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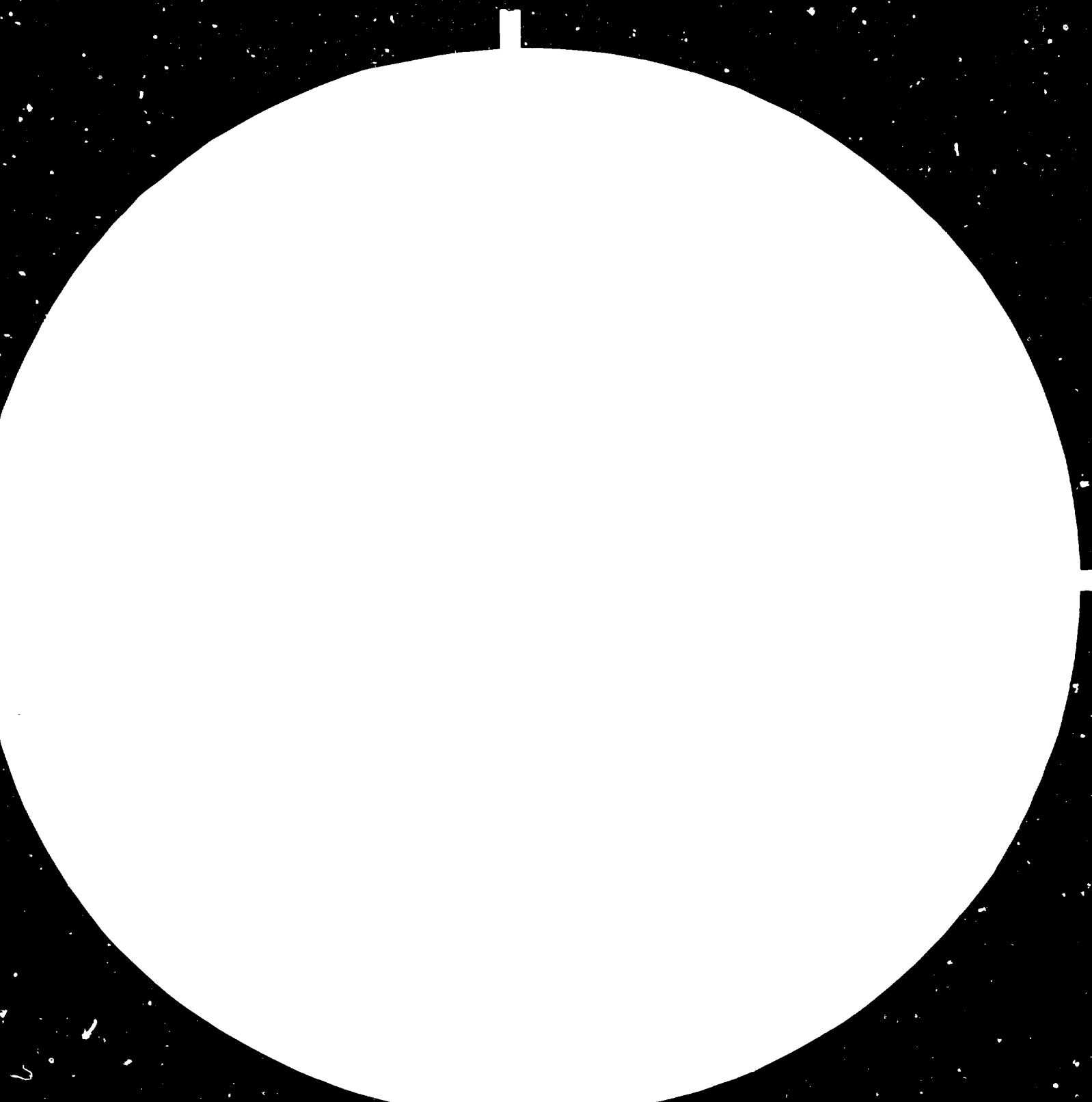


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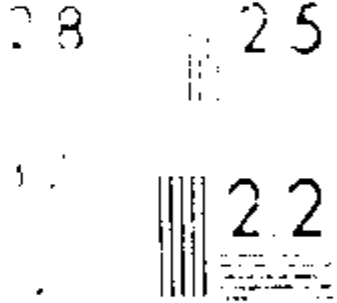
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Meeting on Exchange of Experiences and
Co-operation among Developing Countries in the
Development of Agricultural Machinery Industry

Beijing, China, 20 - 27 October 1980

COUNTRY PAPER - PERU*

by

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INTRODUCTION

In view of the special conditions governing agriculture in Peru, policies and measures have been adopted to counteract the negative effects of the succession of droughts attributable to adverse climatic conditions, mainly on the north coast, as well as to encourage the recovery of agricultural production and to maximize opportunities for employment in the rural areas.

The present situation and future projections of the agricultural machinery industry are closely tied in with the problems now affecting the agricultural sector in regard to the decrease in foodstaffs, unemployment and underemployment, reduction in real income and consequently loss of purchasing power.

The growth rate of agriculture in Peru is insufficient. Whereas gross national product is increasing at the rate of about 5%, the gross product of the agricultural sector has been increasing at a lower rate than the rate of increase of the population.

Moreover, in recent years the gap between the nation's food output and needs has widened, the imbalance being particularly preoccupying in such essential items as rice, milk products, wheat, oil, meat,etc.

In order to correct this situation priority has been given to the agricultural sector with a view to speeding up the growth of agricultural production and providing greater opportunities for employment in the rural area.

In these conditions, and taking into account the progressive bringing into production of 268,900 hectares of new land and the improved water supplies for a further 371,500 hectares as a result of ongoing irrigation projects between the Years 1980-1992, as well as the incorporation of the 715,000 hectares of the regional project for the development of the Huallaga Central, Chiriyaca and Nieva river basins and the areas resulting from the incorporation of zones opened up by the continuation of the highway alongside the forest, a strong and sustained but as yet unquantifiable demand for equipment of the most varied technological level can be foreseen.

The estimates contained in the pages that follow are based on statistical information that has not been brought up to date because of the lack of an ad hoc body; they are supplemented with the author's personal appreciations, which have been confirmed with specialists in the field of agricultural mechanization. The urgency with which this document has to be delivered and the brevity requested have made it impossible to give more statistical support.

1. NEEDS AND DEMAND FOR AGRICULTURAL MACHINERY

Category I

Implements

Because of the special conditions governing development in our mountain areas - preparation of dry land, a topography that restricts the use of motor traction and the distance of the field from the populated centres - traditional implements which have not changed in technical or material conception have continued in use. The light weight and hence low traction power of the work animals (yoked teams) and the fact that harness is not used make it impossible to use mouldboard ploughs, which are only produced for utilization in the low-land areas, particularly for hauling by horses or mules. The shaft or wood plough was introduced by the Spaniards and is made by the farmers themselves, with the iron ploughshare or tip being added. This implement is used in a large part of the 1,300,000 hectares which are cultivated each year without irrigation. The various implements in this category are manufactured locally, at craft or industrial level. It is worth mentioning that the levelling board can be replaced by the "rufa" or earth scoop.

Category II

Intermediate machinery

The nation is self-sufficient as regards the production of three-point implements to be drawn by wheeled or caterpillar tractors of up to 160 nominal HP. Imports are limited to mowers, forage reapers, precision line-seeding machines, potato harvesters and weeders.

This demand has remained fairly steady and so equipment embodying non-traditional techniques is being introduced by the commercial sector with the limited participation of the assistance programmes of foreign governments (AID, CIDA, technical co-operation from Germany, Belgium, New Zealand, the United Kingdom and others). State action can be considered negligible.

There exists a potential demand for fodder-production machines over the whole range for farms averaging 10 hectares in size (intensive) and undertaking of 2,000 hectares (extensive and dry-farming).

Category III

Powered machinery

Since an exclusive marketing concession was given to the local manufacturer TASA in 1974, tractors for horticultural use of capacity less than 45 HP have not been imported. But during the current year, long-standing efforts have succeeded with the introduction of tractors in the 25 to 35 HP range from the international firms Fiat, Kubota, Shibaura and Massey Ferguson, generating a demand for implements for this range.

In the past 15 years, the commercial sector has made 3 attempts to introduce walking tractors (motor cultivators) made by Hélices S.A. (Spain), Kubota (Japan) and Gravely (USA). Because they were introduced without a prior study of market conditions, the technical level of users, and service facilities, the first was a complete failure, the second, done by zones, prospered for a while and the third is still operating but with a small number of sales, with some agricultural extension but chiefly directed at gardens and grounds. The Ford Motor Company has developed a very light machine of approximately 9 HP with a rotary plough but it was unsuccessful because of the conditions in which it was used; altitudes over 3,000 metres above sea-level entailing loss of power, and excessive demands made on it by heavy and fallow land.

During 1978 and the current year, a total of 50 DAE DON motor cultivators have been donated which are being used by farmers in specified areas with associated technical assistance.

Category IV

Specialized machinery

Agricultural wheeled tractors covering the range 45 to 116 HP are produced nationally while other capacities are imported.

The highest powered unit available on the market is 180 HP.

Perkins and Volvo diesel engines are produced nationally covering the range 30 HP to 250 HP in industrial and self-propelling versions.

The demand for high capacity combined harvesters for rice, maize and sorghum has been restricted by the high price of machines and also the need to intensify the use of labour. There is a lack of smaller harvesting machines for crops such as lupine, quinoa soya and wheat which are grown in areas where mechanization, particularly for harvesting is in the early stages.

2. ESTIMATES OF DEMAND AND PRESENT USE

Category I

Implements

Use is not quantifiable and demand cannot be forecast in the absence of a mechanization policy. The figures given are from Technical Report No. 11 PER/72/030/11-09, modified in accordance with present market conditions and trends

MACHINE	USE	DEMAND Ø	
		1981	1982
- Modified animal-drawn plough	Not quantifiable	140	150
- Animal-drawn disc harrows	Not quantifiable	20	40
- Animal-drawn tine harrows	Not quantifiable	20	40
- Rice transplanters	Not used	20	40

Ø Subject to state action or technical assistance programmes.

Category II

Intermediate machinery

Use depends on the machinery pool, estimated at a total of 6,500 units classed as agricultural tractors; it is clear that because of their age and the fact that some dealers no longer have agencies, some units cannot be completely operational and the constitution and condition of the pool determines use levels and demand for intermediate machinery.

MACHINE	USE	DEMAND Ø 1981	1982
- Disc ploughs	4,000	480	500
- Dis harrows	3,000	400	400
- Cultivators	1,500	300	250
- Flouts	200	20	30
- Hydraulic "rufa"	200	15	15
- Plat seed drills	1,000	200	250
- Line seed drills	100	10	15
- Potato harvesters	50	10	15
- Spike tine harrows	20	20	40
- Trailers	1,000	40	50
- Fumigators	120	10	20
- Stationary choppers	300	20	30
- Mobile choppers	40	15	15
- Ø Small capacity 1 TM drying facilities		5	20
- Reaper-binders for cereals		10	50
- Brush wood clearers	400	50	60

- Ø Being introduced

Category III

Powered machinery

An increase is expected in areas of individual cultivation on the margins of forest and roads, and in mixed commercial and self-sufficiency holdings requiring small capacity and/or four-wheel drive tractors and possibly motor cultivators, under a system of zoned use and adequate technical assistance.

This appreciation takes acccunt of the fact that the last National Farming Census (1972) found that in the forest zone 48% of farms ranged from 5 to 20 hectares and 30% from 2 to 4 hectares which defines the type of use of powered machinery.

In order to raise the mechanization index established at 0.21 HP/p.c. in 1976, marketing levels in the order of 500 units for 1977, 1978 and 1979 were laid down, and increased to 680 and 1,200 units for 1980 and 1981 in a programme aimed at raising the index to 0.4 HP/p.c. in 8 years. This level can be reached by satisfying user preferences, bringing small irrigation schemes into use and increasing land occupation in the forests with 15% of machinery coming into the under 45 HP category; it will be noted that estimated demand for category II is not in relation and this is due to market evolution in recent years and the provision of services resulting in improved use of existing machinery.

The evolution of the market, with sales averaging 450 tractors a year (550 this year) has made it necessary to readjust sales forecasts to 650 and 800 units for 1981 and 1982.

Category IV

Specialized machinery

In accordance with the above, 550 and 680 tractors in the range 45 to 185 HP will be marketed in 1981 and 1982, corresponding to 60% of national production.

The question of combined harvesters deserves special consideration. The 1976 Census noted a fleet of 84 units with only 31 operative: it was estimated that 4 units a year needed replacing in order to maintain the operative fleet at the same figure. The high price of this machinery, the sale of a large number of stationary threshers and the fact that they are mostly used for rice which is grown in areas with a large labour force restricts their use to areas with high yields, harvests with a high humidity content or the needs of heavy seasonal demand.

Sub-harvesting machinery or threshers for crops grown in mountain and forest areas where mechanization of this work is in the early stages requires large-scale provision of threshers adaptable to quinoa, lupine soya, wheat and peanuts: this demand has not been satisfied to the slightest degree, which may have had the effect of limiting production.

The initial requirement is estimated to be 50 threshers of 1.5 to 2 tonnes per hour capacity with 7 to 9 HP diesel engines. This may rise to 75 units a year for a period up to 5 years.

3. PRODUCTION AND IMPORTING

The production of tractors in categories 45-116 HP will increase national participation to 50 per cent. No increase in the power range is anticipated because of competition from imported tractors of more than 116 HP.

Components imported for tractors include engines, transmissions, front axles and hydraulic systems; for agricultural implements: parts with dimensions and specifications not produced nationally: for Rome harrows: special steels, perforated bars and axles, bearings and catches, discs.

3.1 Category I

Implements

(a) Annual needs are satisfied except for sickles, scythes and machetes with respect to quality. Expansion of the line of products would imply prior study but the industry shows little interest because of the small demand compared with the cost of the plant required.

(b) Design is not a limiting factor but technology is. Products could be adapted locally with the help of Itintec, Senati and the Agricultural University.

(c) There is no need for foreign franchises.

3.2 Category II

Intermediate machinery

National production of traditional machinery is sufficient. A very small number of conventional ploughs with limited distribution, rotary scrub clearers, rotary cultivators, seed drills, fodder harvesters, etc. are imported. There are considered to be good possibilities for production of scrub clearers (slashers) with adapted technology by existing industry and an annual market of at least 50 units.

For this category, technical assistance is needed to develop and evaluate prototypes for potato harvesters, reaper-binders and small capacity drying and storage facilities.

There is no organization for studying the problems of mechanization at various levels and no studies for adaptation of technology are carried out. Existing support is through the National Institute for Technical Standards and Certification.

The limiting factor in promoting investment for production is the small local market, reflected in the manufacture of machines on demand with a very limited production for stock and plants which operate at 90 per cent of their capacity at any time. The situation has been aggravated by recent droughts and the irregular supply of tractors for demonstration which does not permit demand to be forecast. It is estimated that for threshers of 1.5 to 2 m.t. per hour for crops under cultivation to have acceptable marketing levels and prices within the reach of farmers of limited means, marketing must be carried out through development programmes or an organization since the cost of sale in the commercial sector is continually rising and therefore does not justify sales management for units which are widely dispersed and relatively low in cost.

3.3 Category III

Powered machinery and

Category IV

Specialized machinery

The local industry for agricultural wheeled tractors covers only the range from 45 to 116 h.p. with two wheel drive and tractors of other capacities as well as four sheel drive have to be imported assembled. The introduction of four wheel drive vehicles arose as a way of avoiding import restrictions as they were not widely used but recently they are being imported in huge numbers (30 unit lots) and sold mainly in forest areas.

Estimated imports of tractors smaller than 45 h.p. (2 x 4 - 4 x 4) is approximately 100 and 120 units for 1981 and 1982 respectively, and for the 45 to 185 h.p. range, 200 and 270 respectively, to meet the expected needs of the market.

The demand for motor cultivators cannot be forecast as there is no introduction and/or evaluation programme for their use.

There is a shortage of deep-well pumps for irrigation as the largest main manufacturer is fulfilling export commitments and the urgency of demand does not permit prolonged delays. Therefore import of 400 machines has recently been authorized for the Lambayeque-Viru areas and the La Yarada-Tacna irrigation scheme.

It is possible to maintain a very low import level for combine harvesters of no more than 10 units a year; harvesters with 4' - 6' intakes for forest areas, with caterpillar drive, are considered suitable for importation. A rationalized import policy is remote since there is a compromise at the level of the Andean Regional Group. The Commission set up by R.M. No. 0064-76 stipulated exclusive marketing of agricultural wheeled tractors in the categories from 100 to 110 h.p., 75 to 80 h.p. and 50 to 55 h.p. with larger capacity requirements being satisfied by services rented from the official body Senama, thus avoiding over-investment in machinery.

This provision cannot be implemented since the imports authorized cover various capacities up to 185 h.p. for no less than 5 makes which, in the event of an economic and/or political situation like the recent one could result in the pool becoming inoperative, as happened in the last decade.

The action needed is to ensure that importers maintain stocks necessary on the basis of the age of operative units, avoiding early obsolescence, and that effective technical assistance is provided by the State for efficient use and maintenance of machinery.

Investment in the Tasa tractor factory is in the order of S/480,000 in share capital and S/2 million overall in real terms. The agricultural implement factory, FIAMSA, which supplies 80 per cent of the market has S/283,000 in share capital and S/4 million overall. The latter, which was established in 1969, moved to Trigillo and re-equipped in 1976 to take advantage of tax incentives. It has an area of 4,000 mt^2 of which 1,200 mt^2 is covered. Details of the FIAMSA products are given on the accompanying sheets. There are some problems concerning design which can be solved only by time and investment and it is desirable to have temporary technical assistance from an expert in agricultural machinery and implement design.

3.4 Basic facilities and ancillary industries

At national level, there are the basic facilities described in the UNIDO report prepared by Mr. E. Gasparetto. In the agricultural machinery sector, the limiting factor to establishing industries and extending facilities is the restricted size and variety of the national market where there is no demand for products of a higher technological level or better production levels because of the slowness of capturing the GRAN market.

4. DESIGN, DEVELOPMENT, ADAPTATION, TESTING AND EVALUATION

There are no national institutions for design, development, adaptation, testing or evaluation.

5. TECHNICAL AND TECHNOLOGICAL MANUFACTURING

There are no institutions for these activities.

6. REPAIR, MAINTENANCE AND SPARE PARTS SUPPLY

Provision is made for these aspects by distributors of agricultural machinery, tractors, implements and miscellaneous accessories. Cover is good nationally and is provided by eight firms, each with different levels of cover.

7. POLICIES, PLANNING, STRATEGY AND CO-ORDINATION

There is no national body for dealing with the problem of agricultural mechanization or co-ordination with technical assistance missions. This is treated on an ad hoc basis at the level of individuals, working groups and/or commissions.

8. INTERREGIONAL CO-OPERATION

The matter should be studied since neighbouring countries such as Ecuador and Bolivia have similar or even lower technological levels and this, in conjunction with the limited market, makes it impossible to establish similar industries.

Other countries could offer us assistance and/or technology for:

(1) production of intermediate technology machinery such as animal - drawn implements and manual transplanters;

(2) evaluation and production of small binders and harvesters for rice and of threshers with 1.5 - 2 tons per hour capacity;

(3) Evaluation and production of small and large capacity drying and storage facilities for rice for human consumption;

(4) information on the use of windmills for supplementary irrigation at altitudes of 3 800 metres above sea level with the prospects of a massive production and utilization programme in the high plateau of Peru and Bolivia.

9. ROLE OF UNIDO

In the field of engineering, advisory services are required for machinery and implements, with improved techniques to reduce costs, and for testing of machines.

Aspects of training of personnel for repair and maintenance of machines at user level is being treated separately by the FAO-FERTILIZANTES, SENATI and CENCICO; the recommendations in UNIDO Report No. 11 PER/72/030/11-09 should be implemented. Technical information which may be received from UNIDO should be channelled directly to interested industrial firms avoiding loss of material of high technological value.

10. PROPOSALS AND RECOMMENDATIONS

The main requirement is improvement of intermediate technology in addition to improving efficiency in the use of high cost raw materials which raise the price of the final product.

The high cost of agricultural equipment makes it necessary for action to be directed at raising the technical level of maintenance and repair staff making it possible to use equipment with a high replacement cost.

RECOMMENDATION

The production of intermediate technology agricultural machines should be promoted to fill the existing lack of threshing and husking machines.

An animal-drawn multipurpose tool bar should be developed constituting a stepping stove permitting farmers to go over from more convenient use of draught animals to mechanization;

Animal-drawn ploughs of an intermediate type between the metal tipped wooden plough and the mouldboard plough should be studied and designed. This action should be carried out in Ecuador, Peru and Bolivia. To up date the recommendations in UNIDO Report No. 11 PER/72/030/11-09.