

HIID/ESEPP Project
Planning Commission
Government of Bangladesh

Unedited

OCCASIONAL NOTES
VOL. II

Compiled as of January 15, 1990

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HIID/ESEPP Project
Planning Commission
Government of Bangladesh

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VOL. II

Compiled as of January 15, 1990-

OCCASIONAL NOTES

NO. 89.7

National Accounts of Bangladesh

1. Value added in manufacturing
2. A brief comment on UNDP Mission's Aide
Memoire on National Accounts
3. A short comment on draft chapter 3
of the Commission on National Accounts
4. A very brief comment on Fourth FYP

Compiled as of Jan. 15, 1990

Occasional Notes

Vol. II

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May 5, 1989

VALUE ADDED IN MANUFACTURING

The weaknesses of value added (or GNP generated) in manufacturing are well-known. So are weaknesses in other nonagricultural sectors, particularly construction and transport. Indeed, the estimates of value added and investment in the latter two sectors are the weakest among all sectors. Practically no data exist for these two sectors. GNP estimates for them are based largely on assumed values and ratios.

The heightened concern with the estimates of value added in manufacturing industries is evidently due to the role of manufacturing, its growth and export potential, the highly productive on-the-job training provided by this sector, its linkages with other sectors, and so forth. It is no surprise that in almost all developing countries, industrialization gets priority in national development plans.

The manufacturing sector of Bangladesh consists of four distinct subsectors or components: (1) large sector (main data-generating agency: CMI, BBS); (2) small industries (main data-producing agency: BSCIC); (3) cottage industries (main data-collecting agency: BSCIC); and (4) the handloom industry (main data-generating agency: the Handloom Board). Other agencies and individual researchers have done surveys now and then, which provide checks on (and often supplementary information to) the main sources of data.

None are, however, reliable. For instance, the CMI covered fewer than 4000 units until this year, when all of a sudden it has increased the size of this sector to over 23000 establishments (evidently based on the information provided by the Economic Census, 1986). What could, therefore, be said about its estimates till 1985-86! The capital stock data reported in this source is highly suspect..

I haven't read any source or heard from anyone not remarking about the BSCIC data as being unreliable. I have also heard cynical remarks about BSCIC's current exercise (in which it is carrying out its decennial census of small and cottage industries) to the effect that it is going to be another re-run of the 1979-1981 censuses, which are hardly praiseworthy.

The main reason for the weak data of BSCIC probably is that this agency lacks the expertise of senior researchers and analysts, and its low-paid data-generation machinery (of investigators) is not sufficiently equipped to do a good job.

Any refinement of the existing industrial data, more realistic assumptions about completing the data gaps, or developing new multipliers to revise existing estimates is unlikely to produce the value added measures which can command more confidence. What is the alternative? the alternative is to generate more comprehensive and trustworthy data.

Short-run approach

A new piece of information that has become available during the past one year is the Economic Census, 1986, which includes nonagricultural activities. As of now a 5% sample of

establishments only has been tabulated. This source gives data on "persons engaged" by industry classification and employment-size-classes of industry. Since value added estimates are obtained mainly from employment, by assuming average value added per worker, this source should be considered more reliable than previous sources. For previous employment estimates are obtained from household surveys or population censuses. The economic census is addressed to establishments and household economic activities.

The 100-percent tabulation of establishments as well as 100-percent tabulation of household activities or cottage industries is expected to be ready in the near future. These two sources will provide total employment by industry classification and size-classes of industries. By making guestimates about the mean wage rate, value added by labor can be estimated. Value added by capital will remain a problem.

Long-run approach

There is no substitute for good data in preparing national accounts, BBS is under contract to carry out follow-on surveys, using the Economic Census as a frame. Last year, a subcommittee of the Planning Commission (representing data-users) worked for 4 months and prepared a report on data gaps, in which the following 3 recommendations were specifically made:

(1) The questionnaire of the follow-on surveys should be prepared in close (not cosmetic) consultation with data-users.

(2) The data on incomes, outputs, costs, employment, and similar variables should be in such reasonable detail as to yield comprehensive measures of them for national accounts, manpower

planning, and other purposes.

(3) The coverage of sectors should be complete. It was specially recommended, for instance, that the follow-on surveys must include construction and transport, by both establishments/firms and self-investment by households.

(4) The work on surveys should be expedited.

We are unaware of any response or progress on any of these aspects. The statistical subcommittee of the Ministry, chaired by the Secretary of its Statistical Department (of which Sahota is also an appointed member) has not met over 16 months, even though the data-gap report of the Planning Commission's Data-Management Group was also submitted about a year ago.

There is no reason why these economic surveys cannot generate reliable estimates of national accounts, and for the entire nonagricultural sector. This is the source on which national accounts estimates will have to depend.

2. A Brief Comment on UNDP
Mission's Aide Memoire on
National Accounts

HID, ESEPP PROJECT

PLANNING COMMISSION

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TO : Dr. A. Salam

FROM : GIAN SINGH SAHOTA
RESIDENT ECONOMIC ADVISOR

SUBJECT :

DATE Dec. 18, 1988

Dear Dr. Salam:

I am sorry I could not look at the Aide Memoire on national accounts that you had given me for my comment, until I was reminded of it by the National Report on the Economic Census, that you kindly sent to me last week. Thanks for the latter.

Actually, I do not find matter on which one would disagree with the authors of the aide memoire, as either the things stated there are factual or deficiencies pointed out are already known. After pointing out a couple of issues on which specialists might differ, I will make submission for capturing the upcoming golden opportunity to prepare trustworthy national accounts.

1) It is obviously not correct that "data on output and earnings available from the Economic Census can be used for national accounts" (p.4). There are no data on "earnings" or "output" in the Economic Census.

2) I do not think the recommendation of the aide memoire to stop using "spare parts as gross fixed capital formation" (p.3) can stand. It depends upon how depreciation is treated for national accounts.

3) The authors rightly advise the exclusion of "rental services" of machinery and transport equipment" from value added, for "rental services" are a cost of production. Correctly imputed, however, the rental value is a relevant component of income when one is using the income method rather than the production method of national accounts estimates.

My main comment on national accounts, however, is the following:

1. The main source of future data for national accounts.--The economic surveys that are to follow on the Economic Census can be a sound base for national accounts, provided national accounts experts are invited to participate in preparing the questionnaires and to interact with statisticians when variables are prepared and data are processed.

2. Comprehensiveness of variable measures and appropriateness of questionnaires.--The measures of output, costs, income, and related stock and flow variables may remain partial if economists, who know the theory of national accounts, do not participate closely in the preparation of the questionnaires. It is extremely important to generate comprehensive measures of output and the other indicated variables in the case of permanent establishments and comprehensive net incomes in the case of household economic activities.

In addition to the statistical properties of a questionnaire, two very important economic properties of the questionnaire are critical. (1) The content of a questionnaire, which determines whether or not comprehensive measures of output and income variables are being generated. (2) The particularity of the questionnaire for different sectors. For a single general questionnaire is not appropriate for every sector.

3. Interaction of data-generators with data-users.--Absolutely essential. But very hard to convince data-generator statisticians that such an interaction will immensely increase the quality of data.

When you had gone over to the Election Commission, two data-user groups tried to interact with the BES's Economic Census Department, so they could produce the right kind of data. These were:

(1) The Data-Users Group organized with the blessings of Dr. Rahim. It consisted of 4 members: Dr. Waniuddin Mahmud, identified by Dr. Rahim; Zaïd Bakht, nominated by the Director General of BIDS; Saadat Ullah; and myself. This group was assembled to study the questionnaires of the Economic Census. But the Economic Census Department failed to prepare one. Frustrated by the nonco-operation of the Economic Census Department, despite the backing of Dr. Rahim, the Data-Users Group prepared a set of 7 questionnaires for 7 nonagricultural sectors, including manufacturing, trade, transport, construction, community and personal services, finance, and frozen fish. The Economic Census Department, led by its expatriate consultant, refused to look at them.

(2) The second group consisted of an officially appointed subcommittee of the Planning Commission, called Planning Commission's Data-Assessment Subcommittee, with about 20 members from all the divisions and Acting Joint Secretary Mamed Hossain as its chairman. It worked for 4 months and submitted its report in April 19898. Among other recommendations, the subcommittee marginally revised the 7 questionnaires of the Data-Users Group and unanimously recommended them for the follow-on surveys. To my knowledge, no action has been taken on it.

The reference follow-on surveys provide a golden opportunity to start national accounts estimates on sound footing. These surveys will also serve other multiple purposes, e.g., the preparation of a large, sound input-output table, and so forth. Only if data-users can be incorporated as essential members of the undertaking!

The Economic Census Department's argument for not including transport and construction in permanent establishments at all (repeated in the National Report) is weak. For there must be some such firms. But their argument for not surveying these two sectors at all is baseless and unacceptable, because the household activities part of the survey will and must pick up all economic activities associated with individually owned autos and family-built homes. If such a specialized department as the Economic Census cannot do a survey of these sectors, no matter how diffused, who else can do and who will estimate value added from them?

As a data-user and advisor to the ministry of data-users, I would strongly emphasize that the Economic Census be required to survey these and all other nonagricultural subsectors and do so in close collaboration with economist data-users.

2. A Short Comment on Draft Ch. 3
of the Commission on
National Accounts

Dec. 20, 1989

GNP Ch.3

P.1. Shouldn't transport also be included? The national accounts estimates of that sector are also very weak.

P.3. A weakness of the CMI that can be remedied immediately without major change in coverage and weightage, etc., is the poor job in editing and cleaning up of data. A few examples may make the point. In some cases, the raw materials used have no relation with the output produced. Cases of yarn being the raw material for ice, and vice versa, have been detected. Units appear in the sample with employment and other data but the output cell is blank. There are numerous observations in which labor has increased multifold, when output has decreased multifold, and vice versa. See photocopy of a printed page of CMI 1984-85 and 1985-86, ^{stapled at the end.} The data should be edited much more thoroughly. Even back issues of the CMI can be cleaned up.

P.3. It is not understood why the lag is so long! The 1986 Economic Census was supposed to be tabulated by 1987, it has just been completed--more than 3 years after it was done, and with a multimillion-dollar-aid foreign technical consultancy with all sorts of computers and other equipment. The HIID has carried out an enterprise survey of about 3000 units, roughly the same number as the CMI. The HIID questionnaire is about twice the size of the CMI questionnaire. The entire country is covered. The entire process from field survey to editing and processing of data upto the cross-tabulations (the level of data processing done by SBS) and econometric estimation is about to be finished

within one year.

P.4, top paragraph: Upto 1988, the CMI consisted of about 3500 establishments. It is learnt that BBS has now expanded the list to more than 23,000 units (which will probably be covered by a survey rather than census). For the units with 10 workers or more, the Economic Census figure is 18329 (plus an unknown fraction of 3079 units which did not report the employment size).

P.4. A number of surveys are repeatedly done by BBS, such as the household expenditure survey, the labor force survey, and so forth. It is not understood why the sets of price and quantity weights are not revised frequently!

P.6. The resort to assumed ratios and rates of growth, such as the 2.9% assumed rate of growth of labor force in the small sector (equal to the estimated rate of growth of population), which are evidently weak, can be done away with by appropriate surveys. Instead of the erstwhile annual census of the BBS and the decennial census of the BSCIC, statistically significant annual surveys may be undertaken (see note for p.9 below).

P.6, end of 2nd paragraph, particularly the value 8.3 percent: Instead of the words "about 8.3 percent on yearly basis," substitute the words, "significantly higher than that." The reason is that the 8.3% figure in the table prepared by HIID from the Economic Census is gross, which does not subtract the loss of employment in those establishments which died (for which there are no data). This qualification has been pointed out in the text of the respective report.

By implication, the words "about 8 percent" in the 6th line from below should also be deleted.

P.6. The 1986 Economic Census has ~~now~~ been entirely tabulated. Note that the Census has generated only one economic variable, namely employment. The other relevant variable is the number of establishments, ^{by mech and nonmechanized.} The data relevant for national accounts will come out of the follow-on surveys.

P.8, top two lines: Not correct. New units are regularly added to the CMI. Only the list is partial. The following is the number of new establishments coming out of the Merge File:

1979-80	80-81	81-82	82-83	83-84	84-85	85-86
<hr/>						
<u>New establishments that entered</u>						
185	709	887	1075	1213	1417	1419
<hr/>						
<u>Old establishments that died,</u>						
<u>i.e., did not reappear in CMI</u>						
516 (in 4 yrs)	138	120	104	86	58	43

P.8, mid. This has been done. I guess, the CMI list now consists of approximately 23000 units.

P.8,d. What really is the problem in exactly matching the taxes with the figures of the Ministry of Finance?

P.9, Item e. I do not yet get the functional usefulness of the suggested classification. Why 10, 20-worker cut-off lines are more appropriate than the 10-worker line of CMI? Since the lower class is being separated only because production method is to be

used for the larger class and the mean labor output for the lower class, the earlier classification seems to me empirically more appropriate.

The trouble is that the division used by CMI and the BSCIC is not relevant at all for national accounts. The coverages are partial and there is overlap. Some economy can be realized by synchronizing the CMI-BSCIC data generation.

P.9, Item f: I am not sure which TIP studies are relevant for national accounts! The existing BSCIC data are hopelessly weak.

BSCIC's decennial censuses for small and cottage industries are in progress. Economists should urgently look at their questionnaires to verify whether the net production and income concept being used will generate comprehensive incomes or not. Comprehensiveness is to be insured on both the cost side and the production side.

At this point, it will not be irrelevant to bring up the issue of non-coordination between various data-generating agencies and between these agencies and data-users. In this particular case, data-users are economists and statisticians who prepare national accounts. BSCIC started its decennial censuses in 1987. The BBS did its Economic Census in 1986. (1) Would it not have been highly useful for BBS's Economic Census Department to help design the BSCIC surveys (what they call censuses)? Or for BSCIC planning unit to consult with the former to decide upon the coverage of its surveys? Why were the voluntary services of economists through the Data-Users' Group spurned by BBS⁹, in particular by its Economic Census Department? Why did BBS not

take any action on the report of the subcommittee of the Planning Commission on data assessment, submitted to BBS in April 1988? The BBS functionaries refused to accept any interaction with or recommendation by economists.

Had that advice been considered, the follow-on survey of the Economic Census Department (is it underway?) would have generated ideal data for national accounts. For it is (supposed to be) a complete survey of all nonagricultural activities-- manufacturing, transport and communication, construction, power, community services, investment, and so forth. It would even have been ready by now, for the Fourth FYP. Had there been coordination between BBS and BSCIC, the latter agency's decennial surveys, currently in progress, would (1) either have been unnecessary because the Economic Census is supposed to do precisely what BSCIC is doing for a segment of the industry; or (2) the BSCIC would have used the complete coverage, formulated the correct design, and prepared the relevant parts of the questionnaires to generate comprehensive net production of enterprises in the small-scale subsector and comprehensive incomes of households in the cottage-industry subsector.

What can be done now? It is not too late to rectify the weaknesses. (1) Let BBS incorporate economists in its Economic Census Project and in addition closely interact with other data-users to prepare its questionnaires for the follow-on surveys before it goes in the field. (2) Let BSCIC interact with the Economic Census Unit and economists to make whatever revisions

are possible in its surveys at this late stage. (3) The Planning Commission represents economists and data-users. Why does it not assert in bringing about the indicated co-ordination?

P.9, Item g. The annual surveys would reveal the shrinking and expanding subsectors, to enable weight to be revised.

I have little to comment upon the improvements suggested for construction (and transport and communications). I would only say that BBS must include these two sectors in its follow-on economic survey. The economists must review its questionnaires to assure correct and comprehensive measures of production and costs. Sahota

¹According to the Econ. Census, there are more than 111,000 units with fewer than 10 workers. BSCIC is surveying only a tiny fraction of that.

CHI

Confidential
Not to be duplicated

ESTD.	YEAR	No. of Workers	Output	Output/Workers
		NO-OF-EMPL	MFG-VAL	
1853	84-85	31	5089	164
1853	85-86	165	5457	33
1865	84-85	997	83039	83
1865	85-86	978	59410	61
1887	84-85	19	1454	77
1887	85-86	15	628	42
2010	84-85	19	2996	158
2010	85-86	29	2583	89
2140	84-85	2889	162349	56
2140	85-86	3067	199950	65
2164	84-85	18	7085	394
2164	85-86	84	6765	81
2174	84-85	1790	86418	48
2174	85-86	2109	129093	61
2509	84-85	20	147415	7371
2509	85-86	1893	112625	59
2522	84-85	22	15220	692
2522	85-86	165	13229	80
3030	84-85	16	199866	12492
3030	85-86	2981	172456	58
3051	84-85	258	100242	389
3051	85-86	267	67974	255
3052	84-85	15	8472	565
3052	85-86	31	9249	298
3325	84-85	33	82841	2510
3325	85-86	2264	111529	49
0032	84-85	18	2887	160
0032	85-86	18	3417	190
0127	84-85	10	2388	239
0127	85-86			

This is an average page from the computer print-out of CHI. Observe the errors: in 7 out of 15 industries, when employment goes up several times output goes down several times. There are obvious recording/punching errors.

4. A Very Brief Comment
on Fourth FYP

This was a very brief comment on the CED Member's article on the Fourth FYP in the daily Bangladesh Observer of early January 1990.

Good summary of plan objectives and growth problems, and the strategies about achieving the objectives. Covered almost all issues involved. The integration of macro sectors with micro social groups well-stated. The section on the "residual" is very appropriate and is nicely written.

A comment on two of your suggestions:

1) Creation of an
Efficiency culture

The 4th FYP may allocate some funds to creating efficiency culture or productivity awareness or technology consciousness. For example, one week of training to 300 engineers, teachers, agronomists, transport officers, bureaucrats, bankers, shopkeepers, hoteliers, telephonists, and so forth, in each of the 53 I-O categories. Another week for these 15,900 experts to spread out in their respective sectors across the nation to explain how productivity and the "residual" can be increased. Mr. Proci of ILO tells me that his project staff has visited 161 plants in the past 2-years and explained them where they can increase their productivity. He claims that as a result, each plant has increased its productivity by 5% to 25%.

2) I am disposed, if time permits, devote a few weeks to expanding the augmented I-O table to functionally relate the I-O subsectors through the 24 employee categories and some other equations to social groups. I have done that for Brazil, and have nearly all equations for Bangladesh ready. Only income sources by social groups remain to be developed. Then

it will only be a matter of solving a bigger matrix. The PC's present SAM does not relate employment (income earning groups) by sectors with income-recipient and consumers and savers (social income classes) functionally.

HIID/ESEPP Project
Planning Commission
Government of Bangladesh

Occasional Notes

No. 89.8

COMMENT ON

THE BIDS STUDY OF THE TEXTILE SECTOR

In particular papers by

1. Nuimuddin Chowdhury, "Bangladesh's Handloom Economy in Transition" and
2. Muzaffar Ahmad and Mafizul Islam, "Nominal and Effective Rates of Protection in Bangladesh's Textile Economy"

June 13, 1989

Written for the Paper-
Givers, BIDS

Comment on: M. Chowdhury, Handloom and M. Ahmed and M. Islam, Effective Rates of Protection June 24, 1988

If there are numerous facts that have been brought to surface in GII's monumental research about the textile industry and the many issues that have been raised, I will pick only two. Both are confined essentially to the Ahmed and Islam paper, which I am supposed to discuss. The issues I will discuss, however, concern the results of Chowdhury's study also. One issue concerns ERPs. The other issue relates to the main policy implication of the research.

ERPs

Ahmed and Islam have written a competent review of the conceptual and empirical issues involved in the calculation of ERPs. They have estimated ERPs very carefully. The results, therefore, deserve more confidence than others that have been published before. I only want to point out that they are on the low side as compared to both the TIP estimates for one year and our estimates for 15 years, as may be seen from the comparison of the Ahmed-Islam estimates and our estimates in Table 1. Our estimates are

coincidental, inasmuch as our purpose is not to compute them for their own sake. We are interested in gauging the impact of the net incidence of all policies on investment, employment, and other desirable variables. That analysis can be meaningfully done only over time. For the purpose, actually we compute what we call ERAs, which include domestic assistance in addition to international trade-based assistance. In addition, assistance to primary inputs (labor and capital) is also appropriately incorporated. Annual measures of ERPs for textile products for 15 years are presented in Table 2; those for the 1-0 table sectors in Table 3a (ERPs) and 3b (ERAs). This is not a place to discuss these results. It need only be pointed out that relative differences between ERPs to (1) handloom industry, (2) mill products, and (3) powerloom products are broadly consistent in the two sources. Therefore, policy implications based on the noted relative differences cannot be much different (let they are). Indeed they are opposite. Let us take a look at one of the main policy implications.

Summary of pertinent results

that indicate some policies

1. Handloom produced cotton fabrics of coarse and medium variety are competing credulously against foreign (especially India-made) products. Fine and superfine fabrics of the mill and the powerloom need high protection even to survive against foreign goods

2. VA/output and net profits/VA ratios have risen over time in HL industry

3. The 'internal rate of return' in HL is markedly superior to PLS and mills... in the production of almost every fabric" (p. iii)

4) "Market pressures' have brought about "structural adjustments" in handloom industry, which "has improved its own yarn dyeing and sizing methods" (p. iii)

5. Market forces and entrepreneurship" have brought about 'growth and structural adjustment' in the HL industry

6. "Competition' has enabled HIs to perform better than PIs and Mills (Howdury

7. The most interesting result of this study is that HIs experienced the noted

higher rates of growth, productivity, profitability than PLs and mills in the teeth of much lower ERP than FLs or mills.

Policy implications derived by
the Chowdhury-Ahmed-Islam studies

From the last-mentioned result, Ahmed and Islam derive the implication that the HL industry should receive "equitable protection," and that lower protection and greater vulnerability to competition from imports need to be corrected "(Ahmed and Islam, p.28). Chowdhury takes one step to the right side and the second step to the wrong side when he recommends a reduction of import duty (from its 100 percent to 50 percent rate) on cotton fabrics of coarse and medium variety and an increase of import duty on synthetic/blended fabrics. Then he goes onward to the wrong side by recommending more government interference in this highly competitive micro sector by "forging weaver's cooperative groups," when the motto of cooperation is voluntary action; urging that public intervention, is particularly needed" in yarn distribution, even when the yarn market is nearly wholly privatized" (p.v); calling for intervention in the credit market, while recognizing that weavers

have responded positively to competitive pressures of all kind, in which case a benign neglect of the credit market by government and the resulting supply-demand equilibrium may become conducive of larger mobility and availability of credit resources than under intervention; and so forth.

The state of the handloom industry revealed by this study, *ceteris paribus*, is entirely consistent with the twin fundamental theorems of welfare economics: (1) Any competitive market equilibrium is Pareto efficient. (2) Under certain plausible conditions, every Pareto-efficient allocation is a market equilibrium. Higher competitive pressures seem to have worked. Among other causes, what went wrong with the public enterprises of the world is the imposed negation of competition; what went wrong with denationalization in Bangladesh is that competition was assured neither within nor between public and private enterprises. Denationalization was pushed through as if privatization would serve as a panacea for all inefficiencies.

To conclude my comment, note the following generally known fact and the next

two based by the Chowdhury study:

- a) Bangladesh has lagged behind its neighbors in the field of technology even in traditional industries, such as textile, coir, sugar, and so forth, despite its latecomer advantage
- b) Bangladesh's HL sector is meeting competition from imports very well
- c) Bangladesh's HL industry has faced more open competition than its closely related industries. Despite, rather because of, that it has shown superior results
- d) I may add a fourth fact here, namely, that in our regressions of investment on ERAs and several other variables, ERAs have the negative coefficient and significantly so for enterprises of the size exceeding 50 workers.

Note carefully that a competitive sector has done well. On the other hand, less competitive, more highly protected rival sectors have done worse. What rationale then is there to suggest an increase in the rate of protection of the former sector? Isn't it rather an implication that for the sake of growth, protection on the latter sectors should also be relaxed and that they, too,

HIID/ESEPP Project
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Occasional Notes

No. 89.9

MID-PERIOD REPORT ON
SOME POLICY IMPLICATIONS
OF
THE HIID/ESEPP PROJECT RESEARCH

June 28, 1989

Written for the
USAID Mission

should be exposed to some competition? The same implication applies to domestic assistance. That is, Bangladesh's textile sector needs some deregulation, rather than more intervention.

Seminar to USAID/Dhaka
June 26, 1989
Mid-Period Report on

SOME POLICY IMPLICATIONS
of
THE HILD/ESSEFF PROJECT RESEARCH

The research done in this project thus far has focused largely on the employment and growth potential of industrialization in Bangladesh in general. Some research has also been completed on mini enterprises, but due to the paucity of data, that sector has not been looked into thoroughly. A sizeable field survey to generate the necessary data for small industries is currently in progress. The policies implicated by this research, therefore, relate principally to industrialization in general, though small industries are always in focus.

The policies that will be discussed in this seminar are based mainly on the analyses of the following working papers of the project:

1) WP3: Year-to-year growth of total-factor productivities for about 300 four-digit industries for a period of 10 years and by econographic areas (principal source: CMI)

2) WP4 and WP16: Establishment expansion and employment growth for about 300 four-digit industries over a period of 10 years (principal source of data: Economic Census, 1986)

3) WP5 and WP17: a critical review of the agricultural

sector and differential assistance as between agriculture and industry

4) WP17: an analysis of investment by firm and by 4-digit industry for a period of 10 years. (principal source: Department of Industries; data computerized by this project)

5) WP18: an assessment of the impact of policies as reflected by an interview survey of apex agencies (industrial and business leaders, bank managers; public corporation officials, government officers, etc.)

6) WP20: Effective rates of assistance or the net incidence of all domestic and trade policies, for about 100 products from about 60 four-digit industries over a period of 15 years

7) WP21: Identification of growth sectors, impact of policies, and factors hindering industrialization: an econometric analysis of combined series of the results of the preceding 6 items.

Based on this research, four major problems among others, that hamper industrial growth in Bangladesh, have been tentatively identified. These are:

a) wide-ranging economic regulations (too many price and quantity controls and entry restrictions), often without any economic analysis

b) poor implementation of policies, even those which are otherwise desirable

c) lack of competition within public, within private, and between public and private firms of several industries

d) dearth of improvements in technology and lack of transfer of technology, and its adaptation for local production

Seminar to USAID/Dhaka
June 25, 1989
Mid-Period Report on

CORE POLICY IMPLICATIONS

of

THE HIRD/ESOPP PROJECT RESEARCH

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The policies that will be discussed in this seminar are based mainly on the analyses of the following working papers of the project:

1) WP3: Year-to-year growth of total-factor productivities for about 300 four-digit industries for a period of 10 years, and by econographic areas (principal source: CFI)

2) WP4 and WP16: Establishment expansion and employment growth for about 300 four-digit industries over a period of 13 years (principal source of data: Economic Census, 1986)

3) WP9 and WP17: a critical review of the agricultural

sector and differential assistance as between agriculture and industry

4) WP17: an analysis of investment by firm and by 4-digit industry for a period of 10 years. (principal source: Department of Industries, data computerized by this project)

5) WP18: an assessment of the impact of policies as reflected by an interview survey of apex agencies (industrial and business leaders, bank managers, public corporation officials, government officers, etc.)

6) WP20: Effective rates of assistance or the net incidence of all domestic and trade policies, for about 100 products from about 60 four-digit industries over a period of 15 years

7) WP21: Identification of growth sectors, impact of policies, and factors hindering industrialization: an econometric analysis of combined series of the results of the preceding 6 items.

Based on this research, four major problems among others, that hamper industrial growth in Bangladesh, have been tentatively identified. These are:

a) wide-ranging economic regulations (too many price and quantity controls and entry restrictions), often without any economic analysis

b) poor implementation of policies, even those which are otherwise desirable

c) lack of competition within public, within private, and between public and private firms of several industries

d) dearth of improvements in technology and lack of transfer of technology, and its adaptation for local production

Proposed Policy Reform

The state of Bangladesh's industry just described implicates two major policy reforms: (1) deregulation and increase of competition within and between public and private sector firms and (2) active promotion of technology transfer and a quantum increase in R&D expenditure. The rest of my discussion elaborates these two policies.

1. Deregulation

There are desirable regulations (e.g., trust-busting) and undesirable regulations (for example, barriers to trade). Therefore, when one talks about deregulation, one refers only to the latter category. Regulation may refer to such safeguards as political (for instance democracy versus autocracy), social (such as health and safety requirements for workers), or economic (e.g., price controls). The subject matter of this seminar is economic deregulation. Because the context is understood, we shall refer to it simply as deregulation.

Definition

Broadly defined, deregulation refers to the removal of the public sector's direct intervention in the working of markets. Examples are denationalization, changes in the ownership pattern of enterprises, abolition of legal barriers to entry into a market, dismantling of price and quantity controls, reduction of tariffs, and so forth. The core of deregulation, may be summed up in decontrol of prices and removal of barriers to entry and exit.

Denationalization is a kind of deregulation inasmuch as it is a change in the ownership pattern. Property rights are assigned to individuals. But denationalization is not necessarily

consonant with deregulation. Price controls and entry barriers can and do exist for private firms.

In some cases, regulation may be highly desirable, for example in the cases of natural monopoly, industries with large externalities, destructive competition, infant industry, and the like. Whenever some distortions exist in an economy, the solution is not to reduce distortion in as many markets as possible. Rather the remedial action that is called for is to distort undistorted markets also. The solution for that is optimal second-best pricing, the so-called Ramsey pricing. In practice, however, regulations are rarely promulgated on the basis of optimality criterion. One only has to look at widely varying effective rates of assistance to realize how widely protection differs from optimality. For instance, the estimated effective rate of assistance to safety razor blades is over 2500 percent (primarily because the unassisted value added is extremely low). Yet in the 1989-90 budget, the economist Finance Minister doubled the tariff on safety razor blades from 50 percent ad valorem to 100 percent. Of course, there are reasons for that sort of suboptimal policies: limited information, social objectives, political considerations, interest-group pressures, and so forth. That, however, is not a justification or economic argument for regulation. Interestingly, despite a quarter-century research on effective rates of protection, policies continue to be based on nominal rates of protection, to the neglect of effective rates of protection.

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Inefficiencies caused by
regulation

Firm behavior is not indifferent to regulation. Distortions in factor and product prices cause malallocation of resources. Regulation dilutes property rights and thereby weakens the monitoring of management by stockholders and capital markets, leaving management to pursue other objectives, than profit-maximization necessarily. One is not surprised by the fact noted by the Finance Minister in his budget speech: "Bangladesh has natural advantage in labor intensive industries, but the entrepreneurs show a bias for capital intensive and import intensive industries." Having artificially allowed a much higher rate of return to capital than the cost of capital and having created protected sectors which tend to have higher wages and stronger unions, need one wonder why entrepreneurs show a bias for capital intensive industries?"

The just stated result of regulation is well-known. What is less known, or at least only vaguely appreciated by regulators, but which is very much on the minds of industrialists, is a type of X-inefficiency caused by smuggling, rent-seeking, and corruption, which results from regulation. On this issue, interestingly, there are some information asymmetries: regulated firms have information which is not shared by regulators. When the Planning Commission asked this project to explore why investors have not responded to investment incentives of all kind, we went out and interviewed a large number of them. We learnt much more from them about these three impediments to industrialization (largely caused by wrong policies) than, in our

judgment, are realized by policymakers. The next few paragraphs summarize the discussion of these ailments in the Project Report WP19: Impact of Policies: Evidence from a Survey of Industrial Leaders.

Policy-caused Factors

Inhibiting Industrialization

The policy-caused factors affecting Bangladesh's industrialization may be usefully discussed by viewing in 4 groups of actors: smugglers, rent-seekers, traders, and industrialists. The incentives and concessions given in the industrial policy packages of 1982 and 1986 were addressed to industrialists, but the gains seem to have gone to the other 3 groups.

1. Smugglers.--In a free-enterprise economy, workers are premised to maximize their earnings, shareholders their wealth, entrepreneurs their profits, and consumers their utility. Even in these economies, however, certain modes of earning and making money are considered immoral or unsocial, which, in pursuance of social mores, are usually made illegal. Robbing, prostitution, black marketing, and smuggling, are examples. These occupations have, nevertheless, continued throughout history and across all countries, their relative importance depending upon the expected remuneration relative to what is expected from alternative avenues. Profits from such an activity have to be high enough to offset additional implicit costs of social stigma, bribing law-enforcement officers, and the risk of getting caught. In this note, we are concerned with smuggling.

Causes and effects of smuggling.--Smuggling arises whenever imports are banned, such as cigarettes, sarees, livestock, etc., in Bangladesh, or are subject to high tariffs, e.g., canned food, safety razor blades, several steel products, and so forth. According to the guesses of business leaders, the costs of smuggling are such that whenever an import duty exceeds 40-50 percent, profits from smuggling become so attractive that much of the commodity concerned is smuggled in to the detriment of the domestic producer. (Goods that are easily noticeable, such as cars are exception to this practice.) High tariffs and bans, which are galore in Bangladesh, despite some reduction in the recent budgets, may, therefore, be defeating their purpose of protecting domestic infant industries.

Government's domestic policy of industrial expansion is, to a large extent, also frustrated, as, according to the opinions expressed by business leaders in the survey, "smugglers make more money than importers and the latter more than industrial producers." Entrepreneurs are smart people, whose objective is profit-maximization. When they see that profits are low and risk is high in industrial production while the reverse is the case in alternative investments, they would, in general, not be very smart if they persisted in earning low profits when higher rates are available. Even when they did, frustration will bear heavy on their minds. "If you are smart, then why are you not rich," goes the equip in the U.S., a free enterprise economy of entrepreneurs. In short, smuggling and rent-seeking are not supplementary to investment in machines and mortar; they supplant them. They divert resources to socially far less

productive avenues and thus lead to a net reduction in real investment in industry. Surveillance against smuggling (preferred by industrialists) is made ineffective because the palms of many law-enforcement officers can be greased and because there is no leakproof remedy against smuggling, as the drug traffic in America has shown, and because major smugglers may have their men in the court or amongst the influential politicians. The effective remedy is the elimination of quantity restrictions and lowering of tariffs. Unfortunately, this remedy is not liked by protection-minded industrialists (see the attached table). The ramifications and pros and cons of the suggested remedy are many, into which we will not go here.

2. Rent-seekers.--Licenses, sanctions, and notifications are issued for some desirable objectives. But they have also become sources of rents (unearned incomes) to some agents. The recent ban on the use of natural gas for brickfields in last fall (when for the past several years the consumption of gas as a fuel had been promoted), which led to a significant rise in the price of coal and which, thus, created windfall profits for those who had imported coal under license, is an instance of rent, earned in this case by licensee coal importers. A whole class of rent-seekers seems to have arisen in Bangladesh.

Rent-seeking is bad, not only because it is an unproductive activity--it constitutes a mere transfer from some groups of the society to rent-seekers (and their partakers of rents)--but much more so because it is injurious to genuine investment. Rent-seekers are, however, in an advantageous position vis-a-vis

(1) A suggested reform of the licensing system, etc.: quota auctioning

The present system of giving licenses for import or for plying certain trades may be replaced by quota auctioning. This system has several advantages.

a) Source of revenue: It will become a source of much needed revenue to the government

b) Increase in efficiency: Efficiency will increase due to a more efficient allocation of licenses across heterogeneous products, diverse sources of supply, and most probably among the right parties, for instance among experienced entrepreneurs rather than the politically favored with little business acumen

c) Movement towards liberalization over the longer run: The conditions for liberalization will improve in the long run due to the political costs of regulation--by rendering transparent the levels of controls/protection (reflected by license bids), by raising consumer resistance, and by inviting foreign retaliation

d) Successful experimentation: Quota auctioning has been successfully tested in Australia and New Zealand. The Government of Bangladesh is not unfamiliar with it, in that it routinely sells contracts through tenders.

(2) Competition

Deregulation means an increase in competition and liberalization. Some economists go as far as to state that even monopolies will wither away under the ubiquitous force of competition from substitutes, unless aided and abetted by

government. A wider agreement was, however, developed on a more recently developed economic theory, called the theory of contestable markets. According to this theory, even in a market characterized by only two firms, the equilibrium will closely resemble the one prevailing under perfect competition. Contestability of a market depends fundamentally upon free entry, free exit, and free prices.

It is relevant to refer here to a remarkable duo of fundamental theorems in welfare economics which concerns competition: (1) any competitive market equilibrium is Pareto efficient (in both consumption and production) and (2) under certain plausible assumptions, every Pareto efficient allocation is a market equilibrium. An implication of Pareto efficiency for welfare, furthermore, is even more consequential: (a) a maximal welfare allocation must be a Pareto efficient allocation and (b) any Pareto efficient allocation must be a welfare maximum. A direct positive relationship between welfare and competition is, thus, transparent. In short, regulation of contestable markets is inappropriate for growth and welfare.

The case for deregulation in Bangladesh is so impelling that, in the present context, I am tempted to hazard my professional judgment about a momentous change of the recent past: What went wrong with the public enterprises of the world, and those of Bangladesh for that matter, among other causes, was the absence of competition, or stated somewhat mildly, the embargo on the contestability of markets. This was done by restricting free exit by public enterprises through their perennial subsidization, on the one hand, and preventing free entry either through

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reservation of sectors or putting low ceilings on permissible private investment until recently, on the other hand.

What has gone wrong with Bangladesh's denationalization is that privatization was pushed without much analysis, in particular without assuring competition within and between private and public enterprises, as if privatization by itself is a panacea for all inefficiencies. Privatization without competition and with the existing plethora of regulations is unlikely to play its expected role.

What does deregulation or competition imply for Bangladesh? Public enterprises should be made to compete with private enterprises without being subsidized, without their losses being underwritten by government. Exit (shut down) will then become free when they cannot compete. Private enterprises should be freed from binding regulations.

(3) Reform of labor laws

The South-Asian Commonwealth countries, and Bangladesh for that matter, have inherited a liberal labor code and trade union system from the British. While the British trade unionism has a longer history than the Soviet communist movement, Soviet Revolution had its impact on the labor movements of the world, just as the Soviet centralized planning model had its influence on the postwar development plans of newly independent countries. The founding fathers of postwar India--the first country in the postwar era to win freedom from a colonial power and the first developing country that set the pace for development planning--for instance, prepared the country's constitution by

incorporating, according to their lofty declarations, the best a country can borrow from the West, namely democracy, and the best a country can borrow from the East, viz., centralized planning. Educated as most of them were from the West and influenced by their institutions, they were enchanted by the human values and other desirable traits of democratic systems. As to the planning institution, it was proclaimed that the Soviet planning model held the greatest hope for developing countries to grow at a fast rate to close the gap between rich and poor countries.

While democracy came out unscathed as the most cherished institution in India, alas! the Soviet model yielded disappointing results. Today, Communist countries themselves seem to be revising their centralized planning and control economies. Nationalized and socialized sectors in capitalist countries are being dismantled. Privatization has gathered a bandwagon momentum in the whole world. Liberalization has made a substantial headway during the 1980s. Trade unions have been disciplined in the country of their birth, Great Britain. Certain labor practices have been modified.

While the progress towards denationalization, privatization, liberalization, and decentralization has been impressive in the past 7 years, since 1982, in the world at large and in Bangladesh in particular, Bangladesh's labor code remains untouched. Granted that movements have fought hard and have made substantial gains from safety at work to security of income. These gains are highly desirable. But there are some labor laws which tend to generate indolence and reduce productivity. For instance, the

security of civil servants and employees of nationalized industries from being hired and fired in the same way as in the private sector have rendered government and public enterprises notoriously inefficient. Several labor laws and practices, seemingly beneficial to labor, in reality are hurting labor at large. Certain laws hurt labor in the long run. Some others cause social losses. For instance, the practice of politically motivated outsiders becoming office bearers of labor unions is strongly resented by employers. On the other hand, while Bangladesh has adopted most of the ILO guidelines, there may be certain aspects in which progress is sluggish.

The effects of the noted wide-range changes on labor need to be studied. Just as practices restricting competition among industrialists create inefficiencies, so do restrictive practices among labor unions. There is need, therefore, to analyze the inefficiencies and productivity-decreasing effects, if any, of existing labor laws and related regulations.

(4) The most damaging impact of regulation is on technology

Finally, one of the most damaging results of extensive regulation is that it removes the competitive pressure towards search for and introduction of more productive technology. By hampering competition, regulation impairs entrepreneurs' attitude towards introducing innovations.

Almost zero rate of growth of productivity in the 1970s and positive one in the 1980s in the U.S. is not considered coincidental in view of the high level of intervention and

regulation of the former decade and deregulation of the current decade.

2. Technology-Policy

Technology remains and has been the single most critical and the most productive source of economic development and growth. A country that experiences higher rates of technological improvement attains higher rates of economic growth, other things being equal, than the countries with sluggish rate of technological change. Developing countries which aspire to attain higher rates of economic growth than developed countries in order to close the gap of per capita incomes are in a position to do so, by virtue of the late-comer advantage. They can borrow technology from abroad and adapt to their own environment at a lower cost than if they had to develop it by themselves as the developed countries did. Many developing countries are doing quite well in that respect, for instance, Korea, Singapore, Brazil.

As all luck would have it, Bangladesh is slipping behind even its neighbors in the field of technology--textiles, - cur, sugar, you name it. Small investors are particularly starved of new ideas.

The index of year-to-year TFP productivity growth in Bangladesh's manufacturing industries has fallen over time in the post-Independence period.

Our research has clearly revealed that most small

entrepreneurs simply crowd into the traditional lines of production using outmoded techniques. The major reason for that behavior is, firstly, a paucity of on-line improved technology, new products, and cost-effective processes; and, secondly, a lack of information about whatever new lines exist. In the industrial sector, the paternalistic attitude of government to declare some sectors as "discouraged" reflects upon the bankruptcy of on-line new techniques and products. In the agricultural sector, the reluctance of the UNDP's Agricultural Sector Review, 1988, to recommend increased funding for research because the low productivity of Bangladesh's existing agricultural research institutes/farm experiment stations reflects upon the dismal state of agricultural research. Considering the investment and development expenditures of other countries and given Bangladesh's low level of development, on the one hand, and its high reliance on agriculture, on the other hand, Bangladesh ought to be investing between one-third to one-half of one percent of GDP on R&D. The rest of the economy should also be allocating at least the same percentage of resources to R&D.

I made this point forcefully at the week-long international workshop sponsored by UNDP on the Agricultural Sector Review Report in January this year (see WP17). We had independently derived the policy implication for allocating much larger funds to R&D than are currently allocated as early as last year. We started the process of recruiting a short-term consultant specialist on the transfer of technology early this year. The first three-week visit of our consultant, Robert House, Distinguished Professor of Management of Technology, coincided

with the week-long UN-ESCAP Forum on Science & Technology last month (3rd week of May, 1989).

At the Science and Technology forum President Ershad stated that the Government of Bangladesh would give priority to the development of technology. Prime Minister Houduddin Ahmed set a target figure of one percent of GDP for R&D, which the country should try to attain. Planning Minister Khondakar announced that the Fourth FYP will give priority to technology-based development planning. Finance Minister Wahidul Haq informed the panel that the GOB is determined to provide policy support for technology linked industrial development. Professors, government secretaries and other specialists on technology echoed the same theme.

Pursuant to these policy statements, a task force for technology has been set up. It is headed by Prof. M. H. Khan, Vice Chancellor of BUET, with Prof. Shamsul Ali of Dhaka University, Prof. Nurul Islam of BUET, and one joint secretary each from the Ministry of Finance and the Ministry of Education's Division of Science and Technology as members. Academics, professionals, politicians, and men in power, all are of one voice in calling for a technology-based development. Political will for promoting technology and allocating larger funds to R&D now exists. Let those who are dedicated to the development of this country strike while the iron is hot, and get this country moving. Palliatives won't make any impact. A big effort is needed.

In this project, in a small way, we are in the process of

preparing a blue print on the following projects:—A \$25-million, 10-year plan to set up a KIST-type Institute for the Transfer of Technology in Bangladesh.

Special focus in this institute will be put on technology development for labor-intensive medium and small industries. The plan will include a technical aid part to determine priority areas for R&D in the entire economy and (2) a huge project to build up an institute, or vastly upgrade an existing one on the lines of the KIST; to prepare the budget and logistics for upgrading 4 BITs, 18 polytechnics, Mymensingh Agricultural University (including farm-experiment stations) to the level of graduate degrees, as, e.g., in India; to set higher salary levels; ample research facilities in the proposed institute to attract expatriate Bangladeshis from abroad; to identify an international agency, such as Battelle's Columbus Laboratories (the same agency that set up the KIST) or a university, for collaboration; to explore the possibilities and modes of promoting research facilities among private firms; to prepare inventory of the type of labs, libraries, workshops, computer centers for the proposed institute, and so forth. At the suggestion of this advisor, our technology specialist consultant has left with us a brief outline of the functions and stages of development for a BIST. Apart from attending the week-long UN-ESCAP forum on technology in Bangladesh (May 1988), this advisor has had lengthy discussions with proprietors/managers of several engineering and chemical firms and a sugar mill in Rajshahi; Mr. Gomes, Project Director, Mirpur Agricultural Workshop and Training School (MAWTS); Dr. Nurul Islam of the IAT in BUET;

Iqbal Mahmud, Abdul Quader, and a few others at BUET; specialists in the Planning Commission and IMED; Mr. Anwar Farid, Secretary, Science and Technology Division; Mobassar Hussain of MIDAS; director of technology and IIG consultants at ESCIC, and so forth. We also had face-to-face meetings with the heads of associations of industries and chambers of commerce and industry. The policy implications derived from our statistical research are supported by our qualitative impressions from these contacts. In short, insofar as technology is concerned, we are working on two fronts: (a) to try to get a technology-based development approach incorporated in the Fourth FYP, and (b) to prepare a blue print for an institute of technology transfer and then try to persuade the Planning Commission and donors to pick it up.

Table 15.--The two faces of industrial problems

Private Entrepreneur Face

Government Official Face

- | | |
|--|---|
| <p>1. Bureaucratic sloth and lack of professional support, discourages investment</p> | <p>1. Investors have illusion of making "big bucks" overnight from an individual project. They lack ingenuity, foresight, and seek to be pampered. They do not do their homework adequately and properly, even in filling application forms, and when deficiencies in them are brought to their attention they complain of delays and indifference on the part of sanctioning agencies.</p> |
| <p>2. Lack of infrastructure discourages investment in backward areas.</p> | <p>2. Tax incentives for setting up factories in underdeveloped areas are generous.</p> |
| <p>3. Corruption, bribery at every stage: pre-sanction, for sanction, post-sanction make projects too costly to operate.</p> | <p>3. Private entrepreneurs are also to be blamed for widespread corruption. They attempt to bribe government officials to evade taxes, enjoy monopoly rights, break the queue to get ahead of others, and so forth. It takes two to tango.</p> |
| <p>4. It is a daunting task to complete formalities to be eligible for various governmental tax incentives.</p> | <p>4. Tax evasion and other secretive practices discourage investors from "opening their books" to public officials that may be necessary to be eligible for fiscal benefits from the government.</p> |
| <p>5. Getting project proposals prepared through government or public agency-approved consulting firms is another type of government statutes that aggravates.</p> | <p>5. Entrepreneurs are too naive and short-sighted to appreciate the need of a feasibility study and R&D.</p> |
| <p>6. NGOs usually are more helpful to small and cottage industries than is BSCIC.</p> | <p>6. BSCIC has played a positive role to the growth of small and cottage industries.</p> |
| <p>7. Load-shedding and disruption in power supply increases costs and cause deterioration of the quality of product. Electricity rates are too high. The system cost adds about 40% to actual</p> | <p>7. Somebody has to bear the system loss. Whom to blame for pilferage and collusion with the meter reader? Privatisation of utility companies, and hence the creation of private monopolies, would have</p> |

Table 15.--Contd.

Private Entrepreneur Face

Government Official Face -

cost. Electricity produced out of private gas generators is substantially cheaper than the public supply.

Privatization of utility companies, such as, telephone and power would eliminate much of inefficiency and corruption.

8. NIP82 and RFP86 were a step in the right direction; the problem lies with implementation. Even the much heralded BOI requires the filling of the same old forms and delays have not been reduced. There is no one-step service still.

9. Protection: Bans or high tariffs on products are desirable to protect nascent industries.

10. Smugglers make more money than traders; traders more than manufacturers. They do so at lower risk, quick turnover, and without labor problems. That is a major reason for the stagnation of investment in industry.

11. Union leadership from outside the plant is creating much problems. Law and order authorities do not take effective measures against indiscipline among workers. Gheraos are common. Workers manhandle and even kill managers.

12. The pay scale structure in the industrial sector is determined by the government directly for the public units (including ad hoc bonuses) and, as a consequence, indirectly for private enterprises. Since public-sector firms can pass their deficits on to government, competition between private and public firms is unfair. Labor has only charter of rights; it should

deleterious economic and social consequences.

8. Bangladeshi investors want quick money and often do not have sound projects. When things go wrong because of investors' mistakes or misfortune, government becomes the scapegoat. The BOI is still young and is sorting out procedures. The process will soon improve.

9. Government has provided generous assistance to the first-generation industrialists. But the infant industries scarcely grow up!

10. Government can increase its surveillance and enforcement, but cannot weed smuggling out entirely. Other countries have similar problems of smuggling but their industries are growing fast.

11. Labor leaders support leadership from outside the plant. It allows bargaining without fear of repression. The institute of trade unionism per se is highly desirable even from employers' interests.

12. Government and public enterprises are under similar pressures and budgetary constraints as the private sector when the question of wage raises comes up. Small enterprises are scarcely affected by labor laws. As for large enterprises labor problems will be dwarfed when they start growing and increasing their productivity, and hence wage rates.

Table 15.--Contd.

also have a charter of duties.

13. Industrial sickness is caused mainly by lack of demand, which is reduced for private producers due to floods of smuggled goods. Crowding in industries pioneered by a smart entrepreneur occurs because of lack of sound consultancy and advice in setting up industries.

13. Industrial sickness is caused mainly by high costs of production and low productivity, and not necessarily by low demand. Industrialists themselves are not doing anything to increase their productivity through R&D.

Worker's face.--Most employers mismanage and some even plunder the enterprises. To cover that up they blame workers and use them as scapegoats. Indiscipline among workers is overplayed by employers.

As regards the appointment of outsiders as union leaders, that is desirable from the viewpoint of workers because many an industry does not have workers educated and experienced enough to negotiate with employers. Moreover, internal workers are vulnerable to the employer's wrath and face the threat of dismissal. Outsiders can negotiate wage raises without that risk.

OCCASIONAL NOTES

NO. 89.10

TECHNOLOGY-BASED DEVELOPMENT PLANNING

August 21, 1989

August 21, 1989

TECHNOLOGY-BASED DEVELOPMENT PLANNING

1. Technology as the Key

Factor of Growth

1.1. In a path-breaking study in the late 1950s, Economics Professor Robert Solow of MIT, now Nobel Laureate, discovered that primary factors, labor and capital, could explain no more than 12 percent of the economic growth of America and several other industrial countries. A bulk of the rest 88 percent was due to technological change. Today, as in the past, technology remains the single most important source of economic growth. The rate of return from investment in technology is far higher than investment in traditional forms of capital.

1.2. Without technological improvements, no developing country can advance towards closing the gap between its low per capita income and those of well-off countries. Korea, Singapore, and other East Asian dragons have not reached in a matter of two decades where they have with static technologies.

1.3. The role of technology is to reduce the human toil and increase labor productivity. Technological advance is such a critical source of labor and total-factor-productivity growth that it is often used synonymously with increase in productivity.

2. Research Findings That Implicate Technology Policy

A number of findings of this project has led to the conclusion that among the main reasons for the sluggish rate of growth of private investment and industrial production in general in Bangladesh is the lack or very slow pace of improvements in the industrial technology in this country. Accordingly, the key to the industrial growth of this country, particularly that of small enterprises, and consequently employment expansion, lies in creating the necessary infrastructure and environment that may bring forth a stream of industrial innovations, year after year. Among the findings that yield the stated conclusions are the following:

1. Total-Factor-Productivity Growth Rate has been Declining in Bangladesh

An analysis of about 2500 firms of the CMI over a period of 10 years from 1974-75 through 1983-84 reveals that out of 74 four-digit industries, formed by the group of about 700 firms that existed in 1974-75 and survived through 1983-84, only those in 26 four-digit industries on the average experienced an increase in total factor productivity (TFP or output per unit of input). The remainder 48 suffered a decline in TFP. No more than 35 out of 86 four-digit industries comprised of those firms which did not exist in 1974-75 but entered in subsequent years to a total of 1200 by 1983-84 attained an increase of TFP. Finally, the

corresponding number was 21 out of 50 four-digit industries of those 500-or-so firms which were in operation in 1974-75 but were shut down by 1983-84. In sum, approximately 61 percent of the four-digit industries of Bangladesh have experienced a decline in total factor productivity. That is a somber state of productivity in Bangladesh. Even more depressing is the fact that medium-size firms of Bangladesh with 20 to 100 workers-- which in several Third World countries, e.g., the Philippines, have been found as a dynamic size-class--attained lower total-factor-productivity growth rates than those above (and probably also those below) that size.

2. Small Firms Are Farther Below

the Frontier of Bangladesh's

Prevailing Best-Practice Technology

(Are More Inefficient) Than Large

Firms, Reflecting Inferior

Technology of The Former

Our analysis of best-practice technologies by fitting stochastic production functions indicate that smaller the size of a firm the farther inside the frontier of production (the more inefficient) it is. While inferior technology is only one of several factors underlying the compute efficiency indicies, it is probably the most important one.

HIID's Enterprise Survey of cottage industries took us to poverty-stricken areas. These units are in worse plight. A careful accounting of the costs and incomes of coir weavers, pottery makers, handloom weavers, and other cottage-industry households has revealed that a very high percentage of them is below the critical poverty line. Visits to their homes and the survey of their home-based economic activities is, indeed, a study of "how the poor survive." The entire family becomes self-employed because there is no employment for the head of household outside the home.

Numerous small and medium enterprises use primitive, obsolete technologies. Neither the employer is making much money, nor workers are paid above-poverty-line salaries. Not atypical, for instance, is the ex-servicemen's hurricane lamp (Kerosene-oil lantern) factory in Chittagong, hiring over 100 workers. It uses a very crude technology of the 1950s, producing a low-quality lantern of our great grandfathers' days. It is labor-intensive, no doubt, but it has very low productivity. Ex-servicemen have closed down one plant and are thinking of shutting down this one too.

Faced with shortages of employment, many Bangladeshis are impelled to seek self-employment. Those who can marshal some funds to make modest investments find themselves faced with a lack of on-line, off-the-shelf superior technologies, new products, cost-effective services, or new methods of production to choose from. They look around. Finding that their neighbors have made some money in traditional lines--rice mills, coir strings, powerlooms, photostatic copying services, and so on--

they crowd in the same traditional industries by simply replicating the existing equipment and processes without any cost reduction to capture the market from established firms. They lower each other's profits for static demand, instead of lowering prices through reduced costs and thereby expanding the market demand. The result is that they can earn little surpluses to expand their businesses.

The only effective way out of poverty seems to be to improve the technology of their production activities and the training and schooling and organization that goes with it.

3. Bangladesh Lags Behind Its Neighbors in Technology Improvements

The research of this project has revealed that Bangladesh has fallen behind in productivity growth even in relation to its neighboring developing countries--for instance, Thailand, Malaysia, Pakistan, India (though not Nepal, Bhutan, and Burma). Indian sarees and lungis and textile fabrics from across the border are rated more qualitative and sell at attractive prices than local products. Productivity in the coir industry of India is estimated to have increased significantly over that of Bangladesh. The recovery rate of juice from sugar cane by Indian sugar mills averages out to be over 20% higher, 10.5 percent as against 8.5 percent in Bangladesh. Thailand exports its pineapple juice, frozen shrimp, and many other new products at substantially lower prices with profit than Bangladesh. One may go on and on citing such cases. The major reason for the dismal

total-factor-productivity performance or, which is the other side of the same coin, reduction in its unit costs of production is torpid technological improvements.

HIID's enterprise survey has brought to surface grave inefficiencies connected with technology. The following two cases are typical of the state of Bangladesh industry.

i) The Multiple Juice Concentrate Plant, Chittagong (an enterprise of Bangladesh Freedom Fighters Welfare Trust) installed one of the best-practice hardware technology with the aid of the Swedish CIDA. It was installed in 1983 with a production capacity of 1600 tons of concentrate pineapple juice and 1800 tons of tomato paste. Even this year, it has not produced more than 300 tons of pineapple juice and hardly any tomato paste. The reason for pineapple juice is supply constraint--it cannot procure supply of pineapple for more production than that. The reason for not producing tomato paste is that they cannot sell a fraction of it--they produced 160 tons of it in 1984-85, of which 46 tons are still lying unsold, consequently they have stopped producing tomato paste. Even if and when, in the unlikely event, it attains full-capacity utilization--we are told by its highly motivated General Manager, Mr. Subrata Chakravarty, who seems to be among the few on the management board who are in favor of continuing with the plant--it cannot compete with Thailand and overseas pineapple juice. That is the case when it is basing these estimates on a price of 2 takas per kilo of pineapple fruit and when merchants are taking pineapple off the market at Taka 3 per kilo. Its cost even at full-capacity utilization is estimated to be less than \$800/ ton, whereas the

world price is less than \$600/ton. Neither the supply side of raw materials nor the demand for the product were properly analyzed before installing the plant, both being parts of the process of technology transfer, inasmuch as technology transfer consists of technoware, humanware, orgaware, and inforware (see the definition above).

At this point the factor-intensity issue that might be on the reader's mind may also be mentioned. The Multiple Juice Plant of Chittagong is a capital-intensive plant. The management told us that if they install a labor-intensive hardware plant, it will be difficult to check the undershirts and cleanliness in general of workers who will work at various stages. European and North American consumers want juice untouched by human hands. We found, moreover, that the skilled workers on the machines are only at most 10 percent of the total workforce involved from the farming of pineapples, loading-unloading-trucking, cutting stems from the fruit, feeding fruit into machines, cleaning, distributing, and various other activities outside the main plant. Capital-intensity of the main plant is, thus, not to blame. The blame goes to the organization of production, in particular the procurement of raw material and marketing. Only one manager handles production, procurement, and marketing in this plant.

ii) The Aquacultural Enterprise Ltd. of Cox's Bazar installed one of the most modern plants of prawn hatchery and farm, bought from Japan, with the collaboration of Saudis, in 1986. One of its important sections is lying unused for the past 3 years and is rusting. Reason? Too complex to operate. The

technology was not properly assessed. The managements of shrimpfreezing firms and fish farms tells us that Bangladesh cannot compete with, for instance, Thailand, because they have taken a lead on them (they started in the mid-1970s and Bangladesh in the early 1980s), that their coastal resources are superior to those of Bangladesh, and that Thailand's technology of production is more advanced. Many countries have started exporting frozen fish. Those which can develop/adopt superior biotechnology will capture export markets.

4. The Apex-Agency Survey

Confirms the Above Results

Our survey of apex industrial agencies has confirmed the above results. Industrial leaders claim that smugglers earn more money than traders and traders earn more than industrialists, and that the rate of return from investment in industry is too low to make investment attractive. They report a lot of industrial sickness (low capacity utilization) in the country, which they tend to attribute mainly to lack of demand (for their product). Shortages and surpluses are, however, relevant only at a price. Lack of demand appears because the price is too high either in comparison to smuggled or legally imported goods, or in export markets, or because citizens cannot afford to pay for it.

Bangladesh government introduced numerous fiscal, monetary, and regulatory policies to assist private investment in industry. With a view to lowering industrial costs, the government gave subsidies on input prices, e.g., concessional rates of interest. It provided protection to domestic producers, so they could raise the prices of domestically-produced products. It gave various tax

holidays for industrialists to increase their net profits. Almost all of these policies are supposed to work through price changes--lower input costs and raise product prices or enhance rates of return directly. Numerous price distortions have, thus, been introduced, which have caused grave inefficiencies in the economy. Domestic private production costs (not to speak of social costs) remain high despite assistance. Very little resources and effort, whether by the government or producers themselves, have gone into lowering input costs by providing innovations for production, or by raising the quality and productivity of the product, or developing new products, processes, or services.

5. The Present R&D Organizations
of Bangladesh Cannot Meet the
Demands for Technology of Today

Bangladesh's 4 BITs remain largely undergraduate teaching institutions. Bangladesh's 17 polytechnics are nowhere close to the levels of those of India. Those who graduate from specialized schools such as the Textile Research Institute, BAU's Fishery Department at Mymensingh, and the like cannot find jobs. Thus, the capacity of research organizations need to be expanded. Over 30 percent of Bangladesh's faculties and research institutes are staffed by those who earned their high-cost Ph.D. degrees from abroad, even if we ignore the brain drain. Local post graduate education needs to be upgraded. Much of the work of Bangladesh's Council of Science and Industrial Research, with about 70 Ph.D.'s and 1200 staff, is hardly done in response to identified need.

Its progress is hampered by a severe lack of research funds, which were nonexistent till last year, when for the first time after several years it received an allocation of Taka 15 lakhs--a pittance. The Institute of Appropriate Technology cannot do much in terms of an overall systematic assessment of needs with its skeleton staff of only 8. BSCIC created a technology division two years ago with the objective of making assessment of needs for new technology for small enterprises, but all its energies seem to be spent on publishing a Technical Digest four times a year. The much-heralded MIDAS (never mind its claims) is settling down primarily as a donor-provided credit-distributing agency. Other institutes of science and technology are scarcely developing worthwhile innovations. An impression is held in some quarters that agricultural research of Bangladesh is a success case. Yet the authors of the Bangladesh's Agricultural Sector Review--completed early this year by a team of experts under the auspices of the UNDP and evaluated by two dozen stalwart economists and agricultural specialists from all over the world--found much of agricultural research unproductive and (in their preliminary draft) even concluded that because of their lower productivity, they are undeserving of increased funding. One reason for this probably is that very few of Bangladesh's agricultural research institutes have the necessary critical mass of agricultural scientists. Most probably they have been underfunded. So funding should increase. Several imbalances exist. For instance only about 5 or 6 of the 70-or-so Ph.D.'s of the BCSIR are engineering researchers. The IMED of the Planning Commission has only one engineer on its staff, whose role is evaluation of projects and

not assessment of technology, but who is actually doing administrative duties.

5. Output Growth Rates Have Been Much Lower Than The Growth Rates of Conventional Inputs, Suggesting Technological Decadence

Manufacturing employment, as estimated from the Economic Census, 1986, increased at an average annual rate of 6.2 percent during 1972-73 through 1985-86. New (gross) investment in private manufacturing as a percentage of sector GDP has ranged between 9.3 percent (according to the Department of Industries data) and 8.5 percent (according to the Planning Commission sources), during 1976-77 through 1987-88 (The estimates of net investment are not known). As against this, annual average rate of growth of manufacturing output has been a paltry low of 2.57% from 1980-81 through 1987-88, 2.99% from 1978-79 to 1987-88, and 3.62% from 1976-77 to 1987-88--low, no matter which base year one chooses. Manufacturing operatives' real wage rate declined from the late 1970s till 1984-85 (the latest year for which data are available). All these statistics support the earlier findings, inasmuch as they are a reflection, in part, of a decline in TFP.

7. Investment, Which is Both a Cause and an Effect of Technological Advance, Has Been Sluggish

Profitability is a direct function of TFP, as TFP is free of cost of conventional inputs. In western countries the

profitability of a firm (or industry) is reflected in its asset valuation at the stock exchange. That mirror is available in Bangladesh only for a few firms. Investment in an industry is at once a reflection of its profitability as well as source of embodied technological change. According to the mid-term review of the Third FYP, in the first 3 of its 5 years, actual private investment was only 21.84 percent of its targeted value.

8. Bangladesh's Input in the
Development of Technological
Innovations, namely R&D,
is Meager

R&D in Bangladesh is estimated to be less than 0.3 of 1 percent. Statistics for developing countries that have leaped forward in technology indicate that Bangladesh's allocation to R&D is too low. The R&D expenditure in Korea is well over 2 percent of her GDP. Pakistan and India are estimated to have approached the level of 1 percent of GDP. Industrial countries spend over 3 percent of their GDPs on R&D. It is time that Bangladesh ought to be allocating at least 1 percent of her GDP to R&D in S&T. Much of this will be needed to adapt and digest imported technology to local conditions.

9. Political Will for a Leap Frog
in Technology Now Exists in Bangladesh

The realization of technology as a strategic variable in development did not really emerge until the time of the preparation of the Fourth FYP (1989). Technology awareness became known during the one-week-long international forum on science and technology during May 18-23, 1989, at which the President; the

Prime Minister and the Minister of Industry; the Minister of Finance; the Minister of Planning; the Minister of Education, Science and Technology; the Secretary of S&T Division; the senior Member of the Planning Commission; and other high-level policy makers, one after the other, echoed in one voice to give top priority to technological development. Political will for a technology-based development planning now exists in the country. Technology planners are talking of setting a target of 1% to 1.1% of GDP for R&D by the end of the Fourth FYP, a target announced by the Prime Minister at the One-Week Forum on S&T. In 1987-88, the PP was revised by the Planning Commission requiring line ministries to consider all alternatives before making a choice of technology for a project proposed to be included in the five-year plan and to provide information pertinent to technology assessment. (Economic case)(Political will) = Situation ripe for action!!

4. Nature of Technology

Transfer

4.1. The usual image of technology is that it is embodied in machines. While that is a fact of life and some technology is, indeed, embodied in machines, that is only a partial view. Parts of technology are also embodied in human beings, software, environment, and institutions. Discovery of new products, new processes of production, markets, management practices, accounting procedures; improved organization of production, distribution, co-ordination, balancing, improved work procedures; preparation of more efficient softwares; and so forth are all components of technological environment. For a broad-based

definition of technology, see the appendix.

4.2. Even though advanced technology cannot be implanted in a society that is not educationally, institutionally, and infrastructurally prepared for assimilating it, technology of today can be bought at short notice, whether embodied in hardware or software. Fortunately, South Asian countries, and Bangladesh for that matter, are advanced enough in terms of higher education and English language. Despite its high rank in poverty among other developing countries, Bangladesh is adequately endowed with industrial base, universities, and other institutions, to absorb technology if imported and if the process is properly organized.

4.3. Yet technology transfer is not a simple import process. It has to be assessed in the country of its origin as being consistent with Bangladesh's factor endowment and products which have markets abroad; it has to be bought or otherwise negotiated and arranged to be transferred; it has to be adapted and digested; and it has to be disseminated, diffused and assimilated by entrepreneurs who should have the capacity to use it.

4.4. Since in the present state of arts and factor endowment of Bangladesh, technology ought to have a labor-bias and should be addressed as much (if not more) to small and medium industries as large industries, some highly specialized agency has to "go fetch", adapt, and digest technology. For small entrepreneurs do not have resources and capacity to do so. Small enterprises vis-a-vis manufacturing technology are no different from small farmers vis-a-vis agricultural technology. Just as farm experiment stations are needed to be set up and run by society as they involve massive funds while returns from their

innovations cannot be internalized by individual farmers, so R&D in a developing country with nascent industry is to be undertaken by the society for the benefit of small enterprises, till firms grow to be large enough to undertake their own research-- which stage is still decades away in Bangladesh.

4.5. Bangladesh is a young industrial country, with first-generation entrepreneurs. Even the denationalized textile and jute firms are known to be managed mostly by the sons of the earlier owners who probably lack experience. At the same time, Bangladesh has the advantage of the latecomer. Technology does not have to be developed from a scratch. As stated above, it has price tags and can be bought at any stage. Only it has to be adapted.

4.6. Faced with lack of employment, many Bangladeshis are impelled to seek self-employment. Those who can marshal some funds to make modest investments find themselves faced with a lack of on-line, off-the-shelf superior technologies, new products, cost-effective services, or new methods of production to choose from. They look around. Finding that their neighbors have made some money in traditional lines--rice mills, coir strings, powerlooms, photostatic copying services, and so on--they crowd in the same traditional industries by simply replicating the existing equipment and processes without any cost reduction to capture the market from established firms. They lower each other's profits for static demand, instead of lowering prices through reduced costs and thereby expanding the market demand. The result is that they can earn little surpluses to expand their businesses.

5. Direction of Change in S&T

Policy During the Fourth FYP

5.1. Pursuit of technological and productivity improvements is not a one-shot affair, it has to be a never-ending activity, a continuum to hold one's position in relation to competitors and, if success in the area is superior, to catch up with them, and eventually excel. Every new product or technology begins to become obsolete on the day it first breaks even. A country or firm being the one which makes its own product or technology redundant is the only way to prevent its competitors from doing so.

5.2. To expect to be the one who makes one's own process obsolete before others do so requires comprehensiveness in research. Comprehensiveness in effective industrial research, the lack of which in Bangladesh was bewailed in the Third FYP (P.413), requires a critical mass of scientists, technologists, and engineers, in several basic fields. Insofar as industrial research is concerned, mathematics, physics, chemistry, biology, economics, and so forth are not "disciplines" but tools. In Bangladesh's concern with stagnant industrial productivity and need to raise it in the short-run, the higher emphasis in the Third FYP on "applied and adaptive research" than on "fundamental research" and a "shift in direction of technological research from the simple products or processes to that of engineering and fabrication of plants and materials" (TFP, p. 418-19) was somewhat misplaced. In industrial research, such distinctions have to be shelved aside. The two branches are interactive and

interlinked. Pure research is neither more difficult nor less relevant to developing usable technologies than the so-called applied research. Trivial corrections are often as hard to make and as much resisted as fundamental changes. The diffusion of technology transferred from abroad requires local competence in both pure and applied research. Research efforts needed to make innovations and technological improvements are usually too great to be satisfied with the short-term alone. The aim ought to be to develop a stream of innovations, a process amply demonstrated by the IR7 rice seed.

5.3. Unlike academic research in universities, where it may be an end in itself, industrial research is for its utility, for profit, for production. Industrial research has, therefore, to have close feed-back relationships with production engineers, market managers, and other functionaries. Industrial research to be cost-effective, moreover, has to produce results which are more than just "interesting". They have to be productive and fruitful. The rate of return from industrial research may range from zero to hundredfold, thousandfold, even higher.

6. Commitment to Technology-Based Development Planning

6.1. Bangladesh's plans have so far consisted largely of a collection of aided or domestically-financed projects prepared by ministries and line departments. The Fourth FYP departs from previous plans in three respects, among others. One, in making a beginning at integrating micro and macro planning; integrating public-sector micro projects within themselves and with national-level macro variables and in incorporating predicted responses

collection of aided or domestically-financed projects prepared by ministries and line departments. The Fourth FYP departs from previous plans in three respects, among others. One, in making a beginning at integrating micro and macro planning; integrating public-sector micro projects within themselves and with national-level macro variables and in incorporating predicted responses of private investors into the national plan. Two, in decentralization by formalizing local participation in the preparation and execution of the plan. Third, in introducing a technology plan into the economic plan, an approach to a technology-based development planning.

6.2. Political will for a big leapfrog in technology exists.

First attempt at formulating a national S&T policy was made at the time of preparation of the Second FYP (1980). The draft document prepared for the purpose could not muster adequate support. A second attempt was made at the time of the preparation of the Third FYP (1985), when a new draft policy was circulated by the NCST. As a result, a modest progress was made. The NCST and the S&T Division was directed to undertake a review of the entire S&T development and "formulate S&T policies and plans for future directions of S&T both in short and long-term perspective." A thorough review of the state of technology was commissioned for the Third FYP, which culminated in a multi-volume study under the authorship of Professor Iqbal Mahmud et al. Two feasibility studies, one on biotechnology and the other on oceanographic research were undertaken. A National Science Academy Bhaban was constructed to house the Bangladesh Academy of

Sciences. The National Science Library was augmented. A National Museum of Science and Technology has been completed.

In short, for the Third Plan, a thorough review of various research organizations was done and a modest infrastructure for science and technology research was created. Other than that, many research institutes work with outmoded equipment and remain underfunded. No wonder, the pace of technological improvement remains as slow and sluggish as ever.

The realization of technology as a strategic variable in development did not really emerge until the time of the preparation of the Fourth FYP (1989). Technology awareness became known during the one-week-long international forum on science and technology during May 18-23, 1989, at which the President, the Prime Minister and the Minister of Industry, the Minister of Finance, the Minister of Planning, the Minister of Education and S&T, the Secretary of S&T Division, the senior Member of the Planning Commission, and other high-level policy makers, one after the other, echoed in one voice to give top priority to technological development. Political will for a technology-based development planning now exists in the country. Technology planners are talking of setting a target of 1% to 1.1% of GDP for R&D by the end of the Fourth FYP, a target announced by the Prime Minister at the One-Week Forum on S&T. In 1987-88, the PP was revised by the Planning Commission requiring line ministries to consider all alternatives before making a choice of technology for a project proposed to be included in the five-year plan and to provide other information pertinent to technology assessment.

This is neither to say that the need for technological improvements was not realized before nor that research organization have not been set up in Bangladesh. Technology was not a priority concern till the Second FYP. It was neither mentioned as an objective nor as a strategy. No separate chapter was written on it. The break came in the Third FYP. And then was a separate chapter on scientific and technological research. One of the eight objectives of the Third FYP was "development of technological base for bringing about a long term structural change". The same objective forms a part of the nine objectives of the Fourth FYP, namely, "development of technological base facilitating structural changes". Likewise there is a whole chapter devoted to science and technology.

6.3. As regards the infrastructure, including universities with postgraduate training, there are as many as 64 research organizations in this country. Yet there are numerous gaps. The major research centers--DU, BUET, BAU, BCSIR, BJRI, Fisheries RI, BITAC, leather, food and sugar, textile, and other--independently have their problems. The Third Five Year Plan identified the following basic weaknesses and problems existing in the fields of S&T research; "unplanned R&D work, multiplicity of organizations resulting in lack of coordination of work, overlapping of goals and functions, wastages of resources, and lack of comprehensiveness in the S&T policy" (p. 413). Some directions were provided, but the picture has not changed much today from what it was in 1985.

6.4. The Planning Commission (its HIID Project) has been engaged

in diagnosing the reasons of this slowness and low productivity of R&D organizations. One of the possible explanations is that the research effort in Bangladesh is too little, allocation to R&D is too meager, and comprehensiveness in R&D is lacking. Action plans are non-existent. In setting goals and strategies for the Third FYP, it was emphasized, for instance, that "the critical difference between plans . . . does not lie in their objectives but in the strategies they adopt to achieve the objectives" (TFP, p.38). Interestingly, the six strategies of the plan did not include promotion of technology.

6.5. The allocation of resources to S&T remains modest, as may be judged from the following figures:

Financial allocation to R&D by public sector (Taka crores in current prices)

Plan	Total Public Sector	Plan Allocation to S&T	% of Allocation	Actual Utilization
FFYE	3984	23	0.58	14
TYP	3261	39	1.20	25
SFYP	16060	129	0.80	110
TFYP	25000	60	0.24	?
FFYP ^a	70792	1053	1.49	...

^aAs according to the first of the four alternatives in the Guidelines for the Fourth FYP. The figure is still rough.

6.6. Over 41% of the S&T allocation goes to atomic energy

research. Atomic energy (BAEC) and space research (SPAERSSO) together account for 56 percent of the S&T ADP allocation (see TFYP, p.422). Naturally, very scant public resources are devoted to R&D in industry. No estimates of private R&D exist, but private research in technology is unlikely to be a large relative to public R&D.

6.7. An implication of the significant lag in technology in Bangladesh's industry revealed by the research done at the Planning Commission (HIID Project) is that nothing short of a quantum increase in R&D for a leapfrog in technology development is going to put Bangladesh on the technology escalator in the 1990s that many other developing countries have already stepped on. The existing research organizations of Bangladesh are not foreseen to provide such a breakthrough.

6.3. It should, however, be mentioned that the allocation to S&T does not include financial allocation to S&T development in other than S&T sector proper. These other sectors include agriculture, water resources, industries, transport, energy, etc. An estimate of the R&D component of ADP allocation in the latter sectors, made for the SFYP, comes to about twice as much as R&D to S&T proper, i.e., TK. 264 crore of which allocation for S&T proper is Tk.120 (TFYP, p. 417). Total public-sector allocation to R&D in the SFYP, thus, was 2.5% of total ADP financing of the SFYP. Assuming total ADP for the 5 years of the SFYP was 12% of GDP, the R&D comes to 0.3 of 1 percent, which too is meager.

6.9. At the S&T forum in April 1989, the Prime Minister announced the target of 1 percent of GDP to R&D. If that target were to be

met by the end of the Fourth FYP, and assuming that by the terminal year of the Fourth FYP the private sector R&D will rise to what public sector R&D is today, the ADP allocation to S&T as a percentage of GDP has to increase at the rate of roughly 0.1 of 1 percent of GDP per year. Given the current GDP of approximately \$17 billion, the stated increment comes to \$17 million annually.

6.10. Using 90 percent of it to come from foreign aid, which is currently running at approximately \$2.3 billion per year, the percentage of foreign aid that ought to be earmarked for R&D (provided donors are persuaded that technology is the key to poverty alleviation of this country) is 0.0074 of 1 percent of foreign aid. As a matter of fact, if the Bangladesh Aid Consortium donors agree to earmark 1 percent of their aid for R&D during the 5 year period of the Fourth FYP (a cumulated fund of \$115 million), a private S&T institute of transfer of technology of the size of KIST and KAIST can be set up during this plan alone.

6.11. The reference to KIST is not accidental. In 1965, a large mission of Korea visited Pakistan to learn about planning techniques, including technology planning--so far behind in techniques of development planning Koreans thought they were. The KIST came into being in 1968 with a grant of \$10 million from USAID, which was equally matched by the Korean Government. That institute has not only stood on its own feet since after that aid, it is believed to be the driving force responsible for the technological breakthrough which, in the course of 2 decades, has elevated Korea to the envy of the world, today its goods from

shirts to ships compete favorably in industrial countries of Europe and North America.

6.12. Taking a cue from the KIST, the Planning Commission, through its HIID project, has been engaged in a preliminary study of setting up a relatively big, autonomous, KIST-type institute of transfer of technology, which will be comprehensive with critical masses of scientists in various disciplines. The project will be described a few paragraphs below.

6.13. The goal set by the Planning Commission is modest and practical: catch up with the levels of technology in neighboring countries--Malaysia, Thailand, India, Pakistan--by year 2000. Hopefully the preliminary study for a KIST-type institute of science and technology that is going on in the Planning Commission will produce an acceptable project.

APPENDIX

to

Technology-Based Development Planning

Definition of Technology Transfer

The usual image of technology is that it is embodied in machines (hardwares). While that is a fact of life and some technology is, indeed, embodied in machines, that is only a partial view. Parts of technology are also embodied in human beings, institutions, software, and environment. It is important, therefore, to define technology and technology transfer at the outset.

Technology management specialists define technology transfer broadly to consist of 4 components:

- a) Technoware: both hardware and softwares
- b) Humanware: entrepreneurship, management, skill
- c) Inforware: information, proper documentation, dissemination
- d) Orgaware: effectiveness and linkages of organization.

Transfer of technology, furthermore, involves:

- a) technology assessment in the country from where it is imported
- b) technology transfer logistics and arrangements
- c) technology adoption/adaptation/development, and
- d) technology diffusion.

Finally, an essential part of productivity and technology

improvement is technology consciousness. Koreans put special value on it. Korea launched a national movement for the popularization of science and technology as an integral part of its long-range S&T development plan. The basic goal of this movement was a reorientation of the public's attitudes. They emphasized a broadening of attitudes towards productivity and technology in every aspect of daily life. The movement was in no way conceived of as the special province of scientists and engineers. It called for the equally intensive participation of the housewife, the farmer, the craftsman, the businessman, and the scholar.

The core of technology development lies in the education of and the research by high calibre scientists and engineers in sufficient numbers. A critical mass of scientists in each of several major disciplines is necessary for Bangladesh to leap frog and get on the escalator at which neighboring countries have already firmed up their places.

Private Sector
Development

Short Review Since SFVP

Considering the politico-economic uncertainties till recent years through which it has passed, Bangladesh's private sector has probably not fared that badly. The low ceiling on investment of Tk. 245 lakh till 1974, raised to Tk. 3 crore in 1974 and Tk. 10 crore in 1975 was not completely removed till the end of the decade of the 1970s. Not much investment could take place below these ceilings. Repressed till that time, new private-investment almost exploded during the two years of 1979-80 and 1980-81, as soon as the ceiling was lifted. The resurgence was nipped in the bud, evidently, by the assassination of the incumbent president in 6 years. New private investment fell to a fifth in 1981-82 of what it was in 1980-81 (see Col. 1 of Table 1). It has yet not recovered to regain the 1979-1981 levels despite widespread incentives in the New Industrial Policy, 1982, and the Revised Industrial Policy, 1986.

Almost a similar behavior (an inverted parabola during the period 1976-1988 with the hump around the turn of the decade) is depicted by public investment, as may be seen from Col. 3 of Table 1.

The employment growth behavior, too, is similar, as may be seen from the last column of Table 1. The behavior patterns of all the three key variables--private investment (DI data source),

public investment (Planning Commission sources), and nonagricultural employment (Economic Census)--come from distinctly independent sources. Their consistency with each other is a triple confirmation of the noted results.

It is possible that a good part of private investible resources in the first half of the 1980s was absorbed by purchases of divested and denationalized firms. That does not seem an important cause, however, inasmuch as a sharp slow-down, if not a virtual suspension, in privatization in the latter half of the 1980s does not seem to have diverted private resources to new investment by perceptible proportions. Natural disasters (e.g., the devastating flood of 1988) and external factors (such as a precipitous fall in the world price of jute in the mid-1980s), too, is unlikely to explain the entire sluggishness in private (or public) investment. We have to take a serious look at our saving-and-investment effort.

Why have Investors not

Responded to Policies?

Planners and policymakers have been perplexed as to why private investors have not responded overwhelmingly or even moderately to the two momentous policy packages, NIP82 and RIP88, which provided all sorts of investment incentives and ushered in a climate of liberalization, decentralization, and privatization. With a view to finding an answer, the Planning Commission undertook to carry out two pertinent surveys. To find an answer from the horse's mouth, the first survey was addressed to apex agencies or industrial leaders (office-bearers of industrial associations, Chambers of industry, banks, and public

corporations). The second is focused on entrepreneurs (enterprises). The first survey has been completed. The second is still in progress.

In the first survey, extensive discussions were carried out and inquiries were made about industrial policies, problems faced by industrialists, and possible solutions thereto. Some of the results of the survey of apex agencies reflecting the views of industrial leaders, are summarized in Table 1.

Industrial leaders agree that private investment has not increased as much as they had wished or the government had expected. There is a lot of sickness among industrial firms. Paradoxical though it may appear, industrialists want more and more assistance at the same time when a large percentage of them blame policies for a sluggish response on their part--though not necessarily policies per se, but rather as they are implemented.

Industrialists vociferously complain against smuggling as a discouragement to genuine investment in industrial ventures. Yet they wish for higher protection to their products, notwithstanding the fact that the root cause of smuggling is high tariffs and bans on imports.

Industrialists complain of too much rent-seeking in the country, which cuts the ground from under industrial investment. The fact is that the root cause of rent-seeking, too, is profuse regulation/sanctioning/licensing in the economy.

Industrialists bewail of corruption at all stages of investment and production by public functionaries as a tamper on investment. Much of corruption, however, is an attempt by persons

with whom an investor has to deal to share in the rents and assistance to clients. Once again, a remedy is to reduce assistance and thereby eliminate the process entailed by that. Many industrial leaders, indeed, have stated that they would have, by and large, made the same investments even if industrial policies had not existed.

A search for possible relationships between assistance and industrial performance has revealed from zero to negative (current or lagged) impact of policies on the total-factor productivity, production efficiency, investment, and employment creation in most industries and in almost all size-classes except the segment of the 20-99 worker size-class. See the regression results in Table 2.

In short, the root cause of the ills of Bangladesh's industry is high level of assistance. Consequently, the key to the country's industrial growth seems to lie not in more but less assistance--less regulation and more competition, low tariffs and increased liberalization, less assistance via subsidized factor- and raw-material prices and more assistance through technological innovations.

Privatization and Efficiency

One perceives a deeper-rooted problem that hampers rapid industrialization when one moves from investment growth to the performance of existing industries as between private and public sectors. Data do not yet exist to carry out this comparative analysis for recent years (although a survey is in progress at the Planning Commission whose results are expected by late this year, which should throw light on this hazy area). Upto about the

first half of the current decade the relevant data are available from CMI. An econometric analysis done at the Planning Commission (HIID Project) with these data suggests that in the 20-99 worker range (accounting for 12 percent of employment and 1.23 percent units), the public sector has done significantly better than the private sector in terms of year-to-year total-factor-productivity growth and production efficiency. In the below-20-worker range the public sector has done no better than the private sector. In the above-99-worker range (accounting for 12.53 percent of employment and 0.16 of 1 percent of establishments), the private sector has clearly shown superior performance, as may be verified from the public-sector dummy (DPUB) in Table 2.

From the main preoccupation with economic growth during about the first two decades after WWII, to heightened interest in income distribution around the turn of the following decade of the 1960s to special concern with poverty around the turn of the next decade, the countries of the world have come full circle around to pursue high growth rates. Bangladesh being a low-per-capita income country would naturally want to increase the size of the pie even more. The key source of growth is efficiency. No wonder every donor friend of Bangladesh is for increasing efficiency in Bangladesh.

Different donors want to do it their way. The World Bank and the IMF make no bones about using their aid leverage to pressure countries to accept their conditions in exchange of aid. Structural adjustment, that has become synonymous with balancing the budget, balancing the foreign trade account, balancing the

public-enterprise budgets, controlling inflation, devaluing overvalued currencies, and so forth, is the Bank's way of promoting efficiency. The Bank's "conditionality" is, however, not an unmixed blessing and may create serious social and equity problems for the country concerned. Likewise, USAID pushes its "privatization" objective single-mindedly, without paying due attention to the sound analysis that is needed to reform such basic policies. HIID's motto is to "get prices right," often ignoring numerous cases of market failure. Most other donors have fallen in line with one or the other of the three distinct yet related approaches. They are complementary. So, each donor supports the other, but pursues its own. They are all laudable measures.

Unfortunately, what were supposed to be "means" have, to a considerable extent, become "ends" in themselves. The main economic objective of all the three approaches is the same: efficiency. But efficiency is unattainable without competition. Privatization, getting prices right, and structural adjustment--all are consistent with competition and aim at attaining maximum efficiency. But often in the pursuit of "means," efficiency and competition are lost sight of.

Coming home, in Bangladesh, denationalization and divestment was probably rushed through without sound analysis about finances, management and similar problems. Not much was done to assure competitive environment within and between private and public firms. Numerous regulations stunting the growth of private firms continued despite liberalized setting. Little awareness was created among private and public entrepreneurs about the current

race for technology and productivity. For increasing efficiency, these weaknesses need to be rectified.

The private sector was expected to invest more, produce more - and do so at progressively lower unit costs, and consequently increase efficiency and growth in the economy. The basis of this expectation was the supposed freedom of private firms from the three main causes of inefficiency that plague public firms: lack of competition, absence of management and worker incentives, and bureaucratic and political interference in the management of public enterprises. While some vestiges of the legacy of public behavior continued to some extent even after divestment--such as temporary limitations on laying off of workers, continuation of certain regulations leaving private enterprises still open to intervention from public functionaries, and the like--the latter two causes were, by and large, remedied by virtue of privateness.

The critical first cause remained almost untouched. That is, not only protection from foreign competition continued at high rates (even after recent tariff revisions) for most industries, internal constraints on competitive environment also scarcely improved. For instance, public enterprises have continued incurring heavy losses and being bailed out by the government. That practice removes the fundamental base of competition from under its feet, namely public managers are not constrained to act as profit-maximizers. Public enterprises have not been under similar pressures to resist wage increases as private enterprises, because the former's losses are passed on to the

central budget. These privileges and practices not only mitigate competitive environment among public firms, but in addition introduce unfair competition between public and private firms. For when public employees get a wage raise, private firms immediately come under the worker pressure to match those increases. Higher costs of private firms have to be borne by their owners, unless they can get away with defaults on debt repayment.

On the opposite side, a number of private firms, like public firms, enjoy monopolistic or oligopolistic positions. Thus, competitive challenge is eroded from both sides.

Competition a Key to Efficiency

Efficiency in economics has a special definition and is frequently denoted as Pareto efficiency, after the name of its late 19th-century author, Wilfred Pareto. In the consumption parlance, Pareto efficiency is defined as an organization in which nobody can be made better off without making someone else worse off. In the production sphere, Pareto efficiency is correspondingly defined as an organization in which no scope is left to produce more value by given resources and technology, i.e., the best-practice technique of production and optimal allocation of resources have been attained. Except where the market may fail, two efficiency theorems can be unambiguously proved:

(1) Any competitive market equilibrium is Pareto efficient, both in consumption and production.

(2) Under certain plausible conditions (such as convexity of preferences), every Pareto efficient allocation is a market

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equilibrium:

Two lemmas single out Pareto efficient allocation as the basic criterion for welfare maximization:

- (a) Every welfare maximum is a Pareto efficient allocation.
- (b) Every Pareto efficient allocation is a welfare maximum.

In short, it is competition that guarantees efficiency and welfare maximization. If policies of structural adjustment, privatization/denationalization/divestment, and getting-prices-right become objectives in themselves irrespective of whether or not they are set in competitive environment, the fundamental cause of poor performance by the private sector is not far to seek.

In summary, the fiscal, monetary, trade, price, and regulatory policies to assist private investment and production efficiency have scarcely succeeded. Giving more assistance is not a remedy; a reduction in assistance is implicated by the analysis done in this Commission. Let competitive market prices prevail. For instance, subsidized rate of interest distorts resource allocation and causes inefficiencies of investment. Market rate of interest will be more conducive of efficient growth. Even a benign neglect of handloomers borrowing from money lenders will be efficiency-promoting. The availability rather than cheapness of credit is the critical factor. The policy of promoting equity and reducing income inequalities through price rises does more harm to both equity and efficiency. The most efficient way of enhancing equity is through lumpsum transfers.

Accordingly, the direction of the Fourth FYP will be to

promote competitive environment; to reduce price distortions; to deregulate the economy in those areas where regulations thwart investment and efficiency; to drastically lower tariffs on those products which have already enjoyed protection for 15 years or so; to steadily move towards market rates of interest and other equilibrium prices; and to resist and desist from giving more assistance of the traditional type to industry.

Where assistance is highly in order to promote industrialization, on the other hand, is in the areas which will enhance the productive efficiency of the economy, and thereby raise the rate of return from investment in plant and equipment and skill of personnel rather than from smuggling and rent-seeking. Among these areas is a quantum increase in R&D with the objective of leapfrogging in industrial technology, in which Bangladesh has lagged behind its neighbors in the past years. To promote productivity and engineering efficiency in general in the private sector, the ADP allocation to science and technology is targeted to increase from the estimated low level of 0.3 percent of GDP to 1.0 percent of GDP by the end of the Fourth FYP. Simultaneously, the capacity of R&D organizations will be augmented to absorb the targeted increase in the allocation of resources to R&D. A feasibility study is underway for a large KIST-type institute of excellence in the private sector to take over comprehensive research and development in technology.

In short, to promote the private sector, the Fourth FYP makes a break from the past plans in three areas, among others:

Fiscal and monetary incentives, price and quantity controls, and too much regulation have not only not worked towards the

achievement of the goals of industrialization, they have instead created widespread distortions and inefficiencies in the economy. Therefore, instead of giving more, this kind of assistance will be reduced.

The multi-layer assistance to industry through subsidizing prices of material and primary inputs has created a network of high-cost industries. The country rather needs low-cost industries. Therefore, instead of trying to reduce the industry's costs artificially (and incidentally only as a one-shot change) by granting price subsidies and similar concessions, the emphasis will now onward be on reducing real costs by developing and diffusing streams of innovations, new products and services, and improved processes and methods of production.

Assistance policies will in general be promotive rather than protective. Close watch on monopolistic and oligopolistic practices will be kept, both in the public sector and the private sector, as well as on the restrictive practices of employers and employees. Competition will be promoted in all sectors of the economy. Unnecessary regulations will be reduced.

Following the spirit of the Board of Investment (BOI) in liberalizing, simplifying, and shortening the sanctioning and similar processes for large and foreign business, corresponding improvements will be introduced for small investors also.