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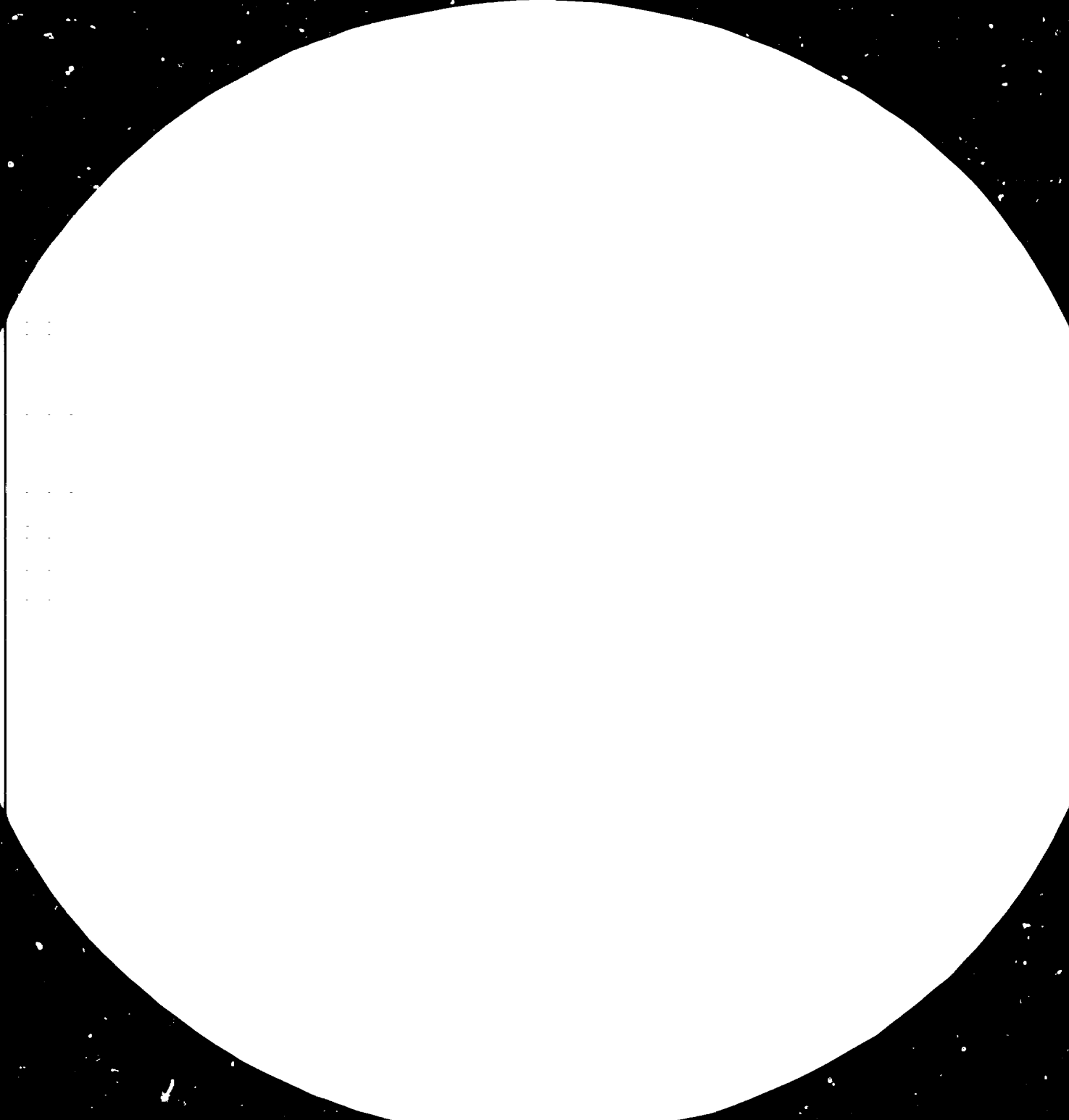
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NECESSITY OF, AND PRACTICAL POSSIBILITIES FOR,
CO-OPERATION IN THE AGRICULTURAL MACHINERY INDUSTRY
FROM THE VIEWPOINT OF INDUSTRIALIZED COUNTRIES*

by

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A quick general survey of existing studies on the situation of developing countries will satisfy us of the immense needs in those countries for agricultural machinery and of the no less considerable structural weaknesses of the world's agricultural machinery industry when it comes to responding to these need .

In most developing countries, the great numbers of people depending on the agricultural sector led for a long time to a belief that mechanization was not a suitable means of developing agricultural production. The absence or weakness of the industrial infrastructure, moreover, does not allow for a development of activities conceived and executed according to a model known and used for many years in the industrialized countries. It is not surprising, under these conditions, that the share of developing countries in the manufacture of sophisticated machinery is manifestly low, with the result that machines and the technology for manufacturing them have to be imported.

The industrialized countries, on the other hand, have acquired a technological lead over the years which is gradually divorcing them from the realities and is certainly preventing them from adequately responding to the demand from developing countries at the present time. The machinery they offer is the result of long research and successive improvements. This complex phenomenon is particularly noticeable in tractor manufacture. The quality of machines is in no way to be criticized, quite the contrary. But it does seem that the sophistication of products is leading to undesirable socio-economic situations which should not be perpetuated or aggravated. The sophisticated machines currently on the market are expensive to buy and to maintain, and their basic deficiency, to our mind, is that they hardly lend themselves to local manufacturing because of the complexity of the processes to be mastered and the very high level of technology needed to manufacture their components. One can, of course, always set up assembly plants for such machines. Experience has shown, however, that since they do not run at full capacity they are not very economic and the investment required is so large that the studies must provide for very long production runs to pay off the expenses.

The machines are then no longer intended for a local market but are expected to supply a fairly large area, covering a region at least. This process leads to a standardization of machinery, and faces many difficulties, as the feeble volume of trade between developing countries in the agricultural machinery sector shows.

The market is thus at present dominated by the industrialized nations, which alone have the technological, industrial and financial capacities required and which tend to perpetuate the development model currently in use in already highly mechanized countries.

Although the situation is less critical as far as technologically simpler machinery is concerned, it is still true that if we want to respond effectively to the problems likely to crop up in the course of the next decade, it will clearly be inadequate to continue promoting machinery which can no longer produce the increased yields that will be necessary in order to try at least to minimize the food problem.

Agricultural progress in the developing countries will inevitably depend largely on motorization and the changes entailed by it. That is by no means to say that the present model of heavy tractorization is the only one that can be envisaged for the future.

Such progress must be accompanied by a development of local industrialization with the consequent changes in people's way of life.

Great care must now be taken to ensure that such progress as is feasible will really benefit the greatest possible number of farmers in the shortest possible time.

This process will have to be speeded up by deliberate action, as the problems are unlikely to take care of themselves. Considering how wide the technological gap is, it would be self-deceptive and even dangerous to resort to policies of falling back on one's own resources, unless we want to wait for years before the slightest progress has the time to make itself felt and to spread across the population.

The only effective way to reach a solution at the moment is to be found in expanded co-operation between developing and industrialized countries and amongst developing countries themselves.

The examples of the difficulties that have been encountered in following through a suggestion like this will give an indication of the difficulties to be expected: we shall try afterwards to point the way to some possible solutions.

AN EXAMPLE OF A WILLINGNESS TO CO-OPERATE: INTERMEDIATE MOTORIZATION

We do not intend to trace the history of this concept, but merely wish to recall that it has gradually developed in response to requests from many developing countries.

Indeed, many specialists have established that too abrupt a change from traditional agriculture based on ancestral custom to a modern form of agriculture can not fail to cause problems. Its consequences soon make themselves felt in the condition of soils and in matters relating to the maintenance and handling of machinery, but above all by giving rise to intolerable social tensions.

It has always proved extremely difficult to introduce very sophisticated equipment without a period of transition, before the establishment of all the conditions in which it can be integrated in everyday life. The slightest hitch causes the proposed model to be abandoned or even rejected.

In short, research work and analyse of the reasons for these successive failures have shown the need for equipment which is simple, sturdy, not very sophisticated and above all easily accepted by the final user. This has led to very close collaboration between various specialized organizations and machinery manufacturers in drawing up a more precise list of specifications for the machinery to be designed. It should be noted that the request came straight up from the grass roots through local development companies which are perfectly familiar with the local problems.

It should also be noted that Bouver immediately set to work along these lines in spite of the hesitations and all the difficulties which were expected.

The standard procedure was followed, whereby prototypes were built and their viability demonstrated, in France at first, but above all in the field, for periods covering several crop seasons. With the experience gained, we can now confirm that this policy of expanded co-operation has borne fruit

in spite of inevitable delays and problems due to the distances between test centres and to the need to transmit information and choose solutions to be adopted. This procedure, still too seldom used, led to the development in record time not only of a tractor, but also of a complete set of attachments and a range of walking tractors adapted to local practices and constraints in developing countries.

In the light of this experience, which has now progressed beyond its initial stage (about 800 tractors are working at the moment, totalling about 150,000 hours of operation, more than 2,000 hours of which were with machines delivered in 1977), we can now identify the difficulties encountered and try to find a remedy for them.

The first difficulty was a technical one in the sense that the distance between the places where tests were carried out and the place where the machines were produced imposed delays quite out of proportion to the nature of the modifications requested.

The second obstacle to be overcome was people's natural resistance to change, although doors flew open once the results of the first few experiments had been obtained. This makes it clear - should that be necessary - that information must be given time to circulate and above all to be understood. A technical report is far less meaningful to the uninitiated than the results of an entire farming season, even if the data must be interpreted prudently because of parameters which are almost impossible to analyse fully.

But the greatest difficulty was and still is the problem of financing. This is true both for the manufacturers as investment in a project like this one requires a solid financial basis, and for the countries requesting or receiving this technology, which, for all its simplicity, is still novel. After the stages of designing and building the machinery, the financial constraint remains a major problem in the popularization of the results of this experiment.

Nevertheless, all that has been done was only possible thanks to an unflinching spirit of co-operation. The results are now convincing, and we should proceed to a further stage.

It is not a manufacturer's purpose to supplement aid programmes developed by bodies better qualified and better equipped for this.

The undeniable technical success should now be extended to the commercial and industrial levels.

These two aspects are indissolubly linked, since it was decided at the time the idea was first conceived that the possibility of producing this tractor in a developing country should be considered. The specifications adopted required the design of the machine to allow for a gradual evolution towards local assembly, and towards the integration of manufacturing processes in medium-sized plants requiring low capital input and tools technologically within the reach of a majority of countries. In implementing the project, finally, priority was to be given to employment in preference to large investments.

Far from being a cheap technology, this example illustrates how much can be achieved nowadays by aiming at a technology which is suited both to local needs and to the necessarily limited means available to developing countries which nevertheless want to acquire such technology.

The problems have not all been solved, but what has been done suggests the solutions to be pursued.

EXPANDED CO-OPERATION

If we assess the implications of the findings of the world-wide study on the agricultural machinery industry (UNIDO/ICIS.119, June 1979) and the study of agricultural prospects for the horizon 2000 (FAO, May 1979) we will find that they call for nothing short of a radical change in the present model of production and distribution in the machinery industry. Although this development is highly desirable, the world-wide redeployment of an activity of this kind is none the less virtually impossible without expanded co-operation and a general consensus among all the parties concerned.

The difficulties already encountered just in drawing the attention of machine manufacturers and users to the new aspect of the problem opened up by intermediate motorization shows what a long road lies ahead of us before we can reach the objectives set in the course of successive meetings.

Establishing, strengthening and developing co-operation between industrialized and developing countries and among developing countries

Activities of this kind have, of course, been going on for many years, but the urgency of the solutions to be found in the course of the next ten years require an even greater display of imagination and the mobilization of even more technical, financial and human resources.

To our mind, the strengthening of the co-operation process should take place in three main areas simultaneously.

Technical co-operation

For some years now, a few attempts have been made to design new machinery adapted to the specific conditions of agriculture in developing countries. Even though very good results have already been achieved in designing a whole new range of products (tractors with tilling attachments, but also fixed machinery), considerable efforts still need to be made in order to move on from the design stage to stages of popularization, as we have been trying to do for several years now.

The technical co-operation which must be established between the various partners begins with the drawing up of specifications for the machines required. The needs must be precisely ascertained so as to avoid the consequences of expensive over-equipment or of equipment ill adapted to the work it will be required to do.

In attempting a world-wide redesigning exercise of this nature, one immediately comes up against major obstacles such as the lack of adequate specialized research institutions in developing countries. With only a very few exceptions, the specialized institutions that can be drawn upon are situated in industrialized countries, where they have the benefit of the entire wealth of experience in soil science and technology acquired by countries with a long history of mechanization.

This situation is not in itself detrimental, but could relatively soon lead to a certain lack of credibility in machinery designed under these conditions. For it is often difficult to convince people with little specialized knowledge of technical matters that the machinery which has been developed is in no way a simplification of machinery used in countries with European conditions and still less a revival of manufactures long abandoned in those countries.

The innovation currently taking place in the agricultural machinery industry remains and will always remain a little suspect in the eyes of the developing countries as long as they do not have the resources and facilities to bring the development of machinery in line with their own needs. On the other hand, it would be a pity not to make use of the considerable amount of work that has been done in industrialized countries to solve the problems inherent in all mechanization. It would be most desirable for the technical processes in operation today to be made available to requesting countries so that machinery can be adapted to particular working conditions.

It may be added that enlarged technical co-operation should not stop at the stage of designing machines but should also take account of aspects of research and development directly relevant to the development of all kinds of machinery. We quite often observe that the research departments of machine-manufacturing firms find solutions which look tempting on paper but which do not coincide with the desires of potential users, nor with local working conditions.

Bringing research and development closer to the final user is a fundamental goal which we must take care to encourage.

In other words, it seems that until now the solution of the technical side of the problem has been given priority over something on the lines of a market study. Yet knowing the needs of the user is the first step in any precise determination of the characteristics of a product.

It would be in the interests of manufacturers as well for the customer to determine the direction to be given to the research himself; this appears difficult, however, in the absence of institutions specialized in this kind of undertaking and in view of the manifold aspects to be considered in this type of work.

Dissemination of information

Even when there are institutions, experience shows that it is not always easy to get hold of, transmit or utilize the data collected. This is true both in the vertical relationship between researcher and manufacturer and in the horizontal relationship between developing countries. There is a real deficiency to be overcome here. It is not easy to see why the results of research work conducted in a certain country should not be available more quickly to other countries with similar characteristics. There is important

formalization work to be done so that the various tests carried out in different countries can be standardized and their results processed sooner and more easily. Such formalization is of paramount importance for the dissemination of information.

The data collection processes should obviously be dynamic because the changes made on any particular model can radically alter the conditions for its adaptation

It is very difficult to eliminate the tensions between sometimes complementary but sometimes also competing institutions entirely, but in the age of data banks it is possible to establish stores of up-to-date information which should be available to anyone involved in the manufacture or use of agricultural machinery, whether they be manufacturers (in particular small and medium-sized enterprises), various specialized institutions, or decision-makers in developing countries.

For the sake of avoiding problems of credibility of information, it would seem a good idea for such data banks to be run on an international basis with specialized regional sections so that one is not submerged in a mass of documents pertaining only to specific features of certain particular machines or types of cultivation.

Training

The current tendency towards highly integrated development projects of vast dimensions and with ambitious aims highlights the third type of co-operation which there is an urgent need to promote even more systematically than at present.

The training of personnel is vital for the future of mechanization and motorization in developing countries. We have already said that to our mind the evolution towards these two forms of progress appeared to us not only desirable but also irreversible. It should nevertheless be pointed out that neglect of the training aspect can bring about the failure of projects, even when they seem to have been given a good start, if specialized personnel arrive at the end of the contract and the changeover has not been prepared sufficiently in advance or with the necessary care.

This is the area in which expanded co-operation can give the best results in the medium term. It is perfectly conceivable - and this in fact happens in some cases - for the machinery manufacturer himself to give this training, either in his own workshops (e.g. training for mechanics) or in the field (training for the user).

We feel bound to point out what a burden such procedures constitute, especially for business without the resources of transnational corporations. Despite the substantial cost involved in following this course, we regard it as necessary to help in the initial stage of the use of machinery which is sometimes rather difficult to become familiar with at first.

At the moment, it is highly desirable that, on a purely industrial level, a beginning should be made in co-operation processes like those which have resulted in the line of action we have been presenting.

This is an obligation at all levels. It is difficult to imagine that it should still be possible to continue alone along the path described above. And it is inconceivable that the work already done and the results obtained should not lead to practical modalities for following up the activities undertaken.

Along with the development of the machinery, an entire development programme has been drawn up including the training of personnel and leading up to the establishment of evolving assembly plants, which are within easy reach of any country wishing to demonstrate its political will in favour of progress through mechanization and motorization.

The main points on which efforts should be concentrated are: the simplification of preliminary operations and the consideration of parallel or complimentary processes so as to provide as complete an answer as possible to problems relating to costs, supply difficulties and the launching of any industrial project faced with the need to bring returns.

It would have been desirable in our case - and this should be envisaged in connexion with similar future activities - for there to have been procedures involving actual research and development contracts which would have enabled a machine manufacturer to take over the conception, execution and development of a project which appeared to be of interest to the final users.

This procedure which remains to be established would enable developing countries to make use of the large number of small and medium-sized industries which are basically keen on joining such an initiative but are justifiably hesitant in view of their lack of funds of their own and the low returns to be expected from projects in the short run.

Everyone will agree that there has to be a rapid turn-about and that efforts must be made at many levels. There should also be an attempt to provide real resources to those who have good will and generosity, but who are powerless by themselves to develop a well-constructed scheme with its own inner logic.

The approach suggested above would seem a suitable way of bringing about the desired change of course by enabling industrial enterprises linked by real "product-in-hand" contracts to respond to the demand of users in developing countries without inevitably returning to the well-known procedures of more or less complete adaptation of machinery already in use.

This approach can be envisaged for all products of the agricultural machinery sector, whether they be sophisticated tractor-type machines, technologically simpler machinery or fixed equipment (for treating and preserving harvested crops).

The needs are there, and so are the means of meeting them: the two terms of this proposition must now be allowed to come together so that the manufacture of any given product can be taken up in acceptable time-limits and with a chance of commercial success, without which all efforts are likely to be in vain.

