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STRENGTHENING THE PRODUCTION CAPACITY  
OF THE AGRICULTURAL TOOLS FACTORY

SE/NEP/83/801

NEPAL

Terminal report \*

Prepared for the Government of Nepal  
by the United Nations Industrial Development Organization,  
acting as executing agency for the United Nations Development Programme

Based on the work of Cafarino L. Follosco, Industrial Economist

United Nations Industrial Development Organization  
Vienna

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## TABLE OF CONTENTS

	Page
I. The Project and its Objectives	1
II. Executive Summary	2
III. General Economic and Agricultural Information	9
IV. Agricultural Tools Factory in Brief	14
V. Marketing	15
A. Products	15
B. Sales	19
C. Channels of distribution	23
D. Advertising and Sales Promotion	24
E. <b>Market</b> Research	25
F. Pricing	25
G. Parts	27
H. Service	27
I. Inventory	27
J. Incentive System	28
K. Systems, Forecasts and Budgets	28
L. Organization	31
M. Assistance required	31
VI. Manufacturing	33
A. Organization	33
B. Engineering	34
C. Production Control	39
D. Inventory Control	43
E. Production	47
F. Labour	49
G. Plant Engineering	50
VII. Finance	64
A. Financial Statements	64
B. Profit Analysis	64
C. Receivables	66
D. Inventory	66
E. Fixed Assets	67
F. Working capital analysis	67
G. Statement of sources and application of funds	69
H. Costing System	70

VIII. Administration	74
A. Organisation and functions	74
B. Personnel	74
C. Procurement	75
IX. Product Development	78
A. Organisation	78
B. Review of current ATF products	78
C. Evaluation of new products	90
D. Product development action programme	103
E. Creation of a Product Development Committee	105
F. Linkages	105
G. Assistance required	106
X. General Management	107
A. Organisation structure	107
B. Creation of a Sales-Production-Procurement Committee	109
C. Productivity	110
XI. Government policy measures	111
XII. Project documents	112
XIII. Appendix	

## I. THE PROJECT AND ITS OBJECTIVES

The Government of the Kingdom of Nepal has requested the United Nations Industrial Development Organization (UNIDO) for Special Industrial Services for the evaluation of the activities of the Agricultural Tools Factory (ATF) and identification of measures required for improving and strengthening the activities of ATF.

Specific objectives of the team were to :

1. Evaluate the past activities of the Agricultural Tools Factory (ATF);
2. Carry out market analysis for selected agricultural machinery and implements which will be manufactured in ATF;
3. Identify measures required for improving and strengthening the activities of ATF;
4. Develop a programme to improve and strengthen the activities of ATF ; and
5. Prepare a draft project document financed under IPF including the training of national cadres, and draft job descriptions for international experts.

The composition of the team are:

1. Mr. Ceferino L. Follosco (Team Leader and Industrial Economist), who prepared all sections, except section VI (Manufacturing).
2. Mr. Sankaracharya Bandopadhyay (Mechanical Engineer), who prepared section VI (Manufacturing) of this report.

## II. EXECUTIVE SUMMARY

Upon the request of the Government of the Kingdom of Nepal, the UNIDO team composed of Messrs. C.L. Follosco and S. Bandopadhyay undertook a study from June 4 to July 15, 1984 to evaluate the activities of ATF and recommend measures to strengthen its activities.

ATF was established in 1964 with the cooperation of the Government of USSR and commissioned in 1968 as a public sector enterprise fully owned by HMG/Nepal. Starting from a paid-up capital of Rs. 12,140,000, plus some additional capital infusions, the networth as of end 1983/84 is only about Rs. 8,900,000 because of substantial losses in the past. ATF started the manufacture of simple hand tools and animal drawn equipment and has diversified into other agricultural, transport, construction and industrial equipment. Its production facility consist of a foundry, forge and press shop, machine shop, heat treatment, electroplating, assembly, carpentry and paint shops. It has a marketing network of seven branches.

Conclusions and recommendations on the various areas studied are shown hereunder :

### 1. Marketing

- a. Product Grouping: In order to simplify the gathering, maintenance and analysis of statistics, present and future products are grouped according to both market and manufacturing similarities.
- b. Sales Analysis: Total ATF Sales of Rs. 8,313,929 in 1982/83 have more than doubled from sales the previous year. It is expected to increase at a much lower rate of 13% in 1983/84. A downward trend in sales of regular products has been observed, requiring more aggressive marketing efforts improved production quality and better prices. Special efforts are also required to diversify into new products. In addition, sales through financial institutions like the ADBN and through the AIC should be intensified.

- c. Channels of Distribution: The existing network of 7 branches have been analysed as to their sales performance, manning and expenses. Some branches fall short of targets and require more assistance. It is important that ATF's dealership network be expanded.
- d. Advertising and Sales Promotion: The present media being used, newspapers radio and cinema, should be expanded to include trade shows and exhibits, sales contests and other promotional activities.
- e. Market Research: As no market research activity is now being done, it is important that this function be organised to handle sales statistics, market studies and review of government development and financing programmes.
- f. Pricing: There is a need to revise the pricing system in order to make it more realistic and aligned to the accounting system.
- g. Parts and Service: While there seems to be no serious problem insofar as parts and service is concerned, this activity should be strengthened in line with ATF'S diversification program.
- h. Inventory : Finished product inventory is very high at Rs. 5, 636,843 in 1982/83 with a turnover rate of 2.3 a year, or an inventory equivalent to 5 months sale. There is need to reduce this.
- i. Systems, forecasts and budgets : Various proposals have been made to simplify systems, preparation of forecasts and budgets and reporting.
- j. Organization : The Marketing Division has a weak organisation, requiring its strengthening such as creating new sections and filling up of several vacancies, including the Division Head.

- k. Assistance required: A marketing consultant on a short term (4 months) assignment is requested to assist in formulating more detailed marketing programs and implementing same.

## 2. Manufacturing

- a. Engineering: Modifications in designs would be required to increase productivity through savings in labour and materials. It was noted that the bill of materials prepared about 10 years ago would require updating. Estimates should include amortization of tools and dies. Quality of products need further improvement, hence, there is a need for a standard check list for inspection and testing of products; stage inspection and the use of go-no-go gauges; and the setting up of a small analytical laboratory.
- b. Production Control: Dies and press tools are available for 17 products of ATF. Utilization of 5 to 10% is very poor due to low production volumes resulting from low sales. The production planning and control system requires improvement by setting up a separate section. Inventory planning and warehousing needs improvement. The setting of minimum levels of inventory, especially for critical items have been proposed. Work-in-process and raw material inventory is very high and would require a disposal program.
- c. Production: Production volumes has increased very much the last two years. It was noted that performance outputs and works-in-process are being reported in terms of sales price and do not reconcile with the accounting system. Workloads in the machine shop, welding and assembly are adequate, while other sections have unutilized capacity varying from 40 to 60%. Foundry operations has become uneconomical with rejection rates as high as 30 to 35%. The equipment needs replacement. Personnel are being shifted frequently due to urgency of other jobs and unavailability of raw materials.



- d. Labour: Absentism of about 25% at durations of 30 to 40 days is very high during June/July and October/November due to seasonal farming demands in the area. Planning and scheduling should consider this. Labour requires training to upgrade their skills.
- e. Plant Engineering: Machinery and equipment are not in good working condition, most of which requires overhauling. Preventive maintenance is inadequate resulting in an increase in frequency of breakdowns by 25% over the last two years. Many of the parts needed are not readily available. Proposals have been made for rebuilding some of the old machines and for new equipments.
- f. Assistance required: A Tool and Die/Production Engineer, Foundry expert and training and fellowships have been recommended for assistance.

### 3. Finance

- a. Profit Analysis: While ATF experienced losses for some time, it has made a profit of Rs. 313,396 in 1982/83. Gross profitability has risen from 15.9% of sales in 1980/81 to 32.2% in 1982/83. Selling and administrative expenses, however, need to be reduced in order to provide a better profit picture.
- b. Receivables: Overdue receivables which is 5.3% of total is within manageable levels. However, there is need to reduce the collection period for the rest of the receivables.
- c. Inventory: Inventory at Rs. 7,200,000 is very high providing a turnover rate of 1.05 a year. Efforts to bring down the inventory of finished products, semi-finished and raw materials to a turnover rate of 2 a year should be made.
- d. Fixed Assets : As most of the machinery are fully depreciated, a re-valuation is suggested in order to increase loan values.

- e. Working capital: In addition to more capital infusion by HMG/N, additional working capital of Rs. 5,896,220 can be raised through decreases in receivables and inventory and additional loans. This should support expanded sales for the next year.
- f. Costing system: As ATF does not have an adequate costing system, recommendations have been made to institute a system in three stages.

#### 4. Administration

- a. Personnel: Personnel turnover has been high especially for officer levels. Where there used to be 9 engineers, only 3 remains. A special recruitment program is required to fill up the vacancies existing. Training and performance evaluation should be regularly conducted.
- b. Procurement : The procurement system needs strengthening as materials are not supplied in time due to late orders, long lead times or lack of financial resources. This adversely affects production and sales programmes. In addition, the high cost of materials has resulted in high prices of ATF products compared to competition. Pricing and sourcing of raw materials should be reviewed.

#### 5. Product Development

- a. Action Programme for Product Development: A review of current ATF products, including sales trends, marketing and production problems were made. In addition, new products for development by ATF were studied. An action programme for development is given below:
  - 1. For immediate implementation through cost reduction and productivity measures: Hand tools, wheel barrows, ADV and water cans.
  - 2. For immediate implementation through redesign and further development: Animal drawn moldboard plough, tractor tyne tillers, tractor disc harrows, tractor trailer and wheat thresher.
  - 3. For immediate implementation through design and development: Powered paddy threshers, power tiller trailers, tanks, forged and pressed parts, truck steel bodies and general fabrication and construction of steel structures.

4. For intermediate-term development: Hand pumps, diesel pumpsets, weeders, sprayers, fertilizer applicators, paddy harvester, powered corn sheller, equipment for animal production and foundry products
  
  - b. Creation of a Product Development Committee: In order to coordinate the functions of product development, which includes the various activities of the Company, the formation of the committee is recommended.
  
  - c. Linkages: To avail of technical support, ATF should strengthen or establish linkages with international, regional and national institutes and other institutes in India and Pakistan.
  
  - d. Assistance required: A Product Development Expert with actual experience in design and manufacturing of agricultural and industrial machinery is requested to assist in training and implementing product development activities.
6. General Management
- a. Organisation Structure: A revised organisation chart has been proposed, incorporating the following changes:
    1. Creation of Management of Executive Committee, Sales-Production-Procurement Committee and a Product Development Committee
    2. Creation of a Controls and Analysis Section in Finance Division and the transfer of the Stores Section to the Works Division.
    3. Converting the present operations of the Sales Section into a Birgunj Branch; creating a Sales Office to supervise Branches and depots and creating a Marketing Services Section to handle advertising and sales promotions, statistics and forecasts and market research
    4. Converting the present Research, Tests and Development Section under the Works Division to an Engineering Section handling design and estimates, plant engineering and quality control; and creation of a Production Planning and Control Section to handle planning and scheduling and the Stores.

- b. Productivity: Productivity on a company basis can further be improved through the organization of Productivity Circles in all areas of the Company, where employees' participation is enhanced.

7. Government Policy Measures

In order to meet its objectives, ATF would need the assistance of HMG in the following areas:

- a. Protection from undue foreign competition through banning or higher duties and taxes
- b. More financing and credit for agricultural equipment on a longer term basis and at preferential rates
- c. Formulation of an agricultural mechanization program to accelerate the country's agricultural productivity in the areas of handtools, animal and powered technology.

### III. GENERAL ECONOMIC AND AGRICULTURAL INFORMATION

#### A. Location and Topography

Nepal is a small landlocked country situated between China and India, the two largest and most populated countries of Asia. Its land area is 147,181 sq. m. with a population of more than 15 million people.

The topography varies from the plains of Tarai with an elevation of 60-300 m. above sea level to the high mountains of the Northern region, rising to 8,848 m., the highest point which is Mt. Everest.

The country can be divided into three geographic regions, the Tarai, the middle hills and the high mountains. The Tarai or low plains which extends almost throughout the country covers 23% of total area. The bulk of the country's foodgrains are grown here. The middle hills cover 43% of land area with numerous streams and rivers. Majority of the population reside here.

The high mountains cover 14% of the country with an altitude of 3000 m. or above. Livestock is the main source of livelihood.

#### B. Climate

The Himalayas are the predominant influence on the climate of Nepal. Altitude divides the country into monsoon subtropical, temperate monsoon and alpine climate zones. The following seasons are described:

Spring (Mid March to June): Warm weather, with temperatures of 6.9° to 29.1°C

Summer/monsoon (Mid June to Mid September): Warm to hot weather with temperatures of 19.1° to 27.6° C

Autumn (Mid September to early November): Warm weather with temperatures of 18.4° to 22.5°C

Winter (early November to early March): Cold with temperatures from 1° to 24°C

Average rainfall is estimated to be 1600 mm.

### C. Soils

Information on the soils of Nepal is limited. The Hill soils are medium to light texture with dominance of coarsegrained sand and gravel having very high permeability. In the Tarai, soils vary from coarse grained sand and gravels of high permeability with low water holding capacity to fine sands and silts with a small portion of clay.

### D. Land Use

Estimates made by the National Planning Commission (The Sixth Plan, 1981) show the following for the year 1980:

Use	Area sq. km.	%
1. Forests	40,997	29.06
2. Cultivable land	31,268	22.17
3. Area under perpetual snow	21,121	14.97
4. Pasture land	17,857	12.66
5. Water bodies	4,000	2.84
6. Settlements/roads	300	0.21
7. Others	25,516	18.09
Total	141,059	100.00

Deforestation is increasing at a fast rate of 15% from 1975 to 1980.

### E. Economic Data

The following information would be relevant to this study:

1. Population (1981)	15,022,839
2. Land Area	147,181 sq. km.
3. GDP (1982/83) Rs'000	33,621,000
Agriculture	17,942,000
Non-agriculture	15,679,000

4. GDP Growth (5th Plan)	2.2%
5. Population Growth (5th Plan)	2.7%

Nepal's trade deficit has been increasing sharply from Rs. 925 million in 1974/75 to Rs. 3,464.3 million in 1981/82. The widening gap is due to rapidly increasing imports and a stagnation in exports. Despite the huge trade deficits Nepal had a balance of payment surplus due to a favourable position in services, transfer account and expanding flow of foreign assistance.

#### F. Agricultural Production

The following table gives the country's agricultural production for 1982/83: <sup>1/</sup>

<u>Crop</u>	<u>Area (000 ha)</u>	<u>Production (000 MT)</u>
Paddy	1,265	1,833
Maize	511	718
Wheat	484	657
Barley	24	21
Millet	129	121
Sugar	25	617
Oil seed	110	69
Tobacco	10	7
Jute	24	31
Potato	59	373

Irrigated land is 242,889 hectares.

The economy of Nepal is based mainly on the production from its principal natural resource - land. Land available for agriculture is limited due to its topography and its productivity has been deteriorating due to improper land use practices caused by increased population. Dependence on agriculture is so high that 94% of the economically active population are engaged in producing 60% of the GDP. Agro-based industries, mainly in cereal.

<sup>1/</sup> Source: ADB/HMG Agriculture Sector Study, Dec. 1982

Industry employs only about 60,000 people or about 0.4 of the population.

The objectives of the Sixth Plan are to :

1. Increase consumption standards by increasing agricultural production;
2. Create productive employment;
3. Maintain exports and
4. Supply raw materials to agro-based industries

#### G. Agriculture in the Hills

Small subsistence farms predominate in the Hills. More than 60% of the households own less than one hectare of land, the average size of such holdings less than 0.5 ha. Many of these farms are fragmented into 7 or 8 plots in different locations.

Main crops are maize & rice, with 36 and 27 percent respectively, of cropped area grown in 1981/82. No mechanization is virtually used. A pair of draft animals and a simple wooden plough are the usual means of land preparation in larger fields, while hand hoes are used for narrow terraces.

Substantial mechanization of Hill agriculture would seem unlikely due to fragmented farm sizes, slope conditions and limited access to the fields.

#### H. Agriculture in Tarai

The size of land holdings is larger in Tarai, averaging 2 ha. per family. More than 60 per cent of the families have holdings larger than one ha.

Crop production in the Tarai is largely rice & wheat, accounting for 64 and 16 percent respectively, of the total cropped area. Maize is 8 percent, oilseeds is 6 percent and sugar is 1 percent.

Average cropping intensity is estimated to be about 146 for irrigated lands and 135 for unirrigated lands.<sup>1/</sup>

<sup>1/</sup> Nepal Rastra Bank : Agricultural Credit Survey, 1980



Although the major source of power for soil tillage operations, threshing and rural transport are draft animals, a certain degree of mechanization is being carried out. There are an estimated 2000 4-wheel tractors in the country with a great number being utilized for transportation, rather than land preparation.

The low mechanization index is due to: 1) small areas under irrigation; 2) high labor to land ratio; 3) high draft animal population in relation to arable land; 4) low rural wages; 5) high investment requirements for mechanical power and 6) inadequate institutional support.

#### I. Irrigation Development

Nepal is endowed with abundant water resources. In the Tarai it has been estimated that 1.6 million ha. can be irrigated <sup>2/</sup> Of this, 340,000 ha. is irrigated, comprising 90,000 ha. developed by the Government and 250,000 ha by local farmers. However, only 65,000 ha. is under year round irrigation. Another 194,000 ha. is under design or development.

Irrigation development presents an opportunity for ATF to exploit, specifically with respect to the use of diesel-pumpsets, sourcing water from rivers or streams or shallow or deep tubewells.

#### J. Size of Landholdings <sup>2/</sup>

<u>Size (Ha)</u>	<u>No. of Households</u>	<u>%</u>	<u>Area of Holdings</u>	<u>%</u>	<u>Average Holdings</u>
0.10-0.41	953,531	55.8	201,623	11.8	0.21
0.42-2.67	644,578	37.8	755,316	44.3	1.17
2.68-10	96,552	5.7	537,505	31.6	5.57
10 and above	12,670	0.7	208,595	12.3	16.46
Total	1,707,331	100.0	1,702,939	100.0	1.00

The larger and medium farmers are mostly absentee landlords who operate on the basis of share cropping.

<sup>2/</sup> Source : Central Bureau of Statistics : National sample of Agricultural census, 1971

#### IV. AGRICULTURAL TOOL FACTORY IN BRIEF

##### A. Organization

ATF was established in 1964 with the cooperation of the Government of USSR and commissioned in 1968 as a public sector enterprise fully owned by HMG/Nepal.

Authorized capital of the corporation was Rs. 30,000,000. The subscribed and paid up capital was Rs. 12,140,000. The net worth of ATF has been reduced to Rs. 5,909,503 as of end 1981/82 due to heavy operational losses in past years. It has sold Rs. 8,313,919 in 1982/83, with profits of Rs. 313,396. Capital infusion was Rs. 930,680 in 1982/83 and Rs. 1,702,680 in 1983/84 by HMG. As of the end of 1983/84, total paid up capital including promoters investment of HMG amounted to Rs. 14,770,680, while networth is estimated at Rs. 8,900,000.

##### B. Objectives of ATF

The main objective of ATF is to increase working efficiency and agricultural productivity, through the improvement of traditional tools and equipment. While at the start ATF has concentrated on simple hand tools and animal drawn equipment, it has diversified into other agricultural, transport, construction and industrial equipment.

##### C. Production Facility

There are at present 233 personnel working in different divisions of the Company of which 131 are working in the Works Division. It has a press and forge shop, foundry, machine shop, meat treatment, electroplating, assembly, carpentry and painting shops. It has overhead crane facilities and other equipment capable of producing a wide range of products.

##### D. Marketing

ATF's marketing network consists of seven branches/subbranches in different parts of the country. These outlets sell directly to private customers or government agencies or through private dealers and the Agricultural Inputs Corporation. Sales through farmers are generally financed through ADBN.

## V. MARKETING

### A. Products

The list of products manufactured and distributed by ATF are indicated in the Proposed Product Grouping. The gathering of sales, production and inventory statistics for various products is time-consuming. It is proposed that all divisions of the Company, including branches and depots, sales, production, accounting and stores use the proposed product grouping and coding. The grouping has been based on both market and manufacturing similarities and are tentative as some products are recommended to be dropped or added. Part numbers can be developed, using the main product codes listed therein. Those with asterisk (\*) are not existing products.

#### PROPOSED PRODUCT GROUPING

##### A- Hand tools

##### 1 - Shovel

1- Oval

2- Flat

##### 2- Spade

1- Kodal

2- Kodalo

3- Chande

4- No. 1

5- No. 2

##### 3 - Hoes

1- Big

2- Flat

3- Pointed

##### 4 - Hand trowel

1- Kurpi

2 -Entrenching tool

5- Rakes

1 - Multi-type

2 - Three-type

6- Chisel

1-1x1

2-1x1- 1/2

3-1x4

4-1x6

5-1x8

6-1-1/4x1

7-1-1/4x6

7- Crowbar

1-1x2

2-1x2-1/2

3-1x3

4-1x4

5-1x5

6-1-1/4x1-1/2

7-1-1/4x2

8-1-1/4x5

10-1-1/4x5-1/2

8- Pick

9- Kukuri

1-6"

2-8"

3-12"

10- Sickle

1-Ordinary

2-Kurpa

11- Hammer

1- 2 kg

2- 4 kg

3- 6 kg

4- 8 kg

5- 10 kg

6- 12 kg

B. Animal Drawn Implements

1- Moldboard plough

1- 6"

2- 8"

2- Tyne cultivator

1- 3 tynes

C. Tractor Implements

1- Tillers

1- 9 tynes

2- 11 tynes

3- 13 tynes

4- 15 tynes

2- Disc Harrow

3- Cage Wheel \*

D. Transport Equipment

1 - Manual

1- Wheelbarrow

1- Regular

2- Rubber wheel

2 - Animal drawn trailer

3 - Power tiller trailer

4 - Tractor trailer

1 - 1 ton

3- 4 tons

2 - 3 tons

4- 5 tons

E. Water Equipment

- 1- Water Cans
- 2- Hand Pumps \*
- 3- Centrifugal pumps \*
- 4- Turbine pumps \*
- 5- Hydraulic rams \*
- 6- Diesel engines \*
- 7- Gasifiers \*

F. Other Agricultural Equipment

- 1- Seed drills
  - 1- Corn Planter
- 2- Transplanters \*
- 3- Weeders \*
- 4- Sprayers \*
- 5- Harvestors (reapers) \*

G. Post Harvest Equipment

- 1- Corn Sheller
  - 1- Manual
  - 2- Powered \*
- 2- Thresher
  - 1- Paddy
  - 2- Wheat
- 3- Dryers \*
- 4- Ricemills \*

H. Miscellaneous Job Orders

- 1- Industrial Equipment
  - 1- Pressure tanks \*
  - 2- Tankers \*
  - 3- Garbage Collectors

2- Fabrication/Construction

1 - Structural trusses

3- Foundry jobs

1- Manhole covers

4- Forged/Press jobs

1- Electrical clamps

B. Sales

1. Sales by Product

Sales figures for the last three years for each of the regular product lines of ATF are indicated in detail in section IX (Product Development) of this report. An analysis of the sales trends are made and recommendations on marketing, production and product development are given.

2. Sales According to Regular Products and Job Orders.

In an effort to ascertain the sales of regular products and those covered by job orders, the following breakdown is given:

	1981/82	1982/83	1983/84 (10mos)
Regular Products			
Quantity	54,789	74,573	41,602
Amount (Rs)	2,449,950	4,915,006	5,630,362
Job Orders			
Quantity	11,788	30,613	16,317
Amount	1,065,212	1,670,948	1,913,982

While sales of regular products has been increasing, this has been primarily due to new products introduced, such as threshers. Efforts must be exerted to increase sales of the traditional products, at the same time pushing for more job order as it provides greater volumes and high profitability.

### 3. Sales by Agencies

The sales by agencies are given below :

	1982/83	%	1983/84 (11 ms.)	%
1. ADBN	739,625	8.9	2,516,254	32.8
2. AIC	929,929	11.2	979,039	12.8
3. Government	6,117,097	73.5	2,925,574	38.1
4. Others	532,281	6.4	1,247,788	16.3
Total	8,313,929	100.0	7,663,671	100.0

It will be noted that sales through ADBN financing has increased by 240% over last year. As the principal finance institution concerned with agricultural development, ATF should tap more effectively this important segment of the market.

ADBN has a loan investment program as follows, in Rs'000:

	1982/83	1983/84	1984/85
Agriculture Implements	33,325	32,000	35,000
Irrigation	24,486	39,550	32,525
Agro-Industry	24,873	29,928	37,000

ATF has only obtained 2.2% of the total ADBN funding for agricultural implements in 1982/83 and 7.8% for 1983/84, based on 11 months. Greater efforts are needed to be exerted by branches and depots to increase sales through ADBN.

The financing available for irrigation and agro-industry is so large that development of new products in this area is needed.

It should be noted that sales through ADBN does not impair very much the liquidity position of ATF unlike sales to government agencies which has a much longer collection period. ADBN's extensive network should be tapped.



Sales through AIC has remained almost constant, contributing only 11.2% last year and 12.8% of total ATF sales this year. Increase in sales of hand tools should be explored as AIC has a very wide distribution network extending to the farmers.

While government sales contributed 73.5% of total sales in 1982/83, its share in 1983/84 (11 months) has dropped to only 38.1%.

#### 4. Sales by Branches/Depots

The sales of seven (7) branches and depots of ATF are shown below, with only 11 months for 1983/84 :

Branch/Depot	1981/82	1982/83	1983/84
1. Kathmandu Branch	1,322,768	2,430,002	1,498,683
2. Bhairahwa	243,548	468,021	947,134
3. Nepalgunj Sub Branch	181,094	504,407	640,753
4. Biratnagar	266,853	593,757	843,502
5. Dangkadi Depot	-	61,680	304,792
6. Janakpur Depot	-	-	314,118
7. Birgunj Sales Section	1,621,638	4,210,542	3,018,699
Total	3,635,903	8,368,411	7,567,605

All branches have shown improvement in sales, except Kathmandu and Birgunj which are supposed to pick up sales in the last month of the year.

The sales of the Branches and depots per man are shown below:

	Branch	Sales	Budget (Men)	Actual (Men)	Sales per man
1.	Kathmandu	1498683	8	8	187335
2.	Bhairahwa	947134	5	4	236783
3.	Nepalgunj	640753	5	4	160188
4.	Biratnagar	843502	4	4	210875
5.	Dangkadi	304792	4	4	8698
6.	Janakpur	314118	4	4	78529
7.	Birgunj	3018699	8	4	754674
	Total	7567605	38	32	236487

Based on sales per manpower, the performance of Dangkadi, Janakpur and Nepalgunj needs further improvement. It should be noted that Kathmandu has the most number of men for all the outlets.

The ratio of the expenses over their sales for each branch is shown below :

	Branch	Sales	Expense	%	Sales	Expense	%
1.	Kathmandu	1322768	91638	<u>6.9</u>	2430002	128395	<u>5.3</u>
2.	Bhairahwa	243548	56588	<u>23</u>	468021	59523	<u>12.7</u>
3.	Nepalgunj	181094	48772	<u>27</u>	504407	59423	<u>11.8</u>
4.	Biratnagar	266853	43797	<u>16</u>	593757	64756	<u>10.9</u>
5.	Dangkadi	-	-		61680	32393	<u>52.5</u>
6.	Janakpur	-	-				
7.	Birgunj	1621638					

Birgunj sales section expenses have not been segregated and the figures for 1983/84 (first 6 months) is still incomplete, hence not included in this analysis.

Dangkadi's expense compared to its sales is out of proportion (52.5%). Assuming they maintain their expenses for 1983/84, their ratio (10.6%) would be at par with other branches. Kathmandu's expense over sales performance is very good.

The sales of each branch through AIC is shown below :

Branch	1981/82	1982/83	1983/84 (10 mo.)
1. Kathmandu	-	-	-
2. Bhairahwa	106675	117177	51834
3. Nepalgunj	70793	123648	100194
4. Biratnagar	14111	55846	-
5. Dangkadi	-	-	105690
6. Janakpur	-	-	-
7. Birgunj	235798	619401	459360
Total	427377	916073	717078
Ave/mo.	<u>35,614</u>	<u>76,339</u>	<u>71,708</u>

As previously pointed out sales through AIC which is only 12.8% of total ATF sales should be improved because of its network.

#### C. Channels of Distribution

The channels of distribution are mainly through the branches and depots (Appendix 1), who in turn sells through dealers or directly through AIC, ADBN, government or individual buyers.

There is need to strengthen the branches and depots, providing the sales personnel with training, especially for ATF'S new products. In addition to AIC, there are only 4 dealers in 3 branches :

Kathmandu :

Shiv Shakti Hardware

General Construction and Material Enterprise

Birgunj :

New Ratan Traders

Nepalgunj:  
Pasupathi Traders.

It is recommended that the dealership network, which was started this year, should be strengthened by the appointment of more capable dealers. Regular visits by Sales personnel should be made. Special dealers, such as tractor distributors, should also be appointed. While initially, dealers are allowed to sell products competitive to ATF, it should later be imposed that they should not sell products competitive to ATF when the makership network becomes stronger.

D. Advertising and Sales Promotion

Advertising is presently done through newspapers, radio and cinema. It is suggested that both institutional and product advertising be strengthened. Advertising through the use of testimonials from satisfied customers can be considered.

Sales promotion activities is limited to mail campaigns where product literatures are used and participation in Agricultural Exhibits.

The Advertising and Sales Promotion function is being handled by one assistant although it has a budget of three. Efforts must be made to recruit and train the personnel needed.

The following sales promotion activities should be further studied :

1. More participation in trade shows and exhibits.
2. Presentable display of ATF products in the showrooms of the Branches and depots. The Kathmandu and Birgunj showrooms should be improved. For large equipment like trailers, harrows, etc. it should be properly displayed.
3. Use of product signs
4. Sales campaigns
5. Contests
6. Sales kits, brochures and catalogues

7. Demonstration of equipment
8. Bulletins
9. Sales leads for sales personnel

E. Market Reserach

There is practically no market research activity being under taken, except for some data submitted by the braches. Industry data, such as demand and supply, is difficult to obtain.

It is suggested that this activity be organized, with one person handling it. He should undertake the following :

1. Compile and analyse sales statistics for present and future products of ATF.
2. Undertake market studies for products under development.
3. Review national development programmes and assess its impact on ATF activities.
4. Review financing programmes of financing institutions and translate them into ATF programmes.
5. Secure government budgets and procurement programmes.

F. Pricing

Present pricing system is done as follows :

$$\text{Selling price} = \text{Prime cost} + \text{Overhead (Mark up)} + \\ \text{Commission (on selling price)} + \\ \text{Transport expense (on selling price)}$$

Where :

$$\text{Prime Cost} = \text{Estimated direct labor} + \text{mach...ne hours} \\ + \text{materials}$$

Overhead = Variable

25% - small tools

30% - agriculture implements

35% - Construction

40% - big projects

Commission = Variable

9% Power equipment

10% Construction

14% Agricultural

Transport

Expense = 5% of selling price

In the price buildup, it is assumed that profit is included in the overhead factor.

It is suggested that in order to realign the pricing system with the accounting system the price buildup should be as follows :

Selling Price = Production Cost +  
Gross Profit Margin

where :

Production cost = Direct labor + direct materials +  
factory overhead.

Gross Profit margin (based on Selling Price) = Selling expense +  
Administrative expense +  
Commission + transport  
expense + net Profit de-  
sired.

Factory overhead will be varied, depending on the product. The same is true for gross profit margins. Hand in hand with this pricing system is the implementation of a cost accounting system which is included in Section VII (Finance) of this report.

The present commission rate for dealers should also be reviewed to attract more dealers.

G. Parts

The parts activity does not pose a problem as of now. However, as ATF sells more complicated machinery and equipment, this function should be organized.

The parts business is profitable and should receive some consideration. Parts lists should be prepared, incorporated in Service Manuals for products. Part numbers, based on the proposed product codes, should be assigned.

H. Service

Presently, Works Division handles all service problems, with Sales coordination. Servicemen should be properly trained to cope with ATF's expanding product lines.

I. Inventory

Inventory and sales for finished products are shown below:

Year	Inventory (Rs.)	Sales (Rs.)
1980/81	2,663,722	3,865,148
1981/82	2,647,343	3,556,519
1982/83	2,412,068	8,313,929

From the Financial Statements shown in Section VII (Finance) of this report, the cost of sales has been computed and finished products turnover a year is indicated below :

Year	Cost of Sales	Turnover/year
1980/81	3,250,589	1.22
1981/82	2,738,519	1.03
1982/83	5,636,843	2.3

Because of higher sales for 1982/83, inventory turnover has more than doubled, showing a big improvement. Under normal conditions and where more than 25% of sales are on a job Order

basis in which no finished product inventory is needed, the ideal objective is for a turnover of 4 to 6 times a year. As of now the total inventory for finished products is equivalent to 5 months sale.

No detailed analysis of the inventory was made but we were made to understand that a lot of non-moving inventory is included.

A cursory analysis of the inventory in the Branches and depots indicate that in some cases, especially for hand tools and ploughs, inventory of one Branch is adequate for total ATF sale for 2 years.

It is therefore recommended that :

1. A thorough analysis of finished product inventory be made and categorized into :

- a) Scrap, like Chemicals, etc.
- b) Non - moving
- c) Slow-moving

Special disposal programs should be undertaken.

#### J. Incentive System

There is an incentive/award system which is given to Branches and depots. It is based on sales and collection performance. The system is good and includes sales people to meet their targets.

#### K. Systems, Forecasts and Budgets

The branches and depots submits monthly reports on incomes and expenditures, sales, inventory and occasionally, letters on various problems of the branch.

There is need to review the reporting system and the forms used in order to simplify same. Although not exhaustive, due to lack of time, the following recommendations are made :

1. Branch/Depot Sales Reports : The Branch/Depot sales report should be in a standard form (printed) with the list of products, based on the proposed product coding, instead of the present system of



of typing this report which is difficult to consolidate at Marketing Division. Adequate columns should be provided for monthly sales, indicating quantity and amount.

Every month, the branch merely writes down his sales. In this way, the Branch Manager can easily analyse his sales on a per product basis as the comparative monthly figures are tabulated in the form. A photo copy of the report is then sent to Marketing Division. This same form makes the manager analyse seasonality of demand.

A similar form should also be made for the Branch or depot showing sales by products on a yearly basis.

2. Branch/Depot Stock and Forecast Report: Another printed form following the same product coding as in the Branch/Depot sales report (1) should be made on a monthly basis. The following information should be included as separate columns.

- a) Name of product
- b) Beginning Stock
- c) Sales for the month
- d) Ending Stock
- e) Running forecast of sales for the next 12 months.

This form will enable the Branch to undertake his own inventory analysis and would simplify controls and analysis by both Marketing and Fiscal divisions. The running forecast is included in order to provide the proposed Sales-Production-Procurement Committee enough lead time. It will also afford the Branch/Depot to adjust his sales forecast based on the changing situation of the market.

3. ATF Sales Report: Using the same form as in (1), a consolidated ATF report is made by Marketing Division for the current year, on a monthly basis and on a year by year basis.

4. ATF stock/Forecast Report

An ATF consolidated stock and forecast report using the same form as in (2) is made by Marketing Division. This report adjusted or modified by Marketing Division and the proposed Sales/Production - Procurement Committee will be the basis for Production and Procurement programmes.

5. Branch/Depot Manager's Monthly Report : A regular monthly report should be required, to include the following information.

a) Sales Performance

- 1) Actual vs Target for the month, with remarks
- 2) Actual vs Target, for government, AIC and ADBN
- 3) Actual vs. Target, on an accumulated year - to - data basis.

b) Dealer performance and dealer development programmes

c) Advertising and sales promotion activities and requirements.

d) Parts and service problems

e) New Products

f) Market and competitive situation

g) Personnel matters

h) Other matters

This monthly report will give Marketing Division adequate information on Branch operations, at the same time train the Branch Manager to be management-oriented.

6. Elimination of the present Sales Register being accomplished in the Sales Section : The complete report of the Branch/Depot is being handwritten in a Sales Register. Nobody uses this register which requires too much clerical work.

L. Organization

The present organizational chart is shown in Appendix 2.

Ten organizational units report to the Marketing Division Head. Because of the very wide span of control, it would be very difficult for the Division Head to effectively supervise these ten units, while at the same time working on marketing policies and strategies and undertaking some major sales efforts.

A proposed organizational chart for ATF which includes Marketing is shown in Section X (General Management) of this report.

A Sales Section with full supervision over all branches/deposits including the Birgunj operations is proposed to be created. The Section Head will be fully responsible for sales performance and reports to the Division Head.

A Marketing Services Section is created which will have full responsibility for Advertising and Sales Promotions and Market Research and Statistics. It shall also handle all sales planning activities, including forecasts.

A special accounts may be created to handle special sales, such as new major products, government sales or special programs like dealer development.

It is further recommended that a Division Head be appointed as soon as possible. While the efforts of the Chairman cum GM has increased sales very much, the viability and strength of ATF would greatly depend on the Marketing Division. Filling up of some of the other vacancies should also be made.

Training of the staff should also be made in order to upgrade their capabilities.

M. Assistance Required

Upon the reorganization of the Division and the appointment of capable men to the various positions, it is suggested that a market

-ing consultant with actual sales and marketing experience in agricultural and industrial products be requested to assist the Division and Section Heads in formulating more detailed marketing strategies and programs and implementing same.

A project document is included in Section XII of this report.

## VI. MANUFACTURING

### A. Organization

The organisational chart of the Factory is given in Appendix 2. Proposed organisational set up of Works Division is indicated below:-

- WORKS MANAGER
- 1) PRODUCTION  
Shops
  - 2) ENGINEERING  
Design and Estimates  
Quality control  
Plant Engineering
  - 3) PRODUCTION CONTROL  
Planning and scheduling  
Store

At present Production also handles the function of production control. The proposed set up enables production to devote full time on production problems.

The allocation of duties are:-

Production - Work Allocation, Technical guidance, Shop Supervision, Watch Progress.

Engineering:- Product Development  
Material And Labour Estimates  
Standardisation of Material and  
Purchase Parts And Components  
Quality Control  
Plant Engineering

Production Control- Production Planning  
Process Planning and Scheduling  
Preparation of Standard Forms.  
Evaluation of Performance

The Post of Works Manager which is vacant should be filled as early as possible.

An Engineer is needed to head production control.

B. Engineering

1) Design

The present strength of the section includes a fresh graduate engineer, two Asst. Engineers who are diploma holders and two draftsmen.

Their functions include the following:

- 1) Design & Development
- 2) Material and labour estimates
- 3) Inspection and quality control.

There is no complete drawing and parts lists existing for any of the present product. Job work is carried out from the dimension given by the party. Products had been copied from some sample model with modification.

The section has started modification of an existing design of wheat thresher, paddy thresher and cultivator.

It is suggested that the following priorities be undertaken:

1. Design modification of existing products to save materials which constitute 60 to 75%
2. Part list and drawings of the existing product should be made.
3. Standardisation of purchase items.
4. Strong need for Technical Support.

2) Estimating

The section only supplies information relating to material needed, with specifications and sizes, which also includes major direct consumables like welding electrodes, etc. In estimating man hours the grade of workers used is indicated. In the case of machine hours, the name of the machine and operation time is indicated. The final estimating is done by the marketing division standards man, Machine hours rates and overhead are fixed.

All the estimates are made on adhoc basis based on past experience. Production time is often indicated lower than actual times.

A quick study of the estimate on material and labour reveals that there is a wide variation between the estimates and the actual.

For all major products and job order estimates, studies should be undertaken on sampling basis to find out the variance with the actual and accurate estimates should be reflected on the standards set.

The cost element is not included in the estimate by amortising dies and presstools, which should be done.

Bill of material prepared for existing products 10 years back, require updating.

3) Tooling:

The unit has dies and press tools for different items of production valued at about Rs.100,000 and are not used. It was told that products manufactured out of these dies are not accepted by the market.

However, the unit has made dies and press tools for its major products, some for complete or partial operations. The utilization is very poor due to limited internal market. The poor utilization of dies and tools could be seen from the following table:



Item	No of Dies and Press Tool	Quantity planned for production in 1984-85	Utilization in a Year.
1. Iron Rake	5	1500 Pcs.	4 days
2. Shovel	5	5000 ..	7 days
3. Rim	2	54 ..	3 days
4. Plough shear Mould Board & components	11	5000 ..	15 days
5. Cultivator	8	25 ..	7 days
6. Paddy thresher	2	500 ..	6 days
7. Kodal	5	1200 ..	5 days
8. Dust cover	2	_____	500 per/day
9. Wheel barrow	4	300 ..	6 days
10.-Ridger	3	_____ ..	discontinued production.
11.-Pole clamp	2	Joborder	400 per/day
12.Slotted angle rack	4	on order	10 sets/day
13.-Shovel flat	3	_____	500 per/day
14. Washer	2 Number each for seven sizes		10 Kg/days.

The production planned for the current year will not be able to utilise press and forge shop by more than 20% of its capacity. Attempts should be made to secure job orders to utilise its high spare capacity.

Since there is no die and fixture designer, the foreman in the production shop is trying to copy some jigs and fixers which he had seen in his study tour to India. He has already fabricated a Hub drilling jig, type bending jig and a drilling jig for trailer components. There is a need

to fabricate a number of fixtures to improve productivity for welding and assembly work.

The present staff has no technical background for the manufacture of dies, tools and fixtures, hence technical back up is very essential. Balancing equipment are also required to fabricate tools. The present machine shop is not equipped to manufacture them.

#### 4) Quality Control and Inspection

Inspection is now confined to purchase items only, which is also by and large visual and occasionally checks dimensions. Practically no measuring instruments are used.

In the production side, neither stages nor final inspection is carried out. Recently, they have started performance tests of paddy thresher, which is run without load for half an hour.

Stage and final inspect may be introduced for the regular prod . items add job orders. Machine shop may be provided with gaug go-no-go type, since the worker can not use measuring instruments.

A small analytical laboratory will be useful to determine chemical composition of steel material and sand testing for foundry.

Standard forms should be prepared for bill of materials process sheets, weekly performance analysis, inspection reports and check lists, to start with.

## C. Production Control

### 1. Systems

No standard production control system is followed in the manufacturing programme. The production engineer, who performs the duty of the production control advises verbally, the shop incharge what items and quality to be produced. He indicates probable date by which the work is to be completed.

Accordingly, the shop Incharge gives his requirement of materials and start working when materials are received.

The system of production planning, scheduling, routing, machine loading is not practiced. Work is done on adhoc basis. Job order gets priority, stopping regular production half way. This makes the material-in-process high.

All the power to control labour and utilization of machine rests on the shop foreman. Good co-operation has been observed between worker and supervisory staff.

### Cycletime

There is no fixed cycletime for any line of production. The progress is dependent on urgency and availability of raw material. No forecast can be made regarding completion time.

Besides, raw material drawn for one Job order are often diverted to another according to the exigency of the situation.

The sample study reveals that delivery period of job order varies from 3 to 4 months. Regular production items has no such time limit.

3. Work in Progress

Work in progress is based on the percentage of work done in terms of sales value. It may also be pointed out that the production report submitted are also in items of sales value.

This system does not reflect the actual production, and to some extent misleading.

4. Manpower Utilization

There is no system of recording time spent by a worker individually or in a group. No standard forms or job card is used. It is difficult to estimate the man utilization factor without any data. However it was observed that the entire system is easy going and workers are hardly engaged in productive work more than 4 hours a day, while the duty period is seven and half hours a day.

5. Machine Utilization

Similarly, machine utilization also could not be analysed in the absence of a recording system. Study reveals that only machine shop, welding and assembly are having maximum work load, while other sections have less work.

Estimated spot study of utilization is indicated below:

<u>Machine &amp; Equipment</u>	<u>Comments</u>
1. <u>Cutting Section</u> plate shearing machine power saw	Utilized fully and put to over time also.
2. <u>Forge Shop</u> Power hammer 250 T. Crank press 250 T. Crank press 63 T.	Utilization about 30 to 40% Remaining equipments utilization is 15 to 20%
3. <u>Machine Shop</u> Lathe Drill Shaper Milling Machine Surface grinder Cylindrical grinder	Utilize maximum about 90%    Utilization 50 to 60 %  Rarely utilized.
4. <u>Welding</u> 9 welding sets	Most of them fully utilized
5. <u>Grinding</u> 9 grinding machines	Two or three are put to use only.
6. <u>Painting</u> Spray painting, 4 sets	2 sets are used for 80% capacity.

Automatic conveyor & baking oven paint mixing units	Not utilised
7. <u>Electroplating</u> Zinc bath	Utilize occasionally when job order received
8. <u>Heat treatment</u> Induction harding unit Other, heat treatment furnace and salt bath Induction furnace	Use 50% capacity Utilized very rarely Not in operation.
9. <u>Foundry</u> Cupola	Not economical to use Utilized 2 to 3 times in a month.
10. <u>Wood working</u> Saw Mill Planer Lathe Circular saw	use maximum about 80% capacity, other machines are sparingly used.

Except machine shop, welding and assmby section as mentioned earlier all other sections has got spare capacity. Attention specially may be given to utilize press and forge shop more profitably which has great scope.

D. Inventory Control

No system of inventory planning and control exists in the factory. The unit is holding very large quantity of raw materials and semi-finished inventory which could be seen from the figures below:

<u>Item</u>	<u>In Rupees</u>	
	<u>1982-83</u>	<u>1983-84</u>
Stores & spare	2,185,018	2,306,555
Semi-finished	498,830	605,159
Total:	2,683,848	2,911,714

It will be seen from the above the inventory has increased by about Rs. 350,000 last year, Figures for the current year is not yet available.

Many of the items in the inventory is not moving. The value of goods which are not moving for the last several years are indicated below:

<u>Item</u>	<u>1982-83</u>	<u>%</u>	<u>1983-84</u>	<u>%</u>
1. Factory consumable	69,516	29.22	68,595	30.63
2. Construction Material	43,895	18.44	42,852	18.33
3. Wise Items	22,255	9.34	21,296	9.46
4. Dies of Tools	102,325	43.00	93,596	41.08
Total	Rs. 237,961	100.00	225,072	100.00

Nonmoving items in the factory consumable are increasing. A huge quantity of steel material is also found unsuitable for use and is not included in the nonmoving list.

Early disposal is recommended. Many of the items have no more commercial value, like heat treatment chemicals, etc, which has to be written off.

### Turnover

Factory consumed Rs. 6,751,256 of material, fuel and other times during 1983-84, of which the main items of consumption are:

	<u>Total inventory</u>	<u>Consumption</u>	<u>Balance</u>
1. Iron and Steel	3,226,225	2,424,295	802,989
2. Component parts	1,352,938	886,517	415,421
3. Fuel and Lubricant	436,909	394,611	42,288
4. Factory consumable	502,599	234,096	218,403

Consumption of steel, standard items and components is the highest. Though there is an opening stock of 802,989, out of which many sections and die steel blocks can not be put to use immediately. These items are being rusted and eaten away by the elements.

Purchase of items in the Factory consumable is also not planned, which has left an equal amount of material as opening stock.

### Record and Control System

The stores section record the materials received in ledgers and bin cards. As far as bin cards are concerned these are not properly maintained. A simple procedure is suggested for formulating an inventory control policy.



INVENTORY CONTROL POLICY PROCEDURE

1. Sales forecast are made by marketing division and then approved by the sales-production-procurement committee. This information is passed on to production planning.
2. Production Planning converts the forecast into long term production scheule.  
  
This is sent to inventory control.
3. Bill of Materials is prepared by Design and sent to inventory control.
4. Maintenance and other departments sends requirements to inventory control.
5. Procurement supplied data for lead time.
6. Inventory Control Checks
  - 1) Production Schedule
  - 2) Bill of Material
  - 3) Periodic Material requirement
  - 4) Lead time
  - 5) Past record.

A flow diagramme has been given in Appendix - 4

It is recommended also that the following be adopted.

Establish a minimum level for the critical items of production.

The inventory control and store has earlier been suggested to be under the production planning and control section. Since production planning has first hand information in respect of short and long term schedules and what material are required, this may be implemented.

Ware housing:

Storing is very poor and in haphazard manner. The purchase components and standard items are scattered all over. No system prevails for quick identification where the particular item has been stored.

All types of steel material are dumped one over the other. No proper stacking is made, category wise. It takes a long time to physically located the material. The steel materials dumped in the ground are being rusted, pitted and slowly turning to scrap.

Material may be stacked category and size wise over wooden wedge. A tag or colour coding may be introduced for easy identification.

Scraps are disposed after long period. Disposal should be a regular feature every year as resale value deteriorates due to rusting.

### E. Production

Both the functions of Production and Production Control are performed by the Production Section Production Engineer, assisted by Five Foreman of which three have been designated as Asst. Engineers. Except for the Production Engineer, no one has any technical educational background except for shop floor experience.

The manufacturing work can be divided into three categories:

- 1) Regular Production item
- 2) Job work undertaken departmentally
- 3) Job work executed through labour contract.

The Production Engineer is mainly busy in the requisition of materials from Stores. Whichever is not available he pursues the procurement.

The foremen organise the work allocation on the basis of availability of raw materials and labour. As there is no planning, work allocation is made on an adhoc basis. Job order received are given priority over regular production and material and men are diverted as situation demands. In short, work is carried out on the basis of urgency of order, exigency of situation and availability of raw materials.

No attention is provided on the technical aspects of the work. Neither foreman nor the worker is aware of the cutting speed, proper tool grinding, rake angle, clearance etc. In the welding section electrodes are excessively used and the weld is not uniform. Only a few standard forms are used by the section, such as work

order, stores requisition, stores return and purchase indent.

The following figures indicate the job work undertaken by the Production Section during 1983 - 84:

	1982/83	1983/84
1. Regular Products	Rs. 6,036,599	Rs. 8,839,000
2. Job order done departmentally.	2,020,401	1,069,000
3. Job order through labour contract	30,000	1,092,000
	Rs. 8,087,000	Rs. 11,000,000

It will be seen from above that production of regular manufacturing items could be increased by diverting the job work to contract labour during the current year. To achieve the above production, more than Rs.250,000 has been spent on overtime.

It is therefore suggested that possibilities of diverting more work to labour contract may be explored to take care of seasonal absenteeism and reduce overtime work which is at 50% more than normal wages.

Supervision is very poor. No technical guidance or direction to the worker is normally given, as the Production Engineer always remains busy with functions other than production supervision.

F. Labour

Works Division employs 108 regular workers and five foremen, three of whom have been designated as Asst. Engineers.

Out of 108 regular workers 24 are skilled, 43 semi skilled and 41 unskilled grade. Most of the workers have started their career in the factory as unskilled labour promoted to semi-skilled and skilled as they gain experience. No one has any technical education background and most of them can not read drawings nor use measuring instruments.

No standard has been laid down for work measurement. It was observed that actual effective working time is not more than 4-5 hours a day.

The rate of absenteeism is very high, about 25% during June/July and Oct/Nov. which is the sowing and harvesting time. Duration of leave during these periods vary from 30 to 40 days.

The wages, along with fringe benefits, compare favourably with those of outside companies. Government rules and regulations are applicable in respect of leave, gratuity and medical benefits etc. Wage structure is shown in Appendix 5.

It was observed that workers do not take care of their equipment used and normal cleaning, greasing and checking is not done before starting the work.

Since the work load in different shops are not uniform through out the year, unskilled workers of a section should be utilised by other sections during lean periods. A training programme in blue print reading for the machine shop and basic trade training for other sections may be started.

Productivity of labour is poor. The creation of productivity circles is suggested.

#### G. Plant Engineering

##### Plant Layout:

The plant layout is quite systematic and spacious. Material movement are done manually by trollies. There are three 2T cap overhead cranes in the main shop which is used for movement of heavy materials and finished goods. Plant layout is shown in Appendix 6.

The housekeeping is poor. Materials, semi-finished products and scraps are scattered all over the shop and kept in haphazard manner. The shops are not kept clean and tidy.

Area may be demarcated and marked with paint to keep the processed and semi-finished items in place. Similarly passage should be marked by painting, so that material do not block the passage.

##### Power:

The factory has its own substation, a stepdown transformer of 500 KVA from high tension line. Control panel consists of separate distribu-

tion channel for each shop. The connected loads are:

1)	Machine Shop	-	114 KW
2)	Press Forge	-	111 KW
3)	Painting	-	100 KW
4)	Electro Plating	-	175 KW
5)	Welding	-	100 KW
6)	Foundry	-	10 KW
7)	Heat Treatment	-	175 KW

The demand load so far has not exceeded 200 KW. Power rate is 42 paisa/KWA. Power interruptions are frequent. Annual consumption of power is Rs.150,000 for the workshop.

There is sufficient capacity to take care of future expansion programmes.

The transformer oil is required to be changed after a certain period of operation. This should be looked into.

A small 10 KW generator may be planned for Foundry to avoid jamming of the molten metal in cupola operation due to power interruption which is very common now.

#### Maintenance:

At present the maintenance group works under Production. A Senior foreman along with 2 workers attend to the mechanical as well as electrical breakdowns. The Foreman has been working since the installation stage of the factory and has sound

knowledge about the working conditions of the existing plant and machinery, including its electrical system and layout.

The frequency of breakdowns has increased considerably during the last two years. Since many of the parts are not readily available, it takes too long to procure them.

No schedule nor programme is made for preventive maintenance. Production does not spare the machine for such work.

The main replacement parts are bearing, bushes, brake system, relays, solenoid and electric motor winding materials.

It is recommended that regular schedule for preventive maintenance should be done considering the poor working condition of the machines.

The preventive maintenance work may be scheduled on non-working days to avoid disruption of production programme. A list of emergency spares should be prepared and stocked.

#### Fuel

Factory consumes mainly two types of fuel - furnace oil and hard coke. The consumption of furnace oil has increased from Rs.102,290 in 1982-83 to Rs.212,954 in 1983-84 with a very nominal increase in output. During the current year, consumption is likely to be much higher. The main reason for such higher consumption of furnace oil is heat loss, as the lining has been completely worn out. Besides, burners are also not working properly.



It is therefore recommended that the oil furnace lining should be changed and oil burner cleaned and repaired.

Hard coke is used by the foundry. The present consumption rate is one kg of coke to produce one kg. of casting. This is very high which should be 1:3 or 1:4 in normal cupolas, depending upon the quality of coke used.

As regards transport, the factory has recently acquired one heavy duty 8 Ton Truck and one 3 Ton truck for movement of finished products. For personnel movement they have also acquired one jeep and one staff car, which seems to be sufficient for the present.

#### Condition of equipment

##### Ferge & Press Shop

1. Plate Shearing m/c  
capacity 12.5 mm width  
3000 mm.

The equipment is not in very good working condition, and require complete over-hauling. Hydraulic system has been already repaired twice.

2. Combination Punch and Shear Machine

Cap. 1) Punching 16 mm plate  
2) Flat cut 20 x 160  
3) Bar cut - Round 45 mm dia, 40 mm sq  
120 x 12 mm Angle T / Beam

The machine is in a bad condition, requiring complete change of shearing blades Profile cutting blocks and punching system. This is critical machine needed for fabrication. The repair work should be attended on a parity basis.

3. Power Hammer - cap - 75 kg

No major Problem, Needs overhauling and preventive maintenance.

4. Power Hammer - 250 kg

Not in good condition, requires preventive maintenance. The clearance between ram and bore has become larger. The m/c is now using 0.015" over sized rings. After some time, ram has to be changed and reboring of the cylinder needed.

5. Oil fired furnace (Thonos)

1000 mm/1000 mm, with one burner

The lining has been worn out and needs immediate replacement. The fuel consumption has been increased by 25% due to heat loss.

The oil burner is also required to be checked. No preheating of oil arrangement exit, causing some problem in winter during starting.

6. Crank Press

cap - 250 T

In good condition, overhauling required. Air filter changed and Ram repaired once.

## 7. Crank press

Cap 63 T

Already repaired once, changed bush and crank turned. It requires major repair and overhauling.

## 8. Crank Press

25 T

Machine is more or less in good condition, overhauling required.

## 9. Friction Press

163 T cap

Hydraulic system including oil seal, is defective and requires overhauling and repair.

## 10. Friction Press

Cap. 63 T

More or less in good condition, require overhauling.

## 11. Mould Board Bending Fixture

In good condition, Minor repair needed.

## 12. Other equipment

Blower, coal furnance, oil pump, power saw are more or less in working condition and requires minor repair.

Machine Shop

1. Nine lathe machines of different sizes are in the machine shop. M/C No. D02, D04 & D05 have already lost their accuracy. The centre is out and can not perform precision work. Only rough work could be done. Require intensive repair and overhauling.

The other lathes are also not in very good working condition; these requires change in gear box & lead screw overhauling very essential.

2. Drill - Two Radial Drilling machines and one vertical drill.

The arm bed of Radial Drill No. D-11 has been worn out considerably. No accurate work could be done on it.

Automatic feeding also not working. This requires major repair. Other two drills are more or less in good working condition, however requires normal overhauling.

The type of job undertaker now require bigger arm Radial Drill.

3. Milling machine

Work table - 1000 x 250 sq mm.

The machine is not in good working condition and requires overhauling. Indexing head and cross slide are defective and gear box required to be changed.

## 4. Shaper

Stroke - 30 mm - 500 mm

Machine is in working condition, although bed is worn out which requires overhauling.

## 5. Power - Saw

Not in good working condition already crank and piston changed, full repair needed.

## 6. Surface grinder

Table 900 x 320 mm in good working condition. Table is little damaged. Require thorough checkup.

## 7. Cylindrical grinder

Height 400 mm, length 1000 mm, and width 360 mm.

Machine very sparingly used. In good working condition normal preventive maintenance is needed. Grinding wheel and wheel dresser required.

Other equipment

Tool grinder, Tool & cutter grinder, Table broken requires repair.

GENERAL ITEMS

## 1. Air compressor - Two numbers

Cap - 8 atmosphere with 28 kw Motor.

Two such compressor are installed and run alternately.

Compressor No. G-02 is out of order for a long time for piston ring.

Requires overhauling.

2. Over Head Crane - Three Nos.

Cap - 2 Ton

These are installed in 3 bays of the production shop. The crane in the assembly shop is damaged. Others are in good condition.

Require repair and overhauling.

3. Dynamic Balancing m/c

Not installed.

#### Heat Treatment Section

1. Tempering and hardening (3 Nos)

In working condition, these are very seldom used.

Require only normal maintenance.

2. Salt bath Furnace

for case hardening

Cap - dia 200 mm & depth - 400 mm

Not used for last several years. Require checking.

## 3. Other items

Hardness tester, quenching tank & exhaust.

Condition require checking.

## 4. High Frequency induction furnace and induction hardening.

The furnace is of 50 kg capacity; while operating gets overloaded and the capacitor gets burned.

The other part of the equipment has induction hardening arrangement. This is working satisfactorily. There are few induction furnace manufactures in India. The circuit of the control panel could be rectified with their assistance.

Foundry

## 1. Cupola

Cap - 1 T/hour

The condition of the cupola is un usable. Three to four times extra fuel is required for its operation. This has already been repaired twice and no useful purpose will be served under taking repair again.

It is suggested that the cupola should be replaced.

## 2. Other items

Sand mixture, core drier vibrating screen.

The condition are such these could not be put to use. These are to be replaced also.

Wood Working Shop

1. Lathe - is not in working condition. Preventive maintenance needed.
2. Drill - Normal preventive maintenance needed.
3. Planer saw & Band Saw - Not in good working condition, Major repair and overhauling needed. The Cutter holder is damaged and cutter blade requiring to be replaced.
4. Grave Cutting machine - Not used, condition is good.

Electroplating Section

1. Plating Tank No. K<sub>e</sub>21 - K<sub>o</sub>23

Size of the tank are very small. Lining has also been cracked. Replacement needed.

2. Cleaning Tank K-41-K-46

Condition are not very good, work could be used for some more time.

3. Selenium Rectified - K - 11

cap - 12 KW

Capacity is too small in good working condition.



### Painting Section

1. A conveyer system passing through baking oven. This was never put to use since the product line does not require it.
2. Similarly paint mixing equipment was never used. The condition of these equipment are not known. In immediate future its utility is also uncertain.

It might be better for the management to dispose of these items or try for job work by which these equipment can be put to use. The repair cost expected to be very high.

3. Spray Gun

4 Nos - These are in constant use. The spray painting booth require renovation.

### Welding Section

Welding section has 3 Nos welding transformer and 6 Nos welding converter. All the equipment are working well. Routine checking and preventive maintenance are needed.

### Grinding and Polishing Section

There are 9 grinding and polishing machines. At present 3 to 4 are put to use. The condition of the equipment are good.

NEW EQUIPMENT

## Tool Room

1. A Tool Room Lathe - 1 No.
2. Die Sinking Machine - 1 No.
3. Horizontal Boring Machine - 1 No.
4. Milling Machine - 1 No.

## Foundry

1. Cupola - 1 Ton - 1 No.
2. Sand Muller/Mixture - 1 No.
3. Moulding Boxes - 12 Nos.
4. Hand Moulding Machine - 1 No.

## Wood Working

1. Power Chain Saw - 1 No.
2. Wood Working Lathe - 1 No.

## Testing Laboratory

1. Carbon Sulphur determination apparatus - 1 No.
2. Analytical Balance - 1 No.
3. Electric Steel - 10 litre capacity - 1 No.
4. Laboratory glass apparatus - -
5. Viscosity meter - 1 No.

- |    |  |                   |
|----|--|-------------------|
| 6. | P. H. Meter                            | - 1 No.           |
| 7. | Screens                                | - Different sizes |
| 8. | Ready moisture teller                  | + 1 No.           |
| 9. | Permeability and green strength tester |                   |

## Store

- |    |                 |         |
|----|-----------------|---------|
| 1. | Fork Lift Truck | - 1 No. |
|----|-----------------|---------|

## General Purpose Equipment

- |    |   |         |
|----|---|---------|
| 1. | Pneumatic Tools<br>chipping, grinding, revating | - 1 set |
| 2. | Sheet Rolling Machine                           | - 1 No. |
| 3. | Angle bending Machine                           | - 1 No. |
| 4. | Gas profile Cutting Equipment                   | - 1 No. |
| 5. | Pipe Cutting Machine                            | - 1 No. |

## Repair &amp; Service

- |    |  |                        |
|----|--|------------------------|
| 1. | Mobile Van<br>with Welding generator and repair<br>Kit | - 1 No.<br><br>- 1 No. |
|----|--|------------------------|

The specification of the above equipment has been given in the list enclosed in the project document.

## VII. FINANCE

This section covers the financial operations of the company, including an analysis thereof. In addition, it covers the Division's organisation and systems.

### A. Financial Statements

Comparative balance sheets are given for the year 1980/81, 1981/82 and 1982/83. In addition, estimated figures for 1983/84 and projected figures for 1984/85 are given. These are shown in Appendix 7.

Comparative profit and loss statements are given for the same periods. These are shown in Appendix 8.

### B. Profit Analysis

A simplified profit analysis for the company's operations has been made in the succeeding table.

The following comments are given:

1. Gross profitability, which is the difference between sales and cost of sales, has been improving from a low of 15.9% in 1980/81 to 23% in 1981/82, 32.2% in 1982/83 and an estimated 33.7% in 1983/84. This is primarily due to reduction in production costs, improved pricing policies and sales with better profitability.

2. Selling expense, in proportion to sales, has gone up from 11.3% in 1980/81 to 13.1% in 1981/82. It has dropped to 10.4% in 1982/83, showing a big improvement, but is expected to deteriorate this year (1983/84) to 13.1%. Some of the causes are the establishment of new outlets which have not produced the required sales targets and higher salaries. Efforts should be exerted to attain a selling expense to sales ratio of 10%.

PROFIT & LOSS

	1980/81	%	1981/82	%	1982/83	%	1983/84	%	1984/85	%
Sales	3,865,148	100	3,556,519	100	8,313,929	100	9,400,000	100	10,000,000	100
Cost of Sales	3,250,677	84.1	2,740,347	77	5,640,898	67.8	6,234,999	66.3	6,590,000	65.9
Gross Profit	614,471	25.9	816,172	23	2,673,031	32.2	3,165,001	33.7	3,410,000	30.1
Selling Exp.	438,623	11.3	467,863	13.1	865,787	10.4	1,300,000	13.1	1,312,000	13.1
Adm Exp.	1,185,161	30.6	1,403,188	39.45	1,608,287	19.34	1,837,000	18.55	1,888,000	18.88
Total Selling/Adm. Exp.	1,623,784	41.9	1,871,051	52.55	2,474,074	29.74	3,137,000	31.65	3,200,000	31.98
Profit	(1,009,313)		(1,054,879)		198,957		28,001		210,000	
Misc. Income	7,858		19,310		114,439		50,000		25,000	
Net Profit	(1,001,454)	(25.9)	(1,035,569)	(29.1)	313,396	3.8	78,000	0.83	235,000	2.3

3. Administrative expense has gone up from 30.6% in 1980/81 to 39.45% in 1981/82; dropping to 19.34% in 1982/83 and is expected to drop further to 18.55% in 1984/85.

4. Net profit has been unfavourable, Rs 1,001,454 net loss in 1980/81 and another loss of Rs 1,035,509 in 1981/82. It has, however, made a net profit of Rs 313,396 or 3.8% of sales in 1982/83. The projections for 1983/84, which show a drop in profit to Rs 78,000, or 0.83% of sales, is due to increased salaries and wages and selling expenses. The above figures for 1982/83 and 1983/84 are tentative and subject to audit.

#### C. Receivables

The receivables including advances in proportion to sales is shown below:

Year	Receivables	Sales	%
1980/81	1,381,509	3,865,148	35.7
1981/82	1,015,408	3,556,519	28.55
1982/83	1,452,270	8,313,929	17.46
1983/84	2,187,880	9,400,000	23.27
1984/85	2,400,000	10,000,000	24.0

While receivables have been going down in proportion to sales, from 35.7% in 1980/81 to 28.55% in 1981/82 and 17.46% in 1982/83, it is estimated to increase to Rs 2,187,840 or 23.27% of sales. While no detailed analysis of the aging of receivables has been made, it was reported that accounts above 3 years are Rs 50,000 (2.3% of total) whereas accounts from 1-3 years are Rs 67,000 (3.0% of total). The total of overdue receivables of Rs 127,000 is 5.3% of total and constitute manageable levels. A detailed review of the receivables below 1 year should be made, with the objective of reducing the collection period and reducing the amount of receivables, in order to provide more liquidity for ATF's procurement programs.

#### D. Inventory

The total inventory for finished, semi finished products and raw materials

is shown below:

Year	Inventory	Cost of Sales	Turnover
1980/81	5,925,069	3,250,677	0.54
1981/82	5,381,855	2,740,347	0.51
1982/83	5,378,692	5,640,898	1.05
1983/84 (Est)	6,200,000	6,234,999	1.00
1984/85 (Est)	7,200,000	6,590,000	0.91

Inventory turnover rate has improved by double in 1982/83, compared to 1981/82. Such turnover of 1.05, however, is still very poor, considering that the company has to keep a stock of materials and finished products adequate for one year's sales.

An analysis of the finished products inventory has been given in Section V (Marketing) of this report.

An analysis of the very high raw materials inventory has been given also in Section VI (Manufacturing) of this report.

#### E. Fixed Assets

Original cost of fixed assets as of end 1982/83 was Rs 7,580,225. Accumulated depreciation was Rs 4,083,081, leaving a net value of Rs 3,497,143.

As the machinery has been depreciated at 10% / year, this is now almost fully depreciated.

Re-valuation of fixed assets can be undertaken in order to increase the company's networth. Such re-valuation can offset write-offs that may be required for raw materials and finished product inventories.

Secured loans of Rs 1,340,441 against fixed assets have been made in 1982/83.

#### F. Working Capital Analysis

The following analysis is based on the estimates for the current year 1983/84, as compared with budget estimates for 1984/85.

Current Assets:	1983/84	1984/85
Cash and Cash in Banks	1,500,000	1,652,880
Bills receivable and advances	2,187,880	2,400,000
Inventory	6,200,000	7,200,000
<b>Total Current Assets</b>	<b><u>9,887,880</u></b>	<b><u>11,252,880</u></b>

**Current Liabilities:**

Provident Fund	65,000	35,000
Bills Payable	1,435,000	1,165,000
Loans	2,600,000	2,800,000
<b>Total Current Liabilities</b>	<b><u>4,100,000</u></b>	<b><u>4,000,000</u></b>
<b>Working Capital</b>	<b>5,787,880</b>	<b>7,252,880</b>

Working capital is projected to increase by Rs 1,465,000. The budget has been based on increases in inventory and receivables due to higher sales. The increase in working capital is primarily due to the expected additional promotor's investment of Rs 2,102,680. If such investment does not materialize, then the working capital will decrease to Rs 5,150,200 or a reduction by Rs 637,680. This will seriously impair the ability of ATP to increase sales.

Attempts at further increasing working capital can be achieved through the following means:

1. Decrease Bills Receivables through a reduction in the collection period: Selectivity should be the norm in selling to customers with long collection periods. Assuming a target for Receivables of two months sales, there will be a reduction of Rs 2,187,880 to Rs 1,666,660 or Rs 521,220.

2. Decrease inventory through disposal of non-moving items, better sales forecasting and production planning: Assuming an inventory turnover target of 2 a year instead of the current 1.0 a year, inventory can be reduced from the projected Rs 6,200,000 to Rs 2,100,000, a reduction



of Rs 3,100,000.

3. Conversion of the present short-term loan of Rs 2,600,000 to long-term loans.

4. Increasing loans by reappraising machinery and equipment, which is now almost depreciated, to market value. From a book value of Rs 4,500,000 in 1983/84, reappraisal can result in a value of Rs 6,500,000. Loan available at 75% value is Rs 4,875,000 or an increase of Rs 2,275,000.

5. Secure development loans at low interest rates on a long term basis for financing the manufacture of new products proposed in Section IX (Product Development) of this report. This can be done through international or regional financing institutions, like the World Bank or Asian Development Bank.

Excluding the loans of Rs 2,600,000 which are being renewed on a year to year basis, possible increase in working capital are:

1. Decrease in Bills Receivables	Rs 521,220
2. Decrease in Inventory	3,100,000
3. Additional Loans	2,275,000
<b>Total</b>	<b>Rs 5,896,220</b>

This additional working capital assumes that reduction in Bills Receivable does not entail write offs and that inventory disposal is at least on acquisition cost.

G. **Statement of Sources and Application of Funds**  
( Cash Flow Analysis for 1984/85 )

Sources:

Cash at beginning	1,500,000
Premotor's Investment	2,102,000
Borrowings	2,800,000
Sales of Products	10,000,000
<b>Total</b>	<b>16,402,000</b>

**Applications of Funds:**

Production expenses (raw materials, labour, etc.) less depreciation	6,420,000
Selling expenses	1,312,000
Administrative expenses, less dep.	1,808,000
Loans payment	2,600,000
Total	12,140,000
Cash Ending	4,262,680

There is an increase of Rs 2,762,680. Liquidity will improve based on the expected projection for 1984/85 and will improve further if the contemplated action in the Working Capital Analysis is accomplished. Cash will increase by Rs 5,896,220 or a total of Rs 10,158,900.

Unless these actions are taken or additional loans or Promotor's investment are obtained, increasing sales under the same terms and conditions as prior years will impair ATF's liquidity.

**H. Costing System**

The Company does not have an adequate costing system. The financial accounts, however, are done once a year and reflect the following cost centers as shown in the simplified Profit and Loss Statement:

1. Production Expenses
  - a. Raw materials used
  - b. Other stores and spares used
  - c. Salaries and allowances
  - d. Other expenses
  - e. Depreciation of machinery and buildings
2. Selling expenses
  - a. Salary, wages and allowances
  - b. Sales commission and bonuses
  - c. Other expenses

### 3. Administrative Expenses

- a. Salaries, wages and allowances
- b. Contribution to Provident Fund
- c. Other expenses
- d. Audit fees
- e. Interest expenses
- f. Gratuity provision
- g. Vehicle expense
- h. Depreciation

Product costs are calculated on the basis of estimates made for prime costs (labour, materials and machine hours) plus an overhead factor which varies on the product group. As the financial accounts are done yearly and in aggregates, there is no way by which costs can be reconciled. Problems arising in the present system are as follows:

1. Materials are issued on an adhoc basis based on a requisition signed by the Production Head for a particular job. There is no way to ascertain the material cost of a product. As there are no automatic controls, materials for a particular job can be excessive due to defects or wastage.

2. Costing of labour is not done, although estimates are made, which have variances of 50 - 80%, based on random samples. Only the total labour cost for the whole Works Division is known at the end of each month.

3. Except for machine hour rates, factory overhead is not properly allocated to the various cost centers. The overhead factor used for pricing purposes is based on product grouping and does not reflect overhead based on cost allocation.

4. Selling and administrative overheads are based on approvals made by the Board of Directors in March 1983.

Considering the present system and the difficulties in making drastic changes in the Costing System, the following recommendations to be done

in three stages are made:

**First Stage:**

**1. Establishment of the following Cost Centers:**

**a. Works**

1. Foundry
2. Others

**b. Marketing**

1. Branches/depots
2. Head Office

**c. Administration**

**2. Standardisation of Material Requisitions on a per product or Job Order basis:** A complete requisition, based on product material standards, is made by the Engineering Section for a particular Job Order. Stores will only issue materials based on the approved requisition. Any deviation from the standard will be covered by a separate requisition to be signed by the Works Division Head. In this way, any error in engineering estimates or production wastage can be brought to the attention of the Division Head.

After the completion of the job, the Material Requisition is forwarded to the Accounts Section (Fiscal Division) for Posting and Job Costing.

**3. Labour:** Since it is difficult initially to maintain Job or time cards due to frequent changes in assignments, labour will be allocated to the Cost Centers based on payroll costs. At the end of the month, total direct labour costs will be compared to the total standard costs for all the jobs completed for the month, and a variance report made.

**4. Overhead:** It is necessary that the overhead for the Works Division be established for its two Cost Centers and to include the following:

1. Indirect labour, including salaries of foremen, supervisors, engineers and managers and other personnel outside the Production Department.

2. Salary-related expenses for all Works Division personnel, such as allowances, leaves, gratuity, etc.

3. Power and fuel costs

4. Repairs and maintenance

5. Depreciation of machinery and buildings

6. Others

At the end of each month, the actual overhead is compared to the estimated overhead application.

The above Costing System would allow for a reconciliation or review of estimates as against actual costs for the various Cost Centers, broken down into labour, materials and Plant overhead.

Second Stage:

1. Establishment of the following Cost Centers:

1. Foundry

2. Forge and Press Shop

3. Machine Shop

4. Welding, assembly, including Painting

5. Carpentry

This breakup of the various Cost Centers would allow a more detailed analysis of actual performance of the various Cost Centers against estimates. Labour and overhead will have to be broken up into the Cost Centers. All other procedures will be the same as in the First Stage.

Third Stage:

Implementation of a Job Order system wherein direct labour is actually charged to the particular Job Order a worker performs should be undertaken upon successful implementation of the first two stages.

## VIII. ADMINISTRATION

### A. Organization and Functions

The Administration Division has the following functions and sections under it:

1. Personnel Administration
2. Vehicle
3. Security
4. Civil Construction and Property Management
5. Procurement

The Organizational chart is shown in Appendix 2.

### B. Personnel

1. Total personnel of ATF is 233, as shown in Appendix 9.
2. Employee turnover : Resignations of senior staff members have been high during the crisis when ATF operations were at a loss. Fourteen staff members, shown in Appendix 10, includes nine engineers. Excluding the Chairman cum General Manager, who is also an engineer, ATF has only 2 engineers left. In addition, there is a Technical Advisor who works part-time.

ATF has a current vacancy of 23 people, 16 of whom belong to the officer class. Appendix 11 shows these vacancies. While not all the vacancies need to be filled up under a more efficient organization, it is necessary that some of the required vacancies be filled.

It is recommended that a personnel or job evaluation or audit be undertaken.

3. Recruitment Program: Recruitment has been a problem. While the country has many qualified men, including engineers, they have not been attracted to Birgunj and to ATF, due to previous crisis in the Company. Advertisements have not resulted in applications. It is suggested that an aggressive recruitment program be undertaken, not only by advertising,

but also by contacting schools or by identifying potential candidates from other firms or agencies and discussing employment opportunities at ATF.

4. Training: A training program is being instituted. Some personnel have been sent to study abroad for formal courses, like the two engineers at ATF who took Mechanical Engineering at USSR, and others who are being sent on seminars. Unfortunately, some of those trained have left ATF.

It is suggested that where ATF shoulders even part of the training expenses, some agreement should be reached so that the employee being trained serves ATF a certain corresponding period. A training program, especially technical, should be undertaken. This is taken up in Section VI (Manufacturing) of this report.

5. Personnel Promotions: A promotions system based on public service policies is in force at ATF. A committee evaluates promotions. It is recommended that in order to make the work of the Evaluation Committee easier, a performance rating be made on all employees, regardless of whether they are due for promotion or not, every 6 months. Quantity and quality of work would be the main criteria in performance evaluation, but should include such factors as punctuality, absenteeism, attitudes, etc.

Those whose performance are below standards should be given every opportunity to improve.

6. Personnel Development: A personnel development program should be undertaken. As a matter of practice, understudies should be identified for various positions.

7. Absenteeism: Absenteeism, especially in the Works Division has been high, causing disruption in activities. While strict implementation of policies has not been made in the past, this is now being done.

C. Procurement

The procurement section is manned by 5 personnel, two of whom are officers and 3 assistants. The Sales Section has analyzed some of their reduced sales for certain products as caused by untimely deliveries. On the other hand, Works Division points to delay or lack of raw materials. The Procurement Section counters that ordering of materials are done very late.

Especially for items requiring bidding under government procedures and for importation from countries other than India, a long lead time of up to 6 months is required. This includes internal processing of orders, board approval, bidding, import licenses, letters of credit, delivery and release from port.

Efforts must be made to shorten this lead time. In addition, the procurement program must be prepared on time, considering the lead times required, economical order quantities and financial requirements. To achieve this objective, a Sales-Production-Procurement Committee has been proposed in Section X (General Management) of this report.

In a review with Sales and Production, many products can not compete with products from India due to high prices of raw materials. Prices of flat steel plates are about Rs 8,999, which is very high compared to prices in other parts of the world. Importation from USSR of \$579/ton results in a much cheaper price.

Philippine prices for steel coming from Japan is only at an equivalent Rs 6,300/-M.T. at the retail level, and yet Philippine duties is 28%, plus 10% sales tax, compared to Nepal's duty rate of only 1% and no sales tax.

It was pointed out that ATF's prices of steel are about Rs 2,000 higher than if these materials were secured at world-competitive prices. Unfortunately,



there are problems encountered such as the lack of financial resources to avail of Indian quota, as bank draft is required, and the lack of interest of Japanese Companies to quote due to smaller volumes.

It is recommended that a more thorough study of pricing and sourcing be made as raw material supply and costs are very critical to the competitiveness of ATF products.

## IX. PRODUCT DEVELOPMENT

## A. Organization

The implementation of Product Development programmes is undertaken by the Research, Test and Development Section, under the Works Division.

It has the following groups:

1. Design, planning and estimates
2. Test and development
3. Quality Control

This Section undertakes not only product development activities, but also all related engineering functions of the Works Division. Considering the present setup of ATF and the lack of technical personnel, this setup will continue to be done with expanded activities as proposed in Section X (General Management) of this report.

## B. Review of Current ATF Products

The succeeding discussions would analyse the sales of the various products presently being manufactured and marketed by ATF. The sales in units for the years 1981/82, 1982/83 and 1983/84 (10 months) are indicated. Recommendations follow each of the products.

## A. Hand Tools

## 1. Shovels

1 - Oval	3811	2942	2266
2 - Flat	635	786	298
Total	4436	3728	2564
Ave./mo.	<u>369</u>	<u>311</u>	<u>256</u>

Sales have been declining over the past 3 years. There is no problem on quality. Competition comes from India. It is estimated that ATF gets about 10% of total demand. While there is need for more aggressive

selling, there is also need for Production to reduce the cost through productivity measures, such as process improvement, reducing labour for making handles, by providing guides to wood lathe operation, and improving the present manual riveting of handles by providing a small manual riveter to the labour subcontractor.

## 2. Spade

1 - Kodai	1064	2391	1075
2 - Kodalo	868	1950	917
3 - Chande	176	165	111
4 - Spade No. 1	919	321	286
5 - Spade No. 2	1161	253	121
Total	4188	5080	2510
Ave./mo.	<u>349</u>	<u>423</u>	<u>251</u>

Sales of spades have considerably declined this year, primarily due to quality and price. It is estimated, based on random sampling in the Birgunj area, that ATF sells only from 5 - 10% of total demand. Price of TATA (India) is Rs 36 as against ATF of Rs 40.

Quality of TATA is much better as it is completely forged, whereas ATF's spade is made of flat steel and the eye for the handle welded. In addition, some farmers observed that wear on the hoes is very fast with one-half of the hoe wearing out in a year.

Complete forging, as in TATA's, is not possible at present due to low volumes, however, the following should be done:

1. Reduce production cost by improving productivity of operations in forging, welding, making of handles and painting.
2. Check material specifications.
3. Hardening a wider area of the hoe, rather than just the tip.

## 3. Hoes

1 - Big Hoe	287	767	394
2 - Flat Hoe	1832	3770	1770
3 - Pointed Hoe	1184	1484	1779
Total	3303	6021	3943
Ave./mo.	<u>275</u>	<u>501</u>	<u>394</u>

Sales have started to decline this year. As in shovels and other hand tools, competition comes from India.

There is need to reduce cost through productivity measures in various operations. There is also need to improve the present dies being used.

## 4. Hand trowel

1 - Kurpi	590	1186	770
2 - Entrenching tool	1957	2258	121
Total	2547	3444	891
Ave./mo.	<u>212</u>	<u>287</u>	<u>89</u>

Sales for Kurpi have gone down this year. The drastic drop in the sales of entrenching tools has been attributed by Sales Section to the lack of demand from the Army. Production has already stopped.

For the Kurpi, as in the others, cost reduction through productivity measures should be done.

## 5. Rakes

1 - Multitype	1392	1604	804
2 - Three type	56	19	18
Total	1448	1623	822
Ave./mo.	<u>121</u>	<u>135</u>	<u>82</u>

Sales for rakes have drastically declined this year, attributed to some delivery problems.

Because of the very low volumes of the three-type rakes which do not warrant economical production, it is suggested that this product be dropped.

For the multitype rakes, cost reduction should be done.

#### 6. Chisel

1 - 1x1	207	187	598
2 - 1x1 1/2	59	83	0
3 - 1x4	14	18	1
4 - 1x6	124	343	130
5 - 1x8	----	20	----
6 - 1 1/4 x 1	370	120	----
7 - 1 1/4 x 6	1224	803	185
Total	1998	1574	914
Ave./mo.	<u>166</u>	<u>131</u>	<u>91</u>

Sales have been declining over the past 3 years.

Cost reduction through productivity measures should be done. Studies should be further made in order to reduce the number of chisel sizes, from the present 7, to probably 4, in order to have a more economical production batch.

#### 7. Crowbars

1 - 1x2	----	173	69
2 - 1x2 1/2	----	----	12
3 - 1x3	191	407	36
4 - 1x4	67	3	5
5 - 1x5	480	1140	88
6 - 1 1/4 x 1 1/2	----	26	6
7 - 1 1/4 x 2	15	----	----
8 - 1 1/4 x 4 1/2	20	228	138

9 - 1 1/4 x 5	1383	194	56
10 - 1 1/4 x 5 1/2	----	344	72
Total	2156	2515	482
Ave./mo.	<u>179</u>	<u>209</u>	<u>48</u>

Sales have drastically dropped this year, which Sales Section has pointed out to be a supply problem. Production has given the lack of raw materials as the cause.

Cost reduction through productivity measures should also be undertaken.

#### 8. Pick

1 - Pick	1660	2975	1873
Ave./mo.	138	248	187

Sales have declined this year, due to lack of supply in time. It is considered competitive in the market and generally used for government construction projects.

There is also need for cost reduction.

#### 9. Kukuri

1 - 6"	----	2	----
2 - 10"	94	55	17
3 - 12"	28	6	27
Total	122	63	44
Ave./mo.	<u>10</u>	<u>5</u>	<u>4</u>

Sales have been declining over the past 3 years. This is generally sold to the military. With a very low volume of 4 a month, thereby making production uneconomic, it is suggested that this be dropped as a regular stock line and considered only for Job Order when there are volume sales.

#### 10. Sickle

1 - Sickle	706	1684	272
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2 - Kurpa	203	473	395
Total	909	2157	667
Ave./mo.	<u>76</u>	<u>180</u>	<u>67</u>

Sales have drastically dropped this year, primarily due to competition from village blacksmiths. Sales potential is big. It is suggested that cost reduction be done in order to compete.

#### 11. Hammer

1 - 2 kg	283	511	119
2 - 4 kg	616	153	110
3 - 6 kg	822	152	221
4 - 8 kg	352	913	440
5 -10 kg	28	230	253
6 -12 kg	268	460	240
Total	2369	2266	1383
Ave./mo.	<u>197</u>	<u>189</u>	<u>138</u>

Sales have been declining over the past three years, primarily due to quality problems, as alleged by ATF's Birgunj dealer. Despite the cheaper hammer of ATF (Rs 17 per kg) against TATA's (Rs 24 per kg), this dealer sells about 50 per year of ATF as against 1000 per year of TATA.

It is recommended that quality be improved by reviewing material specifications and hardening process.

#### B. Animal Drawn Implement

##### 1. Moldboard Plow

1 - 6"	177	113	73
2 - 8"	2916	2198	1398
Total	3093	2311	1471
Ave./mo.	<u>258</u>	<u>192</u>	<u>147</u>

## 2. Tyne Cultivator

1 - 3 tyne	105	49	51
Ave./mo.	<u>9</u>	<u>4</u>	<u>5</u>

Sales have been declining over the past three years. There is a need to improve the productivity of draft animals through more effective tools, due to the high cost of machinery and fuel and the very small landholdings. An average farmer normally has a pair of bullocks with a wooden plough and hoes for village operations.

The present moldboard plough, based on ocular inspection and confirmed by the Agricultural Implement Research Center in Birgunj, and ATP's Technical staff, is too heavy for the bullocks to pull. It has been observed that the width of cut (8") is wider than the popular models desired by farmers. In addition, the plough point and share seems to be inadequately designed, as it provides a scraping action on the soil thereby increasing draft, rather than a shearing action which should result in turning the soil over.

It is recommended that the plough be redesigned to reduce draft. This can be based on the design available at the Agricultural Implement Research Center, which has been proven to be acceptable to farmers. Considering that tooling for the shares and points are now available, modification of the dies would be resorted to.

The 3-tyne cultivator sales are very low, 5 units a month, as it is not a popular tool used by farmers. Its improvement, therefore, should receive a low priority or it should be considered for dropping.

## C. Tractor Implements

## 1. Tyne Tiller

1 - 9 tynes	6	7	14
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2 - 11 tynes	1	5	8
3 - 13 tynes	----	3	0
4 - 15 tynes	----	2	4
Total	7	14	26
Ave./mo.	<u>0.6</u>	<u>1.2</u>	<u>2.6</u>

The tyne tiller is a very popular tool being used by farmers for tractors and in many cases, the only tillage tool being used. While sales have increased this year, it is very far from actual demand.

The number of tractors in operation in Nepal has been estimated to be about 2,000, with about 1,000 in the Terai region. The biggest tractor distributor sells Massey-Ferguson brand. In Terai alone, this dealer sells from 30 - 60 tractors per year.

ADBN has allocated financing for 75 tractors and implements in 1984, and 100 for 1985.

ATP should sell about 70 tyne tillers per year, especially to the Massey-Ferguson distributor and to the distributor of Balarus of USSR. Almost all of the tyne tillers sold with the tractor comes from India. Prices and quality seem comparable.

It is recommended that the following be undertaken:

1. Appoint tractor distributors as dealers of ATP.
2. Since spring type tillers are expensive and for lands that have been tilled for sometime, springs are no longer needed, study the possibility of:
  - a. Using the Ransomes type tiller design where no springs are used.
  - b. Using a pegtooth harrow design where round pegteeth are bolted on 2 parallel circular or square hollow section frames. Inclination of pegs can be adjustable. This is a popular design for tillage in wetland cultivation, in other Asian countries.

## 2. Disc Harrow

1 - 12 disc	5	5	0
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Sales are nil this year, due to lack of demand for the 12 disc harrow. This size is too small for the normal sizes of tractors used for farms. Sales Section has indicated that there is a need for 16 disc harrows.

Based on an inspection of the design, it was observed that the existing design uses 6 bearings, instead of 4, which is ordinarily used up to 16 discs, in other countries. There is available at Parwanipur Agriculture Station a harrow using 4 bearings.

In order to be flexible in the demand for 12, 14, 16, 18 or more discs, 2 channels gang frame should be considered for development and tests.

## D. Transport Equipment

## 1. Manual

1 - Wheelbarrow (steel wheel)	284	466	31
2 - Wheelbarrow	----	20	156
Total	284	486	187
Ave./mo.	<u>24</u>	<u>40</u>	<u>18</u>

Sales have dropped drastically this year, which has been attributed to lack of government orders. The ATF Birgunj dealer claims that there is inadequate stock.

The potential market for wheelbarrows is large. A ISC study for the Development of Bhaktapur in 1981, projects the demand in Kathmandu valley alone of 750 wheelbarrows in 1984/85. Total demand for Nepal should be very large.

It is recommended that the quality be improved, especially the welding and finish. Cost reduction through productivity measures should be done.

## 2. Animal Drawn Vehicle

1 - ADV Wheel	----	71	339
Ave./mo.	----	<u>6</u>	<u>34</u>

The ADV wheels with axle and tires are sold and wooden bodies are fitted. Considering the widespread use of animal transport in Nepal, the market demand is very large.

Selling is not a problem. There are production problems, such as raw material and parts delays. A roller die is also being made to produce rims at ATF.

It is suggested that a review be made as to whether it is economical to make rims at ATF, considering that there is already a manufacturer who produces good quality rims. Rims are proprietary items and are generally made by specialists.

## 3. Tractor Trailer

1 - 1 ton	12	10	5
3 - 3 tons	16	15	23
4 - 4 tons	4	12	12
5 - 5 tons	3	16	8
Total	35	53	48
Ave./mo.	<u>2.9</u>	<u>4.4</u>	<u>4.8</u>

Sales have been increasing and are expected to further increase, considering that more than 2,000 tractors and 1,000 power tillers are now in operation, with many used for transport solely or, during the off-season, for tillage.

Being a high value item, sales through tractor distributors should be pushed. Also, in order to further reduce costs, the trailer be redesigned insofar as structural channels and sheet metal processing are concerned. The location of the axle for two-wheel trailers is too far off from the

center of the trailer body, thus imposing too much load on the tractor itself. This finding was confirmed by the German Engineer of the Parwanipur Agricultural Station at Birgunj. Care must be exercised in the design so that the correct design load on the rear tractor tires and the trailer wheels is observed, at the same time providing a correct balance on the trailer.

In addition, proper jigs and fixtures for better quality and assembly should be made.

#### E. Water Equipment

##### 1. Water Cans

1 - 5 Lts	279	562	543
2 - 10 Lts	197	842	338
Total	476	1404	881
Ave./mo.	<u>40</u>	<u>117</u>	<u>88</u>

Presently the labour for the production of these cans is being subcontracted. It is suggested that in order to improve quality and reduce costs for labour subcontract, seaming operations through manual rollers be used.

##### 2. Hand Pumps

1 - 3"	38	20	1
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ATP had manufactured handpumps 5 years ago, but stopped due to high costs and machining problems.

The demand for handpumps is very high. According to Mr. Narayan Regmi of the Department of Agriculture, government projects alone account for 7,000 units for 1984/85. The potential is also very big, especially in the Terai area.

There are about 3 foundries producing handpumps, including Himalaya Iron & Steel in Birgunj, which makes handpumps for UNICEF and for its own sales.

Pumps also come from India priced at Rs 175 to 225 each. It is claimed by ATF's Birgunj dealer that supply is inadequate.

Manufacturing handpumps is not recommended unless ATF's foundry is efficient. Subcontracting the casting is not also advisable, as foundries sell pumps.

#### F. Other Agriculture Equipment

##### 1. Corn Planter

1 - Hand	0	34	0
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Sales of manual corn planters in 1982/83 were 34 units, but production was stopped due to small production batch.

Considering the present farming practices, the development of manual, animal or tractor driven planters or seed drills should not be done until the farmers are ready for it.

#### G. Post Harvest Equipment

##### 1. Corn Sheller

1 - Hand	401	981	284
Ave./mo.	<u>33</u>	<u>82</u>	<u>28</u>

Sales have dropped this year. More detailed studies have to be made, as the price of Rs 140 seems high for an average farmer. Wholesale price for a hand corn sheller from India is only Rs 7.

Redesign and cost reduction measures should be undertaken.

##### 2. Thresher

1 - Paddy	222	162	264
2 - Wheat	----	2	259
Total	222	164	523
Ave./mo.	<u>18.5</u>	<u>13.6</u>	<u>52.3</u>

While sales for the pedal paddy thresher have improved this year, the potential is so big and would exceed 1,000 units. An ISC study for Bhaktapur Development projects, in 1984/85, a demand of 520 units in Kathmandu Valley alone. The Terai would require very much more. Competitors are from India.

It is suggested that the design be improved further in order to reduce costs.

Sales for wheat threshers seems to be good, although demand has been estimated to be about 800/yr. However, complaints have been received by Sales regarding quality. The cleaning process needs improvement. In addition, the manufacturing process should be improved to reduce costs.

#### C. Evaluation of New Products

Considering the objectives of ATF, its manufacturing capabilities, experience and expertise of the Company's personnel, an evaluation of various products was made following the product grouping established in Section V (Marketing) of this report.

##### A. Hand Tools

No new products are recommended for development.

##### B. Animal drawn Implements

###### 1. Animal drawn disc harrow

Suggestions have been made by ATF's Technical Staff on the development of an animal drawn disc harrow. The Agricultural Implement Research Center has such a model. It is suggested that more studies be undertaken by them in order to ascertain its acceptability under Nepal conditions. It should be born in mind that disc harrows require more draft than moldboard ploughs and the cost of manufacturing is much higher, due to the use of imported discs and more components.

### C. Tractor Implements

#### 1. Cage Wheels

Cage wheels are attached to wheels of tractors to provide additional traction for wetland paddy cultivation. In some cases, where mud is deep, it is designed for both traction and floatation.

This requires further market studies, especially with regards to the use of quick-fit cage wheels and its acceptability by tractor distributors.

#### 2. Power Tillers

The wetland paddy cultivation of Nepal is favourable to the use of power tillers. It is very popular in Japan, China, Korea, Taiwan, Philippines, Thailand and other Asian countries.

It has been estimated that there are about 1,000 power tillers in use in Nepal, mostly for transport purposes. These are mostly of the Japanese type, multi-speed transmission. Data from an ISC study shows that 915 power tillers were imported from 1977 to 1981, mostly from South Korea, Japan and India. The M-F tractor dealer in Birgunj sells the Mitsubishi brand. As the price is very high, about Rs 32,000, its use for tillage purposes is not popular.

The IRRI-type, single speed power tiller developed more than ten years ago has become popular in Thailand, Philippines and Indonesia for paddy tillage due to its very low cost. A unit is available at the Agricultural Implement Research Center in Birgunj.

Considering that IRRI-type power tillers are within ATF's manufacturing capabilities, it is recommended that:

1. ATF request the Agricultural Implement Research Center to undertake field tests under Nepal conditions.
2. ATF undertake a market assessment, including acceptability by farmers.
3. Should the field tests and market assessment be favourable, econo-

ic and manufacturing feasibility studies be undertaken.

#### D. Transport Equipment

No new products are recommended.

#### E. Water Equipment

##### 1. Hand Pumps

This has been included in the review for existing products as this product was previously manufactured. As already pointed, manufacturing is not recommended unless ATF has an efficient foundry.

##### 2. Diesel Pumpsets

A feasibility study for the manufacture of diesel pumpsets was made by ISC in December 1982, and shows that the average yearly demand for 6 years up to 1980/81 is 1,442 units. Demand has been increasing at the rate of 17% a year. It is expected that the demand for 1985/86 is 3,162 units.

According to ADEN, demand this year is about 3,000 units, for which financing is available.

Of the total 8,649 diesel pumpsets imported during the 6 year period, from 1975/76 to 1980/81, 6,800 units (78.6%) were imported by ADEN and 898 units (10.4%) were imported by AIC. The most common models are:

Kirloskar (India)	5/7 Hp
USHA (India)	5 Hp
Kubota	5 Hp

The data indicated are only for diesel pumpsets. Diesel engines are also required for power tillers, ricemills, threshers, generating sets and other equipment.

A project was initiated by ATF in 1975 for diesel pumpsets. Kirloskar and another company submitted proposals based on a tender but the project was not pursued.



Some companies, like ATF and Himalaya Iron & Steel, made centrifugal pumps but had problems on impeller castings.

Considering the market demand now and the large potential, it is recommended that ATF do the following:

1. Negotiate a sole distributorship agreement with a diesel pump manufacturer, preferably with Kirloskar, which is an accepted brand in Nepal and which undertakes manufacturing activities in various countries. ATF will import the engine and the pump and will manufacture the base, tanks and other fabricated accessories. ATF can also supply diesel engines for other applications, like rice mills, generators, etc.

2. Subject to an efficient ATF foundry, ATF can negotiate a licensing agreement for the progressive manufacture of diesel pumpsets. Initially, the pumps can be made during the first phase, with the pump housing, shaft, flanges, bearing covers, etc. to be made at ATF, whereas the impellers and bearings will be supplied by the Licensor. The impeller manufacture at ATF will follow.

Diesel engines' manufacture requires higher technology and should be progressively done in stages as economic and technical feasibility for various components warrant.

### 3. Deepwell Turbine Pumps

The potential for deepwell turbine pumps is high considering the need for good potable water supply.

Market studies should be made at a future date as to actual demand.

The manufacture of turbine pumps at ATF will depend on demand, a good foundry and after experience in making centrifugal pumps has been attained. The bowls, shafts, couplings, columns, spider bearing housings and pump head can be manufactured at ATF, while the bearings (rubber), impeller, right angle gearbox and engines or motors can be imported.

#### 4. Hydraulic Turbines

Hydraulic turbines were introduced in Nepal in the 1960's and its design and manufacture is well advanced. Five manufacturers: Balaju Yantra Shala, Natural Power Engineering, Nepal Yantra Shala, Butwal Technical Institute and Inter-Tech have a capacity of 70 units per year, with over 62 units installed. <sup>1/</sup>Balaju is a joint venture of NIDC and Swiss Association for Technical Assistance.

Considering that the design and manufacture of hydraulic turbines require a different technical skill from present and future programmes of ATP, and the progress already made by the 5 manufacturers, it is recommended that ATP do not develop this line.

#### 5. Hydraulic Rams

The availability of abundant water resources and the terrain of the hills would favor the utilization of hydraulic rams, which is capable of raising the water at heads several times the available head. While its efficiency is very low, using large inputs of water for low outputs, this is compensated by its ability to operate continuously with no maintenance and fuel costs.

Where water is available at a head and not utilized, hydraulic rams would be advisable.

Western industrialized countries have been producing these since the turn of the century. Taiwan is also exporting this to developing countries.

Further market assessment is required. Manufacturing is within ATP's capability.

#### 6. Gasifiers

Gasifiers which burn wood and produce producer gas for fuel of diesel engines are starting to be popular. As one of the alternative sources

<sup>1/</sup> Source: ADB, Nepal

of energy, much research and development is being undertaken worldwide.

Since Nepal has a lot of wood wastes, and diesel is expensive, further studies should be made. The manufacture of gasifiers is within ATF's capability.

#### F. Other Agricultural Equipment

##### 1. Paddy transplanter

The high cost of transplanting, 40 man-days per ha., would need the development of a manual paddy transplanter.

IRRS has developed a transplanter, but it does not conform to the paddy planting practices in Nepal and the rest of Asia. ATF has a model given by the government.

It is suggested that this transplanter be turned over to a Research Center for field trials and tests. Only if farmers accept this system should ATF manufacture.

##### 2. Weeders

Weeding operations are expensive as it takes about 40 man-days to weed a bighar.

IRRI has developed a low cost manual weeder. It is within ATF's capability to manufacture this weeder. The problem, however, is that paddy is not planted in straight rows.

It is suggested that ATF ask a Research Center to conduct trials in order to promote its use for farmers. With this weeder big savings for weeding operators will result.

##### 3. Sprayers

Not much information is available on agricultural chemicals. Its use, however, is increasing rapidly as farmers realize its use against insect and disease attacks. /IC, ATF's distributor, sells more than 50% of total

agricultural chemicals used.

There is no known manufacturer of sprayers, whether power or knapsack type. Most of the knapsack sprayers come from India.

It is recommended that:

1. ATF make a more detailed market study of sprayers.

The manufacture is within ATF's capability with the addition of a small roller and seaming equipment. It may also require the improvement of the existing electroplating section.

#### 4. Fertilizer Applicators

Nepal does not produce any chemical fertilizer. AIC, which is also ATF's distributor, is the sole importer and distributor. While fertilizer usage is low, it is increasing as farmers realize the benefits derived.

Fertilizer is applied by broadcasting. IRRI has shown that tremendous losses occur under this system, hence, the development of Rootzone Fertilizer applicators. It is suggested that:

1. ATF request the Parwanipur Agricultural station in Birgunj to undertake research on this applicator.

2. ATF secure from IRRI the latest development since they are improving their designs.

#### 5. Rice Reaper

Harvesting is done presently by sickles. Based on an interview with a Birgunj farmer, 20 man-days are required to harvest 1 bighar. If a harvester gets 1 bundle for every 15 bundles he harvests, or 6.66% of the harvest, this is a very large share that a farmer loses to a harvester. It also provides a very lucrative opportunity for a custom service operator to have a low cost power reaper.

An animal drawn harvester is being developed by ATF's Technical Advisor funded by the government. Its development may take some time and its

acceptability may be difficult, as manual harvesting would still be needed around the periphery of a paddy plot which is quite small in Nepal.

IRRI has developed a low cost reaper with triangular cutter blades, based on an original China design. It is being manufactured in the Philippines, Thailand and Indonesia, and accepted by farmers.

It is recommended that ATF ask a Research Center to undertake tests of this IRRI reaper. An IRRI power tiller is now available at the Agricultural Implement Research Center, hence, what is needed is the reaper attachment.

If applicable and economically feasible, manufacture can be done, which is within ATF's capability.

#### G. Post Harvest Equipment

##### 1. Powered Corn Sheller

Considering the large area (511,000 ha.) planted to maize, interest has been shown on a powered corn sheller, especially for big areas under cultivation.

Market and manufacturing studies have to be made for shellers with capacities of about 500 kg. per hour. Should a powered corn sheller be saleable, a combination husker-sheller can be considered in the future. All of these are within ATF's manufacturing capability.

##### 2. Powered Paddy Thresher

A prototype has been produced by ATF based on IRRI's TH-6 model. The problem encountered is that capacity is too low, only 60 kg./hr. Possible reasons given by IRRI is that Nepal's paddy is long, (almost 90 cm) while design was based on IRRI varieties of about 40 cm.

Dr. Amir U. Khan <sup>1/</sup> who designed the original IRRI thresher has advised that the original IRRI design is not acceptable in Pakistan, hence an IRRI-PAK design was developed by him during his 3 year stay in Pakistan.

<sup>1/</sup> IRRI Agricultural Engineer

Manufacturers in Lahore, Pakistan further modified this IRRI-PAK design and find it commercially viable.

It is suggested that ATF write or visit Mr. S.I. Ahmad of the Farm Machinery Institute, P.O. Box NIH Islamabad for assistance.

### 3. Paddy Driers

Present practise of drying is by means of sun drying. It has been observed in many paddy producing countries that great amount of losses are incurred where there are no drying facilities. Present system of solar drying results in uncontrolled temperature which causes more grain breakages during milling. Where rains occur during harvest time, losses result.

It is suggested the Research Center look at dryers and its benefit to the economy, especially for use by the bigger rice mills. If at a future date it is feasible and accepted by farmers, kerosene fed or rice husk driers of the batch type can easily be manufactured.

### 4. Rice Mills

Rice is the primary crop, hence the use of rice mills is widespread. There are about 3,900 rice mills in Nepal.<sup>1/</sup> These include 3,620 hullers of which 3,450 units are of less than 30 Hp and 170 units are above 30 Hp; the remaining 280 units are rice shellers. The shellers are of Japanese design mostly of 1 ton per hour capacity. Hullers are mostly of the Engleberg type, which has a horizontal cylinder and a screen. In some cases, it has a polisher attached to it. It has a very poor recovery, sometimes as low as 50%, although rice bran output for feed is very high.

Rice shellers of the rubber roller type, rotating at different speeds, have a very high recovery, sometimes reaching up to 72% in very efficient mills.

Rice shellers are starting to be popular, and the potential market is 3,620 units and is bound to increase as rice productivity increases. A

<sup>1/</sup> S.K. Shalla and T.B. Basnyat, Post Harvest Technology and its Impact on the Rural poor in Nepal, 1981

visit to a rice mill operator in Birgunj showed that the operator would like to shift to the sheller type, as he is getting a very low recovery, below 60% and poor quality of rice with 2% paddy and more broken rice.

It is of common knowledge that losses due to the use of the traditional rice huller reaches into hundreds of million rupees. Many countries like India, Philippines, Thailand and Indonesia have gone into massive modernization programmes using rice shellers, while Japan, Taiwan, South Korea and China are advanced in this program.

Nepal Industrial Development Corporation has been promoting this technology, extending loan facilities. There is a manufacturer of Rice Shellers in Korneindu (Madanlal Chiranjilal Group) which claims to make about 20 units per year. Based on the sample displayed during the Industrial Exhibition, much is desired insofar as quality is concerned.

It is recommended that ATP:

1. Undertake more detailed market studies
2. Undertake an exclusive distributorship agreement with a popular Japanese ricemill manufacturer with proven experience in countries of Asia, such as Satake or Kokuyo.
3. Enter into a licensing agreement for the partial manufacture of the rice mill.

The one-pass ricemill which combines the sheller and a polisher would be an appropriate model to consider. Alternatively, only the sheller can be sold, utilizing the traditional Engelberg huller, which the ricemill owner already has, as a polisher.

#### H. Miscellaneous Job Orders

The present miscellaneous job orders for various products such as man-hole covers, building structures, garbage collectors, electrical components, etc., should be continued as it provides a high volume and higher

profit margins.

ATF should expand into the fabrication of the following products:

1. Tanks: pressure, overhead or underground
  2. Fuel Tankers
  3. Truck steel bodies
  4. Forged/Press products
  5. Industrial plant components and equipment, such as bins, silos, hoppers, structures, etc.
  6. General fabrication/construction of steel structures
  7. Equipment for animal production, such as feedmixers and hammermills
- To be able to do this effectively, ATF should improve their engineering capability and add some equipment such as sheet metal rollers, automatic gas cutters, etc.

Other products that have been looked into are the following:

1. Biogas Plants
- Biogas plants are in use in the country. The Ministry of Agriculture and the ADBN is actively promoting the installation of such plants, now estimated to be about 750.

Two models are used, the Indian which is of steel construction (floating drum) and the Chinese model (concrete underground tank).

As many companies are now in this business, it is recommended that ATF does not diversify into this line.

2. Other Alternative Energy Sources
- A large number of solar heaters are being sold primarily for schools, hospitals and tourist lodges.

Photovoltaic cells for power generation are used for communication purposes.



Due to the high investment costs of solar heaters, photovoltaic cells and windmills, it is suggested that ATF does not consider diversifying into these products.

### 3. Oil Expellers

There are 110,000 ha. planted to oil seeds producing 69,000 M.T. oil. Extraction is done with small expellers installed in small rice and flour mills in the Terai, Kathmandu and Pokhara valleys. These expellers have a recovery of about 38%.

There are, however, some modern expellers sourced from India, but are expensive and are not within the reach of farmers.

In the remote areas, oilseeds are processed by traditional methods resulting in poor recovery. There seems to be adequate number of oil expellers, but they are obsolete, poor quality and small capacity. In some areas, lack of expellers limit the growing of oilseed crops.

It is recommended that since there is a potential for oil expellers and it is within ATF's manufacturing and marketing capability:

1. ATF undertake a more detailed market study.

### 4. Foundry Products

A recent ISC study for the cast iron industry indicates that there is a deficit of 1,913 tons/year of cast iron products.

Nepal Cast Iron Industry, Ltd, at Hetauda is contemplating an expansion. Even with this, the study shows a gap of 990 M.T. of finished cast iron products. The foundry industry is one of the activities which has a great impact on the industrial development of Nepal and the expansion of the activities of ATF, especially for components of machineries such as implements, trailers, pumps, engines, etc.

Present foundries are with cupola furnaces which cannot utilize even 50%

of their capacity, due to lack of hard coke and pig iron which are imported from India.

While some preliminary investigation was made in Section VI (Manufacturing) of this report, as to the need to improve ATF foundry, more detailed studies are required.

D. Development Action Program

Based on the foregoing discussions, the following action programs for various products are proposed :

- a. For immediate implementation (Cost reduction through Productivity measures)
  1. Hand tools
  2. Wheelbarrows
  3. ADV
  4. Water cans
  
- b. For immediate implementation (Redesign and further development)
  1. Animal drawn moldboard plough
  2. Tractor tyne tillers
  3. Tractor disc harrow
  4. Tractor trailer
  5. Wheat thresher
  
- c. For immediate implementation (Design and Development)
  1. Powered paddy threshers
  2. Tanks: pressure, overhead or underground
  3. Forged/pressed parts
  4. Truck steel bodies
  5. General fabrication/construction of steel structures
  
- d. For intermediate-term development
  1. Hand pumps
  2. Diesel pumpsets
  3. Weeders
  4. Sprayers
  5. Fertilizer applicators

6. Paddy harvester (reaper)
  7. Powered corn sneller
  8. Equipment for animal production
  9. Foundry products
- e. For long-term development
1. Power tillers
  2. Turbine pumps
  3. Hydraulic rams
  4. Gasifiers
  5. Paddy transplanter
  6. Paddy dryers
  7. Oil Expellers

E. Creation of a Product Development Committee

Presently, product development activities involving existing products are done as product problems arise and done at lower levels of Management. Development of new products are generally initiated by the Chairman cum GM.

It is recommended that the Product Development function be coordinated by a Product Development Committee, which shall be composed of the following :

Chairman : Chairman cum GM

Members : Head, Marketing Division

Head, Works Division

Head, Fiscal Division

Secretary: Head, Research, Test and Development Section  
or the proposed Engineering Section

Additional members may be appointment by the Chairman as he deems fit. The Committee should meet monthly or as often as needed, with an agenda prepared by the Secretary and circulated in advance to all members. In case the Chairman is not available, the Head of the Works Division shall act as Chairman. All Committee members shall undertake the necessary studies relative to their functions, such as market, technical and financial implications of the products proposed for development. The Committee shall also take up product problems with the objective of improving designs.

F. Linkages with International, Regional and Nations/Institutes

In order to avail of technical support, ATF should establish close linkage with institutions such as the following :

1. ESCAP-RNAM (Regional Network for Agricultural Machinery), based in Los Banos, Philippines
2. ESCAP-Technology Branch, based in Bangkok, Thailand
3. ESCAP-RCTT (Regional Centre for Technology Transfer), based in Bangalore, India

4. International Rice Research Institute (IRRI), based in Los Banos, Philippines
5. UNIDO, based in Vienna, Austria
6. U.N. Center for Science and Technology (UNSTD), based in New York.
7. Food and Agriculture Organization (FAO), based in Rome, Italy
8. Research institutes in Nepal
9. Research Institutes in India and Pakistan

#### G. Assistance Required

There is need to train the staff of the Section. It is suggested that a Product Development Expert with actual experience in design and manufacturing of agricultural and industrial machineries be requested to assist in training and implementing product development activities.

A project document is included in Section XII of this report.

A. Organisation Structure

The present organisation chart of ATF is indicated in Appendix 2. A proposed chart, shown in the following page, basically incorporates all the present functions or activities and institutionalizing some. Features of the chart are as follows :

## 1) Formalizing the following committees:

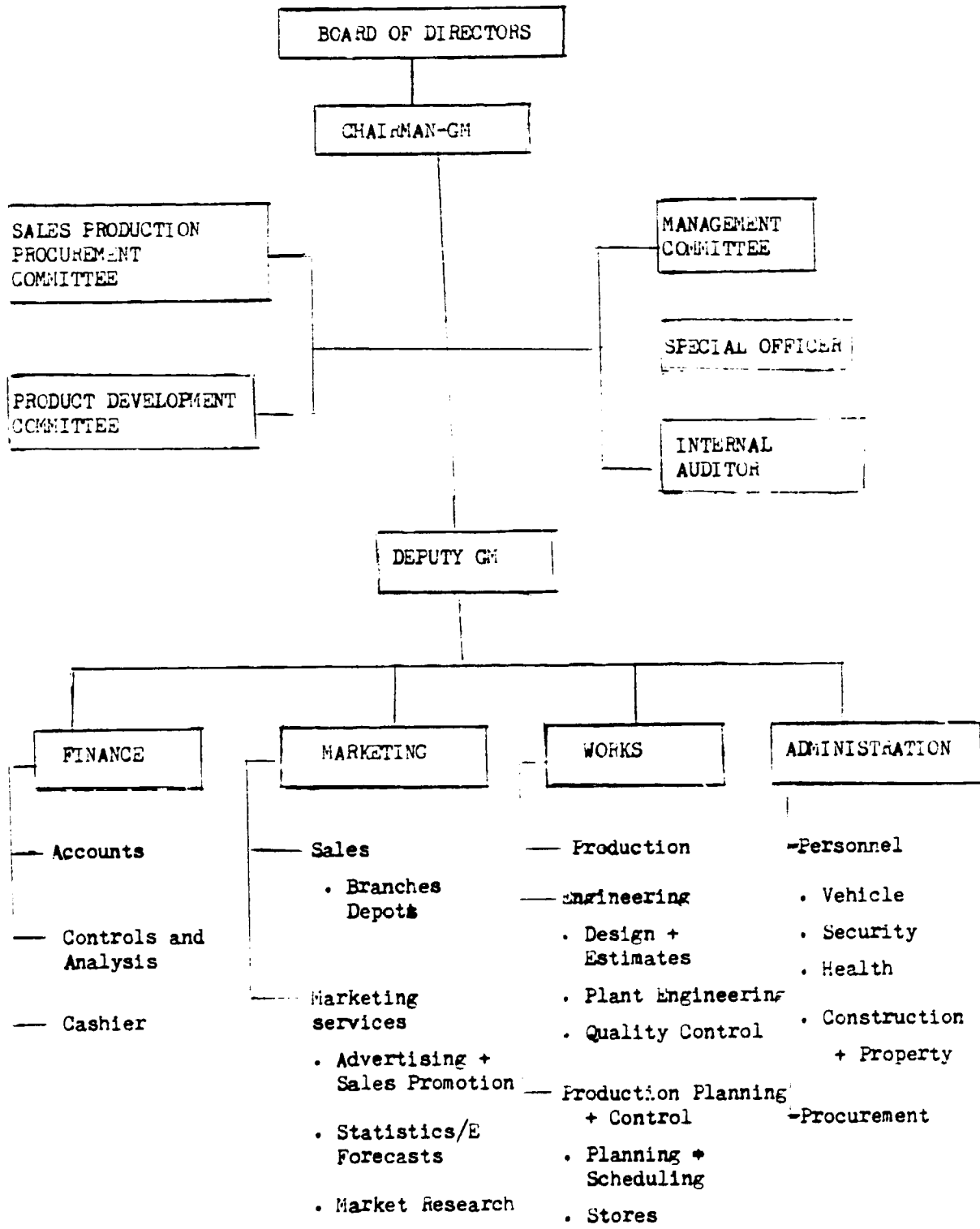
- a) Management or Executive Committee composed of the Chairman cum G.M., Deputy G.M., Special Assistants above Division Head rank and Division Heads.
- b) Sales-Production-Procurement Committee, details indicated in the latter part of this report.
- c) Product Development Committee, details indicated in section IX (Product Development) of this report.

## 2) Changes in the Finance Division:

- a) Creation of a controls and analysis section
- b) Transfer of the Stores to Works Division for better coordination. Only the physical control of the inventory including some order functions are proposed to be transferred while records and controls remain with the Finance Division. Such transfer provides better coordination and check and balance.

## 3) Changes in Marketing Division:

- a) Converting the present operations of the Sales Section into a Birgunj Branch so that it can concentrate on area sales operations.
- b) Creation of Sales Office under a Sales Head who will supervise all the operations of the Branches and Depots.





c) Creation of a Marketing Services Section which will undertake the following services :

- 1) Advertising and sales promotions
- 2) Statistics and forecasts
- 3) Market research

4) Change in Works Division :

a) Converting the present Research, Test and Development Section into an Engineering Section with the following activities:

- 1) Design and Estimates
- 2) Plant Engineering
- 3) Quality Control

b) Creation of a Production Control Section, with the following activities :

- 1) Planning, scheduling and monitoring.
- 2) Stores (from Finance Division)

B. Creation of a Sales-Production-Procurement Committee

In order to institutionalize and strengthen the total planning process from the sales forecasting to the procurement of raw materials and production, it is recommended that a Sales-Production-Procurement Committee be created which shall be composed of the following:

Chairman : Chairman Cum General Manager

Members : Head, Marketing Division

Head, Works Division

Head, Fiscal Division

Secretary: Head, Production Control Section (Proposed)

Additional members, such as the Head of Procurement and Production Sections may be appointed by the Chairman as he deems fit.

The Committee should meet monthly and shall review the following:

- 1) Updated sales forecast of the Branches and depots on a monthly basis for one year.
- 2) Consolidated ATF sales forecast on a monthly basis for one year
- 3) Production program for the next month, considering plant capacity manpower requirements and materials availability. The production program should be able to meet the sales forecast for the month closest to the month of job completion. In general, the accomplishment for the month of the production program should meet the sales forecast for the next month.
- 4) Procurement program for the month or quarter, considering lead times, economic order quantities, financial resources available, import quotas etc.

Members of the committee shall undertake the necessary studies relative to their respective functions, that would result in a credible sales forecast, attainable production program and adequate financial resources.

#### C. Productivity

While productivity has been boosted over the past two years as can be seen in the improvement of ATF's performance, it can further be strengthened with better systems, work methods and work attitude. Employee participation is very important in any productivity improvement, hence, it is recommended that ATF organize a company-wide productivity program that will look at all areas of productivity improvement, such as materials, labour, machinery, energy etc. Towards this end, Productivity Improvement Circles composed of not more than 10 members from the same operations or levels be organized. Each circle will meet at least monthly to propose measures to improve their productivity. Incentives in the form of prizes, recognition or other forms can be awarded monthly to the best individual successful proposal or to the Circle. Supervisory people can also form circles.

Making the productivity circle concept work may be difficult at the start but the rewards in terms of cost reduction or greater productivity is too great to ignore. It has been found to be very successful in Japan and many Asian countries.

## XI. GOVERNMENT POLICY MEASURES

ATF, in order to meet its objectives of accelerating the economic development of the country, particularly in increasing the productivity of its agriculture, would need the support of HMG in the following areas :

1. Protection from Undue Foreign Competition: Because of lack of economies of scale in production, use of traditional production technologies and other socio-economic factors, new local industries are faced with very strong competition from foreign countries, especially India. Considering that Nepal's balance of trade deficit is very huge and that employment opportunities should be provided the people, HMG should protect infant industries through or the increase of tariff duties and other sales taxes for agricultural machineries and tools that are now adequately produced or are capable of being produced in the country.
2. More financing and credit should be available for the purchase of agricultural tools and equipment on a long-term basis, with concessional interest rates.
3. Formulation of an agricultural mechanization program for Nepal: UNIDO's First Consultation Meeting for Agricultural Machinery held in Italy in 1979 stresses the need for developing countries to formulate their own agricultural mechanization programmes in order to increase productivity of agriculture and start manufacturing of agricultural machineries such as hand tools, animal drawn and powered equipment as a base for the manufacture of other capital goods. Such agricultural mechanization should be appropriate, considering economic, technical, socio-cultural factors and resource endowments of the country and should include programs for the improvement in manual, animal and powered equipment technology.
4. Participation in regional bodies, such as ESCAP-RNAM (Regional Network for Agricultural Machinery) based in Los Banos, Philippines which provides information and assistance in agricultural machinery to participating countries in Asia. As of now nine countries in Asia are participating in this program. Workshops and training programs are also regularly conducted.

## XII. PROJECT DOCUMENTS

Based on the findings and recommendations contained in Section I to XI of this report (Evaluation of ATF Activities and Measures to Strengthen it), it is recommended that, in addition to the internal measures that will be implemented by ATF's management, additional external support be given. As pointed out in the Report, ATF plays a very vital role in the economic development of the country, particularly in agriculture which is the base of its economy. Increase in agricultural productivity is one of the main concerns of the Government. ATF, as the only major agricultural tool and equipment manufacturer in Nepal, can greatly assist bring about this improvement

The external support will be in the form of machinery, technical expertise and training.

SUMMARY OF THE INTERNATIONAL INPUTS

10. Project personnel	38 m/m	US \$ 190,000
30. Training & Study tour	11 m/m	US \$ 20,000
49. Equipment		
a) Expendable Repair		US \$ 20,000
b) Non expendable		US \$ 175,000

15,16 & 19

1) Official Travel		
2) Other cost		
3) Miscellaneous		US \$ 10,000
		<hr/>
		US \$ 415,000

Details are herein attached.

A. Project Personnel

11.01. Tool & Die/Prod.Eng.	12 m/m	US \$ 60,000
11.02. Product Dev./ Design	18 m/m	US \$ 90,000
11.03. Marketing Consultant	4 m/m	US \$ 20,000
11.04. Foundry Consultant	4 m/m	US \$ 20,000
	<hr/>	
	38 m/m	US \$ 190,000

Job Description of the above experts shown in D1 - D4.

## B. Training:

## 31 Fellowship

Welding	3 m/m	US \$ 4000
Electro Plating	3 m/m	US \$ 4000
Inventory control	3 m/m	US \$ 4000

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9 m/m US \$12000

Study Tour for Two persons 2 m/m US \$ 8000  
(Product Development)

---

US \$ 20,000

C) Equipment & Material

49 Repair of machines and equipment US \$ 20,000  
(Details in Plant Engineering portion  
of this report)

## New Machinery and equipment:

(Specifications of the machines are in E)

## Tool Room

Lathe	US \$ 10,000	
Die Sinking	US \$ 32,500	
Boring Machine	US \$ 15,500	
Milling "	US \$ 20,000	
	<hr/>	
	80,000	US \$ 80,000

## Foundry

cupola and Equipment	US \$ 10,000	US \$ 10,000
-------------------------	--------------	--------------

## Woodworking Shop

Chain Saw	3,000	
Lathe (wood)	2,000	
	<hr/>	
	5,000	US \$ 5,000

## Testing Laboratory

Chemical Testing and Sand Testing Equipment	5,000	US \$ 5,000
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## Store

Forklift Truck	15,000	US \$ 15,000
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## Publicity

Projector & Camera	5,000	US \$ 5,000
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## General Workshop Equipment

Pneumatic Tools	1,000	
Sheet Rolling machine	20,000	
Angle bending and Rolling machine	10,000	
Profile cutting (gas)	2,500	
Pipe cutter	500	
	<hr/>	
	34,000	US \$ 34,000

Servicing		
Mobile van with welding Generator	20,000	US \$ 20,000
		<hr/>
		194,000

say US \$ 195,000

## JOB DESCRIPTION

## TOOL AND DIE/PRODUCTION ENGINEER

Post Title: Tool and Die/Production Engineer

Duration: One year

Duty Station: ATF . Birgunj, Nepal

Purpose of Assignment : To assist in the improvement of tooling, dies and fixtures and manufacturing process of ATF and undertake training.

Duties : The expert shall be expected to work under the supervision of the Works Division Head with close collaboration with the Engineering and Production Staff in undertaking the following :

1. Manufacture of tooling, dies and fixtures of existing and new products.
2. Improve manufacturing processes of ATF.
3. Improve systems and controls.
4. Guide and train workshop personnel and counterparts.

Qualification : Should be a mechanical engineer with actual experience in tool and die design and manufacturing processes in metalworking industry, preferably in agricultural and industrial machinery manufacture. He should have industrial engineering knowledge.

Language : English.

Background Information : Refer to UNIDO Report on the evaluation of ATF activities and measures to strengthen it, conducted June 4-July 15, 1984.



JOB DESCRIPTION  
MARKETING CONSULTANT

D - 2

Post Title : Marketing Consultant

Duration : Four months

Duty Station : ATF , Birgunj , Nepal

Purpose of Assignment : To assist in improving the marketing operation of ATF

Duties : The consultant will be expected to work under the supervision of the Chairman-GM in close collaboration with the Marketing Division Head and the Staff. He shall undertake measures to improve the marketing operations of ATF, especially in the areas of:

1. Sales Management
2. Branch management
3. Dealer development programs
4. Advertising and sales promotions
5. Sales forecasting and budget
6. Market research
7. Parts and service
8. Training of sales personnel

He shall formulate marketing programs and strategies and assist in implementing same.

Qualifications : Should be a college graduate with sales and marketing experience in agricultural and industrial machinery in a developing country.

Language : English.

Background Information : Refer to UNIDO Report on the evaluation of ATF activities and measures to strengthen it conducted June 4-July 15, 1984.

JOB DESCRIPTION  
PRODUCT DEVELOPMENT ENGINEER

D - 3

Post Title : Product Development Engineer

Duration : 18 months

Duty Station : ATF , Birgunj, Nepal

Purpose of Assignment : To assist in improving the design and manufacture of existing ATF products and to design and develop new products

Duties : The expert will be expected to work under the supervision of the Chairman-GM in close collaboration with the Works Manager and the Engineering Staff. He shall undertake the redesign, design or development of existing and new products in line with priorities set.

He shall:

1. Redesign existing products to improve quality and reduce production costs
2. Design new products, build prototypes and set for commercial manufacture
3. Standardize components and raw materials
4. Establish procedures and
5. Organise and train counterparts to strengthen product development activities

Qualifications : Should be a mechanical or agricultural engineer with intimate and practical knowledge of design and manufacturing processes of agricultural and industrial machineries, especially for low and intermediate technology

Language : English

Background Information: Refer to UNIDO Report on the evaluation of ATF activities and measures to strengthen it, conducted June 4 to July 15, 1984

JOB DESCRIPTION  
FOUNDRY EXPERT

D - 4

Post Title : Foundry Expert

Duration : four months

Duty Station : ATF, Birgunj, Nepal

Purpose of Assignment : To assist in improving the foundry operations of ATF

Duties: The expert shall be expected to work under the Works Division Head with close collaboration of the Engineering and Production Staff in undertaking the following:

1. Proper design and specifications of the cupola/furnace
2. Installation and operation of same
3. Training of worker and counterparts
4. Training of laboratory personnel in testing
5. Install systems, controls and records

Qualifications : Should be a production engineer with ample experience in foundry operations in small and medium scale manufacturing

Language : English

Background Information : Refer to UNIDO Report on the evaluation of ATF activities and measures to strengthen it, conducted June 4 to July 15, 1984

E. New Equipment Specifications

The following machines and equipment has been suggested for proper functioning of ATF.

Tool Room

A Tool Room Lathe	-	- 1	No.
Centre height	- 150 mm		
Centre distance	- 800 mm		
Spindle Bore	- 38/40		

Die Sinking Machine		- 1	No.
Capacity stroke	X - 600 mm		
	Y - 300 mm		
	Z - 500 mm		

Horizontal Boring Machine		- 1	No.
	Dia - 10 mm to 750 mm		
	Stroke - 250 mm		

Milling machine Table	- 450 mm X 700 mm		
-----------------------	-------------------	--	--

Foundry :

The existing cupola has to be replaced. The following equipment suggested:

Cupola		- 1	No.
22" dia, Hot blast			
5 HP blower with control			
Valves and gauges.			

Equipments:

Sand muller/Mixture	-	1 No.
Cap - 100 Kg.		
Moulding Boxes	-	12 Nos.
Hand Moulding Machine	-	1 No.

Wood Working

Power Chain saw	-	1 No.
Length - 700 mm.		
Wood Working Lathe	-	1 No.
Swingover bed 400 mm		
Centre distance - 1600 mm		

Test Lab .

Sand Testing & analytical chemical Laboratory.

Carbon Sulphur determination Apparatus

Analytical Balance

Electric Steel - 10 litre capacity

Laboratory glass apparatus

Viscosity meter

P.H. Meter

Screens

Ready moisture Teller

Permeability and green strength tester

Existing over could ased.

Store :

Fork Lift Truck

Capacity 3 - Tons

General Purpose Equipment

Pnuematic Tools

chipping, grinding riveting , etc - 1 set

Sheet Rolling Machine

Power operated, Rollers: 200 mm X 3 m. long 1 No.

Angle bending machine

Power operated Cap. - 75 mm X 6 mm 1 No.

Gras profile cutting equipment

with nozzles sets 80 mm plate 1 No.

Pipe cutting Machine 1 No.

Cap - 4" dia

Repair and Servicing in the Field

ATF is now marketing its products through seven sales branches located in different districts, and proposing to set up two more so as to cover the entire country. The lack of repair and servicing facilities in the rural areas, is one of the major difficulties faced in marketing the products.

It is therefore suggested that a mobile van with repair kit and a welding set could be provided.

Mobile Van - Pick up with long chassis

With repair kit and welding generator 1 No.

PROJECT BUDGET

COUNTRY - NEPAL

PROJECT - STRENGTHENING  
OF A.T.F. BIRGANJ

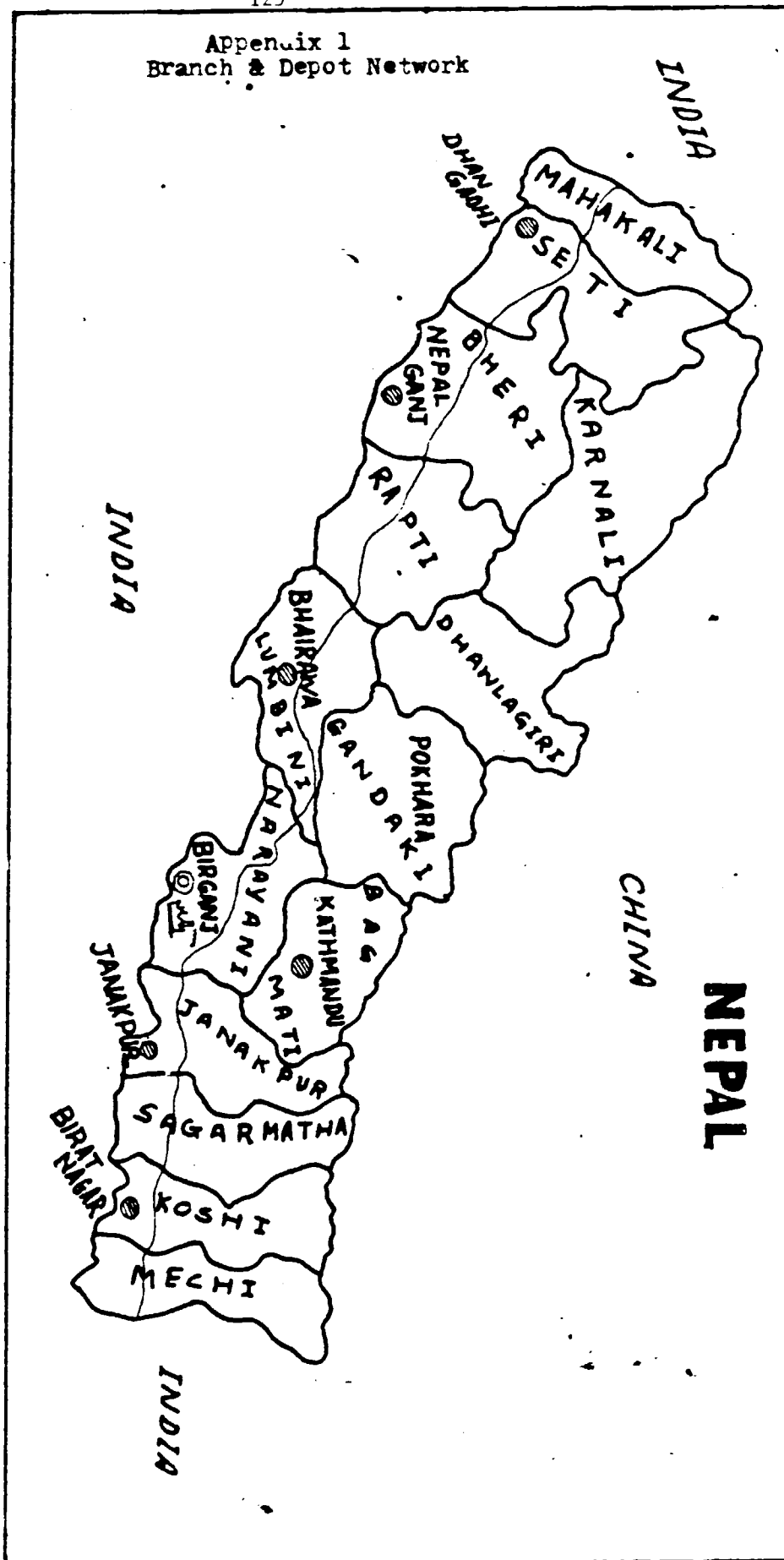
Item	TOTAL M/M	TOTAL - US \$	FIRST YEAR		SECOND YEAR		
			M/M	US \$	M/M	US \$	
<b>10. PROJECT PERSONNEL</b>							
11.01	TOOL, DIE & PROD. ENGG.	12	60,000	12	60,000	-	-
11.02	DESIGN & DEV. ENGG.	18	90,000	12	60,000	6	30,000
11.03	CONSULTANT MARKETING	4	20,000	4	20,000	-	-
11.04	CONSULTANT FOUNDRY	4	20,000	2	10,000	2	10,000
11.99	SUB TOTAL	38	190,000	30	150,000	8	40,000
15.	OFFICIAL TRAVEL	-	2,000	-	1,500	-	500
16.	OTHER COST	-	6,000	-	4,000	-	2,000
19.	COMPONENT TOTAL	-	8,000	-	5,500	-	2,500
30.	TRAINING/STUDY TOUR	2	8,000	1	4,000	1	4,000
31.	FELLOSHIP	9	12,000	6	8,000	3	4,000
	COMPONENT TOTAL	11	20,000	7	12,000	4	8,000
49.	EQUIPMENT & MATERIAL	-	195,000	-	100,000	-	95,000
59.	MISCELLANEOUS	-	2,000	-	1,000	-	1,000
99.	UNDP CONTRIBUTION	-	415,000	-	268,500	-	146,500



## XIII. APPENDIX

1. Branch and Depot Network
2. ATF Organisation Chart (Present)
3. List of Press Tools and Dies
4. Proposed Inventory Control Procedures
5. Salary and Wage Structure
6. Plant Layout (Existing)
7. Comparative Balance Sheets
8. Comparative Profit and Loss Statements
9. ATF Staffing
10. ATF Resigned Employees
11. ATF Vacancies

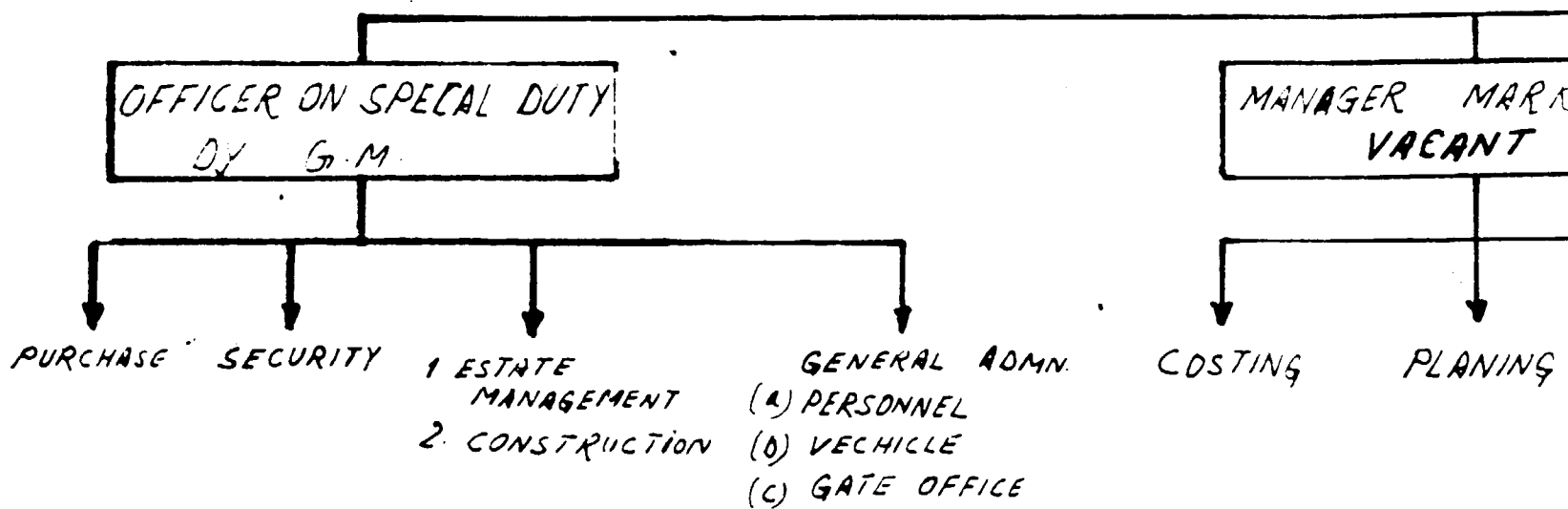


Appendix 1  
Branch & Depot Network

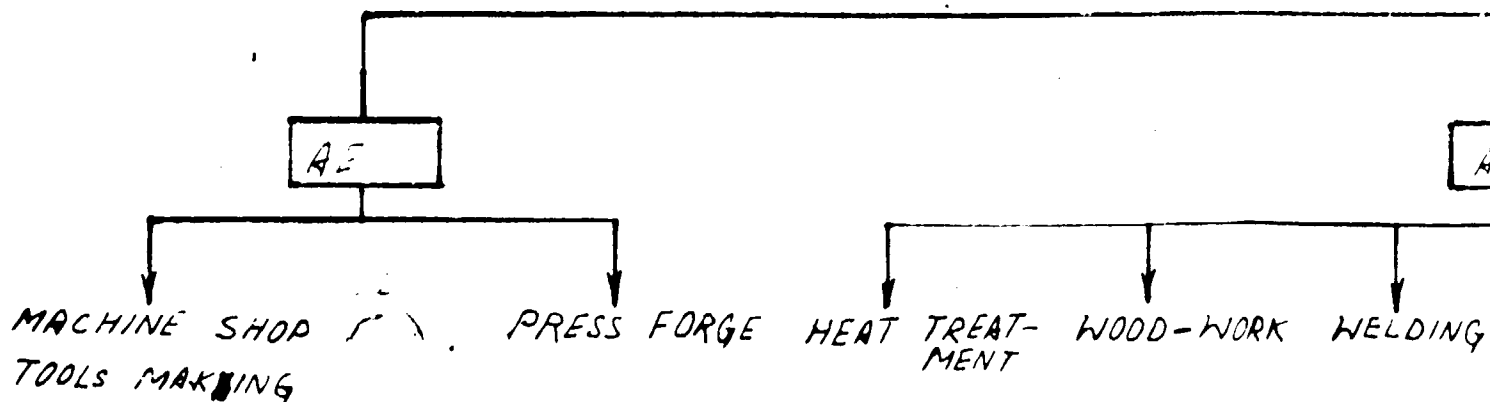


FACTORY =   
 DEPOT = 

# ORGANIZATION



## SECTION 1



# ORGANIZATION CHART A.T.F. BIRGANJ

ATF Org

**BOARD OF DIRECTORS**

**CHAIRMAN**  
SUM  
**GENERAL MANAGER**

**MARKETING DEPARTMENT**

**ADJUTANT GENERAL MANAGER FINANCE**

**BUYING SALES**

**ACCOUNTS STORES**

**MARKET RESEARCH OF FACTORY SALES OFFICER**      **5 SALES OFFICERS IN OTHER DISTRICTS**

**AE**  
**DESIGN PLANNING ESTIMATING**

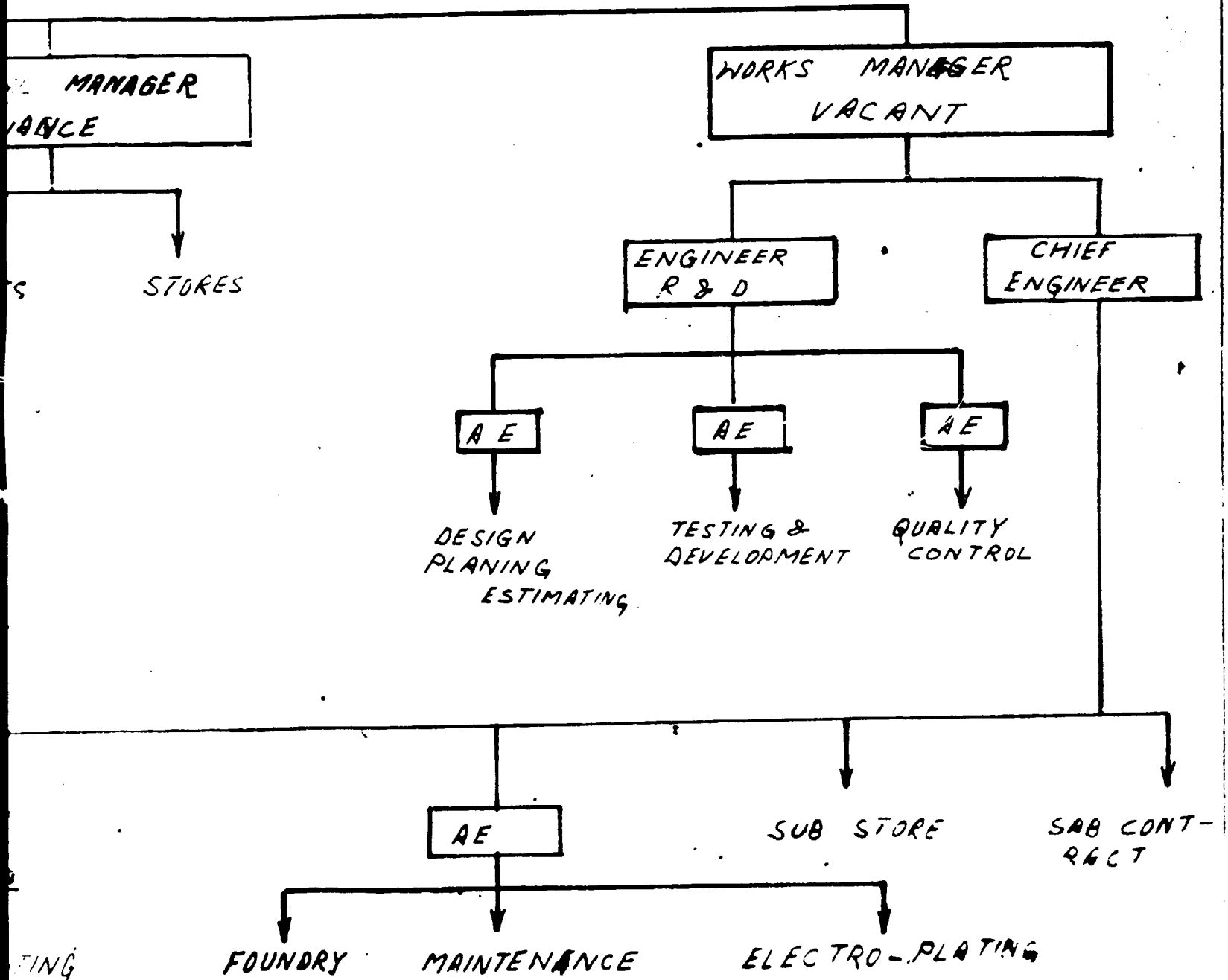
## SECTION 2

**AE**  
**LOADING ASSEMBLY GRINDING PAINTING**

**AE**  
**FOUNDRY MAINTENANCE**

F. BIRGANI

Appendix 2  
ATF Organization Chart (Present)



Appendix 3

List of Press Tools and Dies use in the ATF

Name of the products	Dies/press tools
1. Iron rake	1. Bonding 2. Punching die 3. Socket punching die 4. Socket Bending Die
2. Shovel	1. Blanking Die (body) 2. Bending 3. Bracket Blanking 4. Bracket Bending 5. Bracket Punching
3. Washer	1) Punching Die (6,8,10, 12,16, 20, mm size)
4. Rim for trailers, 5 I, 3T. 4T.	1. Bending 2. Punching
5. Plough Shoar and componnts	1. One side puaching 2. Strut Cutting " 3. Extension Strip 4. Mold board puaching 5. Mold board Balnting 6. Mold board Balnting 7. Brest Punching 8. Lornor plate blanking 9. " " Bending 10. Shear Punching Die 11. " bending die

6. Cultivator

1. Rear frame punching
2. " " slet Punching
3. Lever Bonding
4. " bunching
5. Lever punching
6. Tine stopper bending
7. Shovel punching
8. " bending.

7. Steel Hub

1. Bending die.

8. Paddy thresher

1. Drum cover bending
2. Gear " "
3. Strip punching

9. Kedal ( spade)

1. Punching
2. Radius Cutting
3. Bending
4. Socket blanking
5. " bending

10. Dust cover

1. Blanking
2. cutting

11. Whool barrow

1. Nutch cutting
2. Strip punching
3. " bending
4. Whool Rim blanking

12. Ridder

1. Cutting
2. Punching
3. bonting

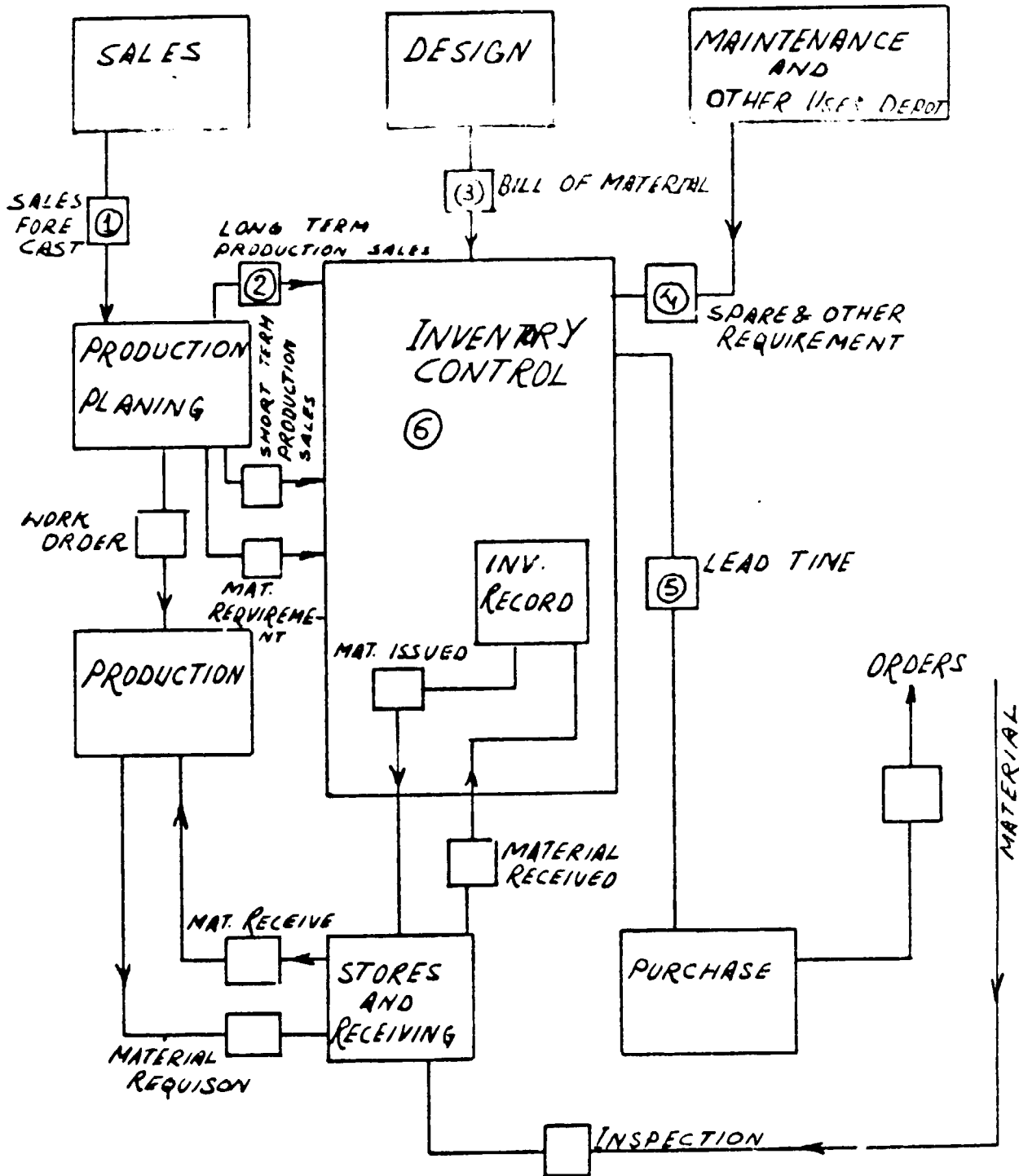
- |                          |                         |
|--------------------------|-------------------------|
| 13. Pole Clamp           | 1. Punching             |
|                          | 2. Bending              |
| 14. D. iron              | 1. Punching             |
|                          | 2. bonding              |
| 15. Rack slotted angle   | 1. Slotting punching    |
|                          | 2. Angle bending        |
|                          | 3. Tray notch cutting   |
|                          | 4. Corner plate cutting |
| 16. P.W.T Wheel thresher | 1. Concave not punching |
| 17. Corn Sheller         | 1. Bending - 2 dia      |
| 18. Shovel flay          | 1. Cutting              |
|                          | 2. Bending              |
|                          | 3. Handle bending       |

Jigs and Fixtures

1. Hub drilling jig
2. Bearing Spool concave drilling jig
3. Tine drilling jig
4. Drill jig for 5 t trailer rim
5. Housing drilling jig
6. Tine bending jig.

# INVENTORY CONTROL

APPENDIX-4





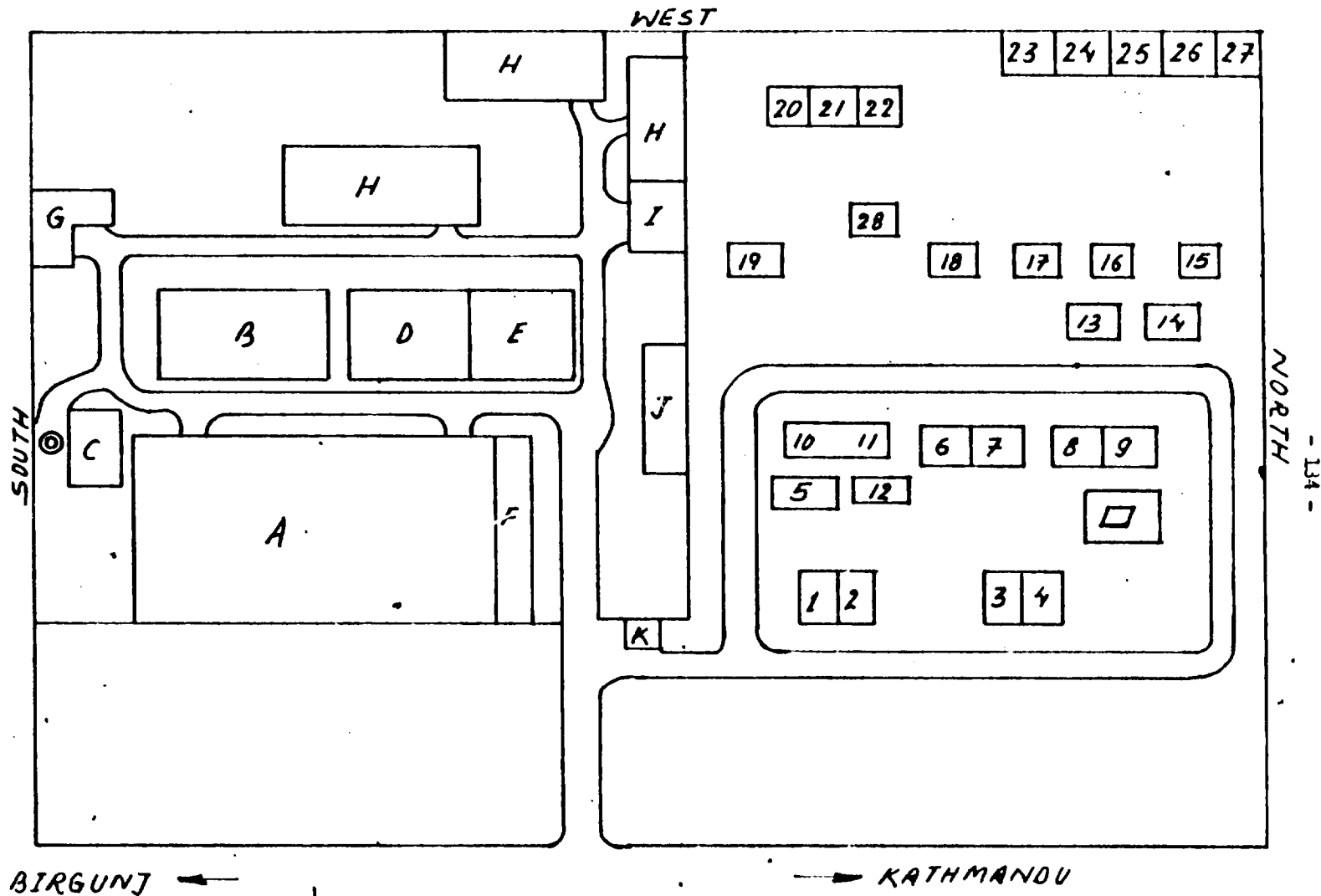
SALARY AND WAGE STRUCTURE

In Rupees

<u>Grade</u>	<u>Min</u>	<u>Max</u>	<u>Allowance</u>	<u>Total at minimum</u>
9	1100	1599	325	1425
8	1030	1199	307-50	1337-50
7	850	1176	264	1114
6	750	1050	237.50	987-50
5A	620	930	241.60	861-60
5B	545	835	259.	804
4A	480	665	202-50	682-50
4B	440	625	191-20	631-20
3	390	534	197-20	567-20
Semi Skilled	330	470	160-40	490-40
UN "	300	375	152	452

IN ADDITION

- i) Rice Allowance Rs. 18/- per months ( only to junior Staff)
- ii) Tiffen allowance Rs.2/- per day
- iii) House rent allowance - Rs. 50/- per month
- iv) Dearness Allowance - 50/- per month
- v) Night allowance - 1/50 per months
- vi) Medical allowance Rs. 10 % basic to junior staff
- vii) Special allowance - Rs 20/- % basic
- viii) Dasher Gift one months salary ( Basis )



A = FACTORY  
 B = ASSEMBLY  
 D = CARPENTRY  
 E = STORE OFFICE  
 F = ADMINISTRATION OFFICE  
 G = FOUNDRY SHADE  
 H = STORE  
 H = GRASS  
 J = SHADE  
 K = GATE OFFICE

EAST

1 TO 9 = OFFICER QUARTER  
 □ = CHAIRMAN RESIDENCE  
 10 TO 19 = UNOFFICER QUARTER  
 20 TO 27 = NATCHMAN QUARTER  
 28 = GUEST HOUSE

AGRICULTURAL I  
Birgan  
BAI ANC

	1980 - 1981		1981 - 1982	
<u>Share Capital Liabilities</u>	2007	2008	2008	2009
<u>Authorised Capital</u>				
30000 Ordinary Shares @ Rs 1000 each		<u>3,00,00,000.00</u>		<u>3,00,00,000.00</u>
<u>Issued Capital</u>				
16000 Ordinary Shares @ Rs 1000 each		<u>1,60,00,000.00</u>		<u>1,60,00,000.00</u>
Subscribed & Paid up Capital		1,21,40,000.00		1,21,40,000.00
Promoters Investment				
<u>Liabilities</u>				
Provident Funds	37,077.95		34,704.84	
Bills Payable	11,79,816.27		11,35,577.94	
Other Liabilities	<u>8,53,259.45</u>	20,70,153.67	<u>5,14,953.57</u>	16,85,236.35
Provision (Gratuity Ead debts)		11,19,811.60		13,27,466.97
Loans (Secured)		<u>10,24,713.49</u>		<u>10,99,677.36</u>
		<u>1,63,54,678.76</u>		<u>1,62,52,380.68</u>
<u>Assets and Properties</u>				
Fixed Assets s per cost	73,23,249.90		73,27,775.72	
Less Depreciation	<u>36,46,906.86</u>	36,76,343.04	<u>38,78,606.86</u>	34,49,168.26
Investment in Shares		12,600.00		12,600.00
<u>Stock in Hand</u>				
Stores and spares	47,29,367.78		21,85,018.96	
Stock of Finished goods	26,63,722.61		26,47,343.78	
Stock of semifinished goods	4,80,937.25		9,98,450.25	
Stores suspense	<u>51,042.10</u>	59,25,069.74	<u>51,042.10</u>	53,81,855.09
<u>Sundry Debtors</u>				
Bills Receivable	8,06,046.35		5,79,120.03	
Advance & Deposits	<u>5,75,462.17</u>	13,81,508.52	<u>4,36,288.72</u>	10,15,408.75
Cash in Bank		1,64,228.47		1,62,849.94
Margin against letter of credit		-		-
Profit & Loss Account		<u>(51,34,928.99)</u>		<u>(62,30,498.64)</u>
		<u>1,63,54,678.76</u>		<u>1,62,52,380.68</u>

AGRICULTURAL TOOLS FACTORY LIMITED

Birgani, Nepal

BALANCE SHEET

- 135 -

Appendix 7

Comparative Balance Sheet

<u>1981 - 1982</u>		<u>1982 - 1983</u>		<u>1983-1984</u>	<u>1984-1985</u>
<u>2038</u>	<u>2039</u>	<u>2039</u>	<u>2040</u>	<u>2040-2041</u>	<u>2041-2042</u>
	<u>3,00,00,000.00</u>		<u>3,00,00,000.00</u>		
	<u>1,60,00,000.00</u>		<u>1,60,00,000.00</u>		
	1,21,40,000.00		1,21,40,000.00	1,30,68,000.00	1,47,68,000.00
			9,30,680.00	17,02,680.00	21,02,680.00
34,704.84		58,645.75		65,000.00	35,000.00
11,35,577.94		10,74,202.30		14,35,000.00	11,65,000.00
<u>5,14,953.57</u>	16,85,236.35	<u>4,10,477.06</u>	15,43,325.12	15,00,000.00	12,00,000.00
	13,27,466.97		13,51,916.99	14,00,000.00	15,00,000.00
	<u>10,99,677.36</u>		<u>13,40,411.68</u>	<u>26,00,000.00</u>	<u>28,00,000.00</u>
	<u>1,62,52,380.68</u>		<u>1,73,06,364.38</u>	<u>2,02,70,680.00</u>	<u>2,23,70,680.00</u>
73,27,775.72		75,80,224.51			
<u>38,78,606.86</u>	34,49,168.26	<u>40,83,081.08</u>	34,97,183.43	45,24,000.00	54,94,000.00
	12,607.00		12,600.00	19,800.00	19,800.00
21,85,018.96		23,16,555.89		31,00,000.00	34,00,000.00
26,47,343.78		24,12,068.97		24,00,000.00	30,00,000.00
9,98,450.25		6,05,159.35		<u>7,00,000.00</u>	<u>8,00,000.00</u>
<u>51,042.10</u>	53,81,855.09	<u>44,908.00</u>	53,78,692.03	62,00,000.00	72,00,000.00
5,79,120.03		11,46,236.09			
<u>4,36,288.72</u>	10,15,408.75	<u>3,06,034.13</u>	14,52,270.22	21,87,880.00	24,00,000.00
	1,62,849.94		9,78,665.97	15,00,000.00	16,52,880.00
	-		69,890.19	-	-
	(62,30,498.64)		(59,17,102.54)	(58,39,000.00)	(56,04,000.00)
	<u>1,62,52,380.68</u>		<u>1,73,06,364.38</u>	<u>2,02,70,680.00</u>	<u>2,23,70,680.00</u>

SECTION 2

AGRICULTURAL TOOLS FACTORY, L.A.

BIRGANI, H.F.

Profit and Loss Account

Particulars	<u>1980 - 1981</u>		<u>1981 - 1982</u>		<u>2039</u>
	<u>2037</u>	<u>2038</u>	<u>2038</u>	<u>2039</u>	
B.F. Stock of Semi finished goods		4,07,402.98		4,80,937.25	
<u>Production Expenses</u>					
Use of Raw Materials	9,25,230.74		8,67,516.61		24,58,660.00
Use of Other stores expenses	6,78,781.81		6,05,295.10		14,93,970.00
Salary, wages and Allowances	7,45,234.44		9,41,820.61		11,87,880.00
Other expenses of the factory	<u>1,22,072.37</u>	24,71,319.36	<u>1,31,344.56</u>	25,45,977.88	<u>2,06,210.00</u>
Depreciation of Machineries and factory Building		<u>2,06,047.00</u>		<u>1,95,504.00</u>	
		30,84,769.34		32,22,419.13	
Less: Stock of semi-finished goods		4,80,937.25		4,98,450.25	
Cost of production		26,03,832.09		27,23,968.88	
B. F. Stock of finished goods		33,24,733.26		26,63,722.61	
<u>Selling Expenses</u>					
Salary wages & allowances	1,69,518.11		2,11,147.13		2,79,350.00
Sales commission & bonus	69,429.08		55,047.30		1,50,760.00
Other Expenses	<u>1,99,676.12</u>	4,38,623.38	<u>2,01,669.45</u>	4,57,863.88	<u>4,35,660.00</u>
Gross Profit B.D.		<u>1,75,848.53</u>		<u>3,48,308.38</u>	
		65,43,037.26		62,03,863.75	
Sales of Finished Goods		38,65,148.89		35,56,519.97	
Stock of " "		<u>26,77,888.37</u>		<u>26,47,343.78</u>	
		65,43,037.26		62,03,863.75	
<u>Administrative Expenses</u>					
Salary wages & allowances	4,35,230.56		5,71,560.23		38,000.00
Contribution of Provident Fund	28,696.08		35,517.45		36,000.00
Other expenses	2,48,813.06		2,71,903.55		3,47,000.00
Vehicle Expenses	1,08,465.04		1,01,460.12		1,42,000.00
Audit Fees	9,000.00		9,000.00		9,000.00
Interest Expenses	2,27,014.86		1,61,378.58		2,27,000.00
Gratuity Provision	91,512.72		2,16,172.74		1,70,000.00
Depreciation Administrative Properties	<u>36,429.23</u>	11,85,161.55	<u>36,106.00</u>	14,00,188.67	<u>35,000.00</u>
Less B.F. Gross Profit	1,75,848.53		3,48,308.38		
Miscellaneous income	7,858.80	<u>1,83,707.33</u>	19,310.64	<u>3,67,619.02</u>	
Net Loss		<u>10,01,454.22</u>		<u>10,35,569.65</u>	
Less Administrative Expenses					
Net Profit					

AGRICULTURAL TOOLS FACTORY LIMITED

BIRGANJ, NEPAL

Profit and Loss Account

	<u>1981 - 1982</u>		<u>1982 - 1983</u>		<u>1983-1984</u>	<u>1984-1985</u>
	<u>2038</u>	<u>2039</u>	<u>2039</u>	<u>2040</u>	<u>2040-2041</u> <u>Estimated</u>	<u>2041-2042</u> <u>Estimated</u>
2.98		4,80,937.25		4,98,450.25	6,05,159.35	6,40,000.00
	8,67,516.61		24,58,663.03		27,50,000.00	29,05,000.00
	6,05,296.10		14,93,971.27		15,65,000.00	17,15,000.00
	9,41,820.61		11,87,880.97		14,50,000.00	15,00,000.00
9.36	<u>1,31,344.56</u>	25,45,977.88	<u>2,05,217.77</u>	58,43,713.04	<u>3,00,000.00</u>	<u>3,00,000.00</u>
					60,65,000.00	64,20,000.00
47.00		<u>1,95,504.00</u>		<u>1,58,600.00</u>	<u>1,70,000.00</u>	<u>1,70,000.00</u>
9.34		32,22,419.13		50,10,783.29	68,40,159.35	72,30,000.00
37.25		4,98,450.25		6,05,159.35	6,40,000.00	6,50,000.00
32.09		27,23,968.88		54,05,623.94	62,00,159.35	65,80,000.00
33.26		26,53,722.61		26,47,343.78	24,12,068.97	23,77,228.32
	2,11,147.13		2,79,355.71			
	55,047.30		1,50,769.59			
23.38	<u>2,01,669.45</u>	4,57,863.88	<u>4,35,661.70</u>	8,55,787.08	13,00,000.00	13,12,000.00
48.53		3,48,308.38		18,07,243.61	18,65,000.00	20,98,000.00
37.26		<u>62,03,863.75</u>		<u>107,25,998.33</u>	<u>117,77,228.32</u>	<u>123,67,228.32</u>
148.89		35,56,519.97		83,13,929.36	94,00,000.00	100,00,000.00
888.37		<u>26,47,343.78</u>		<u>24,12,068.97</u>	<u>23,77,228.32</u>	<u>23,67,228.32</u>
37.26		62,03,863.75		107,25,998.33	117,77,228.32	123,67,228.32
	5,71,560.23		38,564.98		7,88,000.00	7,88,000.00
	35,517.45		35,694.02			
	2,71,903.55		3,47,996.66		4,00,000.00	4,00,000.00
	1,01,460.12		1,42,130.35		1,60,000.00	1,50,000.00
	9,000.00		9,000.00			
	1,61,378.58		2,27,523.18		2,40,000.00	3,00,000.00
	2,16,172.74		1,70,009.03		1,70,000.00	1,70,000.00
161.55	<u>36,106.00</u>	14,00,189.67	<u>35,369.22</u>	<u>15,08,287.44</u>	<u>79,000.00</u>	<u>80,000.00</u>
	3,48,308.38			18,07,243.61	18,65,000.00	20,98,000.00
77.33	19,310.64	<u>3,67,619.02</u>		<u>1,14,439.93</u>	50,000.00	25,000.00
154.22		<u>10,35,569.65</u>		<u>19,21,683.54</u>	<u>19,15,000.00</u>	<u>21,23,000.00</u>
				<u>15,08,287.44</u>	<u>18,37,000.00</u>	<u>18,88,000.00</u>
				<u>3,13,396.10</u>	<u>78,000.00</u>	<u>2,35,000.00</u>

Appendix 9

ATF Headcount

1. Senior Officer : -

1. Chairman Cum Managing Director
2. Dy. General Manager
3. Special Officer
4. Production Engineer
5. Research & Development Eng.

2. ADMIN & SALES STAFF

<u>Dept.</u>	<u>Officer</u>	<u>Staff</u>	<u>Others</u>	<u>Total</u>
Admm	2	6	6	14
Accts	2	2	1	5
Purchase	2	2	-	4
Vehicle		1	8	9
Security		1	17	18
Store	1	4	1	6
<u>Sales</u>				
ATF Office	3	8	1	12
Kathmandu	2	4	2	8
Nepalganj	1	2	2	5
Bhirawa	1	1	2	4
Janakpur	1	1	2	4
Biratnagar	1	1	2	4
Dhangari	1	1	2	4
	<u>17</u>	<u>34</u>	<u>46</u>	<u>97</u>

3. WORKS DIVISION

Production	3	3	1	7
R. & D	3	2	-	5
				<u>12</u>

<u>SHOPS</u>	<u>FORMEMAN</u>	<u>SKW</u>	<u>SNW</u>	<u>UN</u>	<u>TOTAL</u>
Poundry	1	3	9	3	16
M/C Shop	1	5	7	8	21
Press & Forge	1	6	4	10	21
Welding		2	6	8	16
Assembly		1	8	5	14
Painting		1	1	1	3
Grinding			2	2	4
Ele. Plating		1	1	1	3
Carpentry	1	3	2	3	9
Maintenance	1	2	3		6
<hr/>					
	5	24	43	41	113
Daily Wage				18	18



ATF Employees Who Resigned

S.NO ----	Post ----	Name ----
1.	Fiscal Officer	Shree Dibya Bilash Bajracharya
2.	Chief Engineer	" Bishanu Hari Shrestha
3.	Senior Production Engineer	" Birjting Prajapati
4.	Chief Engineer	" Shree Prasad Shrestha
5.	"	" Uma Shanker Rauniyar
6.	Foundry Engineer	" Noor Alam
7.	Design Engineer	" Suresh Prasad Shreiwasta
8.	Thormal Engineer	Miss Bera Shriwastava
9.	Design Engineer	Shree Ramesh Prasad Nepal
10.	Production Engineer	" Biswambhar Jha
11.	Planning & Eco. Management Officer	" Biswambhar Jha " Sharad Chandra Foudyal
12.	Sales Promotion Officer	" " Ghan Shyam Lal Das
13.	Production Foreman	" Jagat Narayan Shrestha
14.	Market Research Officer	" Kripa Nanda Jha

ATF VACANCIES

1. Administration Division

<u>S.No.</u>	<u>Post</u>	<u>Grade</u>	<u>Vacancy Nos.</u>
1.	Manager	Officer IInd Class (9)	1
2.	Administrative Officer	Officer IIIrd Class (7)	1
3.	Administrative Asstt.	Non Officer Class (4)	1
4.	Typist	Non Officer Class (3)	2
5.	Peon	Non Officer Class (1)	1
6.	Driver	Class (4c)	1

Security Section

1.	Watchman	Class (1)	1
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2. Finance Division

1.	Asstt. Account Officer	Officer IIIrd Class (6)	1
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3. Marketing Division

1.	Asstt. Sales Engineer	Officer IIIrd Class (6)	1
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2.	Chief	Officer IIIrd Class (6)	1
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Sub. Branch - Nepalganj.

3.	Chief	Officer IIIrd Class (6)	1
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Sub. Branch - Bhairahwa.

4.	Depot Incharge	Non Officer Class (5)	1
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Depot - Dhangadhi.

4. Works Division

1.	Works Manager	Officer IInd Class (9)	1
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2.	Asstt. Works Manager	Officer Class 1Ind (8)	1
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Production Section

- |    |                               |                         |   |
|----|-------------------------------|-------------------------|---|
| 1. | Production Engineer           | Officer IIIrd Class (7) | 1 |
| 2. | Asstt. Production<br>Engineer | Officer IIIrd Class (6) | 2 |
| 3. | Record Keeper                 | Non Officer Class (4)   | 2 |

Research & Development Section

- |    |                 |                         |   |
|----|-----------------|-------------------------|---|
| 1. | Asstt. Engineer | Officer IIIrd Class (6) | 3 |
|----|-----------------|-------------------------|---|