

REDISA / CIAT-CD



AldeiaGlobal
Food, Health and Wealth

UNIVERSITY OF LISBON
ISA – INSTITUTO SUPERIOR DE AGRONOMIA

“Regulations, Markets and Economic Efficiency: Sustainable Development and Food Security

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REDISA-CPLP/CIAT-CD – NETWORK FOR EDUCATION, RESEARCH AND INFORMATION
FOR FOOD SECURITY AND SUSTAINABLE DEVELOPMENT

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Introduction - 1

- 1 – Food security is the first dimension of any Sustainable Development dynamics, at global but also at local level for all humans/social groups and society;
- 2 - Europe and OECD countries are living on an **output surplus capacity phase**, mainly in food production (but also in several other sectors);
- 3 – Food surplus and food aid were combined in many situations, but sustainable development is a very complex process where food aid can help, but can also be a negative factor to be taken into consideration.
- 4 – The European Union and, specifically, the CAP – common ag. policy, has been very successful, turning the European area/set of countries, from a food deficit situation to a food surplus region.

Introduction - 2

- 5 – Food policy has been the “Key,” based in many different interventions, but regulations, in many different forms, worked very well connected with markets;
- 6 – Many “regulations” can be seen as restrictions to production, but however many of them can also be seen as the major mean to provide markets the best conditions to perform well, under certain conditions and objectives;
- 7 – Markets have been always at the center of the economic relations, and are dependent from the “institutional environment”;

Introduction - 3

- 8 – However economic efficiency analysis needs to consider the existence of public goods, semi-public goods, and a large set of situations where markets can work poorly, such as the situations with significant externalities, scale/logistics problems, environmental impact conditions (natural and institutional) and so on.
- 9 – The example of CAP deserves attention at world level for development purposes, mainly in regard to the enormous effort to support agriculture, trying to avoid unfair trade procedures, which occurred in many situations, and correcting unfair trade impacts.
- 10 – The recognition of many functions of the Ag. Sector, multi-functionality concept and respective de-coupled support measures, has been crucial to promote regional development, pursuing a lower negative impact in international terms (world wide trade).

Introduction 4

- 11 - Global Food Supply, for the time being is not a problem, but hunger persists at very high levels (close to 1 billion people);
- 12 - Addressing possible solutions and understanding the phenomena is the main concern, exploring and identifying contributions from science;
- 13 - Efficiency questions are raised dealing with production, consumption and governance, “vis a vis” the food system and looking at possible science contributions;
- 14 – Science contributions will be linked mainly to technology changes and/or institutional changes and innovation.

II - Main Hypothesis, Concerns and Proposals - 1

- 1 – There is a surplus capacity in food production (Europe and OECD countries) that should be directed to promote others capacity to produce and developed their food systems;
- 2 – Regulations in the food systems should be seen as major elements to support markets functioning, and not has constraints to MK forces;
- 3 – Governance, in several forms, institutions and consumption economics, are other dimensions to be integrated in the global development model to understand the food system changes and dynamics (beyond supply growth).

Main Hypothesis, Concerns and Proposals - 2

- 4 – Demand Constraints and structural changes in the economy should be addressed based on the “food balance equation”;
- 5 – The new “modern economy” based on non tangible goods (virtual goods) and services, will also provide a new opportunity for the agribusiness activities;
- 6 – Health concerns and quality of life objectives will promote alternatives for food production and food consumption systems, that will show the advantages of the “food chain analysis” perspective;
- 7 – Value creation and sustainable development will be much more dependent on education and values coming from a well informed/educated society (with ethical considerations being included);

Main Hypothesis, Concerns and Proposals -3

- 8 – Linkages of the food system with health and quality of life standards, will be crucial for development with sustainability considerations being on the top of the priorities.
- 9 - Biological/Organic/Ecological food systems and the other food systems will evolve with a strong relationship between them, but certainly lower environmental impact is possible and desirable overall.
- 10 – Institutional innovations, starting with strong governance and adequate food policy are needed at global but also at local level if hunger is to be reduced significantly.

III - Data Analysis and Facts

- 1 – World Food Supply growth, global and regional;
- 2 – Rate of growth, technological changes evidence;
- 3 – Global Demand Constraints (Engel's curve);
- 4 – Food balance (supply and demand) phases;
- 5 – Hunger persists - institutional failure (not supply failure): The need for an integrated view, where regulations , markets and efficiency concerns can be part of a “system solution” (linking supply and demand, and demand and supply);

Table 1 - Food Supply per capita (kcal/capita/day) and total average growth rate in the period, per year.

	1961	1971	1981	1991	2001	2007	1961-2007 (Geom. Growth)
World	2200	2370	2512	2620	2722	2797	0.52
USA	2881	3058	3230	3509	3683	3748	0.57
European Union	3000	3212	3279	3377	3457	3465	0.31
LDC's	1918	1968	1957	1966	2053	2161	0.26
South America	2304	2457	2611	2637	2781	2885	0.49
Asia	1804	2026	2233	2441	2590	2668	0.85
Africa	2029	2111	2236	2298	2366	2461	0.42

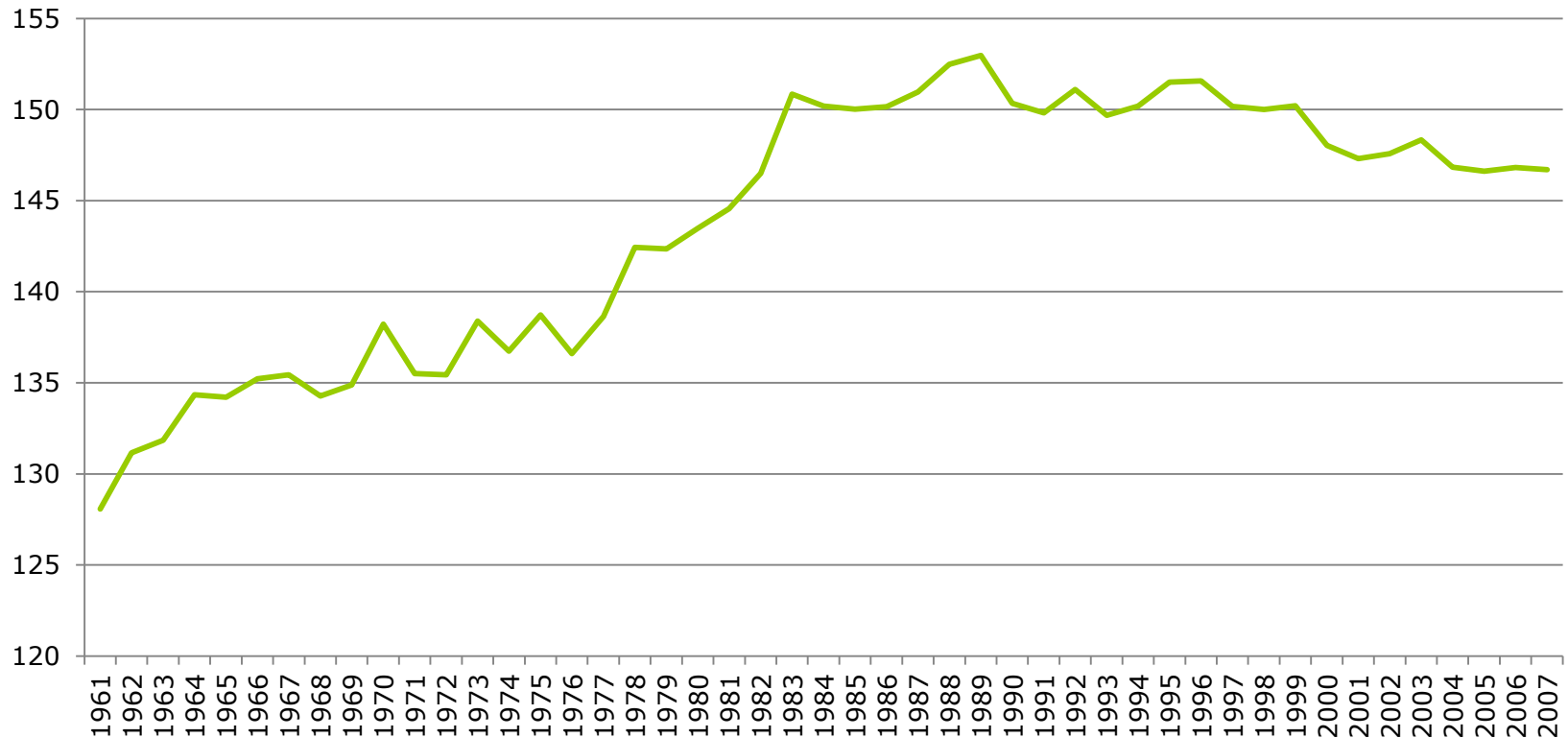
Source: FAOSTAT, 2011

Table 2– Geometric Growth of Food Supply per capita (kcal/capita/day)

	1961- 1971	1971- 1981	1981- 1991	1991- 2001	2001- 2007
World	0.75	0.58	0.42	0.38	0.45
USA	0.60	0.55	0.83	0.49	0.29
European Union	0.65	0.21	0.30	0.23	0.04
LDC's	0.26	0.04	-0.05	0.43	0.86
South America	0.65	0.61	0.10	0.53	0.62
Asia	1.16	0.98	0.89	0.60	0.49
Source: Faostat, 2010					
Africa	0.39	0.58	0.28	0.29	0.66

Demand Constraints Hypothesis: Main Facts and Data (based on wheat, rice and maize)

**Fig. 1 - World Food Supply of Cereals
(kg/capita/yr)**



Source: FAOSTAT, 2011 and author calculations

Fig. 2 - World per capita cereal production (5 years moving average)

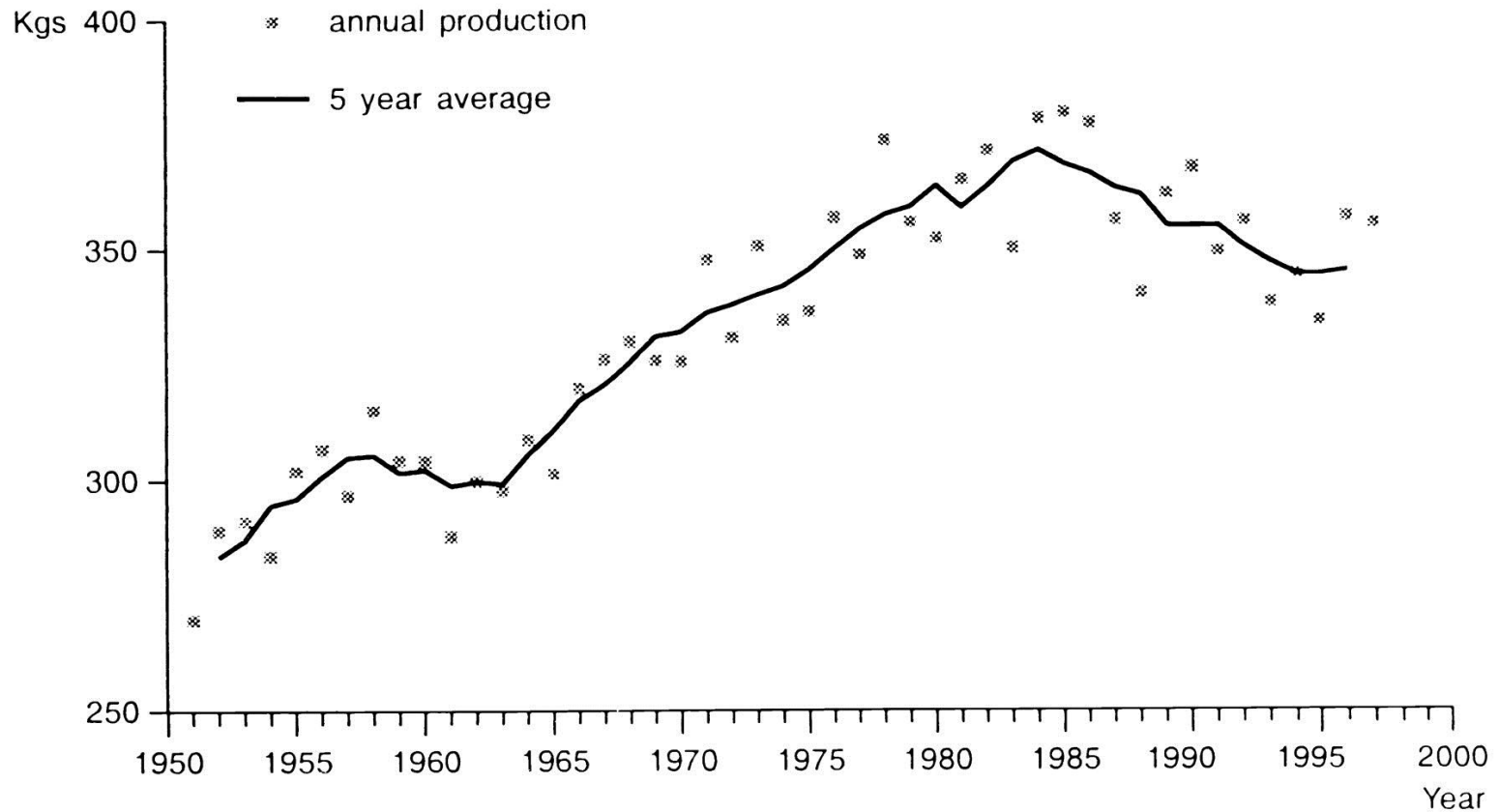
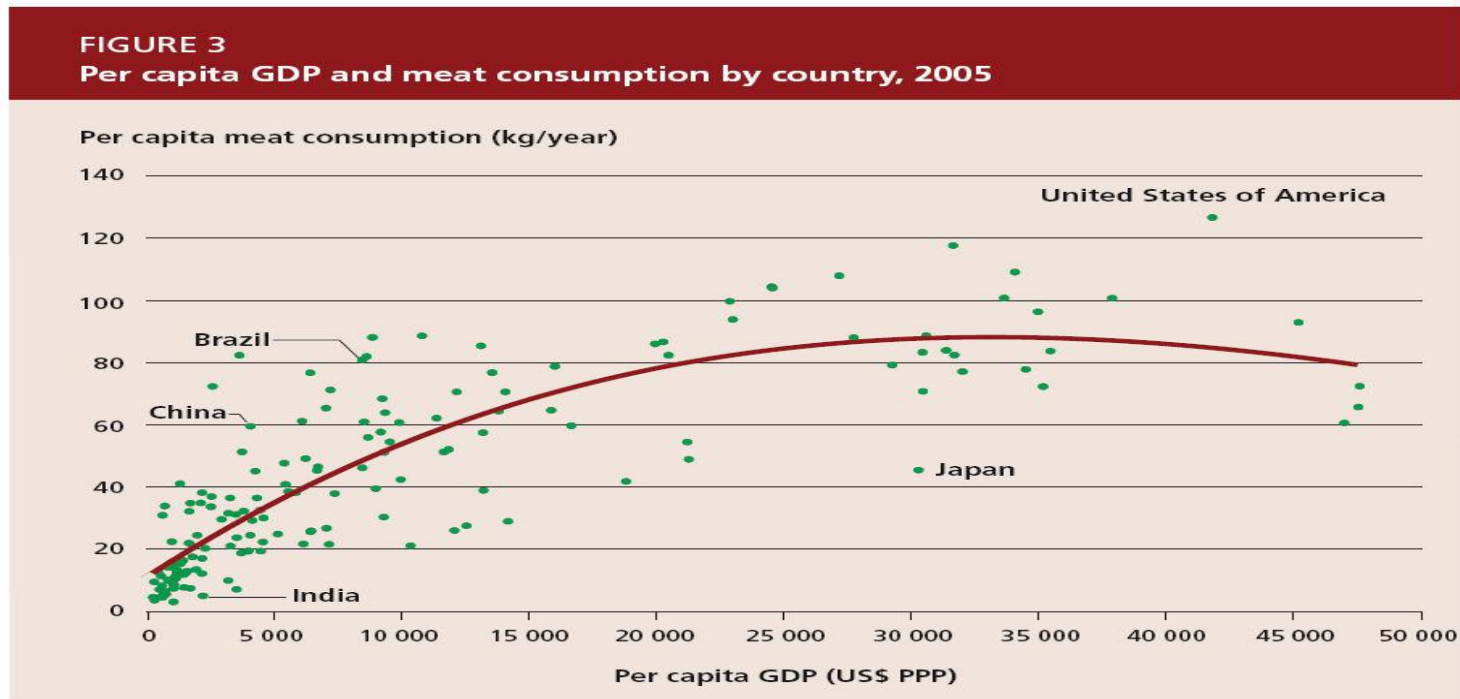


Fig. 3 – Per capita GDP and meat consumption by country in 2005

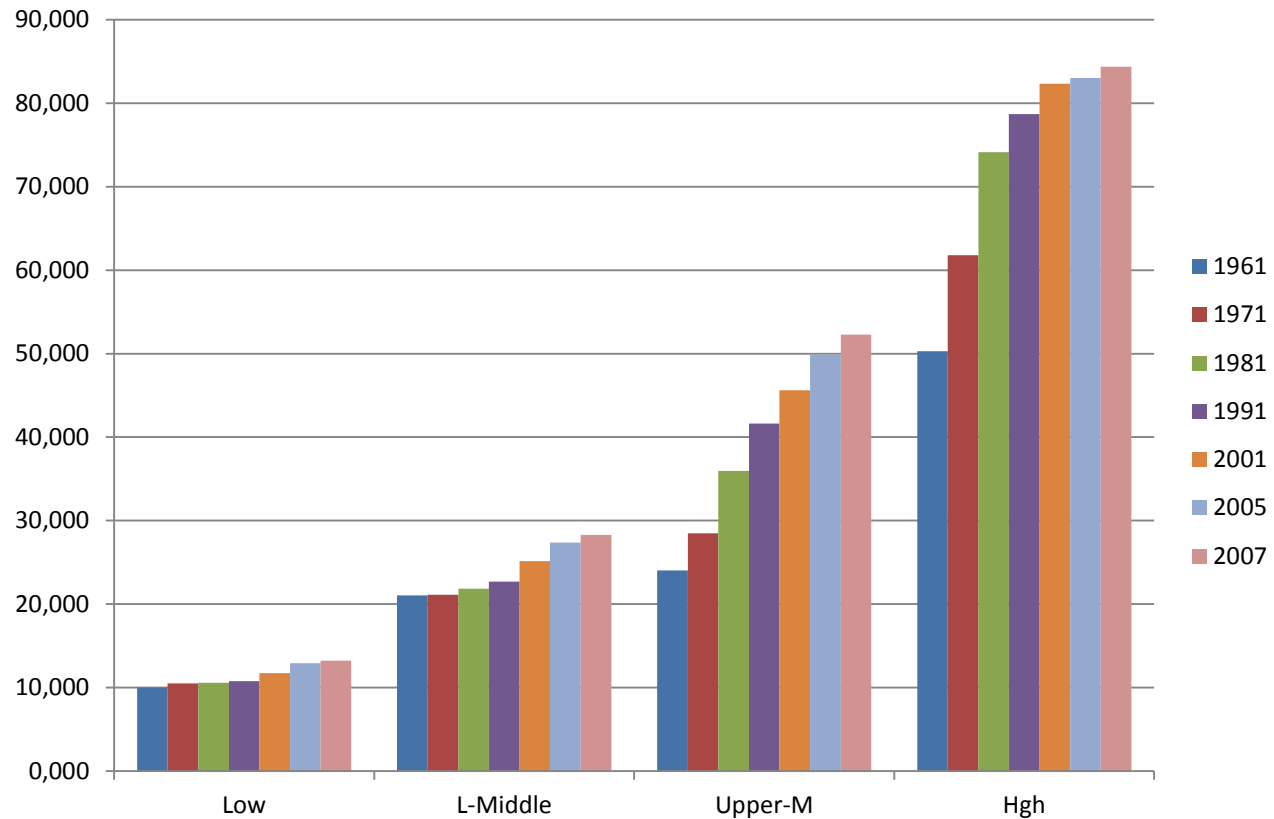
Meat Consumption Pattern



Note: GDP per capita is measured at purchasing power parity (PPP) in constant 2005 international US dollars.
Source: Based on data from FAOSTAT (FAO, 2009b) for per capita meat consumption and the World Bank for per capita GDP.

Source: FAO (2010)

**Figure 4 – Meat Supply (kg/capita/year) by country group
(low income, lower-middle, upper-middle and high income countries)**

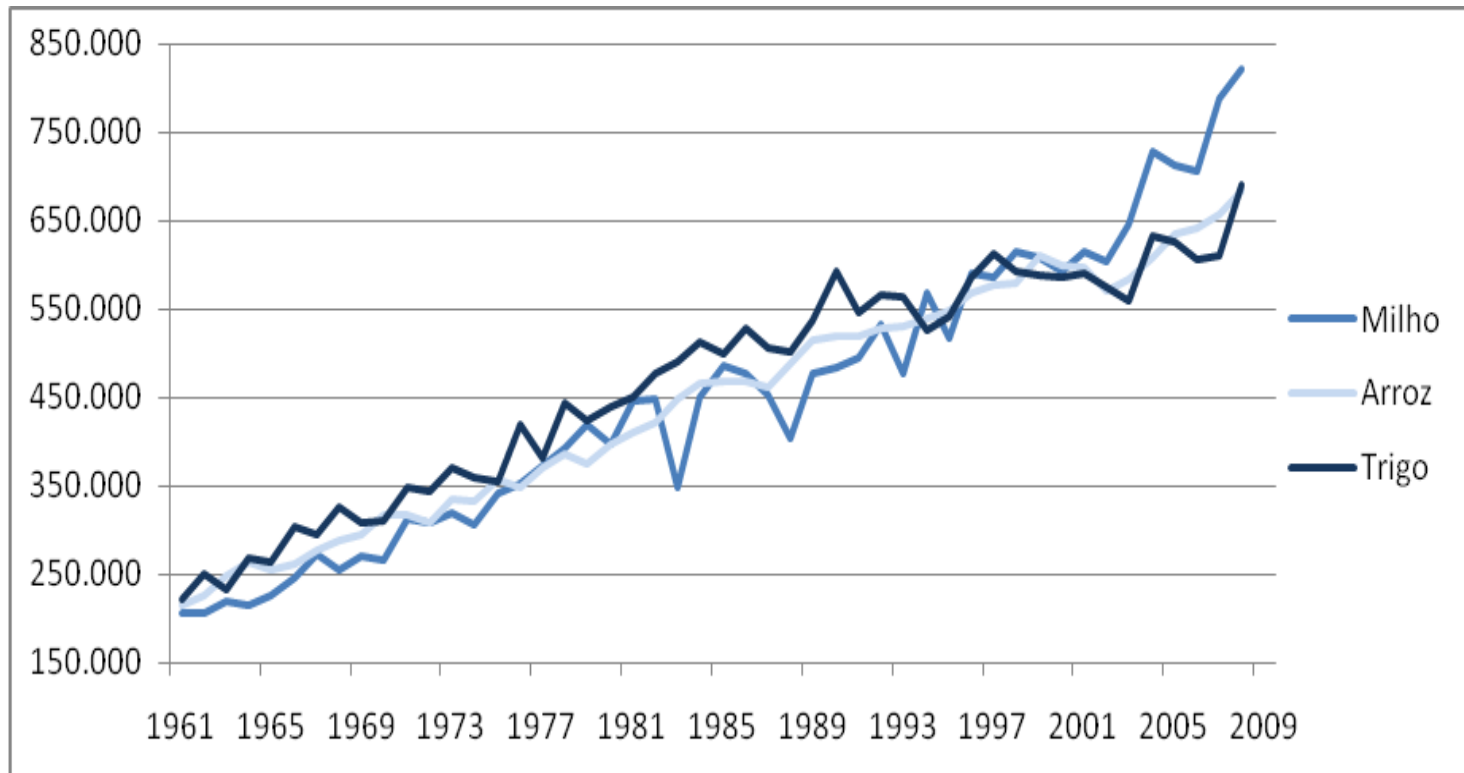


Source: FAOSTAT (2011) basic data and author's elaboration

Food Supply Growth: A necessary condition, but not sufficient

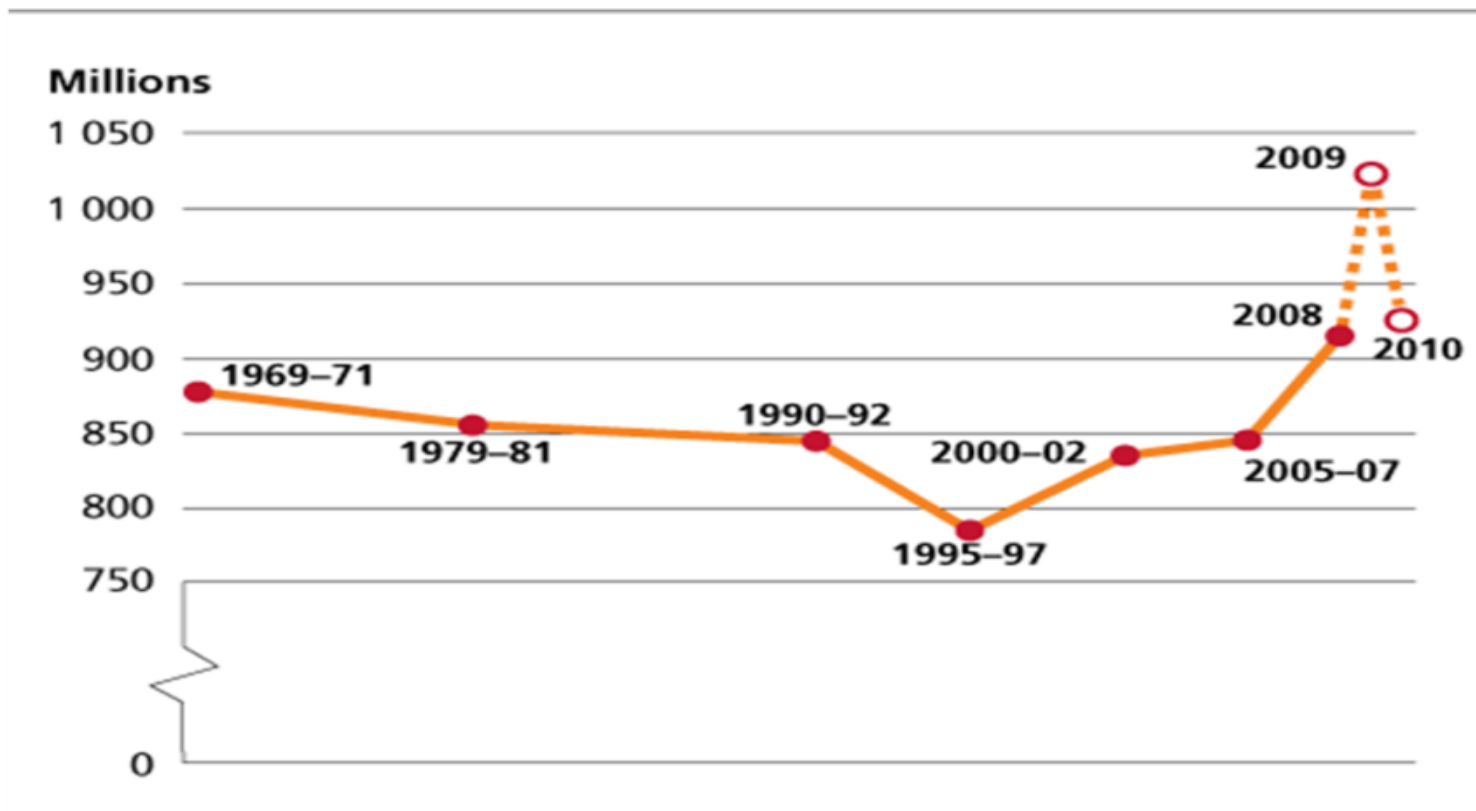
- 1 – Food production growth has been worldwide very stable at global level;
- 2 – Global Demand Constraints are now very evident;
- 3 – Per capita food supply growth is at a very good path;
- 4 – Global levels of food availability already at a good standard, higher than 2800 kcalories per capita/day
- 5 – Hunger levels, absolute and relative, are also very stable in the last decades, not improving much, and much less than before in the 1990 decade.

Fig. 5 - Cereal Production (1000 tons)



Source: FAO DATA

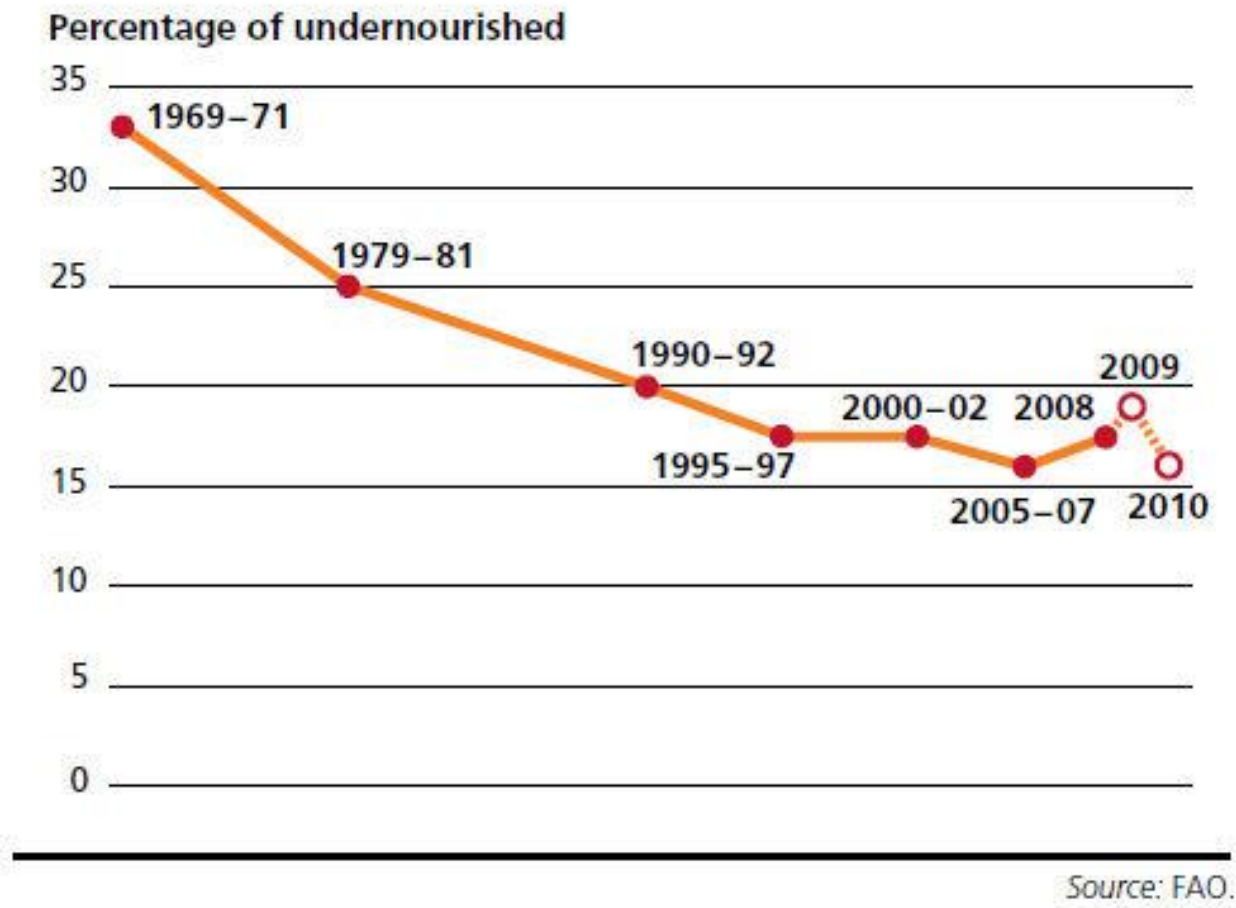
Fig. 6 – Number of undernourished people in the world, 1961/71 to 2010



Note: Figures for 2009 and 2010 are estimated by FAO with input from the United States Department of Agriculture, Economic Research Service. Full details of the methodology are provided in the technical background notes (available at www.fao.org/publication/sofi/en/).

Source: FAO.

Fig. 7 – Proportion of undernourished people in developing countries, 1961/71 to 2010



PARTIAL CONCLUSIONS

- 1 – Failure of the international community to solve the basic needs for a worldwide citizenship;
- 2 – Supply side economics has been performing quite well, but not solving hunger problems;
- 3 – There is a strong need for a Systems perspective, where “social and economic engineering” will have to play a strong role.

IV - Observed Structural Changes

- 1 – Agro related activities decreasing importance in the economy (at least apparently....);
- 2 – Sector shares evolution in the economy, agro and industry related activities, decreasing, services growing;
- 3 – Opportunities for activities related with the ecosystems and nature aiming quality of life;
- 4 – Value Creation changes, from tangible to non tangible goods;
- 5 – Services growth, agriculture multifuncionalidad and services from nature, an opportunity.

Fig. 8 –Agribusiness relative importance in GDP for OECD countries – Year 2000

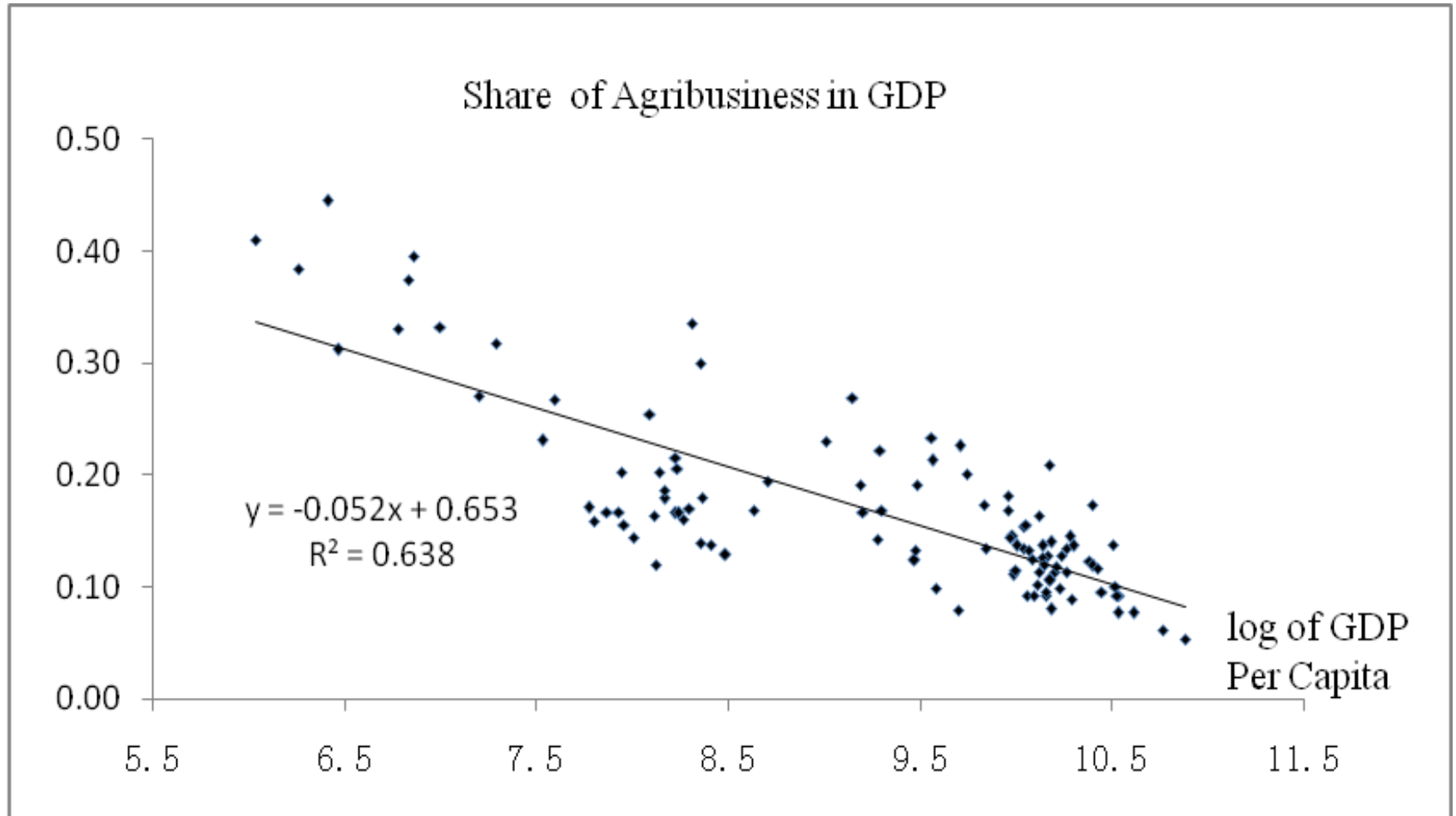


Fig. 9 – Dominant sector structure in the development process: agriculture - industry – services (first, second and tertiary sectors)

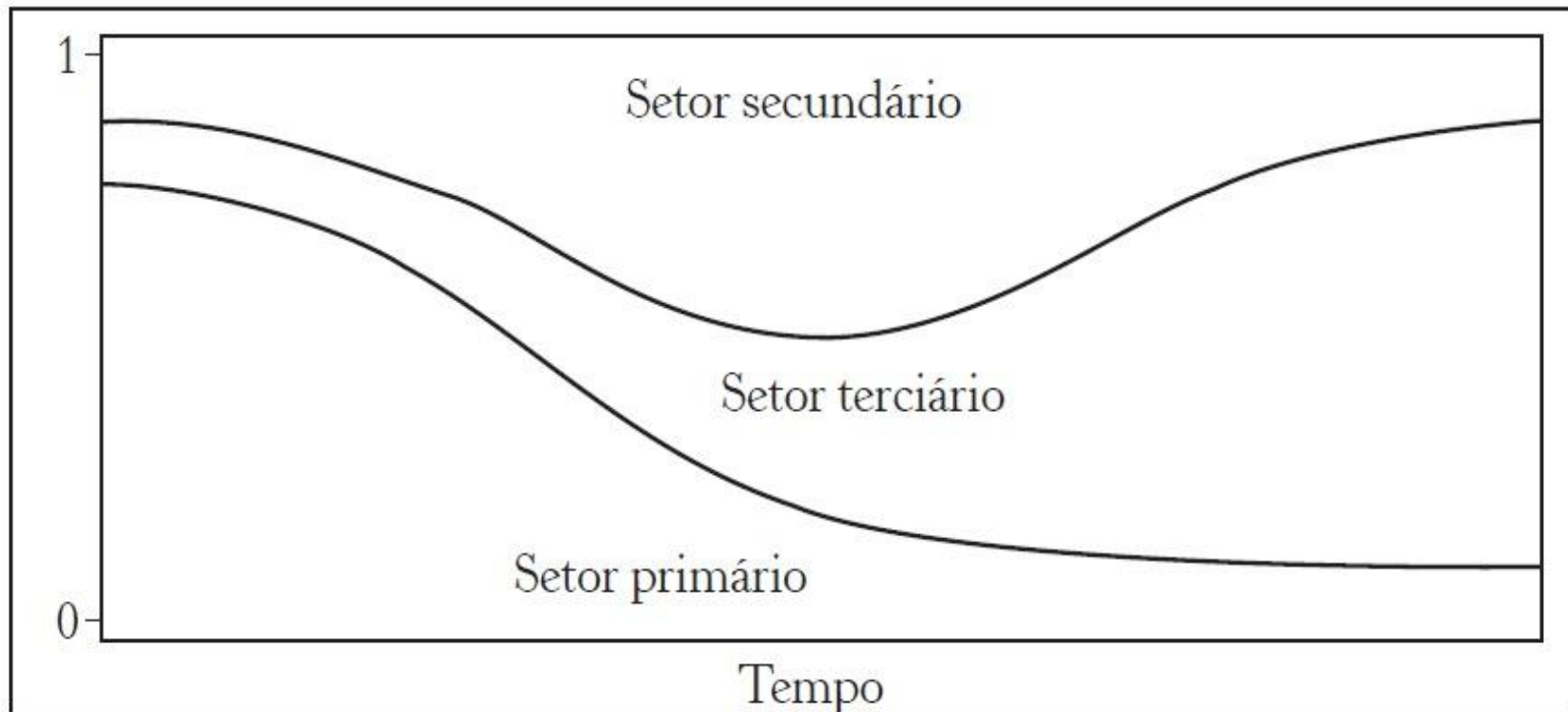


Figura 1.1 – A hipótese dos três setores.

Fonte: Krüger (2008, p.333).

Case Studies: Portugal and other European Countries

- 1 – Relative sector relevance in the economy;
- 2 – Consumption behaviour and economic development;
- 3 – Ecosystems, production and consumption: the mediterranean diet example.

Tab.3 - Portugal – Sectors relevance in % GDP

PORTUGAL	IMP.SECTOR	% GDP									
		1954	1974	1995	2002	2011	Dif.2002-2011				
1ªSERIE	AG+PESC+INDU	55	40,6	27,4							
2ªSERIE	AG+PESC+INDU			21,4		17,3	14,5	-2,8			
				1ªSERIE	2ªSERIE						
	AGR+For +Fis	29	11,7	6	4,9	2,8	1,9	-0,9			
	IND	26	29	21,4	16,6	14,6	12,6	-2			
	ENE	1,4	1,7	3,6	2,6	2,4	3,2	0,8			

Fonte: BP e INE in Eugenio Rosa (2013)

Fig. 4 – Des-industrialization – % GDP industry+energy in the EU

Desindustrialização - % PIB dos sectores de Industria e Energia em Países seleccionados da Europa

		2000	2009	2010	2009-2000
					Dif.%
EU		22,4	18,1	18,7	-4,3
Alemanha		25,3	22,4	23,8	-2,9
Portugal		20,4	16,8		-3,6
Irlanda		34,1	26,4	25,9	-7,7
Espanha		20,9	15,4	15,9	-5,5
França		17,8	12,5		-5,3
Grecia		13,9	13,4	13,6	-0,5

Consumption Economics: Habits and Cultural Background

- 1 – Food consumption depends greatly on income, but cultural habits are also very important;
- 2 – Natural resources, and natural ecosystems are inter-related with production and consumption traditions and technologies;
- 3 – Health factors and quality of life (associated with knowledge and cultural background) requirements can be important determinants of food consumption;
- 4) – Beyond a certain income level, consumption tends to decrease in several items and be more diversified, with “more quality” and other “non tangible” factors entering into the consumption equation.

Tab. 5 - Mediterranean Diet (Intangible Cultural World Heritage) – Unesco Classification (2010-2013): An Institutional Innovation

Average calories available per person per day in
European States - 2007-2009

Estados Membros da UE	Anos		
	2007	2008	2009
>3700 calorias por pessoa/dia			
Áustria	3816	3826	3800
Bélgica	3736	3751	3721
>3500 e <3700 calorias por pessoa/dia			
Grécia	3637	3656	3661
Luxemburgo	3599	3592	3637
Itália	3628	3612	3627
Portugal	3582	3614	3617
Irlanda	3564	3588	3617
Alemanha	3552	3537	3549
França	3520	3598	3531

Tab. 5.1 - Mediterranean Diet

Average calories available per person per day in European States
2007-2009
(cont.)

Estados Membros da UE	Anos		
	2007	2008	2009
>3000 e <3500 calorias por pessoa/dia			
Roménia	3442	3546	3487
Lituânia	3487	3514	3482
Hungria	3491	3495	3477
Malta	3444	3428	3438
Reino Unido	3453	3453	3432
Polónia	3389	3363	3392
Dinamarca	3393	3370	3378
República Checa	3244	3466	3305
Eslovénia	3221	3268	3275

Fonte: DGS – direcção geral de saúde

Tab. 5.2 - Mediterranean Diet

**Average calories available per person per day in European States
2007-2009
(cont.)**

Estados Membros da UE	Anos		
	2007	2008	2009
Holanda	3266	3277	3261
Finlândia	3229	3218	3240
Espanha	3269	3232	3239
Estónia	3121	3131	3163
Suécia	3096	3123	3125
<3000 calorias por pessoa/dia			
Letónia	2949	2993	2923
Eslováquia	2838	2866	2881
Bulgária	2775	2802	2791
Chipre	2644	2665	2678

Fonte: DGS – direcção geral de saúde

Tab. 5.3 - Mediterranean Diet

**Fruits and Vegetables/Legumes Average Quantity Available
per capita (kg) and per year in several
EU Member States
2007-2009**

Estados Membros da UE	Anos		
	2007	2008	2009
>300 kg/ano			
Grécia	388,5	360,2	385,6
Portugal	291,2	279,7	313,1
Itália	300,0	284,1	312,4
Malta	307,4	311,6	305,6
>200 e <300 kg/ano			
Luxemburgo	283,0	291,2	277,3
Irlanda	225,6	244,1	244,3
Dinamarca	208,9	210,5	235,4
Espanha	236,5	247,6	231,8
Áustria	245,8	259,9	228,6
Roménia	209,5	229,2	226,6
Chipre	230,4	205,4	225,0
Eslovénia	203,5	210,7	224,5
Bélgica	212,3	223,0	218,3

Fonte: DGS – direcção geral de saúde

Tab. 5.4 - Mediterranean Diet

Fruits and Vegetables/Legumes Average Quantity Available per capita (kg) and per year in several EU Member States 2007-2009

Estados Membros da UE	Anos		
	2007	2008	2009
Hungria	199,1	217,5	218,2
Reino Unido	219,1	228,1	214,6
Holanda	239,3	221,1	212,6
Suécia	204,0	223,1	208,0
França	215,3	209,2	207,9
<200 kg/ano			
Estónia	175,1	175,0	184,5
Polónia	173,7	170,7	182,4
Alemanha	173,9	172,3	176,2
Finlândia	172,7	165,3	172,7
Lituânia	173,8	171,3	171,9
Eslováquia	151,3	163,2	169,0
República Checa	143,5	152,3	152,9
Letónia	165,2	152,5	151,3
Bulgária	119,4	105,2	105,0

Fonte: DGS – direcção geral de saúde

V- The Need for Development Models

- 1 – Food Balance Equation (WFSE proposal);
- 2 – Induced Changes and Innovation model (ICI model);
- 3 – The combined perspective.
- 4 – The Concept of Food Security: what's new, and which contributions.

5.1 -Models and Conceptualization

- References in the Literature
 - 1 – World Food Equation (Mellor and Johnston 1984), and the World Food Security Equation –WFSE (Carvalho et al 2011);
 - 2 – Induced Innovation model (Hayami and Ruttan, 1973, 1985), and Induced Changes na Innovation Model (Carvalho 2004);
 - 3 – Demand Constraints Rational (Carvalho, 1982, 1989,2014);
 - 4 – Food Security Concept: FAO (1996) and author contributions (1994, 2004, 2012, 2013).

5.2 – Food Security Concept

- In the World Food Summit (1996, November) it was defined “formally”: “Food security exists when all people, at all times, have access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.”
- Food Security, is the first dimension of Human Security concern, meaning low risk (and uncertainty) in all dimensions for food and nutritional needs (availability, access, consumption/(quality, social conditions, education, habits, cultural background, etc.), stability on all previous factors and diminishing vulnerability in all relevant variables), in Carvalho (2012).

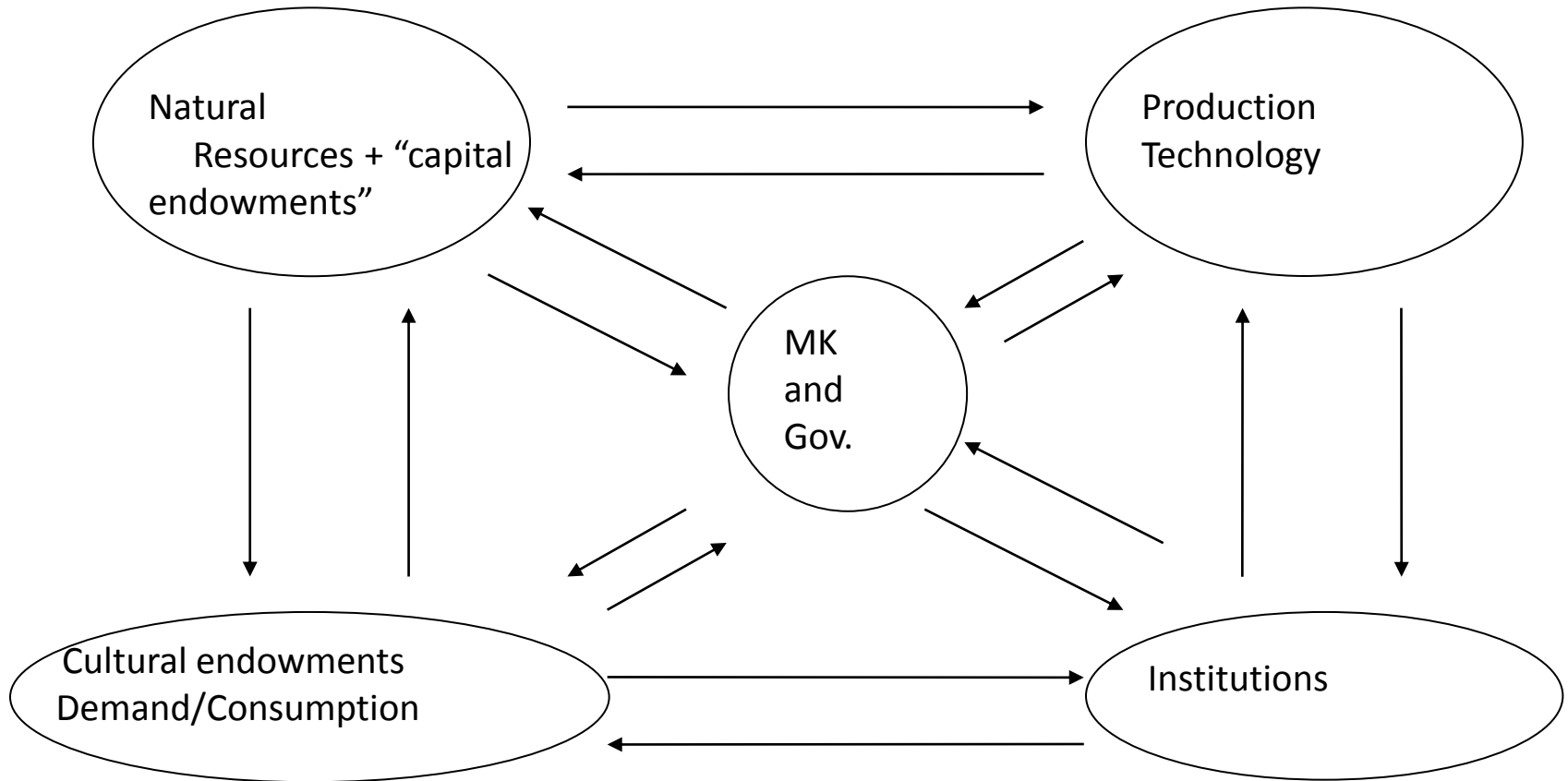
5.3 – Referencial Models - Model A

- WFSE (new proposed model based on demand/supply constraints rational)

- Stage/Phase I – Ecological Equilibrium
- Stage/Phase II – Excess Food Demand (demand growth tends to be higher than production growth)
- Stage /Phase III – Excess Supply (supply growth higher than demand growth).
- Stage /Phase IV – Supply and Demand with more equilibrium, with significant growth in production only when demand constraints are “relaxed” (through export markets and other non food uses).
- This last phase is characterized by Food Demand growth close to zero in quantitative terms (“saturation level” is reached), value creation in production still possible with innovation and qualitative oriented.

5.4 - Referential Model B

Fig. 10 Induced Changes and Innovation model



Source: Carvalho, B. P de (2004) and author elaboration

- 5.5 - Methodological considerations (aiming a combined perspective)

- Development models references and author suggestions:
- 1 - WFSE – World food security equation Model;
- 2 - ICI – Induced changes and innovation model/a general equilibrium approach;
- 3 – The combined perspective/global view with new concepts and approach:
 - Production on a chain view/value creation process;
 - Demand constraints and new demands;
 - Non tangible outputs and services opportunities.

VI – Food System Case Study: Portugal

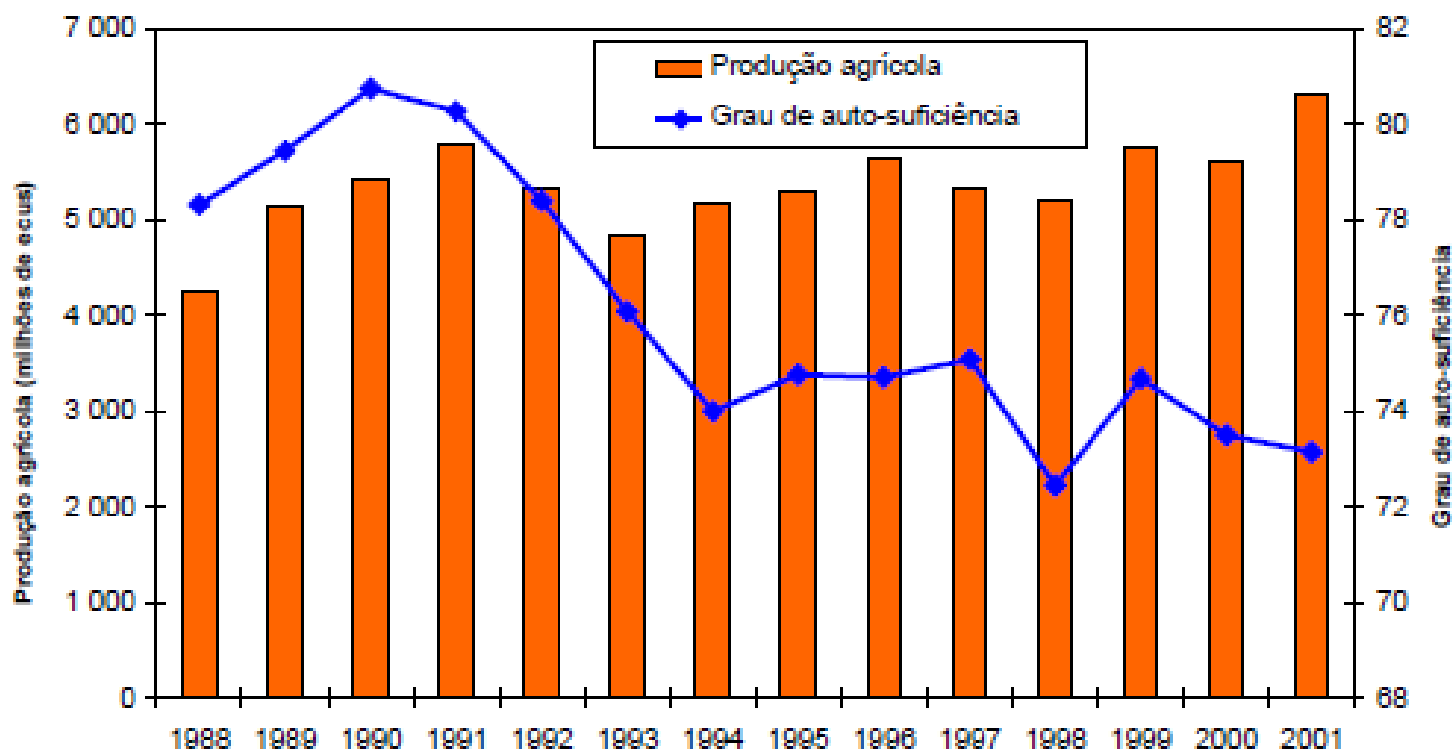
Example in Europe/an overview

- 1 – Structural changes (WFSE model);
- 2 – European integration Impact (dependency and/or interdependency);
- 3 – Food Balance equation: production and consumption evolution (“vis a vis” the ICI model and the alternative of combining perspectives: induced changes and structural changes).

The Main Challenges for the Portuguese Agriculture in the European Context

Impact of the Second phase after 1992: Production and degree of self-sufficiency

Figura 2.1: Produção agrícola total portuguesa e grau de auto-suficiência em produtos agrícolas (1988-2001; preços correntes)



Nota: O grau de auto-suficiência é calculado como o rácio produção interna/oferta alimentar total (a produção inclui as existências líquidas mais as importações líquidas).

Fonte: Cálculos DG Agr+ Dados Eurostat, Comext

Table 6 - Mediterranean Diet – global availability + Share of local production in global availability

	Capitação Bruta							
	1980/1982		1990/1992		2000/2002		2006/2008	
	kg/ano	GAA %	kg/ano	GAA %	kg/ano	GAA %	kg/ano	GAA %
Cereais	143,4	27,8	144,9	47	154	33,1	152	26,9
Trigo	91,2	37,1	99,7	36,1	109	17,7	108	11,5
Arroz	20,7	63,1	23,2	59,35	25,3	52	25,3	53
Milho	12,9	16	12,5	47,2	11,9	43,2	10,6	29,2
Raizes +tub	139,8	94,2	154,4	64,8	103,7	57,8	91,7	58,7
Legumi.Secas	3,8	80,4	6,2	49,2	4,1	16,2	4,3	10,01
Prod.Hortícolas	85,7	148,3	70,1	178,8	95	157,9	114,8	166,4
Frutos	61,5	100,1	103,6	88,4	128,7	72,7	120,8	74,6
Azeite	4	101,6	3,5	104	5,8	47,2	6,2	57,6
Vinho +derivados			62,2	129,1	47,7	118,2	43,6	114,8
Carne+miudezas	51	99	69,9	88,3	91,7	78,9	94,9	69,6
C.de Bovino	12,9	96,2	16,7	76,8	16,3	60,4	18,5	52,2
C.de suino	12,6	100,7	20,4	86,7	31,4	70,6	32,8	51,3
C. de Aves	16,3	100	20	101,3	30,7	96,7	31,5	93
Ovino+Caprino	2,5	100	3,9	92,4	3,5	70,4	2,9	79,8
Leite	63,5	100	84,4	102,1	88,5	107,9	89,3	106,2
Pescado	28,6	102,1	37,4	73,7	33,2	44,6	36,6	41,1

Tab. 7 - Internationalization Importance of the Agribusiness activities (Importância da internacionalização no Complexo alimentar)

Taxas de crescimento médias anuais do comércio internacional do Complexo Agroflorestal e Pescas e Economia 2000-2001 (%) - preços correntes

Average annual growth rates of International Trade for the Agroforestry and Fisheries Sector and the Economy in 2000-2011 (%) - current prices

	Importações <i>Imports</i>	Exportações <i>Exports</i>
Agricultura <i>Agriculture</i>	4,0	10,9
Pescas <i>Fisheries</i>	4,3	6,1
Indústrias Alimentares Bebidas e Tabaco <i>Food, Beverage & Tobacco Industries</i>	4,8	8,0
Silvicultura <i>Forestry</i>	-1,8	5,0
Indústrias Florestais <i>Forest industries</i>	1,6	4,4
Complexo Agroalimentar <i>Agri-food sector</i>	4,6	8,2
Complexo Florestal <i>Forest sector</i>	1,1	4,4
Complexo Agro Florestal e Pescas <i>Agroforestry and fisheries sector</i>	3,8	6,2
Economia - bens <i>Economy - goods</i>	2,3	4,0
Economia - bens e serviços <i>Economy – goods and services</i>	2,6	4,6

Fonte: Estimativas GPP, a partir de Contas Nacionais, INE
Source: GPP estimates from National Accounts, INE

Tab. 7.1 - Portugal Trade Balance (millions of euros)

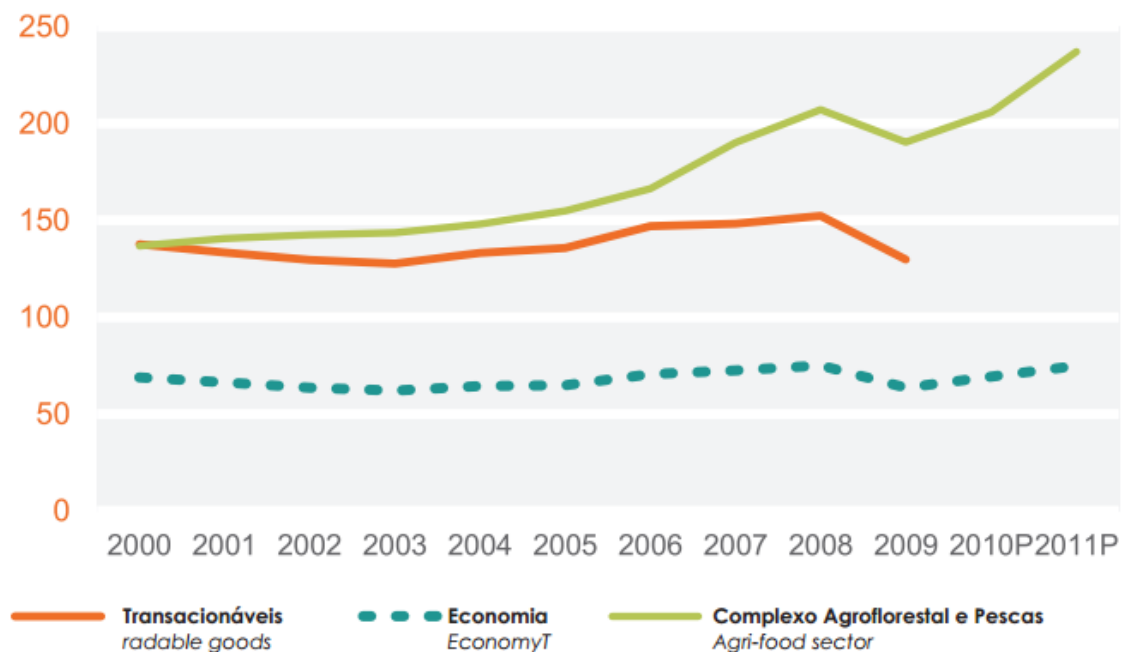
Year	Exports	Exports	Imports	Imports	Trade Bal.
	Goods	Services	Goods	Services	Net Trade Balance
1996	19 322	6 077	26 897	5 002	-6 499
2000	27 209	9 830	43 641	7 622	-14 225
2013	47 653	20 564	54 733	10 639	+2 845

Fonte: Banco de Portugal, Pordata, 2013

Tab. 8 - Internationalization Importance of the Agribusiness activities

Grau de Abertura* do Complexo Agroflorestal e Pescas e Transacionáveis 2000-2011 (%) - preços correntes

Degree of openness* of the Agri-Food Sector and Tradable Goods 2000-2011 (%) - current prices



Fonte: GPP, a partir de Contas Nacionais, INE - Source: GPP from National Accounts, INE

* Grau de Abertura = $(IMP+EXP)/VAB*100$ - Degree of openness = $(IMP+EXP)/GVA*100$

Portugal Relevance in the Agribusiness Worldwide: some references

- 1 –Cork sector – 1st in the World in Production and Transformation
- 2 – Tomato Industry – 4th in World Exports and 2nd in Europe Exports in 2012, after USA, China and Italy – “top yields”- the highest average productivity in Europe and 3rd in the World.
- 3 – Paper pulp; the 6th biggest producer in Europe and 13th in paper, pulp and board industry (Eurostat data in Aicep – Portugal – 2012).
- 4 – Rice (production and consumption relevance (10% “top yields” – 1st in consumption per capita in Europe).
- 5 – Corn (modern systems are achieving average yields at the highest levels in the world);
- 6 – Horticulture and Fruits – The Case of Pera Rocha deserves reference (the 6th biggest producer in Europe for Pears);
- 7 – Wine – traditionally among the top 10 biggest producers;
- 8 – Olive oil – sector recovering from the past with new technology and great expansion in production and exports (for example achieving around 40% of all imports from Brazil). Relevance also on biological production alternatives in traditional systems.

Partial Conclusions

(regarding the Portuguese case study)

- 1 – Portugal was almost 100% self-sufficient for the most part of the food products, with clear deficit only in cereals before EU entry in 1986;
- 2 – EU relations were complex (**more dependent and/or interdependent today**), but in the last years the agro complex has been able to react in many sectors linked with technology changes and/or the international markets; The “openness” of the sector is impressive.
- 3 – All the main important chains in the agribusiness are linked with technological changes and the international markets and/or do not face any demand constraints.
- 4 – The country is very well adapted with good performances in crops and food systems where the eco-systems play its role in competitive terms (with high productivity rates in tropical, sub-tropical crops and/or from Mediterranean origin) and no demand constraints are “binding.”
- 5 – Consumption patterns and its changes are also very much in line with natural resource base and production activities (induced model test, for production and consumption).

VII - Conclusions and New Opportunities for Europe - 1

- 1 – Europe is on the 4th phase in the Food Balance Equation – (WFSE model) with “no need “ to improve global production;
- 2 – The big challenges are around “Quality” and Efficiency, (including lower environmental impact in production activities) creating value, but certainly mainly in new forms, markets and services;
- 3 – Health, quality of life concerns and agribusiness/nature based activities are new “windows” for value creation;
- 4 – The chain value approach, with special concern with the share value distribution along the chain, deserve a lot of attention and call for institutional innovation regarding markets functions and better governance. Transparency, information access (transaction costs) and negotiation power balances are key aspects to be taken into consideration.

Conclusions and New Opportunities for Europe - 2

- 5 - New markets can be created, some of them in the European zone, with new products and “consumption forms,” including in the traditional and non differentiated products, mainly in the Eastern regions, where food consumption can still grow significantly;
- 6 – This production growth should be well connected with consumption growth, but expansion should also be driven by quality and efficiency considerations, and value creation alternatives linked with services and the multi-functionality “deals” of the ag. related activities (eco-tourism, quality of life, climate changes and environmental impacts and so on). A systems perspective is a necessary condition.
- 7 – New Demands, new niche markets and health/quality of life concerns will be crucial, such as the case of the “biological/organic/ecological” production systems, production of intangible goods and services, namely from Nature/environmental and ecosystems context.
- 8 – The over capacity in the food sector in OECD countries should be turned into forms of LDC’s countries support (mainly tropical and/or sub-tropical countries) based on “knowlegde” capacity transfer (not necessarily technological transfer which is not adapted, in most cases, to local conditions), with institutional innovation, giving priority to the ability of promoting sustainable development and empowerment of the food systems.

Agriculture – bio/organic/ecological Production systems in Europe (data in ha) the 10 biggest growth countries in 2010



Fonte: FIBL – IFOAM Inquérito 2012

Unidade: Mil Hectares

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