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Transport and Farm Machinery Study for Makoni District Collective Co-operative Union Limited

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CONSULTANCY REPORT SERIES

TRANSPORT AND FARM MACHINERY STUDY FOR MAKONI DISTRICT UNION OF COLLECTIVE CO-OPERATIVES

MARCH 1988

by
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ZIMBABWE INSTITUTE OF DEVELOPMENT STUDIES

P.O. B ox 880
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First Printing 1989

Published in the Republic of Zimbabwe

The Consultancy Report was prepared by ZIDS for the Makoni District Union (OCCZIM) on contract. The views expressed here are those of the authors.

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CHAPTER FOUR

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The support of Stichting-Hivos of Holland, without which this and other research work would not have been possible, is appreciated.

PREFACE

This report is a component of a series of OCCZIM/MDU studies on specific aspects of MDU operations done by ZIDS. It was financed by Stichting-Hivos of Holland

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This portrayal appears quite generous, partly because even when the equipment was used in a particular month the activity rates were generally very low when compared to levels that could have been achieved with better management.

The rates at which ploughing and discing (the two major activities of the tillage unit) are performed is the second indicator of the effectiveness with which the equipment is used.

Appendices 2(a) and 2(b) are the only two reports on record that show the tillage activity performed, the area covered, and the period it took to perform the activity. From this, we compute the productivity rates in Table 4 below:

Table 4

SAMPLE PRODUCTIVITY RATES IN PLOUGHING

Dates	Days (Inclusive but excluding Sundays	Client	Task	Hectares worked by one (1) or two (2) tractors	Hectarage per tractor per day
14.06.86 to 16.07.86	24	Zingondi	Ploughing	2 = 60	2,5
08.09.86 to 29.09.86	20	Wiriranai	Ploughing	2 = 24,25	1,21
01.10.86 to 09.10.86	9	Tandi	Ploughing	1 = 12,2	1,35
10.10.86 to 21.10.86	10	Nyamukai	Ploughing	2 = 40	4,00
31.10.86 to 13.11.86	12	Individuals at Tandi	Ploughing	1 = 15,4	1,28

From this table, it appears that when the operations are taking place, the area ploughed per day ranges from 1,2 hectares to 2,5 hectares. A figure of 3 hectares per day is considered a reasonable average. This means that, again, by this index, the tillage equipment is used below capacity.

Causes:

The underlying causes of this extreme under-utilization of available, expensive capacity are many, but analysis reveals that they are due to poor managerial practices rather than some *uncontrollable* environmental factors.

To be discounted emphatically is the notion that the tractors are idle for most of the time because of lack of demand. The series of seminars held to review individual co-operatives' activities; for example the Tanhi Co-operative (1986) and Kuedza Masimba Co-operative Seminar (March 1987) reveal quite clearly that despite the fact that some co-ops have a tractor or some other implement, the majority of them experience shortages of essential tillage services, particularly in the peak season, April to October. In this regard, however, it should be noted that the Co-operatives themselves are not entirely blameless as shall be discussed below. The major causes are as follows:

Time Frame

The time period allowed for the project was one month.

A BRIEF HISTORICAL BACKGROUND TO THE MDU TRANSPORT AND TILLAGE UNIT

The general thrust of this precis, which outlines the history of the MDU Transport and Tillage Unit, is to highlight the main events thus setting the context for the analysis which follows.

Table 1

CHRONOLOGICAL SUMMARY OF THE DEVELOPMENT OF THE TRANSPORT AND TILLAGE UNIT

DATE	EVENT
3.12.84	Acquisition from Turnpan of:
	-2 tractors (Model 3088 I.H.)
	-2 sets of duals
	-1 furrow plough
	-1 harrow
4.12.84	Acquisition from Turnpan of:
	-1 furrow plough
	-1 harrow plough (T.20)
12.12.84	Acquisition of:
	-1 four-row Trailer Planter
	-2 Springmaster flat deck trailers
7.3.85	Acquisition of:
	-1 Leyland Landmaster (7 ton)
11.85	Disposal of:
	-2 tractors (Model 3088 I.H.)
17.1.86	Acquisition of:
	-2 Massey Ferguson tractors (65 H.P.)

This chronological summary brings us to a point where we can indicate the current status of the equipment inventory.

Table 2

INVENTORY OF MDU TRANSPORT AND FARM EQUIPMENT UNIT

	ITEM DESCRIPTION	NO.	HISTORICAL PRICE (including S/tax)	HISTORICAL COST
a)	Duals Sets	2	$ 2 525,00	$ 5 050,00
b)	4 furrow plough	2	$ 4 000,00	$ 8 000,00
c)	15" harrow	1	$ 4 200,00	$ 4 200,00
d)	15" harrow (T20)	1	$ 5 950,00	$ 5 950,00
e)	4-row trailer planter with feet attached	1	$10 935,47	$10 935,47
f)	Springmaster 4-wheel 16-foot flat deck trailer with detachable bulk rides	1	$ 6 261,50	$ 6 261,50
g)	7-ton Leyland Landmaster truck	1	$44 500,15	$44 500,15
h)	65 H.P. Massey-Ferguson tractor with canopies, nose weight frames, swinging drawbacks and weights	2	$41 928,00	$83 856,00
i)	Fuel tank	1	$ 150 00	$ 150,00
	TOTAL			$168 902,97

ANALYSIS OF OPERATIONS AND PROCEDURES: FORMAT OF PRESENTATION

This report is intended to be an action/policy oriented one, establishing specific actionable modes of operation and controls. To give effect to that thrust, the structure of the analysis below shall be along the major types of productive equipment being operated by the MDU, specifically the truck sub-unit and the tractor sub-unit. The only exception shall be on obviously common areas like the operating procedures, and, on the whole, it will be noticed that to establish effective controls, this level of detail and disaggregation is what is required. The only general qualification to the intent is the infeasibility to obtain some of the information to make hard and fast rules, given the time allowed for the study. In these instances, indicative types of recommendations shall be made.

To give immediacy to the study, recommended solutions on a specific aspect shall be made immediately following the itemisations and discussion of problems.

The analysis and recommendations on both the sub-units shall be organized in the following categories:

- Capacity utilization
- Financial performance
- Human resources
- Maintenance, repairs and consumable supplies
- Pricing
- Demand for services - market survey

Operating procedures shall be discussed jointly as indicated above.

Human Resources

There are several observations to make about the personnel manning the Tillage Unit:

- Firstly, the drivers employed so far have had no tractor driver's licences. As a result, they have been penalized by the Police in the past by being made to pay fines.
- The differences that can exist in operational results between two drivers have been noted above under Capacity Utilization.
- The recruitment policy of the MDU Committee for drivers seems to be a simple one based on being seen to be equitable to the member Co-operatives. The idea is to hire the drivers alternately from each of the Co-operatives after every year. The hiring is exclusively from the member Co-operatives.

These observations highlight one thing - the lack of professionalism in the MDU's approach, specifically in hiring personnel who should possess a certain technical proficiency. The following specific recommendations are therefore made for reorganizing and reinforcing the human resources component of the Tillage Sub-unit:

a) The job description should contain the following minimum requirements:
   - The driver should be licensed to drive a tractor.
   - Preferably, the driver should have a certain minimum number of years' experience in similar operations. References should be shown to prove this. Preferably the referees should be contactable to check on the work record.

b) Applicants should be accepted from any source within and outside the MDU members, although members of member Co-operatives would in effect, *if* they possess (a), be given preference.

- It is noted that the DDF is currently running Tractor Driver Efficiency Improvement/Upgrading courses which have as their aim the increase of the operational efficiency of the tractor drivers in the way they run and manage the tractors. It is highly desirable, given the rather bitter experience of the MDU with tractor driver productivity in the past, to make timetables for sending tractor drivers for "staff development" courses of this nature. Such programmes should be worked out in such a way that they minimise the disruption of operations of the sub-unit.

However, given that currently the MDU employs one tractor driver, who does not possess a driver's licence, on humane grounds the MDU should look at assisting this incumbent to acquire one as soon as possible so as to regularize the situation.

Pricing

The pricing aspect of the running of the Transport and Tillage Unit is critical to the economic viability or otherwise of the Unit. The guiding principles seem to be that it must charge prices that:

- cover the cost of providing services to the member Co-operatives
- with reference to non-members, cover the cost of operations of providing services, make a certain amount of profit and lastly, are competitive.

CHAPTER ONE

INTRODUCTION

Preamble

This study was commissioned by ZIDS, in its capacity as the main consultant to the Makoni District Collective Co-operative Union Limited as part of a Master Study ZIDS is carrying out for the MDCCU.

The aims and objectives of the study are embodied in the terms of reference below.

The Terms of Reference for the Transport and Farm Machinery Feasibility Study

The terms of reference as given to us by ZIDS were as follows:

- A brief historical development of the existing transport and farm machinery pool.
- Analysis of the economic and other activities of the existing pool focusing particularly on capacity utilisation and service charges as well as the effectiveness and adequacy of such services.
- Determine the key constraints facing the existing operations.
- Identify other services that demand opportunities/potentials.
- Determine the appropriate levels of both short-term and long-term requirements indicating approximate truck, trailer, tractor and implements capacities (sizes).
- Determine the supportive infrastructural requirements e.g. workshop and fuel station.
- Address any other relevant issues/recommendations and factors that may arise in the course of this exercise. The study will be expected to make recommendations about the findings and operational strategies for the MDU. Such recommendations should be concrete *on which aspects require assistance* and the nature of such assistance.

Assessment Methodology

The following activities were followed in conducting the feasibility study:

- *Document Review*:
  A review of documents, produced by ZIDS and the MDU, on the MDU Member Co-operative was made.
- *Interviews with MDU Staff:*
  A visit was made to the current headquarters of the MDU in Rusape. Interviews were conducted with the Administrator, the Secretary and the truck driver.
- *Interviews with Other Relevant People:*
  Interviews were conducted with organizations involved in transport and tillage activities and officials in ministries who deal with Co-operatives.
- *General Literature Review:*
  To obtain a firmer grounding in transport and tillage theoretical economics, a review was made of certain works.

- Breakdowns and Delayed Repairs
  Plaguing the operations of the Tillage Unit have been a series of breakdowns of one or both the tractors or the accessory implements. The tractors have been grounded for such reasons as having no tyres and a stolen alternator. The accessory which has given most problems has been the pressure disc harrow.

  The speed with which repairs were effected leaves much to be desired. The principal causes for this appear to be, firstly, that the tractor drivers sometimes experience delays in getting cash from the MDU to purchase replacements for the defective components or to get the parts repaired in a garage. This points to a deeper problem which arises in the financial administration of the MDU, namely that the MDU has no credit lines with any supplier of spare parts. Secondly, the MDU does not appear to keep in stock those parts of tractors or accessories which are most liable to wear out or become defective.

- Drivers' Lack of Qualifications and Experience
  The driver recruitment policy has been problematic to say the least. Further discussion of this important aspect of effective operations shall be discussed below, (See: Human Resources) but suffice it to say that the extremely high differentials in income-generation between the Driver of Tractor B and Tractor C have resulted in the dismissal of the Driver of Tractor B. The Table below shows the size of the gap in this regard.

Table 5

INCOME-GENERATION RESULTS FOR DRIVERS OF TRACTOR B AND TRACTOR C: 1985-1987:

YEAR	TRACTOR B	TRACTOR C
1985	$ 3 160,50	$10 029,65
1986	$ 8 377,60	$ 8 132,37
1987	$ 4 969,63	$ 9 427,90
TOTAL	$16 507,73	$27 589,92

Source: *Appendix 1(a) - 1(c)*

The upshot of this dismissal is that currently, the second tractor is lying idle. The opportunity cost, though difficult to estimate, is substantial.

- Use of Inappropriate Equipment
  This is really a question of the decision made at the acquisition stage of the equipment. However, its ultimate effect is felt when progress in an operation is excessively slow or if equipment breaks down. A quote from the Makoni District Union Report (undated) illustrates this:

  > Wiriranai was our next place of work. We ploughed 24,2525 ha. of land. Due to the hardness of the soil, it took us almost three weeks to complete the hectarage. The soil at Wiriranai Co-op is very hard to till. Most of our disc ploughs broke down because of the soil hardness. (p.3)

This points to the need to differentiate the areas where the equipment is used and make use of the correct implements. This item shall be discussed further under Acquisition of Capital Equipment.

Financial Performance

As projected by the capacity utilization section, the financial performance of the tillage unit has been dismal. However, it is not possible to completely separate the costs of operating the tractors from those of running the truck.

The reason is that while the revenue generated, wages, repairs and maintenance are shown on the basis of the Truck and each of the Tractors, the Fuel (Diesel) and Oil expense is shown as an aggregate. Appendices 3(a) - 3(c) show this. Table 6 shows the proportion of the fuel and oil expenditure to total direct expenses.

Table 6

IMPORTANCE OF FUEL AND OIL EXPENSES IN TOTAL VARIABLE COSTS

YEAR	% OF FUEL AND OIL EXPENSE TO VARIABLE TOTAL EXPENSES
1985	34
1986	35
1987	29

Source: *Appendices 3(a) - 3(c)*

Table 6 shows that Fuel and Oil expenditure is such a significant proportion of expenses, approximately one-third of the Total Variable Costs, that they have to be allocated to the two sub-units to arrive at a meaningful reflection of the performance of each sub-unit in terms of Gross Profit. For 1985 and 1986, it is the single largest expense item. This situation points to a weakness in the control aspects of the Management Information System which shall be discussed in detail below. (See Administration.)

However, an analysis of Appendices 1(a) - 1(c) indicates the very unequal contributing role of the Truck Sub-unit.

Table 7 throws these unequal roles into relief.

Table 7

PERCENTAGE CONTRIBUTION OF TRUCK AND TRCTORS TO ANNUAL REVENUE: 1985-1986

YEAR	TRUCK (%)	TRACTORS (%)	TOTAL (%)
1985	65	35	100
1986	54	46	100
1987	61	39	100

Given this picture, the inescapable conclusion is that the Tillage Unit is the biggest contributor to the losses the MDU is experiencing. Appendices 4(a) - 4(c) show these losses. The Return on Investment (ROI) is negative, ranging between -10% to -20%.

What, however, it is not possible to do from the Appendices, for the reason given above, is to quantify the exact figures of this loss contribution.

CHAPTER TWO

THE TILLAGE (FARM EQUIPMENT) SUB-UNIT

Capacity Utilization

One feature of operations which is not going well is the paucity of adequate data reflecting the performance of the operations. The data collection and recording is usually non-existent or haphazard. This in itself creates problems for appropriate corrective action to be taken. The MDU Operations Unit is not an exception to this general observation. However, use shall be made of the sketchy information that exists to indicate the general picture.

As indicated in the inventory listing, the Farm Equipment Unit consists of two Massey-Ferguson (65 H.P.) tractors and several accessory implements.

Status

The first indicator of the rate of capacity utilization are the Annual Revenue Statements from 1985 to 1987. These are shown in appendices 1(a) to 1(c).

Between them, the two tractors had 105 tractor months of potential operation in the said period (deducting 6 (3x2) tractor months to account for the time when the two first tractors were disposed of and the new pair purchased and became operational.) Of these, however, they had the work record shown in Table 3. (Using revenue generation as a proxy for activity rates.)

Table 3
ACTIVITY RATE FREQUENCY TABLE FOR THE TRACTORS

ACTIVITY RATE CATEGORY	MONTHS	% OF TOTAL
No Activity (No Revenue)	27	41
Negligible Activity (Income positive but less than $400)	18	27
Some Activity (Income from $400 but less than $1 500)	9	14
Relatively High Activity (Income from $1 500 but less than $2 500)	6	9
Relatively Very High Activity (Income from $2 500 but less than $4 500)	6	9
TOTAL	66	100%

The general picture which emerges is that for over two-thirds (68%) of the period under consideration, the tractors, and necessarily the accessory implements, were either lying completely idle or receiving scanty use.

The sound theoretical basis, therefore, of arriving at the required rates, is a *proper costing* of the provision of the services. Without this base, any other formulations for finding rates are more of "guesstimate second-bests".

The tractors with relevant accessory equipment perform the following functions, in order of importance: ploughing, discing, planting, and freight carriage. The charges for tractor hire by the MDU, by the activity, are as shown below.

Table 8
TRACTOR HIRE CHARGES

Operation	Co-op Rate (ha)	Non-Co-op Rate (ha)	Differential (ha)
Ploughing	$62,00	$65,00	$3,00
Discing	£31,00	$40,00	$9,00
Planting	$31,00	$40,00	$9,00
Maize Transportation	$ 2,33/km	$ 2,33/km	0

These rates were not determined on the basis of any scientific economic appraisals as described above, but rather were the product of surmises and "best guesses/hunches" of the MDU Executive Committee. The issue then is to come up with rates based on an alternate, more rational basis with respect to tillage services.

There are two options in doing this:

- using base studies that have been done by other institutions to come up with the costing;
- conducting one's own base costings by taking readings and recordings while the equipment is in operation.

The second method is preferable because it is specific both in terms of the models of machines being used and the area in which they are working. Because of the time given for the study, one month, this base-line study was not possible.

The first option above, is the next one we resorted to. The question is: Does such a study exist? In the time that was available, attempts to uncover such a study were unsuccessful. The national institution which undertakes tillage services for hire, the District Development Fund, was approached. While we were afforded their rates, shown below, we did not get to see the costing studies on which these were based. The official responsible for these economic studies was away during the period of enquiry.

The analysis below will proceed on the basis that the DDF charges were based on sound economic baseline studies, with appropriate qualifications, where required. The DDF tillage services that apply currently are shown in Table 9.

Table 9

DISTRICT DEVELOPMENT FUND TILLAGE OPERATION CHARGES: EFFECTIVE FROM OCTOBER 1986

	OPERATION	CHARGE
1.	Ploughing	$55/ha
2.	Disc harrowing	$25/ha
3.	Ripping	$30/ha

Source: *DDF Circular*

Note: Labour costs are not covered by the charges. A Government subsidy operates.

Given that labour charges are not covered by the charges as shown in Table 9, the next question is what to do with that cost item. The path we take is to proceed, for the meantime, not explicitly computing it in, but rather, being aware that it is always an additional on whatever final figure we come up with.

Comparing Table 8 and Table 9 yields consistent differences between the DDF charges and the current Tillage Sub-unit charges. Not only is there a difference between what the MDU charges to non-members, and what the DDF charges, but what it charges to members is also different. Both are higher than DDF charges.

Assuming that the DDF rates exclude only labour costs, (taking into account fuel and oil, wear and tear) to arrive at the appropriate charge for the MDU tractors, we would have to determine the expected number of hectares that a tractor would do per month, and then spread the cost of the driver's wage, over the units of hectares. This would give us the cost of labour per hectare. The cost of labour, the wage rate, would essentially be treated as a fixed cost.

However, the danger of charging a price higher than the DDF cannot be ignored. The new head offices of the MDU will be in Chinyudze in the Chinyika Resettlement Scheme. According to the DDF officials interviewed, the DDF operates a team of tractors from the same growth point. In other words, the DDF is a direct competitor in the same market catchment area.

What implications will this pose for the MDU's pricing strategy if it hopes to sell its services not only to its member Co-operatives, but also to the surrounding resettlement scheme farmers?

With the information available to us at this point, it is not possible to give a definitive answer to this important question. If one were to assume a perfect market situation, obviously the MDU would be pricing itself out of the market. In fact, one wonders whether at least part of the explanation as to why there is such a low capacity utilization of the tractor pool is not in fact this reason.

However, given what may be the market realities, for example constraints in supply, especially in the peak April to October season,, and other market imperfections,, the actuality might make the MDU Tillage Unit viable despite this subsidised competition from the DDF.

The final recommendations to be made on this aspect are that:

- More time should be given to the consultant to pursue the "DDF option" upon the return of the key official to duty. This should shed light on the exact situation.
- Plans should be made to carry out a small study to establish, in a "work-study" type of operation, the actual costs on the ground, while the MDU tractors are in the field, for the different types of services offered. This is the most reliable way of establishing the costs.

The exercise is not overly complex, requiring only the specification of what needs to be done by the consultant and the full co-operation of the MDU staff in carrying out the functions in order that "*standard costs*" can be established.

Maintenance, Repairs and Consumable Supply

The issue of maintenance and repairs has presented problems to the Tillage Sub-unit, as evidenced by the breakdowns etc. Discussion of the ramifications of this was made above. (See: Capacity Utilization).

The aim in this section is to note that as a result of recommendations made by ZIDS and Consultant S. Matsvai, the machines are no longer being repaired at "Siya-so" Garage establishments, but at regular, authorized dealers. Performance seems to have improved markedly in this regard.

However, one wants to note that the move to Chinyudze may open other possibilities which should be examined. These can be looked at in both the short-term and medium- to long-term.

- There is a CMED depot at Chinyudze Growth Point. In the short-term, the possibility of entering into a contractual arrangement with them for repairs to the tractors in case of breakdowns should be investigated. If feasible, it can prove an important short-gap measure while the MDU looks at setting up its own workshop/garage with a capability to undertake most of the minor to mildly serious repairs itself.

  In an interview with a commercial farmer just outside Rusape, we were told that he made important savings in the maintenance of his tractors by having a reasonably capable tractor mechanic on his farm. He owned a fleet of 5 tractors. His garage was a modest one.
- In the medium- to long-term, setting up a workshop garage is imperative. When considering this, it is necessary that the MDU should receive expert advice as to how it ought to proceed. Such a project should not be undertaken without bringing somebody knowledgeable from outside to help plan and see its execution. In technical matters, the MDU Management Committee tends to find itself out of its depth.
- Another important observation in this is with respect to consumables and critical but easily worn out or damaged tractor parts. In this period of critical part shortage, given that in providing the kind of service that the Tillage Unit provides, promptness is of the essence, it is extremely important that operations do not cease just because some easily replaceable part whose tendency to yield under stress and average life is known stops to function. An example would be parts like spark plugs, fan belts, etc. For such easily replaceable parts, stocks should be kept that permit a certain time of continuous operation even if supply becomes tight. Such a conscious inventory policy needs to be carefully worked out.

- More mundane but nevertheless very important observations and recommendations are with respect to the general maintenance and security of the tractors and accessories.

  The equipment should be housed in a proper place. It was observed at the MDU Unit in Rusape that the equipment and tractors are left lying in the open air, exposed to the elements. This is not good custodianship of mechanical equipment by any count.

  The equipment should be securely locked up in a suitable building, especially overnight. This is not the case currently at the MDU head office in Rusape. Theft is quite easy under such circumstances. No wonder one tractor had an alternator stolen. In a bid to protect the expensive equipment that the MDU has, it should actively pursue the idea of hiring a night guard. This is of paramount importance, not just for equipment but also for the entire MDU premises and assets.

  Similar strict security and weather-protective measures should be installed in the Co-operatives in which the tractors operate. It is normal for a tractor to spend several days at one Co-operative. Thus, the Co-operatives should be required to construct appropriate, secure garages specifically for the use of th MDU tractor when it is on site.

Demand for Farm Equipment Services and Requirements for Additional Tillage Equipment

In assessing the demand for tillage services of the MDU, the market segments to be considered are:

- primarily and with priority of services are the member Co-operatives
- the resettlement scheme farmers
- the Small-scale and Large-scale commercial farmers.

It appears that for the short- to medium-term, given the capacity of the MDU and the operational problems it has been experiencing, the Tillage Unit has to concentrate its focus on the member Co-operatives.

The Member Co-operatives

Basically, the demand for tillage in a given year depends on the hectarage which the farmers plan to put under crop. The historical record for the areas which have been under cultivation would seem to be a useful guide as to the areas that are expected to be cropped in future. However, this is not the case for a variety of reasons:

- The member Co-operatives have experienced problems in acquiring short-term credit for purchasing inputs with a resultant limit to the areas that they could crop.
- The drought over the last two seasons has had the effect of lowering expectations and increasing risk aversity. The effect is again negative.
- The Government of Zimbabwe has not lived up to its promise of providing an Establishment Grant to all Co-operatives. Many of them have not been afforded sufficient "critical mass" of resources to "take off".
- The base-line seminars done for the member Co-operatives have revealed that there are a host of other operational problems within the individual Co-operatives which hinder effective planning and operation, for example a less than 50% supply of

required labour.

As a result of these factors, the cropped areas for the Co-operatives actually fell from the 1986/87 season levels in the 1987/88 season (from 760 to 480 ha.). The arable land cropped by the Co-operatives is 10-15% of total arable land.

- It is noteworthy, however, that the diversification of the member Co-operatives away from maize (67% cropped area in 1986/87 to 55% in 1987/88) to other more drought resistant crops, for example sunflower, seems to indicate that the areas put under crop should increase, with the decline in the *proportioan* put under maize continuing. As the crop portfolio stabilises with greater drought resistant crops we should see an increase in the area put under crop given that the other constraints mentioned above are relaxed.

  The other aspect which complicates the analysis of the demand for tillage services and the supply situation for these services is the low rate of efficiency by which the current pool has been utilized by the MDU.

  However, despite this rather undefined situation with so many unknown variables, from discussions with both the MDU officials and the member Co-operatives at seminars, it emerges quite clearly that there is a felt need for additional machinery and accessory implements for the tillage unit.

The Resettlement Scheme Farmers

There appears to be a strong source of demand for tillage services from outside the Co-operatives, particularly from the Resettlement Scheme Farmers surrounding Chinyudze Growth Point.

Appendix 5 gives the areas put under crop in the 1989/87 and 1987/88 seasons. Like the Co-operative farmers, the resettlement farmers changed their mix of crops, moving away from maize. Unlike the Co-operative farmers, however, the latter increased the cropped area from 2 acres to 3 375 acres, an almost 20% jump.

PROPOSED EQUIPMENT FOR ACQUISITION BY THE TILLAGE UNIT

The recommendations below are based primarily on the expressed needs of the member Co-operatives as were voiced at intra-co-operative seminars like the Tanhi Seminar and discussions of needs with the MDU Executive Committee.

Tractors

- There seems to be a consensus that two additional tractors are required to meet demand. However, given that the current tractors have been quite under-utilized due to operating procedures, and assuming that the operations would be made more efficient partly in response to this report and others, it is the consultants' opinion that for the short-term, *plans be made to purchase only one more tractor.*
- The types and frequency of breakdowns seem to be partly related to the types of soils that are in a particular area. Some Co-operatives are on sandy loam soils which are relatively easy to work, while some are on red soils which are harder to work.

  Currently the MDU Tillage Sub-unit has two 65 horse-power Massey-Ferguson tractors. From discussions with a commercial farmer in the district (Mr. Freelan: 21/3/88) and the MDU Executive Committee, it appears that *additional tractors should be at least 75 horse-power.* The make should remain the same, the

Massey-Ferguson. It is quite clear that the other makes, Fiats and International, are considered poor performers and the feelings against them are quite strong.

CHAPTER THREE

THE TRANSPORT SUB-UNIT

Capacity Utilization

The Truck Sub-unit currently consists of one 7-ton Leyland Landmaster truck and a 16-foot trailer. The main functions of the truck so far have beeb to service the MDU in terms of:

- the transportation of inputs from source
- the transportation of produce to the GMB or other destinations
- the transportation of the MDU and Co-operative members personnel for meetings, workshops or to leisure places
- carrying on similar activities for non-co-operative members when hired to do so.

The analysis will follow the structure described above.

Status

Appendices 1(a) and 1(b) show that the utilization of the truck, at least for the period under consideration, was one of the most unpredictable aspects of the operations of the MDU. The activity level of operations varies quite randomly, with hardly a pattern emerging. The influence of seasonal factors is quite subdued, although with additional information from the driver and other MDU staff, a slight influence can be discerned.

An Activity Rate Frequency table is presented below.

Table 10
ACTIVITY RATE FREQUENCY TABLE FOR THE TRUCK

ACTIVITY RATE CATEGORY	MONTHS	PERCENTAGE OF TOTAL (%)
Very Low Rate of Activity		
(Zero Revenue to less than $250)	6	18
Low Rate of Activity		
(Revenue from $250 but less than $1 000)	3	9
Some Activity (Income from $1 000		
but less than $2 500)	13	38
Relatively High Rate of Activity	12	35
TOTAL	34*	100

* *Note*: The truck was bought in March 1985 thus for 1989 only 10 months are relevant.

The Table shows that for more than a third of the time over the period 1985 to 1987, the activity levels as indicated by revenues generated in that period were either extremely low or quite low. However, the limitation with this type of analysis is that we are comparing the activity rates of the truck with its own attained levels of operation in other months. This is not the most effective way of doing such an analysis. Preferable would be industry averages as bench marks.

In the time allowed for study, we were not able to locate these. However, it is quite clear that the capacity utilization, while significantly higher than that of the Tillage Unit, is also unacceptably low.

Causes:

The rate of capacity utilization appears to have been conditioned by two main factors, namely breakdowns and delayed repairs and little ability to identify and quickly respond to market opportunities. These shall be analysed in turn.

BREAKDOWNS AND DELAYED REPAIRS

Just as in the case of tractors, but probably less severely so, vehicle malfunctions have affected the operations of the Transport Unit. This situation, as shall be discussed below (See Maintenance, Repairs and Consumable Supplies) seems to have been rectified to a large extent, thanks to the adoption of recommendations by ZIDS and S. Matsvai. The truck seems to be having smooth, regular operations currently because of these measures.

IDENTIFICATION AND EXPLOITATION OF MARKET OPPORTUNITIES

Part of the problem in this regard has been the location of the MDU at the fringes of Rusape - in the "backyard" so to speak. It has been located about five kilometres from the city centre which meant that in terms of clientele other than the MDU Co-operative members, it enjoyed little of the advertisement effects which accrue to organizations which are located in centres of population. This distant location did not only serve it badly in terms of public awareness of its existence, but made access to it by pedestrians difficult.

However, this particular location's handicap is not likely to exist in the new location at Chinyudze Growth Point.

The fundamental problem has been the order soliciting and gathering system. Up until recently, the main active agent in this exercise has been the driver. For the harvest periods when the grains have to be carried to the GMB depot and the pre-planting season when the inputs have to be transported from the centres of supply to the co-operatives, the orders have apparently been more than what the truck can manage. It is the other times, especially between January and April, when demand for these "traditional" transport services is low that demand for the truck services is slack. Not enough has been done to tap the other market segments which require transport services during these times.

Indeed, the MDU, on the advice of ZIDS and S. Matsvai, has recognized the need for a more aggressive transport and tillage services marketing approach. The tangible result of this awareness has been the delegation of Transport and Tillage Unit marketing functions to the Trainee Administrator. Further discussion of this is in the relevant section below (See: Scheduling of Services).

Financial Performance

The problems associated with attempting to arrive at a Gross Profit figure for the Truck and Tractors separately, and establishing other financial control measures, because of the way the data is currently recorded, were made clear in the similar section under the Tillage Unit. The hurdle is the joint Fuel and Oil Expenditure Account. Given its relative size, the individual contributions of either of the two units to Gross Profit cannot be arrived at.

However, as Table 10 shows, the Transport (Truck) Unit has been, in terms of revenue, the mainstay of the MDU, contributing about 60% of the revenue.

This is no reason to be uncritical, however, because of the potential that could have been lost as argued above.

Human Resources

There have bwwn two individuals so far manning the Transport (Truck) Unit, the driver and the truck assistant.

In terms of suitability for the posts, the driver is the holder of a valid driver's licence of the appropriate class, while the assistant, whose duties do not include driving, is experienced in his role. Thus, it can be concluded that the two are sufficiently qualified for what they are doing.

The personnel/labour management consideration with respect to these two is the excessive amount of work that the two have to put up with especially during peak periods. They routinely exceed the normal working hours set by labour statute. Since there is only one driver, during the peak times he hardly ever has days off.

This labour utilization situation is obviously not regular, with potentially damaging legal consequences.

The recommendation with respect to this is that *the MDU should look to employing a second driver so that the two can work in shifts*. If this is acceptable in principle, the problem becomes one of making sure that there is sufficient demand for the truck to be in operation most of the time so as to justify the second driver. The drivers' wages in this context are fixed costs which must be covered.

Pricing

Given that the volume of business that the MDU does is mostly from the Transport Sub-unit and that competition is stiffest here, the question of pricing assumes a much higher profile in this section.

The guiding principles of differentiated pricing used in the Tillage Sub-unit also apply here. To recapitulate briefly, these are to:

- charge for services to member Co-operatives so as to break even.
- charge to non-members so as to make a certain level of profit, taking cognisance of the competition.

The same theoretically sound basis of arriving at the required rates by first carrying out *proper costing* of the services still applies here. The current pricing situation at the MDU is rather confused, there being no document which stipulates what the standard charges are. However, from the latest discussions with the driver, (23/3/88) the Table below seems to reflect the current prices that are charged.

Table 11
TRANSPORT (TRUCK) SUB-UNIT CHARGES

TASK	CLIENT	RATE
Maize to GMB	Co-operative	$0,03/bag/km
Maize to GMB	Non-Co-operative	$0,03/bag/km
Other (Non-Maize)	Co-operative	$1,85/km
Other (Non-Maize)	Non-Co-operative	$1,85/km

Source: *Truck Driver (23.3.88)*

Several important observations can be made on these rates. Firstly, according to the Truck Driver, these rates are handed to him by the MDU Executive Committee, but they are flexible in that if he is operating in a market in which different price rates reign, he adjusts the rate he charges accordingly, particularly if the prices in a given market area or segment are higher. In that case, they would charge the reigning price in that sub-market. This flexibility is to take account of the market forces and realities at any particular place and time period.

The second thing to note is that the rates are given in two formats, one per bag per kilometre, the other per kilometre irrespective of the load carried. The reason for using these two different formats instead of just one is not clear, but it may be that the rates charged for maize transportation are commonly quoted among farmers in that area in that format. Whatever the reason behind that practice of quotation format, we will proceed to convert the first quotation into price per kilometre, the most commonly used quotation practice. The computation is as follows:

Assuming

- that the MDU assumes a full load from source to destination (GMB)
- that 11,11 bags of maize weigh a tonne
- that in use is the 7-ton lorry

Rate per km = $0,03 x 11,11 x 7
= $2,33

Table 12
TRANSPORT (TRUCK) SUB-UNIT CAHRGES

TASK	CLIENT	RATE
Maize to GMB	Co-operative	$2,33/km
Maize to GMB	Non-Co-operative	$2,33/km
Other (Non-Maize)	Co-operative	$1,85/km
Other (Non-Maize)	Non-Co-operative	$1,85/km

Source: *Table 11*

The third thing to notice about the rates is that the current tariff practice does not discriminate between member Co-operatives and non-members. This is obviously a non-observance of the guiding pricing principles of the MDU. In the time given for the

project, it was not possible to interview the rate-setters, the MDU Executive Committee, to find out why this was so.

As done in the case of the tractors, a starting point which gives us scientifically assessed economic costs of providing the transport service has to be found so as to arrive at rational, viable rates for both member co-operative and non-co-operative clients. The same options of -

- making use of a relevant, already prepared genuine baseline study or rates based on such, or
- conducting an original "work-study" type of costing on the actual field operations -

are the only reliable methods.

Computation of Prices Based on Baseline Data Produced by World Bank, National Transport and Feeder Road Studies

Several baseline transport cost studies done by several parties have been condensed by Dangroup, a consultancy company hired by the Government of Zimbabwe to make a Master Plan for Development of Bulk Facilities for the Grain Sector. This work was done in 1984. The table below displays this information.

Table 13

FINANCIAL AND ECONOMIC COSTS OF ROAD TRANSPORT ($/TON-KM)

VEHICLE TYPE	ROAD TYPE	FINANCIAL COSTS	ECONOMIC COSTS
7,5t Lorry	asphalt	0,13	0,11
7,5t Lorry	gravel	0,21	0,17
15,0t Lorry	asphalt	0,11	0,09
15,0t Lorry	gravel	0,17	0,14
30,0t Lorry	asphalt	0,08	0,07
30,0t Lorry	gravel	0,12	0,10

Notes:
1 Financial costs : Rates less Profit
2 Economic cost: Financial costs less (Duties & Taxes) + Subsidies
3 Both Asphalt and Gravel roads assumed in good condition with dI values 0,10 and 0,57 (respectively) and assuming a load factor of 0,5.

Source: *Master Plan for Development of Bulk Facilities for the Grain Sector (Dangroup) 1984.*

The relevant costs are the Financial Costs for the 7,5 ton lorry. It is somewhat of a problem deciding which type of road to take as the norm, whether asphalt-surfaced or gravel-surfaced. The new head offices of the MDU will be at Chinyudze Growth Point, 20km north-east of Headlands. Chinyudze Growth Point is accessible from Headlands by gravel road.

Appendix 6 shows a map of the main area that the MDU Transport and Tillage Unit will be serving.

The Transport Unit and GMB will be based at Chinyudze. Access to some co-operatives from Chinyudze will be wholly by gravel roads and access to others will be by a combination of Gravel and Asphalt roads. The same will apply to other points that the transport units may want to service. So, which type of road shall be selected as the norm and hence what rate should be adopted?

A compromise, simplifying assumption made here is that travel will be equal on both types of roads. Thus, to arrive at a working rate, the average of the two rates will be taken as in Table 14.

Table 14

FINANCIAL AND ECONOMIC COSTS FOR MDU: WORKING RATE

VEHICLE RATE	ROAD TYPE	FINANCIAL COSTS
7,5t Lorry	asphalt	$0,13
7,5t Lorry	gravel	$0,21
Total		$0,34
Average		$0,34 - 2 = $0,17

Source: *Table 13*

The working rate to be used in further analysis is the "average financial cost" of $0,17/ton-km.

The date of this data is 1984. Ideally, to arrive at present day costs, the figures would have to be adjusted to reflect the rate of inflation in transport sector costs since 1984.

This industry's specific inflationary factor was hard to come by and so use is made of the Consumer Price Index (CPI). Since 1984, the CPI has risen by approximately 45% (Quarterly Digest of Statistics, June, 1987). Adjusting the Financial Cost by that factor yields a current day Financial Cost of $0,25. With a 7-ton truck then, the rate charged, at cost, assuming a full payload, should be $1,75/km. However, the Dangroup Report also makes the point that it appears that most haulage contractors reckon on empty return loads, giving an effective load factor of 0,5. For this reason, they impute into the tariffs at least a 25% factor above the financial costs. Applying this on the cost we obtained for a 7-ton lorry, this yields a rate of $2,19/km.

The point to be emphasized is that the *importance of this exercise lies in its indicative value rather than a prescriptive one.* The reason is obviously the assumptions made all the way in arriving at the figures. Specifically, the inflation rates used are not industry specific and it is assumed that the base-study took all costs into consideration in coming up with the figures.

With this in mind, the study seems to point to the following with respect to the prices:

- Unless there are reasons to the contrary, the MDU should charge member co-operatives at the rate of approximately $2,19km in order to break even.
- Assuming that the required rate of return on investment (ROI) is double the rate of inflation, (at 15%) the rate charged for non-members should be approximately $2,85

($2,19 x 1,30). This would give the MDU the leeway to decrease prices due to competitive pressures if need be.

Computation of Prices Based on Original Standard Costing Studies

As in the Tillage Unit section, this costing and computation method is viewed by the consultants as a way of arriving at the most reliable figures which will constitute a data base which can then be updated annually and used to review prices.

Additionally, for routes which are most commonly used, route-specific standard total costs and time to complete the journey can be computed and recorded. These would be used as powerful control devices.

Maintenance, Repairs and Supply of Consumables

As mentioned above, the recommendations made on how to properly service the vehicles, both the truck and the tractors, seem to have been adopted with remarkable results in the running of the vehicles, particularly the truck. It is now serviced regularly at a standard garage.

The same comments and recommendations made with respect to the Tillage Unit with regard to:

- the possibility of contractual repair arrangements with the CMED depot at Chinyudze,
- the long-term establishment of a garage/workshop
- the inventory policy regarding consumable supplies and spares, and
- the general upkeep and security of the truck
- all apply with equal force to the truck's operations as well.

DEMAND FOR TRANSPORT SERVICES AND ACQUISITION OF ADDITIONAL EQUIPMENT

The demand for transport services is by nature a derived form of demand.

In terms of the primary target market for transport services, the main purposes for which they are required are quite clear: during harvesting, for inputs, to market output and other less important business and social needs. The first two are currently the most important, but the third, marketing of outputs, appears to be poised for growth if the activity diversification intentions of the Co-operatives are put into operation. A review of intra-Co-operative seminar documents indicates clearly that demand is high and can be expected to grow.

The other market segments are the resettlement farmers and the business community at Chinyudze. It is not productive at this stage to go into a detailed discussion of what the demand and supply for transport services is like in *quantitative* terms because there are quite a number of relevant factors which cannot be cast in those quantitative terms. However, the Warehouse Study (ZIDS) indicates quite clearly that there is a strong market for transport services which is either going unsatisfied by the present supply or is unhappy with the quality and price of service.

Translation of this considerable demand from all the three segments, into precise transport units requirements is an even more hazardous exercise.

The reason is that this partly depends on the competition from other suppliers, and the reputation of the Transport Unit. Both factors have important effects on the MDU's market share.

Despite this flux situation, the consultants were able to hold discussions with the MDU staff, review intra-Co-operative seminar documents, and the ZIDS Warehouse Market Study. It is on the basis of these that the following vehicle and equipment acquisition recommendations are made:

Trucks

A keenly felt need is that of *an additional truck.* The capacity of the truck should be 15 ton. This is more economical in terms of cost per ton-kilometre.

The make should remain the same, that is, a Leyland Landmaster. The experience which the MDU has had with this make has been good and it should stand them in good stead in terms of maintenance and repairs and the supply of spare parts.

This truck would be used mostly for the long haulage trips, for example, Chinyudze to Harare.

Note: Discussion is not made here of the need to purchase a truck specifically designated for the use of the warehouse. The assumption is that initially the general transport pool would service the needs of the warehouse, but as the level of activity rises, a specially attached truck would become necessary.

Trailer

The purchase of one trailer is also recommended because of its cost reduction effect.

An important and necessary acquisition for the MDU would be one small van for:

- administrative/supervisory purposes
- prompt access to vehicles in cases of breakdowns for repair purposes.

One half-ton van is recommended for this purpose.

CHAPTER FOUR

ADMINISTRATION AND OPERATING PROCEDURES

In this section, both the Transport and Tillage Sub-units are considered together because the personnel which does the administration is the same and most of the analysis and recommendations apply to both.

Administration

The Transport and Tillage Unit has been adversely affected by the problems of an administrative nature which have arisen in the MDU. These take the form of the authorization of trucks for unpaid trips by members of the MDU Executive Committee without the knowledge or approval of the Administrator (whose post has recently been created), similar use of other assets without the Administrator's approval, for example the lending of the trailer's wheels to a member Co-operative in the absence of the Administrator (observed on the trip to MDU 23.3.88).

The root cause of these problems appears to be that the distinction between the duties, responsibilities, powers and authority of the Management Committee and the Administrator has not yet been outlined.

In fact, the Administrator's post and functions have not yet been incorporated in the By-Laws of the Union.

This lack of clarification has led to the confusion that the Management Committee members see it in their rights to issue instructions in the day-to-day use of the MDU Transport and Tillage Unit's assets.

RECOMMENDATION

It should be explicitly incorporated in the By-Laws of the MDU that the Management Committee, like a Board of Directors in a private company, has the duty of defining policy and not the implementation thereof. No member of the Management Committee is allowed to assume an implementation role in the day-to-day running of the Transport and Tillage Unit. These are to be the sole duties of the Administrator or whosoever he decides to delegate this responsibility and authority to.

A related point is the organization and running of the Transport and Tillage Unit itself.

RECOMMENDATION

It is felt that an Operations Manager should be employed to run the Transport and Tillage Unit. This post is to be filled by a person with certain specific qualifications, skills and experience. The following attributes would serve as a minimum:

Skills Requirements for the Operations Manager for the Transport and Tillage Unit.

The candidate should:-

- have at least a diploma in the management of farm operations, familiar with and capable of controlling transport and tillage machinery and operations
- have a demonstrable experience of working within a mechanized farm environment

- have the ability to manage a field staff and relate well in a work environment with clients.

The job description of the post would include the following: (This section relies heavily on S. Shabalala's write-up on this aspect)

- the sole responsibility in deciding the use and charges for the use of transport and tillage services
- relating inputs (costs) to outputs (services and revenue) to breakeven or earn a budgeted profit
- drawing up a budget proposal indicating specifically all the costs and services and revenues for the scrutiny first of the Administrator and finally of the Management Committee. Once the budget has been accepted by the Management Committee and Administrator, the Operations Manager is held accountable to the MDU Management Committee for all budgeted items including profits.
  The Administrator and in turn the Management Union, are not supposed to interfere with the operations of the Transport and Tillage Unit unless the situation demands it.
- drawing up a marketing plan and whatever procurements are necessary to satisfy market requirements at a profit to the Unit.
- The Operations Manager shall report directly to the Administrator.

The Acquisition of Capital Items

There seem to be two related problems in this regard with the MDU, namely an inadequate grasp of technical details of transport and farm machinery and a lack of business astuteness. That monumental problems can arise from procedures in this regard is exemplified by the purchase of two 3088 I.H. tractors in 1984 and their disposal on the basis that they were not fit for the needs of the MDU in 1985. In the process the MDU made a loss of $2000 on the resale price.

The reasons for the disposal were recounted as follows:

- The tractors were too big for the Co-operatives' fields.
- The machines were not fuel efficient.
- The disc harrows complementing the tractors were too large to transport from Co-operative to Co-operative.
- The associated disc harrows were too large to access any farm gate without damaging it.

The point to note is that these are things which would have been noted by someone with the relevant technical know-how and experience.

RECOMMENDATION

The procedure before the purchase of a capital item should follow the following guidelines:

- A proposal brief should be written, specifying the market/s to be served in as great a detail as possible (market study), the generic attributes of the equipment, a preliminary listing of possible suppliers and their various prices.

- The procurement brief should be presented to the Management Committee for scrutiny. If passed, the procurement bid should go out on TENDER, with all the rules that apply to tenders as used by the Tender Board, for example.
- The responses to the tender offer should be reviewed in the normal business manner by the Management Committee, and taking into account the advice of the Administrator and Operations Manager, a rational decision would be made on the best offer to accept.

However, pending the hiring of a qualified Operations Manager, who would be capable of drawing up a procurement brief, *the MDU should enlist the aid of an external consultant* to help in the acquisition decision for capital items.

Transport and Tillage Unit: Operating Procedures: Management Information System

The aspect of the MIS that we will focus on here relates specifically to the Transport and Tillage Unit. Several reports are required periodically to keep the operations in control, some financial, some non-financial. However, critical to all this is the *data capture as operations are taking place.*

Data Capture

The data capture and recording history of the Transport and Tillage Unit has been characterized by haphazard recording of the data, intermittency, lack of checking and some confusion as to what was supposed to be achieved by the whole exercise. Several paper forms have been used in the past. However, we shall not concern ourselves with these. Instead we shall take a critical look at the one currently in use and make comments as to how it should be improved.

Appendix 7 shows a specimen of the form in current use.

COMMENTS ON WEEKLY LOG SHEET USED BY THE TRUCK AND TRACTORS

- The column title "Operation/Duty" should be split into two, one which specifies the exact nature of the task (e.g. disc harrowing, planting or transportation of passengers) and the other the departure point - destination point for the truck.
- The columns for Time, Mileage, Hours are too small. Most of these recordings are in excess of four figures. This suggests that a larger size of paper than A4 should be used to accommodate these.
- The columns for Fuel and Oil consumption are irrelevant on this form which is filled in by the driver. They belong to a different, separate recording exercise discussed below.
- There should be a "Freight" column which indicates the type of commodity carried by the truck.
- A sufficiently large column to accommodate the client's address and telephone number (for business purposes) is required.
- Assuming that drivers of both tractors and the truck will be operating in shifts, a column for the driver's name is required.
- There should be columns for driver log-in kilometre readings (on the odometer) and log-out readings.

- There should be a column for driver log-in time and date and log-out time and date.

Fuel, Oil and Breakdowns Records

Recommended for reasons of convenience, smooth running of operations and control is the installation of a Fuel Tank and Oil Tank onsite of the MDU Head Office.

OPERATIONAL PROCEDURES

As far as practically possible, the vehicles should fill up for fuel and oil at the MDU tanks. If the practical situation demands it, for example a long journey, the driver should be given advance monies which he signs for and returns the change on return, with proof of purchase in the form of a receipt from a garage.

The MDU tanks would be kept under lock, to be operated by someone other than the drivers. This same officer would also make recordings of fuel, or oil filled in. These records would be specific in terms of vehicle, time and date, driver and amounts. The requisite forms should be drafted and printed.

When a vehicle breaks down or has a mishap, the driver in charge should be required to make out a report detailing the relevant aspects of the breakdown. If emergency repair services had to be solicited, this should also be reflected.

NOTE WELL: It is only with this type of information that one can carry out meaningful variance analysis.

Field Control:

The main operations of the Transport and Tillage Unit are not *in situ*. They are usually at considerable distances from the MDU Head Office. This introduces obvious control problems. The root cause of all this is the question of communications between a field operator and the Head Office. A number of approaches to alleviate this problem should be investigated.

USE OF STANDARD TIMES TO CARRY OUT OPERATIONS

If appropriate work and costing study exercises are carried out, they will become a means of a control in that *expected* times of completion of a task will always be compared with the *actual* time that an operation is taking and deviations and thus corrective measures can be taken. The process tends to take rather long to determine when an operation is out of control.

USE OF A CITIZEN BAND RADIO

If the cost is reasonable, this option should seriously be looked at. A powerful citizen Band Radio would ensure constant communication with the field operations within a considerable radius of the Head Office. Its other attraction is the ability to schedule operations more effectively with its use. This will be discussed below.

THE SMALL VAN

This control device is probably the most expensive in the long run. It appears that its use should be minimised. It should only be used to make spot checks of the quality of work done, on drives to obtain orders, to carry out repairs on trucks, tractors and accessories.

The Order Processing System

For cash/payments control purposes, the issue of how the orders are processed, the contract entered into, the invoices issued and the point of the receipt of the monies in an operation of this nature matters a great deal.

The aspects of concern and a suggested system (simplified) are:

- To ensure that before a service is performed, there is a legally enforceable contract for the performance of the services which enables the MDU to take effective legal recourse in case of default if the contract for service is a credit one.
  In this respect, it should be noted that the MDU has large balances of payments owing to it which it would find difficult to legally enforce because of the absence of written acknowledgement of the debt. A pro forma document should be drawn up (in all the three major languages) that only requires the filling in of the other services, specific details and signature to acknowledge the debt. The contract should also specify the collateral which will be attached in the case of default. It is crucial that this pro forma contract be drawn up with the aid of a practising lawyer.
- .Sequentially numbered *pro forma* order booklets should be produced by the MDU. The possession of these would be limited to the Head Office Order Processing Officers, the Marketing Manager, and the truck and tractor drivers. In other words, orders can come through any of these sources.
  The filling in of an order book by a prospective client does not, however, constitute a contractual arrangement. Rather, it is merely a request for services until the MDU accepts the offer to do business.
- If the MDU accepts to service a customer, it could raise an invoice to the value of the service and give it to either the driver of the truck or tractor going to do the service. Additionally, the driver would also take with him the contract pro forma, which the client has to fill in before work is started. After the work is done, the client also countersigns the invoice as an indication of delivery of the service. In this system, note the following:
  While there are many sources from which the orders could come, there is only one source that contracts and invoices can come from - the Head Office Accounts Department.
- Each of the drivers would also be given a cash receipt book with sequentially numbered receipts. If cash is received they would issue a receipt to the client which should agree with the amount on the invoice.
- The main idea would be to minimize float, that is, the amount of cash that is in the custody of the drivers once they receive it from the client. There should be limits stipulated as to the amount of money they can have on their persons while in the field once a customer pays to them.
- At the MDU itself, again limited amounts of cash should be kept on the premises. Prompt banking of cash receipts should be observed. However, for the cash balances at the MDU, a safe should be installed for the safe-keeping not only of cash, but also of important documents, for example the contracts for service and invoices.
- Lastly, the setting-up of the order processing system as suggested in this section would require the assistance of a knowledgeable person.

Scheduling

Of primary importance to all service industries is the scheduling function. The Transport and Tillage Unit is not exempt from this general observation.

TILLAGE SUB-UNIT

To service its member Co-operatives adequately the MDU should ask the individual Co-operatives to send in the planned hectares to be ploughed, disced and planted in time. This would enable the MDU to distribute equipment effectively. It is advantageous in this regard to work on Co-operatives which are near to each other at one time so as to minimize tractor travelling time. This in turn enables the Co-operatives to co-ordinate their cropping activities efficiently.

The MDU should start ploughing for the Co-operatives as from May. Ploughing, planting and discing should end in November so as to allow the farmers to be able to adhere to their cropping plans.

The same principle of "batching" up of areas to be worked applies to the individual resettlement farmers too. It is here that the *marketing* or *order-collection* exercise plays a crucial part.

An issue raised in this regard is the movement of the tractor and implements from one location to the next. If the distances are small, the tractor could power itself there. But if they are large, this may require the services of a truck, particularly to carry the accessory implements. This is another reason why there is need to acquire an additional 15-ton truck which can better carry such abnormal loads.

THE TRANSPORT UNIT

The scheduling aspect of the operations of the truck are even more important because the truck is always spanning relatively large distances. To be noted is one particularly important factor - the load factor. As much as possible, the scheduling should minimize distances that the truck travels unloaded or unhired, or on an "empty return trip". To do this effectively means that the order collection function has to be done very efficiently.

For effective scheduling to take place, the operations manager has to know sufficiently well in advance what orders are outstanding, at what source places, going to which destination, places and dates when the operations are supposed to be completed. Armed with this type of information from the marketing department, more effective and planned scheduling can take place.

If demand between certain points is fairly consistent, thought should be given to providing regular service time-tables rather than the ad hoc demand responsive type of service.

SOURCES

ZIDS Reports on MDU

MDU Documents

S. Matsvai's Report on MDU

Hay, W., *An Introduction to Transport Engineering*, Wiley (1977)

Simpson, F. R., *Domestic Transport*, Houghton Milthin (1977), 4th Edition *ff*

Onakamaya, S. O. and Okanem, N. F. (eds.), *Transport in Nigerian National Development*, Proceedings of Conference held at University of Ibadan, 4th-9th July, 1977

People and Institutions Interviewed:

- MDU Administrator
- MDU Secretary
- MDU Truck Driver
- Mr. Freelan (a commercial farmer at Rusape)
- DDF Official at Rusape
- DDF Officials in Harare
- Official in the Ministry of Transport
- Regional Co-operative Officer in Ministry of Co-operatives, Community and Women's Affairs

APPENDICES

Appendix 1(a)
REVENUE FROM JANUARY 1985 TO DECEMBER 1985

DETAILS	TRUCK	TRACTOR B	TRACTOR C
January			-
February		170.00	100.00
March	144.60	17.00	320.00
April	189.02	-	-
May	1 702.08	344.00	-
June	1 941.80	-	-
July	3 883.40	2 329.50	2 329.50
August	4 218.10	38.00	2 525.75
September	4 118.05	260.00	4 039.80
October	2 630.08	-	-
November	1 897.30	DISPOSAL	-
December	3 897.30		
TOTAL	24 621.73	3 158.50	9 515,05

Source: *S. Matsvai's MDU Study*

Appendix 1(b)
REVENUE FROM JANUARY 1987 TO DECEMBER 1987

DETAILS	TRUCK	TRACTOR B	TRACTOR C
January	1598.10	1813.67	1835.80
February	1213.40	30.00	789.00
March	902.00	469.54	-
April	1889.00	370.00	45.00
May	50.00	-	200.00
June	-	-	-
July	2501.56	-	-
August	1943.00	-	250.00
September	2163.45	-	91.00
October	4945.34	374.39	417.91
November	3478.89	445.00	3470.52
December	2228.74	1467.03	2328.67
TOTAL	22913.48	4969.63	9427.9

Source: *S. Matsvai's MDU Study*

Appendix 2(a)

TRACTOR B OPERATIONS: 1986

DATE	PLACE	CO-OP	PURPOSE		AMT CHARGED	AMT PAID	DEBT
			Task	Hectares	$ c	$ c	$ c
14.05 to 16.07.86		Zinqondi	Ploughing	30	1860 00		1860 00
13.09.86		Rujeko	Maize discing	34 loads 40	680 00 1240 00		1920.0
08 09 to 29.09 86		Wiriranai	Ploughing	12 052.5	747.26		747.26
01.10. to 09.10 86		Tanhi	Ploughing	12,2	755.40		756 40
10 10 to 21.10 86		Nyamukamuni	Ploughing				
22.10 to 30.10.86		Kubatana	Ploughing				
31.10 to 13.11.86	Tandi	Individuals	Ploughing	15,4375	1003.44	1003.44	

Source: *MDU Report*

Appendix 2(b)

TRACTOR C OPERATIONS: 1986

DATE	PLACE	CO-OP	PURPOSE		AMT CHARGED	AMT PAID	DEBT
			Task	Hectares	$ c	$ c	$ c
14.06 to 16.07.86		Zinqondi	Ploughing	30	1860.00		1860.00
18.07 to 03.09.86		Rujeko	Ploughing Discing	10 15	620.00 465.00		1085.00
08.09 to 29.09.86		Wiriranai	Ploughing	12	744.00		744.00
01.10 to 14.10.86		Nyahambe	Discing	required ha were not completed; had to go back			
15.10 to 21.10.86		Nyamukamani	Ploughing				
22.10 to 30.10.86		Kubatana	Ploughing				
31.10 to 03.11.86	Tandi	Individuals	Ploughing	2.4882	161.73	161.73	

Source: *MDU Report*

Appendix 3(a)

OPERATIONS EXPENSES BY ITEM PER MONTH (1985)

			WAGES AND SALARIES				REPAIRS & MAINT.		
MTH	REG. INS.	FUEL OIL	TRK DRV	TRT DRV	TRT DRV	MECH	TRK	TRT	TRT
Jan	16	-	-	-	-	-	-	-	-
Feb	-	-	-	-	-	-	-	-	-
Mar	7493	600	200	100	100	500	61		
Apr	-	1564	200	100	90	480	-		--
May	-	2407	200	100	100	500	-	-	-
Jun	-	140	200	100	100	500	-	62	-
Jul	-	1150	200	100	100	500	262	149	17
Aug	-	1171	200	100	100	500	115	13	75
Sep	-	1251	200	100	100	500	-	105	105
Oct	-	79	200	100	100	500	315	419	415
Nov	-	1141	200	100	100	500	42	22	-
Dec	-	131	200	100	100	500	-	-	-
TOTAL	7509	9634	2000	1000	990	4989	795	770	612

Source: *S. Matsvai's MDU Study*

Appendix 3(b)

OPERATIONS EXPENSES FROM JANUARY 1986 TO DECEMBER 1986

			WAGES AND SALARIES			REPAIRS & MAINT.		
MTH	REG. INS.	FUEL OIL	TRK DRV	TRT DRV	TRT DRV	TRK	TRT	TRT
Jan	6159	873	200	-	-	474	-	-
Feb	115	-	200	-	-	-	-	-
Mar	-	60	200	-	-	-	-	-
Apr	-	63	200	-	-	215	-	-
May	15	775	200	-	-	-	-	-
Jun	262	1025	200	68	76	909	154	-
Jul	-	146	200	100	100	219	-	-
Aug	-	1830	200	100	100	475	-	87
Sep	-	1627	200	100	100	388	275	275
Oct	-	658	200	100	100	61	73	378
Nov	-	1382	200	100	100	100	-	13
Dec	-	204	200	100	100	588	266	204
TOTAL	6551	8643	2400	668	676	3429	768	957

Appendix 3(c)

OPERATIONS EXPENSES FROM JANUARY 1987 TO DECEMBER 1987

			WAGES AND SALARIES			REPAIRS & MAINT.		
MTH	REG. INS.	FUEL OIL	TRK DRV	TRK DRV	TPT DRV	TRK	TRT	TRT
Jan	-	1463	200	100	100	306	13	36
Feb	-	-	200	100	100	-	-	-
Mar	-	885	200	100	100	27	-	-
Apr	-	420	200	38	100	46	-	14
May	-	906	200	-	100	5000	-	-
Jun	6143	81	200	-	100	4752	143	503
Jul	-	906	200	-	100	100	-	-
Aug	-	1178	200	-	100	112	-	-
Sep	-	1228	200	-	100	453	-	304
Oct	-	1450	200	100	100	578	178	174
Nov	-	2396	243	130	130	460	234	252
Dec	-	-	243	130	130	765	215	13
Total	6143	10913	2486	698	1260	12599	783	1296

Appendix 4(a)

MAKONI DISTRICT COLLECTIVE CO-OPERATIVE UNION LIMITED

FINANCIAL STATEMENTS (1985-87)

BALANCE SHEETS

ACCUMULATED FUND	31/10/87	31/10/86	31/10/85
Donations (Holland)	Nil	167 650,35	209 381,46
OCCZIM	Nil	12 325,62 (loan)	20,15
Subscriptions	Nil	284,00	781,00
Reserve Fund	180 333,97		
Less Accumulated Surplus	(30 899,79)	(14 828,65)	(42 524,26)
	149 434,18	165 439,32	167 658,35
REPRESENTED BY:			
Fixed Assets	116 364,98	128 905,52	133 384,56
ADD Working capital	33 069,20	36 533,80	34 273,79
	149 434,18	165 439,32	167 658,35

Appendix 4(b)

MAKONI DISTRICT COLLECTIVE CO-OPERATIVE UNION LIMITED

NOTES IN SUPPORT OF ACCOUNTS FOR 1985 TO 1987

NET BOOK VALUE

1.	FIXED ASSETS	COST	1987	1986	1985
	Truck	44 500,15	27 768 09	30 853,43	38 566,79
	Two Typewriters	600 00	539 09	210 01	233 34
	Two Tractors	83 856 00		74 072 80	61 013 34
			87 212 06		
	Implements	28 370,20		22 829,49	32 526 87
	Office Furniture	668,80	732,42	561,80	624,22
	Filing Cabinet	300 00		252 00	280 00
	Fuel Tank	150,00	113,40	126,00	140 00
	TOTAL	158 095,15	116 364,98	128 905,53	133 384,56
2.	CURRENT ASSETS		1987	1986	1985
	Debtors		29 993 62	30 581 62	21 039 02
	Bank		3 073,23	5 915,12	13 134,94
	Petty Cash		2,35	37,60	7,83
	Accrued Subscriptions		-	-	92.00
			33 069,20	36 533,80	34 273,70
3.	CURRENT LIABILITIES		1987	1986	1985
	Creditors		Nil	Nil	Nil
4.	WORKING CAPITAL				
	Current assets		33 069,20	36 533 80	34 273,70
	Less Current liabilities		-	-	-

NOTE: All the above tables have been adapted from the original Financial Statements of the MDU 1985 to 1987.

Appendix 5

AREA UNDER CROP IN CHINYIKA RESETTLEMENT SCHEME FOR 1986/87-1987/88

	SEASON							
	1986-1987					1987-1988		
CROP	AREA		OUTPUT (bags)			AREA		
	Sample	Population Estimate	Sample	Population Estimate	Per Ha	Sample	Population Estimate	Percentage Change in Area
Maize	741 (65%)	1 853	3 421	8 553	12	672 (50%)	1 680	- 9
Beans	73 (6%)	183	89	223	3	112 (8%)	280	+ 53
Sunflower	197 (17%)		445	1 113	6	466 (35%)	1 165	+ 137
Groundnuts	124	(11%)	182	455	2	100	250 (7%)	- 19
TOTAL	1 135	2 8 00	4 137	10 344	23	1 350	3 375	- 19

Source: *Field Survey (ZIDS)*

Notes: 1. Area in hectares, whilst output is in 90kg bags.

2. Population estimates are proportionate projections of the sample.

Appendix 6 (Continued)

DRIVER TO COMPLETE			BOOKKEEPER TO COMPLETE	
INVOICE/DELIVERY NO.	RECEIPT NO.	NAME OF CLIENT	MAIN INVOICE NO.	MAIN RECEIPT NO.

Appendix 6

CURRENT VEHICLE LOG-SHEET

MAKONI DISTRICT COLLECTIVE CO-OPERATIVE UNION LIMITED **REGISTRATION NO. 1865**

WEEKLY LOG SHEET .....

VEHICLE NO.....

DRIVER'S NAME.....

DATE	OPERATION DUTY	TIME		MILEAGE		HOURS		FUEL (LTS)		ACREAGE	CLIENT'S NAME	PLACE	CLIENT'S SIGNATURE
		Out	In	Out	In	Out	In	Diesel	Oil				

DRIVER'S COMMENTS .....

.....

CHECKED BY ADMINISTRATOR ..... DATE.....

CHECKED BY BOOKKEEPER ..... DATE.....

ANNEX 7

MAP : LOCATION OF MDU HEADQUARTERS AND AFFILIATED CO-OPERATIVES

MDU Headquarters

MDU CO-OPERATIVES

1. Nyahambe
2. Nyamukamani
3. Magura Batanai
4. Bethel
5. Kuedza Masimba
6. Wiriranayi
7. Kubatana
8. Ruponeso
9. Tanhi
10. Zingondi
11. Shingirayi
12. Rujeko