protect the soar in food commodities:

- 20% gasoline (the 5 ethanol feed stocks) replacement throughout the world by 2020, except for Brazil, the EU and the USA (specific targets). Biodiesel projections for the EU-15 members only, crop productivity at baseline level.
- 15% gasoline displacement by 2015, date at which cellulose ethanol appears, holding biofuel feed stocks constant thereafter, with crop productivity held at baseline level.
- Second generation technologies after 2015 as well as increased crop productivity in line with traditional IMPACT-based studies (e.g. strong productivity growth in SSA).

Rosegrant (2008) also advised to slow down or stop biofuel production to control food price hike as follows:

- the freezing of biofuel production at 2007 levels, and
 - eliminating biofuel production after 2007.
- The second generation biofuel such as cellulosic ethanol and biomass to liquid (BTL) biodiesel can also help to reduce food price hike. The three proposals for second generation biofuels are given in Gerber et al. (2008) as follows:
- The removal of all current biofuel support policies, which include tariffs, mandates and budget supplements (tax credits, direct payments, etc.). The impact of each of the three categories is determined by the order in which they are introduced and removed.
 - The combined effects of the current policies, including Energy Independence and Security Act, EISA 2007 and Directive on Renewable Energy (DRE), as well as second generation biofuels (for which the crucial assumptions lie in the amount of crop land dedicated to grow biomass for these technologies, which we believe is part of the two policy packages).
 - The second generation technologies replacing the growth coming from first generation biofuels in the baseline. This hypothetical scenario aims to highlight the impact of the growing biofuel industry on commodity markets and the relative impact that equivalent quantities of second generation fuels would have. So all biofuels are first cut at their 2007 levels in the top biofuel producing four countries (the USA, Argentina, Australia, and Brazil) which have a specific representation for second generation fuels, where these fuels then take over the baseline growth in biofuels thereafter.

The both the populations and incomes are increasing in the developing countries, which create demand for commodities particularly food is going to increase in the region. Food prices may oscillate in future and the governments and scientists must apply modern and developed technologies in agriculture to produce more foods and distribute the foods proportionally worldwide. Increase in agricultural productivity is the major solution for addressing the effects of commodity boom in the medium to long term.

4. GLOBAL FOOD SITUATION IN 2012

Strong traditional tastes and preferences may endear a person to a particular food type such that one will continue to purchase that food as its price rises even in the presence of abundant substitutes. For example, a society which is accustomed to eating rice at every meal may be reluctant to switch to bread or potatoes even if the price of rice rises relative to those other foods. In Bangladesh in 2008 price of rice and wheat increase but price of potato was very low but the people of Bangladesh bought limited potatoes for curry only but did not use as a main food instead of rice.

After reaching a peak in February 2011, global food price indices had been decreasing up to the end of 2011. Since the beginning of 2012, prices have been on the rise again, and since April 2012 has practiced a small decrease. Food prices began to rise again since January 2013. Wheat prices increased by 75% at the beginning of 2010 and the peak in the first quarter of 2011 while corn prices doubled in the same period. It is expected that the global food price increase will be 30% between 2011 and 2016. Most of the studies of price hike suggested that biofuels production is a major driver of inflation of food.

The global food product, export and import are as follows:

Leading wheat producing countries or regions in 2012 are the EU 140, China 120, India 90, the USA 60, Russia 55, Australia 30, Canada 30, Pakistan 25, Turkey 20, Kazakhstan 20, Ukraine 15, and other countries 95 million tons.

Leading corn producing countries or regions in 2012 are the USA 350, China 195, the EU 75, Brazil 75, Argentina 20, Ukraine 20, India 18, Indonesia 15 and other countries 180 million tons.

Leading rice producing countries or regions in 2012 are China 140, India 110, Indonesia 45, Bangladesh 35, Vietnam 30, Thailand 25, Myanmar 20, Philippines 15, Brazil 10, Japan 10, Pakistan 8, the USA 7 and other countries 55 million tons.

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Major Rice exporting countries or regions in 2012 are Thailand 7.5, Vietnam 7, India 6, the USA 3, Pakistan 3.5 and other countries 7 million tons.

Major oil crop exporting countries or regions in 2012 are the USA 37, Brazil 36, Canada 12, Argentina 12 and other countries 17 million tons.

Major corn importing countries or regions in 2012 are Japan 16, Mexico 9, China 9.8, Korea 8, Egypt 6, and the EU 5.5 million tons.

Major wheat importing countries or regions in 2012 are Egypt 10, the EU 7.5, Brazil 7, Japan 6, Indonesia 5.5, Korea 5, China 4 and Nigeria 3.5 million tons.

4.1 Global Short-term Attempts to Control Price Hike

Globally few short-term steps are taken to control the food price hike. Some of them are as follows:

- The use of corn for biofuel production in the USA is slowing down to control food price hike. It stressed on sugar cane to produce biofuels. After years of annual growth above 10%, it remains unchanged for 2011-12.
- Most countries increased their lands to cultivate food crops. For example, the cultivation areas have increased for corn in China and Brazil, for rice in India and Pakistan, for wheat in Russia and the USA. According to the FAO, for the increased plantings and good yields, record about 2.4 billion tons cereal crops are expected in 2012-13 crop year globally, which is a 1.9% increase compared to 2011-12 crop year, when it was already 4% higher than in 2010-11.

5. PHYSICAL AND MENTAL EFFECTS ON CHILDREN DURING THE FOOD PRICE HIKE

When food prices increase the children become first victim. The prevalence of underweight amongst children rises in response to a higher inflation rate for basic food products. Infants depend on breast feeding. If food prices raise mothers find less food or have to starve. Sometimes mothers have to eat cheap foods which have only starch. Infants find only starch rich breast feedings. So the malnutrition measures are mostly insensitive to the inflation rate. As a result the infant morbidity or infant mortality rate increases in the poor families. The children grow with ill health and in future they will suffer from various malnutrition diseases. The poor have to spend more of their household income to buy food and the family budget run short and cannot buy other necessary things. In winter season the children suffer much than other elder family members. Because, the families cannot provide sufficient clothes to the infants to protect themselves from cold, as the families spend much or all earnings to buy food to mitigate hunger. Children of the poor families find less or no health and education facilities. Sub-Saharan African (SSA) and Asian children suffer much than the children of the other continents; because more poor live in these regions and inflation of food items attack them severely. The children of the poor families find limited opportunities of recreation. Most of the poor families send their children in risky works instead of education.

The very high food inflation during 2008-09 was responsible for an extra 39,000 moderately underweight and 24,000 severely underweight children in Mozambique (Arndt et al., 2012).

The US Department of Agriculture (USDA) administers several domestic food and nutrition programs that provide a nutritional safety net for millions of low-income households, as well as school children and nutritionally vulnerable groups such as pregnant and/or lactating mothers and federal expenditures totaled \$103.3 billion in fiscal year (FY) 2011. The five largest food and nutrition assistance programs in FY 2011 accounted for 96% of USDA's expenditures for food and nutrition assistance and those are as follows:

- the Supplemental Nutrition Assistance Program (SNAP),
- the National School Lunch Program,
- the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC),
- the Child and Adult Care Food Program, and
- the School Breakfast Program.

In the USA the SNAP monthly benefit costs have grown from \$2.8 billion in January 2008 to \$6.2 billion in June 2012, with average per-person monthly benefit spending rising from \$100 to \$133. Total outlays for the national school lunch, school breakfast, and special milk programs totaled \$14.4 billion in FY 2011 (USDA, 2012a). WIC participation peaked at 9.2 million women, infants, and children in 2010, while the total cost of food and administration has crept upward to a high of \$7.2 billion in FY 2011 (USDA, 2011).

The US federally supported child nutrition programs during the food price hike are as follows (USDA, 2012b):

- the National School Lunch Program,
- the School Breakfast Program,
- the Special Milk Program,
- the Child and Adult Care Food Program, and
- the Summer Food Service Program.

This program initiative reaches about 32 million children. In FY 2011, federal spending on these programs totaled nearly \$17.5 billion, which is the second-largest federal commitment to domestic food assistance. The basic goals of federal child nutrition programs are to improve children's nutrition, increase lower-income children's access to nutritious meals and snacks, and help support the agricultural economy.

6. FOOD CRISIS IN SOUTH ASIA

About 3.3 billion people live in South Asia and it is the more densely populated region in Asia. So that South Asia is vulnerable in food crisis than other countries of the Asia-Pacific region. Dev (2013) shows that the effects of food prices hike in South Asia are severe than any other part of the Asia. Due to global financial crisis, and food and oil price hike most of the South Asian countries suffered alarmingly. Economies in Asia and Pacific would lose 1.5% point of gross domestic product (GDP) growth cumulative over 2011 and 2012 due to higher fuel and food prices as compared to 2010 (Economic and Social Commission for Asia and the Pacific, ESCAP, 2011a). On the other hand, ESCAP (2011b) has estimated that additional 19.4 million people in the South Asian region remained in poverty due to increased food and energy prices in 2010. It is true that about 50% of the undernourished in the world today live in India.

In South Asian region Bangladesh, Maldives, Nepal, Pakistan, and Sri Lanka had unfavorable terms of trade during 2001 to 2010. Only India had favorable terms of trade during this period but it had deficit of nearly 4% of GDP and later it is facing a balance of payments problem. Afghanistan was more vulnerable in food inflation due to political instability. These South Asian countries adopted different short-term responses in dealing with price hike in agricultural commodities. Bangladesh has taken several measures to tackle food price inflation during 2007-08 and it imported 1 million tons of rice for food-based programs. India banned rice and wheat export during 2006-08 food crises and later it started to export food grains (Dev, 2013). South Asian countries must work together to increase food production to feed the hungry mouths of this region.

Asian Development Bank (ADB, 2011) expressed that,

“A 10% rise in domestic food prices in developing Asia could push an additional 64.4 million into poverty, or lead to 1.9 percentage increase in poverty incidence based on the \$1.25 a day poverty line.”

ADB (2011) had done a survey among developing member countries about the domestic policies to deal with the rising food prices. The policies were classified as follows:

- ❖ food price stabilization, such as through removal or cuts in import taxes or value-added taxes, increases in buffer food grain stocks, export restrictions, or price controls and consumer subsidies,
- ❖ self sufficiency programs, such as largely producer subsidies, and
- ❖ safety nets, such as targeted or conditional cash transfers, food-for-work programs, food-aid programs, or feeding programs.

Global Food Price Hike

More than 80% of agricultural holdings in South Asia are small farms (less than 2 hectares). Two countries of South Asia, India and Bangladesh have, respectively, 93 million and 14 million small farmers. The average size of operational holdings is only 0.5 hectares in Bangladesh, 0.8 hectares in Nepal and Sri Lanka, 1.4 hectares in India and 3 hectares in Pakistan (Dev, 2013).

Main source of income of South Asia is agriculture sector but yields of top ten producers for paddy shows that yields in Bangladesh and India are much lower than the world average of 4.31 tons per hectare (table-1). The yields in these countries can be improved to reach at least world average and try to reach the 6.56 tons per hectare in China.

Table 1. Yields for top ten global paddy producers, Source: (Dev, 2013).

Countries	Yields tons per hectare in 2008
China	6.56
Japan	6.49
Vietnam	5.22
Indonesia	4.90
World	4.31
Brazil	4.23
Bangladesh	4.00
Myanmar	3.72
Philippines	3.70
India	3.37
Thailand	2.97

From the table-1 we see that Asia is in advance for paddy yields tons per hectare but South Asian countries are backward. In 2008, China produces 6.56 tons per hectare and Japan is second position with 6.49 tons per hectare in paddy production. Of course rice is the main food of the Asian countries. At present rice is not using to produce biofuels. The large amount of these paddies is using to feed the people of densely populated Asian region. If paddy production is increased rapidly then poverty of Asia must be reduced.

If we consider the wheat production then we see that only India and Pakistan yield for major wheat producing countries (table-2). These two countries yields are in the lowest position than the world yields. Other South Asian countries are not in the top ten countries and these countries need to increase per hectare product of wheat.

Table 2. Yields for top ten global wheat producers, Source: (Dev, 2013).

Countries	Yields tons per hectare in 2008
France	7.10
China	4.76
Ukraine	3.67
World	3.09
The USA	3.02
Canada	2.85
India	2.80
Russian Federation	2.46
Pakistan	2.45
Turkey	2.35
Australia	1.58

7. SUBSIDIES IN FOOD PRICES

Subsidies in food prices play an important role in the well-being of the poor and poverty reduction in the developing countries. One of the important factors behind rising subsidy is high food prices in domestic and world markets (ADB, 2011). Subsidy in food grains in many countries started during the World War II. In developing countries both in urban and rural areas the poor consumers spend about 70% of their income to buy food. Hence, food subsidies are needed to protect the welfare and nutritional status of the economically disadvantaged people.

Obviously, subsidies are effective in pushing agricultural growth to a certain extent, but it is important to make sure that they do not become a permanent feature of a country's economy. The

largest food subsidy programs in the world that has created a relatively effective social safety net but is also under increasing criticism because of its large contributions to government budget deficits, economic inefficiency and poor targeting and the benefits often do not reach the poor. Continual subsidies will not bring the welfare of the country and make the country vulnerable economically. Subsidies have adverse effect on environment in agriculture such as led to the highly wasteful use of canal water, ecological degradation from water logging, salinity, pollution, excessive consumption of electricity, and over drawl of ground water resulting in the shortage of drinking water in several parts of the country. Most of the fertilizer subsidy also goes to the farmers under irrigated area. The continuous heavy subsidy on nitrogenous fertilizers such as in urea is responsible for inefficiencies in the domestic fertilizer industry. Due to subsidies farmers use excessive fertilizers which make the land infertile. Subsidies in pesticides encourage the farmers to use these more than necessary, as a result beneficial insects are killed and yield less output.

Food prices have sharply risen at the end of 2012 in Bangladesh, India and Indonesia. Recent increases probably mean that inflation will be back on the agenda in countries like China and India.

The main reasons for increase in food subsidy as follows (Government of India, GOI, 2012):

- steep rise in minimum support/procurement prices,
- accumulation of large stocks of grains,
- rising economic costs of food grains,
- high off take of food grains under targeted public distribution system, and
- other welfare schemes and constant central issue prices (CIP) of food grains.

8. FOOD PRICE HIKE IN AFRICA

The population of Africa is growing fast and food production is not increasing proportionally. As a result food security is a major issue in the Africa. It experiences heavy food losses due to poor transport and storage capabilities. According to the World Bank on top of weather conditions and high fuel costs, other specific regional factors have contributed to high domestic food prices in Africa. Corn is a main staple food in Africa, developments in corn cultivation will give benefit to mitigate hunger in Africa. The main causes of food price increase in Africa are as follows:

- the trade restrictions between Sudan and South Sudan,
- hoarding by farmers and traders in anticipation of higher prices in Ethiopia and Nigeria,
- civil unrest in northern Mali and northern Nigeria,
- political unrest in some African countries such as Libya, Egypt, Syria etc.

The G8 countries' aim is to advance global agricultural development, food and nutrition security, including new business commitments for African agriculture.

8.1 Sahel Region food Crisis

Food insecurity and malnutrition are common matter in the Sahel region of Africa. Acute food crises happened in Sahel during 2005 and 2010. A worse food crisis is flowing across the region with more than 16 million people facing food insecurity and over 1 million children under five at risk of severe malnutrition in Niger, Mali, Chad, Burkina Faso, Gambia, Mauritania and Senegal. Causes of food crisis are multiple and include drought, political instability, conflict, high grain prices, environmental degradation and chronic poverty. Cereal production has been reduced through drought in 2012 by 26% overall in the region compared to 2011. Low rainfall is expected in 2012 in the Horn of Africa. Chad and Gambia are already experiencing 50% decreases, Senegal, Niger and Mauritania over 30%, Burkina-Faso 20% (Chatterjee, 2012).

9. INVOLVEMENT OF WOMEN IN AGRICULTURE

About half of the populations of the world are women. So that involvement of women in agriculture equally with men gives overall development in agriculture sector. Participation of women in agriculture has been increasing over time. In most of the countries of the world men are shifting to the non-agriculture sectors for more earning to face economic crisis and more women are involving in cultivation.

Government of India (GOI, 2007) expresses that the women work in,

“Land preparation, seed selection and seed production, sowing, in applying manure, fertilizer and pesticides, weeding, transplanting, threshing, winnowing and harvesting etc. as well as in animal husbandry and dairying, fish processing, collection of non-timber forest produces (NTFPs), backyard poultry, and collection of fuel wood, fodder and other products for family needs.”

In most of the countries women are paid less than men which is a discrimination of gender in the society. All the governments and social organizations of the world must ensure the equal rights of men and women to develop the agriculture sector and to increase in food production. If unemployed women are involved in agriculture, then the food production will increase and food price hike remain in the sustainable level.

10. RECOMMENDATIONS

To face financial crisis microfinance programs are needed in broad range in the developing countries. Banks and microfinance institutions should provide low interest loans to develop small and medium enterprises (SME). Loan facilities must be easy to the farmers and high quality seed must be provided to the farmers. The government and traders must be conscious that long-term exports be much more than imports.

Social policy is a major function of the governments all over the world to respond to the shocks and vulnerabilities of the poor. Social protection programs cover food based programs such as public distribution systems and nutrition programs, wage employed programs such as road, dam and bridge construction in the rural areas and pay wage employing the poor during the food price hike to buy food, self employed programs (women's groups in Bangladesh and India) and other cash transfer programs. Social pensions must be added to this list because the number of old age persons is increasing in the region. Social pensions which are generally cash transfers, not linked to contributions, and are instruments for expanding old age security which can be universal.

11. CONCLUDING REMARKS

In this book we have discussed global food price hike and mitigation policies to keep the food price in the sustainable level to protect poverty in the developing countries. In the energy hungry world the prices of fossil fuels are increasing day by day. Also the global use of fossil fuels is increasing in a rapid rate. On the other hand the greenhouse gas emissions are increasing due to human activities. The environment analysts and the governments of developed and some developing nations are thinking for alternate fuels. Biofuels are the favorite choice of all alternative fuels. But at present biofuels are produced from corns, wheat, sugarcane and edible oils. Biofuel production is increasing in the USA, the EU, Brazil and some other countries. More than half of the populations of the world are affected due to the price hike; especially those are at the bottom of the income ladder. The developed nations are using food items to mitigate the hunger of the vehicles and not thinking for the starving people of the developing countries. The global food price increased severely during the period 2007–08. Also during the 2008–09 period global economic crises; increased unemployment, income decreased, and lower effective household purchasing power happened globally.

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