

CHART 2 — Index numbers of retail milk prices in Phoenix and prices received by farmers.

(Continued from Previous Page)

continue to provide future increases of dairy efficiency. The rate of increase, though, is likely to vary. Economic research indicates that dairies in the size range of 150 to 350 cows are most efficient size units. Most of the economies of scale are achieved at the 150 cow level. At present, the average size herd on DHIA test has reached 155 cows.

There still are smaller herds, and average costs for the industry will likely decrease as these expand. In general, though, the opportunity for cost reductions through increased herd size appears to be more limited than previously.

Opportunities for increased efficiency through higher output per cow still appear favorable. Herds in the DHIA testing program averaged 12,560 pounds of milk per cow in 1963. The average production of all cows in the state was 9,800. The difference — 2,760 pounds — probably is sufficient to enable a cost reduction of about 40 cents per hundred pounds of milk.

With such opportunities, and with the aid of an excellent DHIA program, it appears likely that dairy farmers will continue to strive for and achieve higher outputs per cow.

The Perilous Problems of World Agriculture

By George Campbell and John Burnham

The most important fact about world agriculture today is that total output is increasing — but not as rapidly as is population. Per capita production was less in 1964 than it was in 1958.

The next most important fact is that agricultural production is unevenly distributed among countries, and in relation to population.

One sixth of the world's population

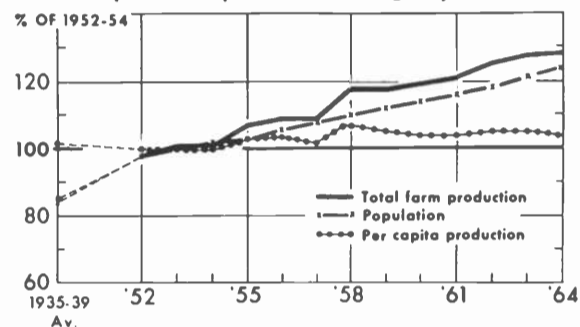
The authors are extension economist and experiment station editor, respectively. This is first half of a two-part article.

lives in countries having more than half of the agricultural lands. These countries include the United States of America, Soviet Russia, South Africa and the countries in Oceania and the River Plate subregions of South America, (Argentina and Uruguay).

At the other extreme, more than half of the world's population today lives in Asiatic countries which have less than one-sixth of the world's agricultural lands.

Two-thirds of this world's population lives in countries whose people do not have enough food, or the right kind of food, to give them an adequate diet. These diet-deficit areas include all of Asia except Japan and Israel, all of Africa except South Africa, the northern part of South Amer-

World: Total Farm Output Again High; Per Capita Output Down Slightly



ica and almost all of Central America and the Caribbean.

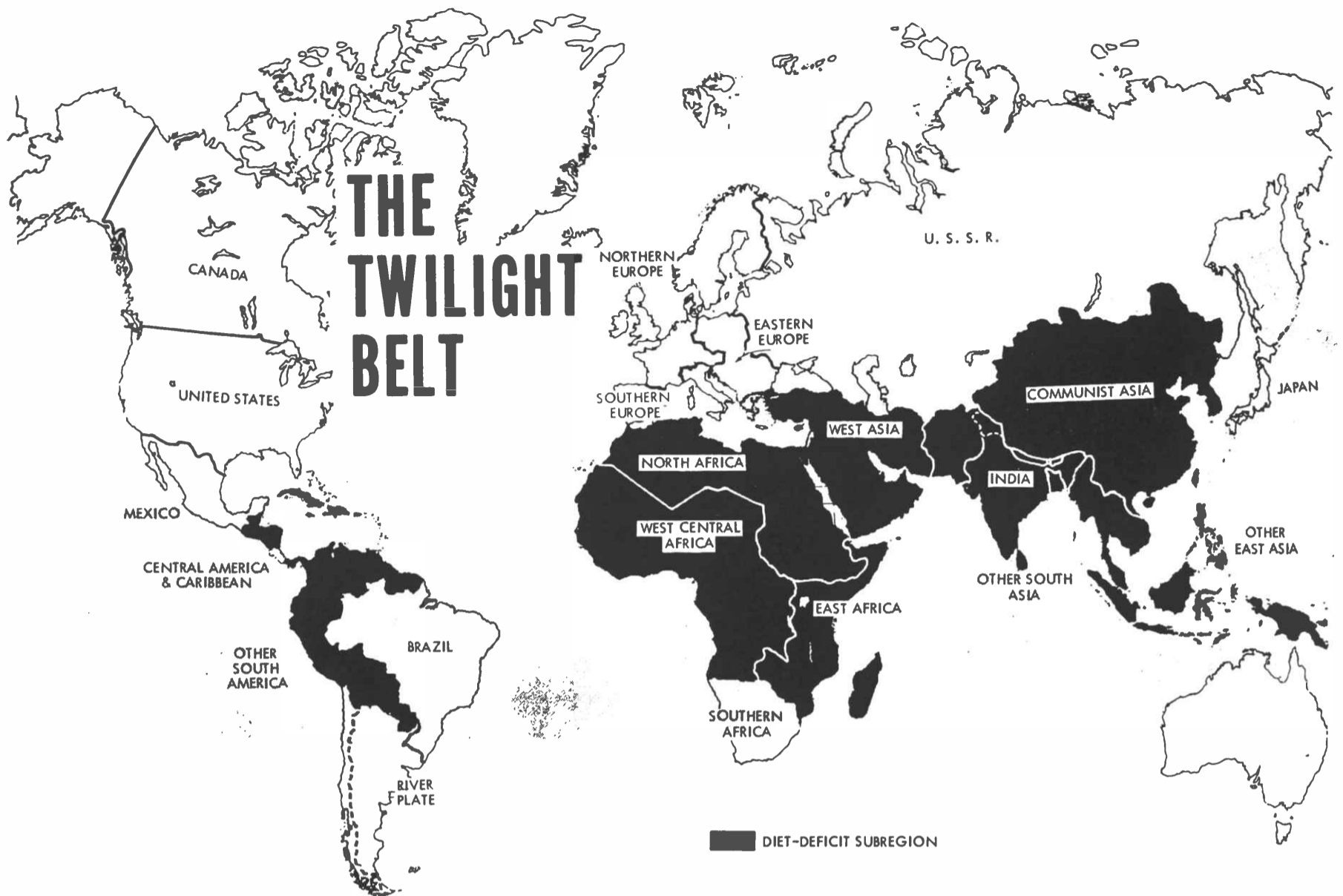
These people live in the "twilight belt" of hunger. There is never enough to eat — and any decrease in production pushes someone into the dark of starvation. Almost 90 percent of the diet-deficit people are in Communist China (62.4%), East Asia, excluding Japan (12%) and India (13.2%).

A geographer with the U. S. Department of Agriculture, Nelson P. Guidry, points out that "Adding to the imbalance between population and farm output are such factors as variations in climate, soils, patterns of agricultural production, and the level of agricultural technology."

It is true that progress in applying modern farming techniques has, to great extent, been most rapid in the highly developed countries which have skilled manpower and which also can more easily afford the needed large capital investment than can the poorer, undeveloped regions.

These are reasons why farm output per capita has been kept at high levels in temperate North America and

(Continued on Next Page)



(Continued from Previous Page)

Oceania, and above the world average in densely populated Western Europe. Likewise, the high quality of the human diet in these areas is a reflection of high per capita consumption as well as production. In fact, the United States, Canada, Australia and New Zealand produce more food products than they consume. Densely populated Western Europe, however, is a net importer of farm products. By far the largest outlet for exportable surpluses from other parts of the world, this highly industrialized region of Western Europe relies chiefly on its manufactured goods to pay for imports of food and raw materials.

"In contrast, the densely populated Far East, including South and East Asia, does not produce enough food and things which can be traded for food to provide its inhabitants with more than a meager diet," Dr. Guidry points out. With more than half the world's population, this region has less than a third of the value of the world farm output, and its net imports of agricultural products are small because it has scant buying power.

The value of consumption per capita is also low in many countries of West Asia, Africa and Latin America, where population pressure on the land is not nearly as heavy as in the Far East, and where exports of agricultural products exceed imports by a large margin.

Interestingly, in all of these underdeveloped regions, agriculture is the major economic activity and the major earner of foreign exchange. In none of them, however, does the value of gross agricultural trade reach as high a level as in the industrialized regions of Western Europe or temperate North America. These two, together, accounted for 43 percent of world agricultural exports and 67 percent of world agricultural imports in 1961.

The world today, through its agricultural scientists, views five means through which the quantity of food per person can be increased:

1. Increase agricultural production faster than population is increasing. (The U. S. is already doing this).
2. Decrease the rate of population increase to the level required to give more of the available food to each person. (Japan so far is the only nation to do this).
3. Increase production of goods which can be sold or exchanged for

agricultural products. (Western Europe and Great Britain have done this).

4. Receive gifts of food from countries which have food surpluses. (India and Egypt are among countries receiving such gifts).

5. Some combination of the above factors.

In a rather gloomy prognosis, the U. S. Department of Agriculture indicates there is little hope for major improvement in diets of the people in the world's "Twilight Zone" before 1970, at the earliest.

The simple facts of life point back at No. 2, above, for the population growth is a major factor affecting the pressure upon food supplies. A given amount of food will feed a given number of people, and when the population grows without commensurate growth in food available, or the means to buy food and ship it in, someone goes hungry — in many countries many people starve.

This growth in population is, naturally, the total number of births less the total number of deaths — the net gain. Over most of the long scope of history, the number of births hasn't significantly exceeded the number of births in any one period, but

(Continued on Next Page)



TEST DEMONSTRATION on interplanted beans and cotton. Dr. Lindbergue, soils professor, stands in fertilized plot in foreground, as Dr. Mardonio stands in unfertilized plot in background.

FERTILIZER TESTS BEGUN IN BRAZIL

By Howard E. Ray

Nearly 100 fertilizer test demonstrations were conducted in 37 Ceará municipios (counties) in 1965. In only a few cases did crops fail to respond to the applied fertilizer. It would appear that farmers in this northeast Brazilian state should be fertilizing their crops regularly. However, the situation is not quite that simple.

Little Fertilizer Used Now

Little or no commercial fertilizer is used in Ceará at present. Why? Because there is no supply available for sale. Because there are no adequate credit facilities available to farmers for financing fertilizer purchases. And, because the benefits from ferti-

Here we start the second "go-round" of articles by members of The University of Arizona's team of agricultural scientists stationed at the University of Ceará, at Fortaleza, in northeast Brazil. Each member of the team has submitted an article to *PROGRESSIVE AGRICULTURE*. Now, after several additional months of experience, each will report again. Dr. Ray is the U of A adviser in soils and extension education on the Brazil team.

lizer usage are not clearly established or accepted.

In spite of the results quoted above, it is obvious that much must be done before the use of chemical fertilizers

will become an accepted practice here. For example, the need for fertilization must be clearly established before supplies and credit facilities can be developed. The work has started, and *how* it has started is the subject of this story.

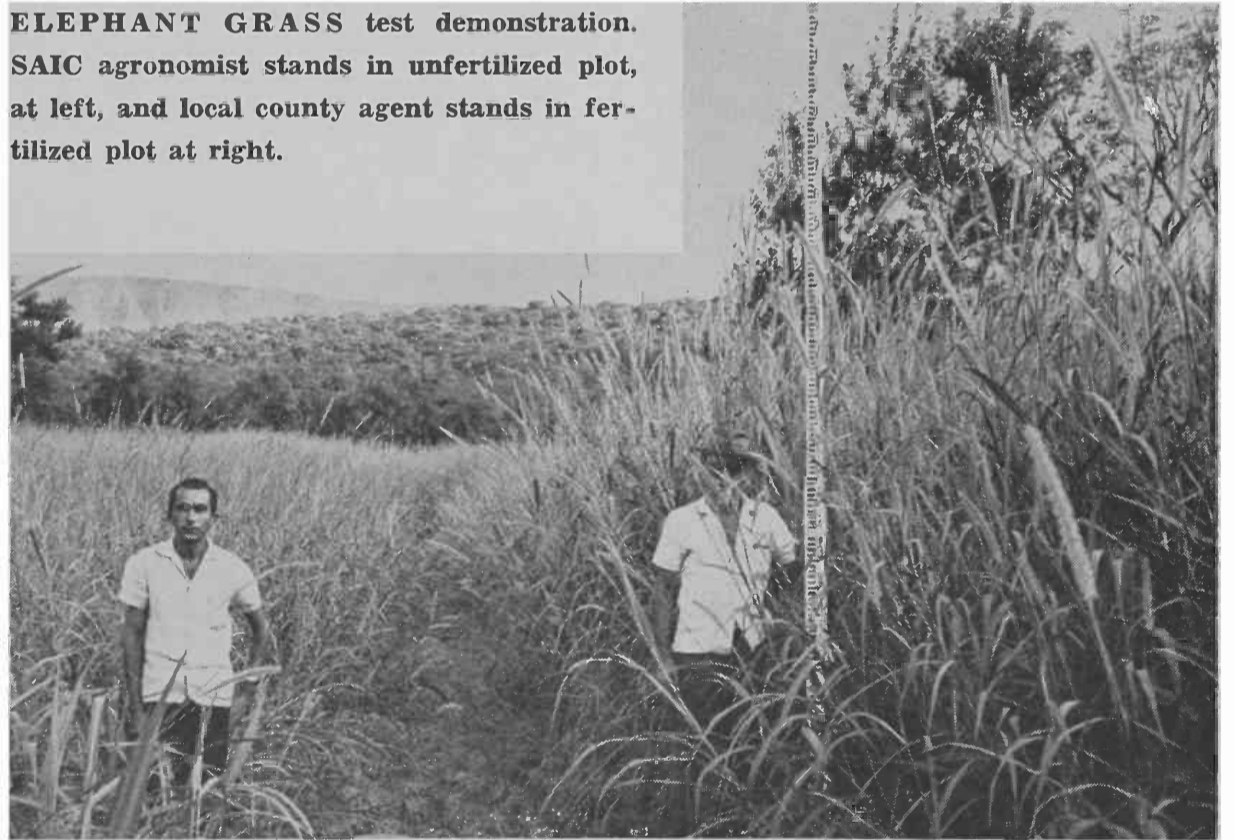
August, 1964 marked the beginning of the first organized attempt to determine fertility needs of Ceará soils. Although a few scattered tests and demonstrations had been conducted earlier by various groups, there was almost no information available on returns which could be expected from use of fertilizers.

Agree on 3-Year Tests

Following a series of preliminary conferences, state and federal agencies agreed to cooperate in a three-year fertilizer test demonstration program having the following objectives:

1. To promote interest in the value and use of chemical fertilizers for increasing production of corn, beans,

ELEPHANT GRASS test demonstration. SAIC agronomist stands in unfertilized plot, at left, and local county agent stands in fertilized plot at right.



(Continued from Previous Page)

in the last few decades this historical balance has been drastically upset by man himself.

Thus, while the 1959-61 world population slightly exceeded three billion people, the current annual increase of 1.8 percent, compounded, will populate the world with 3.6 billion by

1970. Ironically, man's humanitarian efforts have contributed largely to this problem, as more knowledgeable nations have sought to bring better sanitation, better medical facilities, knowledge of causes of infant mortality, more clinics, nurses and hospitals, to nations which formerly had high rates of infant mortality and a limited life span of its adults.

(To be concluded in our next issue)

rice, mandioca, and forage grass.

2. To determine the fertility status of representative Ceara soils and identify specific nutrient needs.

3. To develop a program of soil and plant analysis for estimating fertilizer needs based on correlation of laboratory results with responses in the field.

Necessary fertilizer for the program was furnished by SUDENE, a developmental agency for northeast Brazil,

(Continued on Next Page)