No. 92

Strategy of Agricultural Development
with a Special Reference to Pakistan

by

Sayed Mushtaq Hussain

June 1970

about the author

Dr. Sayed Mushtaq Hussain is a Research Economist at the Pakistan Institute of Development Economics, Karachi.

STRATEGY OF AGRICULTURAL DEVELOPMENT
WITH A SPECIAL REFERENCE TO PAKISTAN

"There are two opposite kinds of stagnation to which
capitalist economies may be subject -- stagnation due to
technical poverty and stagnation due to satiety" $\underline{/}$ 57,p.7$\underline{6/}$.

I. INTRODUCTION

The process of economic development involves substantial

changes in the economy. A strategy of development provides a dis-

tinctive direction to the various economic changes and should be

chosen after a careful examination of the alternatives available to

attain the given objectives.

But for the purposes of designing and evaluating the various

programmes and strategies for the development of an underdeveloped

country, one needs a theory of economic development or at least an

understanding of the basic process of economic development.

The theory (or understanding) about the phenomenon of economic

development should, at its best, take the form of a "full explanation"

or, at the minimum, assume the shape of a mere "characterization of

the whole process or the important elements involved in it.

If one looks through the professional literature in the fields

of economic development and growth, it can be found that most of the

theories come from the i) purely theoretical work (e.g., dual

economy and other growth-cum-development models of W.A. Lewis, Ranis

and Fei, D. Jorgenson, Tsiang, and others), or ii) analysis of the

historical facts about countries which had a successful "take off"
(e.g., Rostow), or iii)intercountry and country analysis to identify
and underline certain relationships and patterns of development (e.g.,
Kuznets, Chenery, Adleman and Morris), and iv) any mixture of (i),
(ii) and (iii).

The various theories available, however, are seriously
deficient in enlightening about the basic process (or elements) of
economic development particularly in the initial phase of it; and
give little attention to the development of the agricultural sector
as such. To elaborate on this point, a few words are said in the
following.

1.1. Most of the theoretical models of economic development
neither pose nor answer the question of how does the process of
economic development initiate itself.

The dual economy development models of Arthur Lewis and
Ranis & Fei explain the initiation of the development process in a
two sector economy in which the marginal productivity of labour in
the industrial sector (MPL_I) is higher than the marginal productivity
of labour in the agricultural sector (MPL_A). In addition to the
sectoral differential in the MPL, the wage rate in the industrial
sector is equal to the MPL_I, whereas in the agricultural sector it
is higher than the MPL_A (i.e., the phenomenon of surplus labour
in the agricultural sector)[1].

---

[1] Lewis, W.A.,$\llcorner$39$\lrcorner$; Fei, J.C.H., and Ranis, G.$\llcorner$ 19 $\lrcorner$; Ranis,
G. and Fei, J.C.M. $\llcorner$54$\lrcorner$; Meir, G.M. $\llcorner$42$\lrcorner$; Islam, Nurul $\llcorner$ 30 $\lrcorner$
and Nurkse, R. $\llcorner$ 51 $\lrcorner$.

Thus initiation of the process of economic development simply involves a re-allocation of labour from the agricultural sector to the more productive and surplus generating industrial sector.[2]

These models though having something useful to contribute, fail to explain the sectoral difference in the MPL, are silent as to how the process of development could be initiated if MPL_I were equal to MPL_A to begin with, and give inadequate treatment to the development of the agricultural sector as such.

The same can be said about Jorgenson's model $\underline{/}$ 32 $\underline{/}$ although it does not assume surplus labour. The duality feature of the economy arises from the sectoral difference in the production functions used.

The emphasis of all the dual economy development models is heavily intersectoral which may be useful in understanding how the process of development can gain momentum or come to a stop, rather than how it gets initiated. In the case of the agricultural sector itself, no meaningful framework is provided by these models.

I.2.   There is another category of models popularly known as "growth models" (e.g., some classical models, Harrod-Domar type

_____

2/ It is assumed that most of the surplus originating in the industrial sector is invested, thus leading to capital accumulation and further expansion of the industrial sector. This expansion of the industrial (modern) sector is the main engine of growth in the Model. Certain forces, of course, emerge to limit the process from going on indefinitely.

models) in which the balance between investment and saving is all important, as opposed to the development models which focus on the balance between capital accumulation and the growth of population.[3]

These models, with a few exceptions, identify capital as the main engine of growth. Because of the emphasis on the problems of general equilibrium of the economy and its stability, and a very high level of aggregation; the growth models fail to enlighten about the process of development itself. For example, the models do not tell whether it is capital _per se_ which is important for growth _or the_ ability to use capital successfully which is crucial in the process of development /‾21, pp. 76-79 ‾7. Moreover, it is not made clear which type of capital will be of vital importance in initiating the process of development, and sustaining it at the various stages of development.

In connection with the development of the agricultural sector, the growth models are even more deficient than the development models in providing a meaningful framework because of their one sector nature/or the high levels of aggregation.

I.3.   The historical approach tries to study the economic and other facts about economies which have already shown self-sustained growth and builds analytical frameworks on this basis. The best known in this tradition is Rostow's stage theory of economic growth /‾58 ‾7.

3/ Jorgenson, D.W./‾32, p. 310 ‾7; Adelman, I. /‾2 ‾7; Hahn, F.H. and Mathews, R.C.O. /‾24 ‾7.

In general it can be said that the historical approach has
concentrated on the experience of countries which achieved economic
development in the past, and hence makes conclusions heavily biased
to the then prevailing conditions. Moreover, as Professor Fishlow
pointed out, the stage theory of economic growth as given by Rostow
suffers from analytical gaps and contains in it many empty boxes
[20].

For agricultural development Rostow's stage theory or any
other theory of similar type does not provide any meaningful frame-
work.

I.4. Empirical research has been heavily oriented towards inter-
country time series or cross-section analysis. The research has
been extended to the analysis of individual countries also where
data permits. The studies of Kuznets [38], Chenery [70,11,12]
Adleman & Morris [2], and many others have been useful in under-
lining certain patterns (or aspects) of the process of economic
development. Due to the lack of proper data, the complexity of the
problem and the absence of a comprehensive analytical framework, the
quantitative research has failed so far to identify "cause-effect"
type relationships.

Thus whereas quantitative research has been useful in
pointing out some regularities (or patterns) of economic development,
                                    the understanding of
it has not yet contributed to the process of development. In the
particular case of agriculture, the research has not been very
rigourous.

I.5.   The Purpose of the Study

The purpose of this study is to propose a plausible characterization of the phenomenon of economic development and test its soundness from the empirical evidence on farmer response to price in the various underdeveloped countries. In this way we hope to establish the usefulness of the proposed characterization of economic development for the development of the agricultural sector.

I.6. The Proposed Characterization of Economic Development

Leaving aside the problems arising from the interaction between the various sectors of the economy (which originate from the differences in technology, tastes, inputs and outputs, etc.) the phenomenon of economic development can be conceived in its essentials, as a function of two factors:

    i)   the propensity of the human agent to seek material advancement (i.e., the existence and strength of "economic incentives"), and

    ii) the ability of the human agent to take advantage of the economic opportunities within his mental horizon, and to create new opportunities.

In the context of the agricultural sector it means that ignoring the problems arising from the demand side and the existence of other sectors, farmers' economic performance is a function of their i) willingness, and ii)ability to understand and exploit given economic opportunities; and to create new opportunities.

The main purpose of this paper is to discuss the usefulness of the proposed characterization through providing empirical

evidence on farmers' economic performance in the various under-
developed countries especially Pakistan.

At the very outset it should be made clear, however, that
the empirical evidence is too narrow and specific to answer the big
question of how economic development initiates itself. Nevertheless
it is believed that the present attempt is a useful building block
in this direction.

To begin with, Part II of this paper will accept the above
                        and examine if
proposed characterization / farmers' economic performance

in the under-developed countries is due to the lack or
absence of their willingness to benefit from the given economic
opportunities, i.e., the problem of economic incentives.

In Part III some empirical evidence will be provided to
verify the second part of the characterization: that the ability
of   farmers to understand and exploit given economic opportuni-
ties plays a crucial role in determining the level of farmers'
economic performance.

At the end (Part IV) a few observations will be made on
the nature of the agricultural development programmes and strategy
adopted in Pakistan. Some tentative suggestions are also made.

Part II. The Problem of Economic Incentives

II.1. Economic incentives, meaning the urge (or willingness) to
exploit the available and well understood opportunities for securing
economic gains, are believed to be non-existing, perverse or very
low in the agricultural(traditional) sector of the under-developed
countries. It is not made clear by the holders of such a belief,
however, whether economic incentives are thought to be low because
the urge to exploit economic opportunities is low or whether the
observable results of such an urge are poor.

       The urge to exploit economic opportunities in itself is a
psychological phenomenon, and it is hard to find that the beliefs
about economic incentives have been based on any meaningful direct
test.

       As one goes through the professional literature, it is easy
to note that many social scientists including economists have
acquired the belief about economic incentives being low in under-
developed countries in general and in the agricultural/traditional
sector of these countries in particular. These beliefs have been
developed on the basis of a priori notions about the social and
economic conditions that prevail in poor countries.

       In addition to these a priori notions about the economic
behaviour of farmers, some writers on the basis of faulty and
inadequate evidence maintain that farmers' supply response to

price is perverse or non-existing.[4/]

The widespread appeal of the above mentioned notions stems from their plausibility but whether they are correct or not is a question for rigorous empirical testing.

Although direct observation of the existence and strength of economic incentives is not possible, indirect empirical tests can be easily designed since the results of the existence and strength of economic incentives are observable. For example, if fertilizers are available to farmers at a cost which makes their use highly profitable, and if we have reasons to believe that the farmers in question understand the use and the benefit of fertilizers, then we can say that the economic incentives exist or not, depending on whether the farmers are observed using fertilizers or not.

II.2. The Existence of Economic Incentives: Empirical Evidence

As noted above, if we have an economic opportunity set that is i) empirically identifiable; and ii) easily understood and falls within the ability of the farmers to exploit, then we have a meaningful and clear cut test for the verification of the existence of economic incentives through looking at the actual behaviour of the farmers in question.

In the context of the area allocation set, if economic incentives exist, one must observe the area sown to a crop to

4/ Boeke, J.h./ 8 /; Nair, Kusum / 48 /; Chand, Mahesh / 9 /; Olson, R.O./ 52 /; Misra, B. and Sinha, S.P. / 45 /; Khatkhati, D.R./ 34 /; Neale, W.C./ 50 /; Grunwald,/ 22 /; Andrus, J.K. and Mohammad, A.F. / 4 /.

increase when its profitability relative to the competing crops is

expected to rise, and vice versa. In other words, for individual

crops we should observe a positive area response to relative profi-

tability when economic incentives exist. Thus the positive short-run

area response to price in the case of individual crops would be a

clear cut evidence for the existence of economic incentives.[5/]

    Table I presents the results of many studies regarding the

short-run area response to price.[6/] All studies that are referred to

are based on a carefully examined and scrutinized area, price and

other statistics. Most of these studies should be regarded as

econometric in the sense that an attempt is made to deal with or be

conscious of the various problems arising out of the regression

analysis.

    The short-run price elasticity of area response (η_A)

though varying among crops, time periods and countries, is positive

and statistically significant at the conventional level[7/]. In the

_____

5/ This is only true under the assumption that as relative price
changes, the relative cost of production remains the same.

6/ The number of studies conducted on Asian countries substanti--
ally exceed the number of studies done for the African and Latin
American countries for the obvious reason of inadequate price and
acreage data. Nevertheless, the coverage is wide enough to embrace
countries/regions with sufficient economic, religious and cultural
variation, and although the list cannot be regarded as "representa-
tive" of all the under-developed countries of the world, yet it is
quite reflective of the diversity of economic life that prevails
in such countries.

7/ The conventional level of significance is 5% or less.

context of the economic opportunity set (i.e., area allocation
among the competing crops) considered here, for which we have every
reason to believe that farmers have the understanding and the ability
to exploit, the observance of a positive η_A is a necessary and
sufficient testimony for the existence of economic incentives.

The results on η_A listed in Table I are fairly wide in
coverage over space, time, crops and cultures; and are sufficiently
meaningful to reject the beliefs/notions held by some economists
that economic incentives are absent or perverse in the agricultural
sector of underdeveloped countries.

II.3.   In order to emphasize the point made above, we move to
another economic opportunity set for which the farmers, in most
likelihood, do not possess the ability to understand or the ability
to exploit.[8]

Such an "opportunity set" could arise from the fact that
farmers have a potential choice of increasing individual/aggregate
crop yields per acre whenever it is profitable to do so. Under
given technology, it means increasing the various inputs so long
as the value of their marginal product is above their marginal cost.

In Pakistan, like most underdeveloped countries, we can
never be sure of farmers' ability to understand and exploit the
potential opportunity for increasing crop yields due to the fact

---

8/   In other words the economic opportunity set is not within the
mental horizon of the farmers or the ability to exploit it is
lacking.

Table I

PRICE ELASTICITY OF AREA RESPONSE (SUPPLY) OF SPECIFIED
CROPS IN UNDERDEVELOPED COUNTRIES/REGIONS

Crop	Country/Region	Period	Price Elasticity of area response (η_A)	Dependent Variable	Study Conducted by:
1	2	3	4	5	6
Cash Crops:					
Cotton(American)	Indo.-Pak. Punjab	1922-41	0.72	SLA	Krishna. 1963
Cotton(Desi)	Indo.-Pak. Punjab	1922-43	0.59	SLA	Krishna 1963
Cotton	India				
Cotton	8-Districts of W. Pakistan	1933-58	0.41	DA	Falcon 1964
Cotton	Brazil	1921-40	0.65	A	Dlein
Jute	Indo.-Pak. Bengal	1911-38	0.76	RA	Stern
Jute	Indo.-Pak. Jute Belt	1911-38	0.46	A	Venkat
Jute	East Pakistan	1949-62	0.29-0.42	A. RA	Hussain
Jute	India: West Bengal	1951-61	0.69	A	Rabbani
Flax	Argentina	1948-65	1.10	A	Freire
Semi-Subsistence Crops:					
Rice	Indo.-Pak. Punjab	1914-45	0.31	A	Krishna 1963
Rice	Thailand	1940-63	0.17-0.18	A	Behrman
Maize	Indo.-Pak Punjab	1914-43	0.23	A	Krishna 1963
Sugarcane	Indo.-Pak. Punjab	1915-43	0.34	A	krishna. 1963
Wheat	Argentina	1948-65	0.56	A	Freire

Table I - Continued

1	2	3	4	5	6
Subsistence Crops:					
Rice(aus & aman)	East Pakistan	1949-62	0.03-0.05	RA	Hussain
Rice	Philippines	Pre-War	0.04	A	Nangahas et.al.
Wheat	Indo.-Pak Punjab	1914-43	0.08	LA	Krishna, 1963
Wheat	West Pakistan	1944-59	0.20	LA	Falcon. 1962
Wheat	India: Uttar Pradesh	1950-62	0.03-0.21	A	Krishna & Rao
Corn	Philippines	Post War	0.07-0.23	A	Nangahas et.al.
Wheat	India: Punjab	1951-64	0.06-0.20	LA	Kaul
Wheat	India: Punjab	1951-64	0.20-0.12	ULA	Kaul

Notes:

a   A   =   Absolute area.
   RA   =   Relative area.
   LA   =   Irrigated area.
   SLA   =   Standard irrigated area.
   ULA   =   Unirrigated area.
   DA   =   At - At

Source: Behrman, J.R., "Supply Response in Underdeveloped Agriculture: A Case Study of Four Major Annual Crops in Thailand, 1937-63" Unpublished Ph.D. Thesis M.I.T.(September 1966);Falcon, W.P., "Farmer Response to Price in an Underdeveloped Area: A Case Study of West Pakistan,"

Unpublished Ph.D.Thesis, Harvard University (1962); Falcon. W.P.
"Farmer Response to Price in a Subsistence Economy: The Case of West
Pakistan", American Economic Review, Vol. 54 (May 1964), pp. 580-91;
Freire, R., "Price Incentives in Argentine Agriculture," Economic
Development Report No.32, Harvard University Center for International
Affairs, Cambridge, Mass. (July 1966); Hussain S.M., A Note on Farmer
Response to Price i. East Pakistan", Pakistan Development Review, Vol.4
(Spring 1964), pp. 93-106; Krul, J.L., "A Study of Supply Response to
Price of Punjab Crop," Indian Journal of Economics, Vol.48(July 1967)
pp. 25-40; Klein L.R., An Introduction to Econometrics, New York:
Prentice Hall, 1962, p.129; Krishna, J. and Rao, M.S., "Dynamics of
Acreage Allocation of Wheat in Uttar Pradesh - A Study in Supply
Response, "Indian Journal of Agricultural Economics, Vol., 22
(January - March 1967), pp. 37-52; Krishna R., "Farm Supply Response
in India-Pakistan: A Case Study of the Punjab Region", Economic
Journal,Vol. 73(September 1963), p. 485; Krishna, R., "Agricultural
Price Policy and Economic Development," in Southworth, H.M. and
Johnston, B.F.(eds.), op.cit. p. 506; Mangahas, M. Recto, A.E.,
and Ruttan, V.W., "Price and Market Relationships for Rice and Corn
in the Philippines," Journal of Farm Economics, Vol. 48(August 1966)
pp. 685-703; Rabbani, A.K.M.G., "Economic Determinants of Jute
Production in India and Pakistan," Pakistan Development Review, Vol.5,
(Summer 1965), pp. 191-228; Stern, R.M., "The Price Responsiveness of
Primary Producers," Review of Economics and Statistics, Vol.44,
(May 1962), p. 206; Venkataramananan, L.A., "A Statistical Study of
Indian Jute Production and Marketing With Special Reference to Foreign
Demand," Ph.D. Dissertation, University of Chicago, 1958.

that new insights into and extension of the existing technology has
been well exhausted already; and the use and understanding of inputs
other than land and simple unskilled labour is very low.

Consistent to our expectations, Falcon did not find a
significant yield response to price during the period 1933-58
$\underline{/}\,16\,\underline{/}$.

Farmers' ability to increase crop yields in East Pakistan
is even lower than West Pakistan. It is of no surprise that no sig-
nificant η_Y for rice in East Pakistan was found during 1949-62
$\underline{/}\,27$, p. $93\,\underline{/}$. Similarly no positive η_Y was found for Thailand and
Philippines $\underline{/}\,6$, $41\,\underline{/}$.

It should be noted, however, that the absence of a positive
η_Y is not inconsistent with the existence of economic incentives since
the necessary and sufficient conditions to observe a significantly
positive η_Y do not exist.

II.4. The Case of Multiple and Complex Economic Opportunity Sets.

Many economists have indulged in empirical work which involves,
in our terminology, more than one economic opportunity sets. For
example, in the case of output response to price the relevant oppor-
tunity sets are the area allocation set and the yield adjustment set,
and the ability to exploit the former may exist with or without the
ability to exploit the latter.

Similarly the price response of marketable surplus involves
production decisions and the consumption decisions. In order to

derive any meaningful conclusions about the existence of economic

incentives by looking at the sign of the price elasticity of marketed

surplus ($\eta_{m.s.}$), one must determine a) to what extent and direction

the consumption decisions made on the basis of utility maximization

and survival considerations overshadow the real outcome of the pro-

duction decisions.

Most research workers seem to be unaware of these comple-

xities and have identified a positive $\eta_{m.s.}$ with the existence of

economic incentives; and a negative $\eta_{m.s.}$ with the absence of economic

incentives. It is obvious that such an inference could be misleading

in cases where the results of the production decisions made on the

basis of economic incentives are rendered unobservable or perverse

by the consumption decisions when we look at the $\eta_{m.s.}$

A negative $\eta_{m.s.}$ cannot be taken to reflect the absence of

economic incentives unless it originates from a negative acreage or

output response to price.

In addition to the farmer response to price studies, there

are other studies that show farmers being motivated by economic incen-

tives (or by profit maximization[9]). Some of these studies are

quite rigorous but cover relatively smaller but more homogeneous

socio-economic units like a village or an ethnic community; others

---

9/ In connection with the supply of labour, Edwin Dean's study
/ 13 / on Malawi shows that farmers had a positive labour response
to relative earnings.

are less rigorous in their statistical and economic analysis.
Nevertheless, they all make the point that farmers are rational in
their production decisions.[10/]

II.5. The Strength of Economic Incentives

In the previous sections we have discussed sufficient evidence
to conclude that economic incentives exist in the underdeveloped
countries. The next logical question is to know how strong they are.
It is a very difficult problem to test from observed facts. In order
to get some meaningful conclusions, we re-phrase the question: Are
economic incentive responses on the part of farmers in the under-
developed countries as strong as they are in the developed countries?

In order to answer this question, we list in Table 2 the
short-run elasticity of area response to price (η_A) for some cash
crops in U.S.A. and U.K. We can see that the η_A for cotton estimated
by Krishna for Indo-Pak Punjab is higher than that estimated by
Nerlove for U.S.A.

The overall range of η_A for developed countries is 0.27 to
0.68 for cash crops and it compares very closely to the range of
0.29 to 0.76 for some of the under-developed countries of Asia.

We conclude on the basis of this comparison that economic
incentive responses on the part of farmers in under-developed coun-
tries are as strong as that of farmers in developed countries for
an economic opportunity set about which we are reasonably sure that
the ability of farmers to understand and exploit in under-developed

$\underline{11}$/
is at least equal to that of farmers in the developed countries.

On the basis of the above discussions it can be concluded that the beliefs about farmers lacking economic incentives in underdeveloped countries should be dismissed, and the causes of low economic activity in the farm sector for the various opportunity sets must be sought in factors other than economic incentives.

III.   Performance of Farmers in Underdeveloped
        Countries: Some Determining Factors

III.1.   In the framework of Part I, there are two factors that determine the level of economic performance: i) economic incentives, and ii) ability to understand and exploit some given economic opportunities, and to create new opportunities.

After finding (i) of little concern, it is hypothesized that (ii) is of crucial importance in determining the level of economic performance of farmers. We think that farmers' ability to understand and exploit the various opportunity sets that may be available is low because of certain widespread constraints. The form and intensity of these constraints vary over space, time and the nature of agricultural activities involved, however.

11/   We have not attempted to compare η_a, $\eta_{n.s.}$ and elasticity of labour supply in under-developed countries with that of in developed countries for the simple reason that we are not sure of farmers' ability to exploit the relevant economic opportunity sets involved in both types of countries to be close to each other.

Table 2

ESTIMATED PRICE ELASTICITY OF AREA RESPONSE
(η_a) IN SOME DEVELOPED COUNTRIES

Crop	Country/Region	Period	Short-run[a] (η_a)	Dependent Variable	Study Conducted by:
Cash Crops:					
Cotton	U.S.A.	1909-32	0.27	Area	Nerlove
Cotton	U.S.A.	1933-41	0.31-0.37	Area	Brennan
Wheat	U.K.	1924-39	0.33	Area	Jones
Wheat	U.S.A.	1909-32	0.48	Area	Nerlove
Peas	U.K.	1938-58	0.65	Area	Jones

Notes:　a　Partial Price elasticity of acreage response estimated at mean acreage.

Source:　Nerlove, M., The Dynamics of Supply Estimation of Farmers' Response
to Price. Baltimore: Johns Hopkins Press, 1958, pp. 201-202;
Jones, G.T., "The Response of the Supply of Agricultural Products
in the United Kingdom to Price", Farm Economist, Part II, Vol.10,
No.1 (1962), p. 18, Brennan, M.J., "Changes in Cotton Acreage in
the Southeast - Implications for Supply Functions," Journal of Farm
Economics, Vol. 40 (November 1958), pp. 835-44.

To organize discussion, the various commonly found constraints
are classified into three categories:

 a) Physical constraints (e.g., climate, water availability,
    fixed land).

 b) Technological constraints (e.g., lack of more productive
    technical knowledge and know-how).

 c) Institutional constraints (e.g., the practice of
    subsistence farming) 12/.

We hypothesize that the economic performance of farmers
varies directly with their ability to exploit economic opportunities
within the horizon.

Since the ability to exploit economic opportunities within
the horizon improves when certain existing constraints on it dis-
appear or are relaxed, and vice versa; we will try to show that
as the constraints on farmers ability to exploit a given opportunity
set tighten, economic performance deteriorates; and as they relax
performance improves. For a meaningful discussion, attention is
given only to those economic opportunity sets that are within
the mental horizon of the farmers.

One of the well understood opportunity sets is the alloca-
tion of land among competing crops on the basis of expected
relative profitability (or price under certain assumptions).

12/   Institutional means established practices that have their
origin in economic rationality and are established so long as the
original rationale for them exists with some time lags permitted
for adjustment.

Economic performance in this context means the degree of area adjustment for an individual crop in response to its expected relative price, measured by the price elasticity of area supply (η_A). Poor performance implies a lower η_A in crop comparisons for a given region/country, or in a regional/country comparison for the same crop. Of course, due regard must be given to the factors that affect the relative profitability other than the area allocation decisions while making inter-crop and inter-regional comparisons.

In order to indicate the depressing effects of the various constraints on η_A, we present the following facts.[13]

III.2. Economic Performance Within the Area Allocation Set

III.2.A. (i) Krishna [36] in Indo.-Pak. Punjab and Falcon [15] in former Punjab of West Pakistan found that whereas the η_A for irrigated wheat was significantly positive, the η_A for unirrigated wheat was not significant.

Results similar to this effect were also obtained by kaul [33] for wheat in the Indian Punjab (1951-64). The obvious reason for the η_A to be nill or low in the case of rainfed cultivation is the fact that farmers in this situation have not or very little control on and certainty about the availability of water. Great uncertainty and lack of control over water supply is a constraint

---

13/ In the following comparisons we expect the η_A as to be close to each other in the case of different crops (in the same region) or in the case of different regions (for the same crop); when various constraints on farmers' ability to exploit the area allocation set are equally binding. It may be noted that η_A's referred to are estimated at the mean acreage for the crops involved.

on farmers' ability to allocate land among the competing crops.

(ii)   In most irrigated areas of Pakistan due to the seepage of the canal water, the ground watertable showed a rising trend. In the summer (Kharif) season cotton and other competing crops like rice, sugarcane, maize, etc. are grown in West Pakistan. Relative to other crops cotton has a deeper tap root system and penetrates to a depth of about 6 feet whereas the competing crops have shallow fibrous root systems penetrating to a depth of 2-3 feet. Thus a watertable, rising to a depth of 5-10 feet should adversely affect the cultivation of cotton.

Ghulam Mohammad $\underline{/}$47$\underline{/}$ in a searching paper on the physical and economic determinants of cotton production in West Pakistan, found that in the canal colonies of the former Punjab the ground watertable was rising since 1915 and by 1940 the watertable had come within 10-15 feet of the ground surface in the major parts of this region; and thus initiated a forced downward trend in the cotton acreage despite the fact that the total area available for cultivation showed an upward trend.

(iii) Hussain's study $\underline{/}$27$\underline{/}$ on farmer response to price in East Pakistan found that the η_A for jute in Dacca Division was 0.29 compared to 0.36 for the province as a whole. This could be attributed to the fact that Dacca Division has some char and bil land where jute is generally sown instead of rice, because the latter would be washed or blown away. Hence the soil conditions reduce the competitiveness of jute with rice relative to other areas

and acts as a constraint on the area allocation among competing crops leading to a lower η_A for jute.

(iv) Studies by Ghulam Mohammad $/\!-22\text{-}b\,\overline{/}$ and Falcon $/\!-17\,\overline{/}$ show that with the development of tubewells the water supply in the former Punjab increased. In addition, the tubewell water is relatively much more certain and subject to control. This led to improved land allocation and increased crop yields.

Carl K. Eicher in a study on Nigeria $/\!-14\,\overline{/}$ noted that the development of transport and communication facilities played a dual role: first it provided economic incentives by linking Nigerian agriculture with the world market, and secondly it reduced the physical constraints on the development of Vigin Land and better allocation of the cultivated land among various crops. This led to improved economic performance of the Nigerian farmers during the 1900-40 period.

III.2.B. Price Response of Acreage Supply: Inter-Crop Differences

It can be seen from Table I that the η_A for subsistence crops ranges from 0.00 to 0.23 whereas the η_A for cash crops ranges from 0.29 to 0.76 (excluding Argentina) and 0.29 to 1.10 (including Argentina)[14]. The pattern of very low η_A for subsistence crops compared with the η_A for cash crops prevails in India,


14/ A subsistence crop is a food crop which is used as a common cereal in diet, e.g., wheat in West Pakistan, rice in East Pakistan and Thailand. The list of subsistence crops can be broadened by including the subsistence crops for livestock.

Pakistan, Thailand, Philippines and many other underdeveloped
countries. It is important to know why this differential exists,
because in our scheme of thought a low η_A implies poor economic
performance.

The most basic reason for the η_A to be low for the subsistence
crops is the institutional constraint of subsistence farming that
prevails in most underdeveloped countries. Given the large price
differential between the sale price of food at harvest time and the
purchase price of food throughout the off-harvest period; and the
uncertainty about the future sale and purchase price of food, it
is worthwhile for most farmers to grow food to meet subsistence
needs on their own land rather than buy it from the market. [15]
Under the practice of subsistence farming, the farmers first
allocate land to grow food for their family and then allocate the
left over land between the various competing crops.

We can illustrate the effects of the constraint of
subsistence farming on the η_A for the subsistence crop through
Graph 1.

Graph 1

---
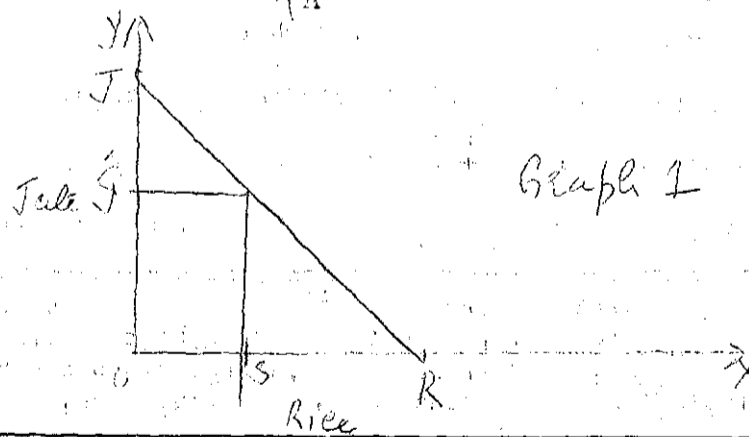
[15] For an excellent discussion of the rationale for the subsistence farming, see: Falcon, W.P., $\underline{/}$ p. 18-23 $\underline{/}$.

Supposing the farm sector has OR = OJ land that can be allocated between the two competing crops: jute and rice.

Under the constraint of subsistence farming, OS = OS' land is reserved for growing food for the family, leaving SR = S'J(left over land) for allocation between the competing crops on the basis of relative profitability (or prices). Depending on the year to year changes in the relative prices, the left over land will be allocated to rice or jute (if the relative yields are not a function of the size of allocated land), or to both rice and jute (when the relative yields vary with the size of the allocated land).

For time series data η_A is computed on the observed mean acreage for the period covered. In the case of subsistence crops (i.e., rice in this case), the observed mean acreage will tend to exceed the acreage that actually responds to relative price and hence will depress the η_A for it. The observed rice acreage is bound to exceed that acreage (i.e., SR) which responds to price because the land devoted to produce subsistence food requirements has little relationship with price changes. Further, the η_A for rice will be lower, the higher the OS/OR ratio which indicates the intensity of the constraint of subsistence farming.

The OS/OR ratio is high in all those underdeveloped countries where the productivity of land is low and the population pressure on cultivated land is high, thus making a low η_A for subsistence crops a generally observed feature of the farm sector.

On the other hand, in the case of cash crops (i.e., jute here), the observed acreage is tied with the left over land (S'J = SR) which responds to price. Thus the η_A for cash crops reflects the unconstrained farmers' response to price and hence exceeds in all cases, other things being equal, the η_A for subsistence crops which is observed under the constraint of subsistence farming.

III.2. C. Price Response of Acreage Supply: Inter-Temporal Differences

In order to test the belief that the level of farmers' economic performance varies directly with their ability to exploit the opportunities within the horizon, a study was conducted to isolate the effects of the growing constraint of subsistence farming on the price response of jute acreage in East Pakistan $/\overline{}29\_7$.

A mathematical model was developed about a farming unit for which the cultivable land is distributed between subsistence (rice) and cash crops, and the income derived is spent on food (rice) and non-food goods. Thus the farmer is an actual consumer and a potential producer of one of the competing crops (rice).

Assuming a logrithmic linear utility function, the following estimating equation is derived separating the effect of the growing constraint of subsistence farming.

$$A = e_o + e_1 \ (P_J^* / P_{F1}^*) - e_2 T (P_J^* / P_{F1}^*) - e_3 T$$

Where

A_J = Jute acreage (in 000, acres)

e_0 = constant term

e_1 = Coefficient of area response to the expected harvest price of jute relative to the expected purchase price of rice: (P_J^* / P_{p1}^*)

e_2 = Coefficient indicating the adverse effect of the constraint of subsistence farming growing in time.

e_3 = Coefficient indicating the effect of time on A_J.

T = Time

E = The error term.

The above mentioned estimating equation was fitted to the relevant data in East Pakistan for the period 1932-58.

Table 3 presents the results for the period 1932 to 1958 during which the subsistence food needs of the farm population as a whole and of the main jute growing areas in particular, were growing. In other words, the constraint on the ability of farmers to allocate land among the competing crops in response to price (or profitability) consideration was tightening. As a result, we expect the area response to price in the case of both the competing crops to decline. Due to the availability of data, only the price response of jute acreage is analyzed.

In the context of the hypothesis that farmers' jute area response declines in a time sample when the constraint (of subsistence farming) on farmers' ability to exploit the area allocation opportunity set tightens in time, the null hypothesis is that the coefficient e_2 in Equation (1) is zero.

JUTE AREA (A$_j$) RESPONSE FUNCTIONS: EAST PAKISTAN

Table 3

Row No.	Constant term	Estimated coefficients of:					Number of Observations	R2	Durbin-Watson Statistics
		$(P_J/FI)_{t-1}$	$T(P_J/FI)_{t-1}$	(P_J/FI_{t-2})	T	$(NSDj)_t$			
	e o	e 1	e 2						
1	2	3	4	5	6	7	8	9	10

Section A:

(i) F.A.O. Data(1932-54):

1.	-1035.2	27.62 (6.4266)	-0.9733 (0.4541)	—	91.16a (51.00)	—	23	.73	1.6826
2.	-1263.1	26.84 (6.1643)	-0.9106 (0.4359)	2.99b (1.7990)	83.58b (28.99)	—	23	.77	1.7845

(ii) FAO-Hussain Data I:(1932-58):

3.	-1099.1	28.49 (5.3327)	-1.0683 (0.3357)	—	97.34 (39.92)	—	27	.74	1.7411
4.	-1273.7	27.87 (5.2183)	-1.0214 (0.3291)	2.38b (1.6200)	90.60 (39.21)	—	27	.76	1.8223

(iii) FAO-Hussain Data II: (1932-58):

5.	-1030.8	27.72 (5.4457)	-0.9996 (0.3564)	—	92.45 (38.41)	—	27	.74	1.8583
6.	-1316.5	27.67 (5.2569)	-0.9977 (0.3441)	2.63b (1.6084)	93.16 (37.08)	—	27	.77	1.9284

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

Section B:

(i) F.A.O. Data (1934-54)

| 7. | -1715.4 | 33.63 (6.5580) | -1.3954 (0.4567) | — | 143.82 (54.75) | -186.30 (84.84) | 21 | .81 | 1.9503 |

(ii) FAO-Hussain Data 1:(1934-58)

| 8. | -1568.7 | 33.32 (5.9275) | -1.4393 (0.3904) | — | 136.58 (47.28) | -140.00a (75.69) | 25 | .80 | 1.8772 |

(iii) FAO-Hussain Data II: (1934-62):

| 9. | -1159.7 | 30.10 (5.4435) | -1.2008 (0.3596) | — | 106.34 (38.63) | -96.30b (59.28) | 25 | .79 | 1.8469 |

Section C: Period extended to 1962:

(i) FAO-Hussain Data I: (1932-62):

| 10. | -665.9 | 24.16 (4.0088) | -0.6949 (0.1954) | — | 63.09 (23.90) | — | 31 | .73 | 1.9941 |
| 11. | -996.9 | 24.59 (3.9224) | -0.7314 (0.1922) | 2.20b (1.4391) | 67.67 (23.51) | — | 31 | .76 | 2.0510 |

(ii) FAO-Hussain Data II: (1932-62):

| 12. | -667.7 | 24.32 (4.4479) | -0.7256 (0.2395) | — | 63.24 (29.34) | — | 31 | .71 | 1.6950 |
| 13. | -876.1 | 24.23 (4.3785) | -0.7194 (0.2358) | 2.10b (1.5367) | 61.65 (28.90) | — | 31 | .73 | 1.7599 |

Source: Computed from the data shown in Appendix Tables A-1 and A-2

Notes:-
(a) Significant at 10-per cent level.
(b) Significant at 30-per cent (or less,but more than 10-per cent)level.
All coefficients other than e_0 are statistically significant at,or less than, 5-per cent level unless they are noted. $(NSD_j)t = \dfrac{\hat{\sigma}^2}{\hat{\sigma}^2 \text{ minus } \hat{\sigma}^2}$ for P_j^1 (t-1, t-2, t-3)

for P_j (t-1, t-2, t-3), where $\hat{\sigma}^2$ = standard deviation.

The results of the statistical analysis show through Rows 1-6 of Table 3 that we can reject the null hypothesis, since e_2 is statistically different from zero.

The rejection of the null hypothesis and the negative sign of the estimated coefficient are consistent with the hypothesis that the level of farmers' economic performance within the area allocation opportunity set declines as the constraint on farmers' ability to exploit that set tightens.

Empirical evidence consistent to this hypothesis was also found in the case of rice and cotton in West Pakistan and for corn in Thailand $/\ 28\ /$. The results are shown in Table 4 and Table 5.

In addition some indirect evidence is also available from West Bengal (India) which could be regarded as consistent to the above mentioned hypothesis. $/\ 28$, pp. 168-172 $/$.

III.4. Economic Performance in the Yield (Productivity) Dimension

We mentioned in Part II that in the case of individual crops, the yields have not been found responsive to price, because the farmers do not possess the necessary ability to do so.

We can extend this view to the agricultural sector as a whole by saying that the aggregate production (given the land) will not be responsive to the agricultural terms of trade in most underdeveloped countries unless the ability to raise crop yields improves.

Table 6 presents the yields per huctare for wheat, rice,

Table 4 :

A. AREA RESPONSE FUNCTIONS FOR COTTON AND RICE IN THE 8 COTTON
GROWING DISTRICTS OF WEST PAKISTAN(1936-1958)[a]

Row No.	Constant Term e_C	Estimated Regression Coefficients of :				Number of Observations	R^2	Durbin-Watson Statistic	Years Excluded[b]
		$(P_C/F_{JI})_{t-1}$ e_1	$T(P_C/P_{SI})_{t-1}$ e_2	$(P_C/P_{SI})_{t-2}$	$(Y)*$				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Cotton (1938-58):									
1.	-625.3	4.0 (0.9947)	-0.1260 (0.0018)[1]	–	4193.4 (777.44)	21	.77	2.0334	–
2.	-638.1	4.0 (1.0531)	-0.1262 (0.0018)	0.13[c] (0.6387)	4179.8 (803.11)	21	.77	2.0098	–
3.	-31.4	3.5 (0.9930)	-0.1192 (0.0017)	–	3022.6 (851.97)	18	.75	2.0263	1943 1948 1945
4.	-15.2	3.62	-0.1094	-0.25[c]	3005.1	18	.75	2.1528	1943 1948 1949
RICE (1936-58):	11_0	11_1	11_2	$(P_C/P_{S2})_{t-2}$	T				
5.	-151.9	3.1 (1.0710)	-0.1460 (0.0070)	–	30.4 (9.38)	23	.82	1.6895	–
6.	-154.6	3.2 (1.1677)	-0.1490 (0.0074)	-0.0054[c] (0.3227)	30.8 (10.02)	23	.82	1.7152	–
7.	-188.7	3.4 (0.9780)	-0.1529 (0.0064)	–	31.6 (8.55)	20	.87	1.8566	1943 1948 1949
8.	-197.7	3.5 (1.0785)	-0.1610 (0.0068)	-0.1405[c] (0.3014)	32.8 (9.17)	20	.87	1.9577	1943 1948 1949

Table 4 :

(1)	(2) Π_0	(3) Π_1	(4) Π_2	(5) $(P_C/P_{S2})_{t-2}$	(6) T	(7)	(8)	(9)	(10)
Rice (1938-58):									
9.	-229.9	3.6 (1.0412)	-0.1675 (0.0068)	—	34.2 (9.24)	18	.86	2.0136	1943 1948 1949
10.	-239.7	3.4 (1.1269)	-0.1639 (0.0070)	0.22^c (0.5217)	33.7 (9.58)	18	.86	1.9695	1943 1948 1949

[a]Districts included are Multan, Montgomery, Lyallpur, Jhang, Shahpur, Lahore, Sheikhupura, and Gujrat.

[b]These are abnormal years due to the impact of World War ll or Partition of the Indo-Pakistan subcontinent.

[c]Statistically not significant.

Source: Computed from the data shown in Appendix Table A - 4.

/TOFAII/

Table-5

CORN AREA RESPONSE FUNCTIONS FOR SOME OF THE IMPORTANT CORN-GROWING CHANGWARDS OF THAILAND 1952-1963

Row No.	Constant Term e_0	Estimated Coefficientsa of:b							Number of Observations	R^2	Durbin Watson Statistic
		$(PLA)_{t-1}$ e_1	$T(PLA)_{t-1}$ e_2	PLA_{t-2}	$(AY)_t$	T	LM	$(AD)_t$			
1	2	3	4	5	6	7	8	9	10	11	12
Nakhornratsima(20):											
1.	−28.0	0.0116[d] (0.0071)	0.0049 (0.0012)	−0.0142 (0.0033)	−12.72[d] (8.04)	36.4 (5.82)	3.11 (0.85)	−	12	.99	2.1542
2.	−39.3	0.0125[f] (0.0124)	−0.0050 (0.0021)	−0.0136 (0.0059)	−18.41[e] (13.84)	35.1 (10.21)	−	−	12	.97	1.8800
Sara-Buri(4)											
3.	−1833.2	0.3696 (0.1043)	−0.0504 (0.0147)	−	61.26[f] (107.50)	266.8 (65.0)	−	−	12	.92	1.6860
4.	−1916.5	0.3616 (0.1116)	−0.0483 (0.0162)	2.56[f] (5.20)	56.83[f] (114.20)	260.5 (70.0)			12	.93	1.7493
Phitsnulok(44):											
5.	−175.3	0.0175 (0.0037)	−0.0047 (0.0006)	−	104.35 (21.13)	23.4 (2.50)	0.19 (0.07)	−	12	.99	2.4095
6.	−210.7	0.0191 (0.0039)	−0.0047 (0.0006)	0.0044[f] (0.0040)	108.80 (21.10)	23.8 (2.48)	0.24 (0.09)	−	12	.99	2.4958
Phichit(46)											
7.	−44.8	0.0087[e] (0.0067)	−0.0020 (0.0008)	−	−19.26[e] (13.90)	18.2 (4.42)	−	0.0273[f] (0.0431)	12	.96	2.0102
8.	−44.7	0.0088[e] (0.0087)	−0.0020[c] (0.0009)	−	−19.35[e] (15.56)	18.2 (4.85)	−0.06[f] (2.17)	0.0279[f] (0.0526)	12	.96	2.0187
Nakhornsawan(48):											
9.	−840.0	0.2055[d] (0.1321)	−0.0259[e] (0.0204)	0.1060[d] (0.0700)	−819.12 (244.17)	227.1 (84.1)	−	−	12	.93	1.7879
10.	−414.8	0.1889[e] (0.1432)	−0.0319[c] (0.0217)	−	−661.67 (240.53)	241.8 (90.9)	−	−	12	.89	1.6076

a
(PIA) = price of corn relative to the competing crops at the local level,weighted by the area under each crop.

T(PIA)$_{t-1}$ =proxy for the growing constraint of subsistence farming at time t.

(AY)$_{t-1}$ = expected yield of corn relative to rice: (AY) =(relative corn yield(t-1)+ relative yield of corn (t-2)+ relative yield of corn (t-3)/(3).

IM= malaria deaths in the previous year as a basis of the expected malaria deaths in year t.

AD= risk indicator for the expected(PIA): (AD)t=(SLA(t-1)+SLA(t-2)+ SLA(t-3)/ (3) where SLA is the standard deviation for the PLA(t-1),PLA(t-2) and PLA(t-3). T= time.

b
All unmarked coefficients are statistically significant at the 5 percent or less level.

c
Statistically significant at the 10 percent leve. ^{d}Statistically significant at the 20 percent level.

e
Statistically significant at the 30 per cent level ^{f}Not statistically significant at the 30 percent or less level.

sugarcane, cotton and jute in Pakistan and some other countries
observed during 1962-65. It is clear that the yield for all crops
is substantially lower than those found in relatively more developed
countries.

In addition to the low productivity of the agricultural
sector, it can be shown that the productivity does not respond to
the sectoral terms of trade unless the incentives provided through
the favourable terms of trade are matched by the enhanced ability to
exploit various opportunities.

It is almost impossible for us to provide empirical analysis
to prove our point, nevertheless it can be hypothesized that the
basic cause of low productivity is the farmers' ability to raise
crop yields which is reduced to a very low level by the high intensity
of the physical and technological constraints.

Among the physical constraints one can list the inadequate
water supply and the lack of control over and uncertainty about its
use. Other physical constraints could be the size of the holding
and the low fertility of soil.

But the most important of all is the technological const -
raints i.e., low technical knowledge and know-how on the part of
farmers. This is due to the i) lack of proper general, technical
and scientific education, ii) lack of transportation and communi-
cation facilities resulting into a very low degree of integration
of the traditional sector with the rest of the economy at home or
abroad, and iii)absence of experience and observation of more

productive technology and know-how thus keeping the 'technical
spectrum' of farmers low and static.[16/]

Although empirical evidence cannot be provided to support
the above view, West Pakistan's experience on agricultural growth
in the 1960's is illuminating and convincing for the line of thought
that has been adopted here.

Falcon and Gotsch in addition to the increased cultivated
land, have traced three sources of agricultural growth, i.e.,
increased cropping intensity and crop yields and the improved
cropping pattern. This was caused by the removal/relaxation of
certain physical and technological constraints on farmers' ability
to exploit various opportunities. The constraints relaxed were
water supply, non-familiarity and supply of fertilizers, etc. For
a more detailed discussion, see: Hussain $\underline{/}$ 28 $\underline{/}$. Of course,
adjustment in the government price and other policies provided
proper incentives at the same time.

III.3.D. Economic Performance of Farmers in the Marketable Surplus Opportunity Set.

Time series analysis on the behaviour of marketable surplus
is not available due to the lack of the relevant data. Cross-
sectional studies can, however, be used to test the main hypothesis
that farmers performance in a particular opportunity set deteriorates

---

16/ The most sophisticated machine that a farmer may have ever
seen in the old days was the British made 'crude' bicycle, or at
best, a flying aeroplane which might confuse him rather than
familarize him with more productive farm inputs/or technology.

as the constraints on farmers ability to exploit them tightens,
and vice versa.

A cross-sectional study of the behaviour of marketed surplus
was made by Raquibuzzaman /¯56_7 using the National Sample Survey
for East and West Pakistan. The results show that in the case of
subsistence crops, the marketed surplus over owner farms varies
directly with production and inversely with family size. Thus the
family size, other things being equal, acts as the constraint on
farmers' ability to market their produce.

The results of Raquibuzzaman's study can be taken as
consistent with our general hypothesis.

Concluding Remarks: The limited but not inconclusive direct and
indirect empirical evidence on East Pakistan, West Pakistan,
Thailand, Philippines and India is suggestive that facts are
consistent with our hypothesis that the economic performance of
farmers within the economic opportunity set of area allocation
among competing crops varies directly with their ability to
exploit the relevant opportunities. Farmers who live in Pakistan,
Thailand, Philippines and India though possess diverse cultures
and religions, and face different social and economic conditions,
seem to have uniform economic behavioural characteristics.

IV.   Policy Implications: Strategy
      of Agricultural Development

     The policy implications of our analysis for the purposes of
economic development are obvious. The level of farmers' economic
performance (i.e., productive capacity) can be raised by removing the
physical, technological and institutional constrains on farmers'
ability to understand and exploit the various opportunity sets.

IV.1. If the increase in the economic performance of farmers
exceeds the population growth in the farm sector, we can say that
economic development is taking place. Hence the minimum degree to
which the constraints ought to be removed to initiate and sustain
economic development in the farm sector, can be determined in the
light of the population growth in the farm sector, and how it
changes in response to any increase in the productive capacity
of the farm sector. As a result the farmers' overall economic
performance (FEP) must grow at a rate greater than the rate of
growth of the farm population ($\dot{P}/P$) in order to achieve economic
development.

     In the light of our discussion, the increase in farmers'
productive capacity (or income) in the farm sector can originate
from three sources:

a)   Increase in the land resources of the farm sector,

b)   Increase in the crop yields of individual crops or
     all the crops/products of the sector, and

c)   Improvement in the allocation of land and other
     resources among the competing outputs.

Source(a) is available if the potentially cultivable land
excee is the actually cultivated land, and if the intensity of
cropping can be increased on a given land. Most common bottlenecks
that might be found are of physical and technological nature.
Institutional constraints like settlement policies, may also be
found. Removal of the various constraints on farmers' ability to
extend cultivated land and the intensity of cropping, should result
in increased agricultural production.

Source (b) is always available so long as the relaxation of
the various physical and technological constraints results into
increased crop yields. We think that the physical and technological
constraints on farmers' ability to exploit this source are very
intense. Removal of these constraints (e.g., inadequate water
supply, poor technical knowledge and know-how, and its application),
can greatly help to raise the crop yields.

Source (c) is found to be not available under the
constrained ability of farmers to allocate land and other resources.
However, if the various constraints (e.g., subsistence farming, poor
know-how) are removed, the allocation of resources among the various
alternative uses will improve and the value of the farm output will
increase.

The removal of the existing constraints on farmers' ability
to understand and exploit given economic opportunities should be
supplemented by the creation of new economic opportunities as well.

The introduction of high-yield varieties of a given crop, say rice
or wheat, amounts to creating new economic opportunities.

      The removal of the various constraints on farmers' ability
to <u>understand</u> and <u>exploit</u> given economic opportunities and the
creation of new opportunities (i.e., extension of the opportunity
space) are the basic elements of a development strategy implied by
our analysis.

IV.2. We must add a few reservations to the above recommended
strategy for the development of agricultural sector.

      Firstly, a continuous removal of the physical, technological
and institutional constraint does not guarantee that we will always
be able to attain a high rate of growth from the sector. Of course,
the likelihood of bringing about a high growth rate for a fairly
long period exists due to the relatively large and useful stock of
available technical knowledge and know-how that can be used/adapted
in the under-developed countries. The limits on the agricultural
growth rate will ultimately show up, however, because of the
biological processes and natural inputs involved in the agricultural
industry. On the other hand, theoretically speaking, manufacturing
(industrial) sector should be able to show high rates of growth for
relatively long time periods since the use of reproducable inputs
and the somewhat non-localized nature of the industry are more
favourable to growth.

Thus the efforts on agricultural development should not steal our attention from the economically feasible and desirable development of the industrial and other sectors.

Secondly, we have completely ignored the problems that can and will arise from the balancing of demand for and supply of agricultural products, and problems arising from the interactions between the sectors. The reason for ignoring these problems is that this study is designed to deal with the supply side only as the literature is relatively abundant and enlightening on the problems of demand and other problems of inter-sectoral nature. Instead of discussing the possible problems we would like to emphasize that they exist and policies must be designed to solve them in a proper way so that the growth of the agricultural sector may not be retarded on their account.

IV.3. A Brief Statement

By way of a brief statement on the process of economic development envisaged in the light of our study, we can say that (a) the process of economic development could be initiated by the removal of physical, technological, institutional and other constraints on the ability of the farmers to take advantage of the given economic opportunities, (b) the process of economic development can be successful only if the relaxation of the constraints is significant (idea of "minimum critical effort" as given by Professor Leibenstein) and it could be self-sustained only if

(c) it is supplemented by the ability to create new economic
opportunities on a continuing basis, and (d) the problems arising
from the balancing of demand and supply, and the interaction between
sectors do not serious impede the momentum of the process of economic
development.

IV.4 A Comparison of the Envisaged Strategy of
      Agricultural Development with Other
      Strategies or Theories

Just to see the nature and usefulness of our characterization
of the phenomena of economic development and the implied strategy of
"remove constraints - extend opportunity space" for the agricultural
development, we will make three brief comparisons with other
theories/strategies.

(i) The usual moral from the various growth and development
methods, apart from their inter-sectoral and general equilibrium
insights, is that the inputs (i.e., capital, technological progress,
labour) included in the assumed production function should be
increased to attain a higher level of production in a sector or the
economy as a whole. Supposing that a growth model tells us that if
the rate of capital accumulation, technical progress, technological
change, etc. is increased, the production of the agricultural
sector will show higher growth rates. The big question that would
bug the policy makers engaged in the development effort is that what
type and to what extent the recommended crucial inputs be used. Such
qualitative but very important information is needed. The growth

models and other theories fail to elaborate on this matter.

Our envisaged strategy of "remove constraints - extend opportunity space" shows the way in which the problems of policy should be studied and the direction to which the development effort be oriented. The growth model-strategies being at a highly aggregative level and interested in different type of problems, are more useful in matters of inter-sectoral nature and the equilibrium problems of the economy than in handling the problems of strategic economic change peculiar to a sector.

(ii) The development theories of A.W. Lewis and Ranis & Fei type, which make the process of development a result of the struct- ural change involving a transfer of labour and wage fund from the agricultural (traditional) sector to the industrial (modern) sector, provide some insights for the development of the economy. Ranis and Fei, for example, think that economic development is essentially a process of the continuous improvement of the way certain basic economic functions are performed $\underline{/}^{-}54\underline{}\underline{/}$. The institutional arrangements that affect the labour and wage fund allocation between sectors, and output productivity in the agricultural sector are the most crucial links. Thus strengthening of these links through the inter-sectoral markets (e.g., commodity, financial and labour markets linking the two sectors) and the learning process through education and experience etc. are the basic elements in the strategy of development.

It is obvious that under the assumptions of surplus labour in the agricultural sector and the marginal productivity of labour being low in the agricultural sector relative to the industrial sector, their characterization of the development problem and the development process is an oversimplification.

Strengthening of the various institutional arrangements linking the sectors can, of course, help but it cannot be regarded as a sufficient condition for initiating and sustaining the development process.

In our framework the improvements in the various basic economic functions are helpful in the sense that the growth originating from the growing ability of farmers to understand and exploit given economic opportunities, and to create new opportunities, will not be frustrated if the various intersectoral markets and institutional arrangements linking the sectors are functioning efficiently.

(iii) On the agricultural development as such, John W. Mellor has given some thoughts $\underline{/}$ 43, 44 $\underline{/}$. He has distinguished between the three phases of agricultural development, namely the traditional agriculture (Phase I), technologically dynamic agriculture -- low capital technology (Phase II) and technologically dynamic agriculture -- high capital technology (Phase III). According to him, these phases are diagnostic rather than historical, and are based on the nature and relative intensity of the various

inputs used in the production process. To him agricultural

development means   moving from Phase I to Phase III, and this

movement or process can be called agricultural modernization. We

quote Mellor on how the process of agricultural modernization

takes place:

> "Agricultural modernization occurs through shifting of
> production functions so as to increase the productivity
> of resources already in use and even more important,
> through developing substitute forms of inputs for which
> the supply is highly elastic." $/\overline{}$ 43, p 288 $\overline{/}$

Mellor's idea of making an increasing <u>use of substitute forms</u>

<u>of inputs for which the supply is highly elastic</u> in order to

accelerate the agricultural development is very useful. The idea

is also consistent with our framework since the increasing use of

inputs for which the supply is highly elastic (e.g., chemical

fertilizers instead of or in addition to the organic manures)

implies that the constraints on farmers' ability to exploit the

economic opportunities (i.e., crop yield potential) are removed.

Here the supply of inputs is emphasized as a possible constraint.

In the traditional agriculture the use of inputs for which supply

is inelastic or without control, is very high. Such inputs are,

for example, rain supplied water, use of manures, low technical

know-how, etc.

Although Mellor's point is important and useful, his

characterization of the development process is too narrow and

somewhat vague. For example, at a given point of time in the

context of a given problem, his characterization does not provide

a framework in which one could decide which of the two or more

equally supply-elastic inputs should be introduced first.

In our framework, on the other hand, one can find out the

order of priorities through the cost-benefit analysis of removing

various constraints. In principle, our framework also implies that

the use of supply elastic inputs compared to the use of inputs for

which the supply is less elastic, is growth promoting, provided the

cost-benefit ratio is the same for both.

IV.5. Planning for Agricultural Development

Ranis $\underline{/}$ 55 $\underline{}\underline{7}$ has identified two basic functions of the

planning effort towards development, namely planning for resources

and planning for stratefy change.

This study provides useful insights for improving both of

these basic functions of development planning. Regarding the

planning for resources, for example, our emphasis on the matching

of economic incentives by the removal of constraints on farmers'

ability to exploit the given economic opportunities, can be useful

in raising farmer response to price policies designed to mobilize

resources.

On the more crucial aspect of strategy change, our framework

provides an operational strategy of "remove constraints - extend

opportunity space." The governments can accelerate the process of

agricultural development through removing the most crucial (binding)

constraints for which farmers of any given region may not have the

ability, resources and organization to remove. This will help to
unleash the energies and abilities of the farmers in their economic
efforts.

IV.6. Application of the Envisaged Development Strategy

The application of the above outlined strategy of agricult-
ural development, requires a thorough study of the agricultural
conditions at some level of aggregation (say a homogeneous region)
in order to identify the various physical, technological and
institutional constraints and their level of intensity. Then the
shadow prices for the various constrained resources be estimated
and compared to the cost of removing the constraints. From such an
analysis the constraints that ought to be removed first and their
timing can be worked out. Government should help farmers to
remove, as a first priority, those constraints for which they are
not in a position to do the job. This will minimize the resource
cost of initiating and sustaining agricultural development.

IV.7. A Critical Examination of the Development Programmes
and Strategy for the Agricultural Sector of Pakistan
(1950-65)

We characterized the phenomenon of agricultural development
as a function of farmers' (i) willingness (or economic incentives),
and (ii) ability to understand and exploit given economic
opportunities; and create new economic opportunities.

i) The Economic Incentives: Although the various Plans
and documents dealing with the development effort are not clear as

to their position on farmers possessing economic incentives, the
official policies of the 1950's give an impression that the
executive machinery of the government did not believe in the
initiative, rationality and economic incentives on the part of
farmers. The policies adopted to raise agricultural production
were of the 'spoon-feeding' type. The extensive use of price and
procurement controls shows that farmers were not trusted in
responding to economic incentives.

Since 1959-60 the government of Pakistan has adopted a policy
of gradual decontrol or the rationalization of the various controls.

It should be noted, however, that although the official
thinking and practice since 1959-60 show that the government has
developed a faith in the existence of farmers' response to economic
incentives, the extent of economic incentives provided through
subsidies on certain inputs and support prices for certain products
is not being critically examined in relation to the various alter-
native policy instruments that could be available under our frame-
work.

As it was pointed out earlier the agricultural production
can be raised through strengthening economic incentives or through
removing the various physical, technological and institutional
constraints on the ability of farmers to understand and exploit
given economic opportunities. To what extent we should use economic
incentives or remove constraints is a serious policy question. It

seems to us that the government does not see these choices. After
the success of Second Plan, there is a tendency on the part of the
government to adopt policies oriented towards 'economic incentives',
which may extend beyond the necessary level.

ii) The Official Development Strategy for the Agricultural Sector

Pakistan's plans and various documents seem to adopt a general
strategy of economic development which says: 'provide infra-structure
and remove the critical bottlenecks/scarcities'.

For the agricultural sector, the Plans at its thinking as well
as practical level, envisage that the production will increase from
two sources:

i) additional land brought under cultivation, and

ii) increased crop yields per acre.

In our terminology, the Plans are conscious of the area and
yield opportunity sets only. We have not come across any mention
about the economic opportunities provided by the optimal allocation
of land and other resources among the various crops. This indicates
the neglect of an important source of increasing the economic value
of agricultural output.

On the strategy of development, it is clear that increasing t
the area under cultivation by providing water, roads, and
colonization facilities and services, does not involve any strategy.
Of course, it extends the opportunity space in a sense, but such an

effort will lead to agricultural growth though not development
since it does not add to the productive capacity of farmers over
the long-run.

On raising the crop yields per acre, all the early Plans
(Six-Year Development Programme, First and Secon! Five Year Plans)
list the missing inputs/factors in the Pakistani agriculture
compared to the agriculture in the developed countries of Europe,
North America, Japan, etc. The list usually reads as fertilizers,
plant protection, mechanization, improved seeds, extension service,
water, credit, and so on. Of course, through time the list is
getting refined in the light of the critique by the local agricult-
ural experts, successes and failures of the various programmes. The
revision of the list of missing inputs/factors has narrowed down to
water and fertilizers being the crucial factors in the Third Five
Year Plan because of the lessons learned during the Second Plan.
Nevertheless, in the absence of any analytical framework at the
theoretical level or empirical level, the hangover of having no
agricultural development strategy can still be found in the Third
Five Year Plan.

iii) The Lack of Optimization of the Development Effort Within the Agricultural Sector

An examination of the Plans shows that an optimal use of
the allocated resources is not being made. It is our belief that the
best that the government may be doing is to examine each development
project on the basis of its own costs and benefits. However, it

seems that given the sectoral allocation of resources, no attempt
is made to chose the projects with the highest rate of return or
with the highest role in bringing a strategy in the sector itself
or the economy as a whole.

The Plans and other documents do not elaborate on the
planning procedures adopted at the sectoral level. For example,
Tims referring to the making of the Third Five Year Plan, says:

> "Even less use was made of the model with regard to the third
> stage, the sectoral detail. Sectoral plans and project lists
> are largely prepared outside the Planning Commission, and
> the decision on the inclusion of proposals depends sometimes
> as much on the organizational talent and persuasiveness in
> the exposition of their sponsors as on the economic justifi-
> cation"/ 63, p. 157 /.

that
Nevertheless, if one reads the various Plans it is easy to discover/
optimization is completely ignored within the sector. For examples,
every Plan envisages huge expenditures on irrigation and coloni-
zation in order to bring new land under cultivation. The resource
expenditure is usually enormous in relative terms, and the area to
be brought under cultivation runs into millions of acres.

It seems that, given some resources, the choice between
bringing new land under cultivation or providing additional water
and other services on the old lands is seldom considered. Our
impression is based on the fact that each Plan allocates a large
part of the sectoral resources on new land without explaining any
special merits of doing so. The impression changes into a belief
when we find that despite the fact that actual settlement of

farmers on new lands seriously lagged behind the effort at
bringing more new land under cultivation continued$\underline{\frac{17}{}}$.

We quote Papanek on this point:

"The government's direct investment programme still left
much to be desired in the 1960's -- water use continued to
lag behind water engineering works, road maintenance behind
construction, and land settlement behind land availabilities"
$\underline{/}$ 53, p. 157 $\underline{/}$.

In general the plans list a number of development programmes
which seem sound on the face of it. But it is never clear whether
the Planning Commission has chosen a set of programmes/projects
considering the whole list as alternatives at some level.

If the optimal selection is not made subject to the constraint
of some given sectoral budget, as is obviously the case, one can
say that a substantial waste is taking place in the development
effort in the sense that larger benefits could be derived if an
optimal selection of the various projects were made.

(iv) It may be noted, however, that our observations
exclude the efforts made in the private sector and only cover
those development programmes and strategies that were adopted by
the government, and as revealed through the various Planning
documents and their evaluation reports.

17/ In the case of India S.R. Sen also notes that heavy bias in
the development effort towards irrigation, colonization, etc.,
exists. It could be due to the vested interests (i.e., engineering
firms, contractors,) that benefit from such programmes directly.
However, we hate to conjecture in the case of Pakistan, unless a
detailed study is made of the whole decision making process in
the relevant government agencies. See: Sen, S.R. $\underline{/}$ 62 $\underline{/}$,
Chapter I.

At the evaluation level, very often the growth experienced
in any given Five Year Plan period is correlated with the programmes
undertaken within the same Plan period. On the basis of such a
correlation, a Plan is praised or blamed. This kind of analysis
could be seriously misleading since there are substantial time
lags involved between the time a programme is undertaken and the
time the returns are actually realized. Moreover, certain important
factors that are exogeneous like weather conditions, private
efforts, etc., are neglected and such improper evaluations may lead
to misleading conclusions.

IV.8. Some Suggestions

i)   The Need for the Recognition of Farmers' Initiative and
Rationality: It is strongly suggested that it should be recognized
that farmers possess initiative and respond to economic incentives.
Although they may be illiterate and poor, they are conscious of
economic gains and do their best to secure such gains wherever
it is feasible. Economic incentives provided through price policy
or input subsidization and other uncharged services, are a
powerful policy instruments in encouraging production.

ii)   The Need for Extensive Empirical and Experimental Research
      to Identify Constraints: The Country may be divided into
more or less homogeneous units on the basis of agronomic and other
conditions that affect cropping pattern, yields, cultural practices,
etc., and for each unit at least one research station be established.

The research stations should be staffed with experts in

agriculture, economics, sociology, etc., and equipped to conduct empirical and experimental research of good quality. The purpose of research would be to study the 'actual level' of farmers' economic performance (i.e., cropping pattern, intensity of cropping, efficiency of resource use, crop yields, non-farming occupations, etc.), and the 'potential level' and pattern of economic performance in the region. By the potential level and pattern of economic performance, we mean that feasible level and pattern of economic performance when the various constraints on farmers' ability to <u>understand and exploit</u> economic opportunities are relaxed.

Since the experimental research is conducted under conditions in which various constraints can be relaxed because of the relatively easy availability of expert technical knowledge and know-how and other resources; feasible potential performance can be easily identified.

However, the main purpose of the experimental research is to identify the physical, technological, institutional and other constraints that prevent the actual performance of farmers to reach its 'potential' (i.e., observed under the various experiments). Also the purpose would be to estimate the cost and benefits of removing the identified constraints in the region.

A carefully worked out benefit-cost type studies of moving from the actual performance to the various levels of potential performance through alternative means should become the basis for the development programmes and strategy to be followed by the government.

iii). The Need for Development Strategy

In order to follow the suggested strategy of 'remove
constraints extend opportunity space',empirical and experimental
research is essential. The government should adopt those programmes
and projects which will have the effect of removing the various
constraints identified through the empirical and experimental
research, for which the farmers do not possess the understanding/
ability/organization to remove themselves. Moreover, among the
constraints that ought to be removed in order to bring the actual
performances of farmers to its potential level and pattern,
priority should be given to the removal of those constraints for
which the benefit-cost ratio (or the rate of return) is the highest
or the removal of which can bring about a quick and widespread
self-sustained growth (i.e., strategy change) in and outside the
sector.

In evaluating all issues and policies concerning the deve-
lopment of the agricultural sector like land reforms, mechanization,
etc., attention must always be given to the question: whether the
adoption of a particular policy in some specific form will result
in enhancing farmers' ability to understand and exploit the given
opportunity space or to extend opportunity space, or not. If
answer is in the negative, then such policies may be adopted on
other considerations, e.g., social justice, national prestige,
political reforms, etc., but the planners should neither expect nor
propagate that such policies will bring about an agricultural
revolution.

iv)   The Need for the Farming Education and Training to Play
       its Crucial Role.

       The actual performance of farmers in most under-developed
countries is found to be at a low level since their ability to
understand and exploit opportunities is kept low by the various
constraints of physical, technological and institutional nature.
Among the various types of constraints, we believe that the tech-
nological constraint occupies a key role, since technical poverty
can cause other constraints to mount up in intensity also.

       The main reason for the technical poverty of farmers is
the lack of farming education and training through formal institu-
tions or experience from the environment in which they live.

       There has been a good many observations on the general
educational system of Pakistan. It is said to be of extremely
poor quality, wasteful and not fulfilling the new realities of a
sovereign state.

       The quality of education is poor because of the low
quality of teachers, lack of teacher training, defective teaching
methods, poor library and other facilities, etc. The system is
wasteful because there is a large proportion of students who 'drop
out' at the primary and higher levels, and the products of the
education industry are unable to acquire those qualities and
skills which they are supposed to get.

       We quote Kusum Nair who recorded the impressions of
farmers about their educated children in some of the villages of

Uttar Pradesh, India:

'Educated boys – well, they are of no use to me in the field'
says Mahendra Singh, referring to his own sons. 'But when I go into
a government office no one will even look at me or pay any
attention, to what I have to say. If I take my sons with me,
however, the work gets done in no time. They are useful
there. That is why we are educating them even though we
have to incur debts to do so'. Ten boys from this village are
studying 'English', as they put it. No one of them has
gone back to work on the land, and even after they have
completed their studies they expect to be maintained at
same standard they become accustomed to as students. Bandan
Singh for example, who failed in the tenth class this year
and is doing no work at present went to his father recently
with a big stick and threatened to beat him unless the
latter gave him 70 rupees to make a coat. $\underline{/}$ 48, pp. 74-75 $\underline{/}$.

The products of the education industry in Pakistan are
almost the same as in India. The fitness of the educated young men
to live and engage themselves in productive work in their immediate
environment is very poor due to the wrong and poor education that
they receive.

We want to raise still an additional point about the
meaninglessness of the whole educational effort. To elaborate, we
want to point out that whereas the bulk of the population (70-80%)
lives in the rural areas and engages itself in the main occupation
of farming, school education at the primary and secondary level
does not impart any specific knowledge and training in the field
of agriculture. This has always been the case in the Undivided
India as well as in Pakistan. The neglect is extremely serious
when we realize that most of the children from the rural areas
seldom receive education beyond the secondary level of schooling,

and those who find the opportunity/privilege to receive college and
other higher education rarely return to the village life.

We suggest that the 'farming education' and 'Practical
training' should be incorporated as a compulsory subject in the
curriculum of all the schools of rural and semi-rural areas.
Primary and secondary school facilities already exist and the
introduction of such education will only require teacher training
and well written text books for all levels. As a direct conse-
quence, the farming education and training will improve farmers'
ability to understand and exploit given economic opportunities,
and extend the opportunity space. One of the indirect benefits
will emerge from the fact that the farming education and training
at the school level will strengthen the basis for the diffusion
of agricultural knowledge, know-how and skills which some other
government programmes are trying to provide through extension
service, radio and other media.

Extending this theme, one can find that in most of the
underdeveloped countries, among other deficiencies of the educa-
tional effort, the investment component of education as opposed to
the consumption component is almost non-existing. To help economic
development, it is essential that the investment component of
education which raises economic productivity, should be enhanced.

The Pakistani approach to increase the investment component
of education has been to open a few polytechnics, patronize a few
technical institutions, and expand agricultural education at the

college level and recommend agriculture as an optional subject in
a couple of schools for the ninth and tenth classes. We feel that
the educational effort in this particular direction has been
inadequate and deceptive.   A much more imaginative approach with
a manifold increase in the resource effort is overdue. A good
beginning can be made by making farming education and training
compulsory for these students who will live and work in the
agricultural sector. In this way a sense of direction and purpose
can be given to the educational effort and the process of agricul-
tural development can be strengthened.

        We also suggest that the resource expenditure on farming
education, training and research at all levels should be treated
and evaluated (on the basis of benefit-cost analysis) like other
development programmes in the sector, because after all, it is an
input like other inputs.

        Let us hope that the new Educational Policy will bring about
the necessary changes.

v)   The Need for a Concerted Effort at Resource Mobilization

        One of the main reasons given for not doing too much in the
agricultural sector is that resources available for development
effort are not enough.

        We note that whereas a large number of programmes, i.e.,
irrigation,subsidized fertilizers, plant protection, extension
services, etc., have been undertaken during the last 15 years or

so, no equal effort is made to tax those farmers who have
benefited most from them.

For future, it is suggested that only those projects be
undertaken which benefit somebody in the agricultural sector and the
agricultural taxation system should be revised in such a way as to
put the burden of taxes on those who benefit from the development
effort. In this way the resources available for agricultural and
non-agricultural development can be increased substantially.

vi)   The Need for Attending to the Small Farmers on an
       Equal Basis

Due to miscellaneous reasons, the government initiated
programmes (i.e., irrigation, subsidized fertilizers, plant
protection, credit, extension services) have tended to benefit (or
reach) to the farmers with relatively large holdings, and hence
the programmes are not oriented to serve the needs of the smaller
farmer at an equal basis.

Apart from social justice considerations to which Pakistan
is committed, the development effort should be directed to those
farmers who can make an efficient use of the government sponsored
programmes and facilities. If the small farmer due to his lack
of touch with the cities and government, and because of his
status, is unable to get water, credit, fertilizers, seeds, etc. ,
though he can make an equally or even better use, the pace of
economic development will be adversely affected.

The government and other public agencies should consciously make an effort to provide facilities especially credit, water and fertilizers to the small farmers if they make an efficient use of them.

vii)   The Need for a Recognition of the Value of Scientific
        Knowledge and Productive Workers

In Pakistan, like most under-developed countries, the respect for and the recognition of scientific knowledge and productive workers is very low. The politician in command and the government servants run the show putting the value of using knowledge and productive workers to a secondary place. This is what most of the under-developed countries have inherited from their feudal/colonialistic past.

The realities of the times ahead demand that rewards in terms of resources, status and recognition must be based on merits of the individual.

It is frustrating to note that research workers, field workers and other productive staff engaged in agriculture is given low salaries and poor recognition. It is very essential that the persons engaged in agricultural education, research and field work must be properly paid, recognized and consulted when the development programmes are being designed. Efforts should be made to raise the quality of the productive workers and their participation in the development effort.

In general the attitude of the government and society needs
to be changed in favour of those who contribute most towards economic
development.

viii) The Need for More Research

Our study could concentrate only on the constraint of
subsistence farming and its effects on farmers' actual performance
in the context of the area allocation among competing crops.
The reason for this narrow based study has been the poor data
availability.

We suggest that as data improves, more empirical
studies should be conducted. Research should extend to other
constraints and opportunity sets both at the time series and
cross-section level. Such studies will contribute a lot to the
understanding of the actual performance of farmers in various
situations.

R E F E R E N C E S

1.   Adelman, I., Theories of Economic Growth and Development, Stanford, California, Stanford University Press, 1961.

2.   Adelman, I., and Morris, C.T. "Factor Analysis of the Interrelationship Between Social and Political Variables and Per Capita Gross National Product" Quarterly Journal of Economics, Vol. 79 November, 1965) pp. 555-78.

3.   Adelman, I., and Morris, C.T. Society, Politics & Economic Development: A Quantitative Approach. Baltimore: The Johns Hopkins Press, 1967.

4.   Andrus, J.R., and Mohammad A.F. The Economy of Pakistan, Stanford University Press, 1958.

5.   Bauer, P.T. and Yamey, B.S., "A Case Study of Response to Price in an Underdeveloped Country", Economic Journal, Vol. 69 (December 1959), pp.800-5.

6.   Behrman, J.R., "Supply Response in Underdeveloped Agriculture: A Case Study of Four Major Annual Crops in Thailand, 1937-63", Unpublished Ph.D. Thesis, M.I.T. (September 1966).

7.   Behrman, J.R., "The Relevance of Traditional Economic Theory for Understanding Peasant Behaviour: A Case Study of Rice Supply Response in Thailand, 1940-63", Paper presented at the Panel on 'Agriculture in Developing Countries at the Econometric Society Meetings, Washington, D.C. December 1967.

8.   Boeke, J.H. The Interests of the Voiceless Far East: Introduction to Economics. Leyden, 1948.

9.   Chand, Mahesh, "Agricultural Terms of Trade and Economic Growth" Indian Journal of Agricultural Economics, Vol. 13, (January-March 1958) pp. 190-93.

10.   Chenery, H.B. "Patterns of Industrial Growth", American Economic Review, Vol. 50 (September, 1960)

11.   Chenery, H., Shishido, S., and Watanabe, J. "The Patterns of Japanese Growth, 1914-1954," Econometrica, Vol. 30 (January, 1962), pp. 98-139.

12.   Chenery, H., and Taylor L., "Intercountry and Intertemporal
                            Patterns of Industrial Growth", Mimeographed,
                            Harvard University, Centre for International
                            Affairs, August, 1966.

13.   Dean, Edwin,   The Supply Response of African Farmers:
                            Theory and Measurement in Malawi.Amsterdam:
                            North-Holland Publishing Company, 1966.

14.   Eicher, C.K.,   "The Dynamics of Long-run Agricultural
                            Development in Nigeria", Journal of Farm
                            Economics, Vol. 49(December 1967)
                            pp. 1158-70.

15.   Falcon, W.P.,   "Farmer Response to Price in a Subsistence
                            Economy, The Case of West Pakistan",
                            American Economic Review, Vol. 54,
                            Proceedings (May 1964) pp. 580-91.

16.   Falcon, W.P.,   "Farmer Response to Price in an Underdeveloped
                            Area: A Case Study of West Pakistan",
                            Unpublished Ph.D. Thesis, Harvard University
                            1962.

17.   Falcon, W.P., and Gotsch, C.H., "Agricultural Development
                            in Pakistan, Lessons From the Second Plan
                            Period", Mimeographed , Harvard University
                            Centre for International Affairs, June 1966.

18.   Farnsworth, H.C., and Jones, W.O., "Response of Wheat
                            Growers to Price Changes: Appropriate or
                            Perverse?" Economic Journal, Vol.66,
                            (June 1956) pp. 271-87.

19.   Fei, John C.H., and Ranis, Gustav, Development of the
                            Labour Surplus Economy, Homewood, III:
                            Richard D. Irwin, 1961.

20.   Fishlow, A.   "Empty Economic Stages?" Economic Journal
                            Vol. 75, (March 1965), pp. 112-125.

21.   Frankell, Harbert S. The Economic Impact of Underdeveloped
                            Societies, Oxford: Basil Blackwell, 1953.

22.   Grunwald, J.,   "The Structuralist School on Price Stability
                            and Development", in A.O. Hirshman(ed)
                            Latin American Issues. New York: Twentieth
                            Century Fund; 1961.

22.a. Ghulam, M.   "Some Physical and Economic Determinants of Cotton Production in West Pakistan", Pakistan Development Review, Winter 1963.

22 b. Ghulam, M.   "Private Tubewell Development and Cropping Patterns in West Pakistan", Pakistan Development Review, Spring 1965.

23.   Gupta, S.C. and Majid, A Producers Response to Changes in Prices and Marketing Policies: A Case Study of Sugarcane and Paddy in Eastern Uttar Predesh, Asia Publishing House, 1965.

24.   Hahn, F.H. and Mathews, R.C.O., "Theory of Economic Growth: A Survey", Economic Journal, Vol. 74 (December 1964), pp. 779-902.

25.   Haq, M.,   "Rationale of Government Controls and Policies in Pakistan", Pakistan Economic Journal, Vol.13, (March 1963), pp. 1-17.

26.   Hopper, W.D.,   "Allocative Efficiency in a Traditional Indian Agriculture", Journal of Farm Economics Vol. 47, (August 1965), pp. 611-24.

27.   Hussain, S.M   "A Note on Farmer Response to Price in East Pakistan", Pakistan Development Review, Vol. 4, (Spring 1964), pp. 93-106.

28.   Hussain, S.M.   "Economic Development of the Agricultural Sector of an Underdeveloped Country with a Special Reference to Pakistan", Ph.D. dissertation, University of California-Berkeley, December 1968.

29.   Hussain, S.M.   "The Effect of the Growing Constraint of Subsistence Farming on Farmer Response to Price: A Case Study of Jute in Pakistan", Pakistan Development Review, Autumn 1969.

30.   Islam, Nurul,   "Development of the Labour Surplus Economy : Review Article", Pakistan Development Review, Vol. 6, (Summer 1965), pp. 271-294.

31.   Jones, W.O.,   "Economic Man in Africa", Stanford University Economic Research Institute Studies: Vol.I, No. 2, (May 1960).

32.   Jorgenson, D.W. "Development of a Dual Economy", Economic
                Journal, Vol. 71 (June 1961), pp. 309-34.

33.   Kaul, J.L., "A Study of Supply Response to Price of
                Punjab Crops", Indian Journal of Economics,
                Vol.48, (July 1967).

34.   Khatkhate, D.R. "Some Notes on the Real Effects of
                Foreign Surplus Disposal in Underdeveloped
                Area", Quarterly Journal of Economics,
                Vol. 76, (May 1962) pp. 186-96.

35.   Krishna, R., "Agricultural Price Policy and Development",
                in Southworth, H.M. and Johnston, B.F.(eds.),
                Agricultural Development and Economic
                Growth, Cornell University Press, 1967,
                pp. 497-540.

36.   Krishna, R., "Farm Supply Response in India-Pakistan:
                A Case Study of the Punjab Region",
                Economic Journal, Vol. 73,(September 1963),
                pp. 477-87.

37.   Krishna, Raj, "Farm Supply in the Punjab (India-Pakistan):
                A Case Study of Cotton", Unpublished Ph.D.
                dissertation, University of Chicago, August,
                1961.

38.   Kuznets, Simon, Modern Economic Growth: Rate, Structure and
                Spread,New Haven, Yale University Press, 1966.

39.   Lewis, W. Arther, "Economic Development with Unlimited
                Supplies of Labour", Manchester School of
                Economic and Social Studies, Vol. 22
                (May, 1954), pp. 139-191.

40.   Lewis, W. Arther, "Unlimited Labour: Further Notes,
                Manchester School of Economic and Social
                Studies, Vol. 26, (January 1958)

41.   Mangahas, M., Recto, A.E. and Ruttan, V.W., "Price and
                Market Relationships for Rice and Corn in
                the Philippines; Journal of Farm Economics,
                Vol. 48 (August 1966) pp. 685-703.

42.   Meier, G.M., Leading Issues in Development Economics,
                New York: Oxford University Press, 1964.

43.   Mellor, J.W. The Economics of Agricultural Development,
                Cornell University Press, 1966.

44.   Mellor, J.W. "Towards a Theory of Agricultural Development',
                in Southworth, H.M. and Johnston, B.F.(eds.)
                Agricultural Development and Economic Growth
                Ithaca, N.Y.: Cornell University Press, 1967.

45.   Misra, B. and Sinha, S.F., "Agriculture and Its Terms of
                Trade with Special Reference to India",
                Indian Journal of Agricultural Economics,
                Vol. 13 (January-March 1958). pp. 194-99

46.   Mohammad, Ghulam, "Private Tubewell Development and Cropping
                Patterns in West Pakistan", Pakistan Develop-
                ment Review, Vol.5. (Spring 1965), pp. 1-53.

47.   Mohammad, Ghulam, "Some Physical And Economic Determinants
                of Cotton Production in West Pakistan",
                Pakistan Development Review, Vol. 3.
                (Winter 1963), pp. 491-526.

48.   Nair, Kusum, Blossoms in the Dust. London: Gerald
                Duckworth, 1961.

49.   Narain, D. Impact of Price Movements on Areas Under Selected
                Crops in India: 1900-1939. Cambridge
                University Press, 1965.

50.   Neale, W.C., "Economic Accounting and Family Farming in
                India", Economic Development & Cultural
                Change, Vol. 7(4), (April 1959) pp. 286-301.

51.   Nurkse, Ragnar, Problems of Capital Formation in Underdeve-
                loped Countries. New York: Oxford University
                Press, 1953.

52.   Olson, R.O., "Discussion: Impact and Implications of
                Foreign Surplus Disposal on Underdeveloped
                Economics", Journal of Farm Economics,
                Vol. 42(December 1960) pp. 1042-45.

53.   Papanek, G.F. Pakistan's Development: Social Goals and
                Private Incentives, Harvard University Press,
                1967.

54.   Ranis, G., and Fei, J.C.H. "A Theory of Economic Development"
                American Economic Review, Vol.51(September
                1961), pp, 533-65.

56.   Ranis, G., "Planning for Resources and Planning for Strategy Change, Weltwirtschaftliches Archiv:No.2 (1965) Also Reprint No.67 of the Economic Growth Centre, Yale University.

57.   Raquibuzzaman, Mohammad, "Marketed Surplus Functions of Major Agricultural Commodities in Pakistan" Pakistan,Development Development Review, Vol. 6, (Autumn 1966) pp. 376-94.

58.   Robinson, Joan(MRS). The Accumulation of Capital, London: MacMillan, 1956.

59.   Rostow, W.W., The Process of Economic Growth. 2nd ed New York: Norton and Co., 1962.

60.   Rostow, W.W., The Stages of Economic Growth, New York: University Press, 1962.

61.   Stern, R.M., "The Price Responsiveness of Primary Producers" Review of Economics and Statistics, Vol. 44, (May, 1962), pp. 202-7.

62.   Tax, Sol.   Penny Capitalism, A Guatemalan Indian Economy, Washington: Smithsonian Institute of Social Anthropology Publication No.16, 1953.

63.   Sen, S.R.,   The Strategy for Agricultural Development, Asia Publishing House.

64.   Tims, Wouter, "A Medium Term Planning Model for Pakistan and its Application, "Mimeographed. Harvard University Centre for International Affairs, June 1966.

65.   Tsiang, S.C.   "A Model of Economic Growth in Rostovian Stages", Econometrica, October 1964.

66.   Welsch, D.E.   "Response to Economic Incentives by Abakakaliki Rice Farms in Eastern Nigeria" Journal of Farm Economics, Vol.47(November 1965).

67.   Wharton, Jr.C.R., "Malayan Rubber Supply Conditions: Some Policy Implications" in T.H. Silcock and E.K. Fisk(eds). The Political Economy of Independent Malaya, University of California Press, Berkeley and Los Angeles, 1963.

68.   Wharton, Jr. C.R., "The Infrastructure for Agricultural Growth", in Southworth, H.M., and Johnston, B.F.(eds.), Agricultural Development and Economic Growth, Ithaca, N.Y: Cornell University Press, 1967.

/M.H/