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DROUGHT IN NORTHEAST BRAZIL

SOME FEATURES OF ITS SOCIOECONOMIC IMPACT

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The purpose of this paper is to present some important features of the drought in Northeast Brazil,[1] with special emphasis on its social and economic dimensions. Why does a periodic meteorological phenomenon assume the proportions of a social calamity, and create armies of drought refugees? To answer this question the author uses data from two sources: from studies which have been produced on the subject, including *Os Sertões*, the literary masterpiece about the inhabitants of the Northeast's semi-arid zone written at the turn of the century by the engineer Euclides da Cunha[2]; and from the author's own research on cyclical drought in the Northeast, carried out during the last two major ones — 1970 and 1979–1984.[3]

PHYSICAL AND ECONOMIC ASPECTS OF THE NORTHEAST'S DROUGHT AREA

The area of incidence of the Northeast's drought covers a surface of 762,000 sq. km. which corresponds to 49.4 percent of the Northeastern region's total area (1,542,000 sq. km.). It is commonly known by the name Drought Polygon (see Map on page 24). Rainfall there amounts in general

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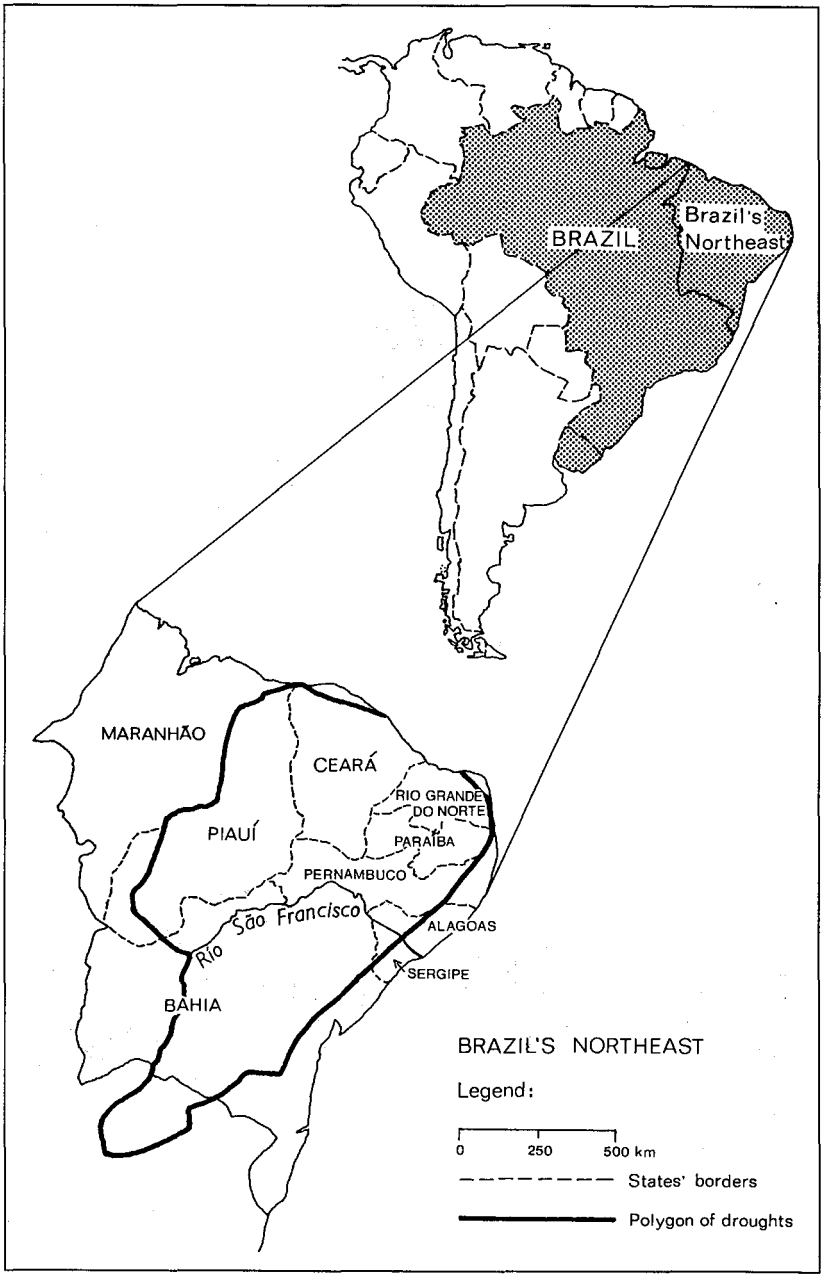
BRAZIL
Brazil's Northeast
MARANHÃO
CEARÁ
RIO GRANDE DO NORTE
PIAUÍ
PARAÍBA
PERNAMBUCO
São Francisco
Rio
ALAGOAS
SERGIPE
BAHIA
BRAZIL'S NORTHEAST
Legend:
0
250
500 km
States' borders
Polygon of droughts

to 600–800 mm per year on the average, with some isolated parts having medium rainfall rates of 1,200 mm yearly. Properly speaking, it is not a dry area, whence its classification as a semi-arid zone. Forty per cent of the Northeast's population live within this polygon (17 million people currently). In spite of some concentration in the more humid sections (the São Francisco river valley, mountain ranges and irrigation basins), the population is fairly evenly distributed. In Brazil the Portuguese word *sertão* is also used to describe this area, a word which roughly translated means "backland." The inhabitants of this area are known as *sertanejos.*

Agriculture is the basic economic activity of the *Sertão,* in particular the cultivation of cotton, and to an increasing degree in recent years, beef cattle. In this system subsistence crops — maize, beans and, to a less extent, rice and manioc — constitute the means through which the large farm guarantees its supply of manpower for the raising of commercial crops and cattle. This labour force is composed mainly of share-croppers, to whom land is yielded for the cultivation of subsistence crops. In return, the worker supplies labour which the landowner uses in the cotton and cattle activities. It is through this reciprocal process that a system of social stratification has emerged in which the landowner presides over primary production while share-croppers and a lesser contingent of wage-earners carry out tasks on other people's land. Within the Drought Polygon there are also small landowners. This group, however, has more in common with the group of landless peasants (share-croppers and wage-earners) than with the larger landowners. It is precisely this population of landless peasants and *minifundists* which is affected, in cataclysmic form, by drought. Average family income for this group ranges around 80–90 US dollars a month, corresponding to an annual *per capita* income for the population involved of around 180–200 dollars.

CHARACTER OF THE NORTHEAST'S DROUGHT

The first thing to be noticed here is the recurring nature of the Northeastern drought — the high probability, even certainty, that sooner or later a climatic crisis will take place. According to the historical records there have been 46 major droughts in the Northeast since the last quarter of the 16th century to present time. There were 2 droughts in the sixteenth century, 6 in the seventeenth, 14 in the eighteenth, 13 in the nineteenth and, so far, eleven in the twentieth century. The pattern of drought recurrence

allows us to establish a rough periodicity of about 10 years. Nevertheless — and this is one of the frustrations for students of climatology in the Northeast of Brazil —, it has so far not been possible to work out a precise formula for determining the cyclical frequency of this catastrophe, on the basis of which forecasts could be made.

Another question arises concerning the definition of a dry season. At which moment can it be categorically stated that a drought is taking place? This definitional problem is further complicated by the occurrence of what, in the Northeast, is known as "green drought." This occurs in situations where there is sufficient rainfall to maintain the robust native vegetation, but not enough to allow the normal development of agricultural crops. Thus, the first step required in order to verify the existence of a drought is to examine whether or not the amount of precipitation is sufficient. The second step requires consideration of the agro-climatological compatibility of the rainfall, that is, has there been precipitation at the right time and in the correct proportions? In the study that Dirceu Pessoa and I undertook in 1970–1971,[4] two distinct concepts of drought were set up: the concept of absolute drought was used in situations where there was a marked *deficiency* of rainfall throughout the year; and the concept of relative drought for those situations in which there was an inadequate *distribution* of precipitation throughout the year. It was observed, in this study, that there are years in the Northeast, occurring at irregular intervals, when the total rainfall is inferior to the minimum required for the maintenance of a robust native vegetation. This is the true regional drought, the absolute drought, when the vegetation loses its freshness and existing water disappears. In contrast to this is the situation which occurs when, because of the low water storing capacity of the semi-arid zone soils and the extreme "time and space variability that characterizes the dominant regime of precipitation,"[5] there is a relative, rather than grave, scarcity of water — hence the concept of relative drought.

ECONOMIC IMPACT OF THE DROUGHT

A central feature of the Northeastern drought — both the absolute and relative variants — is the asymmetrical nature of the impact it provokes in the various social strata that comprise *Sertanejo* society. Furthermore, the characteristics of a typical drought vary depending on the phenomenon's chosen plan of observation, on how data are analysed. For example, in

macroregional terms, the effects of a drought are much less visible in the figures for the region's gross domestic product (GDP) than in those of the primary sector. In 1970, for instance, because of that year's drought, there was a fall of 1 percent in the Northeast's GDP, whereas the agricultural product in the region suffered a decline of 17 percent. On the same occasion, the industrial sector achieved a growth of 12 percent, and the services sector one of 3 percent.[6] In 1981, the third year of the 1979–1984 drought, while agriculture registered a fall of 13 percent in comparison to 1978, GDP in regional terms increased 9 percent in relation to the same base.[7] These statistics have two implications. Although, in global terms, the impact of a drought may be weak, in terms of a specific group, the suffering is significant. At the local level, for instance, its impact is felt more strongly in rural areas. In fact, in the Northeastern space as a whole, the drought's main effect is evident in the collapse of primary production, a phenomenon that is much more severe in the semi-arid zone.

The subsistence crops suffer the greatest impact, then cotton, and lastly cattle-raising. Such a pattern is clearly portrayed in the Pessoa and Cavalcanti study,[8] confirming empirically a hypothesis that was first put forward in the so-called GTDN report of 1959.[9] As a matter of fact, production of maize, in 1970, fell 44 percent in relation to 1969 in the Northeast as a whole, including areas not affected by the drought; the production of beans registered a decline of 46 percent; and cotton — which is produced only in the *Sertão* — dropped by 40 percent. Livestock, however, remained stable, its level of production being the same in 1969 and 1970. To sum up, a drought is a minor rumble in the Northeast region as a whole, a serious disturbance in the *Sertão* zone, but assumes the proportions of a disaster in terms of the production of agricultural crops within the Drought Polygon, especially those destined for consumption.

SOCIAL IMPACT OF THE DROUGHT

Such funneling of the effects of drought in Northeast Brazil becomes even more evident when one understands how drought affects the individual *Sertanejo* through its impact on the labour force. In 1979, for instance, in comparison with 1978, the output of the official refugees (those engaged by the government in its emergency work fronts in consequence of the drought) suffered a reduction of 67 percent in the case of beans, 72 percent in the case of corn, 81 percent in the case of rice, and 65 percent in

the case of cotton.[10] An analogous situation was evident when comparison was made between 1969 and 1970 — a normal and a dry year, respectively —, even though the real gross income of farms was the same in both years.[11] That is, what the meteorological phenomenon does is to fundamentally disturb the life of the landless worker, but without producing any significant change in the landowner's earnings.[12] In fact, as soon as it is confirmed that what people in the Northeast call "winter" (rainy season) is not coming, the large landowners cut their links with the labour force, thus creating a new pool of unemployed. This group can neither assume its food supply — denied by lack of rainfall — nor count on any money income to buy what they need. Simultaneously, the landowner acts to protect his cattle, his chief source of earnings. The unemployment of large numbers of *Sertanejo* workers who do not possess any reserves in terms of money is what gives the drought in the Northeast its specific characteristic — that of a social calamity — and forces the government to adopt relief measures, usually of a charitable nature. This involves providing employment through emergency fronts to hundreds of thousands of individuals: 502,000 people enrolled at the end of 1970, 432,000 in 1979, 244,000 in May 1981, 1,169,000 in May 1982, 747,000 at the end of 1982, 2,643,000 at the end of 1983.

The change in status from peasant to refugee means also a change in income composition for a *Sertanejo* rural worker. In 1978, e.g., a normal year, 54 percent of a worker's income (in the case of those enrolled in the 1979 official emergency program) came from crops; 18 percent from livestock and its by-products, and 28 percent from other sources. In 1979 the situation was this: crops were providing 16 percent of a worker's income; livestock and its by-products, 18 percent (the same as in a normal year), and government aid, besides other sources, 64 percent.[13] This provides a measure of the disturbance that a drought brings about in the life of a rural worker whose crops — the main source of support — tend to disappear. In the case of a peasant, the loss of the crops represents, literally, lack of food. Since the individual has been released from his/her habitual job by the employer, government aid is necessary so that the family group is not forced to migrate (a factor which would diminish the local labour pool). In the 1877 drought — perhaps the worst ever — for lack of a government aid program, more than 500,000 people must have died in the State of Ceará alone, according to accounts which survive from that time.[14] Such a high incidence of mortality might have been reduced, had emergency measures, such as those resorted to in more recent droughts, been utilized.

This raises an important question, central to any study of the Northeastern drought. Is it a climatic event or a social phenomenon? Dirceu Pessoa, my late colleague, in his 1986 study,[15] outlines four approaches to the perception and interpretation of the drought, from which arise distinct policy orientations. These are: (a) the naturalistic approach, which treats the drought as a natural disaster, mainly of a climatological character; (b) the engineering approach, which characterizes the drought as an event that could be offset by means of the correct regularization of the water supply; (c) the agro-ecological-economic approach, according to which the problem exists because of an inadequate adjustment between the activities practised in the *Sertão* zone and its ecology; and (d) the agro-socio-economic approach, "centered in the perception of the differentiated vulnerabilities of the distinct strata of the rural population."[16]

Maybe, one could conclude by agreeing with Otamar de Carvalho.[17] Droughts as a physical phenomenon will continue to exist. However, their repercussions on the economic structure could be greatly reduced or even nullified. If new social relations of production were introduced, there could be a restructuring of productive forces. Within this restructured society, irrigation, agrarian reform, and so on, would be measures that could be undertaken to reduce the differentiated vulnerability, *vis-à-vis* the drought, of the distinct strata of the population in the Northeast's semi-arid zone.

Notes

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1 Composed of 9 States within the Brazilian Federation, the Northeast of Brazil occupies 18 percent of the country's territory, with around 30 percent of its population.

2 Euclides da Cunha, *Os Sertões. A Campanha de Canudos* (1902). The title of the English translation is *Rebellion in the Backlands.*

3 V. Dirceu Pessoa & Clóvis Cavalcanti, *Caráter e Efeitos da Seca Nordestina de 1970* (Recife, SUDENE-SIRAC, 1973, mimeo), and Dirceu Pessoa, Clóvis Cavalcanti, Maria Lia Pandolfi & Leonardo Guimarães, in Fundação Joaquim Nabuco, *A Seca Nordestina de 79–80,* I—Visão Geral (Recife, FUNDAJ—Sec. Agricultura e Abastecimento do Ceará-SUDENE, 1983, xerox).

4 Pessoa & Cavalcanti, *op. cit.* pp. 52–53.

5 José Otamar de Carvalho et al., *Plano Integrado para o Combate Preventivo aos Efeitos das Secas no Nordeste* (Brasilia, Ministério do Interior, 1973), p. 193.

6 Pessoa & Cavalcanti, *op. cit.*, p. 74.

7 Pessoa, Cavalcanti, Pandolfi & Guimarães, *op. cit.*, p. 83.

8 Pessoa & Cavalcanti, *op. cit.*, pp. 86 and 93.

9 Grupo de Trabalho para o Desenvolvimento do Nordeste (GTDN), *Uma Política de Desenvolvimento Econômico para o Nordeste* (Recife, SUDENE, 1967, 2nd ed.), pp. 62–67.

10 Pessoa, Cavalcanti, Pandolfi and Guimarães, *op. cit.*, Table 32.

11 Pessoa & Cavalcanti, *op. cit.*, p. 194.

12 Cf. Manoel Domingos Neto, "É Preciso Rediscutir a Seca Piauiense," *Carta CEPRO* (Teresina, v. 7, no 2), p. 26.

13 Pessoa, Cavalcanti, Pandolfi & Guimarães, *op. cit.*, Table 34.

14 See Rodolpho Theophilo, *História da Seca do Ceará (1877 a 1880).* Rio de Janeiro, Imprensa Inglesa, 1922, 2nd ed.

15 *Secas no Nordeste: Vertentes de Interpretação e de Políticas Públicas*, paper presented to the SAHNOR Meeting "Fight against the Drought in the Sahel and the Northeast" (Bamako, Mali, Ministère chargé des Ressources Naturelles et de l'Elevage du Mali, CILSS and ENDA, Mar. 1986), p. 7.

16 Idem, ibidem.

17 José Otamar de Carvalho, *O Nordeste Semi-Árido: Questões de Economia Política e de Política Econômica*, Ph.D. thesis, Institute of Economics, Universidade Estadual de Campinas (Campinas, 1986), p. 13.