Document No: FIAG/81/12

MALAWI - DEVELOPMENTS IN THE MARKET FOR PAPER, PAPERBOARDS AND FIBREBOARDS (1968 - 1978), TENTATIVE FORECASTS OF DOMESTIC DEMAND TO 2000 A.D. AND IMPLICATIONS FOR INDUSTRIAL UTILISATION OF THE VIPHYA FOREST RESOURCES

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Addis Ababa, June 1981

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TABLE OF CONTENTS

Chapter 1 : INTRODUCTION AND SUMMARY OF FINDINGS / RECOMMENDATIONS.

1.0 INTRODUCTION

The report which follows is the result of a simple desk study on the Malawi market for paper and paperboard for the period 1968 - 78. While the limitations of a desk study without field-survey backup are realised, the findings presented here are thought to highlight the salient features of the market quite well and to form an adequate basis for suggestions regarding which direction policy should take on the following key questions :

a) Whether Malawi should consider establishing a pulp and paper industry purely to meet domestic needs and what chances exist of such a scheme proving financially viable;

b) What opportunities exist and what form they might take for alternative and additional utilisation of the pulpwood resource Malawi has already established on the Viphya plateaux but which is too big for the needs of a purely domestic-oriented pulp/paper industry or even for an industry to supply the avilable proportion of subregional markets at a time when the broader world market is unfavourable ;

c) In order to increase the options available to Malawi for alternative profitable utilisation of the established pulpwood resource along the lines suggested under (b) above, what decisions need to be made regarding forest management regimes .

While the report shows that quite a few courses of action are still open to Malawi, it stresses that careful study of all alternatives is essential if a potentially very valuable resource is not to be wasted on sub-optimal end-uses and so benefit Malawi far less than she deserves after the commendable and costly effort of forest establishment.

At the same time the need for speed is stressed : the more a decision (or decisions) is delayed, the further the pulpwood grows unthinned and unpruned. While in gross fiber terms the resource continues to increase, the quality of wood worsens with knots growing larger and so making it unacceptable for sawmilling or plywood should these options have to be adopted at some stage. Even for pulping, a highly knotty resource is undesirable ; the rsource is thus possibly depreciating even while its volume is increasing. With every extension of delay in making decisions, the end-uses for which the wood would be acceptable are diminishing.

1.1 SCOPE

It is recommended that this report be read in conjunction with a companion study on sawnwood and panel-products markets and industries in Malawi (2)[x] as the two are interlinked and in some way affect and are affected by what developments will occur on the Viphya.

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[x] Numbers in ( ) refer to references listed at the end of the report.

Subject to limitations imposed by lack of a field survey, the report covers the following items :

1. A brief background on social, economic and forestry aspects in Malawi with emphasis on the Viphya pulpwood resource (Chapter 2);

2. A summary of Malawi's gross paper and paperboard demand in the all-Africa and world context (Chapter 2);

3. Malawi's expenditure on paper and paperboards in proportion to imports of other wood products and of all commodities (Chapter 2);

4. An analysis of Malawi's historical developments on imports, exports and apparent consumption of the following products:

   - Newsprint
   - Printing and writing papers
   - Industrial papers and paperboards
   - Specialty papers , paperboards, articles of paper/board, and of printed matter
   - Fibreboards (included because it is later proposed that any local manufacture of these should be integrated with paper-pulp otherwise it cannot be viable) (Chapter 3);

5. For all the products listed above, presentation of price developments and of changes in quality composition of net imports with suggestions where possible of probable underlying factors leading to shifts (Chapter 3);

6. Tentative forecasts of gross domestic demand for all these products (Chapter 4);

7. Estimation of what proportion of the gross projected demand can reasonably be supplied by a local pulp/paper mill and what must continue to be imported even if local capacity is installed (Chapter 4);

8. Estimates of quantities of domestic pulp required (by pulp type) to meet the projected net domestic demand (Chapter 4);

9. Outline of the implications of a small domestic paper/board market for financial and possibly even economic viability of a purely domestic-oriented pulp/paper industry.

   In connection with this, presentation of possible ways to expand and then retain the domestic market and subregional markets so ensuring lower unit costs and ensuring better chances of project viability (Chapter 5);

10. An attempt to highlight the enormous wood resource potential on the Viphya relative to domestic paper/boards demand and on the basis of this, suggestions regarding alternative and additional wood-based industries.

    In the case of certain raw-material-selective industries, presentation of necessary changes in forest-management regimes to make Viphya wood suitable raw material (Chapter 5).

1.2 RESULTS

1.2.1 Background

a) Wood resources and their exploitation

1. Malawi has a plantation-based coniferous pulpwood resource whose annual gross increment is estimated at 0.94 to 1.0 million cubic metres, enough to support a chemical pulpmill in the output capacity range 170 - 182 000 m.t. per year;

2. A pulpmill of this size was to have been installed by 1978 but this has not happened. At the time of writing, even the major infrastructural developments(roads, harbours) have not yet been started;

3. With the world's paper and paperboard market growing rather sluggishly and prices far from bouyant, it appears that a large scale project to manufacture pulp and paper for export is unlikely to be sufficiently profitable to attract adequate capital investment into the project.

   Malawi's distance from seaports, the considerable congestion at those distant ports, and inadequacies in the one-line railways linking the country to them create bottlenecks which would reduce Malawian pulp/paper's competitiveness on international markets relative to supplies from rather better-placed sources;

4. While official policy change is yet to be declared, it appears likely that industrial exploitation of the pulpwood resource will have to be broadened to cover non-pulp/paper industries with the pulp/paper element much reduced, at least for the present.

b) Malawi paper/boards demand in perspective

1. At about 9000m.t. around 1977, Malawi's gross apparent net consumption (ANC) of total paper and paperboards is only about 0.006% of world ANC;

2. In the same year, Malawi's ANC consumption was only 0.65% of Africa's production. The relative smallness of Malawi's market means it tends to have many special characteristics which tend to differ from global or regional averages.;

3. Taking 1978 as example, Malawi's expenditure on imports of total paper and paperboards was at K8.3 million only 2.91% of total imports.

   In the same year other wood products imports accounted for 1.36% of total imports.

1.2.2 Historical Market Developments

1.2.2.1 Gross apparent Net Consumption (ANC)

a) Table 1.01 shows the ANC's on a three-year average basis (averaging is done to reduce fluctuation).

Year	ANC[x] estimate						Printed matter	Fibreboard
	TOTAL	Non-printed matter						
		Newsprint	Printing & writing	Industrial	Special	SUBTOTAL		
1969	5625 m.t	140	1675	2660	385	4855	270	500
	100 %	2.5	29.7	47.3	6.9	86.4	4.8	8.9%
1971	7035	230	1885	3780	450	6345	165	525
	100	3.3	26.8	53.7	6.4	90.2	2.3	7.5
1973	8375	275	2300	4340	590	7510	190	675
	100	3.3	27.5	51.8	7.1	89.7	2.3	8.1
1975	9385	305	2345	5695	385	8730	190	465
	100	3.2	25.0	60.7	4.1	93.0	2.0	4.9
1977	9465	190	2495	5525	395	8615	210	640
	100	2.0	26.4	58.3	4.2	90.9	2.2	6.8
Average%	100	3.1	26.3	55.5	5.7	90.6	2.6	6.8

Table 1.01 : TOTAL PAPER, PAPERBOARDS, ARTICLES THEREOF & FIBREBOARDS - summary of ANC developments.

Notes : x For specialty and printed matter, read "net imports" rather than ANC.

b) Table 1.02 shows the compound-equivalent annual growth rates in ANC during the period, again calculated on 3-year average data.

Item	Product ANC growth rate % p.a.						
	Newsprint	Printing & writ'g	Industrial	Specialty	SUBTOT. P & Bds	Fibrebd	TOTAL
Growth rate % p.a.	13.9	5.2	12.0	No trend	7.0	No trend	6.7
Years referred to	1969-75	1969-77	1969-76	1969-77	1969-77	1964-78	1969-77

Table 1.02: ANC INCREASE RATES - averages of historical market growth rates for Malawi.

c) Table 1.03 shows ANC growth indices for Malawi compared to world rates for three main categories of paper and paperboard.

Year	Newsprint		Printing & Writing		Industrial Grades[x]	
	Malawi	World	Malawi	World	Malawi	World
1969	100	100	100	100	100	100
1971	164	101	113	105	142	105
1973	196	108	138	126	163	120
1975	218	100	140	112	214	107
1977	136	110	149	137	208	124

Table 1.03 : GROWTH IN DEMAND - Malawi compared to world averages.

Notes : x For world, category includes all grades other than newsprint and printing/writing.

1.2.2.2 Changes in quality composition of net imports

Newsprint is uniform so no changes are recorded; for fibreboards, the proportion of softboard is estimated to have averaged 45% of total fibreboards by weight (2).

For the other categories of paper and paperboards, Tables 1.04 and 1.05 summarise the ratios.

Year	% of Total net Imports[x] by quantity			
	Printing	Stationery	Excercise books	Re-exports
1969	94.7	8.3	0.5	3.4
1971	96.8	6.9	-	3.8
1973	89.0	11.0	-	-
1975	95.1	4.9	-	-
1977	92.2	7.8	-	-
Average[xx]	94.7	7.9	-0.3	2.2[xxx]

Table 1.04 : PRINTING & WRITING PAPERS - composition of Malawi's imports.

Notes : [x] For raw paper, net imports equal ANC; for manufactured items, domestic output would first have to be added to net imports to get ANC.

[xx] Average of all years 1968 - 78 inclusive.

[xxx] The re-exports should be subtracted to obtain 100% ANC.

Year	% of Total Net Imports						
	TOTAL ANC	Corrugated paperboard	Other industrial			Boxes & bags	Re-exports
			TOTAL	Not cut to size	Cut to size		
1969	99.7	-	33.5	25.3	8.2	66.5	0.3
1971	99.9	8.5	47.7	45.7	2.0	43.8	0.1
1973	98.2	2.9	68.0	65.7	2.3	29.1	1.8
1975	99.3	26.5	60.6	59.2	1.4	13.0	0.7
1977	96.2	12.1	60.6	58.7	1.9	27.4	3.8
Average	99.1	11.3	50.0	45.8	4.2	38.9	0.9

Table 1.05 : INDUSTRIAL PAPER & PAPERBOARDS - composition of Malawi's net imports by quantity.

Notes : As for Table 1.04 above.

For both printing & writing and industrial papers and boards, there has been a marked decline in imports of ready-made items and a corresponding shift towards raw paper for local convertion. In the case of industrial papers and boards, there has additionally been a drift towards importation of paper in rolls and not precut to size.

1.2.2.3 Price developments

Table 1.06 summarises CIF import prices and compares them to world average export FOB prices for similar categories of paper and paperboards. Table 1.07 compares price increase rates to those for the same commodities (world) and to other Malawi imports.

Note that Malawi's CIF prices are so much higher than the world FOB prices that the difference cannot be entirely due to the freight and insurance element. It is suggested that lack of commercial discounts on Malawi's small purchases may account for most of the difference. Note also that the bulkier items (industrial and fibreboards) show a much greater differential relative to world prices than the thinner papers (e.g newsprint).

Year	Newsprint		Print/Wrt		Industrial		Specialty	Printed matter	Fibreboards	
	K/mt	Ratio	K/mt	Ratio	K/mt	Ratio	K/mt	K/mt	K/mt	Ratio
1969	180	1.78	275	1.49	450	3.08	1211210	1932	-	-
1971	200	1.83	330	1.60	425	2.63	1235	2740	167	3.14
1973	240	1.88	525	2.06	500	2.25	1295	4185	221	3.17
1975	380	1.68	790	1.99	620	1.72	2320	7302	285	2.97
1977	445	1.73	705	1.62	695	2.00	2660	5743	389	3.58
Average ratio		1.76	-	1.80	-	2.32	-	-	-	3.54

Table 1.06 : MALAWI IMPORT PRICES - for paper & paperboard (CIF) compared to world average export (FOB) prices.

Notes : Ratio refers to $\frac{\text{Malawi import price CIF}}{\text{World export price FOB}}$

Year	Price level where 1969 is 100							
	Newsprint		Print/Wrting		Industrial		Other Malawi Imports	
	Malawi	World	Malawi	World	Malawi	World[x]	Total impts	Other Industr. inputs
1969	100	100	100	100	100	100	100	100
1971	109	109	120	112	94	110	107	108
1973	132	125	189	138	111	151	127	131
1975	209	221	286	218	137	244	209	229
1977	246	237	255	223	154	220	266	281

Table 1.07 : MALAWI PAPER & PAPERBOARD IMPORT PRICES (CIF) - comparison with increase rates for the same products (world increase rates) and with other Malawi imports (also CIF).

Notes : [x] The world index refers to a grouping which includes some non-industrial papers other but excludes newsprint and printing/writing grades.

It appears from Tables 1.06 and 1.07 that Malawi not only pays more for her paper and boards than the world average but that her import prices are rising faster. Compared to other Malawi imports in the categories given, however, paper and board import prices are rising slower.

1.2.3 Tentative Forecasts of Apparent Net Consumption (domestic)

1.2.3.1 Gross ANC forecasts

Table 1.08 gives the forecasts :

Year	Newsprt	Print/Wrt	Industr.	Specialty[x]	Printed matter	Fibrebd	TOTAL Gross	TOTAL /'000 capita
1985	360	3670	8850	580	290	820	14570	1.970
1990	480	4470	10610	700	330	1000	17590	2.060
1995	610	5380	12590	840	370	1210	21000	2.130
2000	740	6400	14710	980	370	1410	24610	21165

Table 1.08 : MALAWI - forecasts of gross demand for total paper & paperboards.

Notes :[x]For specialty and printed matter, forecasts are of net imports to which must be added local output to get ANC.

1.2.3.2 Forecasts of net demand available for local products displacement of imports

The forecasts in Table 1.09 include only that proportion of gross demand which a local pulp/paper mill if established can reasonably hope to supply and so hope to displace imports if its price is right. The forecasts are given as amount of pulp equivalent to the weight of paper/board demand projected.

Year	Net demand as equivalent pulp weight (m.t)					
	Newsprint	Print/Wrt	Industrial	Specialty	Fibrebds	TOTAL
1985	380	3470	8365	75	650	12940
1990	505	4220	10030	95	805	15660
1995	640	5230	11900	110	990	18870
2000	775	6220	13900	125	1165	22190

Table 1.09 : PULP NET DEMAND - to cover the proportion of gross demand which a local mill can easily meet.

1.2.3.3 Breakdown of forecast requirements by pulp type

If it is assumed that a local mill will, due to quality distribution of traditional demand have to be basically a chemical facility but with extra chip refiners capacity to produce mechanical pulp for newsprint, blending, and to feed a small integrated fibreboard line, an estimate can be made of how much of each main pulp type will be required.

In making these estimates, it has been further assumed that where a product is normally made from predominantly or only semichemical or chemigroundwood pulp, local practice will be to substitute with blends of mechanical and chemical pulps only. Table 1.10 gives the results.

Year	Quantity (m.t)		
	Mechanical pulp	Chemical pulp	TOTAL PULP
1985	4955	7985	12940
1990	6040	9615	15660
1995	7310	11560	18870
2000	8610	13575	22190

Table 1.10 : DOMESTIC NET DEMAND FOR PULP BY TYPE - for domestically substitutable demand only.

1.3 IMPLICATIONS OF SMALL DOMESTIC MARKET AND RECOMMENDATIONS FOR IMPROVING THE SITUATION

1.3.1 Implications for unit investment and operational costs

1. For the foreseeable future, the domestic market is expected to remain well below the minimum normally considered before local capacity is warranted. Using normal technology, the investment costs of $ US 3500 - 4000 per annual metric ton (excluding infrastructure) are likely to be exceeded by a large margin if capacity becomes exceedingly small as it would have to be for a purely local mill in Malawi . (The cost above is based on integrated pulp/paper operations of up to 50000mtpy (10)). Operational costs would be similarly higher in such a plant than in other small-scale but rather larger units (e.g. the Kenya mill).

2. It is therefore recommended that all efforts be made to boost both the domestic and subregional markets with a view to reducing unit production costs. Some strategies which deserve serious consideration include :

a) Export markets :

i). Creation of schemes for export guarantees and for extended credit to cover the local mill's products ;

ii). Serious consideration of transport subsidies or preferential freight tariffs for the mill's products when exported ;

iii). Creation of workable schemes for accepting payment for paper/pulp exports in the non-convertible currencies of subregional export-destination countries on the basis of reciprocal central-bank clearing accounts.

Agreement on reciprocal central-bank clearing accounts could be used to facilitate such non-hard currency transactions with customers paying into Malawi central bank accounts in their own country, using their own curreny. Malawian imports from such countries could them be paid for from these funds against deposits of equivalent Malawi money in the central bank in Malawi. With such a facility, Malawi would immediately have an enormous advantage over traditional paper/pulp suppliers to the subregion who insist on payment in scarce hard currencies.;

iv). Supply t wood raw material to the mill at cost and in general apply all possible incentives which can have significant downward impact on production costs.

b) Domestic market :

i)i). As recommended for export markets at (iv (a)(iv) above.;

ii). Deliberate subsidy of all non-foreign exchange costs to make the local product significantly cheaper than imports ;

iii). Following a policy of deliberate and strictly enforced poli control of purchases from abroad and ensuring that the mill has priority access to any local inputs ;

iv) Promoting a shift from consumption of unnecessarily high quality papers and paperboards to lower priced (and lower-cost) varieties which satisfy the utility aspects and have no quality'bonuses' which add so much to price but do not add to usefulness.

Malawi unfortunately has a tradition of using unnecessarily high quality papers for such mundane purposes as receipts/invoices, school excercise and text books, drafting pads and general-purpose government stationery. What this tradition means is that for a given money outlay, Malawi purchases less paper and the consumption is artificially kept low. This is no way to support a viable local industry.

c)Additional industry ;

Markets for products other than pulp/paper must be vigorously researched and where potential exists, promoted both domestically and subregionally so that other industries can be established to use the surplus Viphya wood resource.

In this connection, the recent considerable increase in prices of domestic softwood sawn timber is a counterproductive development as it will reduce market growth at the very time when larger markets are needed to help justify industrial utilisation of Viphya softwoods.

1.3.2 Implications for utilisation of Viphya Pulpwood Resources

1. If the pulpwood requirements of domestic net paper/paperboard demand alone are considered, then one year's wood increment on the Viphya is enough to meet Malawi's needs for paper and paperboard for 17 years at projected 1985 demand levels and for about 10 years at projected 2000AD demand levels.

   Enormous surpluses therefore exist which will not be significantly reduced even if subregional paper markets are added to domestic net demand.

2. The ideal situation would be if world demand improved and caused paper/pulp prices to rise significantly and remain high so that a large-scale export-pulp/paper project could be viable. As this seems unlikely to happen in reasonable time, it is recommended that the following alternatives (some of which are already being explored) be pursued or explored further :

   a) Attempt creation and retention of subregional markets for paper/or pulp as recommended at 1.3.1 (a) above.;

   b) Consider alternative additional industries as follows :

      i). Sawmilling

      -In the short term, establish as soon as possible sawmilling capacity in addition to the existing Mazamba sawmill and base it on whatever old-growth pine exists at Lusangazi, Chikangawa/Champhoyo and (possibly) Luwawa if well-pruned and thinned stands exist. This is in line with recommendations made in this report's companion study and would assist Malawi in covering the sawnwood deficit on domestic demand apart from taking advantage of deficits which still exist in neighbouring countries (2).

      -In the medium and long term , establish more capacity as suitable raw material becomes available. To achieve this, however, it is essential that the currently untended pulpwood stands be pruned and thinned according to saw/veneer log regimes starting immediately before the trees develop excessively large knots; this course of action is therefore strongly recommended for urgent decision.

      -Decisions regarding new sawmilling capacity on the Viphya should keep in mind the rather high price of sawn timber relative to its production costs which make it better able to absorb export transport costs than several other wood products.

      ii). Plywood industry

      -Subject to suitable raw material being available, the comments and recommendations are virtually as for sawmilling.

      -Export prospects to within the subregion have been identified which can be taken advantage of over the next decade (2).

iii). Particleboards and fibreboards :

The domestic market has been shown to be very small and not enough to justify capacity; any mills would therefore have to be export-oriented.

The nature of these products is such that Malawi products might not easily be competitive in price in the main markets relative to domestic boards made from low-value wood wastes or relative to more nearby suppliers.

Nevertheless a thorough study of market prospects is recommended for both products.

iv). Industrial chemicals/energy production :

1. Proposals have recently been made to divert a dominant proportion of the Viphya resource to energy production (charcoal, motor-fuel alcohol), fertilisers, wood distillates and naval stores production (11).

While these proposals are commendable , care is needed to ensure that before implementation is authorised, policy - makers are fully convinced that a potentially valuable resource is not diverted to activities which benefit the nation less than if it is converted to the more normal products of wood-products commerce,.if [illegible]

Nevertheless, the Viphya can support energy and chemicals industry but it may be more prudent to initially base this on smallwood derived from "hygiene thinnings" of the crowded pulpwood stands until the technology and markets are known better. This approach provides the energy and chemicals while simultaneously improving forest quality for other industries.

2. Meanwhile, it is recommended that further thorough studies be made to give objective assesments of comparative merits of various options in financial, economic and social cost/benefit terms.

In the specific case of fuel - alcohol, it is recommended that use of wood as raw material be only contemplated when alternative, easier raw materials are exhausted ; at present, Malawi seems to still have surplus molasses which the stock-feeding industry is failing to absorb and which sells at very low prices internationally.

1.3.3 The question of speed

It is no exagerration to describe the present situation of slow progress on exploitation of Viphya forest resources as a crisis for Malawi's forestry sector. Any delay means that an already unhygienically-crowded and unpruned forest continues to grow even more crowded and poorer in quality.

As the trees' quality deteriorates so their suitability as industrial raw material diminishes, even for pulping but more seriously as potential material for future saw/veneer industries. The options open to the country are thus unnecessarily reduced and a potentially valuable resource is devalued.

Irrespective of what the pulpwood will eventually be used for, therefore, it is recommended that as a matter of urgency, the bulk of the pulpwood stands be thinned and then pruned ; thereafter, they should be managed as if they are destined to supply saw and veneer logs.

In this connection, it is worth noting that whileas saw/veneer logs can if necessarybe used as pulpwood, it is not so easy, and is often not possible to use pulpwood as sawlogs or peeler material for a plywood industry. The proposed pruning and thinning will therefore increase the options available to Malawi for alternative industrial utilisation of the forest.

Chapter 2: BACKGROUND

2.0 MALAWI

In a companion document to this one (2)[X] a fairly detailed review of Malawi's geographical, social and economic aspects has been given which will not be repeated here. Those special items of background information which have a particular bearing on demand for the products considered in this report will be mentioned within the report rather than in this introduction. The briefest summary profile of Malawi is :

1. It is a small country with a largely rural population of about 6 million;
2. Average incomes are low with 1978 GDP per capita estimated at K150[XX] (K65.5 at 1970 prices) (2) which places Malawi in the least developed country category.
3. The economy has of late shown considerable inflation but after a period of quite impressive growth. Real growth in GDP is estimated at about 3% p.a. while population is growing at an estimated at 2.9% p.a. (2);
4. Of the total population over 5 years old, 45% were recorded as having gone to school at some time (3, 1977 census) which indicates a rather high illiteracy rate but the size of the school-going population is rising rapidly;
5. The economy is agricultural, with tobacco and tea exports alone contributing 78% to export revenues in 1978. Since export packaging is a significant user of board products, the dominance of, particularly tobacco is of direct interest to the paper/paperboard trade apart from any influence it has on general economic health and therefore demand for all industrial commodities;
6. The manufacturing sector, a significant user of paper/boards, is also growing but remains fairly small with its contribution to GDP at 7% in 1978 (1), a ratio which is declining although actual value of output is rising;
7. Commerce, personal & social services, administration are growing quite rapidly and in 1978 are estimated to have accounted for 64% of GDP, having risen from only 35% in 1970 (2). This sector's growth can also be expected to have considerable impact on demand for certain grades of paper and board.

2.1 THE FORESTRY BASE AND PROPOSED PULP INDUSTRY

The population pressure in Malawi is considerable and has led to nearly complete loss of industrially exploitable indigenous forest in favour of agricultural settlement. A programme of afforestation in fairly inaccessible highlands was therefore started which gathered momentum in the mid/late 1950's and early 1960's.

Apart from the original intention of achieving self-sufficiency in mechanical wood products, a large programme of paper-pulpwood afforestation was started in the early 1960's on the northern plateaux of Viphya. In 1980, this resource was estimated to cover 54 250 hectares (1) of which over 90% is coniferous. At the average productivities recorded on the Viphya, this area has an annual increment of 0.94 to 1.0 million cubic metres of wood

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[X] Numbers in ( ) are of references listed at the end of this report.

[XX] K1.00 equals $ 1.25 US approximately.

which can support a chemical pulpmill of 170 000 to 182 000 mtpy at a conversion factor of 5.5 cum. per adt pulp.

It will be shown later that both demand and prices for paper in the world have been rising slowly over the past decade (mostly because the dominant markets are near saturation and the small ones are not growing rapidly due to recent economic problems). The demand for pulp has therefore also been rising only sluggishly, as have prices for it. Original plans to instal a large, export-pulp mill in Malawi by 1978 appear to have suffered setback due to these developments but also due to Malawi's great distance to export seaports over a rather inadequate rail system, factors which tend to erode competitiveness of any Malawi product in the international markets.

Whilst official policy has yet to be publicly declared as changed, it appears inevitable that the almost-certain non-viability of a large export-pulp industry as originally envisaged will ensure dropping of this scheme in favour of a project more in line with domestic requirements and minor exports to neighbour countries. The success of a recent integrated pulp/paper mill in Kenya is bound to influence such a decision in favour of smaller scale operation which can be expanded as market prospects improve and domestic needs grow.

2.2 WORLD PAPER/PAPERBOARD PRODUCTION AND DEMAND PERSPECTIVE

Since the world lacks external sources and trade destinations, its global production can be equated to apparent consumption if we ignore stocks. This total production, Africa's total production, and Malawi's apparent net consumption (ANC) are presented jointly in Table 2.01 in order to show the latter's demand in proper perspective.

Year[X]	World		Africa		Malawi	
	Quantity[XX]	Ratio[XXX]	Quantity[XX]	Ratio	Quantity	Ratio
1969	123 926	24 176	857	167	5.1	1
71	129 815	19 944	936	144	6.5	1
73	147 840	19?200	1 169	152	7.7	1
75	132 257	14 830	1 163	130	8.9	1
77	153 740	17 425	1 362	154	8.8	1

Table 2.01: MALAWI IN PERSPECTIVE - apparent net consumption of total paper and paperboard in Malawi compared to Africa and world totals. (Units: '000 metric tons for quantity).

Notes : 1. Malawi's quantity is ANC including printed matter,

X For Malawi, the year is midpoint year of 3 years averaged.

XX For world and Africa, quantity of production. Africa's net c consumption can only be derived by summation of individual country ANC's which is not justified only for the purpose of background material.

XXX Ratio of world or Africa figure to Malawi ANC where Malawi equals 1.

Sources : An. St. Ext. Trade (6), YBFP(7).

The main observations to be made from Table 2.01 are as follows :

a) Malawi's consumption equalled only 0.6J% of Africa's production in 1969, but rose to 0.65% in 1977;

b) Compared to world totals, Malawi's 1969 ANC was about 0.004% and rose to only 0.(06% by 1977.

It is clear from the foregoing that Malawi's market is so small that it cannot be expected to necessarily reflect the characteristics of the world or even African market but will be heavily influenced by local circumstances and may be prone to considerable fluctuation from year to year.

2.3 PAPER/PAPERBOARD IN TOTAL MALAWI TRADE PERSPECTIVE

Table 2.02 shows the place of CIF expenditure on various grades of paper and paperboard in comparison to total imports and to imports of wood products (other than paper & paperboards) imports :

Commodity	Value of imports (K10^3) CIF			
	1975		1978	
	K10^3	%	K10^3	%
Newsprint	217.9	).1)	143.8	0.)5
Printing & writing papers	2316.9	1.06	2322.8	).82
Industrial paper & board	4656.(	2.13	43(7.7	1.51
Specialty & articles of p&b	1014.3	0.46	1154.7	0.41
Printed matter	2863.9	1.31	2190.7	0.77
Total (a) to (e	8197.2	3.75	8293.6	2.91
Other wood & articles of wood excl. fibreboard	2556.0	1.17	3360.1	1.18
Fibreboards	111.4	0.05	512.)	0.18
TOTAL MALAWI IMPORTS	218663.0	100.00	284747.)0	100.))

Table 2.02: MALAWI - imports of paper & paperboards in perspective of other wood products and of total imports.

Source : (1).

It appears that in 1975, imports of paper and boards were valued at almost 4% of Malawi's total imports; by 1978, this share had dropped to about 3%. It will be shown later that this is entirely due to faster increase in prices of other commodities than that of paper and paperboards.

Chapter 3 : HISTORICAL MARKET DEVELOPMENTS.

3.1 DEFINITIONS, SCOPE, DATA SOURCES

3.1.1 Scope

The following categories of paper and paperboard are considered :

a) Newsprint

b) Printing and writing papers

c) Industrial paper & paperboards

d) Specialty and minor grades plus articles of paper & paperboard not included elsewhere (often abbreviated to "Specialty")

e) Printed matter

f) Fibreboards - due to their technological similarity to paperboards.

3.1.2 Definitions

The Brussels Tarrif Nomenclature (BTN) codes included under each product listed above are given in Appendix 3.01 . BTN rather than the more common SITC codes are used because the Malawi Customs authorities have adopted the former system in their records.

Where apparent net consumption ANC) is presented, it simply means domestic output plus net trade. Since Malawi has no domestic paper/board capacity, ANC means simply net trade for all raw papar and board. Without a field or questionnaire survey to determine local production, it is impossible to arrive at ANC for articles of papaer & paperboard so where these are presented, they are reported as "net imports" rather than as ANC.

Annual ANC data exhibit severe fluctuation which is attributed to stock effects. The only attempt to contain this problem is 3-year averaging of data to dampen the amplitude of variation.

Where prices are given, they have been derived by dividing the published gross CIF import value by recorded import weight. For all years before 1970, imports were recorded on an FOB basis and have been converted to CIF by adding 7.5% . Attempts to add a higher percentage invariably resulted in pre-1970 prices being greater than those for subsequent years. While this is possible, it is not normal so the rate was lowered until the normal pattern was of increasing CIF prices. For exports (of manufactures from paper/board) and re-exports, the value refers to FOB or FOR prices.

All indices of prices are generally reported with 1969 (midpoint of 1968, 1969, 1970 years) as base equalling 100 units. The index units for subsequent are calculated using kwachas unadjusted for inflation-indused value-erosion.

3.1.3 Data sources

Malawi trade figures have come from various issues of the "Annual Statement of External Trade"(6). Data on all-Africa and world totals are from the F.A.O. "Yearbook of Forest Products" (7), while international price data have come from "Forest Products prices 1971 - 1980" (8). For fibreboard, data on ratios of soft to hardboard and on ANC have come from the companion study FIAG/81/10 (2).

3.2 RESULTS

3.2.1 Newsprint

3.2.1.1 Consumption and trade

Table 3.01 gives developments in apparent consumption and trade for Malawi. alongside world developments. Figures3.01 and 3.02 show the changes graphically together with other paper and paperboards.

Year	IMPORTS	EXPORTS & RE-EXPORTS	ANC		ANC Index	
			Actual	3-yr Av'ge[x]	Malawi	World [xx]
1968	102	-	102	-	-	-
69	158	-	158	140	100	100
1970	156	-	156	215	154	103
71	331	-	331	230	164	101
72	200	-	200	275	196	105
73	293	-	293	275	196	108
74	330	15	315	370	264	111
75	504	-	504	305	218	100
76	93	-	93	245	175	107
77	140	-	140	190	136	110
78	342	-	342	-	-	-

Table 3.01: NEWSPRINT - imports, exports and ANC developments for Malawi.
(Units : m.t.)

Notes : [x] The averaging is done to reduce fluctuation. ANC figures are rounded to nearest 5 m.t.

[xx] World figures are better buffered from fluctuation so 3-year averaging has not been done for them.

Sources : (6), (7).

Using the 3-year average figures, developments can be summarised as follows:

a) Annual consumption has averaged 250 m.t.;

b) From 140 m.t. in 1969, ANC increased nearly lineakly to a peak of 370m.t. in 1974 then declined steadily to about 190 m.t. in 1977.;
The unaveraged results show a new upturn after 1976 but on average any increase is slow and erratic which is quite surprising in a country with no television to compete as information source with newspapers.;

c) On the world scale (which is dominated by industrialised countries) consumption has risen more slowly than in Malawi (by 10% total in the 9 years). This is attributable to rapid growth in competition from television and other media as sources of both news and entertainment in the dominant affluent-economy countries.;

d) Re-exports are only recorded in 1974 when 4.8% of ANC was despatched.

Figure 3.01 : MALAWI - apparent net consumption of paper and paperboards, articles thereof, and of fibreboards using unaveraged data.

Key : NP is newsprint
PW is printing & writing
IPB is industrial paper & boards
SPA is specialty
PM is printed matter
FB is fibreboards

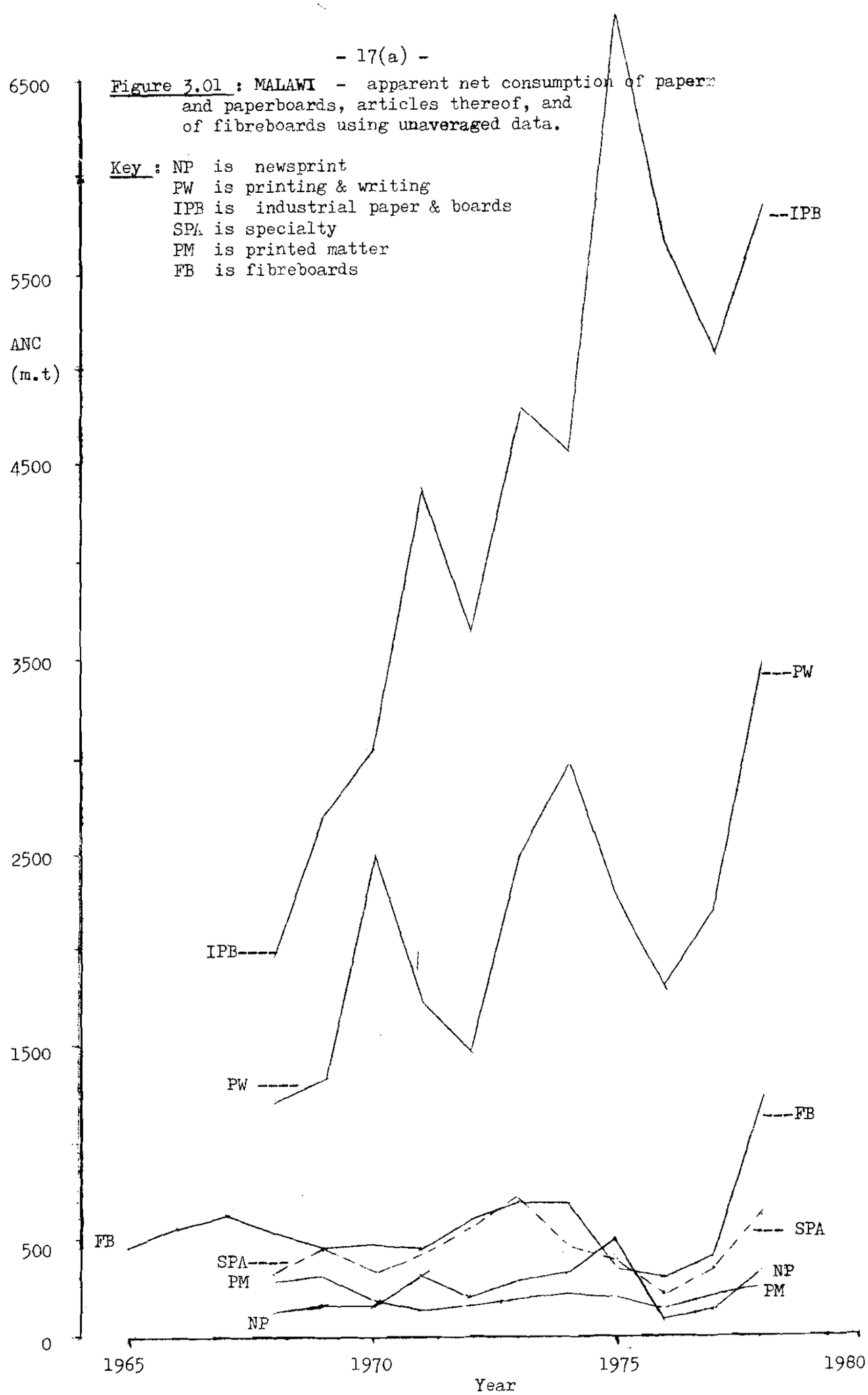
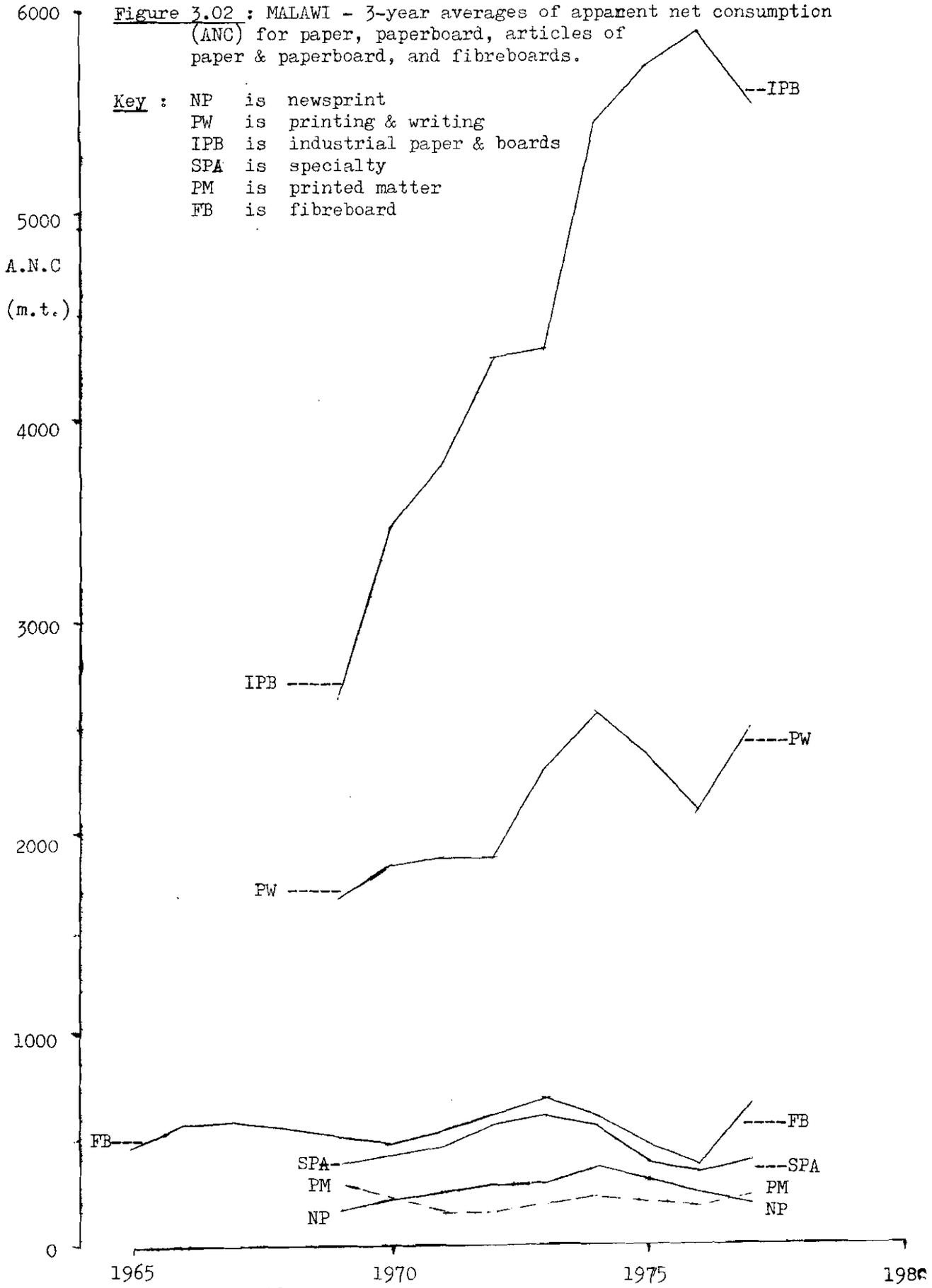


Figure 3.02 : MALAWI - 3-year averages of apparent net consumption (ANC) for paper, paperboard, articles of paper & paperboard, and fibreboards.

Key : NP is newsprint
PW is printing & writing
IPB is industrial paper & boards
SPA is specialty
PM is printed matter
FB is fibreboard



3.2.1.2 Price trends

Table 3.02 shows Malawi newsprint prices compared to world averages and to Malawi's own "all-items" and "other industrial inputs" import price indises. Figure 3.03 shows newsprint prices graphically together with prices for other grades.

Year[X]	Price[XX] per metric ton					Ratio Malawi	General Malawi Indices	
	Malawi			World			All imports	Ot.Ind.Imp. Inputs
	Kwachas	$ US	Index	$ US	Index	World		
1969	180	240	100	135	100	1.78	100	100
70	180	240	100	140	104	1.71	99	99
71	200	265	109	145	109	1.83	107	108
72	185	245	102	155	115	1.58	109	113
73	240	320	132	170	125	1.88	127	131
74	315	420	174	235	173	1.79	172	196
75	380	505	209	300	221	1.68	209	229
76	450	560	349	295	218	1.90	239	251
77	445	555	246	320	237	1.73	266	281
Average ratio		-	-	-	-	1.76	-	-

Table 3.02 : NEWSPRINT - Malawi import prices (CIF) compared to world average export prices (FOB) and to other Malawi import price indices.

Notes : Exchange rates are 1970 - 75 : K1.00 equals 1.33 $ US.
1976 - 77 : K1.00 " 1.25 $ US.

[X] Midpoint year of 3-year average for Malawi paper price; actual for world.

[XX] Prices rounded to nearest 5 currency units; indices based on unrounded prices.

Sources : (1),(6),(8).

The notable points are :

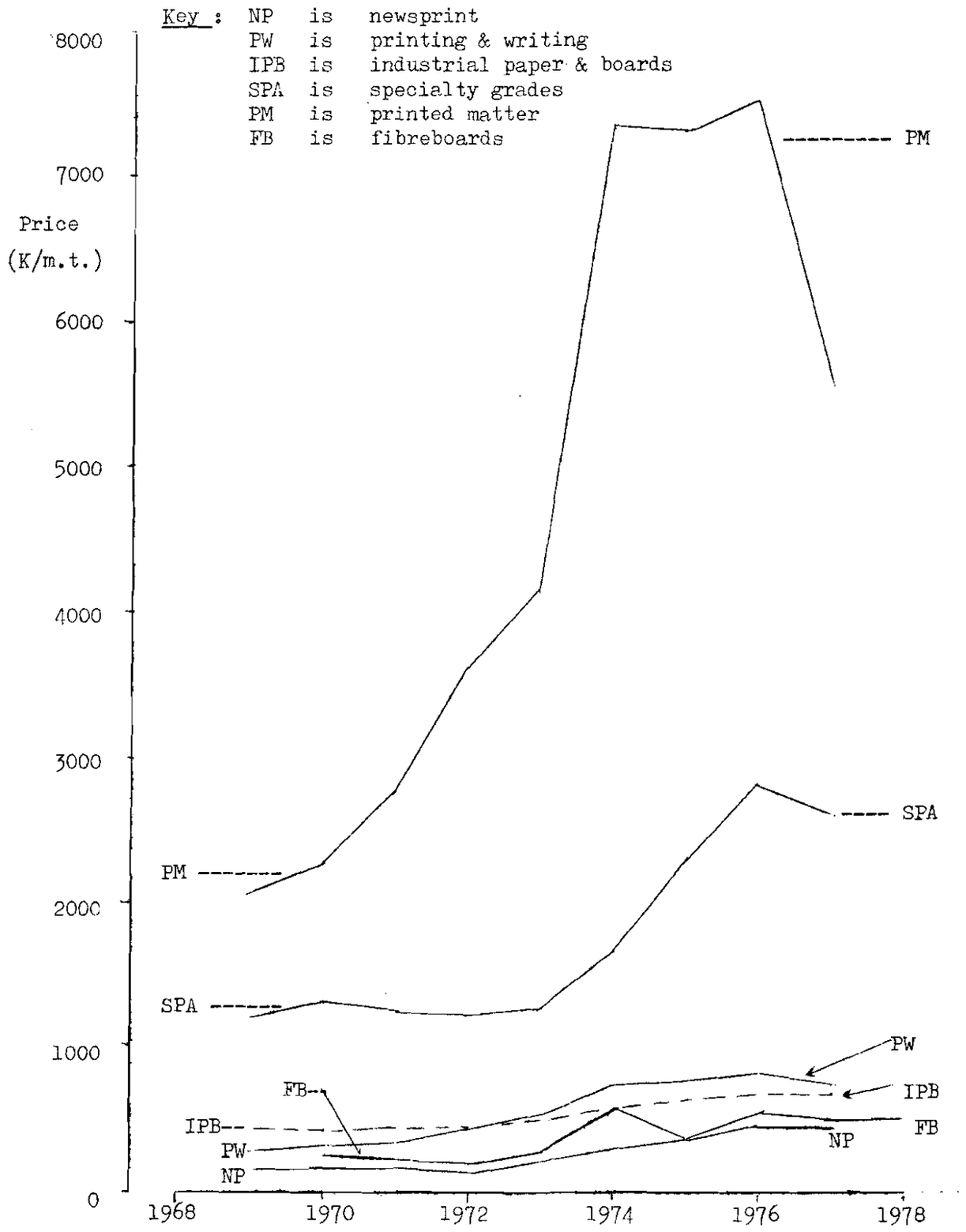
a) If we ignore the slight downturn in 1977, the total increase in price has been 249% to 1976, which corresponds to a rate of 16.9% compound equivalent. The 1969-77 average has been about 12%p.a.;

b) Malawi's CIF prices have consistently been much higher than the world export FOB price with an average difference of 76%. Since this margin is too high to be accounted for entirely by freight and insurance alone, it would appear that Malawi is paying a penalty for being a small customer (no bulk discounts etc.).

Similar large margins have been demonstrated for other wood products (2) and may well exist for all of Malawi's imports.;

c) Price escalation for newsprint has been slower than for Malawi's total imports and for other imported industrial inputs. This is an advantage for Malawi as an importer but a strong disadvantage for her as a potential exporter since it indicates a weak world market for the paper. Note that the world prices have risen even more slowly than Malawi's.

Figure 3.03 : MALAWI - import prices (CIF) in Kwachas/m.t.
(3-year moving averages).



3.2.2 Printing & Writing papers

3.2.2.1 Consumption and Trade

Table 3.03 shows trade and ANC for Malawi alongside world figures. Figures 3.01 and 3.02 respectively show the ANC graphically using raw data and 3-year averages.

Year	IMPORTS	EXPORTS & RE-EXPORTS	ANC		ANC Index	
			Actual	3-yrAv'ge	MALAWI	WORLD
1968	1 335	135	1 200	-	-	-
69	1 370	45	1 325	1 675	100	100
70	2 625	135	2 490	1 845	110	104
71	1 790	65	1 725	1 885	113	105
72	1 450	-	1 450	1 885	113	114
73	2 485	-	2 490	2 300	138	126
74	2 970	(1)	2 970	2 570	154	133
75	2 255	-	2 255	2 345	140	112
76	1 820	10	1 805	2 090	125	130
77	2 215	-	2 215	2 495	149	137
78	3 470	-	3 470	-	-	-

Table 3.03 : PRINTING & WRITING PAPER - imports, exports and ANC development for Malawi. (Units: m.t.)

Notes : As for Table 3.01. Sources:(6), (7).

The following main observations can be made:

a) ANC has risen fairly rapidly but has fluctuated quite considerably. The total increase (3-year average data) has been 49% or which corresponds to 5.2% p.a. compound equivalent growth rate;

b) The increase in Malawi's demand has been faster than the world average which totalled 37% over the same period, (4% p.a. compound equivalent);

c) Re-exports have been rather more significant than for newsprint but only in years before 1972, since when they have virtually ceased.

3.2.2.2 Changes in quality composition of net imports

The ratios of various paper types within the printing and writing category to the total net imports are shown in Table 3.04.

On the average, it appears that 95% of the category is printing papers; stationery for correspondence takes the second share at 8%, a share which has declined, presumably as more stationery is manufactured in Malawi from raw imported paper/paperboard.

A similar situation exists on excercise books which are now mostly made locally.

Year	% of Total Net Imports			
	Printing	Stationery[x]	Excercise books	Re-exports
1968	96.6	13.(	1.4	11.0
69	94.7	8.3	0.5	3.4
70	99.8	5.3	-5.1	5.5
71	96.8	6.9	-	3.8
72	89.3	10.8	-	-
73	88.8	11.0	-	-
74	97.6	2.4	-	-
75	95.0	5.0	-	-
76	95.1	4.8	0.1	0.7
77	91.9	7.8	-	-
78	95.6	4.4	-	-
Average	94.7	7.9	-0.3	2.2[xx]

Table 3.04 : PRINTING & WRITING PAPERS - quality compositon of net imports (by quantity).

Notes : [x] Stationery includes only the type included in BTN codes 48.14.00.00, 48.14.00.01 and 48.14.00.09.

[xx] Only when this column is subtracted is the total %'ge 100 which equals ANC.

3.2.2.3 Price trends

Table 3.05 shows import-price developments for Malawi alongside world prices and Malawi's own all-items and other industrial input import price indices.

Year	Price per metric ton					Ratio	General Malawi Indic.	
	Malawi			World		Malawi	All-items	Other Indust
	Kwachas	$ US	Index	$ US	Index	World		inputs
1969	275	365	100	245	100	1.49	100	100
70	305	405	109	255	105	1.59	99	99
71	330	440	120	275	112	1.60	107	108
72	425	567	154	280	115	2.02	109	113
73	525	700	189	340	138	2.06	127	131
74	735	980	265	500	204	1.96	172	196
75	790	1055	286	530	218	1.99	209	229
76	825	1030	298	565	232	1.83	239	251
77	705	880	255	545	223	1.62	266	281
Average ratio		-	-	-	-	1.80	-	-

Table 3.05: PRINTING & WRITING PAPERS - Malawi import prices (CIF) compared to World average export (FOB) prices and to other Malawi import price indices.

Notes : See Table 3.02. Sources : (1), (6), (8).

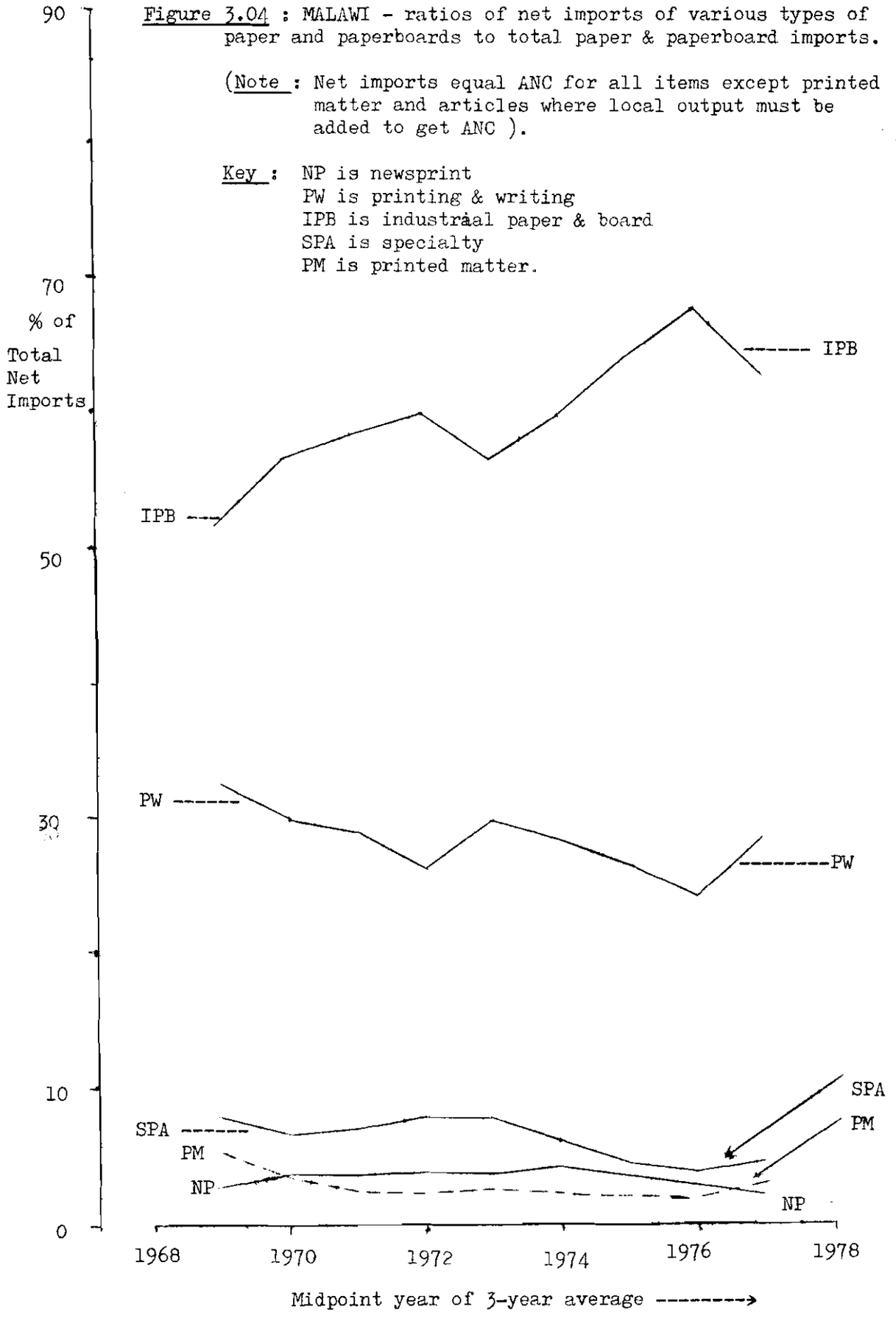


Figure 3.04 : MALAWI - ratios of net imports of various types of paper and paperboards to total paper & paperboard imports.

(Note : Net imports equal ANC for all items except printed matter and articles where local output must be added to get ANC).

Key : NP is newsprint
PW is printing & writing
IPB is industrial paper & board
SPA is specialty
PM is printed matter.

The main observations are :

a) Between 1969 and 1977, prices rose approximately 155% but as Fig.3.03 shows, the increase was faster until 1974 after which it has slowed down and even declined a little. Compound equivalent increase rates are 21.5% p.a. (1969-74) and about 12.25% p.a. (1969-77).
Note that price changes can be due to variation in quality composition or source of imports in addition to any actual pricing changes. The trend towards reduced imports of ready-made articles (stationery) can partly explain the slowdown in price escalation;

b) Malawi's import CIF prices have averaged 80% higher than world FOB export averages. Small-batch purchasing is again thought to explain most of this difference; the recent decline in ratio could be due to reduced imports of stationery.;

c) The price of printing & writing papers has risen slower than that of Malawi imports generally and other industrial inputs imports in particular. but has been faster than for newsprint.

3.2.3 Industrial Paper and Paperboards

3.2.3.1 Consumption and Trade

Table 3.06 shows developments to 1978 while figures 3.01 and 3.02 show the same graphically.

Year	IMPORTS	EXPORTS & RE-EXPORTS	ANC		ANC Index	
			Actual	3-yr Av'ge	MALAWI	WORLD
1968	1 965	-	1 965	-	-	-
69	2 735	10	2 725	2 660	100	100
70	3 315	20	3 295	3 475	131	103
71	4 410	5	4 405	3 780	142	105
72	3 640	-	3 640	4 280	161	113
73	4 890	90	4 800	4 340	163	120
74	4 610	25	4 585	5 415	204	121
75	6 910	50	6 860	5 695	214	107
76	5 735	85	5 650	5 865	220	120
77	5 275	190	5 085	5 525	208	124
78	5 835	-	5 835	-	-	-

Table 3.06 : INDUSTRIAL PAPER & PAPERBOARDS - Malawi trade and ANC. ANC growth relative to world rate. (Units : . m.t.)

Notes : 1. The world figure includes specialty papers and boards.
2. For other notes, see Table 3.01.

The main observations on this dominant category are:

a) Just as for printing and writing papers, growth has been almost linear but has fluctuated a lot due to suspected stock effects.

Using 3-year average data, the total ANC increase between 1969 and 1976 has been 120% which corresponds to about 12% p.a. compound growth. The downturn after 1976 is considered temporary.;

b) Malawi's ANC has risen faster than the world average: while Malawi's level rose 120%, the world figure increased only 20% during the period 1969-76. The world rate is equivalent to only 2.75% p.a. compound;

c) Exports and re-exports are a small proportion of Malawi's trade.

3.2.3.2 Changes in quality composition of net imports

Table 3.07 shows the percentage composition of net imports:

Year	% of total net imports by grade, by quantity						
	TOTAL ANC	Corrugated[x] ANC	Other Industrial ANC			Boxes & Bags ANC	Re-Exports
			TOTAL	Not cut to size	Cut to size		
1968	99.8	-	30.8	20.7	10.1	69.2	0.2
69	99.7	-	33.5	25.3	8.2	66.5	0.3
70	99.4	-	31.6	24.1	7.5	68.4	0.6
71	99.9	8.5[xx]	47.7	45.7	2.0	43.8[xx]	0.1
72	100.0	7.7	57.3	52.7	4.5	35.1	-
73	98.2	2.9	68.0	65.7	2.3	29.1	1.8
74	99.4	23.1	50.7	47.6	3.1	29.3	0.6
75	99.3	26.5	60.6	59.2	1.4	13.0	0.7
76	98.5	29.6	48.0	44.8	3.2	22.4	1.5
77	96.2	12.1	60.6	58.7	1.9	27.4	3.8
78	100.0	14.4	61.5	59.3	2.2	24.1	-
Average	99.1	11.3	50.0	45.8	4.2	38.9	0.9

Table 3.07 : INDUSTRIAL PAPER & PAPERBOARDS - breakdown of net imports by quality for Malawi.

Notes : x Including ready-made board as well as its elements.

xx Domestic manufacture of cartons from raw board started. Note decline in imports of ready-made boxes and bags.

The key observations are :

a) Almost all imports are consummed and not re-exported;

b) Of the domestic consumption, about half is industrial paper other than corrugated paperboard or ready-made boxes/bags.

This category is dominated by paper/board imported in rolls for local convertion (46% of ANC) with pre-cut paper/boards at only 4% of total ANC on avarage but having declined from 10% in 1968. This indicates greater local conversion.;

c)

c) Ready-made boxes and bags have declined from 69% of total ANC in 1968 to only 24% in 1978 due to increasing local production started around 1971.

Corrugated board imported for local conversion has increased from 8.5% of total ANC in 1971 through a 30% peak (1976) to 14.4% in 1978. The total share of corrugated board and ready-made boxes/bags has diminished from 69% (1968) to 38.5% in 1978 although the quantity has risen from 1360 m.t. to 2245 m.t.

The total of imported boxes/bags plus corrugated board should not however be confused with ANC of packaging papers/boards since some imported rolls of raw paper/board are additionally locally made into bags/wrappings.

3.2.3.3. Price trends

Table 3.08 shows Malawi's CIF import prices alongside world average export FOB prices.

Year	Price per metric ton					Ratio	General Malawi Indices	
	Malawi			World x		Malawi	All items	Oth.Industr.
	Kwachas	$ US	Index	$ US	Index	World		inputs
1969	450	600	100	195	100	3.08	100	100
70	430	575	96	210	107	2.74	99	99
71	425	565	94	215	110	2.63	107	108
72	420	560	93	225	115	2.49	109	113
73	500	665	111	295	151	2.25	127	131
74	585	780	129	390	197	2.00	172	196
75	620	825	137	480	244	1.72	209	229
76	675	845	149	435	220	1.94	239	251
77	695	870	154	435	220	2.00	266	281
Average ratio		-	-	-	-	2.32	-	-

Table 3.08: INDUSTRIAL PAPER & PAPERBOARD - Malawi import prices (CIF) compared to world average FOB export price and Malawi's own all-items and other industrial inputs import price indices.

Notes : x Includes specialty papers.

- Other notes as for Table 3.02.

Sources : (1),(6),(8)

The main observations are :

a) Between 1969 and 1977, prices rose 54% in which is equivalent to 5.6% p.a. compound. There is some evidence of slight slowdown in rate of increase after 1976.;

b) Malawi's import CIF prices have averaged 2.32 times the world average export FOB price. It is unclear why this type of paper/board should exhibit a higher ratio to world prices than the 1.76 for newsprint and 1.80 for printing/writing. The greater proportion of ready-made articles (boxes, bags) and possibly greater bulk (corrugated boards) may all be contributory factors.;

c) As for the other paper/board grades, prices have risen slower than for the average of all Malawi imports or for other imported industrial inputs which have gone up [illegible] at 13% p.a. and 14% p.a. respectively.

3.2.4 Specialty and minor papers/paperboards plus other articles thereof

Whileas for newsprint, printing/writing and the majority of industrial papers/paperboards Malawi can seriously consider establishing domestic capacity to displace imports, this is not the case for grades which are consummed in very small quantities and are even on a world scale used in small amounts. The developments in consumption of these grades is included here only for the sake of completeness.

3.2.4.1 Consumption and Trade

Table 3.09 shows developments and Figs. 3.01 and 3.02 do so graphically.

Year	IMPORTS	EXPORTS & RE-EXPORTS	ANC		ANC Index
			Actual	3-yr Average	
1968	350	15	335	-	-
69	470	5	465	385	100
70	360	5	355	415	108
71	480	55	425	450	117
72	570	-	570	570	148
73	725	5	720	590	153
74	495	10	485	550	142
75	450	5	440	385	99
76	220	-	220	335	87
77	345	-	345	395	103
78	630	-	630	-	-

Table 3.09: SPECIALTY PAPER & PAPERBOARDS [x] - imports, re-exports and ANC for Malawi. (Units : m.t.)

Notes : [x] Includes articles of paper & paperboard not included elsewhere.

Source : (1)

Apparent consumption has shown no trend but has averaged about 455 m.t. p.a.; re-exports have remained very low.

3.2.4.2 Changes in quality composition of net imports

Of the total net imports in this specialty category, certain elements have a greater chance of being possibly manufactured in a domestic mill than the rest. The varieties which fall into this group include:

a) BTN code 48.01.96.00 - paper & board not elsewhere specified,

b) BTN code 48.17.00.09 - file covers and paper stationery not elsewhere specified.

Table 3.10 shows imports of these categories separately for sample years 1975-77 inclusive.

Year	TOTAL ANC m.t.	IMPORTS OF:[x]					
		P & Bd 1		P & Bd 2		Subtotal P & Bd 1 & 2	
		m.t.	%[x] [xx]	m.t.	%[xx]	m.t.	%[xx]
1975	440	4	0.9	87	19.8	91	20.7
76	220	3	1.4	63	28.6	66	30.0
77	345	2	0.6	89	25.8	91	26.4
Average	335	3	0.9	80	23.9	83	24.8

Table 3.10: SPECIALTY PAPER & PAPERBOARD & ARTICLES THEREOF - share least special categories.

Notes : [x] P & Bd 1 is BTN 48.01.96.00
P & Bd 2 is BTN 48.17.00.09

[xx] %'ge of total specialty grades ANC for a given year.

It appears that the two least special of the specialty category contribute about a quarter to total consumption.

3.2.4.3 Price trends

One way in which specialty grades were identified was price: a high price is a reflection of high processing costs resulting from either a product being rarely demanded (so raising unit manufacturing costs) or requirement for a lot of inputs, or both. An example is cigarette papers which apart from requiring very thorough and careful refining demand enormous amounts of bleaching and cleaning water. In Table 3.11, the average price of specialty papers is compared to the grades covered earlier to illustrate the price gulf between them.

Year	PRICE OF (K/ SPECIALTY m.t.)	Ratio of specialty price to :		
		Newsprint	Print/writing	Industr.P&Bd.
1969	1 210	6.69	4.37	2.68
70	1 330	7.35	4.39	3.08
71	1 235	6.25	3.73	2.90
72	1 225	6.67	2.87	2.91
73	1 295	5.42	2.48	2.59
74	1 690	5.37	2.30	2.89
75	2 320	6.13	2.94	3.75
76	2 807	6.24	3.40	4.16
77	2 660	5.97	3.77	3.82
Average ratio		6.23	3.36	3.20

Table 3.11 : SPECIALTY GRADES & ARTICLES OF PAPER & BOARD versus other paper/ board prices (import, CIF basis, Malawi).

3.2.5 Printed matter

A considerable proportion of this category is advertising matter, books, technical literature e.t.c. which cannot be replaced by local production. Indeed, with growth in imports particularly of technological goods, an increase in imports of printed matter can occur. Table 3.12 gives historical net import levels; for the future, 0% local substitution is assumed.

Year	Net Imports	Year	Net Imports
1969	270 m.t.	1974	205 m.t.
1970	215	1975	190
1971	165	1976	190
1972	165	1977	210
1973	190		

Table 3.12 : PRINTED MATTER - net imports into Malawi.

Notes : All figures to nearest 5 m.t. and based on 3-year averages.

Source: (1)

3.2.6 Fibreboards

Appendix 5.01 gives the justification for including fibreboard in a study on paper and paperboards. Note that fibreboard market developments in the context of the general market for panel products has been analysed in another study (2).

3.2.6.1 Consumption and Trade

Table 3.13 shows developments; Figures 3.01 and 3.02 show developments graphically.

Year	IMPORTS	EXPORTS & RE-EXPORTS	ANC		C I/ANC Index
			Actual	3-year Av'ge	
1968	545	-	545	-	-
1969	470	-	470	500	100
1970	510	20	490	480	96
1971	490	17	475	525	105
1972	605	-	605	600	120
1973	715	-	715	675	135
1974	705	-	705	605	121
1975	390	-	390	465	93
1976	300	-	300	365	73
1977	400	-	400	640	128
1978	1215	-	1215	-	-

Table 3.13 : FIBREBOARDS - trade & ANC development for Malawi. Source : (2)

The main observations are :

a) As can be seen from Figs. 3.01 and 3.02, there appears to be no significant trend in apparent net consumption of this product ;

b) Total ANC for the 1968 - 78 period has averaged 600 m.t. per annum but for the period since 1964, has averaged 510 m.t. if the 1978 peak is ignored.

3.2.6.2 Quality composition of net imports

This has varied considerably for the few years when hardboard was reported separately from softboards. The current ratio is estimated at 45%(by weight)softboard (2).

3.2.6.3 Price trends

Table 3.14 shows developments since 1970 :

Year	Price per metric ton					Ratio	Other Malawi Indices	
	Malawi			World		Malawi	All imports	Building materials imports
	Kwacha	$US	Index	$ US	Index	World		
1970	186	248	-	-	-	-	-	-
1971	167	223	100	71	100	3.14	100	100
1972	146	195	87	79	111	2.46	102	105
1973	221	295	132	93	131	3.17	119	135
1974	444	592	266	119	168	4.97	161	164
1975	285	381	171	128	180	2.97	196	178
1976	416	519	249	125	176	4.16	224	233
1977	389	486	233	136	191	3.58	249	266
1978	421	526	252	136	191	3.87	250	259
Average ratio		-	-	-	-	3.54	-	-

Table 3.14 : FIBREBOARDS -- Malawi CIF import prices compared to world average export price (FOB) (see Ratio) and to Malawi's total import and building materials import price indices.

Notes : See Table 3.02 ; Sources: (2), (1)

The main observations are :

a) For the 1971 - 78 period (3-year averages), price has increased 152 % corresponding to 12.52% p.a. compound.;

b) During the same period, world average prices have risen at only about 8.45% p.a. compound equivalent ;

b) In contrast to the paper and paperboards covered earlier, fibreboard import price has risen faster than the average for all Malawi imports (but slower than for total building materials) ;

c) The CIF import price has averaged 3.54 times the world export FOB avaerage which is much higher than the 1.76 (newsprint), 1.80 (printing & writing), and 2.32 (industrial grades).

It is likely that the greater bulk of fibreboards help to explain this in addition to the reasons given for the other products.

3.2.7 Total paper, paperboards and fibreboards

Developments for the various products will now be integrated in order to show inter-relationships, but only for consumption. Figure 3.14 shows the ANC levels graphically.

Table 3.15 shows tha apparent net consumption for each product as a proportion of the total :

Year	TOTAL ANC		Product ANC as % of all-products total[x] : net imports						
	m.t.	%	Non - printed matter					Printed matter	Fibrebd
			Newsprt	Prt/Wrt'g	Industr	Specia	SUBTOT.		
1969	5625	100	2.5	29.7	47.3	6.9	86.4	4.8	8.9
1970	6645		3.2	27.8	52.3	6.3	89.6	3.2	7.2
1971	7035		3.3	26.8	53.7	6.4	90.2	2.3	7.5
1972	7780		3.5	24.3	55.0	7.3	90.1	2.1	7.7
1973	8375		3.3	27.5	51.8	7.1	89.7	2.3	8.1
1974	9715		3.8	26.5	55.7	5.7	91.7	2.1	6.2
1975	9385		3.2	25.0	60.7	4.1	93.0	2.0	4.9
1976	9090		2.7	23.0	64.5	3.7	93.9	2.1	4.0
1977	9465		2.0	26.4	58.3	4.2	90.9	2.2	6.8
Average -		100 %	3.1	26.3	55.5	5.7	90.6	2.6	6.8

Table 3.15 : TOTAL PAPER & PAPERBOARD PLUS FIBREBOARDS - proportions of each product's apparent net consumption to total for Malawi based on 3-year average data.

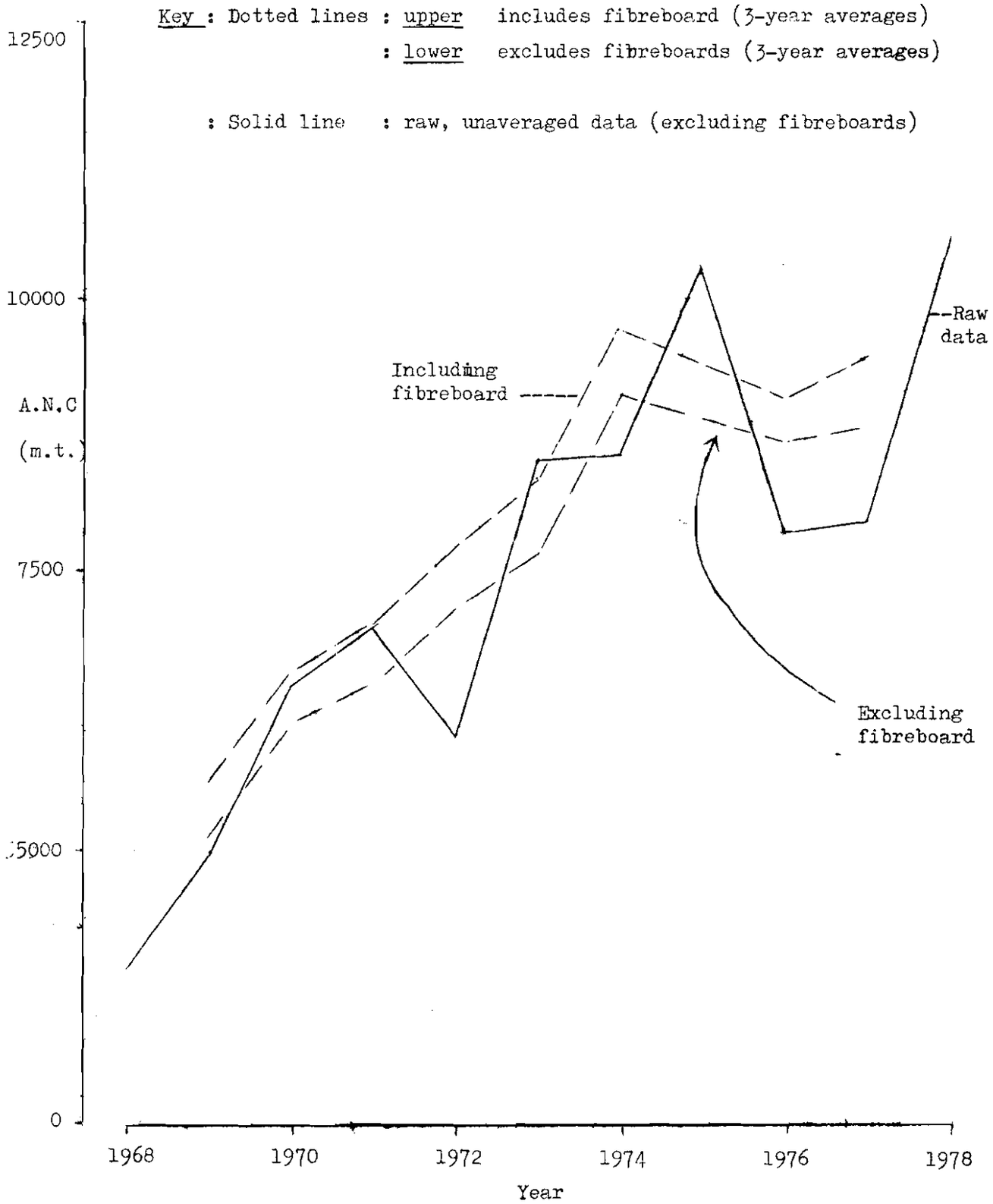
Notes : x For raw paper, paperboard and fibreboards, the figures relate to ANC; for articles of paper & paperboard and for printed matter, the figures are of net imports to which domestic production would have to be added to obtain ANC.

Key developments appear to have been :

a) A marked increase in the share of industrial paper and boards at the expense of all other categories. The industrial grades share rose from 47% in 1969 to 58% in 1977 but reached a peak of 64.5% in 1976. The average share at 55.5% makes this the dominant form of paper/board consummed in Malawi ;

b) A slight decline in ANC share for printing & writing papers from about 30% in 1969 to 26.4% in 1977 and an average of 26.3 % which makes this the second largest category consummed :

Figure 3.14 : TOTAL PAPER, PAPERBOARDS, AND FIBREBOARDS - apparent net consumption in Malawi to 1978.



b) A slight decline in ANC share for printing & writing papers from about 30% in 1969 to 26.4% in 1977 and an average of 26.3 % which makes this the second largest category consummed ;

c) A decline in the share of fibreboards from nearly 9% in 1969 to about 7% in 1977, giving an average of 6.8 % and placing fibreboards third in ANC ranking ;

d) Specialty papers have remeined fourth largest (5.7% average share) but their proportion has declined from nearly 7% in 1969 to only about 4% in 1977.;

e) Newsprint has consistently been used in the smallest quantities.;

f) If we ignore fibreboards, the gross demand for paper, paperboards and articles made from them in Malawi has been rising at a rate equivalent to 7 % p.a. compound since 1969.

For the period up to 1974, growth rate was faster and averaged 7.45% p.a.;

g) If fibreboards are included, the gross demand for all cellulosic-fibre based products has been growing at about 6.7% p.a. compound equivalent since 1969.

In the next chapter, an attempt is made to forecast the demand in future years till 2000AD and to estimate the proportion of gross demand available to any local mill which may be established.

Chapter 4 : TENTATIVE FORECASTS OF DOMESTIC DEMAND TO 2000AD.

4.1 INTRODUCTION

The forecasts given in this chapter are labelled "tentative" because they are based purely on a desk study. A more reliable basis for forecasting would be a combination of desk and field work directed at ascertaining what the end-use pattern of imported papers/boards is and how it is developing.

4.2 METHODOLOGY

In the absence of better information, the method adopted is a simple one. The following are the assumptions :

a) that fibreboard consumption will be as forecast in report FIAG/81/10 (2) ;

b) that per capita ANC will increase according to the extrapolated 1969 - 77 trend (ignoring extremes). Graphical extrapolation has yielded the following figures for total paper and paperboards :

Year	ANC/'000 capita.
1980	1.835
1985	1.970
1990	2.060
1995	2.130
2000	2.165

c) Malawi's population in 1966 was found to be 4.055×10^6 and since then has been found to be growing at 2.9% p.a. by the 1977 repeat census (1). Using this growth rate, the future population levels are estimated to be as below :

Year	Population ($\times 10^6$)
1980	6.051
1985	6.980
1990	8.053
1995	9.290
2000	10.718

d) Based on the trend so far, the proportion of various paper/board grades to total ANC is estimated to develop as below (graphical estimation):

Year	Proportion (%) of total forecast ANC				
	Newsprint	Print/Wrt	Industrial	Specialty	Printed Matter
1980	2.25 %	24.80	61.60	4.00	2.00
1985	2.50	25.20	60.74	"	2.00
1990	2.75	25.40	60.30	"	1.90
1995	2.90	25.60	59.95	"	1.75
2000	3.00	26.00	59.77	"	1.50

For specialty & printed matter figures are of net imports.

The share of industrial paper and boards has been derived by subtraction taking into account the expected continued dominance of industrial papers and boards.

4.3 RESULTS

4.3.1 Gross domestic demand

Table 4.01 gives the tentative forecasts of apparent consumption :

Year	TOTAL	Forecast of ANC[X] by paper/board type (m.t.)					
		Newsprint	Print/Wrt	Industr.	Specialty	Printed matter	Fibreboards
1980	11740	260	2910	7230	470	230	640
1985	14570	360	3670	8850	580	290	820
1990	17590	480	4470	10610	700	330	1000
1995	21000	610	5380	12590	840	370	1210
2000	24610	740	6400	14710	980	370	1410

Table 4.01 : PAPER, PAPERBOARD, FIBREBOARDS - forecasts of gross demand for Malawi.

Notes : X For the "articles" component of specialty and for printed matter, the figures relate to net imports to which local output must be added to get ANC.

4.3.2 Net domestic demand available for local industry

In order to arrive at the proportion of gross demand which can be supplied by a local mill, an estimate must be arrived at of what grades of paper/board must ineveitably continue to be imported.

At this stage, the question of whether a small domestic mill to manufacture Malawi's paper requirements can be financially or economically viable is completely ignored.

4.3.2.1 Newsprint net demand

Complete (100%) substitution by a local product should be possible. Gross foresast (Table 4.01) therefore equals net forecast.

4.3.2.2 Printing and writing papers net demand

In section 3.2.2.2, printing grades were shown to contribute 95% to total ANC of this category (Table 3.04). Unfortunately, this large sub-category includes many varieties which are not identified separately in the statistics. It is reasonable to assume, however, that some of these grades will be used in only small quantities or have special coatings, dyes, loadings of filler or ratios of short-fibre pulp. They can thus be considered too "specialist" for a local mill to try to supply. The ratio of such grades is assumed to be 10% of the printing subcategory until 1990 and 7.5% thereafter.

Of the net imports of stationery and excercise books, again, 10% will be assumed to have a "specialty" aspect until 1990 and 7.5% thereafter.
The result of these assumptions is in Table 4.02.

Year	Gross Forecast (m.t)	Less Specialty grades (m.t.)	Net Forecast (m.t.) Paper/board	Pulp equivalent[x]
1985	3670	370	3300	3470
1990	4470	450	4020	4220
1995	5380	405	4975	5230
2000	6400	480	5920	6220

Table 4.02 : PRINTING & WRITING PAPERS - forecast of net (substitutable) domestic demand for Malawi.

Notes : x Assume 5 % extra for losses in convertion to final products.

4.3.2.3 Industrial paper and paperboards net demand

All varieties including boxes, board and bags should be fairly easy to supply locally. For corrugated board, however, the corrugating medium may (initially at least) have to be imported.

A considerable proportion of corrugated board is in 5-layer configuration. The proportion of corrugating medium will therefore be around 20% rather than the 30-35% for 3-layer boards. A fair average for all corrugated boards would be around 25%.

Total corrugated paperboard has averaged 20.65 % of industrial paper/board ANC since 1975 (Table 3.07). Of the ready-made boxes and bags, it is assumed that 75 % is layflat cartons for the tobacco export trade, in which case these have averaged an extra 16.3% of ANC since 1975. The total of cartons and corrugated board would then be 36.95% say 37% of industrial paper & boards ANC. The unsubstitutable core layer would in this case be (0.25 x 37)% i.e. 9.25% of total ANC. This can be rounded to 10%. When this fraction is subtracted from gross forecasts, the net demand is expected to be as in Table 4.03 .

Year	Gross Forecast (m.t)	Less Corrugating medium (m.t)	Net Forecast (M.t)	
			Paper/board	Pulp equivalent
1985	8850	885	7965	8365
1990	10610	1060	9550	10030
1995	12590	1260	11330	11900
2000	14710	1470	13240	13900

Table 4.03 : INDUSTRIAL PAPER & PAPERBOARDS - forecasts of net (substitutable) domestic demand for Malawi.

4.3.2.4 Specialty paper and paperboards net demand

In section 3.2.4.2 (Table 3.10), the proportion of specialty products which have some chance of local substitution was calculated to be 24.8% of total specialty grades net imports.

Of this share, it is assumed that only 50% can be so substituted for [illegible] i.e. 12.5% of total net imports. Table 4.04 gives the result:-

Year	Gross Forecast (m.t)	Less highly special grades(m.t)	Net forecast (m.t.)	
			Paper/board	Pulp equivalent
1985	580	510	70	75
1990	700	610	90	95
1995	840	735	105	110
2000	980	860	120	125

Table 4.04 : SPECIALTY PAPER, PAPERBOARDS AND ARTICLES THEREOF - forecasts of net (substitutable) domestic demand for Malawi.

4.3.2.5 Printed matter net imports

The gross demand was estimated with no possibility of further substitution by local printing being assumed possible.

4.3.2.6 Fibreboards

After taking into account substitution by local wood-wool/cement (2), the forecast demand was further reduced by 10% for unforseen unsubstitutables.

Year	Gross Forecast (m.t)	Net Forecast (m.t)	Pulp equivalent (m.t)
1985	705	635	650
1990	870	785	800
1995	1070	965	990
2000	1260	1135	1160

Table 4.05 : FIBREBOARDS - forecast of net (substitutable) domestic demand for Malawi.

Notes : 2.5% extra allowed for losses to arrive at pulp equivalent.

4.3.2.7 Consolidated net demand forecast

4.3.2.7.1 All pulp varieties combined

Table 4.06 shows the picture :

Year	Pulp requirements by end product (m.t) x					
	TOTAL	Newsprint	Print/Wrt	Industrial	Specialty	Fibreboard
1985	12940	380	3470	8365	75	650
1990	15 650	505	4220	10030	95	800
1995	18 870	640	5230	11900	110	990
2000	22 180	775	6220	13900	125	1160

Table 4.06 : PULP DEMAND - to satisfy net (substitutable) Malawi domestic market for paper, paperboards and fibreboards.

Notes : x 5% more pulp than corresponding paper/board weight except for fibreboard where 2.5% wastage assumed.

4.3.2.7.2 Forecasts by pulp type

Consideration was given to assuming establishment of a mechanical mill only (which has lower investment and operating costs) but its products would not permit Malawi to substitute for a significant proportion of its printing industrial papers where chemical pulp is essential. Excessive continued pulp or paper imports would therefore result so partly offsetting the cost advantages of a mechanical mill. It has therefore been assumed that a chemical unit will be established but with extra chip - refiner capacity to produce refiner-groundwood pulp for newsprint, a small integrated fibreboard line, and for blending with chemical pulps.[x] Justification for considering fibreboard for joint manufacture with paper/paperboard is given in Appendix 5.01.

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x Fibre-bundle screenings from raw pulp can be diverted to the fibreboard line instead of being refined through micro-ridged defibrators. Capacity for these can therefore be reduced and diverted to primary chip defibration.

It should be noted that the blending ratios adopted here are the author's own and reflect more what can be done than necessarily what are current standard proportions in developed-country mills which generally have access to the full range of pulps from which they can make blends. Table 4.07 gives the results :

Year	Paper/board group	Domestic substitutable demand by pulp type				
		Mechanical		Chemical		TOTAL
		m.t.	%	m.t.	%	m.t.
1985	Newsprint	380	100	-	-	380
	Printing & writing	1145	33	2325	67	3470
	Industrial Paper & Boards	2760	33	5605	67	8365
	Specialty Paper & Boards	20	25	55	75	75
	SUBTOTAL paper & Boards	4305	35	7985	65	12290
	Fibreboard	650	100	-	-	650
	TOTAL	4955	38	7985	62	12940
1990	Newsprint	505		-		505
	Printing & Writing	1395		2825		4220
	Industrial Paper & Boards	3310		6720		10030
	Specialty Paper & Boards	25		70		95
	SUBTOTAL paper & boards	5235	35	9615	65	14850
	Fibreboard	805		-		805
	TOTAL	6040	39	9615	61	15655
1995	Newsprint	640		-		640
	Printing & writing	1725		3505		5230
	Industrial Paper & boards	3925		7975		11900
	Specialty paper & boards	30		80		110
	SUBTOTAL paper & boards	6320	35	11560	65	17880
	Fibreboard	990		-		990
	TOTAL	7310	39	11560	61	18870
2000	Newsprint	775		-		775
	Printing & writing	2055		4165		6220
	Industrial Paper & Boards	4585		9315		13900
	Specialty paper & boards	30		95		125
	SUBTOTAL paper & boards	7445	35	13575	65	21020
	Fibreboard	1165		-		1165
	TOTAL	8610	39	13575	61	22185

Table 4.07 : MECHANICAL AND CHEMICAL PULP REQUIREMENTS - equivalents to net (substitutable) domestic paper, and board and fibreboard demand for Malawi.

Having assesed the present demand (Chapter 3) and estimated future domestic requirements (Chapter 4), it is now useful to place the country's requirements into the perspective of what raw material is available for pulp/paper manufacture. Having arrived at raw material supply - demand balances, it is also useful to see what implications any surpluses and deficits have on other wood industry possibilities. The next chapter does this.

In addition, since the study has so far shown Malawi's present and future requirements to be quite small (by world standards), it is of i interest to assess the implications of this for likelihood of a purely domestic-oriented mill being viable and to propose schemes for placing such industry on a better footing. The next chapter also outlines these aspects.

Chapter 5 : IMPLICATIONS OF SMALL DOMESTIC MARKET FOR INDUSTRIAL UTILIZATION OF VIPHYA FOREST RESOURCES AND FOR VIABILITY OF DOMESTIC - MARKET ORIENTED PULP/PAPER INDUSTRY

5.0 INTRODUCTION

The main point which stands out from Table 4.07 is the smallness of the domestic Malawi market at all times over the forecast period. This can be put into investment/operation cost and raw material availability perspectives as below.

5.1 IMPLICATIONS FOR VIABILITY OF DOMESTIC-ORIENTED PULP/PAPER MILL

1. Pulp and paper manufacturing are capital - intensive technologies due to their development in and mainly for developed economy countries where labour is relatively expensive and capital equipment relatively cheap. This relationship between labour and capital equipment costs is in general becoming more pronounced with time so that the drift towards greater capital - intensiveness is quite marked. Consequently, the investment cost and the minimum economic mill capacity which depends on it are both constantly rising.

2. As shown by Malawi's example in the preceding chapters, developing country domestic markets can often be extremely small. With the passage of time, therefore, the existing pulp and paper technology is increasingly drifting out of their reach, at least insofar as capacity solely for domestic needs is concerned. Gross consumption within their borders is not rising fast enough for them to catch up with the rising threshold of profitable scale.

3. The general problem for such countries has been succinctly summed up by Leslie and Kyrklund (12) who are better quoted than paraphrased :

> "Generally speaking, the prospects for a pulp (and paper[X]) mill in a developing country have been assessed in terms of transferring current technology. Very often and, in fact, almost inevitably, in most developing countries it was found that the minimum economic size of a mill would have a capacity much greater than the size of the domestic market or any possible regional market, and would demand a much greater capital fund than the country could afford.
>
> However, a plant with a smaller capacity, more appropriate to the local conditions, would almost by definition, have a unit of production cost very much higher than the world market prices.

[X] Item in brackets added by author.

The obvious alternatives in such circumstances are to establish a sub-economic mill made viable by direct or indirect subsidy, or to abandon the idea of domestic production ".

4. Malawi is now in exactly this position.

5. The orders of magnitude on minimum mill sizes are as follows :

a) independent pulp/paper mills to produce newsprint and non-woodfree printing and writing papers were found to be financially non-viable without subsidies at capacities of 18 000 and 36 000 mtpa. (12, page 14).

b) mills of the type mentioned at (a) could under special circumstances be viable especially if integrated with a larger pulp and paper operation making industrial papers as well (12).

This would not solve Malawi's problem since non-existence of profitable markets for just such a large-scale mill is what is causing consideration of such a small domestic market - oriented mill in the first place.

c) pulpmills if not integrated with paper could be viable at about the capacities mentioned earlier provided they were mechanical and not chemical.

Again, this would leave Malawi's problem unsolved since :

i). what Malawi needs is paper and board not pulp which would have to be exported for convertion to paper, imports of which would then continue; and

ii). purely mechanical or semi-mechanical pulps would not enable Malawi meet the requirements for those papers/boards for which significant blending (or 100%) with chemical pulps is essential. Among these would be a considerable proportion of the dominant industrial papers category and and kraft packaging/wrappings used for Malawi's important agricultural exports.

6. It appears that the only real solution lies in attempting to boost the domestic market and create, expand then retain a subregional market to a point where even if the minimum economic mill capacity level is not quite reached, the gap between market size and this threshold will at least be more reasonable. Some suggestions for doing this follow :-

a) Export markets:

i). Secure markets, even if temporary, in neighbouring countries to where the transport element would not be a major obstacle and attempt to expand them and retain them using the following :

i). Subsidize the transport by arranging for preferential rates for paper and pulp ;

ii). Offer customers good export credits and the mill export-guarantee schemes to cushion them against the hazards of non-payment or delayed payment which are quite common in Africa due to foreign - currency and other beaurocratic controls ;

iii). Authorise and set up the machinery for acceptance of payment in non-convertible local currencies of the neighbouring market countries.

Agreement on reciprocal central-bank clearing accounts could permit this. In such a situation, customers would pay in their country's own currency into a Malawi account established within their countries and the mill would be paid its equivalent in Malawi currency through the other country's reciprocal account in Malawi into which Malawian importers of other commodities from the correspondent country would pay their debts, also in local currency.

It is suggested that creation of such a facility would immediately give Malawi pulp and paper a tremendous advantage over traditional suppliers to the sub-region who insist on payment in scarce sterling, dollars or other scarce international currencies.

iv).

iv). Establishment in major subregional markets of an importing agency (possibly with local participation) to carry out most of the bulk purchasing for wholesaling in the customer country. Payments through the reciprocal clearing accounts could possibly be made initially to such subsidiary companies.

v). Supply to mill wood and other local raw materials at cost and in general give all assistance which can significantly reduce operating costs (low - cost power, no taxes, rents etc.)

b) Domestic market :

i). See recommendation (a)(v) for export market.

ii). Apply deliberate subsidies to all non-foreign exchange costs to make local product significantly cheaper than imports ;

iii). Strictly control purchases from abroad where local inputs could be found at reasonable cost (if necessary subsidised) and ensure that the mill has priority access to any local inputs including transport services ;

iv).

iv)

iv). Malawi's demand for paper is thought to be artificially depressed to some extent by the country's tradition of using high quality paper where cheaper grades would do perfectly well. This tendency towards unnecessarily high quality applies to a wide range from receipts, drafting pads, general stationery to school exercise books and textbooks.

It is necessary to realise the obvious fact that drafting-pad paper is thrown away after a few minutes or hours during which time cheap newsprint could have performed the job as well as any other paper, and much more cheaply.

Similarly, most school notebooks (especially in primary schools) are of little use after the academic year. It is therefore un not necessary to make such stationery from paper which remains white forever; a brightened mechanical paper rather than a bleached, part-chemical variety is adequate. More examples could be given but these illustrate the point adequately.

v) A commendable effort is being made to produce an increasing proportion of primary school text books locally (unfortunately from paper of too high quality) ; this should be expanded so that virtually all primary-school textbooks can be made locally and significant inroads can be made into the secondary school textbook market. In this respect it must be realised that textbooks need not be glossy and need not be of international provenance to be useful; the criterion for levels up to secondary school is that syllabus requirements are met. Malawian teachers and the local University can, if encouraged, produce most of the basic texts with foreign books later imported only where absolutely essential. It is only at University and reference-library levels that local production cannot be raised significantly.

vi) Additional wood-processing ventures based on the Viphya resource should be considered for integration with any domestic pulp/paper mill in order to spread costs. The next section suggests some possibilities and highlights the current wood-resource quality constraints.

5.2 IMPLICATIONS FOR UTILISATION OF VIPHYA PULPWOOD RESOURCES

1. In section 2.1, the Viphya pulpwood resource was reported to cover 54 250 hectares and to have an annual increment estimated at 0.94 to 1.0 million cubic metres of wood fibre.

   If we assume pulp yield factors of 5.5 cum. per metric ton (chemical) and 2.5 cum. per metric ton (mechanical), then according to the forecast pulp requirements , the domestic demand would have the following impact on available raw materials (Table 5.01) :

Year	Resource available (cum.)	Demand for domestic pulp/paper/boards (cum. WRME)					
		Mechanical pulps		Chemical pulps		TOTAL	
		cum.	%	cum.	%	cum.	%
1985	970 000	12390	1.3	43915	4.5	55305	5.7
1990		15100	1.6	52880	5.5.	67980	7.0
1995		18275	1.9	63580	6.6	81855	8.4
2000		21525	2.2	74660	7.7	96185	9.9

Table 5.01 : MALAWI DOMESTIC DEMAND versus RAW MATERIAL SUPPLY - wood raw material equivalent (WRME) of net domestic paper/board/fibreboard requirements balanced against available Viphya raw material.

Notes : % is of demand as a proportion of total available supply.

2. From Table 5.01, it appears that local needs for pulp-based products will not over the forecast period exceed ten percent of the raw material available on the Viphya.

   Put another way, domestic demand at 1985 levels would be small enough to rely on only one year's wood increment for about 17 years and at 2000AD levels for about ten years.

3. One solution to this enormous surplus problem would be to find assured profitable pulp/paper markets abroad. Unfortunately, the world market is not encouraging. Subregional available markets (to which transport costs would be reasonable) would be unlikely to more than double the raw material requirements. Surpluses of around 80% would still remain.

4. Another solution would be to divert the surplus wood resource to non-pulp industries, examples being :

   a) Sawn timber :

   - A proposal has been made elsewhere (2) for diversion of old-growth softwood stands at Chikangawa/Champhoyo, Lusangazi and possibly Luwawa (if pruned and thinned) immediately in order to help cover Malawi's current deficit on lumber (and plywoods). This is strongly recommended for immediate implementation and would involve transfer of at most 6000 hectares from pulpwood to sawn timber/veneer log working circles in the management organisation.

   - In the case of larger scale sawmilling activities, raw material quality becomes a constraint : the Viphya forests have for the most part not been pruned or thinned for a long time; they are also generally too young yet for sawlog production in significant volumes. Large-scale sawmilling is therefore necessarily a medium/long term possibility.

- It is with the medium/long term sawmilling industry development in mind that it is strongly recommended for a major proportion of the pulpwood forests to be thinned and then pruned starting immediately and thereafter to be managed as if they are destined to feed a sawmilling and plywood industry.

- One major reason why sawmilling deserves greater interest than to date is that relative to pulp and paper, its product (lumber) generally fetches a better price relative to the production costs and therefore has a better chance of absorbing high transport costs to international markets.

b) Plywood manufacture :

- Like sawnwood, plywood tends to have a good price relative to amount and value of production inputs. The possibility of utility-plywood manufacture on a large scale on the Viphya deserves serious consideration.

- In the short term, subject to material of over 30 - 40 cm. diameter being available in sufficient quantities, installation of a mill to meet local and some small export prospects would be recommended (2).

- In the medium/long term, possibilities depend on the pulpwood being thinned and pruned as suggested for sawmilling above. Note that even in these days of small-log veneer lathes, sizeable logs have an advantage over small ones in terms of veneer yield ratio, quality of plywood, and investment costs.

c) Particleboard / fibreboard :

- Both of these products are generally made from wood or other cellulosic wastes which are generally of low value. Since even in the major market countries, wood wastes at reasonable price are generally available, it is rather difficult to envisage these products being made in a remote corner of landlocked Malawi from specially-grown wood (therefore relatively costly) being competitive after transport costs to market are added.

- It is noteworthy that transport costs of particleboard and fibreboards are at least as high and can be higher than [illegible] for plywood, a product they compete with but which is saleable at a better price and so can absorb freight charges better. Add to this the relatively high investment and production costs (at least in developing countries) relative to plywood, and the case for pursuing these options can be shown to at least require very thorough study indeed before Malawi gets committed.

d) Industrial chemicals :

- In a recent study, Comben et al.(11) have suggested diversion of much Viphya wood resource to manufacture of energy products (motor-fuel alcohol, charcoal) and chemicals including fertilisers, wood-distillation products and naval stores, the latter two for export. Detailed comment on these proposals should await more concrete financial and economic analyses of the proposed projects apart from confirmation of international markets for those items intended for export.

- On the fuel - alcohol proposals, however, the following comments may, if made at this stage, be of some use :

i). Malawi's first fuel-alcohol plant is under construction at Dwangwa which will use waste molasses from an integrated sugar mill on the same site.

This leaves surplus molasses still available for export at low prices from the older and nearly equally large Nchalo sugar estates in Malawi's south. The local stock - feed industry has so far failed to absorb significant quantities of molasses which thus remains without significant alternative use.

ii). Molasses is chemically simpler and more reactive than wood in terms of convertion to alcohol. It therefore requires less costly plant to process than the chemically more complex and inert wood. When surplus molasses is still available, therefore, it makes little sense to select wood as raw material instead.

iii). Molasses is inevitably produced when refining sugar ; the proposed wood-alcohol mill would require trees to be specially felled for it; trees which could have many alternative uses. The situation would be better if the wood-alcohol plant were to be based on the inevitable residues of another large wood processing plant but at present no plants like this of significant size are likely on the Viphya.

iv). A wood-based alcohol project bears the full cost (or a large part of) raw material transport and other operating costs whileas a molasses-based plant has the transport element already absorbed by the sugar operation and shares many services with it. In case of technical or marketing problems,therefore, the molasses-based unit is more financially cushioned.

Integration with a sawmill helps only on the raw material aspects (wastes) but financially, a sawmill is dwarfed and contributes little to plant economies. In any case sawmills of significant size are not yet possible on the Viphya (see (a) above).

5.3 A STATE OF CRISIS

In this last chapter, an attempt has been made to relate Malawi's market for pulp - based products to its available wood raw materials. The picture drawn does not claim to be complete since paper and pulp manufacture involves a lot more than just wood. Also, there is more to justifying a project and to deciding whether to carry it out than mere financial and economic considerations ; it is not within the scope of this paper to discuss such matters which are in the final analysis political decisions. The sole function of this report has been to highlight orders of magnitude regarding the dilemma which in many respects resembles that of a mariner surrounded by limitless seas but unable to drink from them and quench his tiny thirst.

Regarding the proposals for market creation and retention, it can be said with confidence that all of them are or can be made feasible to a significant degree. Similar modes of industrial promotion and trade support are already in use in both developed and developing countries. Even the idea of inconvertible-currency transactions has been tried and a successful link is said to be in operation now betweem Mozambique and Zimbabwe which might be worth studying.

The real problem is thus not technical in nature but one of setting priorities. The question for Malawi's policy makers to answer is whether a project that requires such intensive "nursing" to achieve viability is justifiable under Malawi's current economic and social priorities.

As for rational disposal of Viphya forest resources, it is no exaggeration to describe the situation as amounting to a "crisis". It will certainly require imaginative and bold solutions and the decisions needed to implement such solutions need to be taken now. Any delay means more value reduction on the growing forest which remains unpruned and unthinned. As the forest quality becomes poorer, the options open to Malawi diminish as to alternative modes of exploitation until Malawi may eventually be forced to use the crop for some unsatisfactory [illegible] purpose which gives low net benefits. This would be most unfortunate and can be easily avoided if those in policy-making positions have the will to save a project which has potential for generating much wealth if well executed.

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APPENDICES

Appendix 3.01 : LIST OF B.T.N. CODES INCLUDED UNDER EACH PAPER / PAPERBOARD CATEGORY IN THE STUDY.

Product name	B.T.N. CODES INCLUDED	
1. NEWSPRINT	48.01.01.00	
2. PRINTING & WRITING PAPERS & BOARDS	48.01.97.80	Printing
	48.14.00.00	Stationery
	48.14.00.01	Writing pads
	48.14.00.09	Other stationery
	48.17.00.01	Excercise books
3. INDUSTRIAL PAPERS & PAPERBOARDS (excluding articles made from them)	48.01.97.01	Corrugated p/bd
	48.01.97.99	Other ind. p/bd & pap.
	48.15.01.00	Ind.p&bd cut to size
	48.16.02.00	Kraft/similar bags
	48.16.98.00	Boxes, bags
	48.01.97.91	Kraft pap.& bd.
	48.01.97.94	Other pap.& bd.
4. SPECIALTY / MINOR GRADES plus SPECIALTY ARTICLES OF PAPER & PAPERBOARDS	All other items in chapter 48 except Fibreboard.	
5. PRINTED MATTER	All printed matter without exception.	

Appendix 3.02 : RAW DATA ON TRADE AND APPARENT CONSUMPTION

PRODUCT NAME	ITEM	YEAR	TRADE (m.t)						GROSS ANC (m.t)
			IMPORTS		EXPORTS		RE-EXPORTS		
			m.t.	Price	m.t.	Price	m.t.	Price	
1.NEWSPRINT	NPT	1968	102	128	-	-	-	-	See Imports.
		1969	158	142					↓
		1970	156	236					
		1971	331	136					
		1972	200	204					
		1973	293	213					
		1974	330	301	-	-	15	827	315
		1975	504	432					See imports.
		1976	93	404					↓
		1977	140	514					
		1978	342	420					↓
2.PRINTING & WRITING	Year	Code[x]							
	1968	PRT	1161	249					See Imports
		STA	25	707					↓
		WRP	10	582					
		OST	121	522					
		EXB	17	570	132	480			- 115
		TOTAL	1334	288	132	481			1202
	1969	PRT	1256	246					See Imports
		WRP	10	723					↓
		OST	99	690					
		EXB	6	1013	45	444			- 39
		TOTAL	1371	285	45	446			1326
	1970	PRT	2484	171					See Imports
		WRP	13	475					"
		OST	125	720			2	603	123
		EXB	7	679	135	611			- 128
		TOTAL	2627	200	135	611	2	603	2490
	1971	PRT	1669	343					See Imports
		WRP	11	1678					↓
		OST	109	955					
		EXB	-	1593	65	541			- 65
		TOTAL	1789	389	65	544			1724

Continued next page.

NOTES : 1. Price is in Kwachas per metric ton.

[x] The codes are for subitems where PRT is printing; STA is stationery; WRP is writing pads; OST is other stationery; EXB is excercise books.

Appendix 3.02 continued :

PRODUCT NAME	YEAR	CODE	TRADE (m.t) IMPORTS m.t.	IMPORTS Price	EXPORTS m.t.	EXPORTS Price	RE-EXPORTS m.t.	RE-EXPORTS Price	GROSS ANC (m.t.)
PRINTING & WRITING	1972	PRT	1293	324					See imports ↓
		WRP	5	1340					
		OST	152	940					
		TOTAL	1448	392					1448
	1973	PRT	2210	414					See imports ↓
		WRP	9	1073					
		OST	264	1216					
		EXB	1	1464					
		TOTAL	2484	500					2484
	1974	PRT	2901	651					See imports ↓
		WRP	2	1778					
		OST	68	1744			1	1120	67
		EXB	1	1074					See imports
		TOTAL	2972	677			1	1057	2971
	1975	PRT	2143	993					See imports ↓
		WRP	1	2786					
		OST	110	1659					
		EXB	2	2020					
		TOTAL	2256	1027					2256
	1976	PRT	1731	620			12	410	1719
		WRP	1	3570					See imports ↓
		OST	86	1613					
		EXB	1	4453					
		TOTAL	1819	670			12	410	1807
	1977	PRT	2038	645					See imports ↓
		WRP	4	819					
		OST	170	2370					
		EXB	1	4933					
		TOTAL	2213	778					2213
	1978	PRT	3320	617					See imports ↓
		WRP	4	2080					
		OST	148	1789					
		TOTAL	3472	669					3472
3. INDUSTRIAL PAPER & PAPER-BOARDS	1968	INC	406	286					See imports
		ICS	199	557			1	1337	198
		KRB	37	483					See imports
		BXB	1325	438			3	416	1323
		TOTAL	1967	419			4	620	1963
	1969	INC	690	285			1	2005	689
		ICS	225	515			2	164	223
		KRB	82	400					See imports
		BXB	1735	436			6	257	1729
		TOTAL	2732	403			9	350	2723

(Continued on next page)

Notes on Industrial category:

INC is Industrial papers not cut to size
ICS is " " cut to size
KRB is Kraft and similar bags ; BXB is boxes and bags (other).

Appendix 3.02 continued :

PRODUCT NAME	YEAR	CODE	IMPORTS		EXPORTS		RE-EXPORTS		GROSS ANC
			m.t.	Price	m.t.	Price	m.t.	Price	m.t.
INDUSTRIAL cont'd	1970	INC	800	280			6	322	794
		ICS	250	418			2	457	248
		KRB	22	402					See imports
		BXB	2242	500			11	309	2231
		TOTAL	3314	440			19	322	3295
(COR is corrugated)	1971	COR	374	307					See imports
		INC	2016	284			2	269	2014
		ICS	86	959					See imports
		KRB	11	986					"
		BXB	1921	486			3	152	1919
		TOTAL	4428	389			5	203	4403
	1972	COR	281	294					See imports
		INC	1918	311					↓
		ICS	165	882					
		KRB	6	1128					
		BXB	1268	548					
		TOTAL	3638	419					3638
	1973	COR	139	355					See imports
		INC	3178	348			26	972	3152
		ICS	111	1050					See imports
		KRB	6	1134					↓
		BXB	1454	656	2	707	58	436	1394
		TOTAL	4888	457	3	805	84	603	4801
	1974	COR	1059	437					See imports
		INC	2205	545			21	1081	2184
		ICS	140	1413					See imports
		KRB	3	1089					↓
		BXB	1344	753	5	738	1	1999	1338
		TOTAL	4611	624	5	738	22	1124	4584
	1975	COR	1834	372	19	678			1815
		INC	4062	725					See imports
		ICS	95	1475					"
		KRB	40	851	1	1400			39
		BXB	877	974	3	849	27	624	847
		TOTAL	6908	674	23	755	28	623	6857
	1976	COR	1671	132					See imports
		INC	2589	663	8	949	52	1334	2529
		ICS	183	1014					See imports
		KRB	1	3536					"
		BXB	1293	832			27	844	1266
		TOTAL	5737	558	8	942	79	1157	5650
	1977	COR	614	665					See imports
		INC	2996	790			14	822	2982
		ICS	95	2033					See imports
		BXB	1568	1780	2	1677	176	944	1330
		TOTAL	5273	794	2	1675	190	936	5081
	1978	COR	841	658					See imports
		Kraft	2730	615					↓
		Other	730	893					
		ICS	131	1708					
		BXB	1405	853					
		TOTAL	5837	738					5837

Appendix 3.02 continued :

PRODUCT NAME	YEAR	CODE	IMPORTS		EXPORTS		RE-EXPORTS		GROSS ANC
			m.t.	Price	m.t.	Price	m.t.	Price	m.t.
4. SPECIALTY/ MINOR & SPECIALTY ARTICLES OF PAPER AND PAPERBOARD	1968	All	351	989	11	801	4	1223	336
	1969	"	471	1264	2	2560	4	2521	465
	1970	"	360	1125	3	1151	1	1118	356
	1971	"	480	1425	54	685	-	2491	426
	1972	"	569	1076	-	759	-	6290	569
	1973	"	723	1180	-	2809	3	2621	720
	1974	"	497	1633	6	1490	4	3345	487
	1975	"	448	2264	6	1129	1	2539	441
	1976	"	222	3068	-	2322	1	2970	221
	1977	"	349	3088	1	2185	-	10715	341
	1978	"	631	1830	-	3861	1	4382	630
5. PRINTED MATTER Note : Where only value was published, volume was estimated from avarage value. X High %'ge postage stamps.	1968	All	320	2461	15	756	2	1756	303
	1969	"	335	1481	19	737	3	1440	313
	1970	"	214	1855	18	793	7	339	189
	1971	"	155	3254	15	1010	2	2412	138
	1972	"	188	3139	9	1291	15	1028	164
	1973	"	212	4503	17	1412	2	2565	193
	1974	"	245	4921	18	1495	10	2268	217
	1975	"	228	12561[X]	14	3163	11	4113	203
	1976	"	195	4424	38	1233	10	3907	147
	1977	"	254	5647	20	2784	18	4326	216
	1978	"	306	7159	25	3055	8	3332	273
6. FIBREBOARDS	1964	All	370				1	[illegible]	370
	1965	"	485				-		485
	1966	"	3745[X]				-		560[X]
	1967	"	630				-		630
	1968	"	545				-		545
	1969	"	470				-		470
	1970	"	510	186			20		490
	1971	"	490	167			17		470
	1972	"	605	146			-		605
	1973	"	715	221			-		715
	1974	"	705	444			-		705
	1975	"	390	285			-		390
	1976	"	300	416			-		300
	1977	"	400	389			-		400
	1978	"	1215	421			-		1215

Source : Chipeta (2), Tables 3.18, 3.21

Notes : Import and ANC figures to nearest 5 m.t.; for 1966, ANC avarage for 1965/67.

Source : For all paper & paperboard information, Annual Statement of External Trade, various issues covering the 1968 - 78 period. Published by National Statistical Office, Printed by Government Printer, Zomba, Malawi.

Note on totals : In several cases, the ANC figure does not quite match the balance of imports less exports and re-exports. This is simply because some re-exports and exports are below 0.5 m.t. and are therefore not recorded while if totalled, they come to more than 0.5 so they affect the ANC (and in all cases, the effect of minor quantities on average price is retained even if the quantity is not recorded).

Appendix 5.01 : JUSTIFICATION FOR INCLUDING FIBREBOARD IN A STUDY ON PAPER & PAPERBOARDS

General

The domestic market for fibreboards has been shown to average 500 - 600 m.t. per year since 1964. It has shown little sign of increase and has fluctuated considerably. In another study, an attempt has been made to identify potential export markets in the subregion (2). It has been concluded that in the short term, export possibilities remain in Zimbabwe, Zambia, Mozambique but that all three countries have the wood resource to support their own small-scale plants should these prove financially viable or should they be installed for other reasons. In the case of Zimbabwe and Zambia, domestic fibreboard consumption is higher than Malawi's so that given all three countries aiming at self-sufficiency, the other two could more easily justify investment in small plants than Malawi and their units would have more chances of being viable than Malawi's.

On the question of plant scale, plants established in developing countries vary considerably. The plant in Tanzania has a rated capacity of 9000 m.t., the Kenyan plant is probably about the same, while the Ethiopian and Malagasy plants are estimated to be in the 3500 to 4000 m.t. per year range. The latter plants are very close to the absolute minimum size and in investment cost terms are based on high unit costs able to be supported only by a captive market screened by tarrif and other barriers from foreign competition. It is noteworthy that Malawi's annual market is only 12 to 16% of the Ethiopian/Malagasy plant capacities. The unit investment and operational costs for a domestic - only plant would be so high that an independent plant is unlikely to be justifiable except on subsidy terms.

Even if integrated, a purely domestic market would remain too small for the fibreboard line to be more than a dependent partner whose losses will be carried by the other activities in the plant. It is therefore necessary to select the activities with which fibreboard manufacture is integrated very carefully to ensure that if the venture proves extremely unprofitable, it can be closed down without significant disruption. Integration with pulp/paper/paperboard manufacture offers this advantage while integration with sawmilling, or with plywood would not. The reasons are given below.

Finally, it is worth stating in this introduction that the author's inclination is to recommend that at this stage Malawi should not contemplate fibreboard manufacture at all but invest in pine plywood and price it low enough to substitute for a significant proportion of the hardboard proportion of fibreboard. The softboards can continue being imported until local demand justifies capacity. Obviously, if a firm export market were identified, this viewpoint could be rejected.

Advantages of integration with paper/paperboard manufacture

The question of whether domestic paper/paperboard capacity is itself justifiable or viable is ignored here. Assuming such capacity exists, the reasons for fibreboard being integrated with it rather than with other industry or being independent are :

1. Both fibreboard and paper/paperboard are made from cellulosic fibre pulps. All processes up to and including pulp manufacture by mechanical methods are therefore common to both products and can share equipment.

   If fibreboard manufacture is integrated with other wood industries, however (sawmilling, plywood), virtually no processing facilities can be shared apart from minor ones like boilers.

2. Fibreboard's pulp quality requirements are generally lower than for paper and paperboard in that the former can accept fibre-bundles while for most of the latter, pulp must be refined to virtually single fibres.

   Screenings from paper/paperboard can therefore be diverted to the fibreboard line so reducing the necessary pulp-refining capacity, the savings on which can be transferred to financing more chip-refiner capacity for the coarse fibreboard pulp.

3. Just as for paper/paperboard manufacturing, small-scale fibreboard processes require considerable amounts of good water as pulp carrier. Whileas for a large-scale fibreboard plant expenditure on water plant and storage systems is a small fraction of total investment, this item can be quite significant for a small plant. If the fibreboard plant is integrated with a papar/paperboard line, however, its water needs are absorbed into insignificance.

   If it is integrated with sawmilling or plywood,however, the water supply system is entirely for the small fibreboard line and so becomes a major overhead item.

4. Both in paper/paperboard - pulp and fibreboard manufacture, a small proportion of finely-ground fibre escapes the sieves at dewatering which is eventually discharged as effluent. Such fibre has considerable biological oxygen demand and in these ecology-conciuus times, it is common for mills to be forced to build settling ponds or other anti-pollution systems prior to the discharge point for effluent into waterways.

   For a small fibreboard plant, effluent anti-pollution treatment measures would add a significant cost element to the budget. Even when integrated with plywood or sawmilling, the effluent-treatment cost would fall entirely on the fibreboard line as the other two activities have no pollutant of a similar nature.

   When integrated with a paper-pulp plant, however, fibreboard's share of both effluent and of the cost of its disposal would be insignificant

5. In the general introduction to this appendix, Malawi's domestic demand has been shown to be only a fraction of the capacities of the smallest known fibreboard plants. If regional markets proved inaccessible and Malawi decided to "go it alone" by running a mini-plant, the chances of such a project's financial failure would be considerable. Should such failure occur, integration with paper/paperboard would have the following advantages :

   a) All the wood raw material can easily be diverted to pulp for paper/paperboard as specifications are identical;

   b) The wood-chipping and any debarking capacity can similarly be diverted without modification ;

   c) The chip refiners capacity can be diverted, also unmodified except possibly in terms of fitting plates with finer corrugations ;

   d) With some adjustments, the board-formation line (if Fourdrinier-based) can probably also be diverted to making the thicker paperboards ;

   e) If, as is more likely, a batch former/dewatering unit is used, this too could probably with modifications be diverted, if not to paperboard manufacture, then to dewatering bulk pulp for sale as pulp.

   e) The entire stock of chip-storage silos, pulp vats and pulp-transport plumbing, water system and anti-pollution setup can be absorbed by a paper/paperboard operation.

   f) The divertions outlined at (a) to (e) would leave only the driers and hot platen-press as major items left trully redundant if a fibreboard line in a paper/paperboard operation were closed down. It is likely, however that a market could easily be found for both items at a plywood mill (where drier and press capacity are usually less than necessary so necessitating these items' working 3 instead of 2 shifts as for the other principal machines).

6. The dominant theme we have tried to highlight under item 5 above is that whileas a fibreboard plant integrated with a saw/plymill would, if it closed down leave such mills with a lot of costly but unusable machinery, the same line if integrated with a paper/paperboard operation could be put to useful purpose and therefore even stocks of spares would not be wasted.

   Add to this the many shared facilities (water, anti-pollution, energy) and the similar technologies (therefore less costly per unit to run and maintain), the case for integrating fibreboard with paper/paperboard instead of with other industries seems quite strong. At the time of making actual decisions, however, a thorough comparative analysis of all possible combinations would still be necessary.
