This paper analyzes the generation of savings from agricultural production in West Pakistan. It confirms the view that substantial transfers of private savings were and are being made out of the agricultural sector and briefly discusses the policy implications which follow. This paper originated as part of the work undertaken in the Fiscal Policies of Developing Countries Division for the preparation of a paper on "Capital Flows and Income Transfers Within and Between Nations to Sustain the Agricultural Revolution," which Mr. McNamara is to present to the Bellagio Conference on Agricultural Development. I am indebted in particular to Messrs. Jim Hendry and Wouter Tims for helpful comments in the preparation of this paper.
I. INTRODUCTION

1. Economic growth models have emphasized that industrial development must be based on an outflow of savings from the agricultural sector. In recent years the emphasis has shifted. It is now emphasized that before industrial development can proceed on any large scale increased investment in agriculture in order to generate a larger agricultural surplus is essential. This has coincided with a technical revolution in agriculture which makes the generation of such a surplus a physical possibility. However, the exploitation of this possibility is dependent on an adequate availability of savings for financing agricultural development itself. In pursuing these broad questions we have inevitably been drawn into an examination of the flows of funds into and out of the agricultural sector and our study of the literature on this subject indicated that little factual knowledge is available. Moreover the few studies which are available emerge with conflicting conclusions. Recent findings particularly on Japan indicate that the agricultural sector has financed industrial development in Japan to a much lesser extent than previously believed and maybe not at all.\textsuperscript{1} On the other hand, a recent FAO regional study on Asia suggests that "even if the savings rate in agriculture proves to be lower than postulated for the entire economy, the agricultural sector could finance the industrial sector to a significant extent."\textsuperscript{2}

\textsuperscript{1} Ishikawa Shigeru: Economic Development in Asian Perspective, Tokyo, Kinokuniya Bookstore Co., 1967, Ch. 4.

2. Is there a net outflow of private savings from the agricultural sector in West Pakistan? Although not adequately documented, the belief has developed that farmers have tended to invest surplus funds outside the agricultural sector. For instance the IBRD Study of Water and Power Resources of West Pakistan asserted "that very little is known about the extent of private savings, but it has been thought for some time that substantial transfers of private savings were being made out of the agricultural sector." Our own analysis confirms this assertion and discusses briefly the policy implications which follow.

Model

Investment

3. We want to estimate the investment-savings gap for agriculture in West Pakistan, or the net inflow or outflow of capital for years 1964/65, 1969/70 and 1974/75, in 1964/65 prices. We define agriculture as major, minor crops and livestock. To begin with, the agricultural production targets of the Third and the Fourth Plan can be translated into total investment requirements through the use of an incremental capital output ratio. Total investment in agriculture is, therefore, exogenously determined. From the gross production data, we derive value added \( V_t \) by multiplying with 0.72, which is the value added proportion of agricultural production in the West Pakistan input-output table for 1962/63. Total output in agriculture is projected to growth at \((g-1)\) percent or 5.4 percent annually 1964/65 throughout 1974/75. We assume that the value added proportion of total output is constant for the 1965-75 period, for which reason also value added will increase annually by the same percentage.

2/ The agricultural production targets for the Third and the Fourth Plan are taken from the Perspective Plan projections. Ibid, p. 121.
4. Investment in agriculture does not include current inputs, e.g., fertilizers, seeds, pesticides, etc. It is also obvious that growth of value added is caused by current inputs as well as by investment in irrigation, farm mechanization, etc. Since we are concerned merely with investment in the investment-savings gap analysis, the proportion of value added which results from investment must be found. Data from West Pakistan indicate that the proportion of crop output which results from "investment inputs" is expected to be of the magnitude of 60 percent for the Third Plan.\(^1\) Since agriculture in our case also comprises livestock, we increase this figure. We assess that 65 percent (r) of value added in agricultural output between 1964/65 and 1974/75 is due to investment inputs. The value added is corrected with this factor. In the absence of this correction there would have been an upward bias in the investment requirement.

5. To translate growth in value added into investment, two more parameters must be known: the time lag between investment and output in agriculture, and the capital/output ratio. We assume that there is a 1½ year lag between the investment year and the full output year for total investment in agriculture.\(^2\) When investment in period \(t_0\) is related to the production increase between period \(t_0\) and \(t_0 + 1\), a time lag of half a year is implicit. It is assumed that investment expendi-

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tures are spread evenly over the year. With a \( \frac{3}{2} \) year lag, we relate the investment in \( t_0 \) to the increase in output from \( t_1 \) to \( t_2 \). Finally in regard to the incremental capital output ratios (\( \lambda \)), they are assumed to be 2.2 and 2.5 for the Third and the Fourth Plans, respectively. These capital output ratios exclude the costs of the Indus Basin works (See footnote on p. 9, below).

6. Total investment in agriculture required to produce a fixed output can now be written:

\[
I_A = V_t \cdot r \cdot (g-1) \cdot g \cdot \lambda
\]

(1)

Total investment in agriculture and irrigation, \( I_A \), can be split up into:

\[
I_A = I_P + I_{PR}
\]

(2)

where \( I_P \) is public and \( I_{PR} \) is private investment.\(^1\) In 1964/65, \( I_P \) was PRs. 415 million.\(^2\) \( I_P \) is composed of:

\[
I_P = I_{PD} + E_P
\]

(3)

where \( I_{PD} \) represents public domestic investment and \( E_P \) foreign financed investment. We estimate the annual average of foreign aid disbursed to agriculture and irrigation over the Second Five-Year Plan at US$ 13.6 million. If two-thirds of the foreign aid into this sector goes into investment, \( E_P \) 64/65 is the equivalent of some PRs. 40 million. Of total actual investment, public and private, in 1964/65 PRs. 712 million, foreign aid thus represents 6 percent, which is about one-third of the import component of total investment, if this component is assumed at

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\(^1\) The analysis assumes that private and public investment are substitutable not complementary. This assumption appears justified in particular for investment in water, tubewells, etc.

\(^2\) Source of data: Central Statistical Office, Karachi, Pakistan
20 percent. For the projections for 1969/70 and 1974/75, public investment \( (I_R) \) is taken as a given magnitude. By deducting \( (I_p) \) from total investment in agriculture \( (I_A) \), we derive private investment as a residual.

**Savings**

7. In our model, savings in the agricultural sector are a function of the average propensity to save \( (s) \) of the previous years income \( (V_{t-1}) \), net of taxes \( (T) \), but including subsidies. The average propensity to save \( (s) \) in the agricultural sector is not equal to self-financing of investment in agriculture. For both Plan periods, it is assumed that the average propensity to save is 10 percent and that the average and the marginal propensity to save are the same.\(^1\)

8. Value added is measured at factor cost which means that it excludes indirect taxes on factor inputs but includes subsidies on these inputs. For this reason in deriving income net of taxes but gross of subsidies, we merely deduct direct taxes and indirect taxes on the consumption of the farm household. Sales and excise taxes on agricultural produce are not deducted. We accept the widely held notion that the incidence of these taxes falls upon the consumers, mainly the non-agricultural sector and not upon the producers.\(^2\) The taxes considered by us are in addition to direct taxes, therefore only indirect taxes upon products consumed by farm households, i.e., gasoline, kerosene and clothing, etc. On the basis of Indian data, we estimate these

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taxes to be 10 percent of all indirect taxes upon agriculture which in their turn constitute 27 percent of total indirect taxes. 1

9. Savings generated from agricultural production become

\[ S_A = s(V_{t-1} - T) \]  

The investment-savings gap \( K \) becomes

\[ K = I_A - I_P - S_A \]  

which now can be written

\[ K_t = V_{t-r} (g-1)g \lambda - I_P - s(V_{t-1} - T)^2 \]  

If savings which arise from agricultural production \( S_A \) are larger than private capital formation in agricultural \( (I_A - I_P) \) there will be a net outflow of private savings from the agricultural sector. To fully understand this net concept, it should be clear that the savings out of agricultural production do not represent total funds available for physical capital formation and/or financial savings in the agricultural sector. Total funds theoretically available for investment in the agricultural sector in addition comprise:

(i) Savings from non-agricultural production of farm households \( (S_N) \); and,

(ii) Capital transfers from the non-agricultural sector \( (S_F) \).

10. Hence, equation (5) can be reformulated:

\[ K^* = I_A - I_P - S_A - S_N - S_K \]  

It is seen that if \( S_A \) are larger than \( (I_A - I_P) \), i.e. there is a net outflow of private savings from agricultural production, the total outflow now becomes larger by amounts \( S_A \) and \( S_N \). The magnitudes of \( S_N \) and

1/ Ibid. p. 87.

2/ Equation (6) can also be expressed:

\[ K_t = V_{t-1} (g-1)g^2 \lambda - s^2 + sT - I_P \]
S are unknown to us. For this reason, we are solely interested in to what extent savings from agricultural production are in excess of what is needed to reach the production targets, or are deficient for which reason these savings must be supplemented through increased public investment from the government, and/or through capital transfers from the non-agricultural sector. The relevant equation is (6) in which we compare savings from agricultural production with private investment.

Analysis

11. To begin with, we will calculate $K_{64}/65$ with actual data for public investment ($I_p$) and private investment ($I_{pr}$). The value added in agriculture (major, minor crops and livestock) is estimated at PRs. 7,055 million for 1963/64 and at PRs. 7,425 million for 1964/65.1/ For 1964/65, direct taxes and indirect taxes on the consumption of the agricultural sector ($T$) are assessed at PRs. 510 million. On the tax side, the important items are land revenue and water charges, each amounts to some 160 million and indirect taxes on farm household consumption crudely assessed at PRs. 140 million.2/ For 1964/65 we get:

$$K_{64}/65 = I_A - I_P - s(V_{t-1} - T)$$

$$K_{64}/65 = 712 - 415 - 0.10(7055 - 510)$$

$$K_{64}/65 = -360$$

It is seen that the net outflow of private savings of PRs. 360 million


2/ Water charges are taken gross of operating expenses. They do not include land revenue from irrigation.
is nearly of the same magnitude as public investment in agriculture (i.e. PRs. 415).\(^2\) It follows that if there were no net outflow the propensity to save would have to be 4.6 percent or less, instead of the estimated 10 percent.

12. For 1969/70 and 1974/75, we estimate total investment in agriculture \(I_A\) with our formula

\[
I_A = V_t \cdot r(g-1)g_A
\]

(1)

The incremental capital output ratio is set at 2.2 for 1969/70 and 2.5 for 1974/75. However, in regard to the government sector we assume that the 1964/65 situation, where taxes (T) are PRs. 510 million will remain. This assumption appears reasonable for both taxes as well as for subsidies. The likelihood of any increase in agricultural taxation, in particular the land tax is not very great. With regard to subsidies, which are already included in the value added at factor cost, we assume that the subsidies will remain constant in relation to production costs. In fact this may be a conservative assumption since the largest subsidy, the one on water\(^2\) may well decrease. As regards fertilizer, although consumption is rapidly increasing, production costs are falling so that the subsidy can be expected to be reduced or even removed.

13. Moreover, if we start by assuming that public investment in agriculture also remains at the 1964/65 level, we obtain the following results for 1969/70 and 1974/75:

\[
\begin{align*}
K_t &= I_{At} - I_{P64/65} - 3[V_t-1 - T_{64/65}] \\
K_{69/70} &= 785 - 415 = 0.10(9163 - 510) \\
K_{69/70} &= 495
\end{align*}
\]

\(^1\) Additions to stock, in the form of increases of stocks of fertilizers 1963/64 - 1964/65 would not amount to more than some PRs. 60 million. If correction is made for this, the 1964/65 outflow is reduced to PRs. 300 million.

\(^2\) In 1964/65, total subsidies are estimated at around PRs. 410 million; the water subsidy is estimated at not less than PRs. 330 million.
\[ K_{74/75} = \frac{1160 - 1.15 - 0.10(11,918 - 510)}{-395} \]

With our assumptions, the projected net outflow of private savings is 200 million in 1969/70 and 400 million in 1974/75. The marginal propensity to save between 1964/65 and 1974/75, would need to be as low as 2 percent to merely finance the level of investment in agriculture projected for the later year. If in 1969/70 the incremental capital output ratio were 2.5 instead of 2.2, total required investment increases from PRs. 785 to 890 million. The 1969/70 outflow is then reduced to PRs. 390 million. In fact, with the higher capital output ratio, the outflow would disappear and there would be a necessity of an inflow of PRs. 40 million to supplement private savings, were the average propensity to save 0.05 instead of 0.10. In 1974/75, the lower propensity to save would require an inflow of not less than PRs. 175 million. However, we prefer to adhere to the 10 percent assumption, since this figure is based upon empirical data from West Pakistan.

14 To increase the realism of our analysis, we must allow for the fact that in the Third Plan, public investment in agriculture is planned to double over the 1964/65 level, to some PRs. 800 million per year and in the Fourth Plan it may increase by another 50 percent. What are the

14/ Indus Basin investment is not included in these projections. Rightly public investment should be increased by the assessed cost for the amount of irrigation water (additional water), which will be generated by the Indus Basin works before 1974/75. In our model, a higher level of public investment increases the savings outflow. But on the other hand if the relevant part of the cost for the Indus Basin Works is considered in our analysis, the capital output ratio should be higher than 2.5 for the Fourth Plan period. For the purpose of our analysis because of the difficulty of estimating production costs for additional water, it is assumed that the opposite effect of a higher level of public investment and a higher capital output ratio cancel out leaving the derived savings outflow unchanged.
implications of these projections? Obviously the net outflow will increase. For 1969/70 with a capital output ratio of 2.2, the net outflows would be of the magnitude of PRs. 500 million; the 1974/75 outflow would increase by some 800 million to some 1,200 million.

15. Throughout this analysis we have taken the planned 5.4 percent rate of growth of agricultural production and value added as given. To modify this assumption suppose that in 1969/70 with a public investment of PRs. 800 million instead of 415 million, the net outflow will remain at PRs. 500 million. The additional investment of PRs. 400 million will yield a 7.2 percent growth of value added, between 1971 and 1972. It must be borne in mind that the large net outflows for 1969/70 and 1974/75 will be reduced if value added will start to grow by more than the 5.4 percent per year which is the original assumption. A 7.2 percent growth of value added in agriculture might not surprise us unduly, but a much higher rate of growth does not seem likely.

16. A sizeable net outflow of private savings from agricultural production would still remain, even if value added increased somewhat more than 5.4 percent per year. Whilst the assumptions of this analysis may be disputed, it must be emphasized that the net outflow is insensitive to any plausible changes in the basic parameters of the model. Increases in the average propensity to save and the proportion of value added which is due to current inputs contribute to even larger outflows than those we have derived.\(^1\) The same is true if the lag between invest-

\(^1\) In fact, savings of farm households may well increase particularly if prices of farm output continue to rise relatively to prices on industrial goods.
ment and output were shorter than 1½ years. A ½-year lag instead of a 1½-year lag in 1969/70 means PRs. 40 million less of total investment for this year. On the other hand, increases in the capital output ratio obviously will reduce the outflows. In 1974/75 with the "nominal" public investment of PRs. 415 million, the residual outflow was 500 million with a capital output ratio of 2.5. In this situation a capital output ratio of 3.4 reduces this outflow to zero. However, increases in the ratio of this magnitude appear unlikely.

Policy Implication

17. The imprecision of the estimates relating to levels of public investment, the marginal propensity to save, etc., makes it impossible to give anything other than a range for the net outflow of private savings from the agricultural sector in 1969/70 and 1974/75. It appears likely that these net outflows would amount to PRs. 500-900 millions in 1969/70 and 600-1200 millions in 1974/75; the lower figure is applicable if the annual rate of growth of value added increases to 7.2 instead of 5.4 percent per year. If in 1969/70 total public investment in West Pakistan is of the magnitude of PRs. 27 million in constant to 1964/65 prices, the outflow in this year would represent 20 to 30 percent of this investment.

18. What are the policy implications? To answer, firstly it must be ascertained where these funds are used. Are they partially hoarded and used for the purchase of gold or precious stones? Are they used for investment or for consumption in the non-agricultural sector? Unfortunately, little appears to be known about this. However, there are indications that substantial amounts of deposits are made with rural branches of commercial banks and that these funds are used for urban credit expansion. Secondly what is the development objective? Is priority accorded to agriculture or to industry? If the
latter is the case, and it is reasonable to believe that some significant part of the outflows are used for productive investment in industry, then this flow conforms to the economic needs of the country. In fact there may be a need to increase the flow. If on the other hand, the priority in development is towards the agricultural sector, part or the whole of the savings which flow out of this sector should be used for productive investment within the sector. One solution is to mop up surplus savings in the agricultural sector through increased taxation or reduced subsidies and to transfer these funds back to agriculture. Whilst policy changes in these directions might be desirable for reasons of broad fiscal policy relating specifically to the need to mobilize more budgetary funds for development from the agricultural sector, the impact on the outflow of private savings from agriculture is likely to be quite small. If we assume that the savings function is reversible, private savings will fall by only 10 percent of the reduction in disposable incomes resulting from an increased tax imposition on farmers. The major impact will be on their consumption and, to repeat the point made above, this might be desirable for broader fiscal reasons.

There is an alternative to the tax approach which is perhaps more realistic, particularly in view of the fact that the prospects for increasing taxes on agriculture in Pakistan are not bright. This alternative approach is to mobilize surplus funds through existing agricultural credit institutions. Higher deposit rates and interest rates generally would be needed for this mobilization. It has been established that the majority of borrowers in terms of loan volume of agricultural lending institutions in West Pakistan are high income/commercial farmers. It is probable that these are the same farmers who are responsible for the bulk of the transfer of savings to the
non-agricultural sector. It is, therefore, reasonable to expect that if agricultural credit is to expand to those groups, even though this might be at a higher lending rate than at present, it is likely to result in a continuing and growing net outflow of private savings. If private investment and/or the application of current inputs does not increase as a result of this operation, nothing has been gained. To repeat the objective is to increase agricultural production.

20. In fact, evidence from Pakistan reflects the fact that the majority of big farmers may be innovative entrepreneurs in the Schumpeterian sense and that increased public favors to them in the form of subsidies and/or public investment solely allows them to increase their consumption and/or the transfer of surplus funds to the non-agricultural sector. In other words, investment decisions in the commercial farm sector are autonomous and largely independent of government policy, as long as there is an adequate supply of inputs, fertilizers, seeds, etc., and so long as the profitability of agricultural production remains at its levels of recent years. To increase productivity in agriculture, it could, therefore, be argued that the focus should switch towards small farmers. It should be emphasized that this argument derives from the economics of the problem; the equity aspect is another issue. At present, both investment and the application of fertilizers, seeds, etc., of small farmers appear much too low to reach those yields which have been made possible by the new technology. For instance, in India, it has been shown that the annual average amount of capital expenditures was Rs. 75 for small farmers as against Rs. 716 for big farmers.¹ To further increase agricultural

output, the first priority in agricultural lending should perhaps be in the form of long-term supervised credit to small farmers who are capable of producing marketable surpluses. One might even consider the imposition of credit ceilings for large farmers. It should be emphasized that supervision of credit use would be extremely important, for the evidence for Pakistan as well as for several other Asian countries is that well over one-half of all borrowings by farm households goes to finance current expenditures.