BRAZILIAN AGRICULTURE BEHAVIOR FROM 1987 TO 1996

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ABSTRACT - This paper analyses the evolution of Brazilian agricultural production and productivity from 1987 to 1996. In these years, economic incentives directed toward the expansion of agricultural production were decreased. Notwithstanding, Brazilian agricultural production has been increasing. This was caused, mainly, by increases in productivity. We concluded that this increase in agricultural productivity is one of among several causes for the rise in the agricultural sector's share of Brazil's Gross Domestic Product (GDP).

Key words: agriculture, productivity, economic politics, GDP.

INTRODUCTION

Since 1987, there has been a decrease in the use of Brazilian public instruments to provide incentives for the expansion of agricultural production. This was caused by a worsening of the Brazilian fiscal crisis and a consequent inflationary crisis. Today, rural credit policy, minimum prices policy, public expenses addressed to agriculture, and fiscal incentives policy are less importance than they were in the past.

Initially, this caused a decrease in the expansion of agricultural production. But, after few years, significant growth in agricultural production occurred, due mainly to productivity increases. That expansion of agricultural production happened due to a new technological base, but this has not yet been properly studied.

Therefore, this paper analyzes Brazilian agriculture behavior from 1987 to 1996, specifically analyzing the behavior of agricultural

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production and productivity.

This analysis allows one to observe new patterns of behavior in the agricultural sector, behavior that can be taken in consideration and used to reevaluate agricultural sector policies. However, we won't analyze any possible reconfiguration of Brazilian agricultural policies..

This paper is divided in four Sections and this Introduction. In section 2, we examine government policies that led to the expansion of Brazilian agricultural production from 1987 to 1996. In section 3, the evolution of the agricultural sector component of the Brazilian Gross Domestic Product (GDP) is examined, discussing factors that determined the value of this component. section 4 is devoted to a study of the expansion of Brazil's agricultural production and productivity from 1987 to 1996; and in section 5, we give our final considerations.

GOVERNMENT ECONOMIC POLICIES WHICH PROVIDED INCENTIVES FOR THE EXPANSION OF AGRICULTURAL PRODUCTION - 1987 TO 1996

In this section we examine rural credit policies, minimum prices policies, other public agricultural expenses, and special agricultural development programs from 1987 to 1996

In 1965, the creation of National System of Rural Credit (SNCR) by law number 4829 greatly expanded the availability of rural credit in Brazil. During the 70's and early 80's there was a predominance of subsidized credit; loans were made with a negative real interest rate, up to 40% a year below the market rate (Araújo & Almeida, 1996). Such interest rates created an excessive demand for credit which partially compensated for other types of economic discrimination imposed on the agricultural sector. Brandão's results (1989), cited by Araújo & Almeida (1996, p. 162), concluded:

> "... that around 8 to 9% of Brazilian agricultural income was transferred to the non-agricultural sector between 1975 to 1983 through distortions in product and input prices, by explicit and implicit taxes, and by fiscal policies."

Notwithstanding direct benefits obtained by borrowers, the amount and implicit subsidy in rural credit generated a series of costs for the Brazilian society (Sayad, 1984; Shirota, 1988; Araújo & Almeida, 1996). These costs became more clearly evident as inflation rates increased and the resources of financial institutions and Federal Government became depleted. There were also flaws in the rural credit mechanism: credits were concentrated in a small number of farmers, and allotted to a small number of crops (Goldin & Rezende, 1993, p. 24-25).

From 1970 to 1979 there was a large expansion in the number and value of rural credit contracts (Table 1). The amount of available, subsidized, agricultural credit funds was significantly reduced between 1980 and 1984, grew again in 1985 and 1986, and has been sporadically contracting since then.

Table 1 - Rural Credit Contracted - 1970 to 1996 (values in million of Real of August, 1994)

Year	Support purpose	Investment purpose	Commercialization purpose	Total
1970	4,138	2,518	2,621	9,277
1971	4,669	3,165	2,895	10,729
1972	5,524	4,389	3,356	13,269
1973	8,012	6,208	4,543	18,762
1974	10,447	7,023	5,732	23,203
1975	14,826	10,571	8,429	33,827
1976	14,634	11,242	8,802	34,678
1977	14,632	7,507	8,805	30,944
1978	15,002	7,856	8,599	31,457
1979	19,719	9,794	9,692	39,205
1980	21,214	7,033	9,245	37,492
1981	19,072	5,026	8,422	32,519
1982	20,256	4,130	7,104	31,490
1983	14,795	3,972	5,026	23,793
1984	10,234	1,787	2,498	14,520
1985	14,722	2,683	3,299	20,704
1986	17,272	9,894	3,709	30,875
1987	17,076	4,162	3,102	24,339
1988	11,682	2,751	2,741	17,174
1989	12,545	1,648	1,491	15,684
1990	6,707	982	1,270	8,959
1991	7,600	786	859	9,245
1992	6,458	1,225	2,567	10,250
1993	4,893	1,809	2,099	8,802
1994	6,667	2,328	3,721	12,716
1995*	3,418	1,196	902	5,517
1996*	3,368	1,156	297	4,821

Source: Almeida (1994, p. 128)

Note: * The information's in 1995 and 1996 doesn't include foreign resources obtained through the 2148 Brazilian Central Bank resolution (known as "63 caipira") and by modification of the 2167 Brazilian Central Bank resolution. These resources were borrowed at higher interest rate than the SNCR interest rate.

In 1986, R$ 30,875 millions (August, 1994 R$) was lent to the agricultural sector. However, that year's Federal Government fiscal difficulties and an aggravation of the inflationary crisis led to a significant reduction in available rural credit and the elimination of the implicit rural credit subsidy. In 1990, the amount granted by the State for rural credit was R$ 8,959 millions, equivalent to 29% of the total granted in 1986.

The 90's witnessed two different situations. From 1990 to 1994 there was a tendency to increase the amount granted for rural credit (a reduction occurred in 1993). Notwithstanding, in 1995 and 1996, the amount of rural credit granted decreased drastically.[3] In 1996, the sum of granted rural credit was R$ 4,821 million, equivalent to 37.9% of the sum just granted in 1994 and 15.6% of the total granted in 1986.

In the second part of 80's, the agricultural sector's first reaction to the significant reduction in the amount of available rural credit was to lobby, stressing that without cheap, available, rural credit agricultural production would stagnate.

Modifications occurred in 80's in an attempt to compensate for the reduction in rural credit, mainly through a minimum prices policy. This aided the expansion of agricultural production, specifically in Brazil's Center-West region (Goldin & Rezende, 1993, p. 26-28).

However, in the first part of 90's, the financial difficulties of the National Treasury caused a decrease in use of the Minimum Prices Warranty Policy (PGPM). According to Barros (1995, p. 6):

> "The Government was rarely able to fix the prices in a timely manner, to allocate resources at an opportune time for financing or acquisition, or manage official stocks to provide price stability in agricultural markets."

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[3] The credit formerly granted through the National Rural Credit System (SNRC) was partly substituted for by credit granted using foreign resources. But, foreign resources were lent at world interest rates, not SNCR's. Using Central Bank Resolution 2148 ("63 caipira") and by altering Central Bank Resolution 2167, foreign reserves totaling R$ 790.7 millions were loaned to the ag. sector in 1995 and R$ 2,021.1 millions in 1996 (Aug., 1994 R$).

Since 1988, public expenditures directed toward agricultural sector have been decreasing. According to Barros (1993, p. 980):

"Government expenditures for central and decentralized administration and credit operations dropped from 4.7% of GDP to 1.74% from 1988 to 1991."

That relative reduction in public expenses led to, among other effects, the reduction of rural extension services.

Since 1987, the Federal Government has carried out very few development programs to spur agricultural production. Before that date, there was Pró-álcool, which, in 1975, offered large incentives for the cultivation of sugar-cane; wheat and coffee crops were granted large subsidies; incentives, mainly subsidized credit, were used to promote the use of fertilizers and other inputs (Goldin & Rezende, 1993, p. 29 to 37); and fiscal incentives were provided for reforestation (Bacha, 1993, p. 109 to 143).

Two of the last agricultural development programs were the Agroindustrial's Development National Plan (PNDA) and the Rural Development National Plan (PNDR). Regarding these plans, Fonseca & Gonçalves (1995, p. 119) tell us that:

"PNDA and PNDR were created in 1989 to invest in agriculture-industrial activities using black resources coming from BIRD. Their objective was provide for the modernization of this sector."

Fonseca & Gonçalves (1995, p. 157) state that:

"PNDA brought new financial resources to the agricultural sector during a period of shrinking agri/industrial existing program budgets. Substituting programs of similar nature, PNDA enlarged the scope of existing programs, and addressed new agriculture-industrial segments. Unfortunately, that inclusion didn't agree with priorities previously established."

Over the last few years, research focused on alternative agriculture finance has occurred, and subsidized rural credit is totally out of the picture. This has been pointed out by Mello (1994) and Barros (1995). According to Mello (1994, p. 25):

"The return, pure and simple, to a policy of subsidized agricultural loans is not considered because of its unfavorable impacts in distributive terms and due to the substitution of private capital for subsidized loans."

According to Almeida (1995) and Gasques & Villa Verde (1996), the new alternatives for agricultural sector finance use the resources of savings accounts, external resources and free resources originated from the financial system, and new mechanisms developed by private initiative, such as: Certificate of Goods with Guaranteed Delivery - CMG; Bill of Rural Product - CPR; and Green Soy Contract of Purchase and Sale. Such alternatives imply, through the use of positive real interest rates, that the agricultural sector must pay for its loans.

After 1986, there was less use of government incentives to expand agricultural production. Nevertheless, that production rose; and the agricultural sector's share of Brazil's Gross Domestic Product (GDP) has increased over the last 7 years. This will be examined in the next section.

THE AGRICULTURAL COMPONENT IN BRAZIL'S GDP

Economic development in many capitalist countries has been concentrated in urban-industrial activities. Agriculture has aided this process by transferring capital and labor to support these activities, and by generating foreign exchange which increases imports leading to more dynamic industrial activities. In these countries, agriculture has lost its importance as a component of the nation's gross domestic product (GDP) (Araújo & Schuh, 1995).

This phenomenon occurred in Brazil until 1989 (see Graph 1). From 1955 to 1989 the agriculture sector's contribution to the Brazilian GPD diminished from 23.5% to 7.7%. But, since 1990, agriculture's share of GDP has slightly increased, reaching 11.4% of GDP in 1996. This increase is unexpected, but it has been persistent.

Graph 1 - Participation of economic sectors in the Brazilian GDP
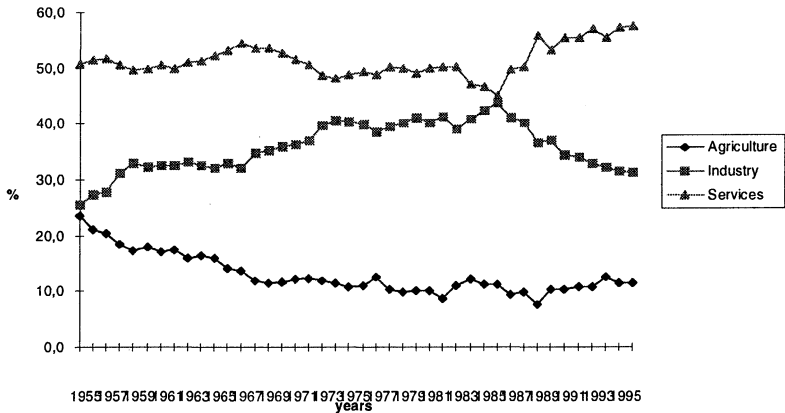
Source: Anuário Estatístico do Brasil (several numbers).
Note: the 1995 and 1996 information's are preliminary estimates.

But, what are the causes for the recovery of the agricultural sector's share of Brazil's GDP? We will initially examine factors that determine the agricultural segment of GDP.

Determinants of the Agricultural Component in GDP[4]

In order to develop an equation that will explicate the variables which affect the agriculture sector's share of GDP, consider that:

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[4] These equations were developed thanks to an initial suggestion made by Prof(a). Heloisa Lee Burnquist.

VA_A = value added by the agricultural sector

VA_I = value added by the non-agricultural sector

P_A = general level of prices in the agricultural sector

P_I = general level of prices in the non-agricultural sector

P_A^I = general level of prices of agricultural products used as input in the non-agricultural sector

P_I^A = general level of prices of non-agricultural products used as inputs in the agricultural sector

I_I^A = non agricultural inputs used in agricultural sector

I_A^A = agricultural inputs used in agricultural sector

I_I^I = non-agricultural inputs used in the non-agricultural sector

I_A^I = agricultural inputs used in the non-agricultural sector

Q_A = physical amount produced in the agricultural sector

Q_I = physical amount produced in the non-agricultural sector

We have:

$$VA_A + VA_I = GDP$$

The agricultural sector's share of GDP is given by:

$$P_{agr} = \frac{VA_A}{VA_A + VA_I} \qquad \text{or}$$

$$P_{agr} = \frac{1}{1 + \dfrac{VA_I}{VA_A}} \qquad (1)$$

The increase of $\dfrac{VA_A}{VA_I}$ makes P_{agr} increase.

Let us see, now, that elements can affect $\dfrac{VA_A}{VA_I}$.

We know that:

$$VA_A = P_A \cdot Q_A - P_A \cdot I_A^A - P_I^A \cdot I_I^A \qquad (2)$$

$$VA_I = P_I \cdot Q_I - P_A^I \cdot I_A^I - P_I \cdot I_I^I \qquad (3)$$

Dividing (2) for (3) and proceeding small arrangements, we have:

$$\frac{VA_A}{VA_I} = \frac{P_A \cdot \left(Q_A - I_A^A\right) - P_I^A \cdot I_I^A}{P_I \cdot \left(Q_I - I_I^I\right) - P_A^I \cdot I_A^I} \qquad (4)$$

Dividing the numerator and denominator of the second member of (4) by P_A, we find that:

$$\frac{VA_A}{VA_I} = \frac{\left(Q_A - I_A^A\right) - \dfrac{P_I^A}{P_A} \cdot I_I^A}{\dfrac{P_I}{P_A} \cdot \left(Q_I - I_I^I\right) - \dfrac{P_A^I}{P_A} \cdot I_A^I} \qquad (5)$$

The expression (5) tells us that an increase in the agricultural sector's physical productivity [an

increase of $\left(Q_A - I_A^A\right)$], in *ceteribus paribus* conditions, leads $\dfrac{VA_A}{VA_I}$ to

arise. The former

generates an increase in the agricultural sector's contribution to GDP [see expression (1)].

The expression (5) implies that an increase of $\dfrac{P_A}{P_I^A}$ (unitary added

value in the agriculture), in *ceteribus paribus* conditions, elevates $\dfrac{VA_A}{VA_I}$,

causing an increase in the agricultural sector's share of GDP.

Finally, the expression (5) also implies that an increase of $\dfrac{P_A}{P_I}$

(relationship of agricultural and non-agricultural prices), in *ceteribus paribus* conditions,

increases $\dfrac{VA_A}{VA_I}$, which, for a time, elevates the agricultural sector's

share of GDP.

However, the discussion above was made under *ceteribus paribus* conditions.

Taking the neperiano logarithm of the expression (5) and differentiating the relation on the time, we have[5]:

$$\left(\frac{\dot{VA_A}}{VA_I}\right) = \left(\dot{Q}_A - \dot{I}_A^A\right) - \left(\frac{\dot{P_I^A}}{P_A}\right) + \dot{I}_A^A - \left(\frac{\dot{P_I}}{P_A}\right) - \left(\dot{Q}_I - \dot{I}_I^I\right) + \frac{\dot{P_A^I}}{P_A} + \dot{I}_A^I \qquad (6)$$

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[5] The point on top of each variable indicates we have the growth rate of the variable.

Examining the expression (6), we find multiple situations that can make $\left(\dfrac{\dot{VA_A}}{VA_I}\right)$ to be positive. For example, every term on the right side can be null, except $\left(\dot{Q}_A - I_A^A\right)$, that can be positive. It can be that

$\left(\dot{Q}_A - I_A^A\right) > 0$ and $\left(\dfrac{\dot{P}_I}{P_A}\right) > 0$ but $\left[\left(\dot{Q}_A - I_A^A\right) - \left(\dfrac{\dot{P}_I}{P_A}\right)\right] > 0$ what also makes

$\dfrac{VA_A}{VA_I}$ arise.

Behavior of Some Variables From 1987 to 1996

Among several factors mentioned in equations (5) and (6), three made important contributions which explain the increase in agriculture's share of Brazilian GDP from 1990 to 1996. They were:

- improving agricultural/industrial relative prices, that is, $\left(\dfrac{\dot{P}_I^A}{P_A}\right) < 0$

- improving the relationship of received/paid agricultural prices, that is, $\left(\dfrac{\dot{P}_I^A}{P_A}\right) < 0$,

- increasing physical amount produced by agriculture caused by increasing in productivity, what causes $\left(\dot{Q}_A - I_A^A\right) > 0$.

Those three factors were combined, in different moments and intensities from 1990 to 1996, in order to maintain the persistent growth

of agriculture's share of Brazilian GDP.

In graph 2, we can observe, excluding fluctuations, that the relationship of agricultural/industrial prices had a tendency to increase starting in 1989 and lasting October 1996, that is to say, it happened

that $\left(\dfrac{\overset{\bullet}{P_I^A}}{P_A} \right) < 0$.

Graph 2 - Index of Agricultural/Industrial prices
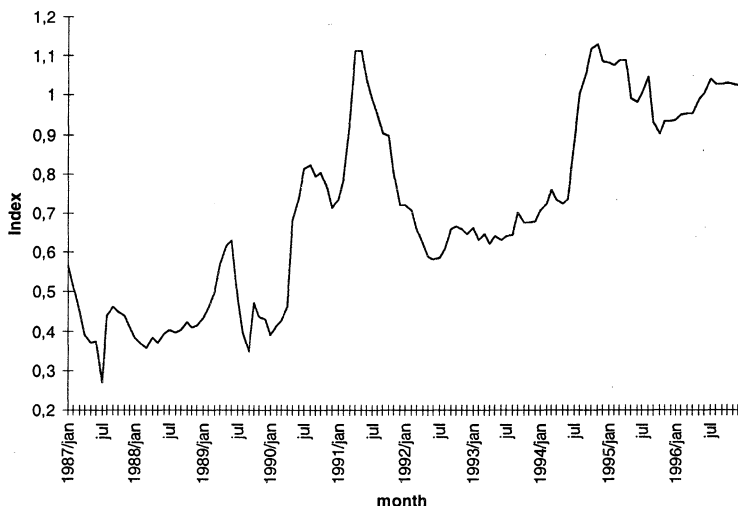
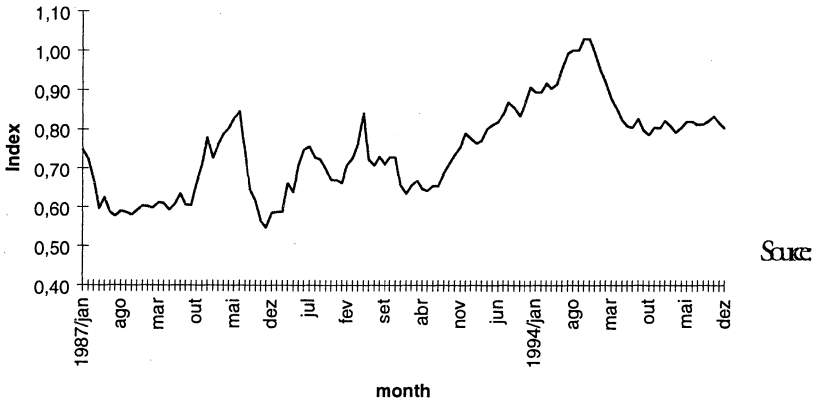**Source:** Conjuntura Econômica Magazine (several numbers)
Note: The Index is 1 in August 1994.

In Graph 3, we have the received/paid agricultural prices relationship for the entire agricultural sector. That relationship allows one to evaluate the evolution of value added by unit of generated product. From November 1989 to November 1994 those relationships increased,

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that is to say, $\left(\dfrac{\dot{P}_I^A}{P_A}\right) < 0$, indicating growth in the value added by a

unit of agricultural product. As we see in equation (6), this is a factor that explains, partly, the growth of agriculture's share of GDP. It occurs because, in the Brazilian case, GDP is calculated by aggregating values added by each economic activity sector.

Graph 3 - Index of Received/Paid Agricultural Prices

Source: Conjuntura Econômica Magazine (several numbers)
Note: The Index is 1 in August 1994

The fall in the received/paid agricultural prices index, Graph 3, began in December 1994 and was more than compensated for by the growth of both agriculture and cattle production from 1994 to 1996, as will be soon be shown.

Respecting the $\left(\dot{Q}_A - I_A^A\right)$ variable behavior, Gasques & Conceição

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(1997) calculated the Tornqvist index for agricultural productivity (which considers land, labor, machines, defensives, and fertilizes as production factors). It was found that from 1986 to 1994, there was an annual geometrical productivity growth rate of 3.11% (land productivity grew by 3.23% each year and labor productivity grew by 2.21% each year).

The growth of productivity occurred because of an increase in physical amount produced without there necessarily being an increase in inputs used (e.g. land). The following section evaluates this aspect, and some differences in behavior between the agriculture and cattle-breeding.

EXPANSION OF BRAZILIAN AGRICULTURAL PRODUCTION, 1987 TO 1996

Brazilian agricultural production stagnated from 1987 until 1993, and has grown rapidly since 1994. On another hand, meat production has been increasing since 1987. The factors which explain these expansions are different. Agricultural production is expanding because of great growth in land productivity (simultaneously the harvested area is dropping). Meat production is expanding, mainly, due to the increasing number of animals slaughtered, and secondarily, because of an increase in the weight of the individual animals which are slaughtered (one of the cattle productivity measures).

The Expansion of Agricultural Production

Graph 4 shows that the production of the 28 main Brazilian crops[6] has been increasing significantly since 1994, while it had remained stagnant from 1987 to 1993.

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[6] Those cultures are: cotton-arboreal, cotton-herbaceous, garlic, peanut, rice, oat, potato, cocoa, coffee, sugar cane, onion, rye, barley, bean, fume, jute, orange, mallow, castor-oil plant, cassava, corn, pepper, sisal, soy, sorgo, tomato, wheat, grape.

Graph 4 - Brazilian Agricultural Production from 1978 to 1996
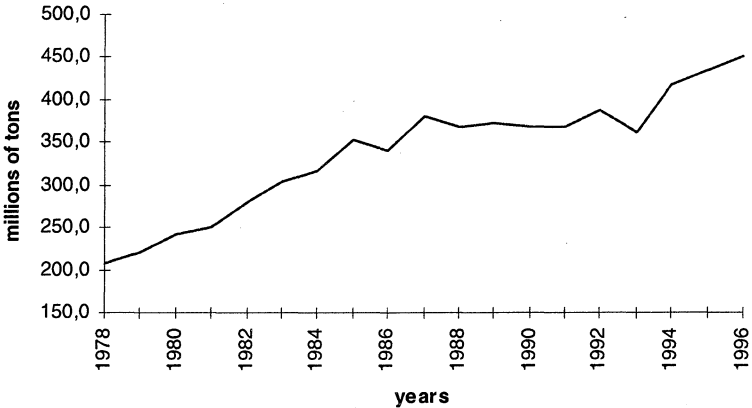
Source: Anuário Estatístico do Brasil (several numbers) and database of the IBGE.

The production of the 28 main crops increased from 207.0 millions tons in 1978 to 380.0 millions tons in 1987 (which corresponded to 6.74% annual geometric growth[7] during those years). From 1987 to 1992 the production of the 28 crops considered here was stagnant with a median value of 370 millions tons, and diminished slightly to 360 millions tons in 1993. Starting in 1994, there has been a spurt in agricultural production that reached 450 millions tons in 1996 (implying an annual geometric growth rate of 7.07% between 1993 and 1996 for the 28 crops considered).

That upsurge in the growth of agricultural production from 1994 to 1996 is explained, partly, by the great increase in productivity per unit of land as the area under cultivation has been dropping (see Graph 5).

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[7] The annual geometric growth rate is the parameter b of the following regression: $\ln Y = a + bt$, where ln is the neperian logarithm, Y is the produced physical amount and t is a measure of the time (where 1978=1, 1979=2,...., 1987=10).

Graph 5 - Area and Land Productivity of 28 main crops - Brazil - from 1978 to 1996
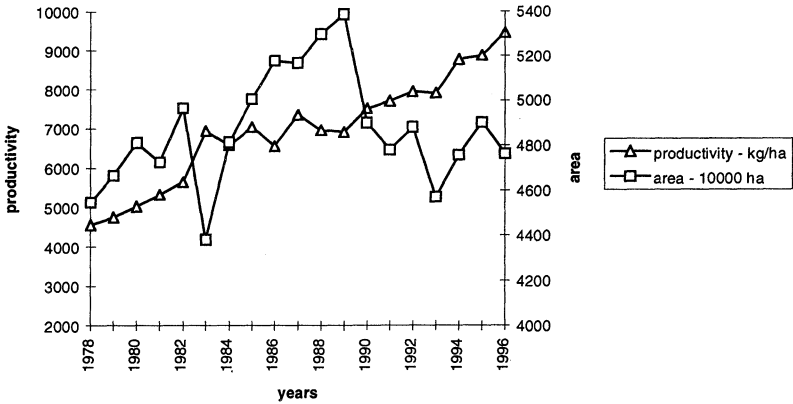
Source: Anuário Estatístico do Brasil (several numbers) and database of the IBGE.

Graph 5 shows continuous and significant growth in agriculture productivity since 1990. However, this rate of growth increased beginning in 1994. From 1989 to 1993, agricultural production in kg/hectare increased from 6,914 kg/ha to 7,894 kg/ha, an increase of 14.17%. A great jump in land productivity occurred in 1994, and another in 1996. This last year, land productivity reached 9,455 kg/ha, 19.77% greater than the agricultural kg/ha productivity observed in 1993, and 36.75% larger than in 1989.

This impressive growth in agricultural productivity per hectare is not yet a well studied phenomenon. It is an important reaction by agriculture to the changes in national context, a context in which public subsidies directed toward agriculture have become scarce (as seen in section 2) and economic globalization has demanded increasing efficiency. Thus, in the main crops (like rice, potato, sugar-cane, bean, corn, soy and wheat) improvements in land productivity are occurring which more than compensate economically for reductions in cocoa

and cotton productivity or the stagnation in productivity growth of the coffee crop.

Simultaneously, aggregate agricultural productivity has been increasing while the total harvested area of the 28 main crops has been diminishing from 53,880 thousands hectares in 1989 to 47,631 thousands hectares in 1996.

The Meat Production Expansion

Since 1987, Brazilian meat production (bovine, swine, and poultry meats) has been increasing due to an increase in the number of animals slaughtered and an increased weight of each animal killed.

Graph 6 shows the evolution of total animal carcasses weight. From 1978 to 1986, total meat production grew only slightly; but starting in 1987, meat production grew continuously and intensely. The annual geometric growth rate of total carcass weight was 2.13% from 1978 to 1985, but was 7.34% per year from 1986 to 1996.

The growth of Brazilian meat production is mainly due to the increase in the number of animals slaughtered.[8] Graph 7 shows the evolution of animals slaughtered index. It should be noted that the number of cattle and swine brought to slaughter has increased significantly since 1986. In the case of poultry, the birds killed number has been increasing since 1978, and this growth accelerated starting in 1989.

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[8] We opted for considering the evolution of the animal killed index (1978 equals 100), because, in terms of units, the number of poultry killed is extremely large in comparison to the number of cattle killed, which impedes the construction of a graph with for easy visualization of the evolution of animals killed index.

Graph 6 - Brazilian Meat Production from 1978 to 1996
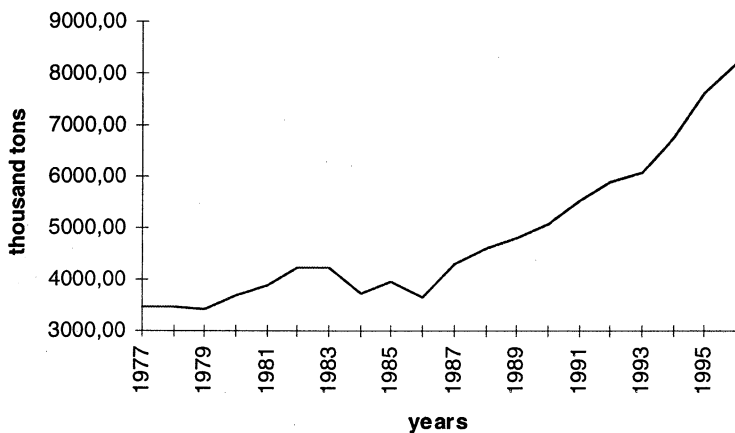
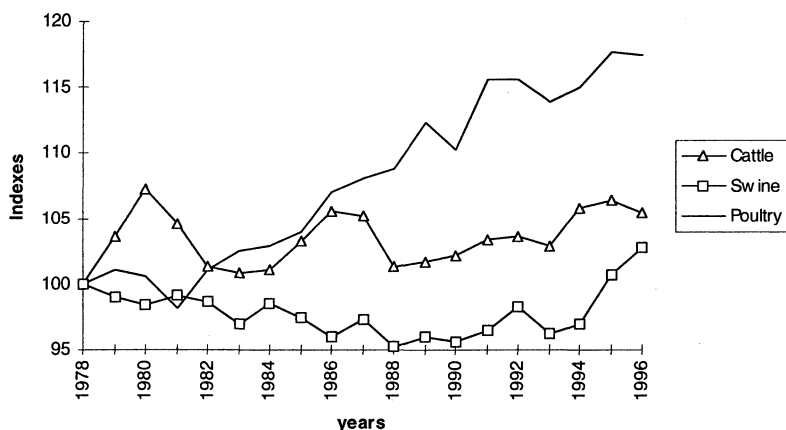**Source:** Anuário Estatístico do Brasil (several numbers) and the data-base of the IBGE.

Graph 7 - Animals Slaughtered Indices - Brazil - from 1978 to 1996 (1978 = 100)
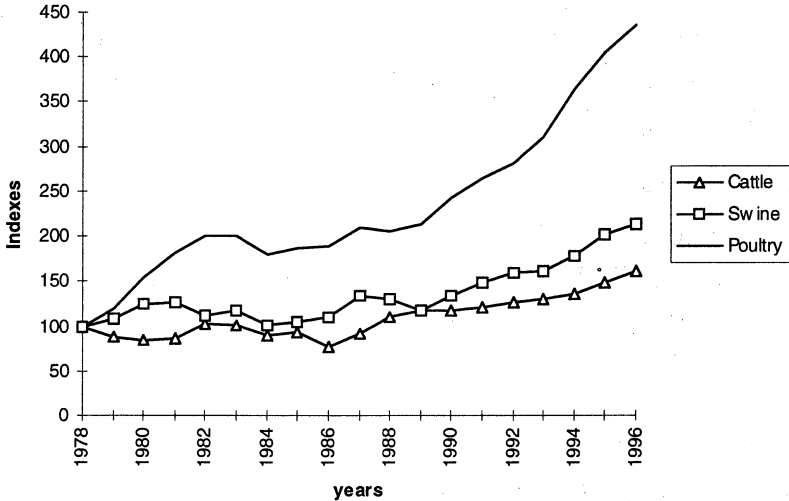
Source: Anuário Estatístico do Brasil (several numbers) and the database of the IBGE.

Increases in "meat production per animal slaughtered" (one of the cattle productivity measures) contribute to the rise in Brazilian meat production. Since 1988, Brazilian cattle-breeders have increased individual animal productivity (see Graph 8).

Graph 8 - Meat Productivity Indexes (carcasses kg per animal killed) - Brazil - 1978 to 1996 (1978 = 100)

Source: Anuário Estatístico do Brasil (several numbers) and database of the IBGE.

However, the cattle-breeding productivity increment (measured by the index mentioned in previous paragraph) has been smaller than the increment in the animal slaughtered index. From 1988 to 1996, the indexes of the number of cattle, swine and poultry slaughtered grew by 47.3%, 63.8% and 111.2%, respectively; while, the productivity indexes of those animals increased by 4%, 8.4% and 7.3%, respectively. Therefore, the great growth in Brazilian meat production starting in 1988 is mainly because of the growth in the number animals slaughtered and, secondarily, because of the growth in the individual animal's slaughtered weight.

In the case of cattle-breeding, it should be observed that the meat production per animal slaughtered is only one possible productivity indicator. The median time necessary for fattening the animal, and the conversion rate of kilo of ration or food type into kilo of meat are also

other important productivity measures which may be used to evaluate cattle-breeding. Probably, the increase in the number of animals brought to slaughter (Graph 7) is in part due to the reduction in median time necessary to fatten the animals. But, are agricultural and meat production increasing more rapidly than the Brazilian population?

The Per Capita Availability of Agricultural Products

Dividing both Brazil's agricultural and meat production by resident population (Table 2), it appears that was a per-capita decrease in the total of food and other non-meat agricultural products produced from 1987 to 1993, and a per-capita production increase these products since 1994; while the total meat produced in per-capita terms has increased since 1987.

Table 2 - Agricultural and cattle-breeding production and resident population in Brazil - 1978 to 1996

Year	Agricultural Production (millions of tons)	Meat Production (millions of tons)	Resident Population (millions of habitants)	Agricultural Per-capita production (kg/habitant)	Meat Percapita production (kg/habitant)
1978	207.01	3.47	115.86	1,787	30
1979	221.44	3.44	118.55	1,868	29
1980	241.46	3.70	118.56	2,037	31
1981	251.30	3.87	121.21	2,073	32
1982	280.34	4.21	123.89	2,263	34
1983	303.76	4.22	126.57	2,400	33
1984	316.90	3.74	129.27	2,451	29
1985	352.45	3.95	131.98	2,671	30
1986	339.38	3.66	134.65	2,520	27
1987	380.05	4.33	137.27	2,769	32
1988	368.47	4.60	139.82	2,635	33
1989	372.50	4.82	142.31	2,618	34
1990	367.74	5.07	144.72	2,541	35
1991	367.58	5.54	147.07	2,499	38
1992	387.32	5.87	149.36	2,593	39
1993	360.72	6.08	151.57	2,380	40
1994	416.76	6.77	153.73	2,711	44
1995	434.34	7.63	155.82	2,787	49
1996	450.35	8.20	157.87	2,853	52

Source: Anuário Estatístico do Brasil (several numbers) and database of the IBGE. Ccf

Table 2 shows that the per-capita availability of caloric and protein sources in Brazil has been increasing over the last few years. In the case of per-capita meat availability, there was an increase of 62.5% from 1988 to 1996, while the per-capita availability of other agricultural products rose 19.9% from 1993 to 1996.

FINAL CONSIDERATIONS

This work analyzed Brazilian agricultural sector behavior from 1987 to 1996, in particular observing agricultural production and productivity behavior during this period (a period characterized by shrinking government agricultural subsidies).

From 1990 to 1996, reversing a trend that had existed for more than three decades, Brazil's agricultural sector as a component of the Brazilian Gross Domestic Product (GDP) rose, from 7.7% of GDP in 1990 to 11.4% of GDP in 1996. Some of the major causes for this expansion are: an improvement in agricultural - industrial relative prices; an improvement, from November 1989 to November 1994, in received/paid agricultural prices relationship; and an increase in agricultural productivity. These three factors combined in different proportions and led to an increase in the agriculture sector's share of Brazil's GDP. It is possible that separately each one of those factors was insufficient to explain the increase. Thus, a continued increase in the agricultural sectors share of GDP will depend on the continuity of the effects which stemmed from the three factors which led to earlier agricultural sector productivity expansion.

Since 1994, Brazilian agricultural production has experienced significant growth while meat production has been increasing since 1987. However, the reasons for these expansions are different. While an increase in land productivity is the main cause for the increases seen in agricultural production, Brazilian meat production has expanded due to the large growth in number of animals slaughtered and, secondarily, because of an increase in weight of each animal slaughtered.

The increase in the availability of agricultural and meat products is not by itself sufficient to improve the nutrition of the national population as income distribution in Brazil is extremely unequal.. But, this great agricultural production growth can allow for a larger agricultural product surplus, increased exports, and an improved Brazilian current account balance; thereby, benefiting the entire country.

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