CHAPTER - 7

SUMMARY OF THE FINDINGS AND THEIR POLICY IMPLICATIONS

Summary of the Findings and Their Policy Implications

The objective of this study has been,firstly,to characterise in details the cotton textile production in Bangladesh. Secondly, to identify and establish a range of alternatives from the modern, intermediate and traditional technologies which are technically feasible and economically suitable under the operating conditions of Bangladesh.Finally, from the findings of the second proposition, evaluate the present non-expansion policy of mechanised loom in the cotton sector and thereby, draw policy conclusion for the future expansion of the textile industry.

The cotton textile industry in terms of basic needs, employment and contribution to the manufacturing value added has major importance. Economic efficiency, productivity level and choice of production technologies are of important significance and have major implications in the future development of the industry. The textile policy during 1973-85 pursued only the expansion of spinning capacity,while maintained a virtual freeze of mechanised loom capacity for the cotton sector. Such policy aimed to protect the employment level that existed in the handloom sector. The Plans further advocated the expansion of employment level in the handloom sector through increase in productivity, setting up of marketing channels and other financial measures. The expansion of spinning capacity during 1973-81 was entirely organised under the Public sector as it was the only sector producing yarn for the country. However in recent policy change(since 1981),the Private sector participation was encouraged and many public owned spinning mills were transferred under private management by the Government. The policy change,however, maintained the strategy of non-expansion of mechanised looms in the cotton sector.

The development Plans during 1973-85 emphasised the expansion of the spinning capacity to 1.6 million

spindles (see chapter 1), however,the actual growth in the capacity fell far short of the expansion plan and reached to 1.1 million in 1981. The Second Five Year Plan targets a per capita cloth consumption of 12 yards,but the per capita production until 1982 reached only to 8 yards. The failure of the Public sector to expand textile capacity as well as production level to the Plan target has partially initiated the Private sector participation. However, during 1981-84, there has been little increase in the total capacity due to the Private sector participation in the industry.

Assuming the Government proposed target of per capita cloth consumption of 12 yards (by 1985) to be measure for required expansion of the textile industry it has been found that (see chapter-1) there has to be an expansion in spinning capacity by almost double i.e upto 2 million and a three-fold increase in the present loom capacity i.e of 30,000 looms, if the consumption target is to be met by expansion in the modern sector. Alternatively, if the target is to met by the modern spinning and handloom weaving then an expansion by an additional 312 thousand handloom would be required. This emphasises the need for expansion of about 35 modern spinning units with 25,000 spindles and 312 thousand handlooms or 35 composite units with 15 thousand mechanised looms.

An industry with such expansion possibility attracts profound interest in terms of its economic efficiency and product of employment. It has been seen, for example (see chapter 6), that to produce a fixed quantity of output ,the employment level of the least cost modern composite unit (rank 1),least cost spinning and Pit loom(rank VII) and KVIC hand-spinning and Pit loom are 1,697 and 56,884 respectively. Therefore, if the objective is to create higher employment irrespective of econmic efficiency then the KVIC hand-spinning and Pit loom would be the obvious choice. However, choice cannot be so straightforward and economic efficiency has important bearing on choice as economic surplus is the prerequisite for econmic development. The other impor-

tant element which also has a high significance is the producitivity level of the technology. The economic efficiency of the technology could be increased significantly without any change in investment cost, but with increase in the level of productivity. Therefore,it may arise that the technology which is not economically efficient may have improved economic performance because of increase in the level of productivity.

The policy on technology choice in different development Plans have emphasised that in the view of the scarcity of capital and comparative abundance of labour the primary objective should be to adopt a labour intensive technology. The technology should, however, also be economically efficient. The technology choice policy, however,does not differentiate between the relative efficiency of capital and labour intensive technologies. It implies that although both the technologies generate surplus but their surplus generation is markedly differentiable and the technology policy appears to suggest that the labour-intensive technology should be adopted as long as it generates some surplus. Such policy clearly indicates losses in efficiency and therefore adversely affect economic development.

The development policy emphasises the improvement in producitivity of the labour intensive technology. 1/ Such improvement on productivity will increase the acceptability of the labour intensive technology compared to the capital intensive alternative. Therefore,the aspect of the choice of production techn olgoy should be viewed from the producitivity level that can be achieved together with their employment and economic efficiency.

The characteristics of the textile industry as explained earlier in chapter 1 suffers mainly from 3 major problems, firstly, from old equipment as well as heterogenity of equipment sources. The machinery vintages for spinning and weaving ranges between 1923-78 and

1920-65 respectively. As most of the expansion of textile capacity took place during the early 1960s, the equipment are already two decades old and have lost virtually all thier technical and economic life and in urgent need of modernisation. Such modernisation is already in progress, however the speed with which it is carried out fails to match the extent of its requirement. 2/ The heterogenity of the sources which resulted in inefficiency of the industry has been illustrated in a recent report which suggests that capacity utilisation and product performance could have increased considerably if sources were less variant. 3/ Secondly, the capacity utilization of the mills both for spinning and weaving are very low . It shows that the industry during the post-independence period (1972-81) did not meet the capacity utilization of the pre-independence level . Low capacity utilization have been because of the increase in the age of the machinery within the industry as there had been little replacement of old capacity. This gave rise to increase in the idle time as a consequence of which there was low utilization. Other reason for low utilization is power failure which varies considerably from year to year and therefore difficult to assess the extent of variation. The information available for the two financial years '80 and '81 shows a loss of 9 and 6 per cent respectively from the total production hours. Old equipment, low capacity and power failure have caused considerable loss in spindle and loom productivity. In 1981, the per shift spindle and loom production achieved were only 2.37oz and 23.47 yards respectively. This shows that the spindle and loom productivity have declined by 5.6 and 19.54 per cent respectively compared to the pre-independence level (1970).

It has emerged, therefore, that to meet the increased demand of cloth consumption, the textile industry needs a substantial expansion in capacity as well as increased level of producitvity. Under the present socio-economic condition of the country, the expansion of the industry would

invariable address to the problem of technolgoy choice i.e whether the technology should be labour-intensive as capital is a scarce commodity; and, also whether technolgoy choice should only concentrate on the employment aspect,while economic efficiency remains to be the secondary objective.The present textile expansion policy has intentionally concentrated on the prtotection of employment in the handloom sector, hence efficiency consideration did not invoke primary consideration. Such policy,obviously has sacrificed efficiency and hence economic development.

The study has therefore, examined the present textile policy in order to establish its viability as an economic option. It extends to investigates the options that could be available for the expansion of the textile industry by identifying alternative sources of modern and other developed , technologies suitable for small scale production. An extensive literature survey has established that economically efficient alternatives are available and technology choice in textile production does not suffer any technological rigidity compared to other industries viz.Chemicals, Refinery ,etc (chapter 2). Such alternatives could within the modern technologies comprising of different vintages of technologies or choice of different sub-processes with alternative production methods inheriting various labour and capital complements,also alternatives with technologies suitable for small-scale and cottage production.

The methodology of the study mainly constitutes, firstly of a technique of identifying the alternative technologies which are technically feasible for operating under Bangladesh condition. Such a technique developed by the David Livingstone Institute known as the DLI has been used in the study. However,instead of selecting each individual sub-process to combine the total process technology,the choice has been made from groups of sub-processes to form complete technology alternatives. Secondly, the methodology

involves costing of the technologies which comprise ascertaining of both the investment and operating costs. Thirdly.to evaluate the alternatives, the Discount Cash Flow(DCF)method has been used. Finally, it identifies the data requirement which is essential for the appraisal of the alternatives.

A detailed examination of the alternatives shows that there may be as many as 66 technically feasible technologies which could be operated in Bangladesh. However, from these only 12 alternatives most widely practiced in India some fo which are already operating in Bangladesh had been chosen for final economic evaluation(chapter-3).These technologies range from alternatives within the modern sector from different machinery sources viz.UK,Japan,India and Rumania with various capital and labour intensities and combined technologies between modern,intermediate and traditional technologies. The sources of intermediate technologies have mainly been India. Such technologies are intermediate power spinning and pedal looms developed by the Appropriate Technology Development Association (ATDA), Rural Fabric Centre(RFC) and the Institution of Khadi and Village Industries Commission(KVIC). The hand-spinning (Ambar Charka) which is also another alternative is also developed in India by the KVIC. However,traditional technologies i.e handloom weaving has been the indigenous option. These twelve alternatives have been evaluated using techno-economic parameter such as productivity level, wage rate,etc. established from an extensive survey of Bangladeshi and Indian textile industries for modern,intermediate and traditional technologies.

The evaluation of the alternatives have defined and a fixed quantity of output (Q) based on which the alternatives could be comapred. Such product is chosen to be the Grey Cloth of 54 picks and 54 ends using yarn of 32s cotton count and with an annual output of 37.13 million sq. yards. This product represents over 20 per cent of the country's cloth production.The comparative scale of output is based on maximum technical .....

economy of scale which could be realised in the modern sector i.e the underutilization of machinery at different sub-process levels. The selection of machinery, manning level, space requirement are based on this output level. It shows that to meet the comparative scale of output (Q) of a modern spinning or a composite unit an equivalent of 20 intermediate spinning and composite units and 240 KVIC units and between 10.64 and 13.82 thousand handlooms would be required depending on their type. The employment potential and skill composition varies considerably, for example the modern composite technology provides the lowest employment of 1,599, while its skill requirement is higher, while in hand spinning combined with handloom, the employment level is the highest of 53,677 but the skill component is significantly lower (see chapter-4).

The costing of the alternaitves involved both the investment and the operating costs (chapter-5). It has been found that the investment cost of the technologies formed by combining modern, intermediate and traditional technologies are relatively higher than most of the alternatives from the modern sector viz. Indian, Rumanian and Japanese technologies. The Indian and Rumanian technologies, for example, have between 23 and 85 perccent and 15 and 72 per cent less investment cost than the combined technologies. However, the UK composite technology has investment cost between 3.64 and 5.18 per cent higher than some of the combined technologies and between 0.5 to 3.0 per cent less than the others. The operating cost of all the modern alternatives are also relatively lower than those of the combined technologies. The difference in operating costs among the modern alternatives is very small, for example, of only about 1.6 per cent between the highest (UK) and the lowest (Indian) operating cost requirements. While, the combined technology which has the lowest operating cost (Power loom composite technology rank VI) is about 30-32 per cent higher than the modern alternatives. Similarly, the combined technology with the highest operating cost (KVIC spinning and Pit loom, rank XII) has about 2.1 -2.2 times higher cost. The operating costs of

the alternatives reduce at the expected or the manufacturers' recommended level of productivity. It has been found that the operating cost reduced between 2.4 and 3 per cent for modern composite alternatives,while for some of the combined alternatives between 1.2 and 4 per cent. For combined alternatives like Pedal(rank X) and KVIC spinning (rank XII) and Pit loom, the productivity level has been used from the observed data and therefore, the operating costs at the expected and the actual levels remained unchanged. The operating cost differential between the modern and the combined alternatives at the expected producitivity level did not vary significantly. The higher operating cost of the combined technologies is owing to their large employment component. It has,therefore,emerged that alternatives to modern technologies are all technically inefficient,i.e the cost of factor inputs increases with the increase in employment expansion possibility , hence, the generation of additional employment entails economic costs.

The findings of the study can be summarised under three major areas. These are the alternatives among different sources of modern and intermediate spinning technologies supplying yarn to the handloom sector,alternatives among the traditional technologies i.e Pit and C.R handlooms and finally composite(spinningand weaving)alternatives from different sources of modern and combined modern,intermediate and traditional technologies.

Among the alternatives in spinning technologies, all modern spinning from sources viz. India,Rumania,Japan and UK are found to be relatively more efficient than the intermediate spinning of the type RFC power, ATDA pedal and KVIC hand spinning developed in.
India by the Rural Fabric Centre (RFC),Appropriate Technology Development Association(ATDA)and the Khadi and Village Industries Commission(KVIC) respectively.The ranking of the spinning technologies shows that the Indian(rank I) spinning has the lowest Present Value Cost(PVC) followed by the Rumanian(rank II),Japanes(rank III) and the UK(rank IV)technologies. Among the intermediate spinning,RFC Power spinning (rank V) is the best option followed by ATDA Pedal(rank VI)

and KVIC(rank VII) hand-spinning. At 15 per cent capital cost, the differential in PVC between the least -cost and the second best options is only 0.5 per cent,while the second-best technology provides an additional employment of 3.8 per cent.In other words, the employment elasticity of the PVC is 8.17 which indicates that 1 per cent increase in PVC will yield 8.17 per cent increase in employment which is a favourable trade off. Therefore, the second-best option in spinning would be an attractive alternative. The cost of additional job created would be Tk.74.74 thousand.The other alternatives viz. Japanese and UK spinning while have higher PVCs than the least-cost and the second-best technologies but provide 2.2 and 3.6 per cent less employment than them and have,therefore, been rejected as options. On the other hand,RFC Power spinning has the least PVC which is about 19.15 per cent higher than the least-cost,while the PVCs of ATDA Pedal and the KVIC hand-spinning are 32.37 and 95.51 per cent higher. However,in terms of employment expansion RFC Power,ATDA Pedal and KVIC hand-spinning provide 5.39, 12.25 and 34.76 times more employment respectively. The employment elasticities of the PVCs are 23.15, 35.11 and 35.35 respectively for these technologies. It shows that the KVIC spinning provide the highest employment at an additional cost of Tk.17.03 per job. The cost of additional job for ATDA Pedal spinning is marginally higher of Tk.17.33 thousand,while the RFC Power spinning cost Tk.26.29 thousand per additional job. Therefore,in terms of employment expansion, the KVIC hand-spinning appears to be the best option.However, the PVC in excess of minimum shows that KVIC,ATDA and RFC spinning have 95, 32 and 19 per cent higher PVCs than the Least-cost technologies respectively.This makes the RFC power spinning the most attractive option with employment expansion possibility of 5.39 times more than the least-cost technology.

In terms of economic surplus or measure of NPVs, it appears that at 15 per cent cost of capital all spinning alternatives generate net loss in NPVs of Tk.26m to Tk.604 million between the least-cost(Indian) and the most labour-

intensive(KVIC) technologies. It emerges that the unit selling price is lower than the cost of production irrespective of the production technology. Compared to the ATDA (India) the yarn price per lb. of identical count shows that the Bangladesh ex-factory price is about 28 per cent lower. This indicates that the low price of yarn could be an indirect policy of the Government to execute its objective of helping to sustain handloom weaving and the employment it presently generates by subsidizing the handloom weavers. In other words, the policy to expand the spinning capacity only for the supply of yarn to the handloom weavers at present price(1981) of yarn is a cost to the economy which affects the economic growth.

The increase in efficiency or profitability with the increase in productivity to the manufacturer's recommended level indicates that at 15 per cent discount rate and existing yarn prices all spinning technologies still incur loss in surplus. However, the magnitude of the loss in NPVs decreased between Tk.16million to Tk.604 million for least-cost and the most labour-intensive technologies. This shows that the loss in NPVs of the least-cost,second-best technologies and the RFC Power spinning have reduced by Tk.10 million, Tk.8 million and Tk.22 million respectively. The loss in NPV for the ATDA Pedal and KVIC Hand-spinning did not change as the expected and the actual productivities of these technologies are identical. Therefore,at the expected level of productivity, the least-cost and the second-second-best technologies would appear relatively more attractive and the RFC Power spinning would increase efficiency among the intermediate spinning technologies.

Among the alternatives in traditional technologies,three most important alternatives have emerged. Firstly,alternatives between the Pit and C.R looms,secondly, the alternatives based on the sources of yarn supply either from modern or intermediate spinning and finally, when

traditional preparatory of handloom weaving is replaced by the Service Centre (SC) and processed warp beam is supplied to the handloom sector.

It has emerged that irrespective of the sources of supply, the Pit loom is relatively more efficient and also provide more employment. When the yarn, for example, is supplied from the modern sector at 15 per cent capital cost, the PVC of the Pit loom is about 2 per cent lower than that of the C.R loom and also provide 18.75 per cent more employment. In terms of efficiency ranking, the Pit loom,, when supplied with processed beam from the Service Centre, emerges as the least-cost option followed by supply sources from RFC Power spinning and the least-cost spinning. The PVCs of Pit loom when supplied from RFC and least-cost spinning are 3.37 and 6.5 per cent higher than the least-cost option.The RFC spinning supply option emerges more efficient than the modern spinning as the input cost of yarn per unit is taken to be 5 per cent lower than the least-cost spinning. This is because the RFC Power spinning units are located near the handloom areas which reduces the marketing and distribution cost from 10 to 5 per cent than if supplied from modern least-cost spinning. The relative advantage of RFC spinning disappears when the distribution costs are identical.

The NPVs of Pit loom when supplied yarn from different sources at 1981 price shows that at 15 per cent discount rate the Pit loom generates surpluses of Tk.37 million and Tk.4 million when the processed warp beam is supplied by the Service Centre which replaces traditional preparatory weaving and from the RFC Power spinning.However, there is a loss in NPV of Tk.27 million if the yarn is supplied from the least-cost spinning. Therefore,the existing yarn price which has been subsidized to sustain the handloom weaving still does not make handloom weaving an efficient option. It is worth noting that the marketing and distribution cost which is taken to be 10 per cent on the ex-factory price of yarn is an underestimated value.

A number of studies suggest that this cost could be between 30 to 100 per cent, 4/ which would make handloom weaving increasingly inefficient. Recent efforts of the Government have been to create different marketing and distribution channels which would ensure better yarn distribution to handloom weavers at lower cost. 5/

Finally, alternatives among the twelve composite technologies from different sources of modern and combined modern, intermediate and traditional technologies have been examined. As in spinning, for composite textile production, modern technoloiges irrespective of their sources are relatively more efficient than the combined technologies. Among sources viz. Indian, Rumanian, Japanese and UK, the Indian technology emerges as the least-cost (rank I) followed by the Rumanian as the second best(rank II). At 15 per cent capital cost, the differential in PVC between the least-cost and the second-best options is only 1.4 per cent, while the second-best technology provides an additional employment of 2.2 per cent. The employment elasticity of PVC for the second-best option is 1.62 which is indicates that with 1 per cent increase in PVC the employment would increase by 1.6 per cent. This trade-off appears inferior than the trade-off achieved for spinning technologies between the least-cost(Indian) and the second-best (Rumanian) options. The creation of an additional would, moreover, incur a cost of Tk.306.84 thousand which is about 4 times higher than that of the spinning. Therefore, the second-best as an alternative option is not so attractive as for spinning. The other modern composite alternatives, viz. Japanese(rank III) and UK(rank IV) have about 2.67 and 10.11 per cent higher PVC while provide 0.77 and 5.77 per cent less employment respectively. Therefore, on grounds of relative efficency, these options have been rejected.

On the other hand, among the combined composite alternatives, technologies ranking vetween V and IX are worth considering. The other three composite technologies (rank X to XII) i.e ATDA Pedal spinning and Pit loom(rank X)

RFC composite unit with Pedal loom(rank XI) and KVIC hand-spinnning and Pit loom have PVCs of about 45,46 and 346 per cent respectively, at 15 per cent discount rate. Moreover, the cost per additional job compared to the least-cost option are relatively higher than other alternatives within the combined technologies. Among technologies ranking between V and IX, the option combining least-cost spinning, Service Centre and Pit loom (rank V) emerged as the best closely followed by RFC composite unit with Power loom(rank VI). These have PVCs which are 18 and 19.5 per cent higher than the least-cost option,while provide about 11 and 6 times more employment. The remaining alternatives i.e the least-cost spinning and Pit loom(rank VII), least-cost spinning and C.R looms(rank VIII) and RFC Power spinning and Pit loom(rank IX) comprise about 25, 28 and 36 per cent higher in PVCs than the least-cost, but provide 13.5, 11.5 and 14.5 times more employment. The employment elasticity of the PVCs show that the technology which emerged with the lowest PVC i.e least-cost spinning ,Service Centre and Pit loom(rank V) among the combined alternatives also has the highest elasticity of 57 per cent. Therefore, an increase in PVC by 1 per cent will bringforth 57 per cent increase in employment which is a very attractive trade-off. Among other alternatives which closely follows this option is, the least-cost spinning and Pit loom(rank VII) with an employment elasticity of 49 per cent,while technologies ranking IX and X have almost identical elasticities of about 42 percent,however, these technologies are at the lower spectrum of PVC ranking. Therefore, among the combined alternatives, the least-cost spinning, Service Centre and Pit loom(rank V) and least-cost spinning and Pit loom(rank VII) are the most efficient technologies in terms of employment expansion. The cost per additional job for these technologies are Tk.8.84 and Tk.10.11 thousand respectively. The RFC composite technology with Power loom(rank VI) although has PVC which is 4.8 per cent lower than that of least-cost spinning and Pit loom(rank VII) but has twice its cost per additional employment.

The measure of economic surplus or NPV show that, at 15 per cent discount rate all modern alternatives viz. UK, Japanese, Rumanian and Indian technologies generate surplus between Tk.77 million and Tk.161 million. While among alternatives within the combined technologies,only the least-cost spinning,Service Centre and Pit loom(rank V) generate surplus of Tk.9.45 million,while all the others ranking between VI and XII incur loss in NPV of Tk.2 million to Tk.193 million. The most labour-intensive technology(rank XII) has the highest loss in NPV. However,among those which had earlier emerged as attractive options i.e rank V and VII,the alternative V only generate surplus while the least-cost spinning and Pit loom composite technology(rank VII) has loss in NPV of Tk.53 million. The RFC composite technology , on the other hand, has a loss in NPV of Tk.3 million which is the lowest. This illustrates that the technology option which comprises of modern least-cost spinning,Service Centre and Pit loom(rank V) is the only economically efficient choice among the combined options which does not require any subsidy from the economy,and provides 11 times more employment than the least-cost technology. The RFC composite technology although requires the lowest subsidy of Tk.3 million i.e Tk.360 per additional job but provides only 6 times more employment than the least-cost option. The other option which emerged as the second-most attractive in terms of employment expansion requires a subsidy of Tk.2,500 per additional job creasted,however,only provide 13.4 times more employment than the least-cost option. Therefore, the technology which require the higest subsidy among them only provide 20 per cent more employment than the most attractive option among the combined alternative technologies.

The affect on efficiency or profitability if the alternatives attain the manufacturer's recommended productivity level i.e when the x-inefficiencies have been minimized by better management and operating conditions have also been examined. It shows that the NPVs of the modern alternatives viz. UK, Japanese, Rumanian and Indian have increased from between Tk.77 million and Tk.161 million to Tk.91 million and Tk.177

million. This shows that the profitability of the least-cost and the second-best technologies have increased by Tk.16 million and Tk.14.7 million respectively. It highlights an important aspect of the findings that if the second-best technology which has a surplus of Tk.11.5 million less than the least-cost option,would appear to have an increase of Tk.3.14 million in surplus over the least-cost if the productivity is raised to the manufacturer's recommended level. This demonstrates that a higher level of economic efficiency could be realised by increasing the productivity instead of selecting options from the alternative technologies.6/ However, among the combined alternatives at a higher level of productivity, the Least-cost spinning, Service Centre and Pit loom(rank V) has an increase in surplus from Tk.9.45 million to Tk.19.22 million and RFC composite unit with Power loom from a loss in NPV of Tk.2.89 million to a surplus of Tk.13.63 million. The technology which appeared as the second most attractive within the combined alternatives i.e modern Least-cost spinning and Pit loom(rank VIII) still incurs loss in NPV of Tk.42.81 million, however,this loss has reduced by Tk.10 million due to an increase in productivity. Therefore,it emerges that at a higher level of productivity viz. the manufacturer's recommended level, the economic efficiency of modern composite alternative increases further, however, the relative increase in NPV of the least-cost technology(Indian) is higher than the second-best option. Although, the most attractive combined composite option i.e the modern least-cost spinning, Service Centre and Pit loom(rank V) has an increase in surplus at higher productivity level,however, the NPV in excess of the least-cost(i.e the differential) has also increased. Therefore,the least-cost(Indian) composite option established among the twelve alternatives would have an increase in its relative economic efficiency at a higher productivity compared to other alternative technologies.

The choice among the alternative technologies, therefore, remain unchanged if the productivity level is increased. It is evident that an increase in productivity level has increased the relative efficiency of modern alternatives i.e least-cost and the second-best technologies have become more attractive than the other options. However,the study has found that the differential in PVC,a measure of

efficiency between the two levels of productivity i.e the actual and the expected is not so significant. This is mainly due to two reasons. Firstly, increase in productivity causes a less significant decline in the operating costs of the alternatives, of the total operating costs,raw-material constituted 60 per cent. The remaining 40 per cent included wages,power, spares and miscellaneous costs. Increase in productivity reduces the wage costs, while other costs experience less significant decline. Therefore,overall reduction in PVC at the expected or manufacturer's recommended level of production is not so significant. Secondly, the attainment of actual productivity level for alternative technology sources have been high, therefore,the gain in efficiency when productivity is increased to the manufacturer's recommended level is not so substantial. However, the actual level of productivity used for this study may have been over-estimated because of the difficulty in estimating the anticipated production loss due to power failure. Nevertheless,these variations in productivity levels do not affect the conclusions arrived at in this study,the modern least-cost and the second-best technologies remain as options when economic efficiency is the criteria of choice. The other aspect of the productivity,is the level considered for the traditional technologies. Productivity level for this sector has been estimated for the existing equipment and loom,which means that the actual level of productivity would be the same as the expected. An increase in productivity level of this sector could be achieved only through better design of equipment and product,training facilities and extensive institutional and financial support.Such measures have been the main thrust of development of the handloom sector in India and also the recent inititative adopted by the Bangladesh Government. 7/ Introduction of the Service Centre as a combined alternative would entail such support. The technological,institutional and financial improvement in the handloom sector would obviously enhance the efficiency of the sector. However,the relative efficiency of the modern composite and the alternatives which combine modern,intermediate and the traditional technologies are so great, that these differentials are unlikely to be eliminated,but, could be lessened.

So far, the ranking of the alternatives have been established at the market prices of factor inputs.The order of this ranking could be reasonably questioned if the market prices do not represent their opportunity cost.To accomodate such variation, a sensitivity analysis have been done for some of the alternatives using corrected factor prices.This analysis had used corrected factor prices for two major factor inputs viz.capital and labour. The capital element of factor cost has only been adjusted for the imported component of the investment,while for labour, only for the semi-and unskilled workers. 8/ It has been found that the cost of foreign exchange per unit to be appreciated by about 20 per cent to represent its shadow or opportunity cost, while the cost of semi and unskilled labours to be adjusted by factors between 0.55 and 0.8 depending on the alternatives. The ranking of the least-cost(Indianand the second-best technologies remain unchanged when using these adjustment in factor cost,however, among the combined alternatives, the RFC composite technology with Power loom(rank VI) emerges as the lowest PVC technology, while the Least-cost spinning,Service Centre and Pit loom(rank V) occupies its position. At 15 per cent cost of capital, the PVCs of the least-cost(rank I) and the second-best(rank III) options increase by 16.9 and 17.5 per cent respectively at adjusted factor prices. But the PVCs of the RFC composite(rank VI) decrease by 5.2 per cent, while the least-cost spinning,Service Centre and Pit loom has a marginal increase in PVC by 0.5 per-cent.These changes in PVCs are not significant enough to change the superiority of the least-cost and the second-best technologies. Although, the RFC Power spinning has increased its economic efficiency considerably,but it still has PVC about 11.3 and 9.7 per cent higher than the least-cost and the second-best technologies. Compared to the least-cost spinning,Service Centre and Pit loom, the PVC has decreased from an excess of 1.1 per cent to 4.67 per cent less. In terms of surplus, the modern least-cost spinning, Service Centre and Pit loom still generates a net surplus,and , therefore remains to be an attractive alternative with a two-fold employment expansion possibility compared to the RFC composite technology.

Important conclusions can be drawn from the findings which could be related with the present textile policy. Firstly, if the present policy of expansion in the spinning is to be continued then the availability of choice within the alternatives is evident. Although the intermediate spinning has a substantial employment expansion possibility, but,however, proved to be economically less efficient. It would be ,therefore,up to the Planner and the assignment of importance attached to the employment expansion objective that would determine the selection of intermediate spinning as an option. However,most importantly,what emerges is that choice exists among the modern sources of technologies. Economic efficiency could be achieved substantially from the choice available within the alternative sources. Furthermore,by combining individual rather than groups of sub-processes,which has been established for this study to form an alternative production technology could appear economically more gainful. 9/

Among the handloom,although the Pit loom emerges as the best option,but its superiority in terms of economic efficiency is marginal.However,its employment expansion possibility is substantial because of the low cost of the Pit-loom.The Pit loom has a higher percentage in yarn breakage, and when the product quality gains importance its marginal superiority may not appear so important.

The suitability of the present textile policy can only be reviewed when the total textile process is examined for a comparable level of output. The policy has advocated for the technologies combining modern spinning and Pit or C.R loom. Such combined options are identified in the established spectrum of technoologies which rank as alternatives VII and VIII. These technologies even when combined with the most economically efficient spinning appear to be inefficient compared to the least-cost and second best composite options except for their large employment level. Therefore,the present textile policy of pursuing textile expansion i.e to expand spinning while maintaining a freeze on the expansion of mechanised looms has been policy which favoured employment generation

rather than economic efficiency. Such policy has continuously subsidized the handloom sector at the expense of the other sectors of the economy,hence adversely affecting the economic growth.

It has emerged that traditional preparatory weaving processes are highly inefficient. A substantial efficiency gain can be realised if these processes are replaced by the Service Centre and the processed beam supplied to the handloom weavers. Such technology is found to have generated adequate surplus to be self-supportive and would not require any subsidy from other sectors of the economy. Also,it has a large potential for employment expansion,therefore, the economic cost incurred by the present policy could be minimised if such a option be examined by the economic planners.Replacement of traditional preparatory weaving by the Service Centre would also improve the quality of the product,however, such combined technology requires better organisation and mangement than those which prevail in the handloom sector. Transition of the handloom industry in India due to competition from the Power loom sector reveals that the employment is mostly affected in the preparatory weaving where half jobs were lost between 1974-81.10/ This emphasises the extent of inefficiency which prevail in the traditional preparatory process. However,although the Service Centre is a relatively better option than the options, the present textile policy pursued,nevertheless,it does not justify as an option to be considered when economic efficiency is the criteria of choice among the alternatives. Therefore, the least-cost and the second-best options remain to be the technologies to choose from because of their relative economic superiority.

Ultimately, the choice among the alternatives would depend on the objective of development plan and the priority assigned to employment level and economic efficiency. In terms of investment requirement,the alternatives combining modern, intermediate and the traditional technologies have no savings in investable funds, rather they require proportionately

higher investment costs. However, of the total investment cost, the entire machinery and equipment of the least-cost and the second-best technologies are imported, while all the preparatory equipment and looms of the traditional technologies are domestically manufactured. For the option, which combines Service Centre to replace traditional preparatory weaving, although, the Service Centre machinery and equipment are imported from India, however, the present technological capability of the country could manufacture these locally. It could therefore, be argued that under the present resource mobilisation for investment which comprised only about 30 per cent from domestic savings and 70 per cent from foreign aid(1981), adoption of economically efficient domestic technologies carries utmost priority. This would also save valuable foreign exchange and reduce the balance of trade deficit which is about 80 per cent of the total investment outlay of the country(1981). The other important aspect is the level of GDP per capita, which is only Tk.769 or $45 per annum. In a country with such a poor level of income, employment opportunity which could provide some income has priority in all the Development Plan(1973-81). The problem of employment has been aggravated by increase in population. It has been observed that population and the labour-force have been growing at the rate of 2.5 and 3.1 per cent respectively(1981). At such a growth rate, the labour-force, which presently occupies 32 per cent of the total population (1980), would increase to 34 and 39 per cent of the total population in the years 1990 and 2000 respectively.11/ Employment problem would, therefore, be a growing one, and, unless the Planners of the country arrest such increase economic development would fail to achieve any real growth of the country. Choice of technology in the expansion of the textile production should, therefore, be viewed from the perspective of the total economy. It is ultimately, the economic Planner of the country who would have to decide from the alternatives available, the expansion policy to be pursued with the objective of the development goal in view. However, the present study has shown that within the formulative objectives, such as, economic growth and the product of employment, there are choice in production technology which could help to improve the efficiency of the policy in generating growth and development.

NOTES (Chapter-7)

1/ The Second Five Year Plan(1980-85),Planning Commission, Government of Bangladesh. P.XIII-8. The Plan emphasises that adequate importance should be attached to labour productivity when choosing labour-intensive technology.

2/ Almost two-third of the capacity of Bangladesh Textile Mills Corporation(BTMC) is under Balancing,Modernisation and Replacement scheme, which is mainly financed by the World Bank. However, until 1981, only 10 per cent of the capacity were actually modernised. Source : Planning and Development Directorate, BTMC.

3/ Absorption and Diffusion of Imported Technology in Cotton Textile Manufacturing in Bangladesh, by Ahmed,Q.K and Rahman.A, Institute of Business Administration, University of Dhaka, 1979, P. 44. The study illustrates that the machinery installed prior to independence(1971) were diverse in sources. For these machinery, the procurement of spares were difficult and maintenance poor,which led to low productivity of the industry.

4/ Estimates of additional costs over the market price of yarn in the form of interest paid by the handloom weavers vary substantially, for instance the Handloom Census-1978, Bangladesh Handloom Board, Dhaka(1979) P. 116-117 puts the interest rate between 38 to 135 per cent. The Report of the Task Force for the Handloom Sector, Ministry of Industries, Dhaka(1982) pp. 47-45 and 61-62,reveals that the market price of yarn is about 15 to 20 per cent higher than the ex-factory price,however, when the weavers procure their yarn on credit terms, they may pay up to 150 to 200 per cent. Assistance to the Handloom Sector in Bangladesh, Ministry of Foreign Affairs, Government of Nederland and Ten Cate Consultants, Nederland(1982) p. 61, also reveals that the handloom weavers pay over 135 percent interest rate for purchase of yarn on credit.

5/ Report of the Task Force for the Handloom Sector(1982), Op. cit. pp. 37-47.

6/ Such findings have also been illustrated by J.Pickett and Robson.R in, 'A Note on the Operating Condition and Techn ology in African Textile Production', in,World Development, Vol. 5, No. 9/10, UK(1977) pp. 879-882.

7/ Report, Ministry of Commerce, New Delhi(1982). pp.178-181. and Report of the Task Force for the Handloom Sector Op. cit. pp.96-99.

8/ The shadow exchange and wage rates have been estimated employing the methodology developed in the Feasibility Study for a Textile Finishing Plant in Tongi,Bangladesh Nederland Economic Institute, Nederland,1980.pp. A 5-6 and A 14

9/ The Choice of Technology in the Production of Cotton Cloth, by Pickett.J and Robson.R. Scottish Academic Press, Edinburgh, 1981. pp.66-84

10/ Handloom Face Liquidisation : Power loom Mock at Yojana Bhavan, by Jain, L.C, Economic and Political Weekly, India, August 27, 1983,pp.1517 to 1526.This special report has shown that due to differential tariff structure, the Power loom production has been identified as handloom prodution. This led to a substantial jobs loss of 2,864 thousand in handloom of which 1400 thousand were in preparatory weaving.

11/ Bangladesh : Recent Economic Trends and Medium Term Development Issues, World Bank, 1983, pp.86-89.