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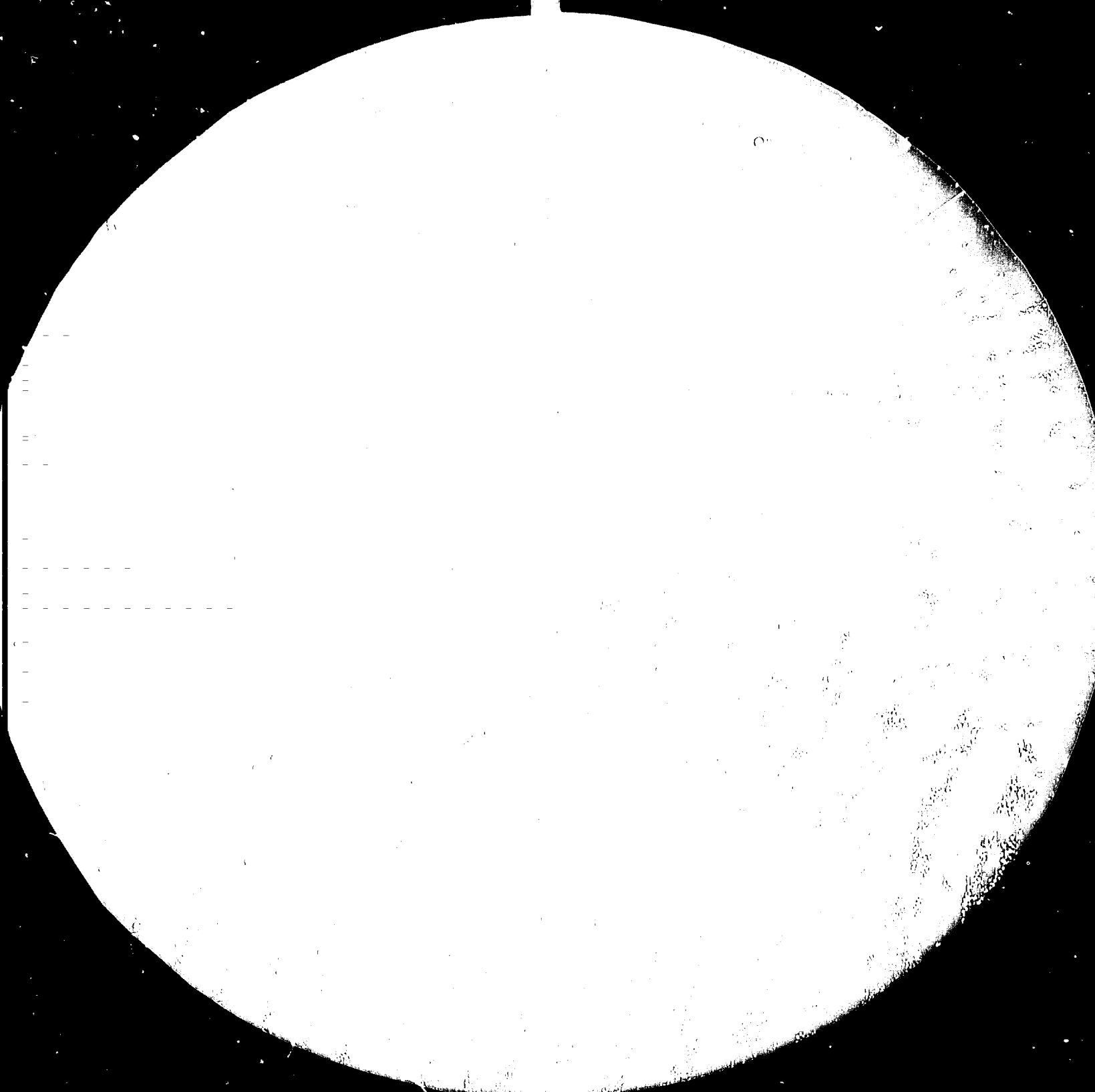
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MICROCOPY RESOLUTION TEST CHART
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Expert Group Meeting on the Development
of Multi-purpose Agricultural Machinery
Plants, at GUOHGZHOU, People's Republic
of China,
13 - 18 November, 1984.

14363

Experience in the operation of
Multi-purpose Agricultural
Machinery Plants in Nepal.

1984

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3114

1. Use of improved agricultural equipments - a necessary input for higher agricultural productivity

Evolution of agricultural machinery industry dates back to stone age when people were conducting various farming operations with primitive hand tools. With the awareness of importance of improved tools and equipments, people gradually shifted to more sophisticated equipments like draft implements and then to mechanically operated machineries such as threshers, harvesters, etc.

Research conducted at various places throughout the world has established that improved agricultural equipments (tools, machineries) are as necessary an input as improved seeds and fertilizers for enhancing agricultural productivity-though the impact of the use of such improved agricultural equipments is not as apparent. That is primarily why the level of use of sophisticated agricultural equipments varies from country to country. In industrialised countries while sophisticated and multipurpose machineries such as harvesters are extensively used, there are countries, among the LDCs, where the sickle, scythe, flail & wooden plough are the implements that are extensively used.

Thus, in developing countries, hand tools or animal drawn implements form the major share in the product range of an agricultural machinery industry.

2. Evolution of Multipurpose Agricultural Machinery Plants.

Most of the agricultural machinery industries in developing countries face one common problem of low capacity utilisation. Because of the low level of agricultural mechanisation in these countries, the captive market of agricultural tools and equipments is small - so that the "Pull" of the market is lacking. This together with other structural bottlenecks like unavailability of raw

materials in quality and quantity, skilled man power, finance, etc create an environment which is not conducive to the growth of an agricultural machinery industry in the country. Thus an industry, specialising only in one product line is bound to face problems of low capacity utilisation, low rate of return on investment, etc.

To avoid such a situation or to increase capacity utilization, it would be prudent to go for a multi-products or multi services approach. In other words, this means a "package" of products or services to cater to the entire requirements of the farmers. The multi-products may range from hand tools to relatively more sophisticated machineries like threshers, harvesters, etc; while multi-services may encompass repair and maintenance, after sales service, or in some situations providing custom hiring facilities of equipments to farmers. In so doing, the industry may be able to withstand the shock of market fluctuations and save itself from disastrous consequence.

Many ambitious industrial undertakings in the developing countries of the world have floundered because of problems of economic viability. The realisation has come, that it is ultimately the product that pays for economic affluence. For the case of agricultural machinery plants, the implements produced should produce sufficient benefit so as to pay for themselves in a reasonable period of time (about 3 years), while having a sufficiently long useful life (about 7 years) . It is only in such cases that the implements will produce a benefit to the consumer commensurate with their value. And it is only then, that the farmers in the poor countries of the world, will invest in such tools and implements. The problem therefore is firstly one of quality i.e. to produce implements that work (by which is meant, that they should produce benefit to the farmer). And secondly the problem is one of quantity i.e. the tools and implements should be popular among the farmers so that the benefits of technology reach a large portion of the population enabling them to raise their standard

of living while incidentally enabling the agricultural machinery plant to engage in economics of scale.

3. Issues and Prospects of MPPs.

3.1 The Advantages :

a) There is hardly any difference between the agricultural machinery sector and other parts of industry making capital goods. For manufacturing agricultural equipment much the same processes, tools and production equipments are required as, for transportation and the whole metal working sector. Its technologies, methods of plant organisation, demand for skills and professional qualifications, are also similar.

What distinguishes agricultural machinery production is largely the seasonal nature of the demand and the physical and organizational characteristics of the market. In developing countries where industrial infrastructure is either weak or non-existent, production of agricultural equipment could become the principle driving force in the capital goods sector. In other words, production of machineries and equipments for agricultural and the rural world can be an effective method of entry into the capital goods industry, while at the same time filling social priorities. Such production can play a key role in the progressive development of a national industrial network. A Multipurpose production system aims at creating industrial activities not only in the agricultural machinery sector but also, by diversifying into the capital goods sector it can generate industrial activity over a broad spectrum. Perhaps the greatest benefit a MPPs provides, from the national point of view, is that it creates an environment of industrial activities, in rural sector.

b) Better Capacity utilization

Because of the reasons already mentioned elsewhere in this paper, any industry producing only agricultural equipments in developing countries, faces the problem of low plant utilization. But once, the industry adopts the multipurpose approach of production system, its utilization goes up. From the financial point of view, it gives extra returns, which favourably affects the return on investment.

c) Import Substitution

Many items falling under the catalog of capital goods, are imported in the developing countries, each in a quantity not justifying the establishment of a separate industry to produce such items. Thus production of such items by MPPs help the country in import substitution.

d) Better Management of Scarce Resources

It is definitely more efficient from the consideration of resource management to produce many goods and services at one plant than setting up separate plants for the various products and services.

3.2 The Bottlenecks :

The bottlenecks faced by multipurpose agricultural machinery plants are of two main classes, the internal bottlenecks which are associated with the plant and the services it provides; and the structural bottlenecks relating to the interaction of the plant with its social milieu.

Internal Bottleneck:

a) Flexibility: The chief requirement of multipurpose agricultural machinery plants is for flexibility of production. This is because the nature of the market is such that a large number of items have to be produced ranging from a hoe weighing half a kilogram, to a trailer weighing a thousand kilos. At the same time the total yearly value of none of the products, justifies the investment required for mass production. In such a situation line production can not be maintained - therefore only alternative left with is batch production.

b) Higher cost of production: Because of very nature of production system - i.e. flexible production with essentially batch production system, the productivity of labour is relatively low - which contributes to higher cost of production.

c) Lack of specialisation: This of course is inherent in the essential requirement of flexibility of MPPs. What is not inherent however, is the Jack of all trades but master of none approach among the products of such factories. Perhaps more important than the higher cost of the production, is the possible deterioration in quality which results from the individual marketing and drilling approach. The farmers who buy the implements, generally live in inaccessible villages, and any breakdown (even minor), in the busy season, causes considerable waste, because the machinery for affecting repairs exists only in the towns.

The structural bottlenecks faced by MPPs are as follows.

a) Inventory: Because of the small and fluctuating nature of the market, the seasonal demand, and the varied number of items to be

produced, it is perhaps inevitable that the MPPs should be faced with problems of unsold stocks and tied up capital. A second problem is the uncertainty of raw material supplies. In developing countries like Nepal which own no large metal production industries, foreign exchange rules and foreign trade regulations of their dominant neighbours pose problems of uncertainty. Moreover, the large number of items of raw material to be kept in inventory. Also the quality of the raw materials is often dubious and lots have occasionally to be rejected after they have been paid for. The overhead charge to compensate for such inventory is a substantial fraction of the total overhead cost of MPPs.

b) Marketing: The agricultural sector in the IDCs, is the most deprived and poverty stricken sector. Even when the advantages of agricultural tools are patent, the farmers are unable to purchase the implements because of lack of credit facilities. As a result the 'pull' of the market is limited, because although the demand for implements exists, the low purchasing power of the farmers severely curtails the output of MPPs.

c) Skilled labour: This problem is most acute in the IDCs. But the flexibility required of MPPs, requires an increase of skills, so that the items might be produced without expensive jigs & fixtures.

d) Ancillaries: The MPPs are created to fill an economic need of the IDCs. But the inadequacy of ancillary industries, and other support services, places an onerous burden on the plants. Cost control & management becomes correspondingly difficult.

cont.....7/-

3.3 Prospects:

The concept of Multipurpose Agricultural Machinery Plant is welcoming. It has got a single biggest advantage of being instrumental in creating industrial activities in rural area. This single advantages outstrips all the bottlenecks put together. However a word of caution ~~not~~ perhaps deserves worth mentioning here.

The MPPs will have to withstand the allure of the capital goods market. While this market is more lucrative than the agricultural implements market, the MPPs should remain true to their philosophy. While manufacture of a few capital items might be permissible to compensate for losses elsewhere, the MPPs should not drift too far from their initial goal of catering to the rural world.

cont.....2/-

4. Case study of Agricultural Tools Factory Ltd., Birgunj Nepal :
An example of MPPs:

4.1 Background:

Agricultural Tools Factory Ltd (ATF) was established in 1969 as a fully Government owned enterprise. The product range varied from simple hand tools to more sophisticated tractor drawn implements like cultivator, harrows, trailers, etc.

Right from the beginning, barring a couple of years, ATF was running at a loss. Till mid 1982, the accumulated losses amounted to about 60% of paid-up equity capital. This resulted in a very tight cash flow which again appeared as a bottleneck in the form of insufficient working capital thus forming a vicious circle.

In 1982 the Government changed the management of ATF. The new management spent some time to diagnose the root causes of bad functioning of ATF. It was discovered that there was not one problem but several of them, each outweighing the other in magnitude. The management determined to overcome these problems and bring the ATF out of the vicious circle. The Multipurpose Production Approach was adopted and within just two years, the result is conspicuous by the following data.

	<u>Unit</u>	<u>1981/82</u>	<u>1982/83</u>	<u>1983/84</u>
Production	Million Rs.	2.7	8.1	12.0
Sales	"	3.0	8.3	11.4
Profit/loss	"	1.8(loss)	0.5(Profit)	1.0(Profit)
Output/labour	Rs '000/person	12	30	40

cont.....9/-

Some of the problems faced and actions taken to overcome them are as follow.

a) Low capacity utilization:

Clearly one of the major causes of ATF running at a loss was low capacity utilization of the workshop (around 50%). In order to bring the utilization rate to a satisfactory level, ATF conducted various market studies to identify different products--both agricultural and capital goods. The study showed the feasibility of many products. As these products were completely different from one another, ATF had to establish its own R & D, and Tool Room units separately to design and develop such new products and also to fabricate different dies, fixtures etc. Following are some of the new items identified, and later produced at ATF.

i) Agricultural Equipments

Wheat threshers, Paddy threshers, Bullock drawn disc harrows, Grain bins, Pneumatic cart, etc.

ii) Capital Goods

Five different types of trailers, Water tank, Oil tank, Steel structures, Truck body building, Sewerage disposal tanks, etc.

iii) Other Miscellaneous items

Electrical transmission hardwares, Shovel, Pick, Crowbar, Hammers, Slotted angle rack, etc.

Inclusion of these new items in the production line has tremendously increased the capacity utilization of the plant to about 95% .

b) Research and development:

This section is manned with two graduate (one Ph.D) engineers and five technicians. They constantly conduct market studies to identify new products that are to be adopted for regular production. In general, the criteria for selection of a new product are as follows:

- Volume of possible market share - to justify the cost of development of prototype and the cost of tools (Dies, jigs, fixtures)
- Technological process - to be able to produce in ATF with existing workers and facilities.
- Primarily should be import substitution.

Any new product which fulfills these criteria are included in the regular production list.

c) Launching of New product:

A vigorous campaign is launched to introduce the new products to customers. Often in case of agricultural equipments, farmers are directly contacted through letters and booklets prepared to highlight the merits of new products. For this purpose ATF has maintained a roster of different types and levels of farmers at village, district, and Zonal levels.

After the sale of the new product starts, a mobile team consisting of mechanics visit some of the farmers mainly to:

- get feed back on the performance of the product,
- Provide door to door repair and maintenance service,
- and to create good will of ATF and particularly of the new product.

4.2 Role of catalitic agent

ATF is fully government owned public enterprise. The nature of its inception entails ATF to have social objectives besides having commercial entity. While ATF has to help in creating the otherwise weak industrial activities in countries like Nepal by demonstration effect, it should also pursue commercial objectives in order to sustain in a longer perspective.

Earlier, many hand tools, which could be easily fabricated by local artisans/blacksmiths were being produced inside the ATF. This created undesirable competition with such artisans which adversely affected their livelihood. This conflicted with the social objective of ATF. Realising this and keeping in view the role of ATF as a catalitic agent in furthering industrial activities in rural areas, a major shift in policy has been adopted as follows:

- a) Discourage production by its own workers of small hand tools within the factory. This leaves ATF workers to concentrate more on bigger capital goods which have more value add, and are less competitive.
- b) Even if some bulk order of hand tools is received, subcontract to the village blacksmiths to produce them for ATF. In this case the materials and component parts are supplied by ATF.
- c) Conduct regular courses for training blacksmiths in the factory to produce small hand tools.

