The Challenges of Food Security

Fondazione Barilla

il tuo cibo, la tua terra

people, environment, science, economy

Executive Summary

"We know, we have seen it throughout human history that a hungry world is a dangerous world. If people don't have enough to eat, only one out of three things happens: they either revolt, they migrate or they die".

Josette Sheeran
WFP's Executive Director

As it can be deduced from this observation of the World Food Programme Executive Director Josette Sheeran, managing and rule ***access to sufficient, safe, nutritious food to maintain a healthy and active life***"[1] is one of the greatest challenges that society faces today on a global scale.

SCENARIO

The most recent FAO projections, estimate that the number of undernourished in the world have risen to **1,02 billion people** during 2009, 147 million people more compared with the 2006 data. This issue hits the **16% of the world's population**.

As it is sadly well known, the **majority of malnourished people** is found in the **developing countries** where lives **approximately 98% of the total**.

Future perspectives are worrying. Considering that in 2050 there will be 2.3 billion people more than today to feed, the current situation - if no action will be taken - could only worsen.

Food access issues should be should be approached by integrating two different **analysis perspectives**: on the one hand, food security must be considered as a requirement for guaranteeing the **availability of food** to the growing masses of the population, especially in developing countries, and, on the other, the absolute **quality and safety** of the food produced and distributed must be guaranteed.

In order to comprehend the complexity of the issue of food security, a **multi-dimensional approach** must be utilized which takes into account various perspectives of the phenomenon, including: economics, politics, environment, and society.

Economics and Food Security

One of the **major causes of malnutrition is poverty** that, in order to be eradicated needs sustainable development mechanisms and a more equitable distribution of wealth, especially in the agricultural sector. It is estimated that 75% of those under poverty level live in rural communities and are primarily small-scale farmers. This explain why a point of growth in Gross Domestic Product generated by the agricultural sector has twice the effect in reducing poverty and hunger, compared with economic growth generated by other sectors.

The increase of the world population, the influx on the market of the consumption requirements of populations previously excluded, and the continuing existence of structural gaps in the global distribution of income pose the inevitable dilemma of finding a practical **path to sustainable development**. Alongside these medium-to-long term trends, financial speculation in commodities are further conditioning price quotation mechanisms thus consumptions levels. This highlight the existence of deep-seated problems in the **mechanisms of income distribution**, as well as natural and energy resources.

Politics and Food Security

The **complexity in relations and management of the various positions of individual countries** and the lack of agreement on choices and decisions to be taken, often force supranational institutions to suspend or postpone the search

1 *World Food Summit, 1996, definition of Food Security*

and implementation of solutions and initiatives. Situations of this type create significant slowing in economic and social development with disastrous consequences for the population, especially the poorest one.

Resolution of the determining factors which generate poverty and malnutrition pass through **political management** that should be marked by a **systemic vision that is complementary and unified in its intent and actions to be promoted and performed**. Political initiatives that lack homogeneity and coordination between them do not generate efficient results, nor do they have any impact on reducing malnutrition and poverty.

The **role played by the market**, seen as the meeting place between private (and public) supply and demand for goods and services, remain crucial. Despite the fact that the recent volatility in prices of agricultural products has led many observers to criticize the failure of the market, its characteristics still make it a suitable instrument in which to find a sustainable point of equilibrium between a range of different needs.

As recently reminded FAO General-Director Jacques Diouf during the 2008 World Food Summit, it is necessary "*to adopt courageous measures, that would not stop before hunger and malnutrition, as if they simply concerned unsolvable, endemic phenomena*".

Environment and Food Security

Natural resources are fundamental assets to the production of food, rural development, sustainable growth and population wellbeing.

The deep structural transformations under way require greater care in managing natural resources in a systematic way. In fact, the **pressure** exerted on **natural resources** in various regions of the world is growing, as are concerns regarding their most efficient use, conservation and containment of negative effects tied to the process of economic development. Competition to exploit and grab natural resources that are scarce and inequitably distributed in a given area often degenerate into conflict, violence and impoverishment of natural capital held in common. These trends are also exacerbated by the changes in growing conditions caused by climate change, extreme weather conditions and scarcity of water.

Climate change, in particular, will have complex **impacts** on agriculture and its ability to provide food products. These effects will be both **direct**, due to the impacts it will have on biophysical processes and on the **agro-ecological conditions** at the basis of agricultural systems, as well as **indirect**, affecting **growth** and **wealth distribution**, and as a result on demand for agricultural products.

In conclusion, it is possible to state that **climate change** will have **negative effects on global food security**, increasing developing countries' dependence on imports and increasing the already precarious conditions of a number people.

Another relevant aspect to be taken under consideration for its serious implications on food security as well as security of the worldwide ecosystem.

It is estimated, in fact, that the decline and conversion of croplands use could cause a **reduction in cultivated land area of 8-20% by 2050**. Moreover, the combined effects of climate change, land degradation, cropland losses, water scarcity and species infestations **may cause projected yields to be 5-25% short of demand by 2050**.

The use of food crops for non-food purposes, thus **reducing their availability** for traditional uses, represents a further element of tension. Production and demand for biofuels has grown rapidly over the last two decades. In 2005, they were 1% of fuels utilized for transport, while **by 2050** it is estimated that **they will be 25% of the global fuel market**.

Society and food security

The social aspects of food security can be summarized in three interrelated main areas: **human health**, demographics, **socio-political issues** (social conflict and migration phenomena).

The relationship between **food security and health** is an issue that primarily involves developing countries given the frequent chronic and/or acute conditions of undernutrition and malnutrition found in this social-economic context. First of all, it should be noted that undernutrition and malnutrition affect the immune system of individuals, their predisposition to exposure to disease and the severity and duration of the diseases themselves. This relationship is reinforced by a system of other conditions typically associated with underweight, such as poor hygiene and sanitation, difficulties in accessing drinking water and basic drugs.

In addition to this is a series of other social-economic conditions that accentuate the relationship between disease and malnutrition, such as **unfitness to work, social-economic marginalization** of the sick person and lack of nutritional knowledge (an issue which reduces the ability of mothers to aid their children).

The vicious cycle involving food/disease both has an influence *on* and is influenced *by* numerous **social-economic variables** (education, living conditions, food prices, overall conditions of health and hygiene, social-political stability) that render the reference scenario complex and multi-faceted.

As it has been already mentioned, the **increase in world population**, seen most markedly in developing countries, has represented, and still represents, a major challenge to the world agri-food sector, generating exponential growth in the demand for food products that must be met. It should also be

noted that there is currently (and expected for the future) a strong urbanization phenomenon, with continuous emptying of urban areas and a population explosion in urban centers, especially in developing countries.

With regard to the **socio-political** dimension of the analyzed issue, all the international analyses substantially agree in identifying certain major forms of conflict/problems for security as being traceable (either directly or indirectly) to the availability of food or natural resources:

- social tension tied to **access and control of agricultural resources**;
- **migration phenomena** connected with appalling living conditions (malnutrition and lack of water), in some cases aggravated by the effects generated by climate change;
- situations of **political/social instability and misgovernment** relative to the response to the **growing needs of the populations**;
- pressure on international governance connected with the **ever-increasing imbalance** between developed and developing countries.

In future terms, there is significant risk that worsening in availability and security of agricultural and food products (aggravated by the climate change currently under way) could lead to a noticeable increase in the level of social conflict, especially in developing areas where **food** and **water** are an incredible **multiplier factor in latent and unresolved tension** (ethnic, religious and economic).

Food security global governance

Inability, on an international level, of avoiding having the 2006-2008 crisis in agricultural product prices become a global food emergency points up the **weakness and inadequacy of food security governance mechanisms**.

At recent international Summits, starting with the "*High-Level Conference on World Food Security*" promoted by the FAO in 2008, up to this year's G8 in Aquila, detailed response around three major pillars have been outlined:

- **investment in food aid and food security networks** for those in greatest need;
- increase in **investment in agriculture** and in development policies;
- the realization of **international trade policies**, differentiated for developed and developing Countries.

The primary sector, in particular, is once again becoming a central element on the political agenda and is being seen as essential for meeting the goals set by the international community for this millennium (known as Millennium Development Goals).

At least five main variables involving the theme of food security which today - and even more so in the future - **impact on international geopolitical balances of power** can be highlighted: the claim for a broader and stronger geo-strategic role from emerging powers; raising of **customs duties and non-tariff barriers for imports**, as well as major **subsidies to domestic agriculture; climate changes** currently underway; the **price of oil** and, more generally, **global energy conflict**; the development of the **biofuels market**.

The primary political challenge lies in **finding the point-of-equilibrium in the trade-off between economic development, environmental conservation, food safety and between local, national and international interests**.

The food crisis and the failure of market mechanisms

The year 2008 was marked by a significant food crisis. At the end of 2008, prices of the main agri-food commodities were **40%** higher than the average recorded in 2007 and 76% higher than 2006 levels. These increases have only been recorded during another period significant for the agri-food sector, the two-year period 1973-1974.

The significant public countermeasures put in place to face the crisis have highlighted the **current market limits**. Limits related both to transparency and efficiency. In this context, the incredibly rapid increase of agricultural product prices caused extreme difficulties in its management and dramatic consequences of the poorest population.

The main reasons of the imbalances identified are to be found both on the demand and the supply side of agricultural products. Alongside the factors that traditionally determine and affect the level and trend in agri-food commodity prices (weather conditions, soil productivity, international stocks, etc.), seems to emerge new phenomena and new trends such as: a rising demand for food commodities used for biofuels productions; the strong process of economic growth seen in countries such as China and India which has generated a major increase in demand for food; financial speculation on agri-food raw materials; the first evidences of the climate change impacts on agricultural yield.

Moreover, a significant role on agricultural raw materials prices is played be the **level of accumulated stocks** on a worldwide level. Starting in 2000, and very quickly, there was a **collapse** in stocks of main agricultural commodities (in eight years, from 2000 to 2008, wheat stockpiles decreased, in relation to consumption, by 46% - an average of 7.5% per year - while those of rice fell by 49%, for an average annual decrease of 8.1%).

Although this factors taken individually might not generate a global crisis such as the recent one, the combined effects of these phenomena could lead to explosive effects and generate, in few months, the most rapidly increase in food prices since 1970 and the emergence of protectionist policies.

Areas of Intervention

The list of priority actions we feel to suggest can be summarized in the following four:

1. **To strengthen global governance mechanisms**. It is essential to restore the central role of food within the international political and economic agenda. This means that the entire food supply chain will have to be restructured and governed in a more clear-cut way towards the goals of **availability**, **sustainability** and **nutritional quality** even through the realization of common space for dialogue and analysis of the issues linked to food security.
2. **Encourage economic development and realize increases in agricultural productivity**. It is necessary to promote pragmatic paths of sustainable development in order to **support operations for developing countries** - geared at achieving a state of food self-reliance - through the **transfer of scientific knowledge and best agricultural practices** to these countries and through *ad hoc* programs designed to **bridge the know-how gap** existing between advanced and backward countries.

It is, moreover, necessary to promote, through suitable incentive/disincentive policies and measures, **the maintenance and development of "local systems"** for the production-distribution-consumption of agro-food goods, preserving high quality productions that are attentive to bio-sustainability.

3. **To adapt the production chain in order to manage the volatility of prices - which are constantly on the increase - and guarantee the existence of safety nets**. It would appear necessary to carry out a process of assessment and selection of the most effective best practices at an international, national and local level, in order to **create food and raw materials stocks**, defining the costs, timescales and roles of a similar process of global "assurance".
   At the same time, it is essential to define a **new system of rules for the food commodities markets**, capable of defending the role of the products exchanged in the markets not only from an economic perspective.
4. **To manage dietary habits**. The diffusion of dietary habits tending excessively towards the consumption of meat and animal products, as well as the "westeralization" of the consumptions models of a growing number of population mainly based in Developing countries, can endanger global food security. Thus, for the first time in history, the **governance and orientation of dietary habits** is becoming a key variable of economic policy and the way to promote sustainable development.

1. The reference scenario

1.1 The current world crisis

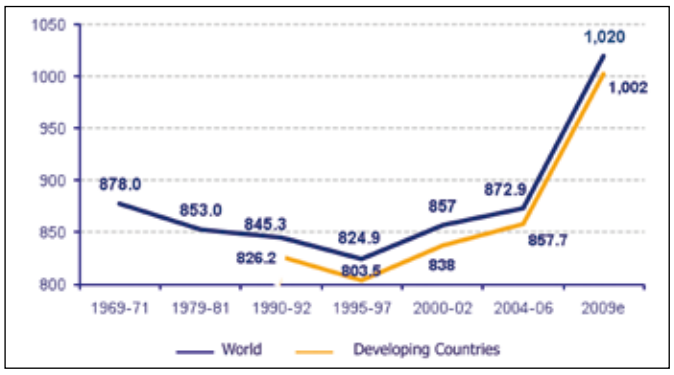
The awareness of the problem of food security in the world – by which is meant the level of availability and access to food of an individual (or population) – can be seen clearly from the statistics that reflect its effects on personal nutrition.

According to FAO statistics, shown in the figure below, the number of undernourished people in the world had been increasing slowly but steadily for a decade.

The current economic crisis emerged immediately following the food and fuel crisis of 2006-08 – on the top of the other structural barriers to food access – have worsen this issue, increasing the number of food insecure.

The most recent FAO projections, estimate that the number of undernourished in the world have risen to **1,02 billion people** during 2009, 147 million people more compared with the previous data. Considering that the world's population amount to 6,4 billion people[1], this issue hits the 16% of the whole population.

Figure 1. Number of malnourished people in the world (millions of individuals)



Source: FAO, 2009

While overweight is a phenomenon primarily found in developed countries – it is estimated that at least 1 billion people in the world are overweight – the **majority of malnourished people** is found in **developing countries**. According to 2009 FAO, the number of malnourished people who live in developing countries is **approximately 98% of the total** of the world's population affected by this phenomenon.

As can be seen in the figure below which shows the trend in this phenomenon from the 1970s to the present, a reduction in the number of malnourished individuals was registered up through the end of the 1990s, largely thanks to the goals and aid programs set up and run by the World Food Summit during the '90s. Unfortunately, however, the recent volatility in the prices of major commodities (in particular oil, grains, rice and sugar) has changed the reference scenario and, as a result, has very negatively impacted on meeting the goals set by the international community.

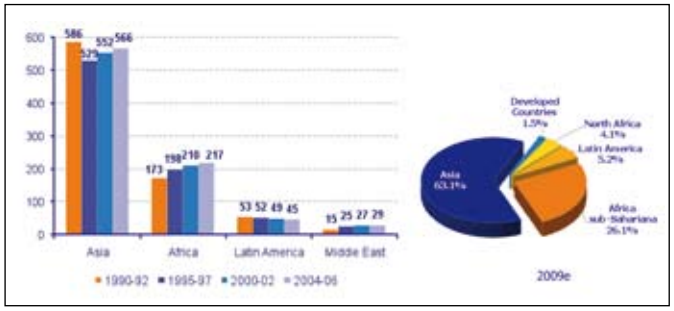
A specific chapter of the present document will be dedicated to the food crisis that occurred in the past few years, and to its dramatic consequences on people. At this point, we will just highlight that it exacerbated the living conditions of million people in the world.

A more detailed examination of developing countries shows that the region with the highest number of malnourished people is Asia. In fact, according to the FAO, **there are 566.2 million people affected by this phenomenon on the Asian continent**, more than double those who live in **Africa (217 million people)**. In **Latin America**, there are **45 million**, while in the **Middle East** there are around **29 million**.

As can be seen in the figures below, trends over the last 15 years have been uneven. In Asia, the trend has been slightly on the decline: it is calculated that the number of malnourished individuals has decreased by 3% (approx. 20 million people), as it has in Latin America (-7.3 million people, equal to -14%). Exactly the opposite has been the case in Africa and the Middle East where an increase of, respectively, 44 million (+26%) and 14 million (+93%) malnourished people has been seen.

1 *Source: FAO, 2009*

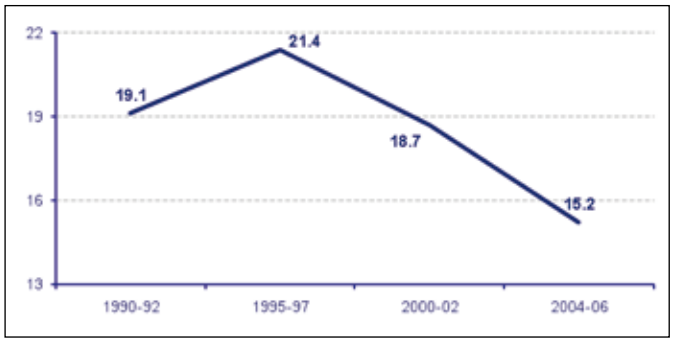
Figure 2. Number of malnourished individuals in a number of regions of the world (millions of people)



Source: FAO, 2009

According to FAO statistics, unlike in **developing countries**, in developed countries the phenomenon of malnutrition is limited to just over 15 million people. The trend has declined over the last fifteen years thanks to direct action that individual governments can more efficiently implement. These actions are primarily public assistance and economic programs and initiatives part of national welfare state measures.

Figure 3. Number of malnourished people in developed countries (millions of individuals)

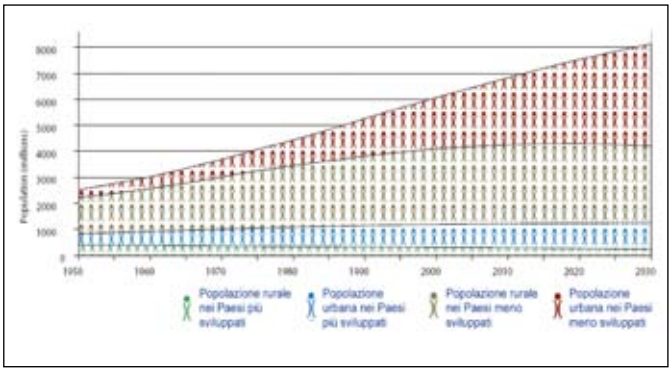


Source: FAO, 2009

In order to understand how the numbers above could evolve in coming decades, the changes in **underlying global trends** that impact on the level of food security must be outlined.

The **dynamics of world population** is one of these. Estimates for 2030 indicate a level of more than 8 billion people, which is expected to reach 9 billion by the year 2050.

Figure 4. Global demographic trend (millions of people)

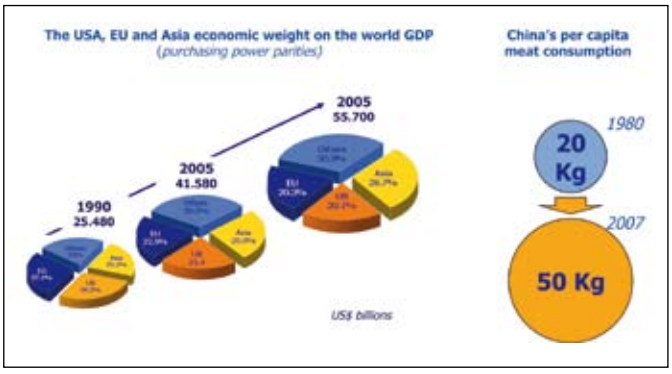


Source: UNDESA, World Urbanization Prospects

Another key trend is that relating to the **economic dynamics of developing countries** in terms of the global situation. In recent decades, the economic weight of these countries on the world scene has increased. The increase in per capita income will contributes to increased demand for products, such as meat, milk and grains.

The economic growth of developing countries is not only relevant for food demand and changes in eating habits. In reality, their increased economic weight will impact significantly on energy and raw materials markets, as well as on the environment. In general, economic growth has both positive effects, such as in the growth of per capita income that can facilitate access to food, as well as a potentially destabilizing impact, for example increased food consumption with resulting impact on supply, increased energy use subject to market volatility and risk of environmental impact, and scarcity of natural resources with related problems of sustainability.

Figure 5. Economic weight of GDP and annual consumption of meat in China



Source: IMF and FAO

And finally, a further underlying trend can be found in the current economic crisis which is currently placing food security in the world in serious difficulty. In fact, while on one hand it has the effect of reducing financial and social aid from rich to

poor countries[2], on the other hand it renders poverty levels in the latter even more critical.

The developing countries most affected by the current global economic situation are those whose economic development strongly depends on exports or exported goods and services, or on foreign direct investments. In other words, these countries are the more involved ones into the global trade dynamics and thus with greater opportunities for economic growth. These opportunities are currently threaten.

Another factor to worry about is the permanence of high-volatile prices on international markets. It is worth noting the **extraordinary fluctuation in commodities prices**, both up and down, occurred in the last 24 months. For example, the **Commodity Price Index Monthly Price** (calculated by the International Monetary Fund) jumped up sharply by 112% between July 2005 and July 2008, only to plummet by 54% in the five months that followed. Since the beginning of 2009, the index has registered a change of +24.2%[3]. It is believed that this volatility could also persist in the future due, above all, to general underlying market instability (for example, that of energy) or basic unfavorable conditions (such as natural disasters).

Figure 6. Commodity Price Index (January 1992 to July 2009)

Source: IMF, October 2009

The section which follows will outline the main **problem areas** and **causes** that threaten food security on a global basis.

1.2 *Food Security*: main aspects and long-term problem areas

The World Food Summit, in 1996, defined food security as being "*a situation that exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life*"[4].

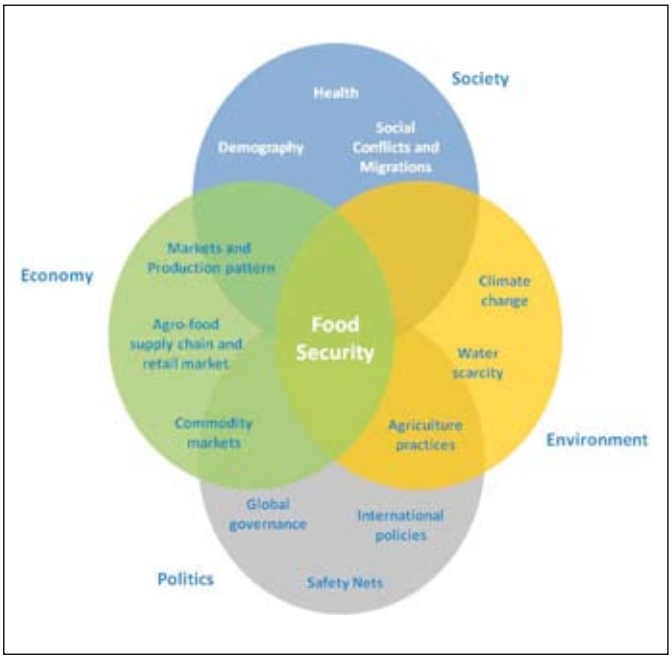
Besides affecting people's dignity, Food Security is a central issue because of the significant number of problem areas that may be connected to it, both directly and indirectly. Some of these have an impact on food security itself (e.g., climate change phenomena), while others are affected by it (for example, migration phenomena/social conflicts), in a particularly dense network of interrelations which include economic and political aspects, social implications and environmental phenomena.

The theme should be approached by integrating two different **analysis perspectives**: on the one hand, food security must be considered as a requirement for guaranteeing the **availability of food** to the growing masses of the population, especially in developing countries, and, on the other, the absolute **quality and safety** of the food produced and distributed must be guaranteed.

In order to comprehend the complexity of the issue of food security, a multi-dimensional approach must be utilized which takes into account various perspectives of the phenomenon, including:

- economy;
- politics;
- environment;
- society.

Figure 7. Food Security: a multi-dimensional phenomenon



Source: The European House-Ambrosetti, 2009

2 *With donor countries facing budgetary constraints in 2009, the IMF projects that the poorest 71 countries will experience an overall drop in ODA (Official Development Assistance i.e. development aid contributed by donor countries) of about 25%, although the new level will remain above that of 2007. Source. FAO, "The State of Food Insecurity in the World, 2009"*

3 *This issue will be examined in more depth further on in this Position Paper*

4 *World Food Summit, 1996*

1.3 Four perspectives on Food Security

In the following paragraphs the above mentioned identified perspectives will be deeply analyzed.

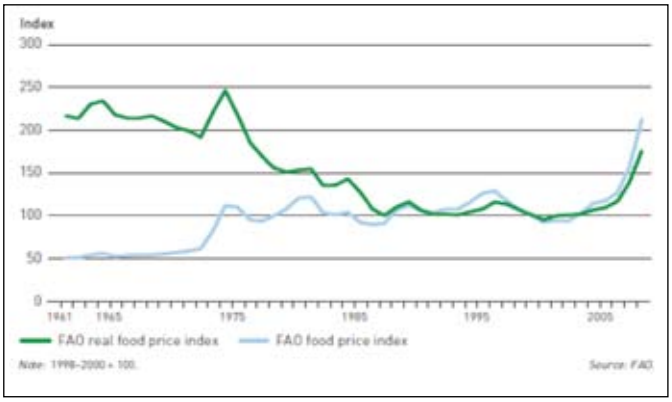
1.3.1 Economics

One of the major causes of hunger is poverty which, to be eliminated, requires equitable, sustainable economic development, especially in terms of agriculture. It is estimated that 75% of those under the poverty level live in rural communities and are primarily small farmers. This explains why a point of growth in Gross Domestic Product generated by the agricultural sector is very effective in contributing to the reduction of hunger and poverty, compared with the same magnitude of growth generated by the manufacturing or service sector.

Recent awareness of the key role of agricultural development in promoting food security, driven by the tension triggered by the 2006-2008 food crisis, represents an element of discontinuity from the twenty years of "neglect of agriculture" (1985-2005), as it has been defined by De Janvry[5]. In fact, following the green revolution of the 60s and '70s which significantly raised yields and lowered prices of agricultural commodities (up to 60%), over the last two decades there has been a decrease in public and private investment in agriculture, also due to low price levels and belief that the market would be self-regulating. As a result, while in 1979 18% of global aid for development was earmarked for agriculture, in 2004, the percentage had fallen to 3.5%: "*The world thought food was no longer a problem: there was a lot of food, at low prices*" *(Stamoulis, FAO)*.

And yet, the 2006-2008 crisis in food prices marked a decisive turnaround in this trend. In 2007 alone, an additional 75 million people fell below the poverty line as a result of the agricultural crisis, thus bringing back into the limelight the problem of the relationship between development, food security and agriculture, leading many to hope for a second green revolution.

Figure 8. Trend in food prices, 1961-2008 (FAO Food Price Index)



Source: FAO, 2008

Despite the peaks in 2006-2008, in 2009 the price of agricultural commodities is definitely lower due to the increase in supply, low crude oil prices and lower demand as a result of the economic crisis, and it is expected that this lowering trend will continue another 1-2 years. Over the ten-year period 2009-2018, the OECD and FAO expect that prices of agricultural commodities will be, on average, higher in real terms by 10-20% than those during the ten years 1997-2006, with probable negative consequences on global food security.

This chapter will focus on:

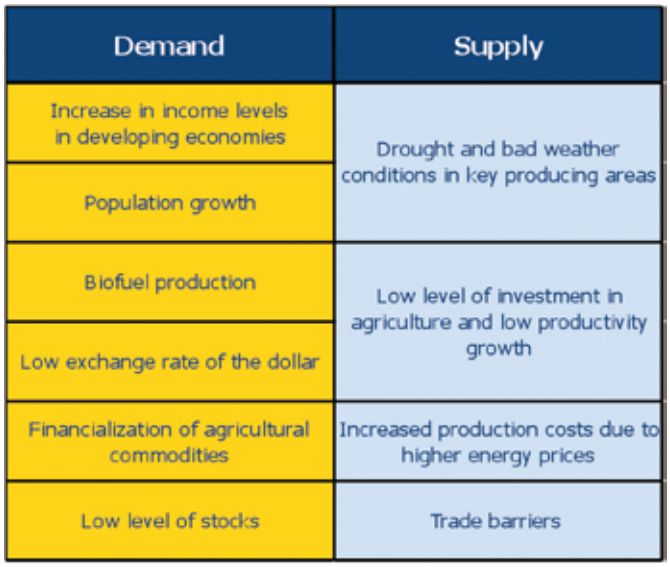
- **supply and demand** dynamics of agricultural goods;
- the **economic intervention measures** required to make agricultural development a key driver in reducing rates of under-nutrition and malnutrition.

There are many, complex and interrelated **factors** influencing agricultural quotations. There are aspects tied to the world **macroeconomic** and **demographic** situation such as the increase in population, the access of populations to the market that were previously excluded from it, trends in oil prices, etc. There are factors tied to cyclicity and **climatic conditions**. In addition to these structural elements, there is also the recent phenomenon of **financialization of *agricultural commodities*** that has triggered speculative activity around the quotations of raw materials (grains, rice, sugar, etc.), creating further increases in commodity trading markets. There is also the sharp increase in demand for agricultural products involved in the production of **biofuels** and the persistence of **protectionist policies** implemented by many governments which contribute to creating further strain on markets.

The causes behind volatility in agricultural prices can be located primarily in factors that determine and influence supply and demand for food products. Out of the full range of factors, distinction must be made between the structural elements that countries and the markets are able to adapt to over the long-term, and conjunctural elements which, although they only have a short-term effect, still create negative impact on the demand and supply side.

5 *Alain de Janvry is the co-author of the recent World Bank report titled "World Development Report 2008: Agriculture for Development". It is also member of the Center for International and Development Economics Research (CIDER) and of the Center of Evaluation for Global Action (CEGA). He obtained a PhD in Agricultural and Resource Economics at UC Berkley. At US Berkley he is Professor of Agricultural and Resource Economics and a member of the Institute's Executive Committee*

Figure 9. Factors behind high quotations in food prices over the period 2006-2008



Source: FAO, "The State of Food Insecurity in the World 2008", 2008

Demand for food products

In terms of demand for food products, there has been a generalized increase due, above all, to the rise in **world population** and **level of urbanization**. Alongside this trend has been economic growth in developing countries (especially in Asia) that has created the preconditions for further **growth** in food consumption. The FAO has shown that, generally, an increase in per capita income brings about not only a rise in demand, but also changes in dietary habits that is reflected primarily in greater consumption of meat rather than grains. As has already been presented in previous publications of the Barilla Center for Food & Nutrition, greater production of meat leads to greater production of grains for livestock raising, with resulting impacts in terms of water consumption and pollution[6]. Despite this, these changes do not seem to be the triggering factor in recent increases in food prices. In fact, they were structural in nature, factors to which countries and the market are able to adapt over the long-term. For example, in the 1980s, China and India imported approximately 14 million tons of grain, but in the last three years this has been reduced to 6 million tons, thanks to greater domestic production of grains over the last twenty years.

In recent years, in the light of the sharp rise in oil prices, a number of countries have provided incentives for **producing biofuels**. This solution has had significant success with farmers due to government incentives and subsidies (generally provided by the European Union and the United States) and by particularly favorable market quotations. The FAO has estimated that, in 2007-2008, 100 million tons of grains were utilized for the production of biofuels, 4.7% of total world production. Production of this type of fuel has generated negative impacts for developing countries, above all. In fact, not only has it pushed up prices of grains, but it has also caused all types of food products to rise. The rise in corn quotations has caused farmers to increase its production, thereby using land destined in the past to other crops and which tends to substitute them. This has generated an overall decrease in supply and has led to further rises in the cost of raw materials.

Another conjunctural factor is related to **currency**. In world agricultural trade, the official currency is still the **US dollar**. Recently, due to the recession in the United States economy, the US currency has dropped in value significantly against other national currencies. This currency trend has impacted on food demand. Low dollar rates have made raw materials particularly competitive for those countries whose national currencies have increased in value. This situation has triggered, first of all, increased demand for food from these countries and, subsequently, a rise in food prices from farmers caused both by the increase in demand as well as, primarily, an attempt to compensate for unfavorable economic conditions caused by the exchange rate.

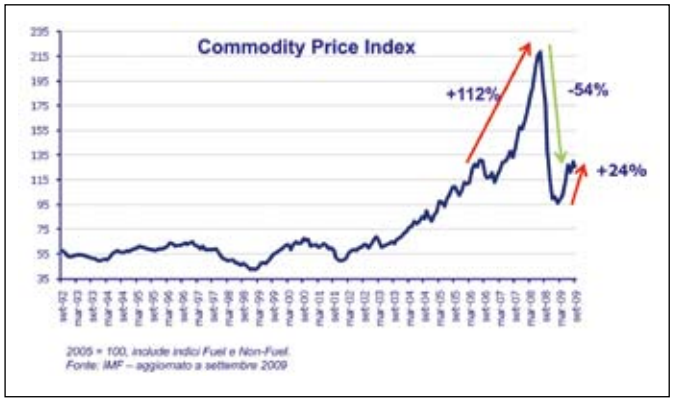
Part of the volatility in agricultural prices is speculative. In recent years, in fact, the use of **derivative financial instruments based on agricultural commodities** has become common and they are considered to be especially remunerative by savers and investors. In the last five years, the number of these contracts stipulated has doubled and the high level of speculation intrinsic in these instruments has directly influenced the real level of food prices. In essence, there has been a true financialization of agricultural commodities. The flow of money put into these derivative instruments has caused quotation levels to remain at a constantly high level and, at the same time, has generated increases in volatility, with negative consequences on consumer purchasing power and, more generally, on the wealth of world population.

There are a number of criticisms about the current system of negotiations and exchange of essential goods, which occurs in specific commodities markets (the primary ones are New York, Chicago and London). The most negative opinions and widespread discontent have emerged during recent jumps in prices, mainly provoked by massive attention from investors to these types of commodities considered an investment haven in periods of stock market crisis (such as the current one). To conclude, what is seen is an interweaving between finance and essential goods where the former, through the choices of investors and speculators, has had a negative impact on efficient determination of real prices for food products.

Because of the effect of investor choices on international markets, ***agricultural commodities*** have registered extraordinary fluctuations, both up and down. The ***Commodity Price Index Monthly Price*** registered variations of 112% from July 2005 to July 2008, then dropping sharply by 54% in the five months that followed. Since the beginning of 2009, the index has risen 24%.

6 *Barilla Center for Food & Nutrition, "Water Management" and "Climate Change, Agriculture and Food", 2009*

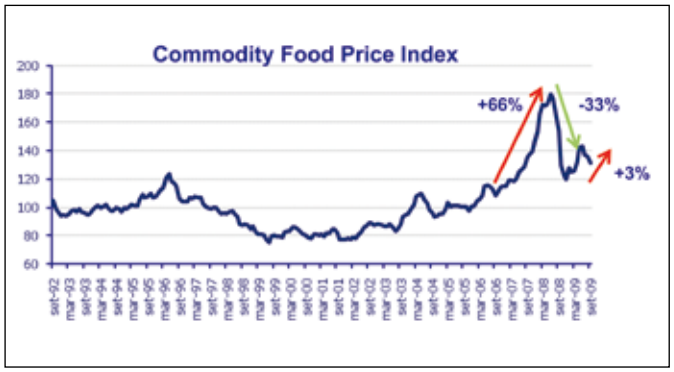
Figure 10. Commodity Price Index trend, 1992-2009



Source: IMF, October 2009

The *Commodity Food Price Index* registered variations of +66% from September 2006 to June 2008 - when it registered the higher value - then dropping sharply by 33% in the six months that followed. Since the beginning of 2009, the index has registered a change of +3%.

Figure 11. Commodity Food Price Index trend, 1992-2009



Source: IMF, October 2009

In particular, trends in **wheat** prices have been the center of debate due to the central role it plays in the diet of the world population. Market volatility caused quotations to jump 191% from July 2005 to March 2008 - when it registered the higher value - with a subsequent drop of 50% in the nine months that followed. In September 2009, compared with the data registered at the beginning of the year, the index registered a change of -20%. Compared with September 2008, the index is -35.3% lower.

Figure 12. Wheat Price Index trend, 1984-2009

Source: IMF, October 2009

As with wheat, the trend in **rice** prices has been at the center of speculation. Recent market volatility caused quotations to jump 389% from January 2004 to May 2008, with a subsequent drop of 46% in the seven months that followed. Since the beginning of 2009, the index has registered a change of 1.3%.

Figure 13. Rice Price Index trend, 1984-2009

Source: IMF, October 2009

Although there has been some deflation of the speculative bubble in commodity prices in recent months, the consequences of recent years have been significant in terms of the weaker segments of the population. Estimates from the International Monetary Fund indicate that between 2005 and 2008 the **high price quotations of food have increased the number of poor people by at least 100 million individuals**, while the World Bank estimates an increase of between **130 and 155 million**. FAO estimates are on the same level: between 2007 and 2008, **115 million people** were pushed into poverty by high food prices. The weaker segments of the population spend between 50% and 80% of their income on food. As a result, a rise of this magnitude has an immediate impact on the amount and quality of food consumed. In essence, it means that these people will consume more low-cost food and will reduce the number of meals and amount eaten during them, resulting, therefore, in a substantial reduction in demand for food.

Supply of food products

The production (or supply) of agricultural commodities has increased over the years and has remained ahead of the growth in population. FAO data show that the 5.8 billion people living in the world today have 15% more food available to them than the Earth's 4 billion inhabitants during the 1980s. The FAO also estimates that the amount of calories produced on a daily basis, per person, is 2,720 Kcal. This means that, **from a purely quantitative-technical standpoint, the world produces enough food for everyone** and this should be reflected in enhanced well-being of people, a situation which, in reality, is not the case, as FAO figures on the increase of malnourished people shows (one billion estimated for the year 2009).

The reasons behind this phenomenon are varied and complex.

An initial explanation can be found in the **food distribution model and national policies** adopted. Some evidence shows that in many countries, despite their significant importance in world agricultural production, there are still many undernourished people. In this regard, it is estimated that approximately 75% of those countries where undernourishment is present are world exporters of food[7]. An example is India, where despite the fact that approx. 230 million people live in conditions of malnutrition, in 2000 60 million tons of grain produced in the country were exported. This example, just one of the many that international bodies and non-governmental organizations bring to the attention of the international community, is the proof of the **inefficiency of food distribution economic models** which seem to prefer commercialization and monetization of food products, rather than place the emphasis on their availability and access to food of all segments of the population. Proper functioning of the food market is the precondition for reducing malnutrition and hunger in the world. In fact, the market has the task of promoting efficient allocation of food to the population and, at the same time, guaranteeing an economic return for all those involved in the process. But the market is not always able to guarantee this on its own. Therefore, in certain contexts and environments, intervention from supranational bodies is required in order to regulate and implement specific economic and social interventions and measures.

In order to improve allocation of resources from agriculture, policies must be implemented that support agriculture on a local and international level[8]. In particular, productivity must be raised through public and private investment to small farmers (for example, investment in irrigation, technologies, seed, technical/scientific support, commercial support). As mentioned at the beginning of the chapter, the variability in yields and profitability of agricultural products have generated an increase in investment risk in agriculture and a consequent decrease in **investments** themselves that has caused a general reduction in land yields. According to FAO data, the yield per hectare of grains today has a rate of growth of less than 1% per year, compared with the over 2% growth rates, with peaks of 5% for wheat, seen between 1960 and 1985. It is clear that reduced investment in agricultural infrastructure and technology leads to a gradual loss in productivity and, overall, to a reduction in food supply.

For small farmers, the majority of those who live under the poverty line, food security is also defined by the level of involvement in the food commodities market and, as a result, more or less free access to the input and output elements of which they are comprised. In general, the factors that determine **market access** are basically the transaction costs, i.e., transport, warehousing, information, finance and contracts. But even more basic, there remains a problem of physical access to the market. It has been shown that the quality of transport infrastructure determines the level of difficulty of market access. For example, in developing countries, 16% of the rural population (approx. 439 million people) must travel at least 5 hours to reach a city with at least 5,000 inhabitants, and in Africa only 25% of the rural population can reach a city with more than 50,000 inhabitants in less than two hours[9]. Finally, another form of physical barrier to access to agricultural markets are quality standards and safety. In fact, due to the low quality of seed, soil and irrigation, part of the grain crops in developing countries does not meet the quality requirements of developed countries, thus preventing export. Involvement in and access to the market requires tremendous effort, especially from the poorer segment of the population. If it is considered that limited involvement further contributes to reducing wealth and increasing the malnutrition level of an area, it is clear that ease of access to the market, through reduction in transaction costs and infrastructure development, is crucial for the future.

Basically, when speaking about market access, what is being referred to are all input factors. Among these, one which deserves attention is the **financial and credit market** which does not exist in rural areas and is not inclined to finance agricultural activity in poor areas. Lack of financial support makes it impossible for regular agricultural activity to take place and, in fact, purchase of equipment, seed, land and fertilizers is difficult. In recent years, with the introduction of microcredit, it has been possible for the poorest segments of the population to access the market and reduce transition costs. For these people, having access to the market means being able to benefit from more advanced technologies, fertilizers and equipment to work the land and, as a result, attempt to make farming a potential source of wealth and sustenance.

Another potential point-of-departure for facilitating access lies in the **distribution of land** and how it is utilized. Often, due to historic reasons, local interests, national policies and market distortions, land is bureaucratized and costly, and

7 *Source: Anuradha Mittal, The Oakland Institute*

8 *"The bottom of the pyramid really depends on agriculture. There is no other way to bring them out of poverty except with agricolture", - Suresh Babu, International Food Policy Research Institute (IFPRI)*

9 *Source: World Bank, 2007*

also with negative impacts on the cost of food. Small farmers, whose crop yields per hectare are often better than large-scale farmers, find themselves in difficult situations due to lack of transparency in land lease contracts and land purchase. These types of situations are also created by **lack of information** between smaller-scale farmers in terms of market conditions and prices. Access to market information – prices, volumes, trade policies, transport and standards – would allow producers to have a clear picture of the nature of the market and thus strengthening their position on the international scene to increment the return on their labor and guarantee increased food security.

A second major cause of distortion in agricultural supply are trade barriers, protectionists agricultural policies and subsidies. Recently, the major grain producers (China, European Union, USA and India) modified their **agricultural policies** for essentially competition-related reasons. The consequences of these choices have generated a significant reduction in world food supply (the FAO estimates that it is the largest decrease in recent years) which has contributed to increasing market price volatility. In addition to this, **policies to restrict international trade flows** have also been implemented that have had significant impact on the world food supply. This refers to all activity aimed at protecting one's own domestic market (customs, import restrictions) or, conversely, supporting it on a global level (export subsidies, agreements). In mid-2008, the World Bank noted 40 countries (including major producer countries such as Argentina, Vietnam and Kazakhstan) that had adopted agricultural trade restrictions to limit or prevent trade of agricultural products on international markets. For example, the tariffs applied to rice by India starting in October 2007 caused the world price of rice to increase by about 20% over just the three months that followed.

Clearly, these policies, implemented mainly in response to the price of food, are aimed at **generating direct benefits for the domestic market** but, at the same time, given the strong interrelationship between markets, they can also generate short-term effects and imbalances in quotations worldwide. A further example of the negative impacts of market restrictions can be seen in the current **Doha Round** debate. It is estimated that an agreement to reduce international trade barriers on agro-alimentary products would generate an increase of approx. 40 billion dollars annually in exports for developing countries. While on the one hand, opening international trade to all countries would be a positive choice and necessary to alleviate the distortion caused by subsidies and protectionist measures, on the other it is not adequate on its own and must be accompanied by parallel economic and social policies that limit the risks of this opening, especially for more vulnerable segments. For example, during the recent crisis in food prices, the worst-hit economies in terms of food security were those most vulnerable because of the lack of sufficient economic and social safety nets. For this reason, a thorough re-thinking of trade, agriculture and social policies on a local, national and international level is of fundamental importance.

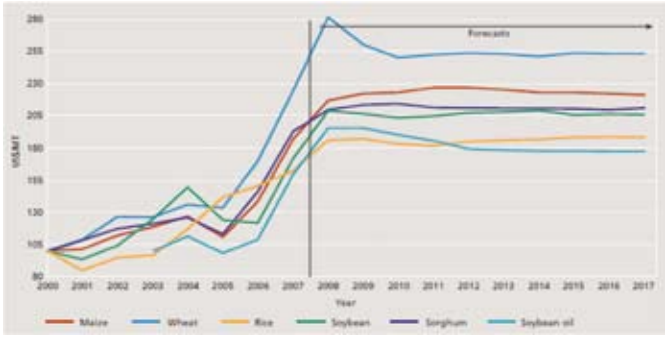
An additional aspect that impacts on supply is environmental/climatic in nature. Unfavorable weather conditions (drought, flooding) and other natural disasters had a significant impact on grain harvests over the period 2005-2008. According to the FAO, worldwide grain production suffered a drop of 3.6% in 2005 and 6.9% in 2006. The consequences on production were seen in subsequent years in a worsening of the level of market uncertainty and a rise in quotations. While these natural events have always represented a clear risk factor in agricultural production, it is expected that they will worsen in terms of frequency and severity due to the climate change currently underway.

Energy prices also have an impact on food prices. The cost of oil and gas have, in fact, a strong impact on the cost of agricultural production. The recent sharp rise in oil prices have had direct consequences on the price of fertilizers and transport which, according to the FAO, for the two-year period 2006-2008, have respectively tripled and doubled compared with the preceding period. The trends and direct consequences of high energy quotations has caused a worsening in production costs and a definite reduction in production, especially for small- and medium-sized farmers.

So, while on one hand the problem of food security is deeply rooted in poverty and low economic development, on the other, recent on-going worsening in food security is strongly tied to agricultural prices that are defined both by structural and conjunctural factors of supply and demand.

As noted at the beginning of this chapter, despite the fact that current lowering in agricultural prices could continue for another one or two years, the forecasts prepared by the OECD and FAO indicate that real prices for the ten-year period 2009-2018 will be higher on average by 10-20% than those for the period 1997-2006 due to the persistence of structural factors, including an increase in demand for food connected with the economic recovery, low growth in productivity in many areas, high prices in energy raw materials, demand for biofuels and climate change.

Figure 14. Average of future food prices forecast by six organizations



Source: WFP-EIU, 2008; FAPRI, 2008; IFPRI, 2008; OECD-FAO, 2008; USDA, 2008b; World Bank, 2008c

As we have seen, to insure a sufficient level of food security, proper functioning of the food market must be guaranteed. Not only must a sufficient amount of food be produced to feed the population, but this food must be **accessible**. In order to guarantee that the population has complete access to food, both **structural and conjunctural factors that impact directly on food supply and demand must be dealt with**. Particularly effective in this regard is investing in the definition and structuring of social and economic models that guarantee efficient resource allocation and economic return for small farmers, allow them to invest in agricultural infrastructure, human capital and scientific research, with the goal of implementing all those strategies aimed at rapid growth in wealth and in the level of food security.

1.3.2 Politics

The role of government and politics in general in identifying the causes and finding solutions to poverty and malnutrition in the world is, perhaps, the most important and decisive for the future.

Despite the fact that the concept of **governance** has only recently been introduced into the debate, it has immediately assumed a central role in the political agendas of national and supranational entities. By governance is meant the management of political affairs of one or more countries on all levels (economic, political and administrative) in terms of efficiency, responsibility, respect for rules, political stability and well-being of the population.

Governing the problems that afflict the world is the tremendous challenge that countries and governing bodies find themselves having to face today. The **complexity in relations and management of the various positions of individual countries** and the lack of agreement on choices and decisions to be taken often force supranational institutions to suspend or postpone the search and implementation of solutions and initiatives. Situations of this type create significant slowing in economic and social development with disastrous consequences for the population, especially the poorest sectors.

Governance is, by nature, complex, as are the problems and situations that the various governmental bodies attempt to manage and solve. Global poverty and malnutrition are the consequence of a complex network of interrelated factors. Change in the conditions of a parameter/factor generates results that are not always predictable, just as acting on individual factors does not guarantee full efficacy in solving the problem. Given this, a systematic and shared approach to problem management is fundamental. And these are the reasons that caused Kofi Annan to state: "*Good governance is perhaps the single most important factor in eradicating poverty and promoting development*".

FAO Director Jacques Diouf, in the opening speech of the World Food Day (October, 16th 2009) stated instead, "*the world food security governance system is inefficient and not well coordinated to address the present food crisis and the new challenges which we will have to face in the future*".

Briefly, resolution of the determining factors which generate poverty and malnutrition pass through political management that should be marked by a **common vision that is complementary and unified in its intent and actions to be promoted and performed**. Political initiatives that lack homogeneity and coordination between them do not generate efficient results, nor do they have any impact on reducing malnutrition and poverty.

The **role played by the market**, seen as the meeting place between private (and public) supply and demand for goods and services, remain crucial. Despite the fact that the recent volatility in prices of agricultural products has led many observers to criticize the failure of the market, its characteristics still make it a suitable instrument in which to find a sustainable point of equilibrium between a range of different needs. Recent criticism refers to a group of distortionary phenomena that are fragmentary and lacking in transparency that could have generated negative impacts on the conditions of food supply and demand.

Unlike the case of other goods, there is no one, single, regulated market on an international level for agro-food raw materials and products. There are, in fact, a number of different markets of a regional/local scope that are guided by conditions of supply and demand, level of supplies, productivity of the agricultural sector and trade policies that are all different from each other. This generates **fragmentation** that inhibits both control over mechanisms of price determination and access/distribution, as well as adoption of standard solutions on an international scale.

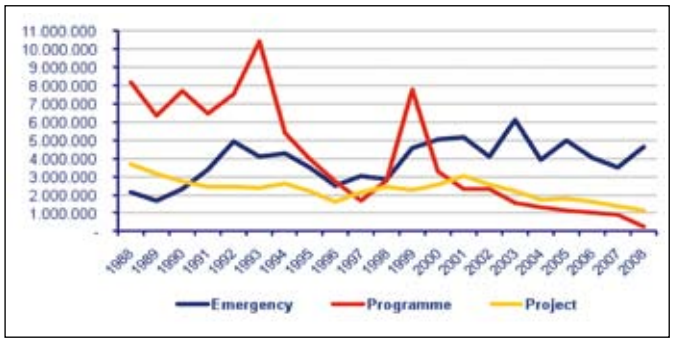
Considering the importance of unified, systematic political management of the food security emergency and, at the same time, presence of a transparent, non-distortionary market, **instruments** must be identified that can accelerate economic and social development in developing countries in the best way possible, while at the same time reduce the number of malnourished individuals.

One of the primary instruments that supranational institutions should utilize is support to countries to **guarantee and optimize political governance** in terms of development of the agricultural and rural sector and meeting improved standards in the level of food security. In developing countries, in particular, political governance does not always occur according to the principles that regulate political life in western democracies and there are, as a result, numerous cases of dictatorship and cleptocracy. Irrespective of individual national situations to be taken on with targeted approaches through transfer of knowledge and know-how, supranational organizations should act to support optimization of governance and identification of areas and processes that merit reform or institutional change. One area of public intervention can be

seen, for example, in a study conducted by the World Bank which showed that an increase of just one point in the Gross Domestic Product generated by the agricultural sector has twice the effect in reducing poverty and hunger, compared with economic growth generated by other sectors. Therefore, it would appear that one of the best levers for taking on the problem of malnutrition is support for governments (especially of developing countries) in order to put together initiatives, reforms and approaches to manage from the standpoint of unified, systematic governance, with strict control over corruption and dominant and distortionary positions of the market.

Another instrument utilized by political institutions is **Food Aid**, i.e., humanitarian aid in the form of flows of money and food, which support food assistance programs for poor countries. Humanitarian aid is recent history and was promoted on an international level by the United States and Canada in 1954. Unified international action did not happen until the early 1970s with the birth of the United Nations World Food Programme, today the no. 1 aid program. Unfortunately, food aid is currently undergoing a fall-off in its configuration: in fact, food aids have declined over time. While in 1988 global aid – defined as the sum of initiatives to meet emergency situations, aid projects and programs – comprised 14 million tons of food distributed, in 2008 the amount had fallen to approx. 6 million tons. There are many reasons for this decrease. The main one is tied to the global economic crisis in recent years which has left the world's major economies in financial difficulty. Particularly hard-hit by the crisis have been the United States and, to a large extent, European Union countries which together comprise 77% of all aid[10]. The reason for the decline in humanitarian aid is thus clear.

Figure 15. Global aid distributed by type, 1988-2008 (agricultural products, millions of tons)

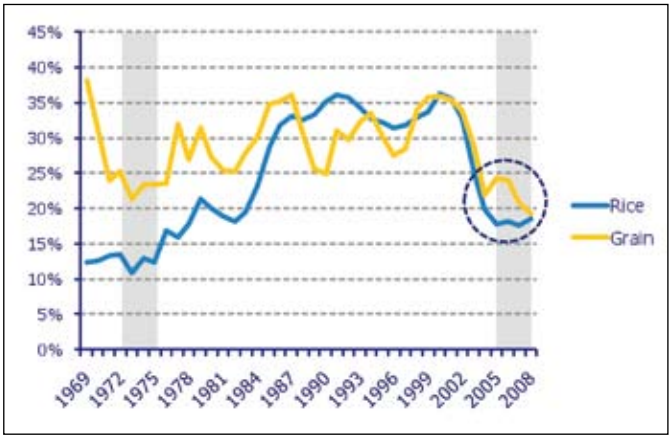


Source: UN, World Food Programme, 2009

There are many opinions about the use of food aid, just as there are various criticisms. In our view, it is an instrument that has its purpose, as long as the beneficiary countries do not become dependent on the aid. Poverty is not eliminated through merely donating money and food, but through creating the basic conditions for economic and social development of the poorest sectors of the population. It means identifying and adopting a series of policies and incentives to foster growth, innovation and well-being. Within this context, national and local government must be supported by providing them with the tools and know-how to implement proper political governance. In general, humanitarian aid must continue to perform its irreplaceable role in emergency situations (war, natural disasters, etc.) which, as can be seen in the figure above, have increased in recent years.

An additional aspect in which political policy must play an increased role is that of safety nets such as **grain stocks**. In the 70s-80s there existed private organizations of raw material producers, the purpose of which was to regulate markets and control prices through the use of stockpiling set for all members. But, in the 1990s, the drop in agricultural prices as a result of globalization pushed many producers to leave these organizations since they required stockpiling of agricultural products whose prices (in real terms) continued to fall. The system became "liberalized" naturally without any set governance system taking the place of the private organizations, also the result of the lack of international interest for this sector considered out-dated and of little political and economic relevance. Today, this situation has led to an inadequate level of stocks. As can be seen in the figure below, 2008 marked the lowest level of stocks since the 1960s. With stocks low compared with agricultural consumption, the markets are unable to face the shock in supply and demand of agricultural products which negatively impacts on the population and food security.

Figure 16. Ratio of global stocks to use, 1969-2008 (millions of tons)



Source: FAO, "State of Food and Agriculture", 2008

Finally, the instrument perhaps most in-line with political policy given its legislative nature is the issuing of **regulations and directives** for agriculture. With this approach, governments affect market policies and structure to support prices and economic operators. An example of this is the Common Agricultural Policy (CAP) of the European Union.

10 *Source: UN, World Food Programme*

From its inception, the goal of the CAP was to economically support farmers through guaranteed minimum prices for agricultural products, established by the European Community itself. In essence, with prices for products that could not fall below the established level, farmers were stimulated to produce more (limiting production factors, increasing technological development and utilizing enhanced agronomy techniques). Guaranteed minimum prices were maintained by specific companies involved in buying up excess production that was then sold to third countries as below-cost exports. In addition, due to the fact that prices of agricultural products in countries outside the EC were lower than those in the EC, the CAP erected actual customs barriers which imposed duties on incoming goods that raised their prices and discouraged their importation. At the same time, exports to countries outside the EC were encouraged through subsidies to exporters. Clearly this approach generated criticism because it affected market functioning.

New regulations were then aimed at modifying the original approach. With the application of the production "quota" system, the European Union attempted to guarantee farmers a minimum level of product prices and to equitably share-out a quota of guaranteed production to all member countries. However, once again, the results of this policy were not very positive for some countries which were unable to adjust to these changes. Requests came from a number of directions for enhanced focus in EU policy on providing the conditions for farmers to be able to compete independently on European and international markets and to make global trade more equitable, reducing, for example, the risk of creating market distortion through export subsidies.

1.3.3 Environment, natural resources and food production

Natural resources – land, water, air, energy sources, climate, biodiversity – are essential to food production, rural development and sustainable growth.

As the previous section highlighted, the profound structural transformations under way (population growth, economic development, increased demand for energy, urbanization, etc.) require greater care in managing natural resources in a systematic way. In fact, the pressure exerted on **natural resources** in various regions of the world is growing, as are concerns regarding their most efficient use, conservation and containment of negative effects tied to the process of economic development. Competition to exploit and grab natural resources that are scarce and inequitably distributed in a given area often degenerate into conflict, violence and impoverishment of natural capital held in common. These trends are also exacerbated by the changes in growing conditions caused by climate change, extreme weather conditions and scarcity of water.

In the first half of this century, global demand for food, fodder and fiber will nearly double[11], while at the same time agricultural products may also be used increasingly for non-food purposes, such as the production of biofuels. Forced to adapt to climate changes and respect natural habitats, agriculture will have to compete with urban areas for land and water resources. In addition to this, it should also be noted that the drying up and deterioration in arable land will be a further challenge for the agricultural sector which, as a result, will be called upon to produce greater amounts of food products within a reduced area.

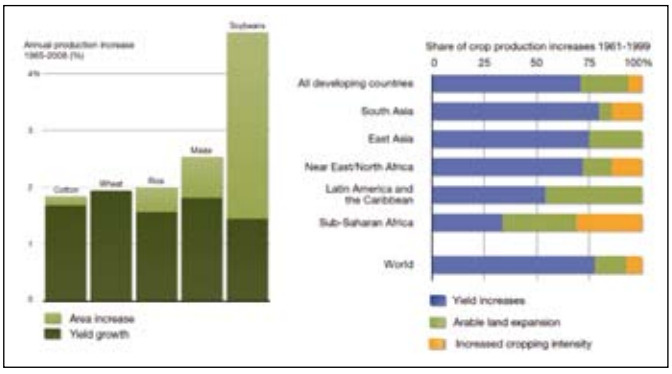
It is estimated, in fact, that the decline and conversion of croplands use could cause a **reduction in cultivated land area of 8-20% by 2050**. The combined effects of climate change, land degradation, cropland losses, water scarcity and species infestations may cause projected yields to be 5-25% short of demand by 2050[12]. However, this represents only an aspect of the overall problem; the indirect effects, i.e., the social-economic repercussions, could be greater. In fact, the reduced availability of land for agricultural production impacts on the earning capacity of rural populations and of those countries which have based their economic sustainability on the export of food products. In addition, the potential spread of disease and contamination in food products threatens the safety of the food chain and, as a result, personal health.

The next section will outline the major challenges/threats that must be faced over the coming decades in order to safeguard agricultural productivity and satisfy the nutritional needs of the growing world population.

Land use competition and contraction

Over the last five decades, the increase in the production of agricultural commodities was the result of an **increase in productivity (approx. 78%)**, made possible by the use of fertilizers and irrigation, expansion of **arable land (15%) and increase in cultivation intensity (7%)**[13].

Figure 17. Increase in production thanks to higher yield and expansion of cultivated land area for a number of main agricultural commodities (left graph, 2009; Increase in agricultural production by percentage of the determining factor, by geographical macro area (right graph), 2006



Source: World Bank, 2009; FAO 2006

11 FAO, 2009

12 UNEP, "The Environmental Food Crisis", 2009

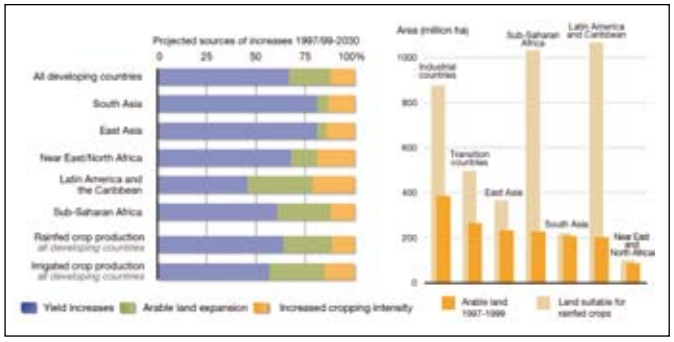
13 FAO 2003; Hazell and Wood 2008

The increase in yields required to meet future food requirements can only partially be met by fertilizers and irrigation, while expansion of the land destined for planting risks jeopardizing biodiversity.

Of the 13.5 billion hectares of land worldwide, currently approx. 8.3 billion (61%) is used for pastures and woodlands, while only 1.6 billion are destined for agricultural use[14]. A further 2 billion hectares are considered suitable for irrigated cultivation (see Figure 18). However, this is land largely covered by woodland, swampland and vegetation that allow for preservation of biodiversity and absorption of CO_2.

To summarize, while 90% of the growth in future agricultural production is expected to be the result of an increase in crop yield and greater intensity of agricultural exploitation, in order to meet global food requirements, arable land must increase over the coming years to **approx. 120 million hectares** in developing countries, especially in Sub-Saharan Africa and in Latin America. Further increase will not be possible in Asia because close to 95% of potentially-arable land is already in use.

Figure 18. Forecasts to 2030 of the factors which will make it possible to increase agriculture yield (left graph); Potential theoretical expansion of planting, without taking into consideration preservation of the natural environment



Source: FAO, "The Environmental Food Crisis", 2009

On a global level, there is still sufficient land to expand production, however, most of this potentially arable land is suitable for only certain types of crops (which may not be those most requested) and is concentrated in a restricted number of countries[15].

Part of the land which is potentially usable is also subject to **urban expansion**. Many countries, especially in the Middle East/North Africa and Southern Asia, have already reached or are about to reach the limit of land available. Urban development of cities, industrial expansion and infrastructure development (rail, roads and bridges) are all activities that have modified land use over time and which, in some cases, have led to its deterioration.

Given current forecasts in the growth of the urban population[16], urbanized areas or those destined for infrastructure will increase, rising from 0.4% of the global land surface in 2000 to 0.7% in 2030 and 0.9% in 2050 (approx. 1.2 million km^2). The ratio of "built-up" area and land destined for agricultural use was 3.5% in 2000, while it is expected to be 5.1% in 2030 and 7% in 2050. This means that if further urban expansion occurs to the detriment of agriculture, by 2030 approx. 0.37 million km^2 of land will be taken out of cultivation, and a further 0.30 million km^2 by 2050.

BIOFUEL: opportunity or threat?

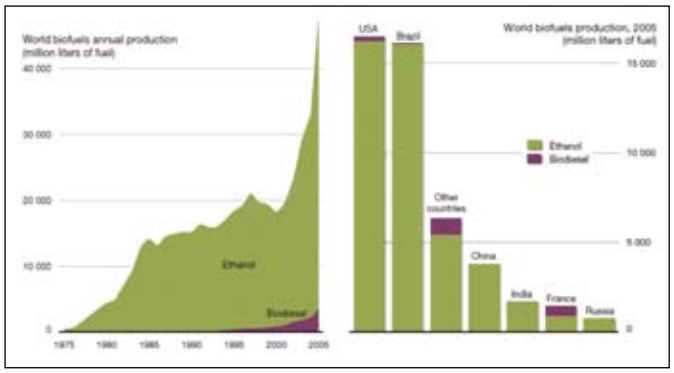
In addition to having to face the issues above analyzed, world food production must also compete with the biofuels market[17] "*which could change the basic variants of the world agricultural market*"[18] considering that forecasts indicate an increase in production of approximately 90% over the next ten years.

Biofuels have been in the limelight for some time, attracting the attention of economists, the media and institutions. In part due to high oil prices and in part for the hypothetical environmental benefits deriving from the substitution of traditional fuels (gasoline and diesel), production and demand for biofuels has grown rapidly over the last two decades. In 2005, they were 1% of fuels utilized for transport, while **by 2050** it is estimated that **they will be 25% of the global fuel market**[19].

On this point, it should be noted that within the context of the recent European energy policy, the so-called "20-20-20" strategy, the European Commission committed itself to replacing 10% of fossil fuel demand in the transport sector and, in order to achieve this, has created tax breaks and subsidies. Special benefits and specific policies have also been created in the United States and Brazil, the main producers and consumers of biofuels. Brazil, which is the no. 2 producer in the world, dedicates approx. 2.7 million hectares of land (4.5% of its arable land) to production of sugar cane for this purpose[20].

14 *Fischer, 2008*
15 *FAO, 2009*
16 *By 2030, it is estimated that two-thirds of the population will live in cities. It should be noted that in 2007, for the first time in history, the world's urban population - over three billion people - exceeded the rural population*
17 *Biofuels are hydrocarbons obtained from the processing of vegetable-based raw materials. They may be in the form of either liquid (ethanol or biodiesel) or gas (hydrogen and biogas). For the transportation sector, only the first form may be used because gaseous forms require adaptations in vehicles currently in circulation as well as a dedicated distribution network. Liquid fuels are those that are increasingly making their way onto the market. Ethanol, in particular, is obtained through fermentation of sugars derived from vegetable-based materials, while biodiesel is produced from vegetable oils, primarily rape and palm. These biofuels derived primarily from foodstuffs are defined as "first generation". Those known as "second generation" which are more tied to technological development, are obtained from waste*
18 *Jacques Diouf, Director General of the FAO. Opening remarks to the "How to feed the world 2050" forum held in October 2009*
19 *UNEP, "The Environment Food Crisis", 2009*
20 *World Bank, 2007; FAO 2008*

Figure 19. Production of ethanol and biodiesel (left graph); Main producers of biofuels (right graph)



Source: Earth Policy Institute, 2006

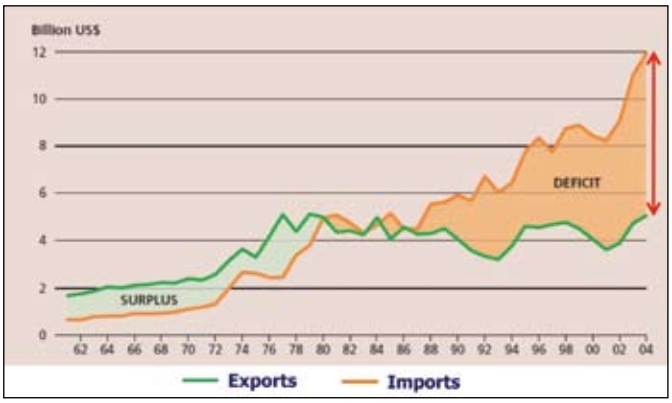
What will the impact of this new global "*biofuel-oriented*" policy be on food security?

As will be seen in more detail in Chapter 3, along with other factors, the use of food crops – such as corn, sugar, seed and palm oil – for non-food purposes has created significant **pressure on prices** for agricultural products, thus **reducing their availability** for traditional uses. In addition, conversion of land dedicated to biofuel production and use of water resources often occurs to the detriment of other crops destined for food, with a consequent increase in price[21].

For food security, risks deriving from higher prices have a significant impact on the ability to provide for poorer populations in rural areas who experience a drop in their purchasing power.

In addition, in terms of the countries themselves, the implications of an increase in agricultural commodity prices can have a greater or lesser negative effect depending on whether the country is a net importer or exporter. Some countries benefit from it, but others (less-developed countries) who have been in deficit for over two decades, will see their situation worsen[22].

Figure 20. Trade balance of the agricultural sector in less-developed countries



Source: FAO, 2008

Nonetheless, in the medium-to-long term, the growing request for biofuels could represent an **opportunity** for developing countries. In fact, emergence of renewed demand for cultivated products could **revitalize the agricultural sector**, generate investment, re-launch exports and have positive implications in terms of economic growth[23].

In fact, many developing countries, given the intrinsic agro-ecological characteristics of their lands, find themselves naturally in a privileged position to produce the raw materials from which biofuels are obtained. If this opportunity were to be properly taken advantage of as a vehicle for rural development[24], they could benefit from positive spin-offs in terms of income and employment. This has been understood in Brazil where the biofuels sector employs nearly 1 million people[25] in rural areas and has indirectly created another 300,000 jobs in manufacturing[26].

The actual spread of biofuels will depend, nonetheless, on the real long-term productive capacity, the ability of supply to meet demand and costs associated with putting into cultivation land that is increasingly less-fertile and already contested. In addition, there is no question but that the elaboration and adoption of bioenergy policies on an international level is necessary to allow it to develop in a sustainable way, in harmony with the needs of local populations, and which properly takes into account the potential impact on global food security.

It should also be mentioned that even though the spread of biofuels was primarily boosted by the potential environmental benefits to be derived from their across-the-board adoption in the transport sector and the ability of the crops used in

21 *It should be noted that biofuels are only one of the drivers in raising prices of foodstuffs. A drop in yields caused by bad weather, reduction in global stocks, increase in the price of fossil fuels and changes in the demand structure also exert pressure on food prices*
22 *FAO, "The State of Food and Agriculture", 2008*
23 *FAO, "The State of Food and Agriculture", 2008*
24 *However, involving small farmers in agricultural production, including of bio-fuels, requires investment in infrastructure, research, rural financing, market studies, trade bodies and the legal system*
25 *Data as of 2001. Source: Moreira, 2006*
26 *FAO, "The State of Food", 2008*

the production of biofuels to absorb CO_2 during their growth process, recent studies do not agree on the net benefit to be gained. In fact, the balance in terms of greenhouse gases generated and/or absorbed depends on a number of different factors, including: production method (use of fertilizers and related nitrogen protoxide emissions have significant impact in terms of global warming and worse than those generated by carbon dioxide emissions), techniques used for change in land use (e.g., deforesting) and type of crop as well as the cultivated area (the results of this analysis depend on the characteristics of the country involved). Analyses of the life cycle of biofuels are not, therefore, always in agreement about their benefits and, on the contrary, highlight the fact that they could contribute to climate change.

It is believed, however, that the introduction of second-generation biofuels based on lignocellulosic feedstocks could overcome this issue. On one hand because cellulosic biomass is the most abundant biological material on earth and compared with conventional crops, they can produce more biomass per hectare of land because the entire crop is available as feedstock for conversion to fuel. Furthermore, as these fuels do not use agricultural products in the process, describe a different scenario for global food security compared to first-generation biofuels. However, it is not clear when second-generation technologies may become commercially viable.

Land degradation

Land degradation is a global problem with serious implications for global social-economic security, food security, as well as security of the worldwide ecosystem.

Land degradation[27] is a **long-term degenerative process** of the function and productivity of ecosystems. It involves impoverishment of soil fertility that is primarily manifested in such phenomena as desertification, erosion (gradual washing away of the soil), salinization and presence of polluting agents.

The process of soil formation and regeneration is very slow and for this reason soil is considered an essential, non-renewable resource.

Figure 21. Main aspects of land degradation: definition and cause

Source: The European House-Ambrosetti based on a number of sources, 2009

Land degradation, which may be a result of either natural or man-made factors (see Figure 21), has direct repercussions on agricultural productivity, basic resources, biodiversity and also climate change[28].

As noted in a recent report of the FAO[29], degradation of arable land is caused, above all, by **poor land management, intensive exploitation** of the soil, **deforestation** and **poor irrigation practices**.

27 *Land which due to natural processes or human activity is no longer able to sustain properly an economic function and/or the original ecological function (ISO, 1996)*

28 *For example, reduction in vegetation reduces the Earth's ability to absorb CO_2. It has been estimated that 300 million tons of CO_2 are released into the atmosphere each year as a result of the desertification process (approx. 4% of total global emissions). Source: "Review of Implementation of Agenda 21 and the Johannesburg Plan of Implementation: desertification", UN, 2008; "Ecosystems and Human Well-Being: Desertification Synthesis. Millennium Ecosystem Assessment", World Resources Institute, Washington, D.C., p. 8, 2005*

29 *"Land Degradation Assessment in Drylands (LADA)", FAO-UNEP, 2008*

Some studies[30], which have monitored this phenomenon over a period of 20 years, maintain that land degradation continues to increase and is gradually spreading in many parts of the world. Currently, this phenomenon involves **over 20% of all arable land**, 30% of woodlands and 10% of prairies. In addition, according to other researchers[31], each year 20,000-50,000 km^2 of land becomes unusable[32], with losses 2-6 times greater in Africa, Latin America and Asia, compared with North America and Europe.

The greatest repercussions are seen on rural populations which depend on agriculture for their own sustenance, for a total of approx. 1.5 billion people (a quarter of the world's population)[33].

In terms of the number of people affected by degradation and desertification, **Asia is the continent most heavily hit**. Nearly 65% of its land tends towards this process. Erosion and salinization represent the main threats in the western part of the area, with over 1.5 million km^2 – a third of the region – hit. In the eastern part of the region, in China, the area affected by desertification represents 28% of the entire region, while the area affected by this process represents 35% of the country's entire territory[34].

In Italy, the areas which risk desertification amount to over 1/5 of the country's surface area and, specifically, over 40% of southern areas. Currently at risk of desertification: 60% of the Apulia region, 54% of Basilicata, 47% of Sicily and 31.2% of Sardinia[35].

Erosion, desertification and salinization directly impact on agricultural yields. In the wake of these phenomena, productivity in some areas dropped by 50%. In Africa, the continent most severely hit[36], losses range from 2 to 40%, with an average level of loss at 8.2% calculated on the basis of the entire estimated area.

On a global level, repercussions from this phenomenon have caused a loss in productivity of between 1 and 8%, equivalent to an annual loss of 400 billion dollars,[37] i.e., 70 dollars per person.

In Europe, the economic impact analysis cited by the European Commission indicates that land degradation could cost up to 38 million euros per year[38].

Pressure deriving from climate change and growing scarcity of water resources, as well as population growth and increase in livestock raising could worsen this situation.

It should be noted that a sustainable approach to agriculture makes it possible to reduce negative effects, prevent the risk of the onset of degradation and, where possible, allow it to be restored. Most improvement initiatives implemented are tied to irrigation techniques and reforestation and reclamation policies.

In light of the information contained in this section, it can be seen that degradation of arable land is an absolute priority requiring renewed attention from individuals, communities and governments.

"*What is required is political will to halt degradation of our ecosystems. We need a change in policies, institutions and agricultural practices. We must once again put agriculture center-stage if we want to preserve an environmental equilibrium on which the future generations of tomorrow will depend,*" recently stated FAO Assistant Director-General *Alexander Müller. "If there is no definite change of direction, environmental degradation will be a serious threat for agricultural productivity and food security*"[39].

Neo-Colonialism and Land grabbing

Food security, seen in terms of security of **production** and **supply** of goods essential to sustenance, is strongly influenced by the factors outlined above. The decrease in agricultural productivity seen in some areas of our planet and connected to the negative external factors seen in the environment (drying up of the soil, scarcity of water resources, effects of climate change and growing competition for utilization currently underway), have led some governments to seek out alternative opportunities for assuring production for themselves. The result has been what is known as "land grabbing").

Competition and the race to grab natural resources is often violent in nature. In order to underscore this process, the Director General of the FAO has defined this modern-day land grabbing as a form of "neo-colonialism".

However, this current process of land grabbing is characterized by a number of special aspects. The two major global crises that have erupted in recent months - the world food crisis and the more wide-spread financial crisis of which the food crisis is a part[40] – have encouraged and continue to encourage land acquisition.

30 *"Land Degradation Assessment in Drylands (LADA)", FAO-UNEP, 2008; "Global Assessment of Human-induced Soil Degradation (GLASOD)", ISRIC, 2008*
31 *Biggelaar et al. (2004)*
32 *Primarily due to erosion*
33 *United Nations Environment Programme, "Global Environment Outlook: Environment for Development (GEO 4)", Valletta, 2007*
34 *China National Report on the Implementation of the United Nations Convention to Combat Desertification and National Action Programme to Combat Desertification, 2006*
35 *ENEA - Progetto Speciale Clima Globale, 2006; "Cambiamenti climatici e strategie di adattamento in Italia. Una valutazione economica", C. Carraro et al., 2008*
36 *Den Biggelaar et al., 2004; Henao and Baanante, 2006*
37 *Calculated on the loss of 75 billion tons of soil through erosion*
38 *European Commission Communication, "Thematic Strategy for Soil Protection", Agriculture DG, 22 September 2006*
39 *Alexander Müller, Vice Director General of the FAO, 2007*
40 *GRAIN, "Making a killing from hunger", Against the grain, Barcelona, April 2008*

In fact, on one side, "food insecure"[41] countries that depend on the importation of agricultural products to satisfy internal demand for food have activated this process in order to initiate production outside their borders and assure supply stability by obtaining direct control of cultivation in other countries. On the other hand, private investors attracted by speculation in food commodities in financial markets see investment in arable land as a new source of income.

The novel aspect of this new type of colonialism lies, above all, in the fact that often the "colonized" countries willingly accept this "invasion" in the hope of being able to develop and modernize their agricultural system counting on the technologies and capitals of investors.

The extent of this phenomenon is significant, is on the increase and is not all objectionable.

What is required, therefore, is to see that the effects generated are as positive as possible and that disadvantages are reduced to a minimum.

Bearing in mind that generally those countries willing to give up their own land are those that have based the sustenance of local populations on that land, the implications of this activity on the transformation of the economic and social fabric in these areas must be closely evaluated.

Considering that current trends and the so-called carbon market could stimulate this phenomenon, it is important that international bodies impose a code of behavior and respect for binding standards for investors[42].

"*The trick here is not just to harvest crops but to harvest money*"[43].

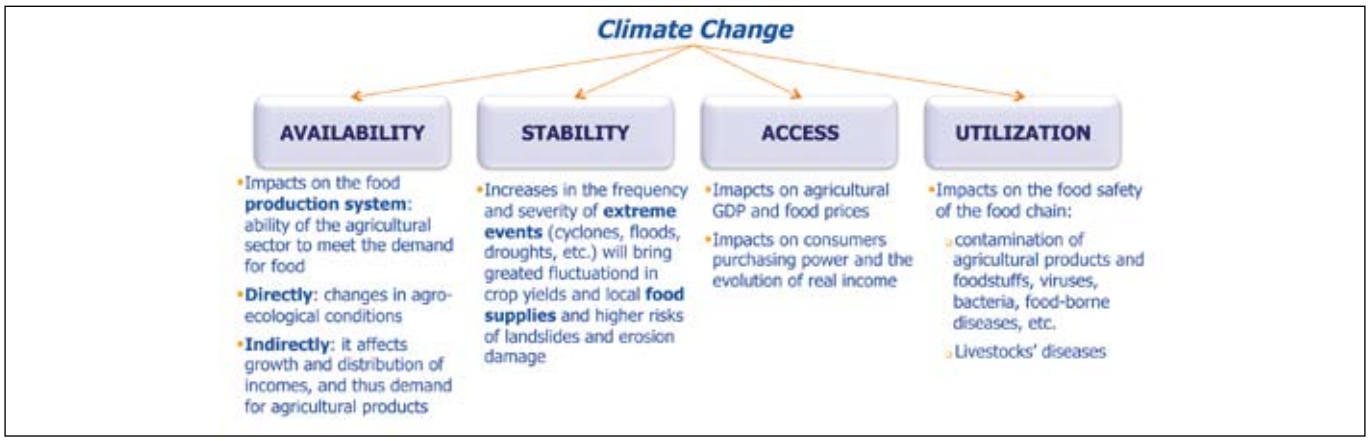
Climate Change, natural disasters and food security

Climate changes are a further factor of insecurity in the global capacity to meet the food requirements of a constantly-growing population.

In order to analyze the potential impact of this phenomenon on all variables that comprise food security, let us quickly repeat its definition: "*a situation that exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs for an active and healthy life*."

This definition includes four key aspects: **availability**, **stability**, **accessibility** and utilization.

Figure 22. Potential impact of climate change of on the key variables of food security



Source: The European House-Ambrosetti re-elaboration based on Schmidhuber J., Tubiello F.N., "Global food security under climate change", 2007

Availability: impact of climate change on agricultural production

Climate change will have complex **impacts** on agriculture and its ability to provide food products. These effects are both **direct**, due to the impacts it will have on biophysical processes and on the **agro-ecological conditions** at the basis of agricultural systems, as well as **indirect**, affecting **growth** and **wealth distribution**, and as a result on demand for agricultural products[44].

Increase in temperature, changes in levels of seasonal and

41 *Among these countries are Saudi Arabia, Japan, China, India, Korea, Libya and Egypt. For example, Saudi Arabia, Egypt and South Korea have obtained from the government of Sudan 1.5 million hectares of arable land for 99 years. Egypt, on the other hand, intends growing wheat and corn in an area of 840,000 hectares in Uganda. Pakistan wants to make available to Gulf States 1 million hectares of arable land, and so on. Source: "Seized: The 2008 Land Grab for food and financial security", GRAIN briefing, October 2008*

42 *At the G8 Summit held in July in Aquila, a declaration of intent on these questions was planned, but the heads of government were not able to reach a joint approach*

43 *Mikhail Orlov, founder of Black Earth Farming and former private equity manager with Carlyle and Invesco, September 2008. Cited in C. Belton, "Agriculture: The battle to bring more land into production", Financial Times, London, 30 September 2008*

44 *These factors of impact have been quantified in a number of studies, for example "Quantifying the impacts on Food Security", "Climate Change: Impacts, Adaptation and Vulnerability, Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change", IPCC, 2007*

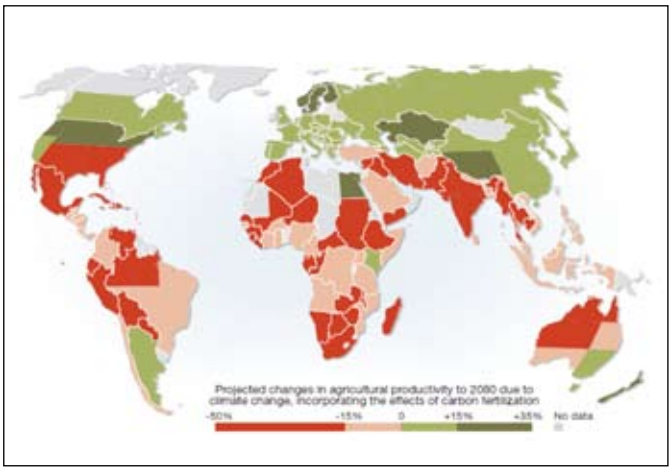
annual precipitation and the increase in the concentration of CO_2 in the atmosphere will affect soil production capacity and volume and quality of the yield, and will also impact on the natural environment in which agricultural activity takes place. Climate changes will also have consequences for the availability of water resources and the proliferation of phytopathies and harmful organisms, which will noticeably modify production conditions.

As has already been outlined[45], in **low latitude** areas of the world where the majority of developing countries are found, a further increase in temperatures will cause a **drop in agricultural yield** and **increased variability** in them, with resulting consequences in food security on a local level. Negative effects on agricultural yields will also be heightened by the more frequent occurrence of extreme climatic events. One of the possible consequences will be increased dependence on imports and an increase in the number of poor people.

At **higher latitudes**, on the other hand, an **increase in productivity** could be the primary phenomenon. In fact, it is believed that the areas potentially suited to cultivation will increase, the growing period will lengthen and along with these, also crop yield and range. Nonetheless, current forecasts do not always take into account the risks provoked by extreme events or the appearance of harmful organisms that could further impact on productive capacity, both local and global[46].

Another important factor that will affect agricultural yield is the increase in atmospheric concentration of CO_2. Given that this is an input of chlorophyll photosynthesis, it is believed that increased concentration of CO_2 will have a positive effect on various crops. However, the extent of this phenomenon, known as carbon fertilization, is still uncertain and will also depend on the soil management techniques adopted (e.g., type of irrigation and fertilizer use)[47]. It must also be considered that the increase in yields might not be matched by the maintenance of quality levels that are nutritionally adequate.

Figure 23. Forecasts of foodstuff losses due to negative impacts of climate change, 2080



Source: Cline, 2007; FAO, "The Environmental Food Crisis", 2009

Stability: Impact of climate change and natural disasters on stability of food availability

The greater variability in global and regional climatic conditions that is forecast, as well as the increased frequency and severity of "extreme" phenomena (flooding, hurricanes, drought) associated with greater risk of landslides and erosion, could cause serious interference in agricultural production leading to increased variability in yield and local availability of foodstuffs. This will have a significant impact on production stability[48] and, as a result, on food security in the broadest sense.

In particular, among extreme events, the natural disasters that will arrive suddenly and violently are those that will have greater impact on production stability.

FAO/GIEWS[49] notes that unexpected and violent phenomena (especially flooding) have significantly increased, from 14% in the 1980s to 27% of all natural disasters that occurred in 2000.

As can be seen in Figure 24, adverse climatic conditions and natural disasters were the no. 1 cause of food insecurity in the world up through 1990s and, although man-made disasters gained the upper hand for a certain period of time, even in the years that followed they have represented a serious threat. Given the rapidity with which they appear and the difficulty in forecasting them, these situations are difficult to manage, as are planning and response initiatives[50].

45 Position Paper "Climate Change, Agriculture and Food", Barilla Center for Food and Nutrition, June 2009

46 These forecasts vary depending on the future scenario for climate taken into consideration to calculate impact on agricultural production

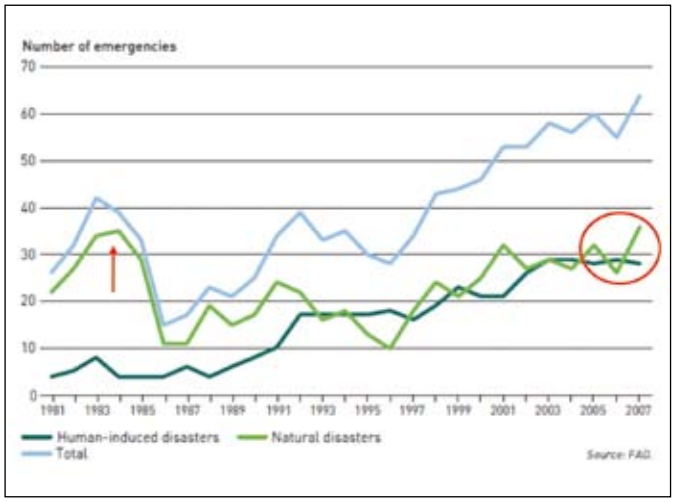
47 It should be noted that, according to laboratory analysis and with CO_2 concentrations of 550ppm, the yield of crops such as rice, soybean and wheat will increase by 10-20%, and only 0%-10% for corn and sorghum. Source: "Climate Change: Impacts, Adaptation and Vulnerability, Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change", IPCC, 2007

48 Climate change and its variable nature are not new phenomena in agriculture. However, what will change significantly is that the areas involved in this variability will increase

49 GIEWS, Global Information and Early Warning System

50 FAO, "The State of Food Insecurity in the World", 2008

Figure 24. Causes of food emergencies occurring during the period 1981-2007



Source: FAO, "The State of Food Insecurity in the World", 2008

Accessibility: impact of climate change on food accessibility

Food accessibility refers to the ability of individuals, communities and countries to acquire sufficient quantities of safe and nutritious food. Over the last 30 years, the drop in real prices of food products and the growth in real income has led to an overall improvement in food accessibility in many developing countries. Increased buying power has allowed a larger number of people to purchase not only food in general, but more nutritious food with higher levels of protein, micronutrients and vitamins.

The economic models utilized in a number of studies[51] have estimated the impacts of climate change on GDP in the agricultural sector and on food commodity prices. In terms of the first aspect analyzed, on a global level, the impacts will very likely be light, with variations between -1.5% and +2.6% by 2080. On a regional level, and above all in countries in which agriculture represents the primary source of income, the impacts will be greater. For example, in Sub-Saharan Africa, losses will vary in a range of 2% to 8%.

The primary messages to emerge from the studies that have analyzed impacts on the second aspect analyzed (prices of agricultural commodities) are:

- on average, with a moderate increase in temperature, prices will increase only slightly (up to 2050);
- after 2050, and as a result of a further increase in temperatures, prices will rise more drastically. For some commodities (rice and sugar), increases will even reach 80%.

However, variations in prices caused by climate change will be lower than those that will occur as a result of social-economic development.

Utilization: impact of climate change on food utilization

The change in climate and environmental conditions could lead to faster spreading of disease and contamination of agricultural products and foodstuffs, compared to that currently seen. This entails enhanced risk and the need for greater controls along the entire food chain.

To conclude, it can be stated that ***climate change*** will have **negative repercussions on global food security**, incrementing the dependence of developing countries on imports and exacerbating the already-precarious conditions of populations living on the African continent.

The Global Water Crisis[52]

In light of the factors outlined in the sections above, a further global challenges humanity as a whole must face is the growing competition for the use of water resources, as well as the alarming forecasts regarding shortages in the future.

Currently, agricultural irrigation utilizes approx. 70% of the world's fresh water supply. In many developing countries, this percentage rises to 95%, while that used for industrial and domestic purposes is, respectively, about 22% and 8%.

Land yields are 2-3 times superior in irrigated land (approx. 20% of the world's cultivated surface area), which guarantee 40% of world production[53] compared with those areas that rely on rainwater alone (80% of land).

The FAO estimates that in order to meet future demand for food production, water consumption will increase 14% in the next 30 years, within a context in which, according to recent studies[54] between 15% and 35% of water currently used for irrigation will not be sustainable in the future.

The relationship between water and food safety remains one of the most difficult challenges for the future of the human race. Considering that the scarcity of water resources already affects more than 1.2 billion people and will involve over 1.8 billion in 2025, it is clear that serious thought must be given to identify a truly sustainable growth model, a process which must be taken on using intersectorial and international approaches.

1.3.4 Society

As highlighted in the analysis outline provided in the opening of this chapter, the factors directly or indirectly

51 *Fischer G., et al., "Climate Change and Agricultural Vulnerability", A Special Report Prepared as a contribution to the World Summit on Sustainable Development, 2002; Reilly J., et al., "Impacts, Adaptation and Mitigation of Climate Change: Scientific Technical Analyses", 1995; Darwin R., et al., "World Agriculture and Climate Change", 1995*

52 *For a more detailed examination of this topic, please refer to "Water Management", Barilla Center for Food and Nutrition, March 2009.*

53 *World Business Council for Sustainable Development (WBCSD), "Facts and Trends - Water", 2006*

54 *Ibidem 57; "Business in the World of Water. WCCSD Water Scenarios to 2025", 2006*

connected with access to food and food security are numerous and also include a social aspect.

The social aspects of food security can be summarized in four interrelated areas: **human health**, demographics, **social-political issues** (social conflict and migration phenomena) and the relationship between **supply and demand for food** on food markets. As this last aspect will be examined in more detail further on in this position paper, the current chapter will concentrate on the health, demographic and social-political aspects connected with food security and how they are interrelated.

Food security and health

The relationship between food security and health is an issue that primarily involves developing countries given the frequent chronic and/or acute conditions of undernutrition and malnutrition found in this social-economic context.

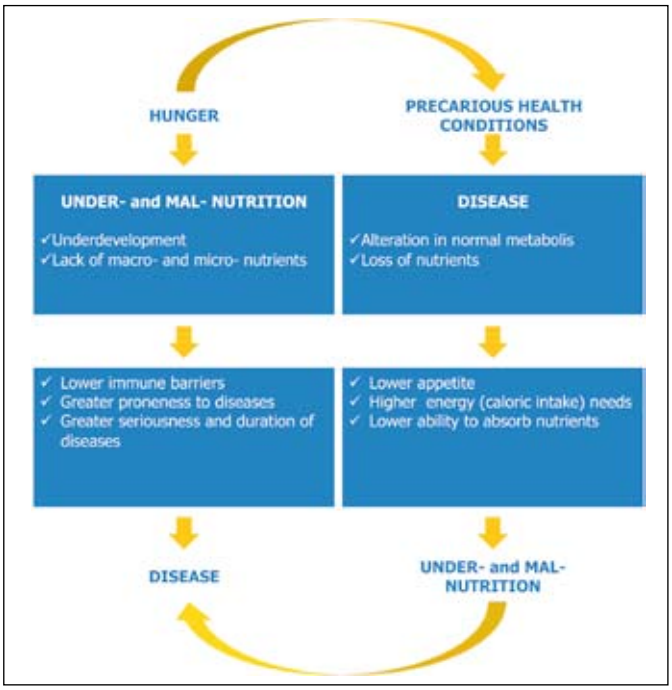
First of all, it should be noted that the relationship between food and health is biunique. On one hand, through a lack of one or more micro- or macronutrients, undernutrition and malnutrition affect the immune system of individuals, their predisposition to exposure to disease and the severity and duration of the diseases themselves. This relationship is reinforced by a system of other conditions typically associated with underweight, such as poor hygiene and sanitation, difficulties in accessing drinking water and basic drugs.

On the other, through alteration in normal metabolism and loss of nutrients the body requires, disease affects the appetite of an individual, the amount of energy required by the body and its ability to absorb nutrients ingested. In addition to this is a series of other social-economic conditions that accentuate the relationship between disease and malnutrition, such as unfitness to work, social-economic marginalization of the sick person and lack of nutritional knowledge (an issue which reduces the ability of mothers to aid their children).

The vicious cycle of malnutrition and disease – which forms the core of the Millennium Development Goals (MDGs) – is therefore the result of a complex set of interrelated factors which require multi-faceted, synergic action.

Dealing with the problem of human health and the possibility of wiping out disease without taking on the issue of nutrition and food security is short-sighted. While in the past many development and health programs were focused primarily on directly combating disease, current and future approaches must shift from analysis and treatment of disease to the direct and indirect causes of the disease itself. And, very often, nutrition has a prominent role among these.

Figure 25. Hunger-Health Cycle



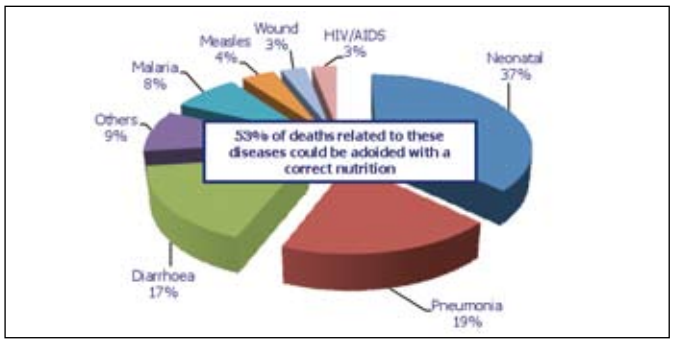
Source: The European House-Ambrosetti re-elaboration based on UN World Food Programme, 2007 data

The vicious cycle involving food/disease both has an influence on and is influenced *by* numerous **social-economic variables** (education, living conditions, food prices, overall conditions of health and hygiene, social-political stability) that render the reference scenario complex and multi-faceted. The list of variables directly or indirectly connected to the relationship between hunger/disease shows that there are a number long-term phenomena and trends and a number of short-term potential events or shocks that are difficult or impossible to foresee and therefore are not "preventable". In a forecast that is anything but reassuring, the World Food Programme estimates that out of a 100 people defined as "in a condition of under- or malnutrition", only 10% of these are due to temporary shock situations (civil war, drought, epidemics, etc.), while 90% are due to chronic, unsolved long-term situations.

In a situation like the one described above, women and children are those most hit for two main reasons. Firstly, on a general level, because they are physically less-resistant to hunger and disease, especially children. Secondly, due to the worse social, legal and economic conditions women and children face in some countries, especially developing countries: these social-economic conditions are reflected in lessened access to food (and quality food) and adequate sanitary-medical treatment.

The United Nations World Food Programme estimates that deaths tied to malnutrition in children under five years of age are **53% of all deaths** on a global level for this age bracket.

Figure 26. Main causes of death in children under five years old on a worldwide level



Source: The European House-Ambrosetti re-elaboration based on UN World Food Programme, 2007 data

5.6 deaths annually in children under five years old are directly tied to diseases which, in the presence of proper diet, would not be lethal, such as, for example, diarrhea, pneumonia and malaria.

It is clear the **fundamental role women** could **have** in improving results in reducing hunger and mortality in children given their central role both in child-rearing and in farming and harvesting.

Nonetheless, in order to play a central role in significant change in the fight against hunger and mortality, women must be:

- put in the conditions to know the risks connected with inadequate or improper diet, **especially for newborns and children under five years of age**;
- instructed in the techniques and basic operations that would produce significant improvement in **agricultural production** over the short term;
- properly informed about **basic health and hygiene practices**;
- given a **social-economic status** which, unfortunately, is often still denied them in many developing countries.

Despite the fact that some efforts have been made on an international level, the reality of the current situation of women in developing countries is that the importance of their central role is not fully perceived. There is still much that must be done to comprehend and bring to fruition all the potential that policies aimed at teaching and involving women could have in a number of critical social and economic situations.

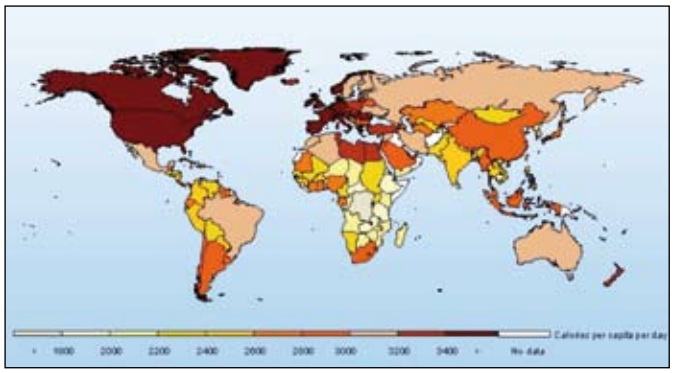
While **women and children** are those most at-risk and most-hit by the negative effects of the vicious cycle of hunger/disease, another group very much affected by this "phenomenon" is that of **refugees**. Great masses of people who move from their homelands because of dramatic weather or natural phenomena, or because of civil war or political persecution, represent a group that is particularly open to the risk of the hunger/disease "trap". Often the living conditions of these people result in serious limitations to the availability of food and food of good quality. Under- and malnutrition weakens the body and exposes it to greater risk from disease, as do poor sanitary conditions in make-shift camps without even the most basic preventive hygienic measures. Spread of disease – both to a limited degree as well as in epidemic form – is very high in these cases.

In fact, deaths related to forced migration are rarely linked directly to the lack of food, but rather to the interaction between infectious disease and pre-existing status of under- and malnutrition in the populations involved. Forced living in close quarters of a large number of people (often from rural areas) exposes to individuals to a wide spectrum of infective diseases against which they have not developed immune defenses. The coincidence of a worsening of a pre-existing state of malnutrition and exposure to new diseases produces an explosive mix.

Therefore, in order to combat these humanitarian crisis situations, providing food alone is not enough; systemic conditions must be created that make it possible not only to treat disease, but, above all, prevent the onset of **epidemic infections** linked to a serious deterioration in the availability of micronutrients essential for proper functioning of the body and keeping immune defenses within acceptable limits.

The warnings launched by international bodies, informational campaigns and dramatic images that often arrive from countries hit by famine and epidemics have unquestionably raised awareness of the need for action from both developed countries and developing ones most seriously affected by this phenomenon. Nonetheless, in terms of the "state of the art" attained on a global level regarding the fight against hunger and promotion of global health, it must be noted that, despite the overall improvement in health conditions and availability of food, **a major discrepancy remains** both between developed and developing countries, as well as internally within developing countries in which, as clearly seen by the United Nations World Food Programme, there remain situations of major improvement in the right direction, alongside cases where the situation remains basically unchanged and even those in which already-serious conditions in the past have worsened.

Figure 27. Number of calories consumed daily per capita on a worldwide level

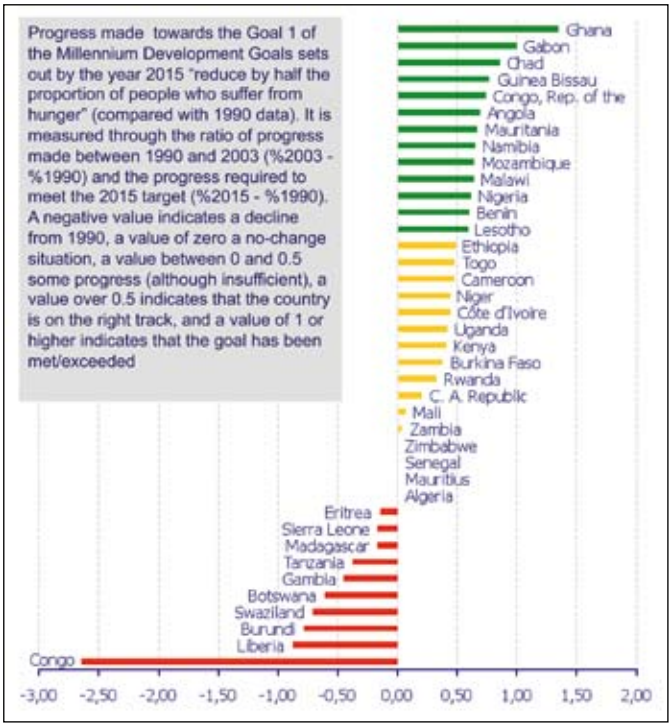


Source: FAO Statistics Division, FAO Statistical Yearbook 2005-2006

In particular, the **Millennium Development Goals** set in relation to food security and health do not appear to be fully on-target. Goal one calls for the elimination of extreme poverty and hunger and sets as its target reduction by half of the proportion of people who suffer from hunger by the year 2015. Reaching of this goal is measured through **two specific indicators**: the number of children under five who are underweight and the percentage of the population whose diet has a caloric intake under the minimum level - meaning that they are undernourished.

On the basis of available data, while in some cases an improvement in key indicators can be seen, in many areas of the world (especially in South Asia and Sub-Saharan Africa) the results achieved continue to lag far behind.

Figure 28. Progress made in Africa over the period 1990-2003 towards reducing the percentage of the population that is undernourished



Source: The European House-Ambrosetti re-elaboration based on UN World Food Programme, 2007 data

The accumulated delays and back-tracking still encountered today are unjustifiable, not only from a moral standpoint, but also a strictly **economic** one[55]. Not at all a problem that could be categorized as an exclusively "humanitarian" one, the vicious cycle involving food/human health actually has a significant impact on the economic development of those countries most closely involved in this phenomenon and generates a negative economic spiral. A smaller available work force, lower productivity per employee, greater problems in foreign trade relations, greater presence of social tension and conflicts, (to name just the main effects) are the direct consequence of the lack of a solution to the problem of hunger and precarious overall conditions of health that aggravate what is very often an already critical overall situation.

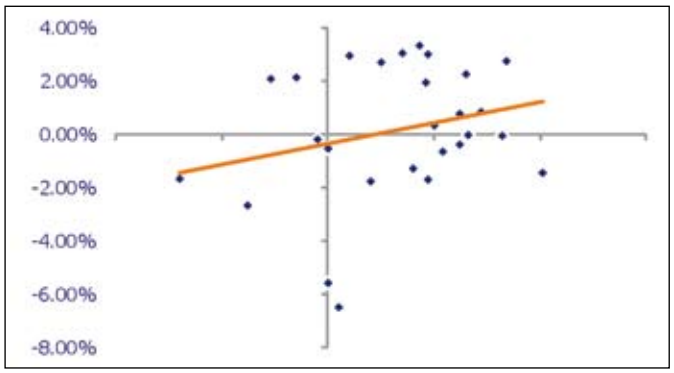
Considering the data for the progress made by a number of African countries in the fight against hunger (prepared by the World Food Programme using the methodology shown in Figure 28) and the growth in work productivity for the same countries (calculated on the basis of the output per worker at constant prices), it can be seen that the countries which have made the most progress in the fight against hunger have generally registered higher levels of growth in productivity (except for some exceptions which also confirm the extreme

55 *"We need to mobilize our collective will to make the right choices. The cost of inaction is high - economically, politically and - most importantly - morally", (United Nations World Food Programme, World Hunger Series 2007: Hunger and Health)*

variability in development processes in African countries in which progress towards reducing malnutrition is sometimes paired with a decline in productivity, and vice versa).

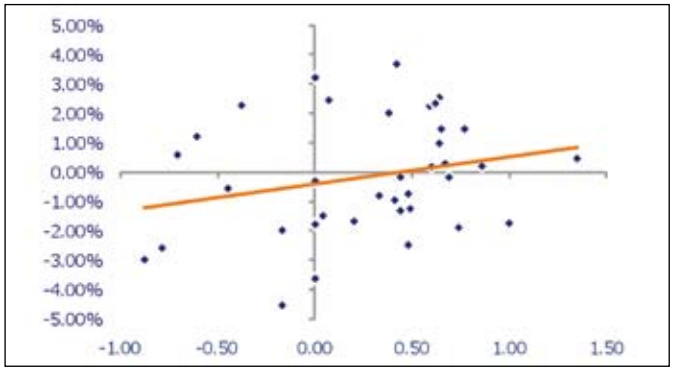
Verification of the relationship between hunger and productivity in Africa was undertaken both in terms of the reduction of the number of underweight children under the age of five for the period 1990-2006, as well as in relation to the reduction of the part of the population malnourished for the period 1990-2003. It should be noted that the two samples utilized were not identical because the World Food Programme does not calculate the progress made in terms of these two indicators for all African countries, and as a result there are two different sub-samples.

Figure 29. Growth in work productivity (y-axis) and progress towards reduction in the number of underweight children under the age of 5 in Africa (x-axis) for the period 1990-2006



Source: The European House-Ambrosetti re-elaboration of UN World Food Programme, 2007 data and Alan Heston, Robert Summers and Bettina Aten, Penn World Table Version 6.3, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, August 2009

Figure 30. Growth in work productivity (y-axis) and progress towards reduction in the malnourished population in Africa (x-axis) for the period 1990-2003



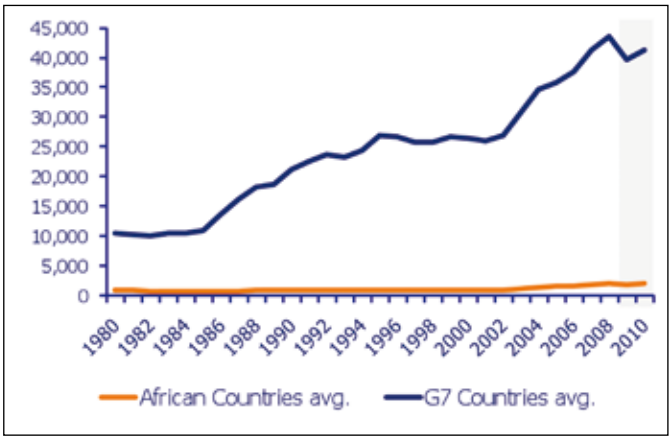
Source: The European House-Ambrosetti re-elaboration of UN World Food Programme, 2007 data and Alan Heston, Robert Summers and Bettina Aten, Penn World Table Version 6.3, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, August 2009

Under- and malnutrition and poor health have a strong negative impact on the formation of **human and social capital** in a country and irreparably undermine its chances for economic growth. The negative effect on growth and social-economic development is long-term and cross-generational and prevents those situations affected from breaking the hunger/disease cycle (see Figure 31 for a 30-year picture of the per capita earnings differential between G7 and African countries).

Without economic growth, a population cannot be guaranteed greater and improved access to food and health resources, especially if – as is the case in developing countries – the population itself is in constant growth. The food and health situation for future generations cannot help but be equal or inferior to those of preceding generations, thus descending each time a notch in the poverty and mortality spiral that has existed for decades.

In light of these considerations, it is clear that the more correct time-frame for taking on the problem of the hunger/disease spiral is that of the **life-cycle**, the analysis of which embraces the entire life of a generation and leads to taking into consideration at least two generations: in fact, the nutrition and health of tomorrow's generation is closely tied to that of the present one and the actions which will be taken in the immediate future.

Figure 31. Per capita GDP for the period 1980-2010e: comparison of average figures in African and G7 countries



Source: The European House-Ambrosetti re-elaboration based on data from IMF, World Economic Outlook, October, 2009

From this standpoint, a key issue – today, but above all, for tomorrow – is so-called **hidden hunger**, which the World Food Programme estimates affects over two billion people. By "hidden hunger" is meant a condition in which, caloric intake being equal, there is an (often dramatic) lack of one or more micronutrients fundamental for the correct functioning of the human body. These shortcomings – which could be more accurately defined as malnutrition rather than undernutrition, even though these two are often present contemporaneously

- give rise not only to problems in terms of basic bodily functioning, but also problems of growth and, in some cases, to very serious psychiatric diseases, especially in younger individuals.

In terms of the latter, the World Food Programme notes that these are one of the major burdens on public spending within already serious social-economic situations in developing countries and contribute to triggering and worsening the numerous internal conflicts that have involved these countries in recent decades.

Among these micronutrients, one of the most important ones is Vitamin A, the lack of which, according to the World Food Programme, causes nearly 800,000 deaths each year among women and children. Vitamin A is involved in regulating a series of basic biological functions, such as growth, sight, reproduction and cell differentiation. The FAO calculates periodically the availability of Vitamin A (retinol) for human consumption in various countries around the world through conversion of estimates of food available for consumption in micrograms (mcg) of retinol equivalents (RE). Currently-available data (for the period 2003-2005 and given in Figure 32) show that lack of Vitamin A is particularly high in most developing countries.

The dietary availability of vitamin A is calculated by converting the amount of food available for human consumption as estimated by the FAO Food Balance Sheets in equivalent of Vitamin A (micrograms of retinol activity equivalent - RAE). However the actual food consumption may be lower than the quantity shown as food availability depending on the magnitude of wastage and losses of food in the household, e.g. during storage, in preparation and cooking, as plate-waste or quantities fed to domestic animals and pets, thrown or given away. The vitamin A added to sugar or other food-vehicle in some countries is not taken into consideration.

Figure 32. Vitamin A available for human consumption during the period 2003-2005

1 Less than 300 mcg of RE available per person per day

2 300-600 mcg of RE available per person per day

3 Over 600 mcg of RE available per person per day

Source: The European House-Ambrosetti re-elaboration based on data from the FAO Statistics Division, 2009

BOX

UNDERNUTRITION AND DISEASE: A SURVEY CONDUCTED IN LIBERIA

The scene of a bloody civil war from 1989 to 2003, Liberia is struggling to restore "normal" social-economic and sanitary conditions.

A survey conducted by the Liberian government and a number of UN agencies in 2006 found that: 39% of children under five risk suffering from rickets or being too short for their age; 6.9% are rundown or too thin for their height, 27% are underweight and 50% risk hunger or can easily fall into situations where food security is not assured.

On the basis of this study, a very high proportion of children in Liberia do not appear capable of reaching adulthood and/or undergo a correct course of growth due to under- and malnutrition. Malaria and diarrhea emerge in particular as the main causes of disease and death for children in Liberia.

"Underweight" was found to be directly connected with lower weight at birth and conditions of disease, especially fever and diarrhea. Children smaller than normal at birth and which have had periods of fever or diarrhea were found to be significantly more exposed to the probability of falling into a situation of undernutrition.

In turn, low weight at birth was also seen to be closely tied to the nutritional status of the mother. Undernourished mothers were seen to have 31% greater probability of giving birth to a child with problems of underweight, compared with mothers with a normal nutritional profile.

Therefore, women and children are one of the key targets for policies and initiatives that aim concretely at breaking the chain of hunger, guaranteeing an improved health status for future generations and providing significant support for overall social-economic development in Liberia.

Most of the studies performed on a worldwide level on the issue of food security and human health concentrate on examining the factors that determine the dramatic conditions of hunger and disease so widespread in developing countries. Naturally, also in terms of emergency and timely intervention, these aspects are of fundamental pre-eminent importance for the international community.

Nonetheless, if in setting the boundaries of what food safety actually comprises reference is made to the definition given by the 1996 World Food Summit, food security is defined as being "*a situation that exists when all people, at all times, have physical and economic access to sufficient, **safe** and **nutritious** food to meet their **dietary needs** and food preferences for an **active** and **healthy life***."

Analyzing this definition, it can be seen that the problem of the relationship between food security and health cannot only be solved purely through having physical access or not to something to eat - an aspect already mentioned in terms of "hidden hunger". From this standpoint, richer countries are also directly involved in the pairing of food/health: in these countries, we have seen in recent years a significant change in diet and lifestyle towards a reduction in physical activity and an increase in the average amount of calories consumed.

Connected with these phenomena is also an exponential increase in the incidence of overweight and obesity in the population and significant increase in those diseases (primarily heart disease, diabetes and cancer) for which diet is fundamental in terms of prevention[56]. Major international studies have shown that approximately 80% of the cases tied to these diseases could be prevented by eliminating a number of risk factors, such as consumption of tobacco, unhealthy diet, physical inactivity and excessive alcohol consumption.

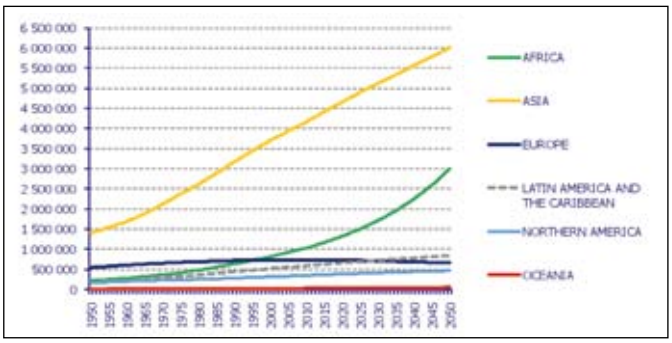
In light of this, it is clear that the relationship between food and health involves the entire planet, although with differing consequences, problems and characteristics. While for developing countries the relationship between food security and health is seen primarily in availability of food and adequate minimums of micronutrients, for developed countries the primary issue is that of following a healthy, correct diet.

Food security and demographic phenomena

Among the phenomena with the greatest impact on food security (especially in terms of physical access to a sufficient amount of food products) is that of population.

The **increase in world population**, seen most markedly in developing countries, has represented, and still represents, a major challenge to the world agri-food sector that generates exponential growth in the demand for food products that must be met. Anything but marginal, this demographic trend will also be a challenge for the future. As can be seen in the following figure, it is expected that the population will grow in Africa and Asia until at least the year 2050.

Figure 33. Forecasts in world population growth to 2050



Source: The European House-Ambrosetti re-elaboration based on data from the United Nations, Department of Economic and Social Affairs, Population Division (2009). World Population Prospects: The 2008 Revision

As will be seen later in this study, an answer has been possible, in part, thanks to the gradual increase in productivity in cultivated land and use of areas of the Earth not previously dedicated to agricultural production which was also thanks to technological advances (the so-called green revolution).

Nonetheless, as was so dramatically noted at the start of this document, the number of undernourished individuals continues to be very high and, as seen from the relationship between hunger and disease, along with the positive efforts made to fight hunger in a number of nations, there are numerous situations of non-progress or back-sliding on a world scale.

In addition to what could be defined as "absolute values" in population change, it should also be noted that there is currently (and expected for the future) a strong "shift factor" in the world population. For a number of decades, and with increasing intensity, there has been a significant trend towards urbanization with continuous emptying of urban areas and a population explosion in urban centers, especially in developing countries.

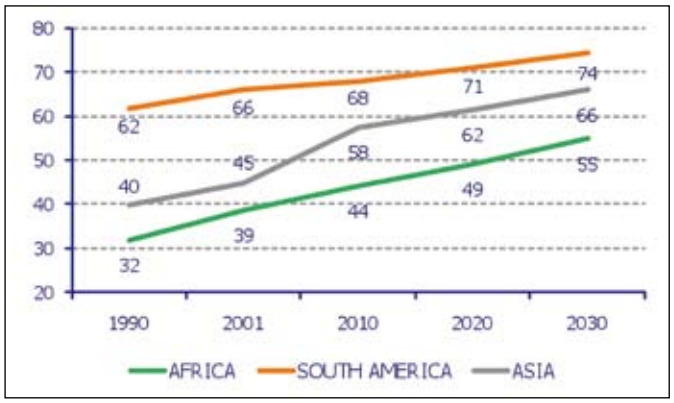
The shift of large numbers of people from the countryside to the city is critical for food security for a number of reasons:

- It generates a "migration effect" with masses of people in areas of restricted size and - often - lacking in basic social and sanitary facilities (drinking water, sewers, hospitals, humanly acceptable living accommodations, etc.);
- It generates pressure on the production-distribution system for food within those metropolitan areas involved;
- Rural land, including agricultural land, is abandoned and left unattended;
- There are problems connected with the possibility of access to food that is not only quantitatively but also qualitatively adequate for masses of people often driven towards urban areas by conditions of extreme poverty and hunger.

56 *For more information, please refer to the "Food and Health" Position Paper published by the Barilla Center for Food & Nutrition*

This phenomenon, especially if seen in terms of the future, is tremendously significant. According to United Nations forecasts, in Africa, the percentage of the population in urban areas will go from 32% in 1990 to 55% in 2030, an increase of 72% in 40 years.

Figure 34. Population in urban areas (as % of total population)



Source: The European House-Ambrosetti re-elaboration based on data from the United Nations, Department of Economic and Social Affairs, Population Division (2008), World Urbanization Prospects: The 2007 Revision, United Nations, New York; UN-Habitat, Urban Info 2008

Food security and social conflict

The presence of natural and agricultural resources, their use, and profits from their production and sale have historically been the source of conflict, both on a national scale (in the form of conflict within individual countries that often manifests itself as civil war and secession), as well as international (with the outbreak of wars - openly declared to a greater or lesser degree and of which public opinion is aware - for the control of border areas rich in agricultural and mineral resources).

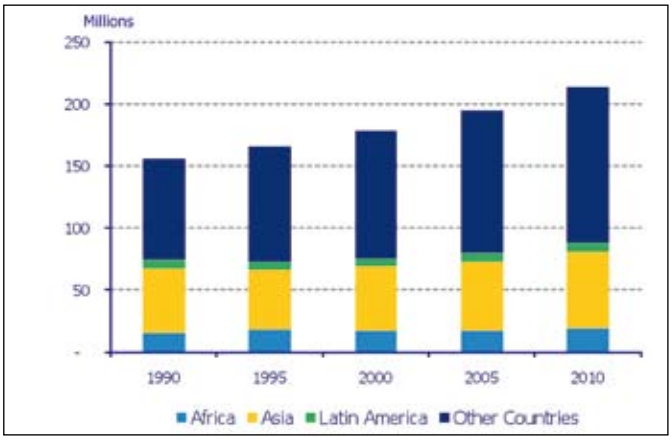
Starting from the end of the Cold War, there has been an increase in these conflict situations, especially in the form of civil wars within individual countries, and where poverty and congenital political-social instability make access to food, water and natural resources essential, both for survival and for the creation of economic wealth of the various ethnic, social and religious groups found in that area[57].

On the basis of UNEP forecasts, in at least 18 internal conflicts registered on an international basis since 1990, agricultural and natural resources have played a fundamental role, both as the root cause and in feeding the conflicts themselves. If this time frame is broadened to the last 60 years, once again according to the United Nations, at least 40% of conflicts within countries have been connected to the availability, use and exploitation of agricultural and natural resources.

All the international analyses substantially agree in identifying certain major forms of conflict/problems for security as being traceable (either directly or indirectly) to the availability of food or natural resources:

- social tension tied to **access and control of agricultural resources**;
- **migration phenomena** connected with appalling living conditions (malnutrition and lack of water), in some cases aggravated by the effects generated by climate change[58];

Figure 35. Estimate of number of migrants on an international level



Source: The European House-Ambrosetti re-elaboration based on data from the United Nations, Department of Economic and Social Affairs, Population Division (2009). Trends in International Migrant Stock: The 2008 Revision

- situations of **political/social instability and misgovernment** relative to the response to the **growing needs of the populations**;
- pressure on international governance connected with the **ever-increasing imbalance** between developed and developing countries.

In future terms, there is significant risk that worsening in availability and security of agricultural and food products (aggravated by the climate change currently under way) could lead to a noticeable increase in the level of social conflict, especially in developing areas where food and water are an incredible multiplier factor in latent and unresolved tension (ethnic, religious and economic).

In fact, natural resources often play an ambivalent role. On one side, enhanced supply of resources is a source of income and prosperity for a country, while on the other it can tangibly contribute to generating and feeding instability and conflict. Often in developing countries, the expectation of enjoying

57 *The recent study dedicated to this issue by the United Nations Environment Programme, "From Conflict to Peacebuilding. The Role of Natural Resources and the Environment", published in the initial months of 2009, attests to the extreme topicality of this issue*

58 *In December 2003, the European Council adopted the European Security Strategy, identifying competition for natural resources (chiefly in relation to agricultural and water resources) as among the most important global challenges in terms of security, for both the present and the future. "The competition for natural resources that, in the next few decades, will be aggravated by global warming, will very probably produce upheaval and migratory phenomena in several parts of the planet."*

long-term economic and social prosperity from its natural resources gives way to damage of the natural environment due to commercial exploitation and use of profits from natural resource trade not for technological improvement and enrichment of the population, but to reinforce the influence of local powers (often armed).

Even if not directly aimed at their control, when social conflicts arise, natural resources often become the tool for financing the conflicts themselves, thus transforming control of exploitation of these resources into a strategic goal for the war's factions.

Resource governance also represents a challenge within stable political-social situations, but it becomes a key factor in countries in which weakness of local governments and lack of transparency favor the opportunistic attempt to gain control of resources through patronage or illegal commerce (in this regard, see "*Natural Resources and Violent Conflict*", World Bank, 2003). In these situations, the risk that exploitation of agricultural and natural resources will degenerate into civil war/secession or the outbreak of conflict with neighboring countries (for control of jointly-held or particularly profitable resources) is very high.

Often, these conflicts are only seen from a short-term perspective: number of dead, wounded, refugees, destruction of land and forests. But rather than having merely a temporary effect, social conflicts – especially if connected with exploitation and commerce of natural and agricultural resources – often undermine at the base the possibilities for future growth and social-economic development of countries affected by conflict (as well as neighboring ones where conflict causes migration).

The relationship between natural resources, conflict and food security is, unfortunately, very close, in a vicious cycle which, from war and loss and devastation of available agricultural resources, leads to hunger, disease and, often, massive migration, creating tremendous problems in terms of health and access to sufficient quantities of food and water for masses of helpless people.

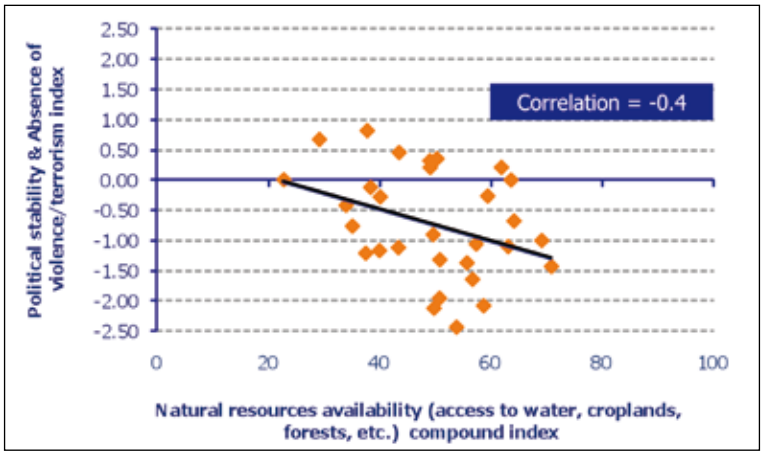
Even in those cases in which they have been able to survive and return to normal life in countries where, formally, peace has been restored, populations of countries involved in conflicts due to natural resources have had to face the often arduous challenge of returning to a very difficult development process.

BOX

EMPIRICAL PROOF

Looking at 30 developing countries, we have verified the existence of an inverse relationship between availability of local natural resources and stability of the government of the country – confirming numerous studies on the ambivalent relationship between resources and social conflict.

As the availability of natural resources increases – in particular access to water, arable land and forests (summarized in a general index) – the increase in the level of internal conflict can be seen.



Source: The European House-Ambrosetti re-elaboration based on data from the United Nations Environment Programme, GEO Data Portal 2009, World Bank, "World Bank Dataset on Governance", 2009

2. Food Security and Global Governance

Inability, on an international level, of avoiding having the 2006-2008 crisis in agricultural product prices become a global food emergency points up the weakness and inadequacy of food security governance mechanisms. In fact, **management policies** seem overall to have **failed in the attempt to reach the objective, especially** with regard to the poorest and most vulnerable countries and segments of the population. The most evident aspect of this is the significant increase in the number of undernourished individuals which, in developing countries, rose from 923 million in 2007 to 963 million in 2008.[59]

Exacerbating this situation - already complex in terms of its causes and solutions - has been the global financial crisis which emerged in the second half of 2008, immediately following the price shock. Despite the fact that the price of agricultural raw materials began to decrease, the resulting **economic slowdown** meant that the **number of undernourished people continued to increase**. They now total one billion people and the situation is especially serious in Sub-Saharan Africa where one person out of three can be considered chronically undernourished[60].

Although their base causes are different, **these two crises appear strongly interrelated** through their implications on stability and financial, economic and social-political security.[61] In addition, while the consequences of the current world economic crisis are not yet completely known, for lower-income countries it can only be expected that the problem of hunger will become even worse. This is why **immediate and coordinated action to guarantee long-term global food security** has been requested.

The global financial crisis must not overshadow the food crisis[62] and one of the priority challenges highlighted by the international community remains that of satisfying the growing food demand on a worldwide level.

In this context, at recent international summits, starting with the "High-level conference on World Food Security" promoted by the FAO in 2008, up to this year's G8 in Aquila - whose principal declarations will be reported further on in this chapter - a detailed response around three major pillars have been outlined:

- **investment in food aid and food security networks** for those in greatest need;
- increase in **investment in agriculture**[63];
- **the activation of international trade policies**, differentiated for developed and developing countries.

As has been mentioned, the primary sector, in particular, is once again becoming a central element on the political agenda and is being seen as essential for meeting the goals set by the international community for this millennium.

2.1 Geopolitics of the global food crisis: significant variables

The global food crisis is causing a veritable turnaround in the virtual value of alimentary products. In the 21st century, food is once again becoming a **factor of strategic superiority**, as is the case with energy and defense. The price of commodities, together with the contingent dependence of some markets, result in governments reinforcing their exclusive sovereignty[64]. For example, this is the case with Russia which, for the first time since the days of the Soviet Union, has returned to **nationalizing production, storage and export of grains** through a specially-created state-owned company.

Other countries which in the recent past have accumulated currency reserves in what are known as sovereign investment funds, are rapidly re-orienting their soft operations activity (acquisition of shares of companies, financial derivatives, stocks and bonds) to hard investments, above all in land to be utilized for cultivation in the event of global food crisis. This is the case of China which through the National Sovereign Fund is purchasing large plots of land in Africa (particularly in Madagascar and Sudan), and a number of Persian Gulf Emirates and Russia itself are doing the same.

In a recent report prepared by the two UN agencies involved

59 *"The State of Food Insecurity in the World", FAO, 2008*
60 *"Secretariat contribution to defining the objectives and possible decisions of the World Summit on Food Security on 16, 17 and 18 November 2009", FAO, 2009*
61 *Von Brown J., "Food and financial crises: Implications for agriculture and the poor", IFPRI, Food Policy Report, 20, 2008*
62 *Vos R., Kozul-Wright R., Inoue K., "Don't forget the food crisis: New policy directions needed", UN-DSA Policy Brief, 8, 2008*
63 *Speaking of the world financial, economic and food crisis at the high-level international conference entitled "Water for agriculture and Energy in Africa: the challenges of climate change" in December 2008, the Director General of the FAO, Jacques Diouf, stressed that "promoting agricultural production in poor nations is the only possible and long-term solution to fighting hunger. We must, therefore, invest more heavily in agriculture"*
64 *Ansalone G., "Il cibo come fattore strategico. Sicurezza alimentare sfida del XXI secolo", GNOSIS no. 2/2009*

with food and agriculture (IFAD and FAO)[65], the role of private and state investors in the growing trend of purchase of agricultural land was highlighted. This phenomenon, known as ***land grab*** and considered by some as a development opportunity[66], greatly suffers, however, from a **lack of regulation** and, where not subject to proper political-administrative governance, it risks becoming what FAO Director General Jacques Diouf has called "*neo-colonialism*"[67].

At least five main variables involving the theme of food security which today – and even more so in the future – **impact on international geopolitical balances of power** can be identified. These are factors that have been fully discussed in the previous chapter, but which are mentioned once again here in terms of those aspects more relevant to potential political and governance implications for food security.

First of all, from the standpoint of food security, by which is meant **security of production and supply of goods essential to sustenance**, we are seeing the claim (backed by the relevant statistics, from population to GDP) for a broader and stronger geo-strategic role from emerging powers, including India, China, Brazil, Russia, Saudi Arabia, Nigeria, South Africa and South Korea. These countries are, first of all, all consumer markets with a growing middle class whose **diet and eating habits are undergoing major evolution**. It is calculated that, by 2020, the population of these areas of the planet will grow by 40% and a significant part will orient its diet towards meat, milk and bread, rather than rice. Nonetheless, faced with these needs, these countries still have a fragmented agricultural system characterized by small farms oriented towards local production.

From an **economic standpoint**, the social-demographic evolution mentioned above often translates into an attempt by governments to reinforce domestic production in order to sustain the economy and reduce its dependence on supply of foreign goods. This goal is pursued through the raising of **customs duties and non-tariff barriers for imports**, as well as major **subsidies to domestic agriculture**. Currently, 82% of world agriculture enjoys direct or indirect production subsidies in both emerging countries and developed economies such as Japan, the US, Canada and the European Union.

Another element of the impact on food security is tied to the **climate changes** currently underway (for more information, see section 1.3.3), starting from the growing unpredictability of weather patterns which makes harvest planning and export quotas increasingly difficult. For example, in 2007 Australia was forced to forego 50% of its domestic agricultural production because of persistent drought.

Very likely, climate changes will produce a shift in the geo-economic balance of power on food production and consumption maps. **Over the next twenty** years, melting of the glaciers around the polar caps, recurrent droughts in Middle Eastern and North African countries and the Mediterranean basin in general and the gradual biological depletion of the rainforest and equatorial areas in South America **will modify the geography of agricultural production and crop varieties on a worldwide scale**. The countries that will probably benefit from this are those with more vast arable area as well as the richer economies of the Persian Gulf which can invest capital in more-advanced technologies for agricultural production in land that today is not very fertile; and, yet again, it is expected that Africa will suffer the heaviest consequences.

Another critical food situation that contributes to increasing the strategic nature of agricultural production is the **price of oil** and, more generally, **global energy conflict**. There are two aspects regarding the effect on the agricultural market of fluctuations in crude oil prices that should be mentioned. Firstly, the cost of transporting and logistics in the food product trade have increased, as has the retail cost of fertilizers which, to a large extent, are derived from petroleum. In 1999, a ton of fertilizer cost approx. 100 dollars on the market, while today the cost has jumped to 320 dollars per ton. Similarly, in recent years, freight and shipping costs have risen exponentially. Secondly, countries which are largely importers of food products are, for the most part, also oil importers. As a result, these governments find themselves having to pay an even higher "energy bill".

Although still controversial, a final point of impact on food safety is tied to the development of the **biofuels market (bioethanol, biodiesel, rapeseed, palm oil and other fuels)**. This is a new, growing sector with significant subsidies from governments whose intent is to create a market with tremendous potential, while at the same time reconverting traditional agricultural production that finds itself in crisis. The prospect of clean energy capable of replacing oil and fossil fuels is unquestionably tremendously appealing. However, in addition to unresolved questions about how useful biofuels actually are, the substitution factor of crops for uses other than food-related ones is still not clear. Fragile countries with weak economies are attempting the risk-filled route of cultivation of commodities for biofuels, investment stimulated in large part by initiatives of sovereign investment funds.

2.2 Obtaining Food Security throughout the world: models, orientations and recommendations from a number of key international bodies

The large number of players in this area (nations, institutions, organizations, etc.), as well as the complexity of the relationships that develop between them, make it impossible here to provide a detailed analysis of all the positions and proposals currently under debate. Therefore, the sections below will only provide some orientations, proposed models and positions of some of the key players in the field of global food security governance,

65 *Cutula L., Vermeulen S., Leonard R., Keeley J., "Land Grab or development opportunity?", IFAD-FAO-IIED, 2009*

66 *According to the opinions of some, land grabbing could represent a development opportunity for local communities as it often implies direct foreign investment whose goal is to render crops highly profitable and productive*

67 *Interview with J. Diouf, Financial Times, May 24, 2009*

together with the declarations and results of some of the most important and recent international summits and conferences held on this theme.

2.2.1 Declaration of the *High Level Conference on World Food Security*: short- and medium-to-long term goals

Prices and food security was the theme of the High-level Conference on World Food Security, promoted in June 2008 by the FAO as an important opportunity for strategic reflection in preparation for the G8 summit in Hokkaido and, above all, the UN Call to Action on the Millennium Development Goals held in September 2008 in New York.

From the Conference there emerged **three main points**[68], which, if on one hand are in-line with the context of food emergency in which the meeting took place, on the other they limit themselves to declarations of principle without entering into the merit of the questions of political economy, also due to the failure to reach agreement on some key problems, such as biofuels and genetically modified organisms.

First of all, the conference affirmed the **need for a global alliance to face the food crisis**. However, the problem of the role of the players was not taken on clearly, in particular that of institutions on a global, national and sub-national level, as well as the financial commitment of donor nations.

In addition, it was agreed that there was a **need to put in place social welfare safety nets on a short-term basis**. However, the conference did not consider the problem of their complementarity within national social welfare systems and strategies to reduce food insecurity and poverty.

A further element on which agreement was reached involved the **need to reinforce long-term investment to sustain agricultural productivity**. But once the goal was set, the strategy to be followed was not delineated clearly; in particular, no answers were provided on what, how and where to produce.

These are questions for which there are no easy answers, but which must be begun to be faced to prevent initiatives, especially on an international level, from being paralyzed.[69]

2.2.2 The twin track approach and right to food within the context of global food security governance: position and proposals of the FAO

The growth trend in malnutrition on a worldwide level and the various challenges and threats to global food security suggest that, in order to meet **the goals of MDG1**[70] and the **World Food Summit**[71], **concrete actions** and **tremendous effort on a global level** will be required.

To take on these challenges, governments must follow a **twin-track approach** that is thorough and coherent in defining and implementing **food safety policies and reducing poverty**. This approach should include:

- measures that aim at **increasing agricultural productivity**, especially for small landowners;
- **attentive development of social welfare safety nets** for those most vulnerable in terms of food security.

The institutional context of each country – which includes the organizations and institutions involved and relevant interests and power-bases, as well as the formal and informal rules governing interaction between the various players – will define how the two tracks can be implemented.

During a recent international seminar dedicated to the economy of global equity and sustainable economic development held in Milan last January 23rd, the position expressed by the FAO[72] was that of admitting that the failure in attempting to effectively reduce the problem of hunger was caused above all by the **failure of global food security governance**: weak institutions, lack of effective coordination and strong involvement on a global, regional and national level prevent implementation of solid plans for food safety.

On a global level, according to the FAO spokesman, what is lacking is a **truly representative body that is action-oriented with strong political support, solid scientific base and proper economic support**. The proposal involved creating this structure and making sure that it received the **support of alliances and coalitions** on a national level that could coordinate actions related to food safety.

In order to function and obtain concrete results, these alliances and coalitions must be based on participation of the main stakeholders on a national level (UN agencies, private sector NGOs, trade organizations, other organizations part of the social fabric, etc.) and should be based on solid analysis and scientific study.

68 *"Declaration of the high-level conference on world food security: the challenges of climate change and bioenergy", Rome, June 5, 2008*

69 *De Filippis F., ed., "Prezzi agricoli ed emergenza alimentare. Cause, effetti, implicazioni per le politiche", Gruppo 2013, minutes of the workshop held in Palazzo Rospigliosi, Rome, July 8, 2008*

70 *Millennium Development Goal number 1: reduce by one-half the percentage of malnourished people by the year 2015*

71 *Bring the number of malnourished people to a level corresponding to one-half the level registered in 1992 by, and no later than, the year 2015*

72 *In a paper by Kostas Stamoulis, Director, Agricultural Development Economics Division, FAO*

In addition, according to the FAO, the **human right to food**[73] and the principles of right to food, especially in terms of responsibility, good governance, involvement, security and solidity of institutions, can represent the base of reference on which these coalitions and alliances are based in order to give voice to a wide-ranging series of stakeholders and also include more vulnerable groups. Once it was declared that food is a basic human right, individuals should have the opportunity to identify the responsibilities of their own governments and, potentially, claim their rights. This possibility can improve the action of individual governments to assure that the measures defined on the basis of the first and second tracks are implemented efficiently and efficaciously.

For this reason, according to the FAO, the right to food represents the **third basic track** and the Voluntary Guidelines on the Right to Food[74], adopted unanimously by the members states of the FAO in 2004, already provide a conceptual reference framework on a global, regional and national level[75].

2.2.3 Non-distortionary agricultural support measures: proposals of the High Level Expert Forum

In order to guarantee food security for all, what is required is not only investment to improve agricultural productivity, but also design of a **suitable system of agricultural incentives** for both developed and developing countries, while at the same time striving to **minimize their distortionary effects** that can be extremely harmful for developing countries and for the weakest segments of the world's population.

Over the years, with the reduction in the economic weight of the primary sector, developed countries (the United States and European Union in particular) introduced a series of measures to support agriculture to stimulate domestic production. These measures made it possible to improve the profitability of domestic agriculture by limiting variability and protecting it from the effects of harmful natural events, for example.

Nonetheless, these policies can create major distortion on international agricultural markets (for example, lowering of prices, reduction in import demand) to create long-term economic disincentives for agriculture in developing countries.

At the same time, guaranteeing incentives to agriculture in developing countries remains fundamental given the key role agricultural development occupies within overall economic development. The need to avoid distortionary effects is mirrored in the current debate around "decoupled support", i.e., towards agricultural policy measures that interfere less with decisions about planting and production. Examples of these policies are support for land provisions, technological support and investment in human capital. The shift from direct agricultural support to "decoupled" supports have created greater variability in farmer income for which a shield has been created through public and private insurance policies, but which, in turn, can lead to distortion. For this reason, these insurance measures must be designed in a more sophisticated way and must be combined with less-distortionary instruments, such as modern risk management instruments[76].

A second area of economic governance is represented by **international trade policies**.

The effects of trade policies vary depending on whether they are policies of developed or developing countries. In terms of OECD countries, an initial example of distortionary policy can be seen by the tariff and/or non-tariff barriers (such as quality standards, quotas, etc.) that constitute a major barrier to agricultural development in developing countries and also impact on planting and production decisions. A second example is that of export subsidies which provide incentive to production and push prices down.

Among developing countries, on the other hand, there are noteworthy differences between poorer countries that apply very low customs duties and medium-rich countries that apply medium-to-high duties.

Although protectionist measures are sometimes necessary to support other domestic agricultural policies, their abuse can be just as harmful. International debate on this theme remains open and it is to be hoped that specific studies to evaluate their effects and produce more specific recommendations will be undertaken.

Other measures desirable for developing countries are **input subsidies** (seed, fertilizer) **to sustain productivity**, especially in poorer countries characterized by market failure.

Finally, as mentioned previously, safety nets for small farmers are of fundamental importance to limit the vulnerability of weaker segments.

73 By Right to Food is meant the unalienable right of every human being to have regular access to a sufficient quantity of food that is suitable from a nutritional standpoint and culturally acceptable, in order to lead an active and healthy life. It is the right to procure one's food with dignity and independently, rather than the right to be nourished. This right is echoed in the Universal Declaration of the Rights of Man adopted by the General Assembly of the United Nations on December 10, 1948, and was subsequently reiterated in the "Voluntary Guidelines on the Right to Food" adopted by the Council of the FAO in 2004. Source: http://www.fao.org/righttofood/

74 In 2004, the member nations of the FAO unanimously adopted guidelines for the right to food and a unit within the agency to coordinate and assist countries in their implementation. These voluntary guidelines represent a practical tool for helping countries in their efforts to eliminate hunger, and represent a coherent body of recommendations pertaining to work, land, water, genetic resources, social safety nets, scholarization, etc., and are intended to encourage budget allocations for programs to combat hunger and poverty.

75 Stamoulis K., "Perspectives on the Right to Food in the context of the global governance of food security", FAO, 2009.

76 High Level Expert Forum - How to Feed the World 2050, "Non-distorting support measures to farmers", Rome, October 12-13, 2009.

2.2.4 Agricultural policies and food crisis in Africa: perspective of farmers organizations

The recent joint declaration[77] on the state of African agriculture by four regional African networks of farmers organizations (EAFF, PROPAC, ROPPA, UMAGRI)[78] states that poverty, dependence and food insecurity – already very serious in Africa – could worsen as a result of uncontrolled liberalization and significant opening of their borders and agricultural and agro-alimentary markets, as stipulated in WTO accords and as provided for in economic partnership agreements promoted by the European Union.

For this reason, these organizations ask that the right of each country to provide itself with **agricultural and trade policies oriented towards food sovereignty** be granted, as well as satisfaction of food requirements using regional products and recognition of family farms as the priority means for guaranteeing food security in the fight against poverty and for economic and social development in Africa. They also request that laws regarding land ownership be adopted that specifically safeguard small farmers and weaker segments of the population (women, young people and minorities) and that **technologies be developed which respect sustainable management of natural resources**, environmental preservation and biodiversity and which prepare farmers for efficient adjustment to climate change.

In relation to world governance of agriculture, members of the African platform of farmer organizations do not believe it necessary to create new, specially-designed institutions, but governance should be conceived and assured within the context of the **United Nations framework**, with enhanced **involvement of professional agricultural organizations**.

And finally, they ask for an **increase in investment in favor of small farmers and small family farms** and also for their respective professional organizations through reinforcement of their access to financing, training and technological innovation. They also agree to undertake precise responsibilities, and at the same time increased involvement in the planning, implementation and evaluation of agricultural policies for rural development.

2.2.5 The food security initiative launched by the G8 summit in Aquila

The recent summit of **G8 agriculture ministers** reconfirmed the central role of an economy based on agricultural production for developing countries, setting new objectives in the fight against hunger in the world that range from fraud prevention to control of commodity financial speculation. The final document also stresses[79] the key role of small farmers as protagonists in development and affirms the principle of agriculture fully meeting the principles of food security and wholesomeness. In addition, within the context of broadened participation (including Brazil, China, India, Mexico, South Africa, Argentina, Australia and Egypt), the delegations backed the proposal for Global Partnership for Agriculture, Food Security and Nutrition as part of the UN framework. As part of this, they also confirmed their support for the on-going talks involving strengthening of the Committee on Food Security.

Following the agriculture ministers meeting, in **Aquila** in July this past summer, the **heads of state** reiterated the urgent need for decisive action to free humanity from hunger and poverty, and the need for food security, quality food and sustainable agriculture remain a priority issue on the political agenda – all issues to be taken on using an **across-the-board and inclusive approach** that involves all relevant players on a global, regional and national level. In addition, actions effective for food security must also be tied to measures to adapt to and mitigate against climate change, and for sustainable management of water resources and agricultural land, soil and other natural resources, including protection of biodiversity.

The joint declaration in Aquila on global food security (**Aquila Food Security Initiative - AFSI**) stressed that **emergency aid** will remain an important instrument through which national bodies – with the help of the World Food Programme (WFP), other specialized agencies and funds and programs, together with non-governmental organizations--can supply aid to those suffering from acute hunger. Instruments such as the distribution of food, money and vouchers through efficient humanitarian emergency aid, and through social safety nets and food programs – such as food-for-work and cash-for-work programs, unconditional cash transfers, school lunches and food programs for mothers and children – remain of fundamental importance to face emergencies. In the long-term, government-run cash-based **social protection systems** and targeted food initiatives are needed in order to provide support to the poorest and excluded populations. It would also be necessary to further explore the feasibility, efficacy and administrative modality for the creation of a **strategic reserve system** to take on humanitarian food emergencies, or as a means to limit price volatility.

In addition, **long-term** and predictable **financing** such as major, targeted investments are urgently needed to reinforce food production capabilities on a global scale. The leaders of the 40 countries and heads of international organizations committed themselves to putting together **20 billion dollars over the next three years**[80] to aid rural development in poor countries.

Finally, leaders hope for **reinforcement of global and local governance for food security** as a crucial factor in defeating hunger and malnutrition, as well as promoting rural

77 Result of the meeting held in Rome, April 14-15, 2009.

78 EAFF: East African Farmers' Federation; PROPAC: Plateforme Sous-régionale des organisations paysannes d'Afrique Centrale; ROPPA: Réseau des Organisations Paysannes et de Producteurs Agricoles de l'Afrique de l'Ouest; UMAGRI: Union Maghrébine des Agriculteurs.

79 Final declaration of G8 Agricultural Ministers, Cison di Valmarino (TV), April 20, 2009

80 G8 countries provided 13 billion dollars between January 2008 and July 2009

development. Improved governance on a global level must be based on existing international organizations and financial institutions, making use of their comparative advantage and **boosting their coordination and efficacy, while avoiding overlap**. Towards this end, the G8 supports the UN High Level Task Force on the Global Food Security Crisis and the basic reform processes currently in-progress at the FAO, the Committee for World Food Security (CFS), Consultative Group on International Agricultural Research and global agricultural research though the Global Forum on Agricultural Research.

As mirrored in the words of its Director General Jacques Diouf, the FAO has commented positively on the content of the Aquila Joint Declaration on Food Safety, which "evidences a positive and encouraging shift towards policies of support for food self-sufficiency for the poor and hungry."

2.3 Food Security and food safety

The complexity and growing interrelationship of the global economic scenario also make the aspect of food security more closely tied to the **safeguarding of consumers and public health** particularly urgent. This aspect, known as food safety, was brought to public attention in the late 1990s when the world, already globalized, was faced with the so-called "mad cow" and chicken and dioxin scandals, the last in a long series of threats to consumer health.

The production processes of the livestock and agro-food chain have become extremely complex and the new rules of global trade, discussed within the World Trade Organization, make **product traceability**, reconstruction of the chain and, as a result, certification of **quality** extremely difficult. In addition, in the last decade, there has been an exponential increase in crimes connected with food adulteration, while the global trade network allows for infection from bacterial and viral organisms of animal origin or vegetable parasites to be immediately transmissible.

Policies to safeguard public health, a principle guaranteed by all international bills of rights as well as major constitutions, have to come to grips with fragmentation in responsibilities and poor coordination to-date. Food safety policy should provide for effective mechanisms for early warning of risks, rapid reaction to crisis and, finally, clear and open communication with citizens/consumers.

In this regard, the policy established by the European Union can be considered exemplary in terms of food safety connected to health and control of food quality. Similarly, in the United States, the Food and Drug Administration has recently strengthened its powers of control and audit of food quality and has broadened its perimeter of action in prevention against adulteration of food and drugs.

With the publication of the White Book on Food Safety[81], the European Commission has identified guidelines for an efficient policy for safeguarding food safety and public health, together with full transparency in communications. The White Book underscores a number of strategies to reinforce coordination of government policies and, as the first, proposes the creation of a European Food Authority, a scientific-consulting body whose task is to monitor emergencies, provide analysis and technical research and coordinate responses in the event of a crisis.

The document sets out clearly the priorities of the European Union in terms of food safety, which are:

- guarantee a high level of health protection;
- promote proper functioning of the food product market;
- stimulate clear definitions to facilitate agreement on the definition of "food";
- reinforce quality and independent scientific control;
- guarantee traceability of food products;
- implement policies that guarantee consumer rights;
- fully comply with international trade agreements;
- guarantee free access to information and food legislation, above all for the public.

The White Book marked a turning point in the coordination of policies related to food safety and opened the way to innovative forms of collaboration between governments, including for fraud and adulteration protection, through intelligence initiatives and coordination of investigative efforts. But, above all, it definitively opened the way to the creation of a European food safety body (**EFSA - European Food Safety Agency**) which was created in January 2002 and whose headquarters was subsequently established in Parma, Italy. The Agency is an independent, supranational body providing consulting and information regarding food chain-related risk. It produces scientific opinion and specialist consulting to provide a solid foundation for the legislative process and definition of food and health policies in Europe.

EFSA's declared objective is to be recognized on an international level as the European entity of reference for risk evaluation in food and feed safety, animal well-being and health, nutrition, protection and health of plants. A particularly sensitive aspect of EFSA activity involves research into biological and genetically modified organisms.

2.4 Summary remarks: challenges and possible answers

If the international community is not capable of finding effective solutions for food safety governance and intervene with new means other than those used in the past, the current population trend and rate of climate change risk exacerbating what is already a crisis situation in food over the coming years and the development goals set by the United Nations will not be met.

81 *Commission of the European Community, "White Book on Food Safety", Brussels, January 12, 2000*

The primary political challenge lies in **finding the point-of-equilibrium in the trade-off between economic development, environmental conservation, food safety and between local, national and international interests**.

Using as a starting point the results of recent international summits and the debate currently in progress on a global level, some recommendations can be summarized to **reinforce global governance regarding food safety**:

- promote **investment in technology** to maximize the prospects for agricultural production, guarantee water conservation, fight waste and prevent pollution of water tables. Promote the use of new technologies in agriculture to save water and rationalize the "crop per drop" coefficient;
- expand the possibility for **cultivation of land that remains uncultivated for lack of economic goals** in the short term. In Cameroon, for example, 40% of the land remains uncultivated despite good basic conditions and very high unemployment;
- draw up a **strict international code of conduct** and scientific research that does not overstep accepted ethical limitations in terms of use of genetically modified organisms (GMOs) as proposed by the FAO;
- promote a concrete, realistic and practicable commitment to **combat climate change**;
- promote a **policy of food education** which, in emerging economies, will promote gradual changes in diet and consumption habits and, in the West, limit those dietary habits that strongly impact on the environment;
- review the **system of trade barriers and subsidies** in order to get beyond the short-term perspectives in which support for an economic sector is seen as a threat to the subsistence of millions of people;
- promote technical cooperation across borders in order to avoid future wars over control of watercourses.

3. The food crisis and the failure of market mechanisms

3.1 The food crisis

The year 2008 was marked by what the media and experts defined as a **food crisis**. At the end of 2008, prices of the main agro-food commodities[82] were **40%** higher than the average recorded in 2007 and 76% higher than 2006 levels. Cocoa was up +520%, sugar +110%, wheat +55%, soybean +36% and oats +20%. As will be seen later in this study, these are increases that have only been recorded during another period significant for the agro-food sector, the two-year period 1973-1974.

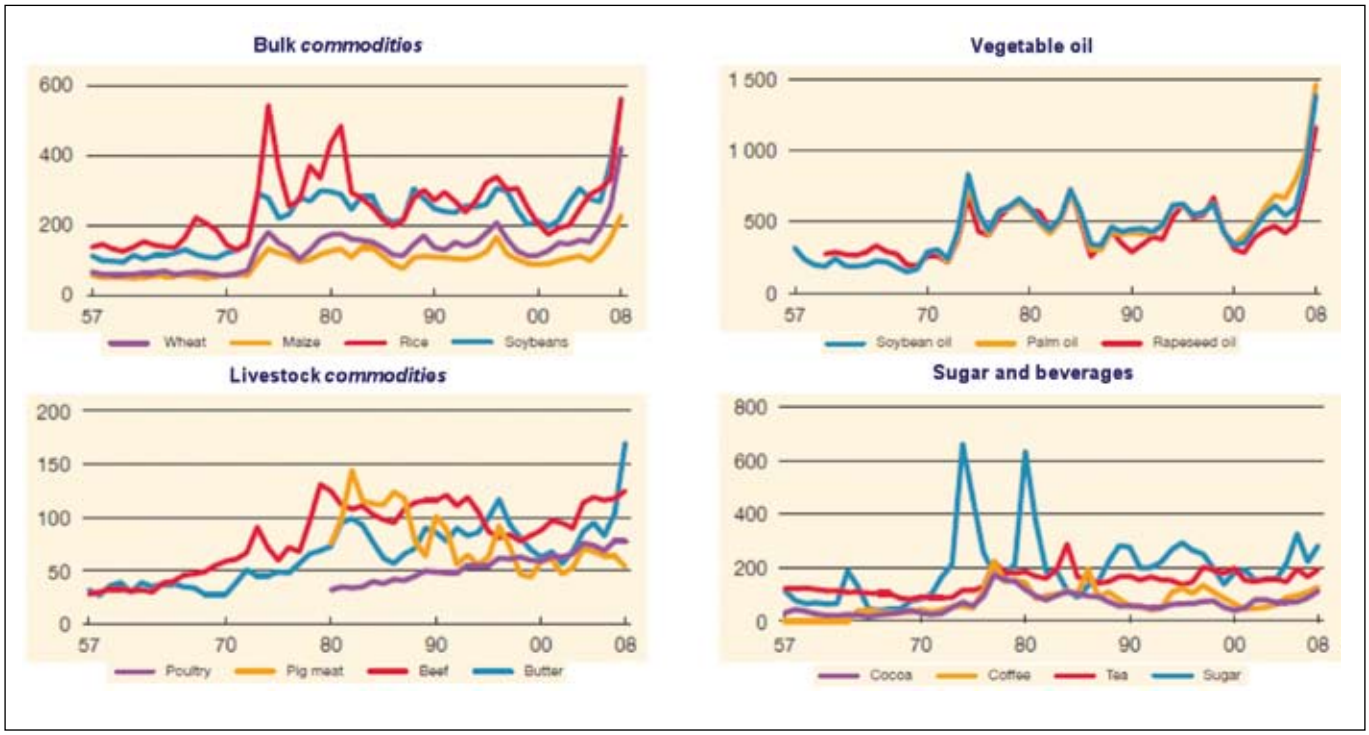
82 *By the term commodities is meant the raw materials and standardized mass-consumption products that can be produced to the same standards in every part of the globe and stored without losing the original characteristics. These characteristics mean that these products can be sold internationally and they form the underlying basis of derivative and futures contracts. On a worldwide level, since the mid-1970s, thanks to significant improvement in crops and technologies utilized in agriculture, food has taken on an increasingly important commodity role because there has also been increased standardization in far ming and processing on an International scale and a decrease in prices in real terms*

The social and economic relevance of these across-the-board increases is naturally tied to the role agro-food commodities have in the majority of production/distribution processes of food products commonly consumed. Significant variations in the prices of these commodities generate both direct consequences (on the selling price of bread, pasta, grains and the purchasing power of families) and indirect ones (in terms of livestock raising costs which impact on the prices of food products such as meat, eggs and dairy products), on the level of well-being of the population and on the profitability of companies involved in the food chain (but not only, given the effect of reallocation of individual consumer choices).

Figure 36, taken from a recent FAO study, illustrates in a clear, easy-to-comprehend way, the impact and speed of the shock the world experienced starting in 2007.

The sudden, rapid increase in virtually all commodities – exacerbated by the drop in value of weaker currencies against the dollar and euro, the currencies normally used for agricultural

Figure 36. Trend in nominal prices of principal agro-food commodities



Source: FAO, "The State of Agricultural Commodities Markets", 2009

and food products on international markets – produced negative effects on the markets and with manufacturing, distributors and consumers. But, above all, it damaged that part of the world population which already lived in conditions of poverty and malnutrition, driving an additional 115 million people below subsistence level – for a total of 1 billion oppressed by chronic hunger.

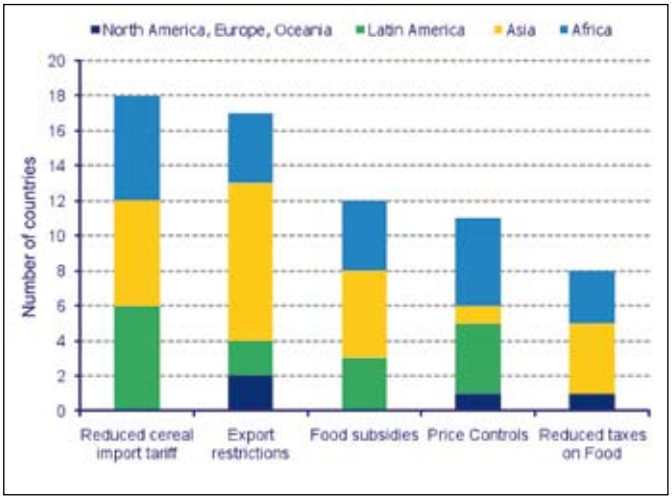
The increase in prices, together with the relative dependence of some markets, made food a critical factor for countries – according to some analyses, on a par with energy and arms – leading governments to reinforce their level of intervention into the agro-food sector.

In fact, in the wake of the crisis, over 40 governments imposed price control measures and forms of export restrictions. In particular, isolationist measures were adopted by many developing countries in order to reduce the impact of price increases in international markets and on the purchase price on the domestic market.

But not only developing countries are involved in this. Russia is once again nationalizing production and export of grains, while China and some Middle Eastern countries are purchasing vast tracts of land in Africa through the use of sovereign funds (a phenomenon some experts have referred to as "neo-colonialism"). China, India, Brazil and Russia, as well as the US and EU, are adopting protectionist agricultural policies aimed at self-sufficiency and exclusivity. China has increased export duties on wheat by 160% to prevent food products leaving the country. Countries in North, South and Central America, Europe, Asia, Africa and Oceania are intervening utilizing different instruments, but in a decisive manner.

The overall effect of a situation pre-dating the crisis – in which agriculture was one of the sectors with the highest presence of instruments, regulations and intervention strategies set by national governments – **and of a series of anti-crisis measures** provides a result which, in some ways, is disturbing in an era dominated (until the current financial crisis) by the marketplace as the central means for determining and mediating economic interests: **approximately 82% of world agriculture benefits – either directly or indirectly – from forms of subsidy or protection**.

Figure 37. Policies adopted in response to prices increases in 2008



Source: The European House-Ambrosetti re-elaboration from FAO, "The State of Food and Agriculture", 2008

To this point, what we have is the account of an unforeseen crisis (further on, we will ask if it actually was "foreseeable" or not from careful analysis of a number of market-relevant factors). Nonetheless, if we shift from newspaper headlines to analysis of the causes behind the crisis and its actual extent, the picture appears somewhat different, at least partially.

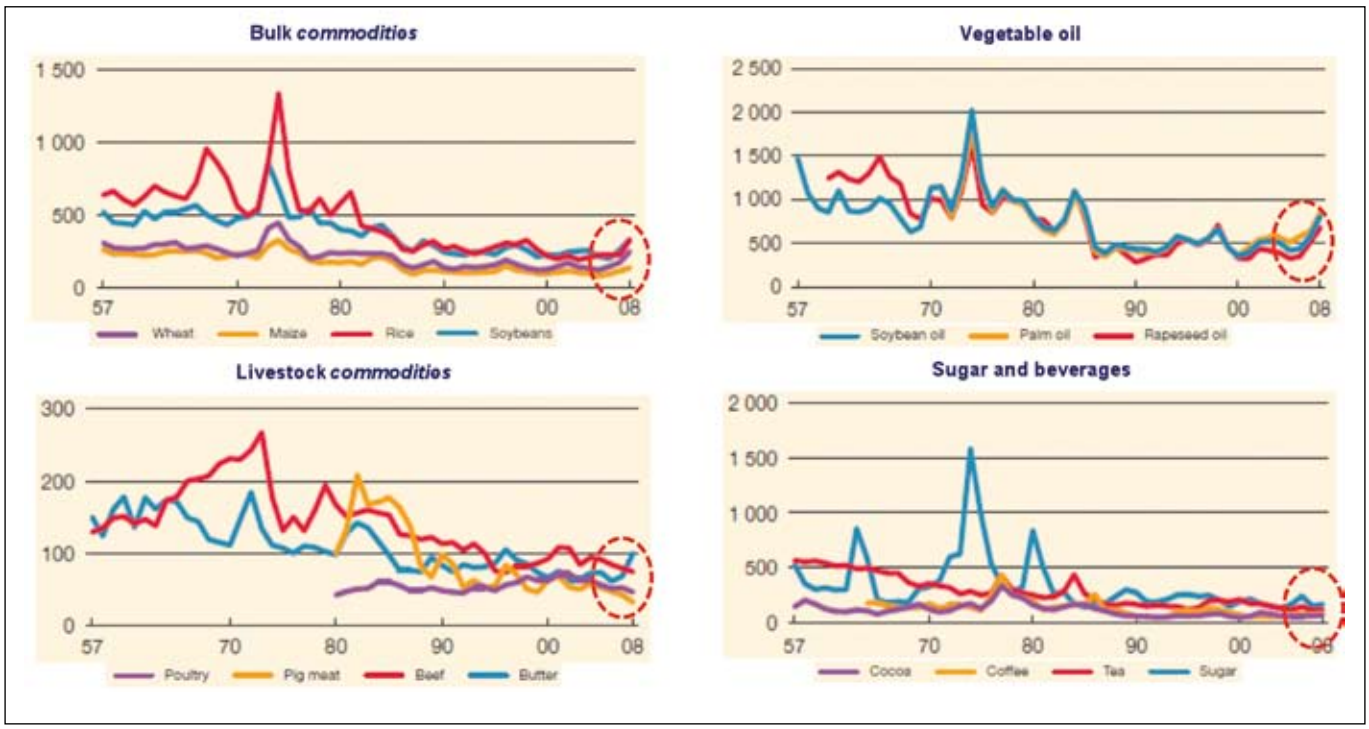
Examining long-term statistics and cleansing them of the effect of non-specific inflation[83], it can be seen that international agro-food markets were coming from an approximately 30-year period of decline (or stagnation) in prices in real terms (see Figure 38). On a general level, from the 1970s on, each year on average, food prices declined between 2% and 3% in real terms, up until 2008 when this trend was reversed, including in real terms (reflection of the real "strength" of the 2007-2008 crisis).

From a long-term standpoint, therefore, the historic import of the increase recorded in 2008 appears somewhat down-scaled, and many adjectives used in the international press seem, in part, unjustified.

More than the absolute oscillation in prices, it was the **rapidity of the increase that occurred in 2008** which **alarmed the markets** and caused a widespread **loss in purchasing power** of the poorest countries.

83 *Real prices refer to nominal prices corrected for changes recorded in the "US Producer Price Index", considering for the calculation in variations a value for 2000 equal to 100*

Figure 38. Trend in real prices of principal agro-food commodities



Source: FAO, "The State of Agricultural Commodities Markets", 2009

From a historic perspective, it can be seen that from 1950 to 1970 production of grains on a worldwide level increased by 80% thanks to the so-called "green revolution" based on the introduction of pesticides and fertilizers. This generated a massive increase in productivity and yields available in areas not previously suitable for cultivation. In 1972 - the year which preceded what remains the worst food crisis ever experienced "in real terms" on a worldwide level - bad weather hit harvests throughout the globe and production dropped for the first time in 20 years, leaving unmet a requirement of 24 million tons.

In the two years following the oil crisis, during which the price per barrel quadrupled, the situation became worse since many pesticides and fertilizers were (and still are) petroleum-based. In response to the uncertainty on international markets, the US blocked export of 10 million tons of wheat out of fear of creating domestic inflation hotspots (as many countries during the current crisis have also done).

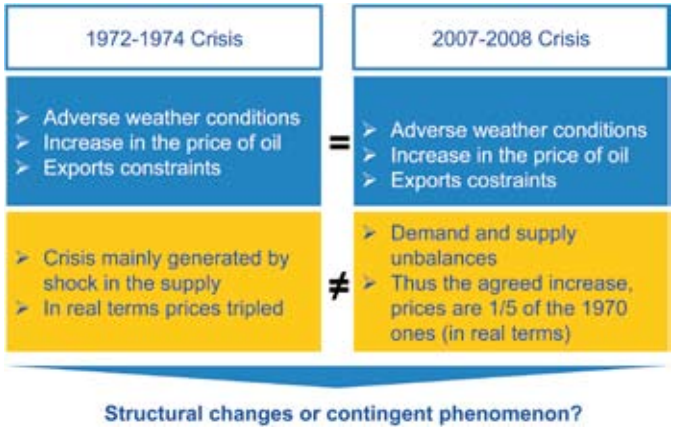
The crisis spread, with the price of agro-food commodities reaching an all-time high. But after the peak in 1974, prices slowly began to decrease.

No exact calculations were ever made of the crisis' impact on world populations but, based on the differences in mortality rates, the FAO has estimated that about 5 million people died as a direct consequence of the food crisis in the 1970s.

Despite the fact that the 2008 crisis (and its consequences that are still being felt) can be rescaled in terms of absolute variations in prices recorded, the same is not true in terms of its speed of propagation, disorientation generated in the markets and with economic operators, or the impact on human life and overall global political-institutional system. It is a serious and alarming crisis with a number of key aspects. In fact, unlike other crises, including the financial crisis which accompanied it over 2008:

- it represents a wound to human dignity and challenges decades of initiatives and battles to provide primary needs for all mankind;
- it distorts the international macro-economic scenario because it often renders the rules of the game superfluous or excludes them altogether, promoting the establishment of a competitive arena founded simply on survival of the fittest;
- it represents a threat to international security because it almost definitively undermines an already-fragile political-social system and promotes the spread of conflicts for control of territorial resources.

Figure 39. 1973-2008: two crises compared



Source: The European House-Ambrosetti elaboration, October 2009

In analyzing the crisis of 2008, the factors which seemed to have had most impact on markets, provoking the increases seen, appear to have been:

- a negative production-related shock caused by weather conditions (e.g., severe drought and failed wheat harvest in Australia during the 2006/2007 season);
- very low food stock levels worldwide;
- increase in the price of oil;
- increase in demand for agricultural products used in biofuel production;
- rapid increase in income of emerging countries (China, India, etc.);
- appearance of financial speculation on agro-food commodity markets.

The underlying causes of the crisis in the 1970s ended up being predominantly conjunctural in nature, as shown by the fairly quick return of prices to a "natural" level and a market situation which in the decades to follow only confirmed the structural tendencies in the agricultural sector that had already been in place before the crisis. Even now, this crisis can be seen as a conjunctural, sudden and temporary "flare-up" part of a long-term trend determined by structural phenomena (including, above all, increase in agricultural yield due to technological innovation).

Do the phenomena which can be identified to be the basis of the 2008 food crisis indicate the presence of structural changes within the long-term trend, or are they simply a contingent phenomenon, as was the case during the crisis in the 1970s?

While noting that given the recent nature of the phenomenon being analyzed, any response will, by nature, be only partial, initial econometric examination of the recent increase in prices would not seem to indicate that the trend towards a lowering or stability in food prices in real terms has changed in any significant way. Naturally, this assessment must be put to the test of time and there must be the opportunity to gather and evaluate further data about the crisis, its duration and consequences over the medium-to-long term. Of significant influence over long-term results will be the extent of certain phenomena and how long they last, phenomena that have had major influence on the crisis and, if they persist and continue to spread, could lead to a structural change in the world agro-food scenario.

A number of factors affect the level and trend in food commodity prices. Some of these (which we will call "traditional factors") are historically tied to basic aspects of the agro-food commodities sector and market, while others are tied to the emergence of new phenomena and new trends, including ones that are not directly part of the agro-food sector, but which can indirectly, and tangibly, influence pricing and levels of supply and demand on the commodities market.

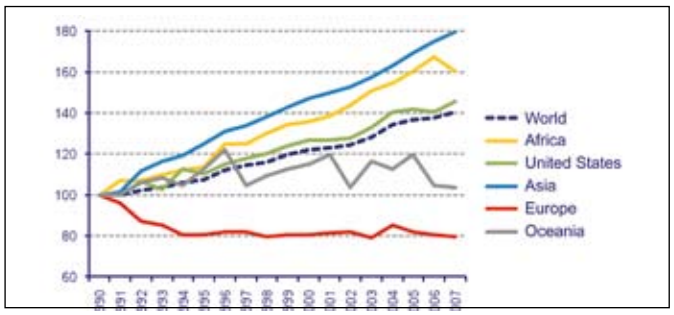
The main traditional factors (characterized by a historically-consolidated relationship with food prices) are world production (linked to climate conditions and agricultural production technologies), international stocks, price of oil, population trends and periodic changes in consumer preferences. These will be analyzed briefly before looking at emerging phenomena on the food commodities market.

The **level of production of agricultural products** has always been recognized as one of the factors capable of explaining the trend in food prices. In turn, the level of production depends on a number of factors, including climate conditions and production technologies.

The poor weather conditions in some agricultural export-intensive regions have been identified as one of the factors that caused prices to rise. In particular, the 20% decrease in grain production in Australia and Canada created tension on markets. In fact, these countries represent less than 10% of world production, but almost 30% of grain exports. As a result, production flux in these markets can have a wide-reaching and distortionary effect on an international level. Given markets that are highly fragmented and not very transparent, variations in normally-traded levels on an international scale, event if not that significant in terms of overall global production, can generate a multiplier effect on the variation in prices set on these markets, which are those of reference for international trade.

Analysis of the index of world agricultural production (Figure 40) shows that there were not especially significant variations in structural trends in world production. In fact, production grew constantly from 1990 to 2007 at an average rate of 2% per year.

Figure 40. Total agricultural production (1999-2001 = 100)



Note: To improve legibility of the graph, index values were converted to set 1990 values to 100

Source: The European House-Ambrosetti re-elaboration of FAOSTAT, 2009 data

Based on OECD and FAO estimates in the recent *Agricultural Outlook 2009-2018*, it can be seen that world production of wheat, rice and course grains is expected to rise by 2010, settling at 2.26 billion tons, or 7% more than in 2007 (2.12 billion tons). Similarly, world production of pork, beef, chicken, lamb, and milk is expected to increase 7% over 2007 levels by the year 2010.

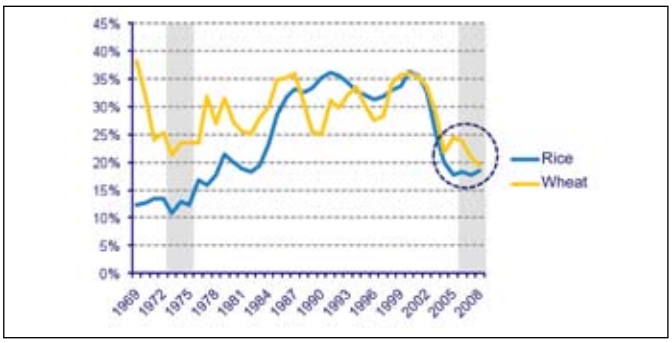
Overall growth in agricultural production will be 10% for developing countries, while it will be very low or close to zero for developed countries, such as Europe.

A second variable traditionally linked to the trend in food commodity prices is the level of **accumulated stocks on a worldwide level**. Starting in 2000, and very quickly, there was a **collapse** in stocks of main agricultural commodities (in eight years, from 2000 to 2008, wheat stockpiles decreased, in relation to consumption, by 46% - an average of 7.5% per year - while those of rice fell by 49%, for an average annual decrease of 8.1%).

On the basis of available data, the correlation between this reduction in stocks and the increase in food products that occurred starting in 2007 can be calculated.

The correlation coefficient between the **stocks/consumption ratio** and the **price trend** in grains is very high (-0.65), showing that there is a strong **biunique relationship between the two variables**: while on one hand reduction in stocks, caused by a drop in supply, pushes commodity prices up, on the other the increase in prices makes it even more profitable to reduce stocks by selling them off on the markets.

Figure 41. Relationship between stocks and consumption of agricultural products (in %)



Source: The European House-Ambrosetti re-elaboration of the United States Department of Agriculture, Foreign Agricultural Service, 2009 data

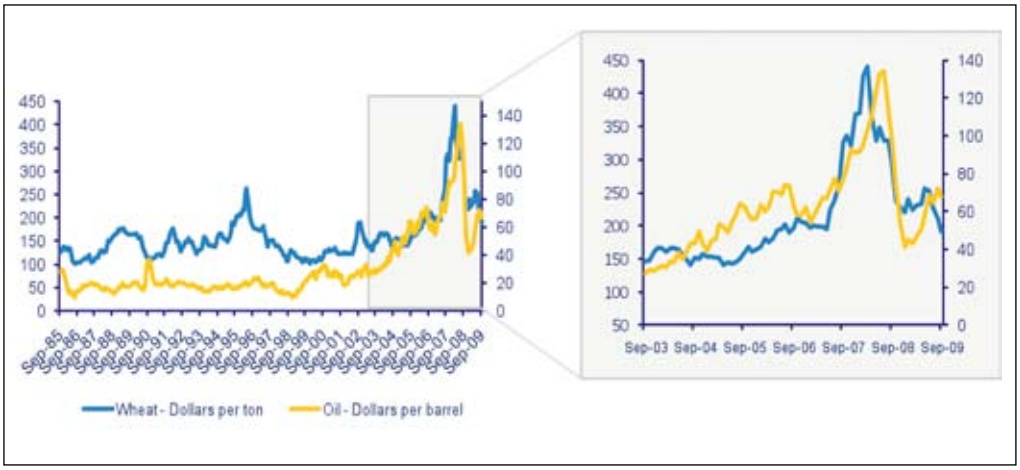
Another variable historically tied to trends in agro-food commodity prices is the **price of oil**. The influence of this variable is primarily seen in its effect on agricultural production costs, in particular:

- due to the effect on the cost of fuels utilized for farming equipment;
- due to the effect on the cost of chemical products (fertilizers, herbicides, etc., in the past and still currently derived from petroleum).

Finally, the price of oil **also has an influence on intermediate costs** which arise between production and consumption of agricultural products, such as transport and packaging.

If monthly price data for oil and wheat are examined from over a fairly long-term period, it can be seen that there is a very high covariance, even if in some cases (such as the 3-year period 2004-2006 preceding the crisis), it is "delayed" by a number of periods.

Figure 42. Overview: monthly price trend for oil (right graph) and wheat (left graph) from 1985 to 2009



Source: The European House-Ambrosetti re-elaboration of IMF, Primary Commodity Prices, 2009 data

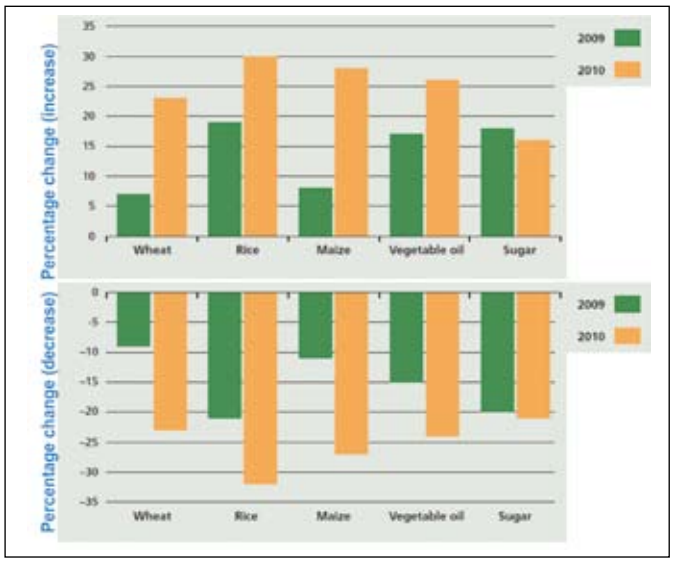
The FAO, basing itself on a hypothesis of oil at $130 per barrel, has attempted to forecast the effects of agricultural product prices following:

- a 50% increase in the price of oil, to $195 per barrel;
- a 50% decrease in the price of oil, to $65 per barrel.

Their model also took into consideration the effect deriving from the change in demand and production of biofuels which, as shall be seen below, represent an emerging phenomenon on world agro-food markets.

The forecast results are shown in Figure 43. As can be seen, the major effects in terms of price variation are those for rice and corn.

Figure 43. Effects of a 50% increase/decrease in the oil price on agricultural products for the two-year period 2009-2010



Source: FAO, "The State of Food and Agriculture", 2008

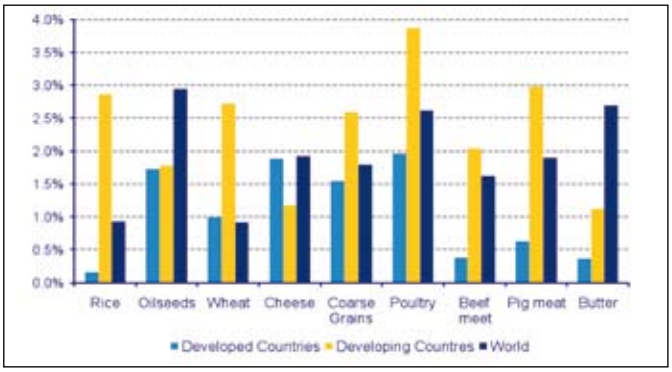
Finally, in terms of factors identifiable as elements capable of influencing the price of agricultural products, are **population trend** and changes in **consumer preferences**.

An increase in population generates an increase in the demand for food products, just as a change in tastes can cause a shift in demand towards some products rather than others. Nonetheless, these phenomena are normally gradual and market operators should be capable of foreseeing these macro-trends.

Why, then, are demographics and preference shifts so often included among the primary underlying causes of the 2008 food crisis? The reason lies in the exceptional nature and rapidity with which some major social-demographic changes emerged that had been underway for a number of years. Among these, and the most important, is the sudden and considerable increase in world population. As a number of informed experts have noted (for example, Mario Deaglio, "*Agflazione, la nuova malattia dell'economia*", 2008), the number of people to be fed in the world increases each year by 60-70 million, the equivalent of an entire country the size of Italy each year.

Together with the increase in population is the increasing appearance of entire world populations (the most demographically dynamic) on the market of "Western-style" food products (above all meat and dairy products).

Figure 44. Estimated average annual composite growth rate of consumption of some types of food products, 1999-2017

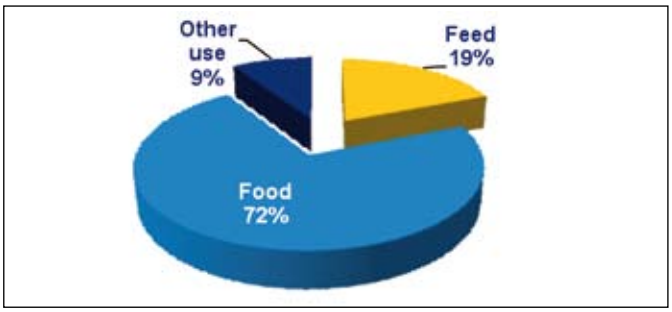


Source: The European House-Ambrosetti re-elaboration of OECD-FAO "Agricultural Outlook 2008-2017", 2008 data

Within this context, it is important to note how the shift in consumption from grains towards meat produces, in any case, a more than proportional increase in consumption of grains required to feed livestock. This multiplier effect is relevant in light of the fact that, already today and according to OECD data, livestock consumes the majority of world production of coarse grains.

Also in terms of wheat (the grain traditionally utilized in the human diet), according to OECD and FAO estimates, by 2010, nearly 20% will be earmarked for production of livestock feed.

Figure 45. Estimate of end-use worldwide of wheat by 2010



Source: The European House-Ambrosetti re-elaboration of OECD-FAO "Agricultural Outlook 2008-2017", 2008 data

To this point, we have briefly examined those factors that could be identified as "traditional" mechanisms in price setting and determination of the quantity of agro-food commodities

produced and sold. As was mentioned earlier, in addition to these there have emerged in recent years a number of trends and new phenomena not present in the past (or not in the same form and/or force).

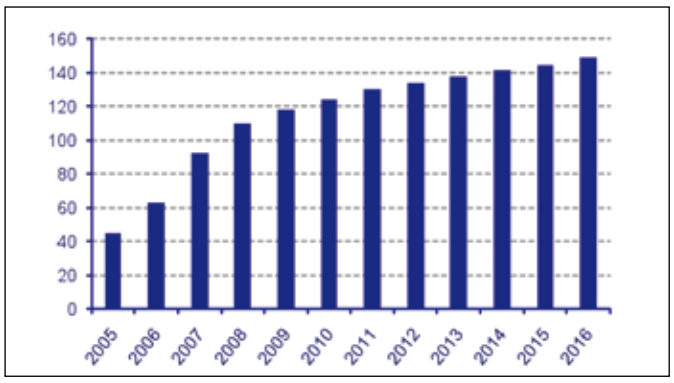
These "**new factors**", which would suggest the appearance of a change in the consolidated relationship between agro-food products and traditional factors, are basically three:

- increase in demand for agricultural products, especially those involved in the production of biofuels, in the wake of the rise in the price of oil which pushed the use of alternative energy sources, and policies promoting the use of biofuels in the US and EU;
- the strong process of economic growth seen in countries such as China and India which has generated a major increase in demand for agricultural products, both directly through increase in livestock and the products needed to feed them (grains, seed, etc.);
- financial speculation which primarily arose following significant drops in stock and bond markets.

In terms of the demand for agricultural commodities for the production of **biofuels**, the use of a number of crops for that purpose (often in quantities that are not insignificant) has reduced their availability for traditional use on established markets (primarily human consumption and animal feed). Within commodities, biofuel production has particular impact on the demand for wheat, corn, sugar, oils and seed, thus generating a sort of pressure on agricultural product prices.

On a world level, in 2007, 12% of corn production was used to produce ethanol. Of the almost 40 million tons of increase in world production of corn during that year, 30 million were used for ethanol production. In the US, use of corn to produce ethanol represents 30% of corn consumption on the domestic market, while in the European Union, 60% of the rapeseed harvest was used to produce biodiesel.

Figure 46. Grain demand for ethanol production, forecasts to 2016 (millions of tons)



Note: these forecasts combine data for China, Canada, the European Union and the US.

Source: The European House-Ambrosetti re-elaboration of OECD, Trade and Agriculture Directorate, 2007 data

Above and beyond the statistics for the growing proportion of certain crops utilized by the biofuels sector, the problem of alternative energy crops cannot be restricted exclusively to the amount of crop used in fuel production, but must also be broadened to include the amount of land that can be earmarked or reconverted to the production of seed for the biofuel industry as part of a trade-off logic in the use of the finite "soil" resource; to-date, however, it is not clear who are the winners and who are the users in this process.

In particular, corn production increased worldwide by 18% in 2007, but this was only possible by reducing soybean and wheat production for which production fell and prices increased.

Any reasoned and rational thinking on the issue of alternative use of finite and scarce resources must start from economic evaluation. In this case, is it more efficient to directly appropriate resources and indirectly sacrifice some crops to produce biofuels, or is it more efficient to resolve the trade-off of the use of financial, technological and natural resources available in favor of crops destined directly or indirectly to human consumption?

High oil prices and environmental, institutional and strategic considerations have favored the development of biofuel crops. However, under current conditions, with the sole exception of ethanol produced from sugar in Brazil, the production of biofuel energy does not appear to be economically sustainable and, at this time, is more expensive than the production of fossil fuel energy. In fact, production of biofuels is possible almost exclusively thanks to subsidies numerous governments have decided to allocate to this sector. In 2006, the US and EU alone contributed 10.8 billion dollars (5.8 billion in the US and 4.7 billion in the EU).

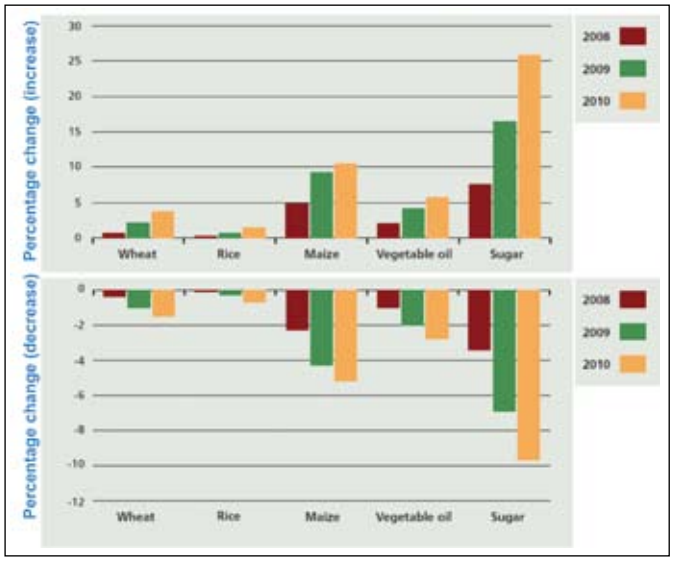
There are currently no guarantees about the future trend in biofuel production which will depend on the policies adopted by nations on the issues of environmental and energy sustainability (policies involving supply, international agreements, funding for research, commitment to environmental issues, etc.), the trend in oil prices (the higher its price, the greater are market incentives to develop alternative forms of energy) and technology available in terms of production and use of biofuels (cost of crop production, environmental impact of installations, safety, efficiency, etc.).

Nonetheless, as was done for oil, the FAO has attempted to predict the effects (both past and future) on agricultural product prices following increased or decreased use of biofuels, outlining two alternative scenarios:

- 30% increase in the demand for wheat, sugar and vegetable oils for biofuel production;
- 15% decrease in the demand for wheat, sugar and vegetable oils for biofuel production.

Their results are shown in Figure 47 and, as can be seen, the major effects in terms of price variation are those for sugar and corn.

Figure 47. Effects of a 30% increase and 15% decrease in demand for agricultural products for biofuels on the prices of agricultural products for the three year period 2008-2009-2010



Source: FAO, "The State of Food and Agriculture", 2008

The second phenomenon indicated as being central in setting prices of agricultural commodities in recent years is the marked **increase in global economic wealth, especially in emerging countries**.

On one hand, the increase in income seen, above all, in south-east Asia and China has been translated into an increase in demand for basic food products (predominantly grains and agricultural products), thus generating pressure on basic agricultural goods.

On the other, the changes in per capita income have been reflected in shifts in the composition of the diet of large masses of the population (which are not only numerically ample, but also growing significantly) which have turned their consumption increasingly towards foods with a high caloric and nutritional content, such as meat, compared with foods with a low caloric and nutritional value, such as wheat.

Both stimuli generated by the economic growth in countries demographically highly significant may have contributed, in part, to the inflationary phenomena seen in the agro-food sector in 2007-2008. Nonetheless, the relatively gradual nature of the social-demographic changes make it necessary to adopt at least a cautious approach in attributing these phenomena a significant role in the sudden and rapid increase in commodity prices.

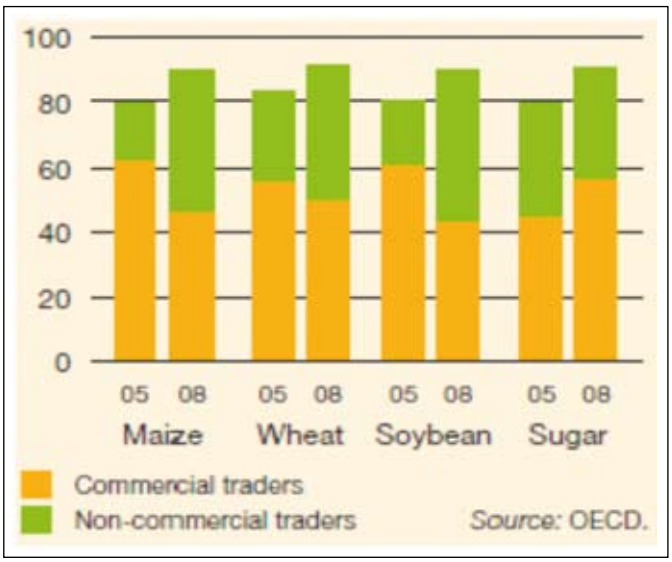
In addition, despite the fact it is often considered correct and widely-accepted, the theory by which an increase in demand from populous countries such as China and India was a fundamental factor behind the increase in prices in 2008, is not clearly or directly confirmed from analysis of some precise statistics which, on the contrary, indicate a more complex situation. For example, demand on international grain markets in China and India does not appear to have increased noticeably in recent years. The expected increase in demand for grains for animal feed (generated by new levels of consumption) seems to have been almost entirely absorbed by the domestic market without generating pressure on an international level. In addition, in 2008, China and India remained net exporters of agricultural products.

The third and last phenomenon identified as a potentially new factor affecting price equilibrium on international commodity markets is that of **financial speculation** which has been seen in the world of business and finance in recent years, especially the period 2005-2008.

The drop in real estate and stock prices generated an outflow of funds from those activities which were then redirected to the agricultural commodity and raw materials sector. This generated a significant increase in the level of futures and options bought and sold by funds and private individuals. Often these instruments - born in these markets for largely insurance-related purposes for sectors highly subject to sudden changes in the availability and price of traded goods due to high variability in production and harvest level - were not linked in any way to actual economic-production-related aspects of the agricultural sector.

In numerical terms, over the three-year period 2005 to 2008, transactions involving agricultural products (corn, wheat and soybean) for "non-commercial" purposes doubled.

Figure 48. Percentage of futures contracts for agricultural products



Source: OECD, 2009

Although the increase of investment flows in agricultural products coincided with the increase in prices of agro-food commodities, the International Monetary Fund and other studies carried out on this phenomenon have not yet identified a precise connection between these monetary flows and the increase in market prices.

Although it has not been shown that financial speculation has clearly distorted commodity market prices, it seems undeniable that new "non-commercial" players – such as investment banks, hedge funds and pension funds – operate on the market from the standpoint of maximizing profit tied not to fundamental aspects of the market and business activity directly connected to the agro-food sector, but rather to the creation of greater profit by speculating on the variation in price of a given commodity. These players are increasingly involved in these markets and consider food a commodity like any other (even if it is not).

These observations show how, irrespective of any econometric proof in this regard, speculation played an important role in increasing prices of agricultural prices over the two-year period 2007-2008. Economic theory also indicates that speculation accelerates processes, but does not cause them. The role of speculation is reflected in the rapid, immediate increase in prices. In other words, speculation does not seem to have caused prices to increase, but it has accelerated their increase, while at the same time broadening volatility and instability. Future studies – which will draw on more long-term effects – will have the task of clarifying and quantifying this aspect.

3.2 The food crisis and failure of market mechanisms: overview of expert analyses

The food crisis of 2008 has been one of the most fertile areas of economic, political and institutional debate of the last decade. The views of experts and analyses put forward have been numerous and have touched a range of aspects of this problem that has revealed itself to be so serious, especially for the most defenseless populations. This after decades of trust in a world in which agriculture no longer seemed to be a central issue, and even less a political economic one.

For many years, the maximum interest shown by nations and governments throughout the world – and above all those in the west – about agricultural production seemed to be the bureaucratic/institutional creation and "maintenance" of rules and regulations. These rules guaranteed perpetuation of the marked disparity in production and, especially, international trade in agro-food products and allowed many domestic markets (starting with those in Europe and North America) to exist in a sort of "timeless limbo" outside the rules of the market and often removed from questions of aid and growth in developing countries. As part of this, international aid was assigned the task of regulating as best it could the age-old problem of hunger and disease which not only failed to disappear, but actually continued – and continue – to represent the murky side of a world that is completely globalized with the exception of living conditions and access to food and health as testified to, including numerically, by the continuation of tremendous disparity in global distribution of wealth.

Including directly through meetings and interviews, we have gathered a number of views and analyses which some of the top Italian and international economists and experts have developed about the food crisis, its causes and possible impacts on future scenarios involving food security.

According to the experts[84], over the long-term, world food production is highly-sensitive to the price of agricultural products. In their view, high prices, in particular, represent an incentive to investment in the agricultural sector and search for enhanced productivity yields per hectare, making it possible to obtain higher overall production levels. Historically, in cases of necessity, productivity in the agricultural sector has shown itself to be more sensitive than in other sectors, such as manufacturing and, as a result (according to the analysis some economists have made of the recent food crisis), there is no valid reason to believe that this situation will change in the future. Using such observations as a starting point, these economists conclude that, over the long-term, stimulated by high prices, farmers should be able to significantly increase the productivity of their land through more efficient use of fertilizers and farming equipment, thus averting any danger of potential global excess demand for agro-food products compared with the available supply. In addition – as proof of the theory that says there is no real problem in terms of world agricultural production and the possibility of feeding a population in constant growth – these experts underscore how, in developed countries, the arable land surface has continued to contract over the last 30 years as a result of urbanization in many areas and an increase in per hectare yields which have made it possible to reduce production without having to cultivate all potentially arable land. The example often given is that of the United States. In the US, over the last 50 years, the work force dedicated to agriculture has fallen by 2% and currently-cultivated land is half of that available. But, despite this, agriculture in the US is able to provide food to American citizens, as well as export soybeans, wheat and corn. Theoretically, higher prices for agricultural products represent an incentive for farmers in developed countries to extend their land under cultivation, with positive results in obtaining increased global agricultural output. Utilizing this "channel" also makes it possible to satisfy growing world demand without any particular problem.

Some economists, on the contrary, have highlighted the existence of serious problems – both present and future – in relation to food security on a global level, above all in the wake of changes in recent years that have contributed to the

84 See, for example, the views of Professor Gary Becker of the University of Chicago, 1992 Nobel prize winner in Economics.

outbreak of one of the worst food crises in history. Above all, these experts[85] emphasize the alarming fact of the end (or at least serious slow-down) in the increases in productivity experienced by world agriculture starting in the 1970s. In their interpretation of the world agricultural scenario, it is probable that we are in a moment in which, with the effects of the green revolution having been exhausted, the extremely negative effects of climate change are beginning to be felt. Potential responses aimed at guaranteeing that food crises tied to availability of resources do not occur in the long-term are to be found in the search for new technologies that will allow agricultural productivity to increase significantly once again. In particular, one solution could be the use of new-generation GMOs that go beyond the limitations found in those currently utilized. These analysts, who do not at all limit themselves to a "pro-production" examination of the problem of food security, also stress the existence of serious limitations in current governance approaches in the agricultural sector and humanitarian aid on a world level. Their hope, for the future, is for reform of current, largely inefficient, policies and institutions.

Another very interesting viewpoint about the food crisis and problems of global food security has been expressed by a number of experts and economists[86]. They have noted, in particular, the significance of unsolved problems generated by globalization (e.g., representation of some developing countries in world organizations). The problems generated by globalization have not been properly evaluated and taken on. As a result, they have accumulated, thus significantly contributing to generating the recent crisis. For years, and even today, global economic policy initiatives were aimed at industry with the goal of primarily managing the problem of unemployment and no interest, or virtually none, was paid to agriculture. On the basis of this interpretation of the food crisis, the agricultural sector is not in a crisis situation for reasons of its own (food manufacturing is not in trouble and world agricultural production continues to grow), but due to lack of international equilibrium from an economic, financial and governance standpoint. In order to prevent food crises like that of 2008 being repeated and to guarantee access to food in a more equitable and balanced manner throughout the various areas of the globe, these experts believe a process to adapt and reform the rules, roles and forms of participation in world governance of the agro-food sector are required, starting with international trade and the agricultural and development models adopted. According to this viewpoint, the world has changed and is continuing to change in a profound, rapid manner: rules and institutions cannot remain anchored to ways of operating and models of action that are outdated and unsuitable for governing current situations and planned development for the future.

And finally, the position expressed by a number of experts and commentators[87] is of particular interest, which maintains that there are numerous economic and climate studies that clearly show that the policies adopted by developed countries and supported by the FAO have led to the food crisis. Specifically, according to this analysis, current agricultural development models based on the use of fertilizers, GMOs and single-crops would impoverish the global agricultural system and make it more vulnerable by altering the climate and causing damage that is actually greater than any benefits obtained. Increasing financing for the production of chemical substances utilized in agriculture would mean, in their view, increasing the number of people who suffer from hunger over the long-term. From the standpoint of these analysts, emphasis must be placed on small-scale agriculture and the use of local seeds, while offering tangible support to those who develop organic farming, while stopping subsidies for the production and use of fertilizers.

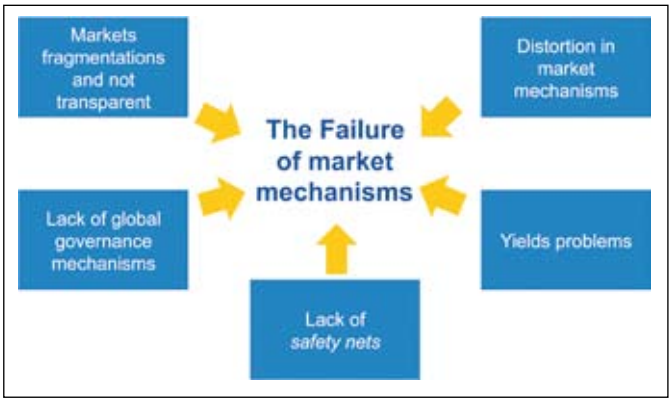
3.3 A proposed synthesis

"Food is not a commodity like others. We should go back to a policy of maximum agricultural self-sufficiency. It is crazy for us to think we can develop a lot of these countries without increasing their capacity to feed themselves."

Bill Clinton
United Nations World Food Day
October 16, 2008

Given the analysis and interpretations provided by leading international economists and environmentalists, an attempt can now be made to provide an overall evaluation of the 2007-2008 world food crisis. Figure 49 presents the analytical framework prepared which will be briefly examined further on in this study.

Figure 49. Possible interpretive framework: the five factors that contributed to creating the food crisis



Source: The European House-Ambrosetti elaboration, October 2009

85 See, for example, the position expressed by Professor Mario Deaglio, of Turin University

86 Among these, the position of Professor Giacomo Vaciago of the University Cattolica in Milan.

87 See, in particular, the views expressed by Vandana Shiva, founder of the Research Foundation for Science, Technology, and Natural Resource Policy in New Delhi.

Firstly, it can be seen that unlike the case of other goods, there is no one, single, regulated **market** on an international level for agro-food raw materials and products[88]. There are, in fact, a number of different markets of a regional scope that are guided by conditions of supply and demand, level of stocks, productivity of the agricultural sector and trade policies that are all different from each other. This fragmentation inhibits both control over mechanisms of price determination and access/distribution in these markets, as well as adoption of standard solutions on an international scale. In fact, markets are fragmented and not very transparent and prices set in them are highly influenced by a small number of large-size operators.

In addition to the markets and their rules of operation, another key aspect would seem to be that of **governance mechanisms**. Despite the fundamental importance of agro-food commodities and "food" as such, to-date there is neither an international authority nor a codified system of rules that guarantees unified governance for this highly-critical, sensitive and fragmented sector. Given its current authority and jurisdiction, the FAO does not seem able, at this time, to provide a valid response regarding this aspect. The recent food crisis and persistence of elements of tension from the standpoint of food security on a worldwide level, have highlighted how the absence of a system of governance makes it impossible to efficiently bring back into balance the structural and conjunctural problems which, if not managed, can have serious economic and humanitarian consequences.

In addition to inefficient markets and world governance that is absent or, at best, inadequate, the 2008 food crisis has also shown (as already mentioned in this report) that there is a lack of adequate food and social **safety nets** *on both a global and local level*. As was noted earlier, in the 1970s, there existed private organizations of raw material producers, the purpose of which was to regulate markets and control prices through the use of stockpiling set for all members. But with the gradual disappearance of this form of market management, the system became "liberalized" naturally without any set governance system taking the place of the private organizations, also the result of the lack of international interest for this sector considered out-dated and of little political and economic relevance. 2008 saw the lowest level of stocks since the 1960s: if stocks are low compared with consumption of agricultural products, markets are not able to meet the shock in the supply and demand of these products. The non-governance of the system led to having no safety nets, the dramatic consequences of which were those seen in terms of food security during 2008.

88 *There are a number of markets throughout the world for trading of food products. The CME Group runs the markets of reference on a world level, including the CME, CBOT and NYMEX for trading of options and futures of a range of commodities, including food commodities, as well as energy- and mining-related ones. On average, each day 650,000 contracts to buy or sell food products are made, out of a total of 10 million daily commodity contracts.*

In addition to these elements, there is also a strong trend tied directly to the agriculture sector. The steady decline in the positive impact of the technological and productive revolution in agriculture during the 1970s (green revolution), the appearance of major effects related to climate change, and the drop in investment in agriculture (due to the high variability in earnings and profitability), have contributed to causing a general reduction in **marginal productivity** in agriculture. According to FAO data, the yield per hectare of grains today has a rate of growth of less than 1% per year, compared with the over 2% growth rates (with peaks of 5% for wheat) seen between 1960 and 1985. Also within the context of these figures, the food crisis has underscored how insufficient current national and international policies are which aim at increasing productivity through public and private investment for small farmers. Investment earmarked for spread and modernization of irrigation techniques, production-related technologies and seeds utilized seem particularly insufficient, above all in developing countries. The efforts made towards defining direct and concrete means for technical/scientific and commercial support for agriculture in local developing countries economies also seem to be lacking. Absence in the past of similar investment and direct action can be identified as one of the basic reasons for the severity of the effects of the food crisis on developing countries.

And, finally, on top of all these problems is the one that, perhaps more than any other, contributed to generating the short-term food crisis during 2008: the existence of major **distortion in market mechanisms**. Financial speculation played an important role in increasing agriculture product prices over 2007-2008. The use of certain specific agricultural products for the production of biofuels has reduced their availability for traditional harvesting, thus creating market distortion (including through the introduction of a trade-off in available arable land use). The existence of national policies strongly protectionist of domestic agro-food sectors, has produced distortions in the price-setting mechanisms on an international level. The lack of ability for governance of local markets by governments of many countries, especially developing ones, has rendered impossible efficient functioning of production/distribution mechanisms for agro-food products in these areas of the world.

Taken individually, none of these five factors would have been able to generate such a broad and sudden increase and oscillation in agro-food product prices. It was only the combined effect of these phenomena and the generation of "multiplier effects" between them that appears to explain (at least partially) the causes, severity and consequences of such a serious and profound food crisis as that experienced during 2008.

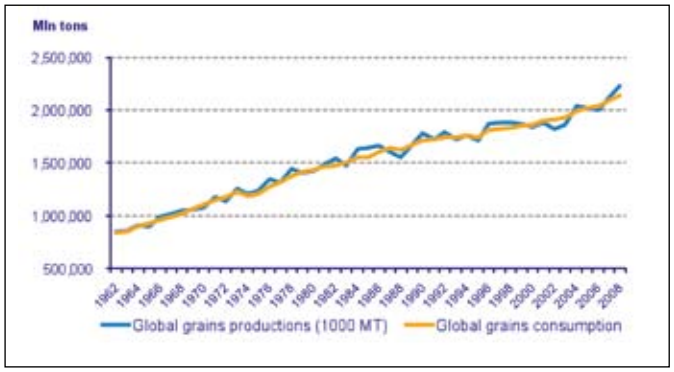
3.4 Post-crisis world: structural changes in food models and food security in the next twenty years

As mentioned previously, one of the main problems facing agriculture on a global level to-date, is distribution of food products.

In fact, what emerges decisively from the most recent studies carried out by the FAO is that the productive capacity and production currently exist to feed every person on the planet.

Globally, over approximately the last 50 years, **grain production has kept up with the growth in demand**. In certain specific years, greater consumption of grains compared with annual production rates was satisfied through the use of stocks which have remained, on average, between 20% and 30% of total production.

Figure 50. Worldwide production and consumption of grains

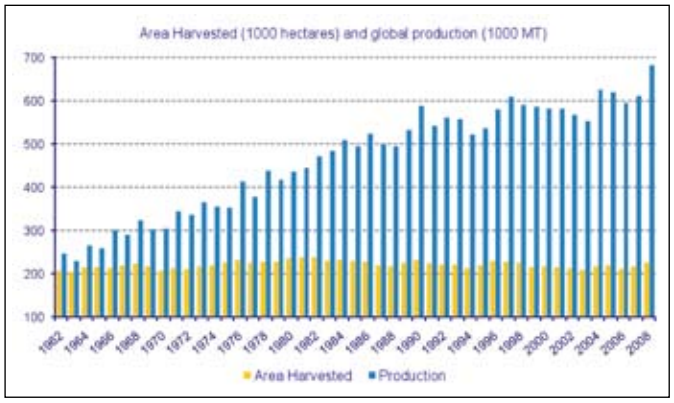


Source: The European House-Ambrosetti re-elaboration from FAO data

In addition to this, it must be stressed that the rise in world demand for grain occurred with a marginal (or minimal) increase in the harvested area[89].

Looking at grain, for example, it can be seen that the increase in production is due solely to an increase in productivity and not an increase in the harvested area.

Figure 51. Worldwide production and consumption of grains



Source: The European House-Ambrosetti elaboration from FAO data

89 *The increase in cultivated land has been around 8% over the last 50 years. The European House-Ambrosetti elaboration of United States Department of Agriculture data.*

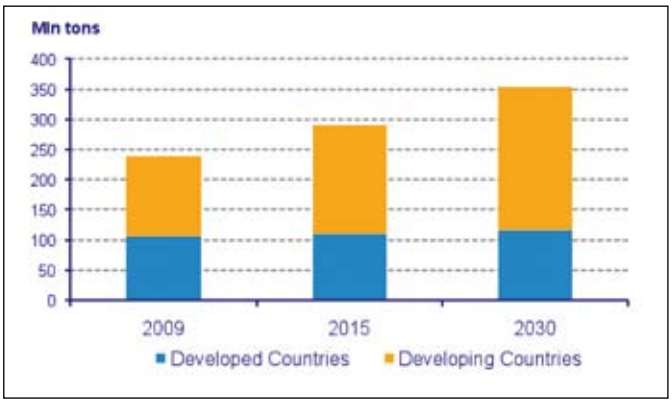
Despite the fact that per hectare productivity rates have more than doubled from the 1960s to the present day (as was fully documented in previous chapters), the number of people oppressed by chronic hunger has not diminished. This **clearly and precisely demonstrates that there is a food distribution problem.**

In addition to this, we believe that in the near future, alongside the problem of food distribution, there will also be **problems in its production caused by shifts in dietary preferences of the world's populations**.

Already today, a great proportion of **grains production is used for animal feed**. This percentage is destined to grow significantly given that **consumption of meat is expected to rise sharply from the current 240 million tons to approximately 350 million tons by the year 2030**, an increase of approx. 45%.

Most of this increase can be attributed to developing Countries which will represent two thirds of world demand for meat by the year 2030, equivalent to approx. 240 million tons out of a total of 350 million tons.

Figure 52. Current and future meat consumption in developed and emerging countries



Source: The European House-Ambrosetti re-elaboration from FAO data

Dietary changes on a world scale, and in particular in emerging countries, will generate considerable pressure on production of grains used for animal feed.

In fact, the conversion coefficient between meat and grains is not 1, i.e., producing 1 kg of grain is not equivalent to producing 1 kg of meat. Specifically, to produce:

- 1 kg of chicken requires 2 kg of grain;
- 1 kg of pork requires 4 kg of grain;
- 1 kg of beef requires 7 kg of grain.

Even this cursory statistic example is sufficient to **understand how an increase in meat consumption produces a growth in demand for grains that is more than proportional to the increase in growth of just meat alone**.

Calculating the increase in terms of grain equivalent required to meet the growing demand for meat, it can be seen that **grain production must double by 2030**[90].

In this context, **even assuming that world grain production will continue to grow at the rate of years past**, between the 2%-3% annual rate **that characterized the green revolution, by 2030 the gap in world production is expected to be between 1.2 and 1.3 billion tons**[91].

Using 2030 as the cut-off year, this gap will equal 40% of estimated global grain production, assuming, once again, that between now and 2030 production continues to grow at a rate similar to that during the green revolution.

To conclude, **recognizing the importance and immediacy of the need to create governance mechanisms that can solve the accompanying problem of food distribution, the issue of change in dietary habits should not be ignored, because over the long-term, this could become an equally as serious food production problem**.

90 This figure will rise from the current 2.2 billion tons to 4.4 billion tons in 2030. These estimates have been made using statistics in the United States Department of Agriculture database under the category of "grains"

91 Also assuming that the current cultivated surface area remains unchanged, as has been the case for the last 50 years

4. Recommandations

4.1 Areas of intervention

The aim of the present study was to outline Food Security and Food Access issues in a multidisciplinary approach, considering the broad, complex and interrelated range of variables inherent to this phenomenon. The following paragraphs intends to summarize the main evidences emerged and to suggest possible areas of intervention.

Causes and dimension of the issue

Although from a purely quantitative-technical standpoint, the **world has sufficient production capacity to theoretically feed everyone**, this doesn't prevent the existence, permanence and amplification of enormous inequalities in access to food. This can be clearly seen considering that **in the world coexist 1.020 million people malnourished and 1.142 million people obese**.

Beforehand, it is necessary to state that inequalities in access to food still affects a great proportion of the world population. First of all, there are still deep **structural factors** related to poverty and to the need of the most underdeveloped Countries for a sustainable and fair economic development.

To solve this aspect of the problem, it is necessary to put in place multidimensional policies aimed at fight poverty, especially in rural areas, through adequate investments in agriculture and 360° social-economic development measures. These initiatives should be oriented to production, re-distribution and environment protection objectives: it fact, it isn't enough investing on the increasing of the production capacity (first of all, through an improved technological transfer, scientific knowledge and best practice sharing), but it is also necessary realizing a more fair income distribution through the creation of income opportunities and a more sustainable use of natural resources (land, soil, water, etc.). To these aspects we dedicated the first chapters of the present document.

On the top of this structural factors, food security has been further threaten by recent **conjunctural factors** - that could also persist in the future if a proper action on the causes will not be taken. In *primis*, the recent volatility of major agricultural commodities markets, caused by global phenomena (such as energy markets volatility, climate change effects on agricultural output, economic and demographic growth, etc.) and amplified by financial speculation. The third part of this document examined in more depth this aspects.

Among the possible interpretation keys of Food Security, two appear to be particularly relevant and up-to-date:

- the **failure of** pure **market mechanisms** in the agri-food sector;
- the **lack of adequate and coordinated multilateral intervention** of socio-economic, political and environmental nature, to govern and manage access to food, modifying, even with structural actions, the identified inequalities.

Financial speculation, protectionist policies of various kinds adopted by a huge number of Governments throughout the world and alternative uses of the land to the detriment of food productions etc., have combined to produce significant distortions of the conventional market working mechanisms, revealing a dramatic lack of governance on an international scale.

Since we are talking about food production and since over 75% of poor is represented by rural population, it appears clear **the main role played by agricultural development** within the Food Security context. The **drop in investments** - both public and private - in agriculture over the last twenty years and the lack of general political governance (a part from the adoption of agricultural and trade policies often protectionist and distorted) finds a clear explanation in the productivity gains obtained the in the last thirty years thanks to the widespread of innovative techniques, transfer of scientific knowledge and best practices in agriculture (known as *green revolution*). These gains permitted a progressive and constant increase in production, together with a progressive and enduring drop in food prices.

With this in mind, certain authoritative commentators have pointed out how the economic dynamics in operation such as today's pressures on food demand, could lead - also due to the increase in average prices of agricultural commodities - to greater **attractiveness of investments** by the sector. Investments capable of sustaining the launching of a new strategy, a new *green revolution*, based on the increasing of the values of agricultural productivity. Nevertheless, the higher expected **volatility** of agri-food markets implies greater risks that **represents a strong constrain to agricultural investments and development**.

Moreover, efforts aimed at increasing agricultural productivity represents only one aspect of a more complex framework that comprises socio-economic development and fight

against hunger. Manage each of these aspects (investments, technological transfer, access to markets and their functioning, international trade agreements, safety nets, education, social empowerment, the creation of social and economic opportunities, destination and management of natural resources, etc.) requires a global coordinated action.

Future challenges

As stated above, to the structural issues that currently affect Food Security further challenges are threatening world stability. Let's name three: **population and economic growth** of a number of emerging countries, which is bound to change the consolidated balances of power; **climate changes**, which are going to play a major role in conditioning agro-food activities over the next forty year; the shift **from fossil fuel to renewable energy and biofuels**.

With respect to the first issue, let's call to mind that there are two possible response strategies, classifiable, respectively, as mitigation or adaptation strategies: The better the results of the Copenhagen Conference and the more efficacious the choices of action, the more the strategies relating to the agricultural sector will tend towards mitigation, with **adjustments of a predominantly adaptive nature**. The failure of an overall policy for curbing the phenomenon of climate change leaves us open to the risk of potentially catastrophic scenarios, with major disruption in the agricultural sector – which is the economic activity most directly hit by climate change phenomena – in terms of possible yields, geographical areas of interest and useable water resources.

The second area also poses challenges that are not to be underestimated. The growth projections for the population over the next forty years pose the problem of identifying **new growth paths for agricultural productivity**. The debate on the need for a technological paradigm shift towards the use of biotechnology has been open for some time now.

Another aspect of considerable importance seems to us to have been rather neglected: that relative to **global dietary habits** and **those of the emerging Countries**. In our view, this is the variable that still requires further examination, that has the power to shift – conditions of population growth being equal and taken for granted (considering that demography is a science with a high predictive capacity) – the needle of the productivity gains required to sustain the higher demand for food products.

What it assesses, in our view, is not just the demographic dynamics as such – together with the growth in economic well-being – but how these two dimensions affect the **consumption patterns** adopted by the populations with a view to identifying, and possibly orienting, the composition of the food demand in the near future in a timely manner. This is the unknown variable in the equation thanks to which alternative strategies for the medium-to-long term may be developed.

Areas of intervention

In the light of this brief introductory remarks, we can offer the following four recommendations:

1. TO STRENGTHEN GLOBAL GOVERNANCE MECHANISMS: there is an evident lack of governance in the global food system which requires rapid and specific action on a variety of levels. The specific nature of food products – which cannot be simplistically reduced to commodities, as was the tendency over the last few decades as a result of their greater availability – and the failure of the distribution mechanisms makes it necessary to move on from the paradigm of the self-regulating market, to coordinate global policies and to gradually reduce unilateral protectionist policies.

It is, therefore, essential to:

- restore to food a central role of primary importance within the international political and economic agenda. This means that the entire food supply chain will have to be restructured and governed in a more clear-cut way towards the goals of **availability**, **sustainability** and **nutritional quality**. It is of fundamental importance, in fact, to guarantee and ensure the quantity and quality of the food produced and distributed.
- to this end, it is necessary to create a **common space for dialogue and analysis** of the issues linked to food security: no Country, Institution or economic player in the agro-food supply chain has the ability to respond alone to the challenges posed by the reference context (environmental, political, social and economic). A multilateral and transversal approach to the issue of food security is required, an approach that involves all public and private players directly and indirectly connected with the agro-food sector, with a view to further increasing the average standards of the sector.
- at a higher level, the **economic policy actions** geared at backing up the economic growth processes of the poorer countries emanate from a higher level. Actions that require the active intervention of the international community.

The choices relative to this chapter, which are immensely important and extremely difficult to bring to fruition are, unfortunately, in terms of the future, only the preliminary steps towards the efficient working of the sector.

2. TO ENCOURAGE ECONOMIC DEVELOPMENT AND REALIZE INCREASES IN AGRICULTURAL PRODUCTIVITY. It is necessary to identify, realize and support pragmatic paths of sustainable development in order to indentify and spread credible solutions, actions and tools applicable to developing Countries and in those key sectors for economic development.

In terms of **productivity**, the extent of the increases required for the next 40 years in order to meet the demands of the growth in worldwide food consumption is, in our view, a variable that depends on a complex network of variables: from the growth of the world population to the impacts of climate

change on agricultural yields, to the composition of the future global food basket. This last variable, if properly managed, will help contain the productivity increase required to meet world consumption demands.

The challenge involves making continuous innovations with a view to generating **high output agricultural and production models, higher quality and lower environmental impact**.

Some paths have already been marked out:

- It is necessary to promote **support operations for developing countries** – geared at achieving a state of food self-reliance – through the transfer of **scientific knowledge** and **best agricultural practices** to these countries and through *ad hoc* programs designed to **bridge the know-how gap** existing between advanced and backward countries.
- It is, moreover, necessary to promote, through suitable incentive/disincentive policies and measures, **the maintenance and development of "local systems"** for the production-distribution-consumption of agro-food goods, preserving high quality productions that are attentive to biosustainability. But it is also important to **combat tax and trade policies** that distort the world agro-food markets, especially to the detriment of the developing countries.

These measures, combined with a more rational exploitation of the territory, have the power to achieve significant results on their own. Other strategies, connected with shifts in the technological paradigm – such as biotechnology – should undoubtedly be explored at one and the same time, in the awareness that the various approaches involving their use still require further examination and careful evaluation.

3. TO ADAPT THE PRODUCTION CHAIN IN ORDER TO MANAGE THE VOLATILITY OF PRICES – WHICH ARE CONSTANTLY ON THE INCREASE – AND GUARANTEE THE EXISTENCE OF SAFETY NETS. The agricultural sector, destined to live with a significant and growing volatility of prices, must set technical and practical solutions to manage and face in the best way possible this new reality.

In order to avoid, combating and preventing new food crises appear necessary to:

- carry out a process of assessment and selection of the most effective best practices at an international, national and local level, in order to create food stocks and raw materials, defining the costs, timescales and roles of a similar **process of global "assurance"**.
- at the same time, it is essential to define a **new system of rules for the food commodities markets**, capable of defending the role of the products exchanged in the markets not only from the economic perspective (e.g. envisaging forms of **active surveillance by an independent authority** or imposing "**position limits**" in order to guarantee that the sums invested do not involve operations of an excessively speculative nature).

4. TO MANAGE DIETARY HABITS: the models used for forecasting today are limited, in our view, by two major shortcomings: on the one hand, the difficulty in incorporating provisional data relative to the **evolution of the climate change phenomenon**, due to the objective uncertainty characterizing the potential impacts; on the other, the inherent difficulty encountered in forecasting the **evolution of dietary consumption habits**. We know, in fact, that the environmental impact and degree of efficiency in the consumption of natural resources (land, water, fodder, etc.), combined with the various dietary choices can be extremely wide and varied. The Western Diet and the Mediterranean diet differ, first and foremost, as regards the quantities of meat consumed. It is possible to demonstrate – as we have done in the third section of this document – that consumption models tending excessively towards the consumption of meat and animal products can endanger global food security.

As regards food supply, the central theme of each consideration must, of necessity, focus on the **future composition of the demand for food products**, in the light of the extraordinary changes already foreseeable today. The increase in population is associated, in fact, with high economic growth in many areas of the planet, with wide layers of the populations of emerging countries having access to more sophisticated consumption models.

For the first time in history, the **governance and orientation of dietary habits** with a view to promoting sustainability is becoming a key variable of economic policy. It is becoming a concrete reality in the developed countries, with a view to coping with a health emergency caused by the spreading of metabolic disorders, cardiovascular diseases and tumors deriving from bad dietary habits. It will also become crucial for the developing countries, due to the impact that this is bound to have on the balance of global production in agriculture.

Moreover, the choice of sustainable dietary habits for the future will result in less importance being placed on the issue of productivity gains, which generates in turn, pressures on natural resources and threaten environment sustainability.

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