A

FEASIBILITY STUDY

FOR THE FORMATION OF A

MACHINERY RING.

Prepared for: 1989 NEW ZEALAND RURAL LEADERSHIP PROGRAMME.
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INTRODUCTION.

A simple introduction as to what a Machinery Ring is could describe it as "a management co-operative whose members, through a central office and accounting system, seek to rationalise their machinery and labour levels by doing work for and/or having work done for them by other members.

It aims to make best use of members' machinery capacity by hiring it among members at competitive rates.

The concept of Machinery Rings is very well established throughout the world with the main areas being Central Europe, Japan, and Israel. There is an International Machinery Ring Federation whose triennial conference is being held in Brazil in 1990. Their main objective is to help establish Machinery Rings throughout the world by giving assistance in starting them up.

Germany is particularly strong with a very large number of it's farmers belonging to a Ring. Indeed one Ring has over 2000 members and has been running successfully for over 25 years.

However, all my contact has been with the manager of the "Borders Machinery Ring" which was set up in the Southern region of Scotland in 1987. This Ring was modelled on the Bavarian Machinery Ring in Germany. It now has over 100 members and operates in a region very similar to many parts of New Zealand. You will find throughout this study many pages of and references to the "Borders Machinery Ring". this is intentional as I do not wish to duplicate the regulations and phrases when they are suitable to New Zealand conditions.

The real or true cost of ownership of farm machinery has been well documented and in most cases there is a very strong financial argument against private ownership. Some of these studies are documented in the Appendix for your perusal. A well known and respected Christchurch accountant, Mr. Pita Alexander, has stated that he has found that a useful ratio to see if you may over capitalised with machinery, is to relate your Gross Farm Income to the clearing sale value of your plant including your car or cars - at anything less than a factor of 2 you should be doing some further homework, perhaps membership of a Machinery Ring is a viable option, that is, if your Gross Farm Income is say $140,000 and your plant value is $75,000 you have a factor of 1.87 which would tend to indicate your Gross Farm Income is on the low side or your plant is over-capitalised or both. It may pay to work out your own ratio, you could be very surprised.

One of the main arguments for private ownership of plant and machinery is security of independence and also it enables good timeliness of completing the job which is a very important factor for the successful farmer. It may well be cost efficient to own the major items of plant and machinery that you use frequently, however, there are often many thousands of dollars tied up in plant that may only be used for a few days each year. and your neighbour is in the same situation with the same piece of machinery.

Even if your plant value is realistic it could still be worth your while to consider membership of a Machinery Ring even if it is just for access to specialist plant and machinery.

REGULATIONS AS TO METHOD OF OPERATION.

The ring acts as an agency between two parties. It brings them together and enables them to sort out their machinery requirements to their mutual benefit. The member who wants some work performed or wishes to hire an implement **(the Demander)** communicates with the Ring manager and tells him what his requirements are. The Ring manager then consults the computer database and is able to draw up a list of members who have a suitable machine to do the required job and who are able to do it, **(the Supplier)**. This list is then given to the Demander who makes his choice as to who or what he wishes to hire. The Demander and Supplier are then left to come to arrangements over when the job is to be completed by. In most instances when a member asks for a service the machine comes with the operator, although in some cases it is possible to hire just the machine.

The hire out rates are usually fixed at an hourly or per hectare rate, however ,negotiation on the rates can occur. Some Rings use the price list to act as a base rate with problem jobs being able to be negotiated upwards, while other Rings use the price list as a guide only and the rate for each job to be negotiated by the manager.

Compared with employing a contractor to carry out the work, the Ring utilises it's existing machinery resources and is able to carry out jobs cheaper. Because it is a "non-profit" organisation, it can set it's charges below the normal farm contracting rates in the area.

All members agree to share machines and pay for their use on a formal basis. The machines are the members own equipment. Unlike a machinery syndicate, the Ring does not own or purchase tackle.

One of the benefits to members is that it can help justify their investment in machinery. Many farms have over capacity of machinery which is becoming more and more costly to purchase and run. Being a member of the Ring does not guarantee work for them , but it does provide the opportunity for them to get work for their machines.
Membership may also allow farmers to release some capital tied up in expensive machines.

Work must be organised through the Ring. Farmers in the Ring must offer spare machinery capacity to other Ring members first. Only if there is a surplus of machine capacity can they offer it outside the Ring. Likewise, Ring members must hire machinery from fellow Ring members. Only if the service they require cannot be met by another Ring member can they go outside the Ring. The Management Committee of the Machinery Ring does have the power to ask a member to resign, however, this should be avoided at all costs as the "good will" between members and management will help the Ring to grow.

To be assured of long term success, a Machinery Ring must be established with watertight rules and regulations that leave no doubt as to each member's responsibilities and rights.

The following two pages are from the "Borders Machinery Ring" and most if not all of their regulations regarding the method of operation could be adopted for New Zealand use.

BORDERS MACHINERY RING : FIRST SCHEDULE

REGULATIONS AS TO METHOD OF OPERATION

1. in order that information is made available to the members quickly and clearly a list of available machinery with a price list will be circulated annually.

2. when a member requires work to be done (a demander) he should contact the manager of the ring as soon as possible. once he has received a request from a demander,it is the responsibility of the manager to match up a member to supply the services (a supplier) and to notify him of his commitment

3. all members who intend to carry out work for the ring should ensure that their insurance policy is extended to include contracting and that they are fully insured to cover public liability.

4. it is the responsibilty of the supplier to ensure that equipment is mechanically sound and fit for its purpose and that it is fully guarded to comply with the rules of the health and safety legislation in force at that time.

5. the demander should have full insurance cover for personal accident or injury when work is being done on his farm.

6. the manager must be notified immediately of any breakdowns on farm.the operator will be given a reasonable length of time (seven hours) to have the machine operational again. if for any reason the repair is going to take longer then the manager may appoint another member to complete the work. the member will get paid for that part of the work which he had completed.

7. the demander will be responsible for damage to supplier's machinery if caused by neglect,e.g.stone damage to combine.

8. all complaints regarding transactions between members must be made in writing to the manager for arbitration.if no satisfactory settlement can be arranged it is the member's right to present his complaint at the next meeting of the machinery ring management committee,whose decision will be final.

   all members complaints as to the general management of ring business can be raised with either the chairman or vice-chairman.if no verbal settlement is adequate,a written statement is to be sent to the chairman with all relevant information for discussion at the next management committee meeting.the decision of the management committee will be final.

9. when a job is completed to the satisfaction of the demander a schedule of the work undertaken is prepared and signed by the demander and the supplier.the supplier returns the schedule to the manager of the ring.

10.members should have a current account at a bank together with authorisation for the manager of the ring to use this account as regards payment for work done among the members,by variable direct debit and credit.

11.the supplier will be paid within twenty eight (28) days of rendering the work completion schedule to the manager.

12.the machinery ring will charge a four per cent (4%) levy on work done by members for members.two per cent (2%) will be paid by the demander and two per cent (2%) by the supplier.

13.the ring is not responsible for any default in payment by any demander,or damage caused by any supplier arranged by the manager.

14.all work is undertaken at standard rates as detailed in the price list in force at the time.alterations in price due to operating conditions,quantity of work or any other circumstances may be negotiated;in which case this should be agreed with the manager before work is started,and the manager then informed in writing.

15.members are obliged to use their free machine capacity only through the ring and to cover their own additional demand for machines from the ring.

only if an arrangement through the ring is not possible is the member free to offer and seek machine capacities outwith the ring,after first informing the ring manager.

16.any two or more ring members who have a pre-ring working agreement will be able to have this continued in ring work allocation.

17.members can use the ring as a source of sub-contracting for work to outside ring customers.the demander member will collect his own bill through his normal invoicing routine,and the supplier member will be paid through the ring system.

18.all transactions and negotiations in connection with the machinery ring must be made through the manager who is responsible to the management committee of the ring.

as amended,february 1988.

SET OUT OBJECTIVES.

There is only one main objective of a Machinery Ring and that is:

> "To assist members in carrying on agricultural businesses through the mutual aid between members farms of a more rational joint use of agricultural equipment and labour."

Further secondary objectives may be added by the members at the inception of the Machinery Ring.

ANALYSE EXISTING BUSINESSES.

There are a large number of ways in which an individual farmer can supply his farm with the required plant and machinery to allow him to run his operation as an efficient business.

The most usual is private ownership by one person, but as has already been discussed, the true cost of ownership can be very high.

It is also common for neighbouring farmers to jointly purchase a piece of equipment relying on an informal agreement regarding the use of the machine. This relationship however relies mainly goodwill for it's success and can cause problems when the machine is damaged or if one party wants to sell his share but the other is reluctant to pay the asking price.

Leasing of major farm items such as tractors and combines are very popular options overseas especially in England and the USA. In New Zealand however there does not seem to be any interest in leasing machines from either the dealer nor the farmer.

The following are alternative choices for operating farm machinery, usually on a formal business-like manner.

They are:

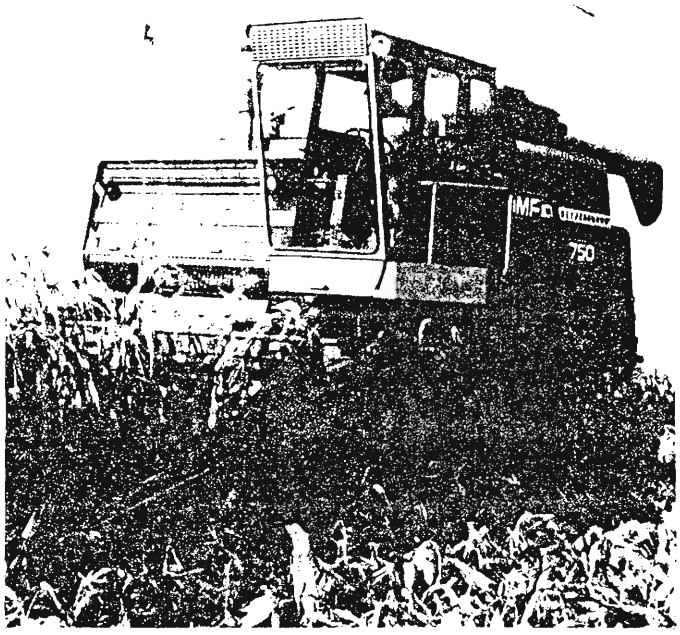
- Employ contractors.
- Hire machines.
- Machinery syndicate.
- Machinery ring.
- Co-operative societies and commercial organisations.

Machinery syndicates are very popular in many overseas countries, however, they usually have a very high level of Government support to help get them going, usually in the form of low interest loans. Whilst there are some notable success stories regarding machinery syndicates in New Zealand, most of the ones that started only ran for a few years before they ceased operations for a number of reasons.

The Ministry of Agriculture and Fisheries have published a number of Aglinks which suitably cover the various choices regarding the ownership or sharing options of farm machinery.

Farm Production & Practice

Ministry of Agriculture and Fisheries



Machinery Sharing Alternative Systems

Advantages and Disadvantages

Few farmers or growers can afford the luxury of owning all the equipment they need. Rapid price rises in recent years have caused even highly mechanised farmers to consider the alternatives before replacing existing equipment.

Sharing equipment with neighbours on an informal basis is common for simple machines, relying mainly on goodwill for its success.

Such an arrangement may evolve into a system where several farmers provide one or more implements to complete a system for, say, silage making. They then work together as a team. Such flexible arrangements often result in failure where dissatisfaction arises over unfair sharing, poor maintenance, damage to machinery, etc. causing one or more farmers to withdraw.

When properly planned on a formal basis with written rules, such difficulties are less likely to occur.

The more business-like choices open to the farmer are as follows:

- Employ contractors.
- Hire machines — from hire pools or neighbours.
- Join a machinery syndicate.

The option selected is largely based on individual preferences, current taxation level and local availability. The advantages and disadvantages of the various options are given below to enable farmers to evaluate the system with the most potential for their circumstances.

Contractors

Contractors provide a valuable service to the majority of New Zealand farmers. They avoid the farmer having to purchase, house, and maintain equipment, and they provide operators skilled in their task from continual operation of the machines.

The fixed costs of the equipment are spread over a larger workload resulting in a lower cost per unit. This saving is however more than balanced by the high overhead and transport costs to be met by the contractor who also has to employ skilled staff out of season and make a profit. Contracting costs are therefore relatively high, but included in the cost is a labour charge. At peak times, when the farmers and their staff are busy, this extra labour is well worthwhile.

The charge is usually calculated per unit (hectare, bale, tonne etc.) which tends to encourage speed of work rather than quality. The farmer has little control over the choice of machines or standard of work and often has no alternative choice of contractor in the district — should the work not be up to standard. An hourly rate may therefore prove more appropriate for certain operations such as cultivation and perhaps a scale of charge related to the yield obtained would be more applicable for harvesting or baling operations.

Liaison between the farmer and contractor often leaves much to be desired. The criticism of a contractor being unavailable when the weather or crop is right can be largely overcome by giving an anticipated date of operation, area and yield well in advance and confirming this nearer the time.

Many contractors are experiencing difficulty in replacing their expensive equipment and several have gone out of business. In areas where contractors are unavailable, alternative means of sharing equipment may be applicable.

Hiring machinery

When sufficient labour is available, a farmer might consider hiring equipment for a short term particularly where regular use of the item is not envisaged, e.g. a post hole borer or a large 4-wheel-drive tractor required for subsoiling. Hireage facilities for certain machines are not always locally available and transport of larger equipment can be a problem. The implements available for hire are usually low cost simple tools, though hiring a tractor etc. is little different to hiring a car.

Hired equipment tends to be poorly operated resulting in high repairs and maintenance costs to the owner who also has to make a profit. Overheads are spread by more fully utilising such limited-use equipment so although costs tend to be fairly high they are often cheaper than owning the implement.

Long term hire of machinery is proving successful in

1/3000/2/81 : FPP 485

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some areas overseas, but few facilities are available in New Zealand. This system is similar to renting a television, with repairs and maintenance (apart from tractor tyres) being the responsibility of the hire company.

Hiring from neighbours is a more business-like arrangement than informal borrowing. It would probably encourage the sharing of equipment by many farmers who are reluctant to ask a favour of their neighbours. The charge should be set so as to cover the operating and fixed costs of the machine; repair costs; transport; and a profit of say 20% to cover the supervision and efforts involved by the owner.

Machinery syndicates

Joint ownership of machinery by two or more farmers is well proven overseas where government grants are available and credit companies have been set up with the specific purpose of lending to farm syndicates. Repayment over 4 years at base interest rate plus 2% on a diminishing balance is the usual arrangement.

No such incentives exist in New Zealand although lending institutions will probably regard a syndicate as having better security than an individual farmer. There are however several examples of successful syndicates operating within the country, some of which have been going for over 20 years.

AgLink FPP 486 outlines the rules, regulations and responsibilities of farmers involved in a machinery syndicate.

Advantages of joining a syndicate

- Reduction of capital investment in farm machinery by an individual allowing better use of capital thereby increasing or maintaining liquidity.
- Finance generally easier to obtain due to increased financial strength and creditworthiness. The Rural Banking and Finance Corporation is actively encouraging machinery syndicates to enable farmers to act co-operatively in overcoming the high cost of individual ownership of machinery.
- Cost of borrowing is low compared with hire purchase or individual loans.
- Cost of doing the job is often less than hiring a contractor or running own machine.
- Equipment can be regularly replaced and kept up to date by incorporating a depreciation and replacement account into the financial arrangement.
- Maintenance of equipment is improved, since members tend to ensure the machine is in good order before passing it on. Also a regular inspection and overhaul by the dealer is often arranged.
- Machine capacity is adequately utilised on the larger total "hectarage" involved. It is essential that the machine capacity is not under-estimated, and that an ample "safety factor" has been allowed for in the event of a poor season. In a good season the group members may benefit from additional contract work if it is available in the vicinity.
- Use of larger machinery can be more efficient e.g. making silage quickly gives higher dry matter at reduced costs.
- Economies of scale may be possible, e.g. obtaining a discount by buying baler twine in large quantities.
- Encouragement of co-operation. Realisation that other members have similar problems may well lead to group discussions.
- Increased time for management planning and leisure due to responsibilities being shared.
- Utilisation of special skills held by individual group members.
- Pooling labour enables a working gang to be formed when required. A 24 hour operation can be organised if desirable. A far more efficient use of labour is possible particularly on 1½ man units.

Disadvantages and prejudices

A loss of independence is inevitable, but individual farmers must consider if they can afford to remain independent. Within a syndicate each member probably has a greater control over the machine and a greater certainty of achieving the desired operation on time than when employing contractors or hiring equipment.

Non-availability of the machine when required can give reduced timeliness of operations. In practice this rarely occurs due to adequate pre-planning and correct selection at the outset of a machine of sufficient size and power to cope with the total work load of all members. Four farmers wishing to harvest 50 ha of cereals each, is little different to one large farmer planning to harvest 200 ha. Regular group discussions to arrange a programme and work out a rota with the order changing each year, generally provides a solution satisfactory to all members.

Keeping good records and planning in advance are essential. These may seem a chore to some farmers, but once compelled to improve their paper work after joining a group, most realise the benefits to be had in terms of improved management.

Maintenance and repair of the equipment: It is best if made the responsibility of one member with an annual report being submitted by an engineer or dealer after inspection. A financial incentive to keep the machines in good order is often warranted. If the syndicate owns several machines each member could be made responsible for one.

Arranging a fair basis for sharing may be difficult. For simple machines an initial contribution could be made by members in proportion to their anticipated use. Expensive machines need a more precise estimate requiring annual review. Alternatively an equal capital contribution could be made by each member and a charge made per unit used. Total running costs could be divided in proportion to the amount of fuel used by each member. Where members underestimate their work load in a given year, the extra work is charged at near commercial rates. Any extra costs incurred or income received are divided in proportion to each member's share of the purchase price.

Risk of disagreement: Since all members have joined the syndicate for their mutual advantage disagreement is unlikely assuming that suitable partners were originally selected; the machine can cope with the total work load; and that the scheme is well planned and legally drawn up. The participation of an experienced local advisor and/or accountant is advisable particularly in the initial stages.

Members could be liable in event of accident, bankruptcy etc. Insurance is therefore advisable to cover machines and assets; accidents to workers; liability for say $200,000; and accident and sickness of members. A limited machinery company requires more formality, extra legalities and additional accountancy. It also tends to be less flexible with rules and daily organisation. However members are not liable for the debts of the group above their own contribution.

Types of machinery sharing

Simple machinery syndicate: This is where one key and usually expensive machine is owned and operated by 2–5 farmers. For example a meter-chop maize harvester costing say $24,000, may be owned by five farmers who contribute the capital and running costs of the machine in proportion to their average maize silage 'hectarage' (Table 1).

The operator would be selected from one of the members or might be an employee. Such a person would be responsible for the machine, would soon perfect any essential operating skills, and labour would be replaced when working on other farms, or paid for by the syndicate. Alternatively members could operate the equipment when working on their own property.

Table 1: Simple machinery syndicate.

	(ha)	*%*	*Capital* $	*Annual running costs calculated $20/ha* $
Farmer A	40	13.3	3,200	800
Farmer B	35	11.6	2,780	700
Farmer C	22	7.3	1,760	440
Farmer D	123	41.0	9,840	2,460
Farmer E	80	26.8	6,420	1,600
	300		24,000	6,000

Complex machinery syndicate: This involves the sharing of all equipment necessary for a complete farm enterprise such as lucerne hay making (mower, conditioner, rake, baler, bale handling system, trailers, tractors) or cereal growing (plough, cultivators, roller, drill, sprayer, header and perhaps grain storage, drying and handling facilities).

The system is more complex and considerable thought is required in order to fit the appropriate size and type of machinery to the group's total needs before purchase can be made.

The necessary tractors to power the implements may be owned and operated individually for most of the year, but hired to the group during the season.

A higher horsepower tractor however may be purchased by the group for use with the larger implements.

Machinery syndicate with operator: The operator is hired by the syndicate either for the season or in some instances on a full time basis. The job includes responsibility for running and maintaining the equipment and possibly for arranging the operating schedule of the member's machinery requirements. Consequently the term "manager" is perhaps more applicable. This may also involve the job of secretary to the group.

To find a person of this calibre is difficult, but perhaps a local contractor could be the very person. Like farmers, contractors are very concerned at the cost involved in replacing their equipment and some are considering going out of business rather than investing in more capital. By incorporating a contractor into a syndicate, perhaps as a shareholder as well as an operator, then the group will immediately benefit from such a persons machinery skills and business ability. The contractor would lose some independence by joining the group, but in return would have the challenge of making the system run efficiently and the incentive of operating more up-to-date, expensive and complex machinery.

A bonus scheme could be instigated to encourage proper running and maintenance of the machines.

Total machinery syndicate: In this case all the field work of a number of farms is done by a service unit operating one set of equipment. Members pay capital and running costs in proportion to their use. Labour may also be pooled and a saving may result. Alternatively there are circumstances when several members could well do with some additional labour, but do not have enough work to warrant employing one extra person on each farm. For example if three dairy farmers together employed one person as a relief milker working on a rota system they would each get a total of 7 days off, including one long weekend, every 4 week period. They would also have the benefit of the additional labour for operating and maintaining equipment between milkings. In peak periods of course the labourer could be fully employed as the machinery operator.

A similar situation often occurs where several farms are owned by one person or organisation and all the field work is done by the service unit. This works well, and the only difference being advocated here is that each farm is owned individually.

Machinery circles: This is a voluntary scheme open to all interested farmers, contractors, syndicates, etc. living within a given locality.

A manager is appointed, perhaps on a part-time basis. All members who own an implement/s which they would be willing to hire inform the manager to this effect.

The available equipment together with details of capacity, size, horsepower requirement, tyre size etc. is catalogued in a card index and a list of all the equipment is sent to each member. When a job needs doing, say driving in fence posts, the member requests a post driver through the manager who consults the card index and the owner of a suitable machine is notified by telephone. The machine can be hired by itself or perhaps the owner will be contacted. With something like 200 members in the circle owning perhaps a million dollars worth of machinery between them, then few requests will not be fulfilled.

If there is a great enough demand for a certain implement which cannot be satisfied then a contractor member of the group might be encouraged to purchase such an implement knowing the demand is there.

After the job is complete the owner fills in a form stating type of job, time spent etc. which is signed by the farmer where the work was carried out. This is sent to the manager who transfers the appropriate sum from the farmer's account to the owner's.

Such a system stimulates the machinery owner to utilise equipment more efficiently. Furthermore all the problems of arranging jobs, sending out bills, collecting debts etc. are dealt with.

Farmers owning little machinery can hire all they want from other members.

A nominal amount per hectare of land farmed is paid annually for the privilege of being a member of the circle. This goes towards the manager's salary and other expenditure.

Such systems work well in Europe and members do not suffer from a loss of independence in the same way as they would if joining a syndicate.

Co-operative societies and commercial organisations: A co-operative society is generally set up on a large scale requiring at least seven members. Shareholders use the grain drying, fruit packing, milk processing or similar facilities with which the society is concerned. Field machinery is not usually considered.

Large commercial organisations however, sometimes provide a farm machinery service to their growers to encourage production of processing crops in which they have a special interest. Food processing firms for example, let out contracts for growing say tomatoes. Tight control over the time of sowing, variety and other factors of production is maintained so that at harvest time, expensive harvesting machinery moves from one farm to another in logical sequence keeping both the field machinery and processing plant operating over a prolonged period of time.

Conclusion

Syndication is not necessarily restricted to machines. Group ownership of shearing sheds, cattle yards, packing sheds is feasible.

A farmer may also be a member of more than one syndicate and of course a syndicate could employ a contractor or hire machines when necessary.

Co-operation between farmers or growers is likely to increase as economic constraints become greater. Which of the above systems of co-operation is most applicable, is dependent upon the circumstances of the potential members and the type of enterprises concerned.

By careful planning at the onset a system can be designed to be mutually beneficial to all members.

Table 2: Implements suitable for sharing.

Implement	*Typical working width (m)*	*Implement field efficiency (%)*	*Working speed km/h*	*Approximate working rates ha/hour**	*ha/day*
Plough (3 furrow)	1	80	5.5	0.45	3.1
Plough (6 furrow)	2	80	5.5	0.9	6.2
Rotary cultivator	1.5	85	4	0.5	3.6
Tine cultivator	3	85	5.5	1.4	10
Spring-tine-cult harrow	4	85	8	2.7	19
Disc harrow	2.5	85	5.5	1.2	8.2
Roller	3	85	7	1.8	12.5
Fertiliser spinner (0.3t)	6	50	8	2.4	16.8
Combine drill	2.5	60	8	1.2	8.4
Precision drill	2.5	60	3	0.45	3
Crop sprayer (450 litre)	12	40	7	4.2	29.4
Header	3	75	3.7	0.7–1.6	4.9–11.2
Pick-up hay baler	3	50	7	1.05	7.35
Mower, flail	1.5	85	7	0.9	6.3
Tedder, 2 row	3	85	8	2.04	14.3
Swath turner/side-rake	3	85	8	2.04	14.3
Forage harvester (flail)	1.5	65	5	0.5	3.5
Forage harvester (fine-chop)	3	65	4.5	0.88	6.1
Potato planter (automatic 2 row with fert.)	1.5	60	5	0.45	3.15
Potato elevator, digger (1 row)	0.7	70	4.5	0.2	1.5
Potato harvester (main crop 1 row)	0.7	70	2	0.1	0.7
Fodder beet harvester (1 row)	0.5	50	4.5	0.1	0.8
Cabbage transplanter (2 row)	—	—	0.12	0.06	0.4

*Includes turns, machinery adjustment, refilling spray tanks etc.

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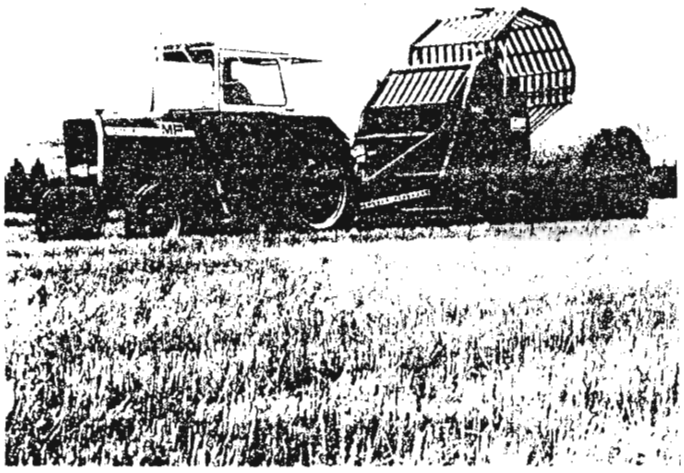

Machinery Sharing Syndicates

Establishment

To be assured of long-term success, a machinery syndicate must be established with watertight rules and regulations that leave no doubt as to each member's responsibilities and rights.

Different variations on the machinery syndicate theme are described in AgLink FPP 485, as are the advantages and disadvantages of each.

This AgLink suggests the steps to be taken by farmers once they're decided on some form of machinery syndication.

Potential membership

Organise a meeting of all potential interested parties chaired by an official representative from MAF, University, etc or an interested solicitor or accountant.

The proposal should be propounded in general terms emphasising the advantages to be enjoyed by the members. The business improvement aspects of the scheme must be clearly outlined and the potential disadvantages should also be discussed rationally.

It should be borne in mind that members must get on with each other since they will be working closely together, and their properties should not be geographically too far apart. Those interested in taking the project further should contact the organiser within a week.

Formal channels through which farmers can seek advice on syndication are limited. Several MAF advisory officers have had experience in assisting groups as have some accountants and solicitors with a personal interest in syndcation. Indeed the existence of many groups is due to the enthusiasm of such individuals. In many districts such expertise is difficult to obtain, but every effort should be made to find a suitable person to act as consultant and carry out a feasibility study.

Feasibility study

The consultant should initially set out a programme, stating proposed date of completion and fees. The costs of the study are to be paid by the members on some previously agreed basis, equal shares being usual.

It could be that members carry out the study themselves seeking advice where possible. The consultant however can dispassionately examine the business involved and calculate the effects of the proposed syndication. He/she may ascertain that the formation of a group is not in fact the best solution, whereas members, already strongly biased towards the concept, might not see this possibility and make the wrong decision.

The feasibility study should:

- Set out the objectives.
- Analyse the existing businesses.
- Ascertain the effects the syndicate would have on the farmers, their income and their life style.
- Examine the legalities of forming a partnership or company.
- Give guidance on organising the group and formation of a management structure.
- Suggest appropriate methods of record keeping and payments so that all transactions are shown.
- Indicate capital requirements and possible sources of finance.
- Indicate labour requirements.
- Suggest modifications to the original proposal.

The study is presented to the group together with the recommendations. It could be that some members will benefit more than others so re-organisation of the original group with perhaps the need to introduce more members may be necessary. A further study may then be required to investigate the new objectives. Table 1 gives an example of the results of a study. Farmer Z would no doubt be unhappy about the advantages to be had by joining the syndicate under this proposal.

Legalities

Setting up a company or partnership inevitably requires legal advice together with the services of an accountant. They should be appointed at this stage to advise on the setting up of the organisation. Developing record keeping systems, drawing up partnership deeds and developing operating rules are jobs requiring considerable expertise.

For a simple partnership, members are jointly liable for group borrowings or bank overdrafts and any losses.

1/3000/2/81 : FPP 486

Media Services, MAF, Box 2298, Wellington, New Zealand.

Table 1: A feasibility study of the present position of three farming businesses and the financial effects of forming a syndicate.

Before syndication	*Farmer X* $	*Farmer Y* $	*Farmer Z* $	*Total* $
a. Total investment in machinery	79,400	128,400	16,800	224,600
b. Annual machinery costs (including depreciation, repairs, interest, fuel etc.)	26,400	39,200	7,400	73,000
c. Labour costs	16,000 (1 full-time & casual)	12,000 (1 full-time)	3,000 (casual)	31,000
After syndication				
Farmers agreed share in syndicate	42%	48%	10%	100%
	$	$	$	$
d. Total investment in syndication	77,616	88,704	18,480	184,800
e. Annual machinery cost	22,764	26,016	5,420	54,200
f. Labour costs	12,264	14,016	2,920	29,200 (1 manager, 1 full-time)
g. Annual machinery cost savings (b–e)	3,636	13,184	1,980	18,800
h. Labour savings (c–f)	3,736	–2,016	80	1,800
Total savings (g+h)	7,372	11,168	2,060	20,580
Capital savings (a–d)	1,784	39,696	–1,680	39,800

If a private limited liability company is formed, in order to borrow money a formal written guarantee of the company's borrowings is generally required from each member by the lender. A lower interest rate may be negotiable due to this joint liability.

Statement of intent

Each member is asked to commit him/herself to the syndicate as follows:

I.....(name) of.....(address) state my intention to join the..... syndicate and enclose $..... as an initial payment towards the setting up costs.

If I withdraw from the syndicate during its formation I understand the payment is non-refundable.

Signed..... Date .....

Group organisation

- A chairman and secretary are appointed annually with possibility of re-nomination.
- The chairman is responsible for calling meetings, which can be at the request of any member. An annual general meeting (AGM) must be held within a few weeks of the group's balance date set for income tax purposes.
- The secretary records minutes of all meetings. The feasibility study, rules and financial statements are filed permanently in the minute book.
- A bank account is opened in the group's name with cheques requiring signature of any two members.
- Each member has one vote regardless of contribution to the group, size of enterprise etc.
- A majority decision shall be binding on all members except where a unanimous decision is specifically required.
- An outside arbitrator is selected in the event of any dispute and decisions must be accepted by all members.
- All machinery should be insured comprehensively unless all members agree not to.

Rules

The following points must be considered by members before commencing group operations:

- The minimum amount of land each member agrees to commit initially to the group operation.
- The proportion of machine purchase price which members shall contribute and whether additional capital will be sought elsewhere. Purchase price can be divided by land area, tonnage or hourly use.
- The basis on which members contribute to the running costs and other expenses. Fuel tanks for example,could be filled up before leaving each property or a separate fuel supply used for group operations and each individual's fuel use recorded.
- The year's work programme must be planned in advance including the entitlement of members to the use of the equipment. Area, soil type, crop varieties etc. must be considered in the discussions. A written estimate of anticipated work in the forthcoming 12 months to be provided to the chairman by each member before the AGM.
- The order in which members shall obtain use of the equipment and an annual rota to determine who goes first each year.
- The period for which each member may keep the machine, paying due regard to the likely affects of adverse weather. If essential the agreed plan may have to be interrupted to save the maximum value of crop on each member's farm.
- The operator of the equipment. Since performance of a complex machine is very dependent on the operator it is best if one person operates the major machines on all farms where feasible.
- The provision of ancillary equipment such as tractors and trailers to the group by individual members and the necessary cost adjustment for the use of such equipment by the group. No charge should be made for ancillary equipment used solely on the owner's property.
- Responsibility for the machine, its repairs and maintenance and preparation of the annual report on its condition. Need for repairs or adjustments should be reported to this person and any costs incurred paid for by members in proportion to their share.
- Regular inspection and assessment of the condition of the equipment. The local machinery dealer is the usual choice. A report is circulated to members at least annually.
- The awarding of a maintenance bonus to the machine operator/serviceman if a good report is received, thereby encouraging conscientious maintenance.
- Storage of the equipment out of season and on what terms.
- Hiring of additional labour (e.g. a driver/manager), the skills required, wages and housing.
- The need to pool labour for certain operations and at what charge to the group. The cost of this labour is paid by members in proportion to their share of the equipment.
- Whether outside contract work is permissible after the members' requirements are completed. The operator of the machine and the charge-out rate need annual review and a maximum travel distance laid down.
- The chairman to be notified monthly in writing of each member's requirements for the coming month.
- The charge out rate to group members and the basis for calculation. This should include a machine replacement cost as well as running costs, interest charges etc. Initially it should be on the high side and surplus funds refunded. After a year of operation charges can be set fairly accurately and should be reviewed annually.
- The method of payment by members for work done and the sending of accounts.
- The method of distributing surplus funds to the members at the end of a financial year.
- Provision for amendment of rules. A unanimous decision normally required.
- The procedure to be taken should a member act contrary to the rules. After a written warning the member could be expelled from the group by a unanimous decision of the remaining members, and capital repaid at some period after expulsion.

Once the above points have been fully discussed and

agreements reached, written rules can be drawn up.

These rules must be signed by all members and few problems should then arise.

Experience has shown that careful and thoughtful planning at the outset alleviates future problems.

Retiring members

Rules requiring this eventuality and also relating to death, physical or mental disability or bankruptcy are necessary. A typical set are given below:

- No member may leave the syndicate during the peak season (e.g. harvest).
- 6 months notice of withdrawal is required in writing.
- A retiring member may find a replacement who, if accepted by the other members, assumes all the responsibilities and commitments of the retiring member.
- Repayment of capital to the retiring member may be delayed by up to 12 months if the remaining members consider immediate repayment would endanger the success of the group. Normally it would be repaid in cash after the required period of notice.
- A member's death, physical or mental incapacitance, or bankruptcy shall be treated as if notice of retirement has been given.
- After the retirement date the group's assets will be valued by an independent valuer. The group's liabilities are listed and the net value of the group ascertained. The retiring member's share can then be calculated. An annual interest rate should be accounted for to be paid to each group member according to the original contribution. Any surplus then left can be credited to members in proportion to their work throughput.
- Surviving partner/s may exercise the right to purchase the share of the retiring member on terms acceptable by the vendor or appointed representative. Usually 30% of the valuation should be paid within 2 months and the balance paid with interest after 2 years.
- Any expenses involved in the retirement, death etc. of a member shall be split equally by all members including the retiring member.

New members

- New members can be admitted by unanimous consent of existing members.
- The group's assets will require valuation so that capital can be redistributed fairly.
- Any expenses involved in admitting a new member should be split equally amongst all members including the new member.

Purchase of machinery

A list of machines required, the appropriate capacity and the suitable brands available should be drawn up. Selection may be difficult due to a variety of personal preferences by group members.

With a large syndicate it may be that machines currently owned by members will be made superfluous by formation of the group. These must be valued and the group purchase those it requires. The remainder are purchased by the group and used as trade-ins against the new equipment.

The tendency to retain existing machinery in the event of an emergency situation is not recommended as such machinery in practice is rarely used and tends to simply rust away.

It is important the group only purchase machines which specifically meet its requirements rather than use a machine already owned by one of the members.

Example: Assume three farmers intend to begin a silage-making machinery syndicate. The valuation of the relevant equipment currently owned by each is as follows:

	Present equipment ($)	*Annual anticipated area to be harvested* (ha)
Farmer A	7,500	50
B	5,000	30
C	1,000	40
	13,500	

The company purchases all this equipment retaining part as follows:

	Retain ($)	*Sell* ($)
Farmer A	4,000	3,500
B	3,500	1,500
C	—	1,000
	7,500	6,000

A new forage harvester and trailers etc. costs an additional $15,000 so that the company has to raise $22,500 capital.

Assume $4,500 is borrowed and capital is shared according to hectarage. The remaining $18,000 capital required is obtained as follows.

Farmer A is required to provide $7,500 but sold $7,500 worth of equipment to the group and therefore makes no contribution.

Farmer B is required to provide $4,500 but sold $5,000 worth of equipment so gets a rebate of $500.

Farmer C is required to provide $6,000 but sold $1,000 worth of equipment to the group and therefore has to find $5,000 contribution for the privilege of becoming a member.

Working expenses

The total expenses for the operations involved must be assessed as accurately as possible. The assumed total tractor hours are calculated and a 10% allowance added. Wages, fuel, transport, repairs and maintenance, administration expenses, chairman's and secretary's honorarium, insurance, interest charges, depreciation etc. must be accounted for as accurately as possible.

Assuming the total is say $3,300 and members intend to harvest a total of 120 ha of pasture in the first year, a charge of $32/ha would cover costs and give a small profit which can be later repaid.

Further discussion might be required if for example there is likely to be differences in the yields of pasture harvested per hectare. To overcome such anomalies a cost per hour may be considered more appropriate.

For a complex syndicate with a range of operations the cost for each operation can be realistically calculated and then adjusted until total expenses are covered and all members are satisfied.

The depreciation fund is kept in a separate account and used eventually to replace the equipment. It could perhaps be advantageously invested in a separate short term enterprise run by the group thereby effectively earning a high interest rate until required.

Record keeping

Standard forms are useful to minimise paper work. Three types are required.

Members' anticipated work sheet: To be completed monthly and handed to the chairman or manager.

Implement operator's work sheet: For accounting purposes it may be preferable to have a work sheet filled in at the completion of each job and signed by the member as shown below or the operator/manager could keep a weekly record of all operations carried out each day.

Invoice for jobs done. (This would be sent out monthly to each member.)

– Members' anticipated work sheet:

Name ..... Month ending 30/11/81

Paddock	Area	Operation/s required	Starting date	Final completion date	Comments
Home farm 14	13.2 ha	Pasture mown	12/11/81 if rain not imminent	1/12/81	
		Forage harvester	12-24 hrs after mowing	2/12/81	Finest chop setting required. Pasture quality likely to reduce after early December

Manager's comments:

– Implement operator's work sheet:

Job sheet

Starting date and time	Farm and paddock area worked	Operation	Finishing time	Actual operating time (or tractor hours)	Comments
Wednesday 15/11/81 7.30am	Home farm Paddock 14 13.2 ha	Mowing	6.10 pm		Sharpened blades 3 times
Thursday 8.00am	"	"	2.50pm	14 hrs 36 min	1 damaged blade replaced

.....
Farmer's signature

– Invoice:

Name ..... For month ending 30/11/81

Date of work	Paddock	Operation	Total area	Total units	Rate	Total
15/11/81	14	Mowing	13.2 ha	14.6 hours	$12.50/hr	$182.50
17/11/81	14	Fine-chop harvester	13.2 ha	13.2 ha	$32/ha	$422.40
					Total	$604.90

Please pay by December 20th

Signed .....
Company Secretary

R. E. H. Sims
Senior Lecturer
Massey University

MEMBERSHIP STRUCTURE.

A Machinery Ring Can be established in two main ways.

1. The establishment of a Society.
2. An informal agreement between members.

To set up as a Society you are required to be registered under the Industrial Provident Societies Act. This requires all members to be issued with equal shares of the Society, usually with a nominal value of $1. If a member withdraws from the Society then he is repaid the value of his paid-up shares. The Society must have a Registered Office and must also have a written objective. The directors of the Society have quite wide powers to fulfil the accomplishment of the objectives.

The requirements of the Society to issue shares can mean some considerable expense and it is doubtful whether this can be warranted especially when starting up a Machinery Ring with a low number of members. There would have to be an up-front payment by the new members and this could meet with some resistance.

The only benefits that a Society would initially bring would be in taxation where the Society is able to increase members shareholding without being taxed. This is of minimal use for a small Society.

An informal agreement between members would be the preferred option when starting a Machinery Ring. It is much simpler and would be easier for the potential members to grasp and it would also cost less to establish. Although informal, the members still have to sign a document stipulating that they would abide by the rules of the Machinery Ring, these mainly relate to the "Regulations as to method of operation". A member would be able to withdraw from this agreement without any penalty or reimbursement.

Any arrangement made between the "Demander" and the "Supplier" for use of equipment will constitute a contract between them to which the Ring is not a party.

The business of the Ring would be given direction by a Machinery Ring Management Committee consisting of 10 members who were elected by the other members at the Annual General Meeting. The Management Committee fix the ring charges and review annually. It would also be the function of this committee to give a final decision if there is a dispute regarding transactions between the members and it could not be satisfactorily settled using the manager as arbitrator.

An annual subscription fee would be payable by the members. This would be a set amount for each person and would be used for paying Ring overheads - rent, mileage, office expenses and telephone. The amount of the subscription would be largely determined by the number of initial prospective members and what they would be willing to pay. The current subscription fee for the "Borders Machinery Ring" is set at about $NZ150.

BORDERS MACHINERY RING LTD

APPLICATION FOR MEMBERSHIP

NAME OF APPLICANT: _____

ADDRESS _____

_____

_____

POST CODE _____

TEL NO _____

I HEREBY MAKE APPLICATION TO BE ADMITTED AS A MEMBER OF THE ABOVE NAMED MACHINERY RING AND I AGREE TO PAY THE SUM OF FIFTY SEVEN POUNDS FIFTY PENCE (INCLUSIVE #7.50 VAT) AS THE ANNUAL SUBSCRIPTION TO THE RING FOR THE YEAR ENDING 30 APRIL 1989.

I ENCLOSE HEREWITH THE SUM OF FIFTY SEVEN POUNDS FIFTY PENCE (#57.50),IN PAYMENT THEREOF,INCLUSIVE OF VAT (#7.50).

I HAVE READ,FULLY UNDERSTAND AND,IF ADMITTED,UNDERTAKE TO BE BOUND BY THE RING'S CONSTITUTION AND REGULATIONS FOR THE TIME BEING.

I UNDERSTAND THAT ANY ARRANGEMENT MADE BETWEEN ME AND ANOTHER MEMBER FOR THE USE OF EQUIPMENT WILL CONSTITUTE A CONTRACT BETWEEN ME AND THAT MEMBER TO WHICH THE RING IS NOT A PARTY.

I ACKNOWLEDGE THAT THE RING'S CONSTITUTION AND REGULATIONS WILL BE DEEMED TO BE INCORPORATED IN ANY SUCH CONTRACT.

SIGNATURE: _____ DATE: _____

A CHEQUE FOR (POUNDS)#57.50 SHOULD BE MADE PAYABLE TO BORDERS MACHINERY RING AND RETURNED WITH THIS APPLICATION FORM TO:-

BORDERS MACHINERY RING LTD
NETHERRAW FARM
LILLIESLEAF
MELROSE TD6 9EP

METHODS OF RECORD-KEEPING & PAYMENTS.

The computer plays an essential part in the administration and operation of a Machinery Ring. The computer database is used to store the list of all of the machinery that is available for hire from the "Suppliers". This can be readily accessed by either the region of the "Demander", the machinery he wants, or both.

As mentioned before, when an arrangement is reached between the"Demander" and "Supplier" it is a contractual agreement. Each Ring member has a triplicate Invoice book which is filled out on completion of the job. The "Demander" has to sign at the bottom of the invoice to indicate that he was happy with the quality of the job. One copy is retained by the "Demander", one by the "Supplier", and the other is sent to the manager for invoicing.

Most Machinery Rings operate a direct debit system whereby each member agrees to allow the manager to direct debit his nominated bank account the amount indicated on the invoice plus half the managers' commission. This process is allowed to proceed for a week during which any problems can be sorted out. Once the debit has been cleared by the bank the manager sends the "Supplier" a self-billing invoice for the work done less the other half of the agreed commission percentage and authorises the Ring bank to credit the "Suppliers" bank account with the appropriate amount. The "Supplier" is usually paid within 28 days of job completion.

The accounting system is such that all a "Demander" has to do is pick up the phone, and all the "Supplier" has to do to get paid on job completion is fill out a time sheet and post it.

The ring does not guarantee the solvency or otherwise of any member and cannot be made to pay a "Supplier" if the "Demander defaults on payment.

If special rates are agreed to then they are negotiated through the manager and he invoices at the appropriate rate.

All invoicing can be done through the computer with any commercial debtors software e.g. Trader Debtors series. This also allows the manager to keep track of who is using the Ring and can print an end of year summary for each member.

The following is a typical "Demander/Supplier" invoice which is filled in on completion of the job.

BORDERS MACHINERY RING
Tel. 08357 214

WORK SCHEDULE
White Copy To Office

No 7039

DEMANDER— PRINT	Date Sheet To Ring Office	/ /	Start Date	/ /	
SUPPLIER— PRINT	Date Sheet Received	/ /	Finish Date	/ /	

Fuel from Demander YES/NO Tank(s) Checked on Arrival →

Type of Work, Details, Materials-Fuel-Supplied, Notes	Travel Hours Miles	Work Time Hours	Amount Area Ha. Ac.	Rate Per Ha., Ac. Hr., Mi. Unit	Chargeable Cost £ p

Total

Excl. Vat.

Demander—Retains Blue Copy

(Signed) .....

Supplier—Retains Pink Copy

(Signed) .....

The Demander hereby agrees that His/Her Designated Bank Account will be charged with the cost of the above work.

THE MANAGER.

As manager, it is his job to make compatible arrangements between the"Demander" and the"Supplier", he remains available to help sort out any unforeseen problems eg. breakdowns, conditions etc and to do all the invoicing for debtor and creditor. He may also be asked to help with the promotion of the Ring to attract new members.

In return, he covers his time and expenses by taking a 4% commission from the gross turnover of the Machinery Ring. This is provided by 2% from the "Demander" and 2% from the "Supplier". The manager actually receives 75% of all commission.

The manager would probably not be employed full-time with the Ring until the number of members were over 300. One of the Rings operating in Germany which has about 2000 members still only uses one manager. It would therefore be initially only a part-time occupation. However, a personnel consultant specialising in farm employment has indicated an interest in combining his current position with that of being the manager for the Machinery Ring. As he already has the offices, suitable computer hardware, and the contact with farmers this could be a very suitable arrangement. The Ring members would either pay a lease for the computer or could negotiate a slightly higher commission percentage to cover these extra costs.

As an indication, to service about 100 members could take up to 30% of his time.

Theoretically there is no limit to the distance that the members are from the manager as all communication is by either telephone or post. If the cost of a phone call would be seen to be a limiting factor to the growth of the Ring then a Freephone (0800) could be installed and the costs recovered through either subscription fee or commission increase.

Growth of the Ring is likely to start off slow and so it will require a manager who is dedicated to see it through the initial stages and reap the benefits later on. A good manager is essential to the existence of the Ring as the main way it will grow is by word of mouth so the members have to feel that they are being treated well.

WHO WILL THE MEMBERS BE?

It is likely that if the Machinery Ring was based on the Western suburbs of Christchurch there would be three main groups of farmers that may be interested in joining.

1. Large scale arable farmers.
2. Dairy farmers.
3. Small block or "hobby" farmers.

Arable.
The arable farmer would be mainly wanting Ring membership to be able to offer him the extra cultivation or combining facilities should they strike a bad patch of weather. They are likely to retain most of their plant and machinery as timeliness in cropping is very important. They may be interested in specialist machinery hire. The arable farmer is likely to become a major "Supplier" of services especially if he lives near either of the other two groups.

Dairy.
The Dairy farmer can get away with owning very little machinery as they tend to only use plant for very short periods of time. They tend to rely heavily on contractors for a lot of their cultivation/drilling work and also for fodder conservation and so are prime candidates for being Ring members.

Small block.
The small block farmer tends to have either no plant and machinery at all or if he has it is old and rather small and is not suitable for cultivation of paddocks. He would initially try to work the paddocks himself and when he finds out he can't then will get the neighbouring farmer or the local contractor to do it. Being new to farming scene he may be very quick in taking up new ideas and could easily become a large section of the membership. Although their paddocks may be small, the rates of hire could be negotiated to allow for this.

Because of the range of services potentially available anyone with an interest in the land could benefit from being a member but until the range does build up the membership is likely to consist of the above three groups.

CONCLUSION.

The starting up of New Zealand's first Machinery Ring could very easily go the same way as machinery syndication - a lot of early enthusiasm, a number of groups starting up, but then just dying back to service the committed few. The only way that a Machinery Ring will survive is if it offers sufficient benefits to the members for them to continue to use the Ring rather than buy a piece of machinery or go and hire an outside contractor. The administration must be efficient, the manager must be pleasant to deal with, and there must be sufficient members with a good range of plant and machinery offered for hire.

Contractors are welcome to become members of the Ring but they must use the Ring prices as their minimum charge out rate. In fact, if there is a good demand for a particular piece of machinery then a contractor may be persuaded to buy it and make it available for hire to the Ring.

The establishment of the Ring may get some support from the professional sector. Farm consultants, accountants, and bank managers have long been saying that many farms are over capitalised with plant and machinery and they may be able to put some persuasion on these farmers to join and use a Machinery Ring.

Machinery Rings work successfully in many other countries of the world, and there is no relevant reason why they shouldn't work here.

Still, the odds are probably stacked against the ability of Machinery Rings surviving for any length of time, mainly because of the well known streak of independence embedded in the New Zealand farmer. But we won't know until we try and to that end the first meeting of interested parties is planned to take place in mid-December. Only after that meeting will we know whether it is worth continuing to establish New Zealands first Machinery Ring.

Costs frighten

IT IS an interesting exercise to establish just how much it costs to run a tractor, says Graeme Fraser, rural business adviser for Coopers and Lybrand in Hawke's Bay. "The answer will frighten most tractor owners and operators, and certainly makes the rates some agricultural contractors charge look like a bargain." Mr Fraser uses the following formula to calculate the hourly rate of operating a machine. He has used a John Deere 4455 (157HP) FWD Power Shift, to demonstrate the costing method.

			Est $/hr
1) Calculate economic life — Total Hours	6,000		
Years	8		
Hours per year	750		
2) Determine Operating Costs			**Est $/hr**
Depreciation			
Capital costs		130,000	
less resale value 25%		32,500	
Net depreciation		$97,500	
Allocate over economic life on hourly basis			16.25
Interest			
Capital cost		130,000	
Add resale value		32,500	
		$162,500	
Divide by 2 for average annual investment		$81,250	
Interest at 16.5%		$13,406	
Allocate on per hour basis			17.87
Insurance			
Rate per $1,000		$3.50	
Amount		$455	
Allocate on per hour basis			.60
Maintenance			
Est 66% of capital cost		$85,800	
Allocate over economic life on hourly basis			14.30
Fuel			
.15 litres hr x hp x price/litre			
.15 x 156 x .565¢			13.22
Oil and grease 20% of fuel cost			2.64
COST OF RUNNING TRACTOR/HOUR			**$64.88**

Points to note are:

1) This formula is based on costing a tractor purchased new, the cost of a cheaper machine will reduce the interest charges, but this will be compensated for by the lesser economic life of a secondhand or low-cost machine.
2) The hourly rate is very sensitive to interest rates charged.
3) The lower the number of hours a year the machine is used, the higher the hourly running costs.
4) The formula does not include a return or cost of operator's labour, or profit.

NZ Farmer

THE REAL COST OF FARM MACHINERY OWNERSHIP

Keith Woodford
Lecturer
Department of Farm Management
Lincoln College

Summary of a paper presented to New Zealand Society of Farm Management Field Day on Farm Machinery Ownership, October 20th, 1980.

In this paper I will discuss some of the financial problems associated with farm machinery ownership. I shall concentrate mainly, but not exclusively, on the question of crop harvesting equipment, because I believe this is the area that is going to be of greatest concern over the next five years.

As a result of work that I have been recently undertaking in this area two points have become abundantly clear.

(1) Correct costing of farm machinery is complex.

Items that should be taken into account include:

- purchase cost.
- running costs.
- repair costs.
- opportunity cost of capital.
- borrowing opportunities.
- resale prices.
- tax rates.
- investment allowances.
- depreciation.
- depreciation recovered.
- inflation.

Unfortunately, many of these items are often ignored, and consequently total machinery costs are sometimes underestimated by 50% and more. Over-estimation of costs also sometimes occurs (usually as a result of double counting of interest and opportunity cost of capital) but this is less common.

(2) The total costs of farm machinery ownership can vary enormously between farmers.

Factors such as tax rates and borrowing opportunities are particularly important, in general much more so than the number of hours that a machine works. Because the costs do vary so much between farmers - often by a factor of ten both on a per farm and on a per hectare basis - it is not possible to present simple recipes as to the appropriate form of ownership, frequency of renewal, etc.

The Present Situation on Cropping Farms

The following information on headers has been extracted from the 1979/80 Wheatgrowers Survey undertaken by the Agricultural Economics Research Unit.

Number of Headers of Various Ages

Age	Number of Headers	Percentage of Total
1-4 years	15	14
5-8 years	24	23
9-12 years	37	35
13-16 years	16	15
17 plus	14	13
	106	100

Average Age of Headers by Width of Cut

Width of Cut	< 10'	10'-11'	12'-13'	14' plus
Average age in years	15.4	13.6	8.3	5.7

Overall, the average age of headers in the survey is 10 years.

If above figures projected would take 27 years to replace all headers - this is

Two points emerge from these figures:

(1) It is clear that the proportion of headers replaced in the last four years has been low. At this rate of replacement the total fleet of headers would only be replaced once every 27 years.

(2) Farmers purchasing a new header are tending to buy large machines.

Does this low rate of header replacement suggest that farmers are unable to afford the purchase of new headers and that the industry is consequently heading into a difficult period?

to the extent that the existing complement of crop harvesting machinery is capable of dealing with the existing area of crop then the answer appears to be NO.

to the extent that the rate of renewal of headers over the next four years may well need to be greater than

that over the last four years the answer could well be YES. It would certainly seem that an increasing number of farmers will be approaching their accountants, solicitors and bank managers for assistance over the next few years.

It is interesting to compare the situation for headers with that for tractors.

Number of Tractors of Various Ages

Age	Number of Tractors	Percentage of Total
1-4 years	127	45
5-8 years	73	26
9-12 years	37	13
13-16 years	28	10
17-20 years	13	4
20 plus	6	2
	284	100

Average Age of Tractors by Horsepower

Horsepower	< 60	61-85	785
No. of Tractors	82	151	51
Average age in years	12.2 yrs	5.5	3.0

The average age of all tractors is 7 years.

These tractor figures suggest that although tractor replacement may be a cause for concern to some farmers, most of them, in conjunction with their financial advisers, are managing to find the necessary capital to allow frequent replacement. In fact, most farmers in the survey do have a tractor less than 5 years old and it is only the presence on farms of second and third tractors that increases the average.

It is interesting to note that the physical life of a tractor is about 12,000 hours. Given the average usage on New Zealand cropping farms of approximately 400 hours per annum then the physical life of a tractor is about thirty years and the replacement rate should be less than 5% per annum.

When looked at in economic terms a similar picture emerges. It would therefore seem that the average farmer is prepared to pay a considerable premium per year - calculations show this to be in the order of $500 to $1,200 per annum post tax - for the pleasure of owning a newish machine. Of course, this pleasure may take several forms including pride, comfort and the peace of mind that comes with owning reliable equipment.

Problems of Header Replacement

At this point I would like to focus in on the problems faced by a farmer wishing to replace a header.

I shall assume that at present the farmer has a header with a 12 foot cut that was purchased in 1970. Depending on the model it would have cost between $10,000 and $12,000. Let us assume it cost $11,000.

To replace that same header in 1980 with a similar model would cost approximately $60,000 (some of the larger machines with up to 5 metre cut are now over $100,000).

If our hypothetical farmer decides to purchase the $60,000 header then the question arises as to how he finances it.

- Selling the 1970 model will probably provide about $16,000, leaving $44,000 to find.

- By claiming the 20% investment allowance and 25% initial depreciation the farmer can reduce his tax by about $13,500 (assume he is on a 50% marginal tax rate).

But, depreciation recovered on the old tractor will be about $9,500.

Therefore, the net cash effect of taxation, assuming that the farmer deducts $9,500 depreciation recovered from the book value of the new machine rather than directly paying the tax on depreciation recovered, is that the farmer will save approximately $12,000 in tax.

THEREFORE THE FARMER IS LEFT HAVING TO FIND $33,000. GIVEN THE CASH RETURNS FROM CROPPING OVER THE LAST FIVE YEARS THIS WOULD BE VIRTUALLY IMPOSSIBLE TO FIND FROM CASH RESERVES. IT WOULD NEED TO BE BORROWED OR IN SOME OTHER WAY OBTAINED.

It is interesting to see what will happen if our farmer decides to delay the header purchase for another two years.

- Given current inflation rates, the price will probably rise over this period by about 40% to $84,000.

- The value of the existing header will remain approximately constant at $16,000.

- The depreciation recovered on the existing header will increase slightly to about $10,000 on account of the reduced book value.

- The net tax saving on purchase of the new header will be about $17,600 (assuming 50% marginal tax rate).

THE BALANCE OF CASH TO BE FOUND IS NOW $50,300.

Assuming an interest rate of 12% (taxable) on invested funds then the farmer would need to set aside $24,400 of post tax income in each of the next two years (i.e. $48,800 of taxable income).

He would need to set aside $8,200 of post tax income (i.e. $16,400 of taxable income) each year just to keep the remaining balance to be found from other sources at $33,000.

Should our farmer try to solve the problem by saving over a longer period (say, five years) by setting up a sinking fund then he will find that the combined effects of inflation, interest rates that are less than inflation and taxation of nominal profits, makes his task virtually impossible. Other farmers, with machines of lower trade-in value, or on lower tax rates, will get even less far along the road towards a new purchase.

CONCLUSIONS

(1) Many farmers underestimate the real costs of farm machinery.

(2) The rejection in New Zealand of inflation accounting for taxation purposes:

(a) increases the real cost of farm machinery.
(b) helps perpetuate the tendency to under-estimate costs.

(3) Inflation and the present tax system make saving for machinery replacement a futile exercise. Unless inflation is controlled (or inflation accounting for taxation purposes is introduced) then farmers will become increasingly reliant on the financial institutions to assist with the purchase of farm machinery.

(4) If the financial institutions are not able to provide long term loans on realistic terms then I predict we shall see a slow but steady trend away from cropping, and in particular small seed production, on the Canterbury plains.

I will leave it to this afternoon's speakers to suggest alternative methods of financing and forms of ownership that can be used to help prevent this situation occurring.