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REGIONAL AGRICULTURAL GROWTH:

THE CASE OF WEST PAKISTAN

by

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Regional Agricultural Growth: The Case of West Pakistan^{1/}

by

Carl H. Gotsch

I. Introduction

West Pakistan presents one of the more encouraging examples of agricultural development in recent years. Relatively stagnant before 1959/60, it has managed to produce, for the period 1960-65, a respectable annual growth rate in agriculture of 3.8 per cent.

Although the improved performance of the agricultural sector is reflected somewhat in all sub-sectors, it is clear from Table 1 that the main growth component has been in the crop category. Output in these sub-sectors has increased at nearly 5 per cent per annum over the period.

Several recent commentators on the Pakistan case have suggested that a major factor in this improved performance

^{1/} I am indebted to Walter Falcon for comments. Remaining errors and points of view are, of course, my responsibility alone.

Table 1

Growth Trends in the Agricultural Sector,
West Pakistan, 1960-1965

	Growth Trend ^{a/} <u>(percent/annum)</u>	Proportion of Agricultural GNP <u>(1962/1963)</u>
Major crops	4.9	53.4
Minor crops	4.8	10.4
Livestock	1.9	34.9
Fisheries	3.9	.9
Forestry	9.7	.4
	<hr/>	<hr/>
TOTAL	3.8	100.

a/ Computed from National Income Commission [7], p.106.
1964/65 data obtained directly from the Central
Statistical Office. The estimate for livestock, however,
clearly needs an upward adjustment. See Gotsch and
Timmer [6].

of the agricultural sector was the general liberalization of the economy over the Second-Plan period (1960-1965). Specific policies that have been identified as being particularly favorable to agricultural development were (1) incentives in the form of substantial subsidies on inputs and reductions in export taxes on certain key commodities, (2) relaxation of compulsory procurement policies on wheat, and (3) general import liberalization that made raw materials available for the manufacture of implements, engines, pumps, etc.^{2/}

In addition to the general improvement in agriculture's economic environment due to what might be called discretionary measures, a recent study by Lewis and Hussain shows that the terms of trade between agriculture and industry were also shifting rather drastically in favor of agriculture from approximately 1955/1956 onward.^{3/}

Considering the significance that has been attached to

^{2/} Falcon and Gotsch 2/

^{3/} Lewis and Hussain 9/

the general incentives to agricultural development indicated above, one might have expected a picture of geographically diffused growth. Even a cursory look at the data, however, quickly dispels such a hypothesis. As Table 2 indicates, the wide disparity in regional progress that we have come to expect in developing countries is found in West Pakistan also. Generally, the area which was part of the former State of Punjab has exhibited marked progress relative to the areas that were previously a part of the State of Sind and the Northwest Frontier Province. This is true both in terms of absolute levels of output per worker and rates of agricultural growth.

Regional disparity in economic performance is also obvious within the borders of the former Punjab. Table 3 shows district trends in gross production value of major crops over the periods 1957/58 - 1964/65 and 1959/60 - 1964/65.

It is clear from these figures that what has been hailed rather widely as "agricultural growth in West Pakistan" is really a rather remarkable rate of growth in a relatively

Table 2

Agricultural Growth and Productivity in Major Crops by Region
in West Pakistan (1960-1965)

	Annual Trend Rates ^{a/}	GVP Per Farm Worker ^{b/}	Proportion of Total Production
	Percent	Rs/ Worker (64/65)	Percent (64/65)
Peshawar Region (North - roughly former N.W.F.P.) ^{c/}	1.8	441	14.3
Lahore Region (Central - roughly former Punjab) ^{d/}	6.0	654	64.0
Hyderabad Region (South - roughly former Sind) ^{e/}	3.5	523.	21.7

^{a/} Trend equation was $\log Y = a + b \cdot \text{time}$.

^{b/} Rural labor force based on projections from the 1960 Population Census.

^{c/} Contains Rawalpindi, Peshawar, and Dera Ismail Khan Divisions, shown in Figure 1.

^{d/} Contains Sargodha, Multan, Lahore, and Bahawalpur Divisions, shown in Figure 1.

^{e/} Contains Hyderabad, Kalat, Khairpur, Quetta and Karachi Divisions, shown in Figure 1.

Figure 1.

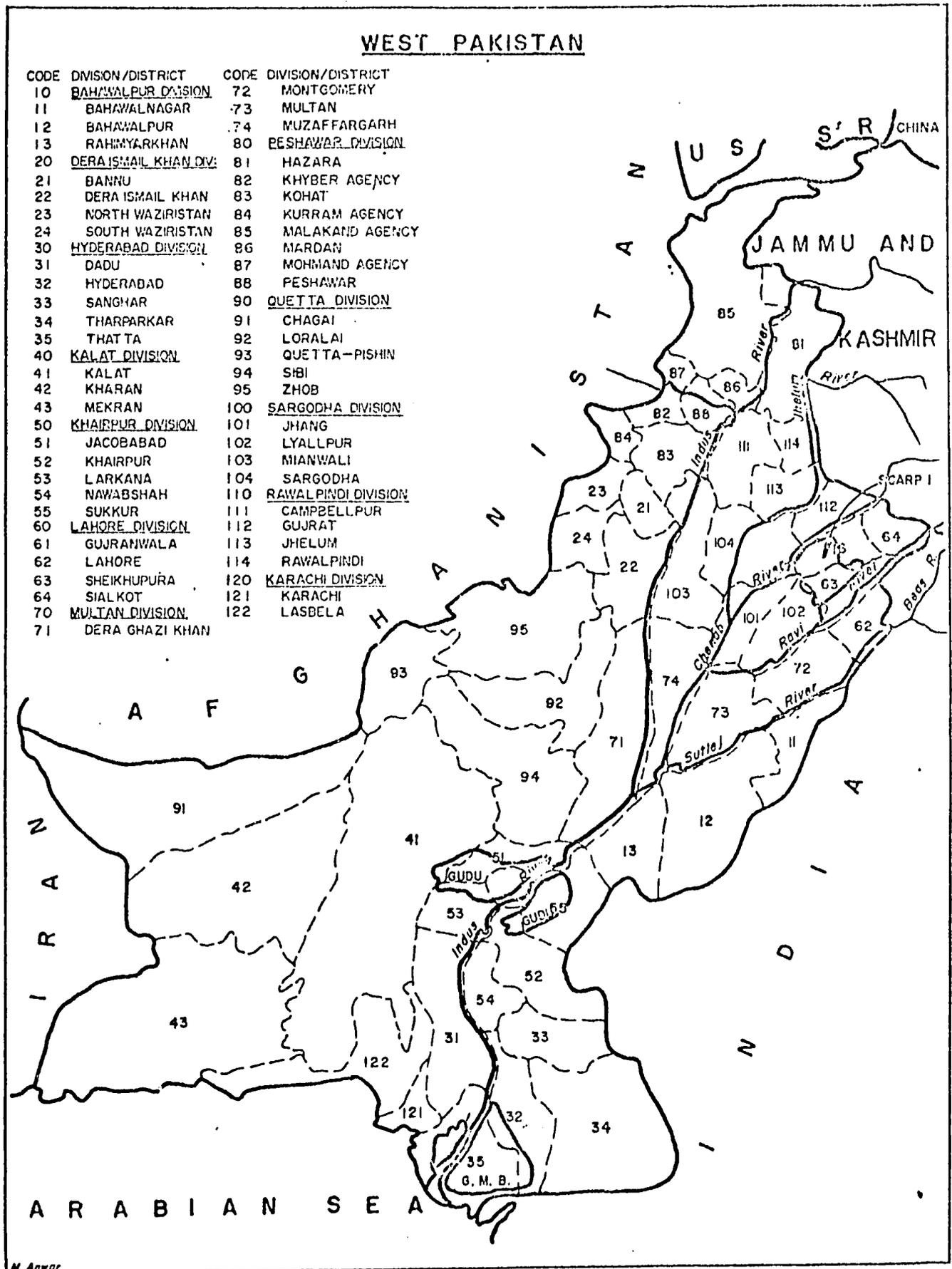


Table 3

Growth in Gross Production Value for Major Crops by ^{a/}
District, Former Punjab

District	57/8	⁻² R	60/1	⁻² R	Proportion of Total Production	
	64/5		64/5		1957/8	1964/5
	%	^{b/}	%	^{b/}	1	2
Jhelum	-4.3	.15	.4	0	2.6	1.5
Gujrat	3.2	.59	2.4	0	5.0	4.2
Sargodha	4.2	.67	3.2	.33	9.0	8.2
Lahore	4.0	.35	4.2	0	4.6	4.1
Siaklot	- .11	0	-1.6	0	5.4	4.3
Sheikhupura	4.5	.54	7.81	.94	5.3	6.0
Gujranwala	4.3	.66	5.61	.62	6.8	6.7
Rawalpindi	.8	0	-1.11	0	1.6	1.4
Campbellpur	-1.6	0	-2.5	0	3.1	2.1
Lyallpur	5.4	.79	9.3	.96	14.6	15.8
Jhang	5.1	.81	8.3	.95	5.2	5.6
Mianwali	.7	0	3.4	.54	3.9	3.4
Multan	5.7	.83	8.6	.89	15.5	16.3
Montgomery	6.4	.92	9.0	.99	12.0	13.8
D. G. Khan	9.6	.91	12.1	.92	1.7	2.5
Muzaffargarh	5.5	.71	8.6	.65	3.8	4.3
Total Former Punjab	4.3	.83	5.7	.74	100.	100.

^{a/} Estimating equation for growth rates: $\log y = a + b \cdot \text{time}$

^{b/} $R^2 = R^2$ corrected for degrees of freedom.

few districts. For example, Lyallpur, Multan, and Montgomery, 3 out of the 16 districts in the former Punjab, have averaged an increase of approximately 8.9 per cent per annum for the period 1959/60 to 1964/65. These three districts produce 46 per cent of the gross production value of the Punjab, yet occupy only 29.8 per cent of the cultivated area, and contain only 32.6 per cent of the population.

The comments made above are not to suggest that economic incentives have been insignificant in accounting for the improvement in West Pakistan's agricultural sector. What they do suggest, however, is that the response to these incentives has been exceedingly varied and that a real understanding of recent increases in output will require more detailed regional studies. Such regional comparisons may provide new ideas on everything from improved production relationships to a better appreciation of social and cultural impediments to development.

But the justification for increased attention to the regional aspects of growth goes beyond the need to know more about the ingredients of successful agricultural development

programs. It is important that planners in West Pakistan begin to be concerned about the inter-regional - the spatial - effects of national development policies. As Friedmann suggests, this may not be, initially, as important in a developing country as the need to get something - virtually anything - started.^{4/} But by all appearances, West Pakistan is already in a "transitional" period in which regional pressures on national policy will rapidly become more significant than they have been in the past. Awareness that some communities have been growing much more rapidly than others probably is not yet a sharply-focused part of the rural political scene, but that day is not far off. This is particularly true in light of the fact that major urban growth centers are

^{4/} Friedmann [^{3/} distinguishes four phases of national development, each of which is associated with a different level of concern regarding regional development policy.

<u>Type of Economy</u>	<u>Pre-Industrial</u>	<u>Transi-tional</u>	<u>Indus-trial</u>	<u>Post-Industrial</u>
Share of industry in GNP	0-10%	10-25%	25-50%	Declining
Importance of Regional Policy	Inappropriate	Critical	Vestigial	Shift to a new focus

developing in the areas that are experiencing the most rapid agricultural growth. For example, it is already obvious that cities such as Lyallpur, Lahore, Montgomery, and Multan are destined to become the centers of locational development matrices in the classic manner suggested by location theorists.^{5/}

In the following sections, some of the issues raised above are treated in greater detail. In Section II, an attempt is made to sort out the more obvious sources of diversity in growth rates shown in Table 3. (Analysis is restricted to the Punjab because of the lack of disaggregated data for the other regions.) On the basis of this analysis, a number of conclusions regarding regional agricultural development in the Indus Basin are drawn. Section III examines several issues that large and rapidly increasing disparities in regional growth pose for planners concerned with national development policy.

^{5/} See Schultz [15], Chapters 9 and 10, for one of the earliest expositions of the process of growth using this terminology. Further research by Nicholls [13] and Tang [16] is exceedingly relevant.

II. Sources of Inter-District Variation in Agricultural Productivity and Growth in the Former Punjab

The term "sources of growth" can be used in a number of ways. First, and perhaps most obvious, is its interpretation as a study of input-output relationships; analytical efforts usually involve either a "yardsticks" approach in which response coefficients of various inputs are measured separately and then assumed to be additive as the attempt to estimate a production function by econometric techniques. Because of data problems, this is generally the most difficult point of attack.

A second useful approach, at least in a multi-commodity type of agriculture, is to try to break down the increase in an area's gross value of production into such components as acreage effects, yield effects, cropping pattern effects, and some interaction of the above. Such an approach suffers in that it is usually non-stochastic, but it is much less demanding in terms of data and provides an easily understood means of disaggregation that keeps the total growth picture in view. Moreover, some notion of the effects of different types of physical inputs can be obtained since fertilizer

and improved seeds obviously act on yields, water may act on both yields and acreage, etc.

Lastly, "sources of growth" may refer to an analysis of the importance of particular commodities in increasing or decreasing the value of output. An example of such an approach is the familiar attempt to examine the relationships between cash crops and food crops in describing historical trends in the agriculture of less developed countries.

In the following paragraphs, all three perspectives will be utilized to look at the variation in district growth in the former Punjab.

Irrigation and Growth:

As someone once said, for selecting the largest tree among those of similar size, there is no substitute for measurement. But if one tree towers above the others, much can be accomplished by inspection. Such a metaphor seems appropriate in describing the presence or absence of a controlled water supply as a factor in explaining inter-district variations in growth. Indeed, in West Pakistan

such a conclusion is almost axiomatic since this region would, for the most part, quickly revert to the desert it once was, were it not for the annual outpouring of the irrigation canals that criss-cross the countryside.^{6/}

The data presented in Table 4 clearly support the above hypothesis. Districts having a large irrigated base relative to the total cultivated acreage have almost invariably had a substantial rate of increase in agricultural output. In fact, statistically, the irrigated-cultivated ratio accounts for nearly 60 per cent of the variation in growth rates.

Much the same point can be made by examining data on labor productivity. Table 5 shows indices of gross output of major crops per man during the past several years. With but one or two exceptions, returns per worker in districts having a proportionately large irrigated base are clearly higher, even if substantially larger costs of production were subtracted in the heavily irrigated

^{6/} Hsieh and Ruttan [8], however, draw the same general conclusion about the importance of irrigation for much of South and Southeast Asia.

Table 4

Growth Rates, Irrigated-Cultivated Acreage Ratio and Increased Water Supply, by District, Former Punjab

District	Annual Growth Rate	<u>Irrigated Crop Acreage</u> <u>Cultivated Crop Acreage</u>	Additional Irrigation Water
	%	% <u>a/</u>	acre ft/acre
Jhelum	.4	4.6	N <u>b/</u>
Gujrat	2.4	56.1	.16
Sargodha	3.2	63.4	.04
Lahore	4.2	93.5	.35
Siaklot	-1.6	41.2	.51
Sheikhupura	7.8	81.8	1.65
Gujranwala	6.6	102.5	1.36
Rawalpindi	-1.1	2.9	N <u>b/</u>
Campbellpur	-2.4	5.0	N <u>b/</u>
Lyallpur	9.3	112.0	.24
Jhang	8.3	82.2	.13
Mianwali	3.4	19.6	.04
Multan	8.6	100.2	.44
Montgomery	9.0	107.8	.46
D. G. Khan	12.1	43.8	.05
Muzaffargarh	8.6	78.7	.08

a/ Values greater than 100 indicate double cropping.

b/ Negligible.

Table 5

Indices of Gross Production of Major Crops Per Man in the Former Punjab

<u>District</u>	<u>Index of Labor Productivity</u>						
	<u>1959/ 1960</u>	<u>1960/ 1961</u>	<u>1961/ 1962</u>	<u>1962/ 1963</u>	<u>1963/ 1964</u>	<u>1964/ 1965</u>	<u>1964/ 1965</u> ^{a/}
Jhelum	100	89	60	91	80	77	414
Gujrat	100	109	117	123	121	114	552
Sargodha	100	115	116	119	119	119	952
Lahore	100	111	137	145	132	132	500
Sialkot	100	114	104	102	99	104	496
Sheikhupura	100	98	108	109	118	131	867
Gujranwala	100	110	123	114	121	135	1064
Rawalpindi	100	94	113	88	90	93	335
Campbellpur	100	93	92	98	90	90	455
Lyallpur	100	93	104	114	117	132	1133
Jhang	100	89	97	107	108	114	851
Mianwali	100	87	84	84	84	92	712
Multan	100	97	111	116	128	127	1141
Montgomery	100	100	106	116	126	130	881
D. G. Khan	100	100	106	128	142	144	447
Muzaffagarh	100	104	91	108	132	126	588

^{a/} Rupees of gross production value per man in the labor force.

area. As one would have expected from the data presented in Table 3, much of the divergence in returns per man has occurred in the recent past and is a function of the sharp differences in district growth referred to earlier. For example, in Lyallpur, Multan, and Montgomery, gross output per worker averages over Rs. 1000. This compares with approximately Rs. 400 per worker in districts such as Gujrat, D. G. Khan, and Jhelum. The indices for output per worker for the former districts stand at approximately 130 (1959/60=100) whereas, for the latter districts, it has in most cases declined.

Having said this much about the extent of irrigation as a major identifiable source of divergence in the regional growth rates of agriculture in West Pakistan, one is left, unfortunately, with the uneasy feeling of having answered everything and explained nothing. For example, such an explanation says nothing about why some areas currently have a high percentage of cultivated land under irrigation and others do not. Moreover, within the predominantly irrigated areas, the use of the irrigated-cultivated ratio as an independent variable does not distinguish between districts

whose water development is relatively recent, and those whose irrigated base is of long standing. The distinction is of some importance since, in the former case, additional water has probably been the primary direct source of growth while in the latter, the growth rate is more likely to be associated with other inputs such as fertilizer, improved seed, better management of existing water supplies and the like.

The implication, of course, is the same in both cases: water development is critical to any strategy of growth in West Pakistan. To point this out as strongly as possible may not be without service since it is only in recent years that authorities in West Pakistan have considered the massive tubewell program being undertaken as a basis for increasing output, rather than as a response to the water logging and salinity problem.

The first question raised above admits of an easy answer. That is, the districts showing little or no growth are primarily dryland wheat areas. Unlike some dryland areas - for example those in East Punjab - annual rainfall appears to be insufficient to support groundnuts or other crops that might

increase the value of output.^{7/} In addition, the low and uncertain rainfall makes the use of fertilizers much less attractive than it is in areas of adequate moisture. Hence, yields have also not increased over the period under study.

There is little reason to suspect that the current pattern of stagnation in the dryland areas will be altered radically by future developments. Their topography is generally broken and ill-suited for irrigation. Moreover, ground water, except in parts of Sialkot and the Gujrat Plain, is too far below the surface to permit easy exploitation. Consequently, these districts, and also a number of areas in the Northwest Frontier Province and the former Sind, are potentially the Appalachias of West Pakistan. (Such a diagnosis clearly presents a challenge to any regional development program and more will be said on this problem in the final section on policy.)

The second question raised by the correlation of the irrigated-cultivated ratio with growth is much more difficult

^{7/} For a discussion of recent growth trends in East Punjab, India, see Brown [1].

to answer. As indicated earlier, even if it has been shown that areas which have high ratios have made the most rapid progress in increasing agricultural output, it is not clear whether the growth was primarily a result of additional water supplies, or whether it was due to fertilizer, seeds, and other inputs applied to a more or less adequately irrigated base.

A full treatment of this question obviously requires a micro analysis of the areas under study. The data needed would include information on the changes in the volume of water utilized in each district, fertilizer use, distribution of seeds, and the like. Unfortunately, most of these data simply do not exist and the prospect of reconstructing them appears dim. For example, in the case of fertilizer, (1) physical inventories and stocks on the books of local cooperatives bear little relationship to each other over a major part of the Second-Plan period (1960/65), and (2) substantial unrecorded transshipment between areas occurred as the market circumvented the zoning system instituted in the last years of the Plan.

The one input about which there is some information

on increments by district for the period 1960-65, is water. The data, shown on Table 4, were derived by noting that canal supplies, i.e., surface water, did not appear to have increased significantly during the Plan period, but that there had been substantial additions to total water supplies as a result of private and public groundwater development.^{8/} By assuming that this increase was distributed regionally in approximately the same fashion that the capacity to pump water from the aquifer was distributed, estimates of increments per acre were obtained.

It is obvious, at least in terms of the available data, that there is little correlation in the already irrigated districts between incremental water supplies and the growth rate of the district. For example, Gujranwala and Sheikhpura appear to have profited significantly from large amounts of additional water; Lyallpur and Jhang, on the other hand, appear to have done equally well without. The important conclusion regarding regional variation and irrigation is that growth, where it did take place, was firmly linked to the

^{8/} See Ghulam Mohammad [12] for details of the acceleration in private tubewell installation.

existence of irrigation facilities and a large irrigated base.

Beyond that, the appropriate inference appears to be that incremental water was a sufficient but not a necessary condition for increased output. Districts experiencing a substantial increase in irrigation supplies invariably experienced rapid growth; however, rapid increases in output also occurred in certain districts in which very little additional water was available.

Components of Growth in GVP

The failure to obtain a satisfactory relationship between outputs and specific inputs, however, does not exhaust the insights which disaggregated studies can give into the sources of variation in regional growth. As indicated earlier, it is useful to know how acreage changes, yield changes, and cropping pattern shifts have interacted to produce the difference in GVP observed from one period to another.

A simple way of obtaining the necessary disaggregation has been suggested by Vinhas and Vardyanathan in their study of of Indian growth.^{9/}

^{9/} Minhas and Vardyanathan /11/.

Let (1) $GVP_0 = \sum_{i=1}^n A_0 p_i C_{i0} Y_{i0}$ and

(2) $GVP_t = A_t \sum_{i=1}^n p_t C_{it} Y_{it}$ where

GVP_0 = gross value of production in the base period.

GVP_t = gross value of production in the terminal period.

A_0 = total acreage in the base period.

A_t = total acreage in the terminal period.

Y_{i0} = yields of the i^{th} crop in the base period.

Y_{it} = yields of the i^{th} crop in the terminal period.

C_{i0} = percentage of the i^{th} crop of total acreage in the base period.

C_{it} = percentage of the i^{th} crop of the total acreage in the terminal period.

p_i = constant price weights for i^{th} crop.

then (3) $GVP_t - GVP_0 = (A_t - A_0) \sum_{i=1}^n p_i C_{i0} Y_{i0} +$

$$A_t \sum_{i=1}^n p_i C_{i0} (Y_{it} - Y_{i0}) +$$

$$A_t \sum_{i=1}^n p_i (C_{it} - C_{i0}) Y_{i0} +$$

$$A_t \sum_{i=1}^n p_i (C_{it} - C_{i0}) (Y_{it} - Y_{i0})$$

The first element on the right hand side of Equation (3) indicates the increase in output that would have occurred on the basis of area increases alone, yields and cropping pattern remaining constant. The second element is the effect of a change in yields for a constant cropping pattern; the third element indicates the effect of changes in the cropping pattern assuming constant yields, and the fourth and last element indicates the effect on output that can be attributed to an interaction between yield changes and shifts in the cropping pattern.

The calculations involved in (3) are, of course, simple arithmetic and the analysis is strictly non-stochastic. However, it permits a quantification of the effects on the value of output of shifting from low to high valued crops. As the results in Table 6 indicate, this has been a significant part of the growth picture in West Pakistan, one which is extremely difficult to capture using trend analyses.^{10/}

Table 6 employs the results of the preceding analyses to group districts according to their growth patterns from

^{10/} One point of reassurance with regard to the methodology is that the simple annual growth rates of GVP derived by comparing 1960 with 1965 are very close to the trend rates shown for that period in Table 3.

1960-1965.

Group I contains the districts of the former Punjab that have stagnated or actually declined in growth between 1960 and 1965. As indicated earlier, these are primarily dryland wheat areas in which only limited possibilities for growth appear to be present. Group II comprises districts in which increases in yields have been the major source of increased output. If data were available, one would expect that these districts would show the highest inputs of fertilizer, pesticides, improved seeds, improved cultural practices, etc. Group III is made up of the districts in which a relatively large amount of the increase in output can be traced to a combination of acreage and cropping pattern effects.

Because farming in West Pakistan is generally impossible without irrigation, because most crop-water response curves exhibit diminishing returns, and because there is a good deal of economically "free" land available, it would be expected that these latter areas would turn out to have received the largest increase in water supplies.^{11/} Comparison of the

^{11/} See Gotsch [4] for a discussion of the argument and the case for assuming diminishing returns to water.

Table 6

DISAGGREGATION OF DISTRICT GROWTH, 1960-1965

Districts	Growth Rate (GVP)	Acreage Effect	Yield Effect	Cropping Pattern	Inter-Action	Major crops involved (in order of importance)
<u>Group I Stagnating Districts</u>						
JHELUM	-2.4					
GUJRAT	2.2					
SIAKLOT	-1.2					
RAWALPINDI	1.0					
CAMPBELLPUR	-2.2					
MIANWALI	3.2					
SARGODHA	2.6					
<u>Group II Growth Due Primarily to Yield Effects</u>						
LYALLPUR	9.6	9.0	71.5	10.0	9.5	Sugarcane, wheat
MONTGOMERY	8.4	15.7	61.8	16.3	6.2	Cotton, wheat
MULTAN	8.2	23.8	65.2	6.8	4.2	Cotton, wheat
<u>Group III Growth Due Primarily to Acreage and Cropping Pattern Effects</u>						
LAHORE	4.9	48.5	34.8	9.1	7.6	Wheat, rice
SHEIKHUPURA	7.9	47.2	44.4	7.0	1.4	Rice, wheat
GUJRAWALA	6.2	47.0	45.9	5.1	2.0	Rice, wheat
JHANG	8.1	39.1	51.3	6.9	2.7	Sugarcane, wheat

groupings indicated above with the level of additional water supplies shown in Table 4, however, indicates that there is only partial consistency between Group III effects and groundwater development. For example, output in both Gujranwala and Sheikhupura has been dominated by acreage and cropping pattern effects and these districts, as indicated earlier, have indeed experienced substantial increases in per acre water applications. On the other hand, Multan and Montgomery, also districts with significant increases in water supplies, have grown largely because of increased yields.

The above findings suggest that perhaps land, although it is generally a "free" good to the district, is not to the individual farmer. Once he has installed his own tubewell, the limited flexibility of certain types of cropping patterns makes land a binding constraint and excess water is used to increase applications per acre and hence to increase yields. There is also some evidence that water, fertilizer, and seed interact to produce more than additive effects on plant yields. This would help to explain why farmers in some districts with fairly high inputs of water may have chosen to increase output per acre instead of increasing area. The

latter point, of course, does not explain regional variations in behavior.

In general, the disaggregated analysis of the rapidly growing districts provides grounds for optimism regarding the difficulty of shifting from a strategy of acreage-dominated growth to one of yield-dominated growth. The increased yields during the 1960-65 period in West Pakistan were all achieved without the benefit of improved types of wheat, rice and maize that are now being widely disseminated. These new varieties, together with substantial increases in fertilizer targets, suggest that yield improvement in itself may be sufficient to accelerate the current rate of growth. Indeed, based on recent reports, it appears likely that West Pakistan will be a food surplus area by 1969/70, largely as a result of increased yields.

Growth in GVP by Commodity

The disaggregation of the components of regional growth yields an interesting by-product, namely, the quantification of the contribution made by different commodities to the increased output of the rapidly growing areas. As Table 6 indicates, in those districts showing the most rapid growth,

cash crops have been the major growth components. In the northern irrigated districts of the Punjab, Gujranwala and Sheikhupura, it has been rice; in the central regions of Lyallpur and Jhang, it has been sugarcane; and in the southern part, Multan and Montgomery, cotton has led the way. (As might be expected, other traditional summer crops such as the coarse millets, declined in virtually all areas.)

The positive contribution made by the cash crops has been split about evenly between increased acreage (acreage effect plus cropping pattern effect) and increased yields. In one case, however, that of Lyallpur district, 70 per cent of the positive contribution to the increase in GVP from 1960 to 1965 resulted from increased yields in sugarcane.

The regional variation in cropping pattern obtained from the above analysis contains a number of elements of comparative advantage. For example, the northern districts have heavier soils, some rainfall, and a high water table, all of which are conducive to growing rice. Similarly, the southern areas have the dry, hot climate favored for cotton.

In the case of sugarcane, however, farm management studies have shown that at current prices, sugarcane is the

most profitable enterprise wherever sugarcane mills exist. Hence, much of the regional concentration of production was determined by the location of mills and the zoning regulations that have been introduced as part of the location decision.

The above comments imply that provincial agricultural price and commodity policy had and will continue to have important regional effects. For example, in 1961/62, the Government partially decontrolled the sugar industry by lowering the quotas of refined sugar which had to be delivered at a fixed price. This meant a larger share of the crop could be sold on the open market at significantly higher profits. The impact of this policy on certain districts such as Lyallpur, Jhang, Mardan, etc., which contain sugarcane mills was substantial. Other obvious examples of provincial price policies with regional effects were the decisions to increase the procurement price of fine rice for export and to reduce export duties on cotton. Each of these produced a change in the relative price structure and encouraged rapid expansion in those areas particularly suited for the production of the favored commodity.

Regional Variation: A Summary

The pattern of regional variation which emerges from the foregoing analysis remains somewhat murky. It is clear, however, that growth has been confined to those districts having a broad irrigated base. Large increments in the supply of water, on the other hand, while appearing to be sufficient for increased output, were not a necessary condition.

A second interesting observation is that yield increases have played an important role in the overall growth picture. Districts showing the highest growth rates were all districts in which yields were the dominant component of the increased GVP. Reports indicate that these same districts are the most rapid adopters of new, high yielding varieties.

Lastly, it was apparent from the disaggregation that each crop, such as rice, sugarcane, and cotton, has in the past, been the major source of increased output.

III. Some Issues in a Regional Development Policy for Agriculture

The preceding paragraphs have attempted to examine briefly the sources of regional divergence in output.

Although the results have been somewhat ambiguous, the significance of increased yields of cash crops in irrigated areas emerges clearly as the major source of growth and thus of regional variation. But even if the data and conclusions regarding the exact sources of regional growth must be regarded as tentative, the fact that large regional disparities exist is generally accepted. This understanding alone is sufficient to provide the impetus for a more clearly articulated set of regional policies at the provincial level.

Regional planning for agriculture is difficult to separate from regional policies in general. The agricultural sector may be best thought of as simply another instrument to be used in attaining overall goals of employment, increased incomes, regional income distribution, etc. This implies that many of the relevant decisions in regional planning for agriculture are really about questions of substitution. Given a constraint of total resources available for investment in manufacturing and agriculture, and the physical environment and problems in areas A and B, where should the agricultural effort be concentrated? In other words, where does agriculture

have a comparative advantage, given a complicated set of goals that go beyond the simple criteria of efficiency?

The scope of this paper does not permit the description of a full-scale regional development plan for West Pakistan which would be responsive to the variations in agricultural growth discussed earlier. Rather, two issues that would be critical in developing an over-all policy will be examined in some detail. Hopefully, they will serve to illustrate the kinds of conflicts which must be resolved in any honest attack on problems of regional disparity.

The first area of concern is the relationship between what Friedmann has called the "downward transitional" areas and the remainder of the country.^{13/} Characteristically, "downward transitional" areas have little potential for economic development and are generally over-populated relative to the opportunities that exist there. As a result, they are areas of large potential outmigration.

^{13/} See Friedmann [3] for a full discussion of this and other regional concepts.

A number of the districts in the northern Punjab and the Northwest Frontier fit this description rather well. As indicated in Section II, they are dryland areas with only very limited opportunities for increasing the amount of land under irrigation. Some water development projects have been built on the minor tributaries of the Indus, but they are small relative to the needs of the population. Communications in the "barani" regions of Jhelum, Rawalpindi, Campbellpur, etc. are poor and community services such as health, education, etc. are noticeably below the standard of the more dynamic areas of the central Punjab.

Our experience in developed countries gives ample evidence that if some efforts are not made early in the development of a nation to lay the groundwork for the type of structural changes that differential regional growth requires of these areas, the problem becomes cumulatively intransigent. Selective outmigration removes the most adventuresome, and the remainder sink further into poverty and apathy. Community services deteriorate still further. The vicious circle of a depressed area is well underway.

The future consequence of these conditions in West

Pakistan will undoubtedly be a substantial movement of unskilled laborers from the northern districts into the central Punjab. Some will undoubtedly be attracted into agriculture where the development of water resources can be expected to create significant employment effects.^{14/} The majority, however, will stop only when they have reached the rapidly growing urban centers of Lahore, Lyallpur, etc.

What should be done? Should Pakistan, at this stage of development, take the long view and make the compromise between efficiency and social goals that a policy of real concern for the situation would dictate? Or would a minimum strategy that recognized the political necessity of some gestures toward backward areas, but did not go beyond that, be the appropriate one?

Argument by historical analogy is always somewhat dangerous. Nevertheless, the experience of a number of developed countries suggests that a determined effort should

^{14/} Gotsch [5] suggests that the increase in labor requirements may be on the order of 50-60 per cent. The difficult question, of course, is to what extent the increased labor needs are likely to be met by the currently under-employed farmer himself.

be made to develop the human resource potential of depressed regions at a much earlier stage in a country's development than has heretofore been done. While this means concern in backward rural areas for all forms of community services, it means, particularly, an emphasis on improving the quantity and quality of education. Begun early enough in the development process, such programs have a cumulative effect; by the time the country is fully immersed in the problems of urbanization and industrialization, one could hope that the flows of migrants from the "downward transitional" areas had the skills that permitted their absorption into the rest of the economy. The thrust of the proposal is not that all efforts at education and technical training should immediately be shifted to the "barani" areas. It does, however, suggest that the inefficiencies that result from the remoteness of the areas, both in time and distance, should not deter efforts to minimize the deleterious effects of the inevitable population migrations.

The comments made above are directed at a situation in which significant regional variation and limited economic potential dictated that the focus of regional concern ought

to be directly on the people of the area. The question in this case was not only between, say, education and other uses of development resources, but the conflict as to where the resources for education should be used. The latter question has a counterpart in a second major regional issue in West Pakistan, namely the allocation of water supplies between the central Punjab and the Sind to the south.

The Sind-Punjab dispute, often called the Indus Waters Dispute, goes back to the early 1920's. Upon Partition and the implementation of the so-called "One Unit Rule" in West Pakistan, the parties to the dispute changed but the interests did not.^{15/} Indeed, they are now even more complicated for not only is the issue of water allocation under question, but the timing and magnitude of projects financed from general resources are being debated.

The decision by the Government to build a large dam on the Indus at Tarbela provides a partial answer to some of these questions. Although it has hardly been appreciated, the dam at Tarbela is a major step in an attempt to insure

^{15/} For an excellent and highly readable discussion of this dispute, see Michel [10].

the long-range improvement in the development of the Sind relative to the more prosperous Punjab. The decline in disparity can be expected to come about in two ways: (1) the 1/3-2/3 split in the Indus waters with the larger share going to the Sind, and (2) the shift in resources from the groundwater program of the north to the dam and reclamation projects in the south. (The latter statement is disputed but seems inevitable in the light of over-all resource availabilities.)

Again the question of conflict arises. Is it better, in view of Pakistan's present situation, to concentrate resources in what are currently the most dynamic and efficient areas, or do the political, social, and even economic considerations of the long-run view justify a shift in the pattern of expenditures toward the southern zone? (In this case, the question is complicated somewhat by the fact that the northern zone can make good use of the power generated by the project.) Issues of this sort are among the most difficult to resolve in mapping out a regional development strategy. They contain the same problem that faces proponents of the "leading sector" approach to the theory of economic

growth, namely: at what point does a leading sector (or area) cease to promote dynamic attempts to redress imbalances in the economy, and become, instead, a negative force in a country's development efforts?

The appropriate development strategy ought to incorporate what Rodwin has called "concentrated decentralization".^{16/} In this approach, a promising development site, say Hyderabad, would be selected as a "growth center" for the surrounding region. Resources would be committed to provide the appropriate infra-structure, investments required to lay the groundwork for industrial expansion would be undertaken, etc. In addition, agricultural development projects, where feasible, would be geared to the anticipated urbanization in the area. Hopefully, such a strategy would set in motion the kind of interaction between urban and rural areas that has so often been the characteristic of successful economic growth.

It is too early to predict the extent to which expenditures on water development programs for the Sind will be related to the notion of spatial concentration. The Tarbela proposal is without much thought on these matters but that is

^{16/} See Rodwin ^{14/}.

to be expected from a large surface storage project. More significant will be the location of individual reclamation and irrigation projects. Fortunately, decisions which continued to give priority to the development of fresh groundwater areas would also be likely to stimulate growth in several of the major urban centers.

Endorsement of attempts to promote agricultural development in the Sind should not be interpreted to include several settlement schemes being undertaken in that area. Parts of the new tracts are generally inhospitable for agriculture and funds being used there would have been better concentrated in areas where greater growth potential exists.

IV. Regional Variation and Development Policy: Conclusions

It is clear that intra-country variations can be expected to increase in West Pakistan in the short run. The rapid growth in agricultural output in the central Punjab can be expected to continue. It will be accelerated even more relative to the remainder of the country by the dissemination of new, high yielding varieties of rice, wheat and maize. The true potential of these varieties is only realized under

the high fertility, high maintenance environment of an irrigated area. Moreover, the significant industrial growth and urbanization taking place in the heart of this region will continue to exacerbate differences.

Of the two more backward areas, the Peshawar zone will be the most difficult to deal with in the long run. It has neither the agricultural and/or mineral resources nor the geographical location to be considered seriously as an "upward transitional" area. Consequently, the accent on dealing with the disparity between this and other regions must be on developing the human resource itself. If the experience of developed countries is not to be repeated, a sincere effort to provide equal access to community services, involving particularly education and health, will be needed.

The Hyderabad Region (Sind), even though currently lagging behind the Lahore Region, has substantial economic potential. Hence, the concern for the area manifested in the water development program appears to be justified.

Care should be taken, however, that development programs be concentrated enough to insure the emergence of a viable

center of economic activity in the area.

The timing of the implementation of programs designed to mitigate or eliminate regional disparity is, of course, a much debated issue. Again, judging from the experience of developed countries, it may be desirable both in terms of efficiency and welfare, to begin the process much sooner along the development path than has heretofore been advocated.

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