POPULATION GROWTH AND FOODGRAIN SUPPLY IN EAST PAKISTAN

Thesis for the Degree of M. S.
MICHIGAN STATE UNIVERSITY
Zinat Syed
1962

ABSTRACT

POPULATION GROWTH AND FOODGRAIN SUPPLY IN EAST PAKISTAN

by Zinat Syed

The purpose of this study is to examine the pattern of the population--foodgrain resource problem likely to develop in the future in East Pakistan, given the present level of foodgrain production and per capita consumption.

The primary source of data used was the crop statistics and census reports published by the Government of Pakistan. The hypothesis tested by this study is whether or not the Province would be able to feed the growing population from its own foodgrain resources in the future.

In the past the domestic production of foodgrains has not been enough to feed the population of the Province at the low level of 14.5 ounces per capita per day. The cumulative balance for 1947-60 between foodgrain supply and requirements at this level of per capita availability shows an over-all deficit. However, when imports are also taken into account, the deficit situation turns into a surplus. In reality the surplus in part represents a net addition to stock to maintain an even supply in commercial channels.

The rate of growth of population has been less than one per cent for 1901-1931 due to high birth and death rates. During the decade 1931-41, the official rate of growth was higher in the previous period probably due to an inflation of returns and a diminution in epidemics. In 1941-51, the increase is negative because of the effects of World War II, partition, etc. During the last decade, i.e. 1951-61, the rate of growth registered about a two per cent increase due to a decline in

the death rate. This may be considered a minimum rate of growth for the future period under study to the end of this century. If this rate of two per cent were to continue, population would more than double in the next forty years. To feed this population at present level of the per capita availability, double the present quantity of foodgrains would be required.

The potential for foodgrains production is such as to permit a higher level of per capita availability. This, however, is unlikely to be achieved. The probable production achievement estimated on the basis of past performance is likely to be barely sufficient to maintain a much larger population at the existing per capita consumption levels in the absence of an increased volume of imports. The level of demand, however, is not likely to remain static, due to industrialization and urbanization, at least in the urban sector.

Extraordinary efforts over and above present levels will, therefore, need to be made to increase production. Alternatively the increase in the rate of growth of population will need to be checked, not by increasing the death rate, which is impractical for political and social reasons, but by checking the high birth rate.

POPULATION GROWTH AND FOODGRAIN SUPPLY IN EAST PAKISTAN

By

Zinat Syed

A THESIS

Submitted to
the College of Agriculture, Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF SCIENCE

Department of Agricultural Economics

1962

Approved Laurence Witt

ACKNOWLEDGMENTS

The author wishes to express her gratitude to Dr. L. W. Witt for making this study initially possible, and to Dr. M. F. Perkins for his guidance and supervision in the preparation of this manuscript.

Thanks are also due to Dr. L. L. Boger and the Department of Agricultural Economics for providing the opportunity to the author to continue her studies; their policy of extending this opportunity to many foreign students is greatly appreciated.

Sincere appreciation is also expressed to many faculty members of the Department of Agricultural Economics, Economics, Home Management and Child Development, and Sociology and Anthropology who have contributed greatly to the authors education during her stay at the Michigan State University. Appreciation is also expressed to fellow graduate students for their assistance and help in extending their co-operation and cordiality in all aspects during her stay here.

The author is also grateful to some of the staff of the U.S.D.A. and the Library of Congress for their providing facilities in collection of material.

Finally the writer is indebted to Mr. M. S. Niaz for his assistance in making available some of the very useful data, and also for providing the author this opportunity. Any errors remaining in this manuscript are the sole responsibility of the author.

****

TABLE OF CONTENTS

LIST OF TABLES

LIST OF MAPS

LIST OF APPENDICES

INTRODUCTION

East Pakistan seems overpopulated under its present economic state. With the rapid increase in population without a corresponding increase in the availability of land under food cultivation, the per capita availability of land has shown progressive diminution.[1] With little or no improvement, and, in some cases, a declining tendency, in the yield per acre of food crops, one is liable to suspect that availability of food supplies per capita, purely from domestic production, has also diminished. This suspicion is strengthened by the tendency to import large quantities of foodgrain both from West Pakistan as well as overseas.

Given the present food situation, the question arises as to what pattern this population-resource problem is likely to take in the future. This study is an attempt at clarifying this question. It takes into account the rate of growth of population as well as the feasible increase in production of food likely to be achieved from various sources.

The food resources of the province contain numerous items but because of limitations imposed by time, space, and availability of data the study is restricted to the foodgrain[2] supply only. Another reason for restricting this study to foodgrains is that they constitute more than 80 per cent of the diet of the people.

---

[1]The area of land sown per capita diminished from 0.58 acres in 1948-49 to 0.54 acres in 1956-57.

[2]The term foodgrain includes rice, wheat, jowar, bajra, maize, barley, and gram.

A time-period of forty years into the future has been taken for the purpose of this study because, within this period, the present population (1961 estimates) is likely to double. Moreover, in this long period it is possible to undertake development projects designed to improve the productivity and progress of agriculture.

In assessing the production potential of the province it is natural to start with physical setting or economic geography. The setting discusses the boundaries and their evolution, physical division, viz. the alluvial plain and the hilly region, rivers, and their constructive and destructive activities, climate and their importance, soil and their fertility, land classification and utilization, the crops and the cropping pattern, method of cultivation, etc. The physical setting provides some idea as to available resources and the production potential.

The study then examines the rate of growth of population up to the present time in relation to the birth and the death rates. It includes explanations of the variation in the rates of growth in the last 60 years.

This is followed by a consideration of the production of various foodgrain crops, their importance, the trends of area, production and yield per acre, and finally the accuracy and reliability of the data.

In the fourth chapter the discussion relates to food supply situation in relation to population growth up to the present. The food supply situation takes into account foreign trade and food distribution other than for food. Certain nutritional criteria are established and adjustments made to convert population data to an adult population basis.

A comparison is then made of the supply availability (both including and excluding the balance of foreign trade) against the minimum foodgrain requirement based on the criteria established to determine the extent of excess or deficit of the former over the latter.

The final Chapter is concerned with the future trends of both population and foodgrain production. The population projections are made on the basis of the present trend with adjustments for probable future changes in birth and death rates. On the basis of this population projection, future foodgrain requirements are estimated at the present level of consumption of foodgrains. To meet this additional pressure of population the possibilities considered are: to import larger quantities, to augment the existing local supply through intensive and extensive cultivation and/or to reduce wastes. In defining the possibilities and limitations of increasing local production, the development of basic resources of land, water, etc. are considered only in general way and not in any detail.

In conclusion a point to be kept in mind is that resources are not something to be considered as static. They tend to grow with the improvement in knowledge of their utilization; nevertheless, there are physical, natural or political limits to development, e.g. with all known improvements yield per acre of any crop cannot be increased beyond a certain limit nor can cultivable land be increased beyond a certain limit imposed by physical or geographical boundaries, basic soil fertility, etc.

CHAPTER I

SETTING

East Pakistan is an agricultural area with a few cottage industries and only a beginning of modern industry. Eighty-five per cent of its people depend directly or indirectly on agriculture.[1] The standard of living of the people is very low and at or near subsistence levels.

East Pakistan is one of the two provinces of Pakistan. It has an area of 54,500 square miles and a population of about 42 million according to the Census of 1951.[2] It was created as a separate province in August 1947 when India was partitioned into two Dominions of Pakistan and India. The boundaries of the Province are shown in Map 1 on page 5. East Pakistan was created out of the division of the old Province of Bengal with the addition of a major portion of the former district of Sylhet in Assam.

The West Bengal Province of India lies on the western border of East Pakistan. Assam and Tripura are on the eastern border, West Bengal and Assam lie to the north and the Burma border is on the southeastern side. To the south is the long coast-line along the Bay of Bengal, extending from the district of Khulna to Chittagong.

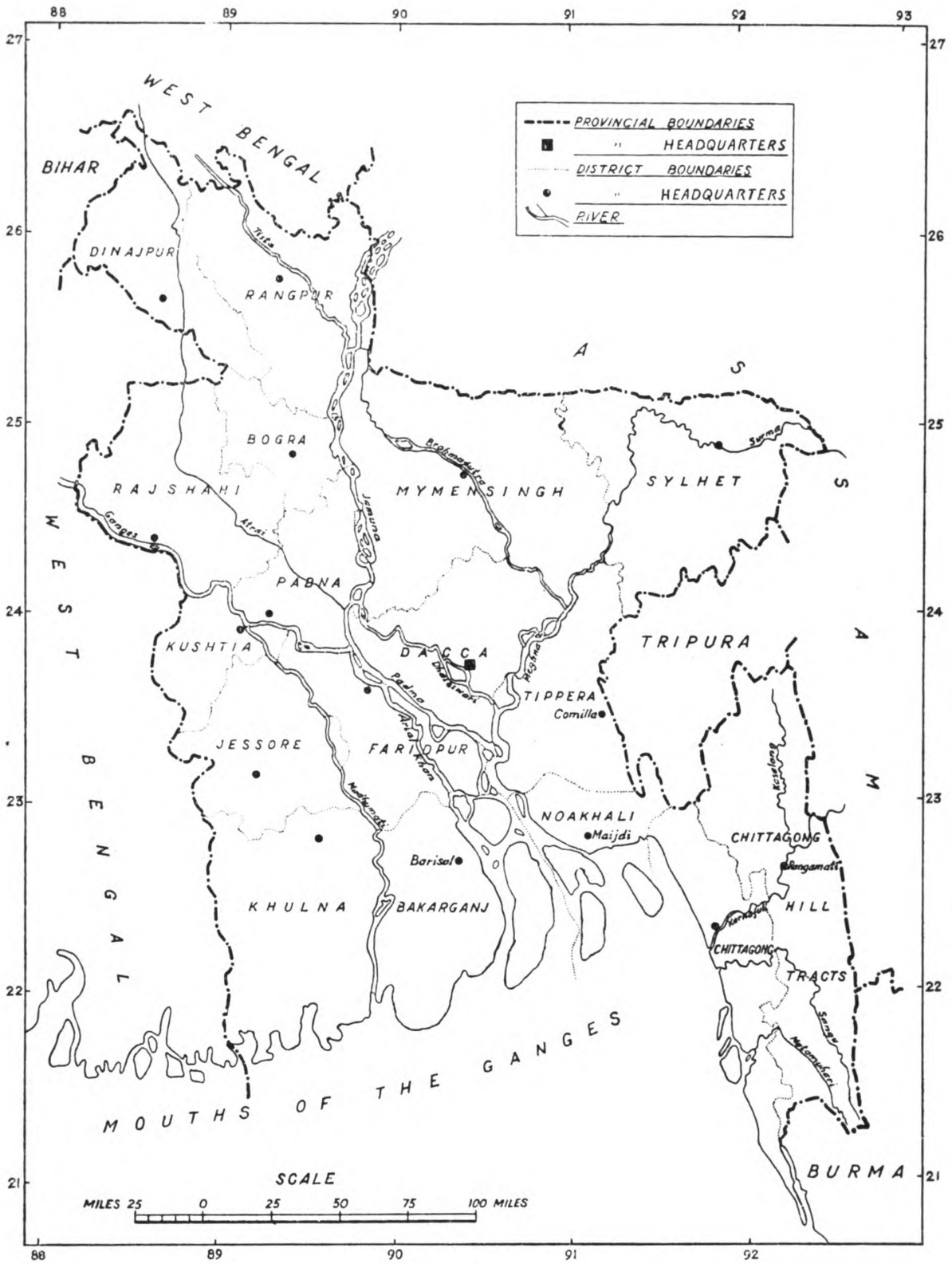
The Province is roughly divided into two main physical divisions; viz., the vast alluvial plain and the hilly region.[3] Out of a total area

---

[1]Manpower Survey Report, Ministry of Labour, Government of Pakistan.

[2]Census of Pakistan, 1951, Vol. 1, Table 1, pp. 1-2.

[3]An Economic Geography of East Pakistan, Nafis Ahmed, p. 11.



Administrative Divisions

of 54,500 square miles less than one-fourth is hilly or mountainous. This hilly region mainly comprises Sylhet and the southeastern corner of Chittagong and Chittagong Hill Tracts.

The rest of the province is a flat plain, the monotony of which is broken by undulations which sometimes develop into high ridges. These ridges are mostly found on the western side of the province. The rocky soil on the crest of these ridges is infertile and does not admit of any serious cultivation. There is generally a growth of scrub jungle and forest which have partly been cleared.

The intervening depressions receive detritus washed away from the top of the slopes by rain water; these are generally rich and yield a good crop of rice. On the slopes also rice is grown by means of terracing, the rain water being retained by small embankments.

The most significant feature of the flat plains is its numerous network of rivers, a parallel to which is nowhere found in this world. The rivers of East Pakistan have many tributaries and distributaries which carve out an interesting drainage pattern.

The activity and behavior of these rivers is of the utmost importance in determining the economic conditions of the people. They serve as drainage channels, ensure an abundant supply of fish, provide cheap and convenient means of transport and communication,[1] and above all act as a great fertilizing agency for a large part of the province.

There are three major river systems in the province, viz. (i) the Ganges and its distributaries, (ii) the Meghna and the Surma System, and (iii) the Brahmaputra's affluents and channels.

---

[1]Small streams dry up after the advent of cold weather; but they all remain navigable for a considerable part of the year from the middle of June to the end of October.

The Ganges or Padma is the pivot of the system of deltaic rivers. Along with its distributaries, it wanders through the rocky western limits to the East, filling up the depressions and in this manner building up the deltaic area of the Province.[1] Even now the same process is going on although it is scarcely perceptible.[2]

The Meghna is formed by the union of the two rivers in Sylhet: the Surma and the Kusiyara. It brings down the waters of the heaviest rainfall area and is navigable all the year round because of great depth, but the most favorable season for navigation is the calm, cold season from November to February.

The rivers in the Brahmaputra system cover a large territory, extending from the Eastern part of North Bengal districts and the main channel of the Brahmaputra to the Meghna.

The Brahmaputra is notorious for its shifting channels and for the formation of chars.[3] No permanent settlement or buildings can

---

[1]The old province of Bengal, it is stated, is largely the result of the alluvial formation of land by the action of rivers. There was a time in the geological history when the greater part of this province formed the bottom of the sea which extended as far as the foot of Garo and Khasia hills. (Survey and Settlement Report of Mymensingh by Sachse, pp. 1-2.) As a result of the continuous process of silt depositing, the sea was gradually pushed off toward the South and land emerged out of it. Cf. Economics of Rural Bengal by K. B. Saha, Ch. I.

[2]Every year as silt is deposited on the lands, which are flooded during the rains, their levels gradually rise; thus, most of the marshes and swamps which abound in different parts of the province are slowly being filled up.

[3]The large quantities of silt with which they are laden are not wholly carried away to the flooded fields and to the sea, but is also deposited on their beds causing the formation of sand banks and alluvial islands called chars or diaras. This leads to a partial blocking of the free passage of the current and as a consequence, it tries to widen the channel by changing its course. The eroded bank supplies fresh material for further deposits of silt which either adds to the size of the old alluvial island or leads to the formation of a new one. As a result of this alluvial or diluvial process, these rivers are frequently changing course.

exist along its bank because of this. "The new lands are a continual source of litigation and violence between people on either side." Even in the dry season, it has a breadth of from three to four miles and is thus an important waterway.

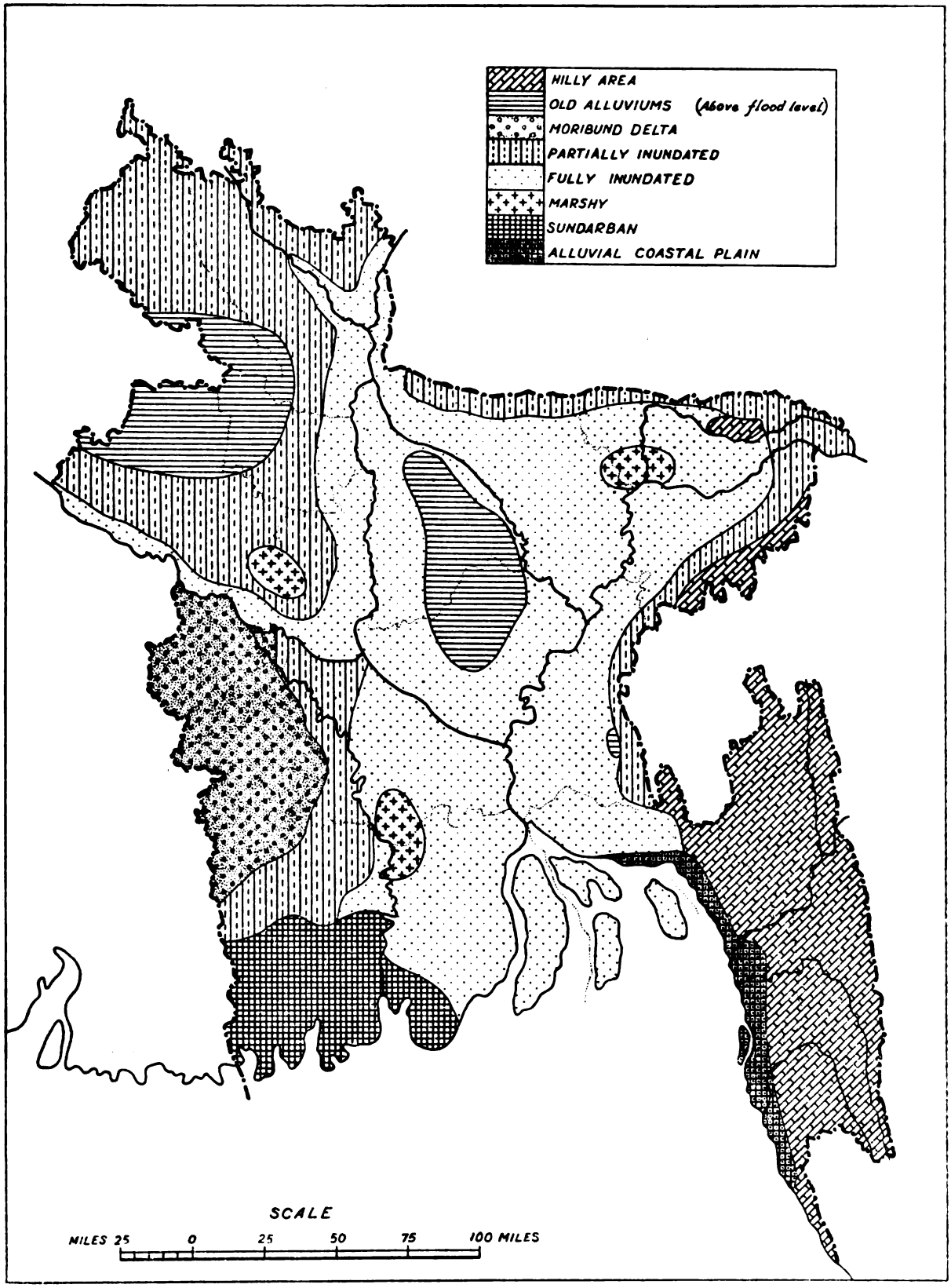
These rivers, therefore, are never at rest in their constructive and destructive work. The process of delta formation has gradually shifted eastward, leaving the rivers in the western districts of Kushtia, Jessore and parts of northern Khulna and northwestern Faridpur to decay.

The alluvial plain may thus be divided into the old alluvial plain (see map on page 9) and the new alluvial plain. The level of land in the old alluvial plains is above that of annual floods due to silt deposition. Therefore, in this area little or no flooding takes place. As a result, water may not be available in sufficient quantity and the fertilizing effect of silt deposition may be absent. This area is comprised of Dinajpur, Rangpur, Bogra, and Rajshahi districts. Cultivation in this part entirely depends on the timely and sufficient rainfall, or on artificial irrigation.

The new alluvial plain consists of the active delta. It covers the whole of Dacca division with the exception of Madhupur jungle tract, the two western districts of Chittagong division and the southeastern portion of Rajshahi division lying between Padma and Jamna. Here the process of delta formation is not complete. Land here is highly fertile as it is annually enriched by the deposits of silt through floods.[1] Cultivation in this area is less dependent on rainfall than in other parts of the Province.

---

[1]If, however, floods are too early or rise too suddenly and rapidly, the crops may be destroyed by being submerged in water but broadcast aman paddy is fairly immune from this danger. Broadcast aman has a surprising capacity of coping with the rising level of the flood. It will recover from the effects of the floods without sustaining



Physiographic Divisions: Generalized

Marshes and swamps (bils) are found throughout the province but more so in the northwest of Bakarganj. River action or earth movement[1] are the probable causes of the existence of these bils and marshes. These bils are generally connected with rivers through khals (water courses); they are also inundated during floods. Thus, they are slowly being filled up by silt deposits. In many of these depressions a peculiar, long-stemmed variety of rice grows well, adjusting itself to the rising level of water.

The Sunderbans is a vast swampy region along the sea coast. This region is covered with mangrove forest.

The amount and distribution of rainfall over the year is highly important in determining the future of the crops and, therefore, the prosperity of the agriculturists. Rainfall occurs largely in the summar monsoon period, i.e., during the months of June to October. It is brought about by the southwest monsoon. The average annual rainfall is somewhat above 75 inches. Although in the flood area, the cultivator is less dependent on rain than in other parts of the province; but this is only during the flood season. During the winter months the northeast monsoon brings drought conditions.[2]

In regions not subject to floods the cultivator has to depend on rainfall throughout the year for moisture in the absence of irrigation.

---

any serious damage. For a good harvest, therefore, the gradual advent and subsidence of flood is important in this region. This region is the most important jute districts of the province and constitutes the richest agricultural area of the province.

[1]Survey and Settlement Report of Bakarganj, by J. C. Jack, p. 5.

[2]Spring showers in early March are necessary for preparation of grounds for sowing of jute and other autumn crops as the soil is caked hard during the dry, cold weather. Thereafter, rain at intervals is necessary for the growth of these crops.

The important crop in these regions is transplanted aman rice. A few inches of water is necessary on the field for transplanting and also for a healthy growth of rice plants thereafter. Rain water is thus conserved by means of small embankments (bunds) around the fields.

During the dry northeast (winter) monsoon cultivation is to a large extent dependent on irrigation facilities almost everywhere in the Province.

Of the total area of 35.381 million acres, the classification of land (1956-57)[1] has been as follows:

		million acres
Area not reported		0.731
Area reported		
1. Forest	5.460	
2. Area not available for cultivation	5.590	
3. Other uncultivated land excluding current fallows	1.960	
4. Current fallows	1.190	
5. Net area sown	20.450	
Subtotal		34.650
Total		35.181

The area cultivated (including current fallows) is about 63 per cent of the total area reported whereas the area under forest is 16 per cent; the area not available for cultivation is 16 per cent and other uncultivated area (excluding current fallows) is about 5 per cent.

[1]Land and Crop Statistics of Pakistan, Ministry of Food and Agriculture, Govt. of Pakistan, Karachi, Fact Series III, March 1959.

Of the total cultivated area of about 21.64 million acres, 5.48 million are sown more than once, i.e., about 25.3 per cent of the total cultivated area is double cropped. Classification of area in the Province since 1936-37-1956-57 is given in Appendix I.

Production of crops may be classified into food crops and cash crops. The main food crop is rice, though, wheat, other cereals and pulses are useful supplements to the diet. The chief cash crops include jute, sugar cane, oil seeds, tobacco, tea, and cotton.

The distribution of area under major crops in 1959-60 is estimated to be:

Food Crops	Thousand Acres
Rice	21,151
Wheat	138
Other cereals	72
Gram	133
Total	21,494
Cash Crops	
Jute	1,375
Sugar cane	281
Oil Seeds	720
Cotton	52
Tea	78
Tobacco	110
Total	2,616
Grand Total	24,110 [1]

[1]Total cropped area is 25.930 million acres of which 24.110 million acres are under major crops and the remaining 1.820 million acres are under other minor crops such as pulses other than grams, linseed, ground nut, etc.

The area under food grains forms 79 per cent of the total area under crops. Rice alone is 98 per cent of this area under foodgrains. This shows the importance of rice cultivation. The most important nonfood crop is jute.

Various early references to crops suggest that rice has always been the most important crop of the Province, though certain cash crops have changed in sequence.[1] Jute now plays a dominant role as a cash crop and is next in importance to rice. It covers 5.1 per cent of the total cropped area.

Natural conditions are favorable for the cultivation of various crops but the part played by man is unsatisfactory. The method of cultivation is crude and prescientific. It has not shown any improvement from time immemorial. Crude and primitive implements are used to cultivate the land.[2] Livestock is of a poor quality. Use of manure and fertilizer is limited. Farmyard manure is used mostly but oil cakes and black earth (from old tanks and ditches) is also used. Green manure is used sometimes. The use of chemical fertilizers, insecticides and improved seed is narrow in scope.

Rotation of crops is practiced to a limited extent. Rice is produced year after year without any break. However, in jute districts rice and jute are alternately grown.[3] Some amount of rotation is also

---

[1]Cultivation of cotton declined whereas safflower and indigo (both producing dyes) assumed importance at the beginning of the 19th Century. Jute cultivation, with its growing demand, has now assumed dominant importance amongst cash crops.

[2]Deep ploughing is harmful for rice cultivation but for cultivation of other crops deep ploughing is essential. (Economics of Rural Bengal by K. B. Saha, Ch. III.)

[3]In flood areas the cultivator has not much scope in the choice of his crop. Jute is one possibility but depth of water and fertility of soil sets limit to this as jute requires more fertile soil than paddy to be an alternative.

practiced by the cultivation of subsidiary crops during the interval between two major crops. After jute or rice, the rabi crops[1] are sown sometimes. The area, however, sown more than once, at present, is not more than about 25.3 per cent of the total cultivated area of 21.64 million acres (see page 12).

The yield per acre for most crops is comparatively low. The yield per acre in Japan, of rice is about 1,813 lbs. and wheat about 997 lbs.; against this the yields in East Pakistan are 825 lbs. and 500 lbs. of rice and wheat respectively. Yield of gram (chickpeas) is more or less on par with world averages. Yield per acre of barley and maize in West Bengal (India) is about 710 lbs. and 660 lbs. respectively; whereas, in East Pakistan they are about 430 lbs. and 535 lbs. respectively. Yield per acre of jowar and bajra has been higher than India.

The per capita availability of area under foodgrains was 0.47 acres in 1947-48. It has been reduced to 0.43 acres in 1959-60 due to the increase in population from 41.47 million in 1947-48 to 50.41 million in 1959-60.

---

[1]From the point of view of harvests and of the main period of the growth of crops in East Pakistan, the crop season can be divided into three periods viz. (i) Rabi, (ii) Kharif or Bhadoi, and (iii) Aghani or Haimantic.

Rabi crops are sown in winter and reaped early summer (Feb.-March). These crops include summer rice (boro), gram, pulses, wheat, barley, vegetables, mustard, oil seeds, tobacco, sunn hemp, etc. These crops not only fill domestic needs but also provide cultivators with cash. These are of greater importance in the northern and central parts of the province. Kharif crops belong to the rainy season. They are of great importance to the people because they include jute and aus; one important for food and the other for cash. Aghani the cold weather (Nov.-Dec.) harvest, mainly consists of aman rice though sugar cane is also harvested in many districts. Rainfall is a great influencing factor governing the sequence.

Continuing low yield trends plus the declining per capita availability of land leads to the conclusion that the foodgrain supply situation may be deteriorating in the absence of imports. With no change or increase in the yield per acre of foodgrains, the supply situation is likely to deteriorate further with the rise in population, unless large imports are made which would improve it, or population growth is checked and finally if the productivity of land is increased.

There is tremendous scope for increasing this productivity of land. East Pakistan is a rich agricultural area with a great potential for increasing production. Hitherto this potential has not been well exploited. It has fertile land which can be cropped more than once. The temperature in the province is good for growing crops throughout the year. Yet the extent of area cropped more than once is only about 25 per cent of the total cropped area. Temperature limits severely double cropping in Japan. Yet the ratio of production per acre per annum is considerably higher than in East Pakistan. Of the two climatic factors which determine the possibilities of multiple cropping, the province enjoys fully the benefit of one, i.e., temperature. Moisture, the second factor, shows certain deficiencies which govern the extent to which the land in the province could be double or triple cropped in a year. With an adequate and assured water supply yield per acre could also be increased and double cropping could be extended.

With water control, economic use of other factors such as fertilizers, better seeds, etc., is possible which do not seem to have been adopted extensively.

Several reasons may be given for this static situation. In the first place technical knowledge is such that cultivators are generally unaware of possible improved practices which they could adopt. Where this is not the case, however, other inhibiting factors are present. Thus market imperfections often limit the profitable use of such

items as chemical fertilizers by low commodity prices and high factor prices to the producer. High interest rates are notorious. These imperfections and deficiencies may be further related to the general level of development of the region as a whole and a probable lack of desire by producers to change their accustomed ways of life to achieve a higher plane of living.

Whatever the basic causes the situation remains that the level of productivity is low, little capital is being profitably utilized, per capita land availability is low and thus the size of farms is small. All these add up to a low plane of living. In addition, it is difficult to discover any evidence that a change in this situation will be forthcoming in the near future, unless extraordinary and successful efforts are put forth by Government.

CHAPTER II

POPULATION TREND IN THE PAST

The natural increase of a population over a period is the "difference between births and deaths during that period in relation to the population at the beginning of the period." In the world of today, two extreme demographic situations stand out with, however, some exceptions. In one, both birth and death rates are relatively low. The standard of living in these areas is high and dietary of the people is well balanced reaching a level of over 3,000 calories per day. In the other situation both the birth and death rates are relatively high. In years of prosperity mortality is reduced somewhat and population grows fast; however, with adverse conditions such as famines and epidemics death rate increases and population growth is checked somewhat. The standard of living of the people in these areas is low and their calorie intake is about 2000 per day. Such a situation is found in most of the Asian countries including Pakistan.

Pakistan's birth rate estimated by Thompson is "in the neighborhood of 40-42 per thousand.[1] About the death rate he states, ". . . death rate of 30 or 31 would appear to be about the minimum rate one could reasonably assume for Pakistan during the period of independence preceding the 1951 Census and it may very well have been somewhat higher."[2] On the basis of this estimate, the natural increase would amount to about 1.0 to 1.1 per cent.

---

[1]W. S. Thompson, Population and Progress in the Far East, p. 279.

[2]Ibid.

Population growth in East Pakistan since 1901 to 1961 is shown in Table 1.

Table 1. Variation in Population in the Decades 1901-61.

Year	Population in thousands	Variation		Annual Rate of Increase in Per cent
		Number in thousands	Per cent	
1901	29,397	--	--	--
1911	31,925	+2,528	+8.6	+0.8
1921	33,647	+1,722	+5.6	+0.5
1931	36,039	+2,392	+7.1	+0.6
1941	42,277	+6,238	+17.3	+1.6
1951	42,062	- 215	-0.6	-0.01
1961*	50,844	+8,782	+20.9	+2.0

Source: Nafis Ahmed, An Economic Geography of East Pakistan, p. 289.

*Figures are provisional as issued by the Government of Pakistan.

During the last 60 years, 1901-61, the population of East Pakistan grew by 73 per cent. This rate of increase of the population though high has not been abnormally so because the growth over the years has not been uniform.

The rate of increase during 1901 to 1931 has been less than one per cent. The controlling factor has been the **high mortality rate.** The population has responded to the presence or absence of war, famines, epidemics and due to their absence or presence grew or declined accordingly. The decade 1911-21 covers the period of World War I. The annual rate of increase is 0.5 per cent which means the excess of birth over death rate was about five per thousand. Since the birth rate was very high, the death rate may also have been

equally high to leave such a small excess. The increase during the decade 1901-11 and 1921-31 has also been small; therefore, the birth and the death rates presumably were also relatively equal during these two decades.

In the decade 1931-41 the population rose sharply. The death rates could not have declined so considerably as to account exclusively for this margin of natural increase. Two factors together probably explain this situation: (i) There was no severe famine or epidemics in the province, and (ii) the rising tension between Hindus and Muslims led to an inflation of the Census returns in those areas where the outcome of partition remained doubtful.[1]

The decade 1941-51 shows a negative increase. This may be due to famine in 1943 and other effects of World War II. Another reason attributed to this negative increase during this period is the fact of Hindu-Muslim riots and the partition of India into India and Pakistan as a result of which Hindu population migrated to India and Muslim population in India migrated to Pakistan but the number of Muslims migrating was very much less than the Hindu emigrants. Many contend that this is due to the inaccuracy of data in the past and improvement thereon at the present time. Whatever may be the reason but the fact remains that death rate has been the controlling factor of the growth of population in the past in the face of a high and stable birth rate.

There is no evidence to show "any significant fluctuations in the birth rates."[2] Voluntary limitation of births has not played any significant role in determining the size of population. In fact, a laissez-faire attitude towards the size of the family has been

---

[1]The over enumeration is estimated at 3.7 million (Thompson, op. cit., p. 121).

[2]Ibid., p. 123.

maintained by the Muslims in undivided India who have always had a higher birth rate and therefore a higher rate of natural increase compared to the Hindus,[1] if death rates are assumed to be the same for both Hindus and Muslims. There is still an insignificant birth control movement.[2] Because of this and the decline in the death rate due to health measures taken by the Government, the population has increased at a rapid rate in the last decade although it is not the highest in the world.

The problem, however, is not so much of the rate of increase but the net absolute addition to the existing population in every decade. Because of the large existing population in the Province, even a small percentage increase yields a net gain of a few millions. This large net addition has constituted a major problem because it offsets the limited efforts to improve the admittedly very low standard of living. All efforts to increase food production, other commodities and services, to give a better per capita supply to the existing population has largely been frustrated by additions to the population.

---

[1]Kingsley Davis has estimated that differential fertility of Muslims over Hindus is 12 per cent (Kingsley Davis, The Population of India and Pakistan, p. 81). A study of differential rates of increase in the Muslim and non-Muslim population of undivided India suggests that annual rate of increase of Muslims was about 1.36 per cent during the period 1931-51 as compared to an average of 1.26 per cent for all others. Cf. The First Five Year Plan 1955-60, op. cit., p. 190.

[2]Of the six planned parenthood clinics in Pakistan only one is in East Pakistan (Thompson, op. cit., p. 280).

CHAPTER III

FOODGRAINS AND THEIR PRODUCTION

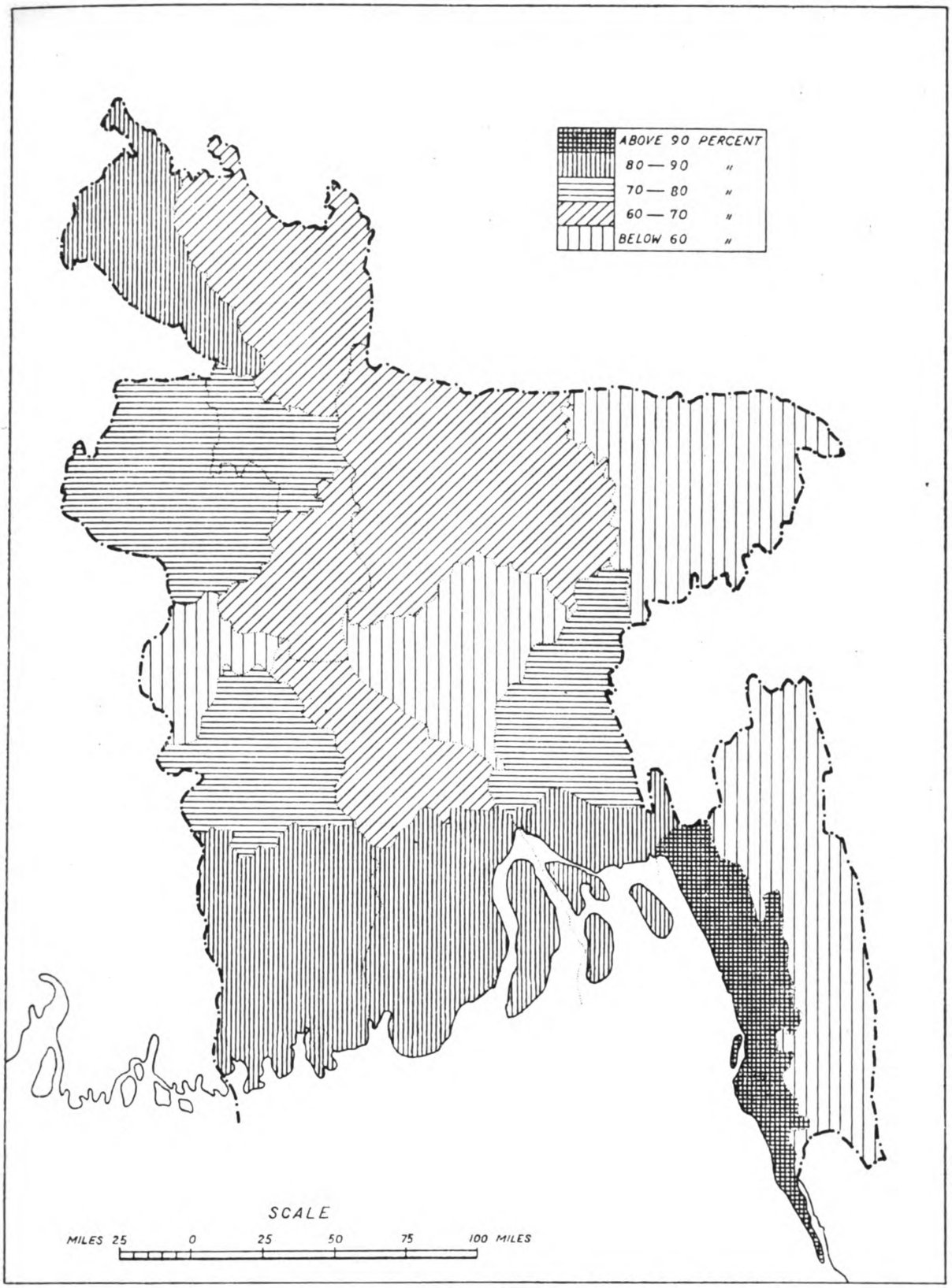
East Pakistan is called the land of rice growers and rice eaters. About 78 per cent of the total cropped area is under rice, and about 80 per cent of the diet of these people consists of rice. This makes rice the most important crop of the province. Its production is encouraged by natural conditions.[1]

The intensity of rice cultivation varies from district to district. Rice as a percentage of cropped area is shown by districts in Map 3 on page 22. In some districts, viz. Chittagong, its cultivation covers more than 90 per cent of the cropped area whereas in Chittagong Hill Tracts, Sylhet, and Dacca it is below 60 per cent.

There are numerous varieties of rice grown in the province. These may be divided into three broad classes according to the season in which they are harvested--aman or winter rice, aus or autumn rice, and boro or summer rice. The area under each of these three varieties are as follows:

Varieties of rice	Average Annual Area Sown in 1947-48--1957-58	Percentage of the total area under rice
Aman	13,901	68.8
Aus	5,499	27.2
Boro	797	4.0
Total	20,228	100.0

[1]Rice is almost an aquatic plant and can be most successfully grown if an abundant supply of water is available. This supply, to a large extent, is ensured by the annual floods and, in areas above flood levels, by rainfall under conditions which exist in most of East Pakistan.



Rice: Normal percentage of Cropped Area by Districts

It will be seen that boro as compared with other two kinds is of very small significance occupying only about 4 per cent of the entire area under rice. As regards the other two varieties which together account for the remaining 96 per cent aman is about three times as important as aus.

Aman is either transplanted or broadcast.[1] Boro is generally transplanted while aus is sown broadcast.

Each of these classifications of rice has its own characteristics and its own suitability to climatic and land conditions on which it is grown. The kind of rice a cultivator will grow depends largely on the level of land and its condition with respect to the supply of water.[2] There is a difference, however, in the physical and economic outturn yielded by them. Boro yields a higher physical yield and a higher cash return than aus or aman, due to its availability during periods of seasonal scarcity while aman gives a better physical return than aus.[3]

---

[1]Sometimes aman and aus are sown broadcast together on the same field. In such a case aus which matures much earlier is reaped in July or August while the aman remains in the field until December when it is harvested.

[2]Boro though its yield is the heaviest, is grown in a period in which the water required by the plants is not available except in the bils and marshes and low-lying chars (new land formation). It is for this reason that its cultivation is practically confined to these areas. A certain depth of water at the time of transplantation of aman is very necessary. Nine or ten inches of water is not suitable for aman; for aus, two or three feet of water would be sufficient; more than this would be harmful for the plant as its stalk is about four or five feet high.

[3]Aus has its own advantage. It gives a return to cultivator much earlier than aman, at a time when he needs it most. Moreover, lands on which aus is grown generally yield a second crop in the year. Sometimes aus is succeeded by transplanted aman as is the practice in some parts of Noakhali and Tippera. (Settlement Reports of Noakhali and Tippera.) But more generally it is followed in the winter by a rabi crop--rape, mustard or some kind of pulse. Economics of Rural Bengal by K. B. Saha, Ch. II.

Again transplanted rice usually is superior both in yield and quality than broadcast rice.

The utilization of these rice varieties with differential technical and economic characteristics represents a conscious attempt by the producer to maximize his returns, at least in a technical sense, if not fully in an economic sense. Pressure of population dictates that the land should be used to its fullest capacity within the limits of technological knowledge. This means, in effect, those varieties of rice sown have been chosen, through a process of prescientific selection, which yield the highest physical returns under given conditions. The emphasis on physical rather than economic returns is indicative of the subsistence nature of agriculture in East Pakistan, particularly as regards rice production. Here rice is grown primarily for direct consumption; only a minor proportion is produced for sale. The important cash crop whereby the producer usually earns the exchange necessary for the purchase of non-agricultural goods is jute.

The area under rice has shown considerable fluctuation from 1936-37 to 1959-60. However, the trend has been upwards. The years 1943-46 registered considerable increase specially in 1944-45, in response to internal scarcities following the relatively low harvests of 1943 and the isolation of Burmese sources of supply in consequence of the Japanese occupation of that area.

In 1947-48 about 19 million acres were devoted to rice cultivation and since then there has been further increases in acreage. This may be attributed to higher rice prices during this period, the Government-sponsored "Grow more food campaign,"[1] and the transfer

---

[1]Directorate of Agricultural Marketing, East Pakistan: Rice Situation in East Pakistan, p. 1.

of land under jute to rice.[1] Thus, as there has been no appreciable increase in the total area cultivated, the increase in rice acreage has occurred partly through the reduction of jute acreage and current fallows and partly through an increase in the acreage sown more than once (see Appendix I). In fact, a reduction in the total cultivated area took place in 1955-57, probably as a consequence of adverse weather conditions.

Fluctuations are also apparent in rice production. The highest yield in the entire period of the 25 years was registered during 1943-44, i.e., immediately after the famine. Subsequently some decline took place but on the whole we may conclude that yields have been more or less static so far as rice is concerned (see Appendix IV).

The area under other foodgrains is small compared to rice; it is only 2 per cent of the rice area. Here also there are wide fluctuations in area and yield. Except for the area under wheat, acreage under other foodgrains, including barley, has declined. Yields per acre of these crops have also shown variable trends.

Production of foodgrains, on the whole, has increased from 6,824 thousand tons[2] in 1947-48 to 8,554 thousand tons in 1959-60 with fluctuations in between. Weather conditions have a great bearing on this. Floods are a normal feature of East Pakistan. Every year large areas under rice are too heavily inundated and abandoned. Floods in 1954-55 were "unprecedented in the history of the area." The effect of weather on production is evident also from the variation

---

[1]A good deal of land on which rice is grown can also be used for cultivation of jute. A higher price of jute in one year stimulates its cultivation the following year and vice versa. Thus, there is limited but real competition between jute and rice for land, but the area under jute was restricted through Government regulation and therefore, jute lands were switched into rice cultivation.

[2]A long ton is equal to 2,240 lbs.

in year-to-year yields per acre of rice. Area, production, and yield per acre of foodgrains are shown in Appendices II, III and IV, respectively.

Different views are held with respect to long-term yields per acre. On the pessimistic side the Land Revenue Commissions in 1939[1] held that they were declining. The Plot to Plot Enumeration Survey[2] of 1944-45 holds to this same opinion. There is considerable support for this view, especially with regard to the old alluvial plain. In the active delta however the yield ought to be maintained because of deposition of silt, whereas, in the old alluvial plain, this silt is lacking. If, therefore, yields have likely been maintained in the active delta any net decrease would be attributable to the deteriorating situation in the old alluvial plain.

In this connection an observation is necessary concerning the accuracy of the statistics. Statistics with respect to "acreage in East Pakistan are highly subjective and not very reliable."[3] The method of collection of acreage statistics has been that:

> Until recently East Pakistan had no local revenue staff in the villages. Area statistics were collected and compiled simultaneously by the Civil and Agriculture Services, and issued by the Director of Agriculture. The primary data in the case of Civil Services were collected by the circle officers through the Presidents of the Union Boards and the Chowkidars (village watchmen) and passed on to the sub-divisional officers who submitted them to Collectors and finally to the Director of Agriculture. On the other hand Agriculture Department had its own staff with one Union Agricultural Assistant (also called Primary Licensing Agent) for jute in each union of about 10 to 12 villages, who recorded acreage figures, in relation to estimates derived

---

[1]Rep. Land Rev. Comm. Bengal, 1940, Vol. 1, p. 81.

[2]Plot to Plot Enumeration, Bengal, 1944-45, Part I, pp. 83 and 85.

[3]Proceedings from the IX Pakistan Science Conference, Peshawar, 1957: Symposium on the causes of decline in Agricultural Production in Pakistan, p. 23.

> from a complete plot to plot survey taken in 1944-45 but sometimes in absolute figures worked out in relation to the previous years' estimates. The data thus collected were passed on to higher officials of the Agriculture Department in succession and finally compiled by the Directorate of Agriculture. [1]

From the above it is evident that those responsible for collection of area statistics were not qualified or well trained for the purpose. Figures thus collected are liable to be inaccurate.

The production estimates are arrived at by multiplying area sown with the "normal yield" and a seasonal condition factor. The "normal yield" is arrived at on the basis of average outturn of a series of years as obtained from crop cutting experiment conducted by the Directorate of Agriculture East Pakistan. The said "normal yield" has been in force since 1942-43 and has not been revised. Any change in yield trends apart from annual fluctuations are thus unlikely to be reflected in the estimates or at least inadequately so.

The estimates of production are subject to even greater error than area or yields because of the unreliability both of acreage and yield statistics. Measures are being taken to remove the margin of error in the compilation of agricultural statistics yet much remains to be done.

A summary of the longer-term situation as it has developed since independence and as reflected in official statistics would indicate that foodgrains production including pulses and gram has increased from an average of 7,355 thousand long tons in 1947-48/1949-50 to 7,738 thousand in 1957-58/1959-60 or by five percent. The acreage under foodgrains over the same periods have increased from 19,708 thousand acres to 20,662 thousand or by almost five percent. In balance, therefore, and by implication, yields have shown no tendency to increase.

---

[1] National Planning Board, Government of Pakistan: The First Five Year Plan, 1955-60, p. 269.

In view of the status of crop reporting in terms of the statistical methods in use, the probable degree of error in the data is such that definite conclusions cannot be looked for. What can be said, however, is that within a certain degree of error upwards and downwards the trend in foodgrains production has been flat. At best it is unlikely that production has increased at a rate greater than the increase in population and most likely it has not kept pace. The most likely view, therefore, is some slight reduction in per capita production of foodgrains.

If one were to accept as "most probable" the view that production and acreage had increased by five percent from 1947-48/1949-50 to 1957-58/1959-60 and that the rate of increase in population over the same period has been slightly less than two per cent per annum, and further that there has been an insufficient increase in urban population to render the rural population static, it follows that the increase in rural population, and thus of the rural labor force, has been greater than the increase in acreage under foodgrains. This situation is worsened to the extent that there has been a shift in non-food crops, particularly jute, to foodgrain crops as the net acreage increase has not been absolute. It would further follow, from the apparent failure of yields of foodgrains to increase, that the additional labor availability per acre of foodgrains cultivated has been ineffective in productivity. The marginal productivity of labor in agriculture, then, may well approximate zero.

This conclusion would appear to follow from the underlying situation which has existed in East Pakistan over the past decade. There is much evidence to support the view that the combination of land, labor and capital on the eve of independence was such that the point of absolute diminishing returns with respect to labor was on hand. Since then little technical change has taken place. Nor has there been

any significant increase in the amount of invested capital. The situation, therefore, has apparently deteriorated from the point of view of labor productivity.

CHAPTER IV

FOOD SUPPLY IN RELATION TO POPULATION GROWTH

Undivided Bengal was a large importer of cereals immediately prior to Independence. As a result of partition, the more fertile land fell to the lot of East Pakistan and consequently its resulting foodgrains deficit was smaller in comparison to that of West Bengal particularly in view of the fact that Calcutta was included in the latter. In the early years of Independence the deficit in rice and wheat together was estimated at "nearly 0.15 million tons per annum."[1] Normally this deficiency was met by rice imports from West Pakistan. When, however, this deficit assumed a greater magnitude due to the growth in population and, in some years, to crop failure on account of drought, floods, insect pests, etc. other sources were tapped.

Taking into account the imports and exports of foodgrains together with the local production thereof, the food supply situation is summarized in Table 2. There was no export of foodgrains from the province except for 1954-55. This may be attributed to the good harvest in 1953-54 which permitted some export of rice during 1954-55 mainly out of the undispersed stock of the Civil Supplies Department.[2]

The per capita availability shows wide fluctuations. It ranges between 13.1 and 16.6 ounces per day. The shortage in any one year is made up statistically from the surplus in other years. On the whole the per capita availability is around 15 oz. a day.

---

[1]Directorate of Agricultural Marketing, Government of East Pakistan: Rice Situation in East Pakistan, p. 8.

[2]Ibid., p. 9.

Table 2. Food Supply Available Since 1947-60

Year	Foodgrains Production	Nonfood Use[1]	Total Available for Food from Domestic Production	Imports(+) and Exports(-)	Net Supply Available of Foodgrains	Population[2]	Per Capita Availability [4]
	thousand tons					(thousands)	(oz. per day)
1947-48	6824	682	6142	+38	6180	41,471*	14.6
1948-49	7760	776	6984	+111	7095	42,052*	16.6
1949-50	7472	747	6725	+308	7033	42,641*	16.2
1950-51	7428	743	6685	+131	6816	43,238[3]	15.5
1951-52	7127	713	6414	+262	6676	44,628	14.7
1952-53	7431	743	6688	+177	6865	45,311	14.9
1953-54	8342	834	7508	+45	7553	46,001	16.1
1954-55	7697	770	6927	-27	6900	46,563	14.6
1955-56	6470	647	5823	+582	6405	47,186	13.3
1956-57	8261	826	7435	+459	7924	47,954	16.2
1957-58	7670	767	6903	+338	7241	48,745	14.6
1958-59	6999	700	6299	+300	6599	49,563	13.1
1959-60	8554	855	7699	+320	8019	50,408	15.6

[1]This is approximately 10 per cent of the domestic production.

[2]In mid years

[3]Shows population up to mid-1951. The census figure as enumerated in 1951 was 42,063 million.

[4]Assuming no stock change.

*Population has been calculated on the basis 1.4 per cent rate of increase estimated by the Planning Commission, Government of Pakistan. Second Five Year Plan 1960-65, p. 331.

In estimating the extent of foodgrain per capita availability, a distinction has to be made between the calorie requirements of a minor and an adult in order to obtain some criteria for minimum quantities.

Lusks[1] coefficient of comparison of the food requirement of children with those of an average adult is:

Age	Adult Equivalent Value per head
0-15	0.7
Males over 15	1.0
Females over 15	0.83
Average	0.835

Dr. Aykroyd[2] has suggested the following scale of coefficients on the basis of caloric requirements:

Group	Coefficient
Adult male over 14	1.0
Adult female over 14	0.8
Child 12 and 13 years old	0.8
Child 10 and 11 years old	0.7
Child 8 and 9 years old	0.6
Child 6 and 7 years old	0.5
Child 4 and 5 years old	0.4

The practice in most of the rationed areas in the province is to treat all children of 8 years and below as requiring half the quantity of foodgrains that is needed for an adult. This means, roughly, 30 per cent of the total population would be in this category in 1951.

---

[1]R. K. Mukerjee. Food Planning for Four Hundred Million.

[2]Baljit Singh, Population and Food Planning in India.

This would approximate a 15 per cent adult man value. Thus, 85 per cent of the total population would represent an effective equivalent adult population.

Official estimates, however, are that 100 people are equivalent to 80 adult male units. Projections of food requirements are made by the Government on this basis.

Caloric requirements are estimated on three bases, viz. (1) for minimum body maintenance, (2) for everyday activity, and (3) for heavy labor tasks.

Dr. Aykroyd[1] has estimated on an average 2,600 calories per day for ordinary work; in heavy manual labor, however, 2,800-3,000 calories would be required. Dr. Burridge's estimates are 2,680 caloric requirements per person per day.[2] A diet survey in South India arrives at a figure of 2,560 calories.[3] The total number of calories for rice eaters has roughly been fixed at 2,600 by Mukherjee[4] (including 200 calories for wastage).

The F.A.O. in the World Food Survey Report of 1952, estimated the requirements of Pakistan at 2,300 calories per person per day. The Indian Nutrition Advisory Committee suggested between 2,250 and 2,285 calories for wheat and rice diets respectively. Consumption of about 2,250 calories per person per day has been considered the minimum desirable by the Government of Pakistan.[5]

---

[1]Ibid.

[2]Mukherjee, op. cit

[3]Singh, op. cit.

[4]Mukherjee, op. cit.

[5]Memorandum on the U.S. Surplus Agricultural Commodities Aid to Pakistan, p. 3.

As a basis for comparing the present levels of production of foodgrains with what might be considered to be reasonable minimum requirements for East Pakistan, the estimate of 2,250 calories per person per day as given by the Indian Nutritional Advisory Committee will be accepted. Such a criterion ignores nutritional standards other than calories, i.e., proteins and vitamins, but time and data do not permit a more comprehensive approach.

It is further assumed, based on analysis of foodgrains patterns, that 80 per cent of the calories consumed in East Pakistan are derived from foodgrains. Thus the food grains required per adult per day would be 1,800 calories and, on the basis of 100 calories per ounce of foodgrains, the adult daily foodgrain requirement is 18 ounces. On a per capita daily basis covering the population as a whole, the equivalent would be 14.5 ounces after allowing for age composition.

Foodgrain requirements as calculated on this basis are shown in Table 3. The supply of foodgrains available to the population from 1947-1948/1959-1960 is shown on this table, also. This estimate excludes net trade in foodgrains and an allowance of 10 per cent has been deducted for feed, seed, and wastage.

A comparison between the supply availability from domestic production and the minimum foodgrain requirements, as estimated above, would indicate, over the period covered, that on balance there has been a deficit. The accumulation of annual balances shows a surplus of about 1.7 million tons up to and including 1954-1955; thereafter, beginning with a substantial deficit in 1955-56, the cumulative figures worsen to a deficit for the whole period of two million tons by 1955-1960.

It may therefore be concluded that on the basis adopted here, East Pakistan's foodgrains production is not keeping pace with the growth in population nor the minimum calorie requirement. This conclusion,

Table 3. Foodgrain Situation (Excluding Imports and Exports) 1947-48/1959-60

Year	Foodgrain Supply Available[1]	Foodgrain Requirement[2]	Foodgrain Balance (Col. 2-Col. 4)
	(2)		
1947-48	6,142	6,138	+4
1948-49	6,984	6,224	+760
1949-50	6,725	6,311	+414
1950-51	6,685	6,399	+286
1951-52	6,414	6,605	-191
1952-53	6,688	6,706	-18
1953-54	7,508	6,808	+700
1954-55	6,927	6,891	+36
1955-56	5,823	6,984	-1161
1956-57	7,435	7,097	+342
1957-58	6,903	7,214	-311
1958-59	6,299	7,335	-1036
1959-60	7,699	7,460	+239

[1]Excluding 10 per cent production, feed, seed, etc.

[2]At 18 ounces per adult per day, i.e., about 14.5 ounces per person per day.

however, must be interpreted in the light of the statistical deficiencies outlined in the previous chapter.

It would appear that the minimum calorie basis adopted here is in accordance with the Government of Pakistan's foodgrain policies, for the Government has apparently imported foodgrains in order to supplement domestic production so that available supplies would approximate the levels of food requirements as indicated by the 14.5 ounces per person per day used in this analysis. This is indicated by the data on foodgrain supply availability and requirements shown in Table 4. Here the available supply includes net import data. On this basis the cumulative balance of foodgrains for 1947-1948/1959-1960 would indicate a surplus of 3 million tons above the minimum requirements as estimated.

In order to maintain this position, however, it would appear that there has been an increasing necessity to expand the volume of foodgrains imported. This is indicated in Table 2 by the relatively higher volume of net foodgrains imported in the period from 1955-1956 onwards as compared with previous years. This conclusion, however, must be adjusted to take into account the fact that the Government of Pakistan in these years has been attempting to increase its stocks of foodgrains in order to maintain an even supply of foodgrains in commercial channels throughout the year. Data are not available to the writer which would indicate the magnitude of these stocks at the present time.

Practically all foodgrains have been directed towards the supply of urban requirements. As such they represent a supplement to internal foodgrains procurement both private and governmental designed to supply the non-agricultural population. The necessity for imports, therefore, has been due largely to the fact that the volume of domestic procurement has not been adequate to supply a growing

Table 4. Foodgrain Situation Including Imports and Exports 1947-48/1959-60

Year	Net Foodgrain Supply Available	Foodgrain Requirement[1]	Balance of Foodgrains
1947-48	6,180	6,138	+42
1948-49	7,095	6,224	+871
1949-50	7,033	6,311	+722
1950-51	6,816	6,399	+417
1951-52	6,676	6,605	+71
1952-53	6,865	6,706	+159
1953-54	7,553	6,808	+745
1954-55	6,900	6,891	+9
1955-56	6,405	6,984	-579
1956-57	7,924	7,097	+827
1957-58	7,241	7,214	+27
1958-59	6,599	7,335	-736
1959-60	8,019	7,460	+559

[1]At 18 ounces per adult per day, i.e., about 14.5 ounces per person per day.

urban population. This in part may be due to inadequacies of government procurement policies, particularly as regards prices offered which have usually been set at a level corresponding to the seasonal low during the main harvesting period. One reason for this may be to minimize the financial burden on the treasury due to the fact that government procured foodgrain supplies have not always been sold at a price sufficiently high to cover procurement plus marketing costs and thus involved a subsidy.

On the other hand the lack of an adequate volume of internal procurement sufficient to cover urban foodgrain requirements is indicative of the strength of demand for foodgrains at present real income levels, on the part of the rural population, which is somewhat higher than the minimum calorie levels assumed here. The income elasticity for food is probably high in East Pakistan. Moreover, due to the high degree of self-sufficiency in East Pakistan agriculture where most foodgrains is produced for direct consumption, the level of rural consumption fluctuates annually with the size of the crop, i.e., additional production is largely consumed on the farm. This may also be indicative of a minimum cash requirement for non-agricultural goods or at least one which may not change much with the size of the cereals crop.

Given the rate of increase in population illustrated in Chapter II and the relative dearth of unused land resources relative to the population, as well as the overwhelming rural nature of the economy and the failure of yields to expand, the outlook for increasing the volume of foodgrain surpluses in rural areas, which could be used to feed an increasing urban population, is not good. Assuming that these estimates of minimum calorie requirements in terms of foodgrains were to hold in the future and the rural pattern of consumption would not change with relatively static income patterns, then it is unlikely that

any considerable increase in rural procurement of foodgrains by government would occur. The conclusion, therefore, would appear to be that the need for imports for foodgrains is more likely to increase than to diminish in the future, unless trends in production and population growth as envisaged here were to change.

Efforts were made by the Government to increase foodgrain production through yields--by use of better seeds, fertilizer, etc., but there is little evidence of any response to these efforts. Efforts have also been made to tackle the problem from the other side of the equation through a reduction in the rate of growth in population. Again it has been indicated that this rate has been increasing as a result of a high and stable birth rate with a decreasing trend in death rates. For political and social reasons it is highly unlikely that public health programs, largely responsible for the decline in the death rate, will be relaxed. Any reduction in the net surplus of births over deaths, therefore, would need to be induced through efforts to reduce the high birth rate through measures to introduce family planning concepts, such as the establishment of planned parenthood clinics. The extent of efforts in this direction by the Government have been limited to date. Government efforts would need to be stepped up drastically if any significant results are to be attained. Even so, it is unlikely that immediately effective results would appear.

Meanwhile, short-term measures designed to alleviate the tight foodgrains situation have been adopted through the imposition of regulations designed to restrict consumption. Rationing had been maintained since Independence until recently for the urban population with varying degrees of success. Various regulations have also been issued to restrict overconsumption and waste not only of foodgrains but for sugar, potatoes and animal products. Limits have been imposed on the number of people to whom such items may be served

on festive occasions and social ceremonies. Such measures, however, must be considered as mere palliatives and do not attack directly the two main problems involved; namely, the need to increase the productivity of agriculture and or to reduce the rate of growth in population.

CHAPTER V

POPULATION AND FOODGRAIN SUPPLY PROJECTIONS AND CONCLUSIONS

Population has been increasing at a rapid rate in East Pakistan though the rate of increase is not the highest in the world. Unless Malthusian "positive checks" become operative or, otherwise, some very strong and effective measures on the part of the Government to institute preventive checks, this tendency to increase will continue for a number of years.

As stated earlier, famine in the early Forties in Bengal and migration around 1947 resulted in a setback in the population growth between 1941-1951 (see Table 1). It is also possible that this difference may be due to inaccuracies of the data.

Thompson[1] thinks that the rate of population growth will rise rapidly for some time as determined by "the degree of success attained by the health services." The birth rate, according to him, "will decline very slowly within the next two or three decades, if at all, while the death rate may drop rapidly after another five or ten years." His projection of population growth or rather what he calls his "informed guess" for the country as a whole for every 1,000 people is shown in Table 5.

---

[1]W. S. Thompson, Population and Progress in the Far East, p. 280.

Table 5.[1] Probable Birth and Death Rates, and Population Increase in Pakistan, 1951-83

Years	Birth Rate	Death Rate	Natural Increase	Percentage Increase
1951-58 (7.5 years)	42	30	12	1.2
1959-63 (5 years)	42	28	14	1.4
1964-68 (5 years)	41	26	15	1.5
1969-73 (5 years)	40	24	16	1.6
1974-78 (5 years)	38	20	18	1.8
1979-83 (5 years)	38	18	20	2.0

The rate of increase per annum estimated by the Planning Commission[2] is:

Years	Percentage Rate of Increase
1947-48/1950-51	1.40
1951-52/1954-55	1.42
1955-56/1964-65	1.45

According to the latest available census figures the population of East Pakistan now stands at 50.844 million as compared with the 1951 census estimate of 42.063. This comparison indicates an increase of about 20.9 per cent over the decade or at a rate of about 2 per cent per annum. This rate of increase is much higher than that which was projected either by Thompson or the Planning Commission. If this is the rate of increase over the past decade, the rate of increase

[1] Ibid.

[2] The Second Five-Year Plan, Planning Commission, Government of Pakistan, p. 331.

in the subsequent years is likely to be at an accelerated pace if no appreciable decline is envisaged in the birth rate but a decline in the death rate continues. Perhaps 2.4 per annum would not be too high an estimate as a maximum. Should the birth rate decline to 40 per thousand and the death rate does not decline as fast as has been envisaged, i.e., if it should decline to 20 per thousand the rate of increase would then be about 2 per cent. Two per cent increase is likely to be the minimum rate. For the purpose of this study we assume this 2 per cent growth throughout the period under study. A population projection based on this estimate is calculated in Table 6.

Table 6. Projection of Rate of Increase and Population Growth in the Decades 1961-2001

Years	Birth Rate	Death Rate	Natural Increase	Population in millions
1961	42	22	20	50.996
1971	42	22	20	62.164
1981	41	21	20	75.778
1991	41	21	20	92.373
2001	40	20	20	112.602

Under this assumption the population in 1961 would more than double by the close of the century.

To feed this population, more than double the present (1959-60) quantity of foodgrains would be required, on the assumption of no appreciable change in the consumption habits of the people, their income and prices in general.

To this quantity may also be added the requirements for seed, feed, and waste which is estimated to be 10 per cent of total.

Thus on the basis of 14.5 ounces of per capita per day, plus the requirement for seed feed etc., the total foodgrain requirements over the decades 1960-61/2000-2001 works out to be:

Years	Foodgrain Requirements for Human Consumption	Foodgrain Requirements for Feed, Seed, Waste	Total Food Grain Requirements
	----------in million tons----------		
1960-61	7.547	0.839	8.386
1970-71	9.194	1.022	10.216
1980-81	11.215	1.246	12.461
1990-91	13.671	1.519	15.190
2000-2001	16.665	1.852	18.517

If the population has to be fed entirely from the local produce at the present level of consumption then there are several possibilities to augment the available food supplies viz. (i) to increase the area under cultivation, (ii) to increase the productivity from land, and (iii) to reduce the extent of wastage. An alternative possibility is to reduce the number of mouths to feed either by increasing the death rate or reducing the birth rates.

If the population has to be fed entirely from the local produce, the crop area will also have to be doubled, if the productivity of the land and the extent of double cropping is assumed to be the same as at present.

The possibilities for extending the agricultural crop area is limited, the limit being imposed by political boundaries, water resources, etc.

The total area of the province is only about 35.4 million acres of which a maximum of 26 million acres could be cultivated ultimately.[1]

---

[1]Planning Commission, Government of Pakistan, The Second Five Year Plan, 1960-65, p. 194.

At present, only about 21.6 million acres are under cultivation of which about 1.2 million acres remain current fallow. The ultimate maximum net area sown would be about 25 million annually excluding current fallows amounting to one million acres. The possible net increase in the area is thus likely to amount to about 3.6 million acres.

The use of an acre twice or thrice when previously it was used once a year is in a sense equivalent to an expansion of area. Nearly two thirds of the area in the province is single cropped (see Appendix I). An additional solution therefore lies in converting as much as possible of this single cropped area into double or multiple cropped area.

Dr. Van Blommestein[1] estimated that of 22 million acres under cultivation 13 million acres were not subject to inundation or only inundated in part. He considered it practicable to irrigate this huge area by a canal system fed by pumping stations or by the construction of barrages. This is also indicated in the First Five Year Plan of Pakistan[2] which reads:

> The ultimate increase in the sown area is limited by water supply available during the dry winter season. Its maximum availability in winter, for agricultural purposes, has been estimated roughly to be of the order of 50 million acre feet, which if properly utilized, would be able to irrigate about 13 million acres. Given adequate supplies of water, it should be possible to sow 25 million acres in the monsoon, and 80 per cent of this, or 20 million, in the winter.

The Planning Commission's estimates add up to a gross of 45 million acres that can be cropped including double cropping.

Crop yields in East Pakistan are low though not significantly as compared with neighboring countries. Rice (Paddy)[3] yields in some

---

[1]FAO: The Appraisal of Agricultural Fishery and Forestry Resources in Relation to Needs in the Lower-Ganges-Brahmaputra Basin, Ch. V, p. 65.

[2]First Five Year Plan: National Planning Board, Government of Pakistan, p. 344.

[3]The ratio of paddy to cleaned rice is 100:60-65.

of the Asian countries are:[1]

Countries	Yield quintals per hectare
India	13.6
Burma	17.0
Ceylon	15.5
Thailand	13.9
Philippines	11.0

In East Pakistan the yield per acre of rice (cleaned) is around 10 maunds[2] per acre,[3] i.e. about 14.6 quintals per hectare of paddy.

These low yields could be improved with water control measures, use of fertilizer and other cultural practices, research and extension.

Ong, in his Farm Management Studies for the Ganges-Kobadak area assumed an increase in paddy yield from 13.5 to 21.6 maunds from the effects of irrigation alone.[4]

All other evidence also points toward "a gain of around 10 maunds or perhaps more from controlled irrigation, without manuring or other cultural improvements, compared with the average of good and bad years when the paddy crop is dependent on the fortunes of the monsoon floods."[5]

As regards the ability of fertilizer to increase yields the results obtained to date have been mainly that from experiment research station. This data has led to considerable controversy.[6] Mukerjee,[7] however,

---

[1]FAO Production Yearbook, 1960, Rome. Table 18, pp. 50-51.

[2]One maund is equal to 82.286 lbs or 0.373 quintals.

[3]See Appendix V.

[4]FAO: The Appraisal of Agricultural, Fishery and Forestry Resources in Relation to Needs in the Lower Ganges-Brahmaputra Basin, Ch. VI, p. 14.

[5]Ibid., Ch. VI, pp. 14-15.

[6]Ibid., Ch. VI, p. 23.

[7]He writes: "As a result of my observations on the effects of fertilizers on the growing crops and discussions with the cultivators,

is of the opinion that there is no reason why the response to fertilizers in West Bengal and East Pakistan should be lower than in Bihar.

The response to fertilizer is estimated by FAO to be on the average around 10 maunds (3.73 quintals) per acre for paddy and 5-7 maunds (1.865-2.611 quintals) for Rabi cereals; for pulses it is estimated to be similar to winter cereals "but data are too scanty to be sure."[1]

Data are also not available on the response of crops to factors other than irrigation or fertilizer. It is, however, generally held "that use of existing improved varieties under existing conditions would raise yields from 15 to 25 per cent."[2]

Of the 26 million acres (see page 44) 13 million acres can be irrigated; a little over 10 million[3] cannot be irrigated because of annual inundation, and the rest also cannot be irrigated because of the elevation being slightly higher or because of special soil or other characteristics.[4]

At present these inundated lands are used principally for boro rice cultivation. "Much of it is irrigated by a primitive system from the deeper areas where water remains." The extent of this area

---

I am convinced that the conclusions drawn by the FAO expert Teensma and the Economic Botanist, Dr. Alim, that the use of fertilizers is not economical and should be advocated with great caution, are based on extremely limited evidence, much of which are not of general application." Monthly report of FAO, Nov. c.f. FAO, Appraisal of Agricultural, Fishery and Forestry Resources in Relation to Needs in the Lower Ganges Brahmaputra Basin, Ch. VI, p. 23.

[1]FAO: The Appraisal of Agricultural, Fishery, and Forestry Resources in Relation to Needs in the Lower Ganges Brahmaputra Basin, Ch. VI, p. 23.

[2]Ibid., p. 24.

[3]Ibid., p. 35.

[4]Ibid., p. 35.

cropped is limited by the land that can be prepared in time.[1]

As regards the prospects of increasing the yields of crops in these inundated areas the FAO report reads:[2]

> . . . It would appear probably, however, that after the development of the irrigation resources of the lower Ganga Brahmaputra basin, irrigated paddy will have a very considerable comparative advantage, and with the gradually increasing importance of an exchange economy, rice production is likely to be confined to these areas. Therefore, except in so far as the inundated areas can be dependably irrigated by pumping from rivers or lakes during the dry season,[3] the land-use may well change from transplanted boro to other Rabi crops for which the area will have a greater comparative advantage. In bringing the full area available under crop, better implements, stronger draft animals, and perhaps even some mechanical power will be important.

The FAO report reads further that:

> Yields of rabi crops in these seasonally inundated areas should be capable of reaching levels well above the present average rabi yields in the survey unit, where a large proportion of the rabi grows under precarious moisture conditions. The exceptionally high initial soil moisture, the comparatively adequate winter rainfall and the very considerable possibilities for supplementary irrigation should ensure near-optimum moisture requirements with improved variety, better soil preparation and fertilizers there would appear to be no reason why yields of cereals and pulses should not average at least 15 maunds (5.595 quintals).

---

[1]B. L. C. Johnson, "A Note on cropping system in relation to physiographic conditions in East Pakistan," 1957.

[2]The Appraisal of Agricultural, Fishery, and Forestry Resources in Relation to Needs in the Lower Ganges Brahmaputra Basin, p. 36.

[3]Van Blommestein's proposals for maintaining water levels in the Mymensingh Sylhet depression by a barrage across the Surma on Meghna are relevant here. The Appraisal of Agricultural, Fishery, and Forestry Resources in Relation to Needs in the Lower Ganges Brahmaputra Basin, p. 36.

The resultant yields from better irrigation facilities, use of fertilizers and improved farming, are estimated in the FAO report[1] at 40 maunds (14.92 quintals) per acre for paddy (i.e., an increase of about 25 maunds (9.325 quintals) per acre) 25 maunds (9.325 quintals for wheat and 20 maunds (7.46 quintals) for pulses. No definite figures are available for rice yields in the nonirrigated area; however, the estimates for other cereals and pulses are around 15 maunds (5.595 quintals) per acre.

The Planning Commission's estimates of 45 million acres that can be cropped annually including double cropping may be distributed between foodgrains and other crops on the basis of their existing distribution[2] as follows:

	Summer[3] Monsoon	Winter[4] Monsoon	Total
	------- in million acres ------		
Net cultivated area	25.0	20.0	45.0
All other crops (excluding foodgrains	4.5	3.5	8.0
Foodgrains	20.5	16.5	37.0

This foodgrain area may be distributed to rice and other crops as follows:[5]

---

[1]Ibid.

[2]The existing ratio between food and other crops (excluding foodgrains) is approximately 11:2.

[3]June to October.

[4]November to February.

[5]The entire area under foodgrains would be put under rice cultivation during summer monsoon and approximately 50% of the total foodgrain area would be put under rice during winter monsoon and remaining area under other foodgrain crops, because of suitability of soil, demand for other foodgrains such as gram, wheat, etc.

	Summer Monsoon	Winter Monsoon	Total
	in million acres		
Wet rice	20.5	8.3	28.8
Dry crops	--	8.2	8.2

The maximum yield per acre of rice and other foodgrains estimated in the FAO report using the best of present known technology is:

	Summer Monsoon	Winter Monsoon
	in long tons per acre	
Wet rice (cleaned)	1.0	0.75 [1]
Dry crops	--	0.70

The production of foodgrain thus calculated would be:

	Summer Monsoon	Winter Monsoon	Total
	million long tons		
Wet rice (cleaned)	20.5	6.20	26.7
Dry crops	--	5.8	5.8
	20.5	12.0	32.5

This is the maximum possible foodgrain production that the Province could have when all the land and water resources are fully developed and all the present known technology is applied. This is much more than the requirements estimated for the beginning of the next century which is about 18.517 million long tons inclusive of feed, seed, etc.

These estimates, however, do not seem feasible of achievement in the next forty years. The irrigation of entire 13 million acres does not seem likely to occur in this period in view of achievements to date. The irrigation program envisaged in the First Five Year Plan was only partially fulfilled. Against a target of 100,000 acres of new

[1] No estimates were given by the FAO of winter rice yields. These are therefore estimates based on slight improvement over the present yields.

area to be brought under cultivation and 1,819,000 acres improved through irrigation facilities, the achievements were only 58,000 acres and 562,000 acres respectively.[1] During the Second Plan, the cultivated area likely to be improved by irrigation and the new area to be irrigated are 1,127,000 acres and 230,000 respectively.[2]

Keeping in view the past performance and present estimates made by the Planning Commission about the extension of irrigation facilities, it would not be too ambitious to expect 1.4 million acres of new area to be brought under irrigation and 6,900,000 acres improved through irrigation facilities. In all, therefore, about 8.3 million acres would be irrigated at the beginning of the next century out of an estimated irrigable area of 13 million acres.

The total area at present under cultivation is 21.6 million acres (of which 1.2 is current fallow) and the new area to be brought under cultivation over the next 40 years would be 1.4 million acres. The net cultivated area would thus be 23 million acres of which at least 1.0 million may be expected to remain current fallow. Thus, the remaining area of 22 million acres could be made available for cultivation. This is taken to be a reasonable and achievable goal based on past performance.

The Planning Commission estimates that the 100 per cent of the cultivated area (25 million acres) is a maximum that could theoretically be brought under cultivation during the monsoon season (see page 45). In winter it estimates 80 per cent of this area (see page 45), i.e., about 17.6 million acres, could be sown during winter. This adds up to 39.6 million acres. However, irrigation facilities as estimated here will be available to the extent of 8.3 million acres and the extent of double cropped area at present is only 5.5 million acres[3] all of which adds up

---

[1]Second Five Year Plan, Planning Commission, Govt. of Pakistan, p. 197.

[2]Ibid., p. 137.

[3]Presumably in the non irrigated area.

to only 13.8 million acres or roughly about 14 million acres to be double cropped. Therefore, on this basis only 36.0 million acres would be available for cultivation towards the close of the century.

This entire area, however, will not be put to foodgrain cultivation. At present, the ratio of area under foodgrain to other crops is about 11:2. If this same ratio is also considered the distribution of area to foodgrain and other crops would be:

	Summer monsoon	Winter monsoon	Total
		million acres	
Net cultivated area	22.0	14.0	36.0
Other crops (excluding foodgrains)	3.5	2.9	6.6
Foodgrains	18.5	11.1	29.6

The breakup of area between rice and other foodgrains would thus be:

	Summer monsoon	Winter monsoon	Total
		million acres	
Wet rice	18.5	5.6	24.1
Dry crops	---	5.5	5.5

To achieve the high yields estimated by FAO under optimum conditions given present knowledge (see page 49) though possible is not feasible in so short a time. No estimates are given by FAO for rice yields in the non-irrigated areas. Feasible yield estimates considered here would be about 0.75 long tons per acre of wet rice[1] in summer monsoon and 0.52 million tons (long) per acre in winter monsoon and that of other foodgrain on an average would be around 0.56 tons (long) per acre.

---

[1]Cleaned.

The production of foodgrains thus calculated on the basis of above yield and feasible acreage estimates would be:

	Summer monsoon	Winter monsoon	Total
	in million long tons		
Wet rice (cleaned)	13.88	2.96	16.82
Dry crops	--	3.08	3.08
Total	13.88	6.02	19.90

If 10% of the foodgrains are deducted from this for feed, seed, waste, etc., the available supply at the beginning of the next century would be 17.91 million (long) tons. The per capita availability of foodgrains on the basis of this feasible programme would be about 1,580 calories in the year 2001 for a population of 112.6 million. The increase over the present consumption level would thus be about 130 calories, i.e., about 9% increase.

Such a per capita supply of foodgrains would seem adequate at the present level of consumption and income. However, these levels are not likely to remain static. With industrialization and urbanization income levels are likely to increase thus raising also the demand for food.

The conclusion of this examination of the relationship between probable increases in population and feasible upward adjustments in the acreage under cultivation and the yields per acre of food grains based on present knowledge is that foreseeable expansion in the food grains supplies is unlikely to meet the need of the population beyond the near-present levels of consumption. This would be unsatisfactory on political and welfare grounds. Considerable effort would need to be made by government and the rural community merely to keep on an even plain. No bright future could be held out to the population as a reward for extra effort, the adoption of improved technology and additional capital investment.

Assuming the "feasible" estimates given here are all that is possible on the basis of present programs, it is highly likely that food grains and other food stuffs would have to be imported to feed a growing industrial and urban population who presumably would, as a result of their higher productivity, trade union activities and government measures designed to increase real incomes, demand a higher standard of living than they are now enjoying. Developments in recent years point in this direction.

This would still leave, however, a vastly increased rural population at or near present levels of real incomes as most of their working time would be devoted to producing the basic food stuffs required for their maintenance. It may be concluded, therefore, that extraordinary effort, over and above that presently being put forth which is extrapolated in the "feasible" targets adopted here, will be necessary in order to achieve a closer approximation to FAO's maximum achieveable acreage and yields, if any material improvement is to be made on the present plane of living.

Such extraordinary measures would require a rapid stepping up of the rate of growth of those factors considered to be necessary in order to translate presently known and improved knowledge to rural population. This means improvements in the basic level of general education through the elementary school system including training in technology required for increased production. Such improved basic educational facilities must be supplemented by an effective extension service. Product markets for factors of production, particularly for fertilizers, improved seed, etc., must be developed. Moreover, in the near future, programs for necessary water control measures on a considerable scale must be planned and implemented, for, on the scope envisaged by FAO, forty years is not a very long time for implementation.

As stated above the view adopted here is one of questioning the belief that the goals laid down by FAO can effectively be implemented. Hence, under the assumption that adequate foreign exchange or foreign aid will not be forthcoming to finance food imports, an alternative or complementary solution is to attempt to slow down the rate of increase in the population. It will be remembered that the rate of growth of population of 2 per cent adopted here is a minimum; on the basis of recent trends a higher rate of 2.4 per cent could well occur. The solution of letting the death rate rise is neither politically or morally feasible. Attention, therefore, needs to be directed to a slowing down in the birth rate from present high levels. This may well come about naturally with the continued growth in population relative to natural resources and possible increases in real incomes similar to that which has taken place in Japan and in Europe. For purposes of policy making, however, it is not feasible to assume that this will take place. The advocacy of a program of birth control, however, involves problems which probably are equally as difficult as those required to solve the problem of production. Effective implementation is unlikely to come about as a result of official government programs in the absence of active cooperation and initiative on the part of the population in general. It is not the purpose here to examine what would be a feasible program for reducing the birth rate but only to indicate that unless the production of food can be increased at a much greater rate than is expected here then the only method of tackling the problem is to reduce the number of mouths to be fed below that which may be expected as a result of the present trends in birth and death rates.

BIBLIOGRAPHY

Central Food and Technological Research Institute, 1952, Mysore, "Food and Population and Development of Food Industries in India."

Department of Agriculture and Forests, Government of Bengal, 1944-45, Calcutta, "Agricultural Statistics by Plot to Plot Enumeration in Bengal." Part I.

Directorate of Agricultural Marketing, East Pakistan, 1958, Dacca "Rice Situation in East Pakistan."

Food and Agriculture Organization, Rome, 1960 "Production Year Book."

Food and Agriculture Organization, Rome, unpublished, "Appraisal of Agricultural, Fishery and Forestry Resources in Relation to Needs in the Lower Ganges Brahmaputra Basin."

Government of Bengal, 1940, Calcutta, "Report of the Land Revenue Commission," Bengal, Vol. I.

Government of Pakistan, 1951, Karachi, "Census Report of Pakistan," Vol. I.

Jack, J. C., 1915, Calcutta, "Final Report on the Survey and Settlement of Operators in the Bakarganj District, 1900-1908."

Ministry of Agriculture, Government of India 1948, Delhi "Estimates of Area and Yield of Principal Crops in India, 1936-46."

Ministry of Food and Agriculture, Government of Pakistan 1961, Karachi, "Area, Production and Yield per Acre of Principal Crops in East Pakistan 1947-60."

Ministry of Food and Agriculture, Government of Pakistan, March 1959, Karachi, "Land and Crop Statistics of Pakistan," Fact Series III.

Ministry of Labour, Government of Pakistan, 1956, Karachi, "Manpower Survey Report."

Mukherjee, R. K., 1938, London, "Food Planning for Four Hundred Million."

Nafis, Ahmed, 1958, Karachi and New York, "An Economic Geography of East Pakistan.

National Planning Board, Government of Pakistan, December 1957, Karachi, "The First Five Year Plan 1955-60."

O'Malley, 1916, Calcutta, "Rajshahi District Gazetteer."

Planning Commission, Government of Pakistan, February, 1961, Unpublished "Memorandum on the U.S. Surplus Agricultural Commodities Aid to Pakistan."

Planning Commission, Government of Pakistan, 1960, Karachi "The Second Five Year Plan 1960-65."

Proceedings for the IX Pakistan Science Conference, 1957, Peshawar "Symposium on the Causes of Decline in Agricultural Production in Pakistan."

Saha, K. B., "Economics of Rural Bengal."

Singh, Baljit, 1947, Bombay, "Population and Food Planning in India."

Thompson, W. S., 1959, University of Chicago Press, "Population and Progress in the Far East."

APPENDICES

APPENDIX I - Classification of Area in East Pakistan 1936-1957.

Years	Total Area	Area Not Reported	Area Reported: Forest Area	Not Available for Cultivation	Other Uncultivated Land Excluding Current Fallows	Current Fallows	Net Area Sown	Total Area Cultivated 7 & 8	Area Sown More Than Once	Total Crop Area Col. 8 & 10	Total Col. 4 & 5 & 6 & 9
1	2	3	4	5	6	7	8	9	10	11	12
					in thousand acres						
1936-37 to 1938-39 (average)	33,882	NA	3,066	6,162	3,840	2,312	18,502	20,814	4,281	22,783	33,882
1939-40	34,255	"	3,155	6,124	3,955	2,251	18,770	21,021	4,314	"	"
40-41	34,255	"	3,124	6,033	3,300	2,796	19,002	21,798	4,403	"	"
41-42	34,255	"	3,151	5,934	3,803	2,994	18,373	21,367	4,593	"	"
42-43	34,143	"	3,113	5,592	3,710	2,448	19,280	21,728	5,342	"	"
43-44	34,143	"	3,118	"	3,738	1,448	20,247	21,695	6,184	"	"
44-45	34,143	"	3,111	5,498	3,561	1,577	20,396	21,973	6,859	"	"
45-46	34,107	"	3,117	5,469	3,487	1,786	20,242	22,028	5,883	"	"
46-47	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
47-48	35,383	732	2,982	5,351	4,288	2,601	19,428	22,029	"	--	34,650
48-49	35,383	731	2,982	5,098	4,230	2,692	19,649	22,341	5,592	24,242	34,651
49-50	"	732	"	5,005	4,335	2,232	20,096	22,328	5,562	25,658	34,650
50-51	"	"	3,150	4,762	4,504	1,692	20,542	22,234	5,708	26,250	34,650
51-52	"	733	"	4,770	4,481	1,552	20,696	22,248	6,080	26,776	34,659
52-53	"	734	"	4,797	4,393	1,401	20,907	22,308	6,574	27,481	34,648
53-54	"	731	"	4,770	4,396	1,445	20,890	22,335	6,909	27,799	34,651
54-55	"	"	5,510	5,010	2,010	1,170	20,960	22,130	6,570	27,530	34,660
55-56	"	"	5,460	5,550	1,990	1,200	20,450	21,650	5,510	25,960	34,650
56-57	"	"	5,460	5,590	1,960	1,190	20,450	21,640	5,480	25,930	34,650

Source: 1936-37 to 1945-46: Estimates of Area and Yield of Principal Crops in India 1936-46, Min. of Agri., Govt. of India.
1947-48 to 1953-57: Land and Crop Statistics of Pakistan, Min. of Food and Agriculture, Govt. of Pakistan, Karachi.

APPENDIX II - Area Under Principal Crops in East Pakistan, 1936-60

CROPS	Average 1936-37 to 1938-39	1939-40	1940-41	1941-42	1942-43	1943-44	1944-45
				In Thousand Acres			
Rice	16,837	16,866	15,971	17,582	17,691	20,115	21,554
Wheat	56	64	61	60	65	77	100
Bajra	--	--	--	--	--	--	--
Jowar	1	1	--	1	2	2	2
Maize	6	3	5	5	15	8	13
Barley	61	54	61	61	77	74	146
Total Cereals	16,961	16,988	16,098	17,709	17,850	20,276	21,815
Gram	101	109	119	120	160	164	283
Total Foodgrains	17,062	17,097	16,217	17,829	18,010	20,440	22,098
Sugarcane	256	258	269	258	252	283	254
Rape & Mustard	576	635	625	619	722	667	419
Sesamum	177	163	156	160	154	166	160
Jute	2,115	2,367	4,526	1,382	2,481	1,939	1,523
Cotton	59	64	79	79	79	56	80
Tea	108	108	108	108	108	108	108
Tobacco	279	283	289	289	274	272	146
Total area under crops	20,632	20,775	22,259	20,724	22,080	23,931	24,788

Source: (1) Ministry of Agriculture, Government of India, Estimates of Principal Crops in India, 1936-46.
(2) Ministry of Agriculture, Government of Pakistan, Area, Production and Yield per Acre of Principal Crops in East Pakistan, 1947-60.

APPENDIX II - Continued

CROPS	1945-46	1946-47	1947-48	1948-49	1949-50	1950-51	1951-52
			--------- In Thousand Acres ---------				
Rice	20,305	NA	19,007	19,424	19,528	20,007	20,300
Wheat	85	"	85	95	97	94	96
Bajra	--	"	(a)	1	1	1	1
Jowar	2	"	1	1	1	1	1
Maize	7	"	6	7	12	13	10
Barley	103	"	73	85	86	82	82
Total Cereals	20,502	NA	19,172	19,613	19,725	20,198	20,490
Gram	221	NA	208	206	201	200	200
Total Foodgrain	20,723	NA	19,380	19,819	19,926	20,398	20,690
Sugarcane	259	"	224	225	227	226	229
Rape & Mustard	428	"	432	463	477	488	502
Sesamum	138	"	137	128	130	143	144
Jute	1,842	"	2,059	1,877	1,561	1,711	1,779
Cotton	91	"	56	55	55	55	56
Tea	109	"	70	73	74	75	75
Tobacco	151	"	131	126	128	128	130
Total area under crops	23,741	"	22,489	22,766	22,578	23,224	23,605

(a) Negligible

APPENDIX II - Continued

CROPS	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59	1959-60
	---------- in thousand acres --------							
Rice	20,778	22,010	21,336	19,486	20,055	20,235	19,643	21,151
Wheat	98	98	103	94	133	107	99	138
Bajra	1	1	1	1	1	1	(a)	(a)
Jowar	1	1	1	1	1	1	1	1
Maize	10	10	9	9	6	7	5	7
Barley	86	84	86	88	72	57	60	64
Total cereals	20,974	22,204	21,536	19,679	20,268	20,408	19,808	21,361
Gram	202	203	216	176	165	136	141	133
Total Foodgrain	21,176	22,407	21,752	19,855	20,433	20,544	19,949	21,494
Sugarcane	246	262	264	259	255	252	244	281
Rape & Mustard	507	505	521	543	468	398	554	578
Sesamum	147	149	151	153	153	124	139	142
Jute	1,907	965	1,243	1,634	1,230	1,563	1,528	1,375
Cotton	58	58	58	52	53	51	51	52
Tea	73	75	74	77	76	76	76	78
Tobacco	131	131	135	113	109	107	111	110
Total area under crops	24,245	24,552	24,198	22,686	22,777	23,115	22,652	24,110

APPENDIX III - Production of Principal Crops in East Pakistan, 1936-60

CROPS	1936-37 to 1938-39	1939-40	1940-41	1941-42	1942-43	1943-44	1944-45
	---------in thousand long tons ----------						
Rice (cleaned)	6621	6316	4701	7128	5331	8862	7669
Wheat	15	17	12	14	19	20	23
Bajra	--	--	--	--	--	--	--
Jowar	--	--	--	--	--	--	--
Maize	2	1	2	2	4	3	5
Barley	20	17	17	20	25	22	34
Total Cereals	6658	6351	4732	7164	5379	8907	7731
Gram	28	30	28	34	49	43	70
Total Foodgrain	6686	6381	4760	7198	5428	8950	7801

Source: Ministry of Agriculture, op. cit.

APPENDIX III - Continued

CROP	1945-46	1946-47	1947-48	1948-49	1949-50	1950-51	1951-52
			---------- in thousand long tons --------				
Rice (cleaned)	7256		6736	7673	7377	7343	7034
Wheat	18		20	19	23	20	23
Bajra	--		(b)	(b)	(b)	(b)	(b)
Jowar	--		(b)	(b)	(b)	(b)	(b)
Maize	2		2	2	3	3	2
Barley	21		15	16	17	15	16
Total Cereals	7297		6773	7710	7420	7381	7075
Gram	49		51	50	52	47	52
Total Foodgrains	7346		6824	7760	7472	7428	7127

(b) Below 500

APPENDIX III - Continued

CROP	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59	1959-60
			---------in thousand long tons ------					
Rice (cleaned)	7335	8245	7589	6384	8185	7598	6921	8482
Wheat	24	24	26	22	23	22	25	29
Bajra	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
Jowar	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
Maize	3	3	2	3	2	2	1	2
Barley	16	16	17	17	16	12	14	12
Total Cereals	7378	8288	7634	6426	8226	7635	6961	8525
Gram	53	54	63	44	35	35	38	29
Total Foodgrains	7431	8342	7697	6470	8261	7670	6999	8554

(b) Below 500

APPENDIX IV - Yield Per Acre of Principal Crops in East Pakistan, 1936-60

CROP	1936-37 to 1938-39	1939-40	1940-41	1941-42	1942-43	1943-44	1944-45
	---------- In Maunds of 82.286 pounds ----------						
Rice (cleaned)	10.7	10.2	8.0	11.0	8.2	12.0	9.2
Wheat	7.3	7.2	5.4	6.3	8.0	7.1	6.3
Bajra	--	--	--	--	--	--	--
Jowar	--	--	--	--	--	--	--
Maize	9.1	9.1	10.9	10.9	7.3	10.2	10.5
Barley	8.9	8.6	7.6	8.9	8.8	8.1	6.3
Gram	5.7	6.6	6.4	6.9	8.3	7.1	6.7

Source: Ministry of Agriculture, op. cit.

APPENDIX IV - Continued

CROP	1945-46	1946-47	1947-48	1948-49	1949-50	1950-51	1951-52
	---------- In Maunds of 82.286 pounds --------						
Rice (cleaned)	9.8	NA	9.6	10.8	10.3	10.0	9.4
Wheat	5.8	NA	6.4	5.4	6.5	5.8	6.5
Bajra	--	--	--	--	--	--	--
Jowar	--	--	--	--	--	--	--
Maize	7.8	NA	9.1	7.8	6.8	6.3	5.4
Barley	5.5	NA	5.6	5.1	5.4	5.0	5.3
Gram	6.0	NA	6.7	6.6	7.0	6.4	7.1

APPENDIX IV - Continued

CROP	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59	1959-60
	---------- In Maunds of 82.286 pounds ----------							
Rice (cleaned)	9.6	10.1	9.7	8.9	11.1	10.2	9.6	10.9
Wheat	6.7	6.7	6.9	6.4	4.7	5.6	5.9	5.7
Bajra	--	--	--	--	--	--	--	--
Jowar	--	--	--	--	--	--	--	--
Maize	8.2	8.1	6.0	9.0	9.1	7.8	5.4	7.8
Barley	5.0	5.1	5.4	5.2	6.0	5.7	6.3	5.1
Gram	7.1	7.2	7.9	6.8	5.8	7.0	7.3	5.9