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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

**THIRD
CONSULTATION
ON THE
AGRICULTURAL
MACHINERY
INDUSTRY**

Belgrade, Yugoslavia
29 September to 3 October 1986

REPORT

Distr.
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Abbreviations

ALADI	Latin American Integration Association
ARCEDEM	African Regional Centre for Engineering Design and Manufacturing
FAO	Food and Agriculture Organization of the United Nations
RNAM	Regional Network for Agricultural Machinery

PREFACE

The Second General Conference of the United Nations Industrial Development Organization (UNIDO), held at Lima, Peru, in March 1975, recommended that UNIDO should include among its activities a system of continuing consultations between developed and developing countries with the object of raising the share of the developing countries in world industrial output through increased international co-operation. 1/ The General Assembly, at its seventh special session in September 1975, endorsed the recommendation and requested UNIDO to implement it under the guidance of the Industrial Development Board.

In May 1980, the Industrial Development Board decided to place the System of Consultations on a permanent basis, and in May 1982 it adopted the rules of procedure 2/ according to which the System of Consultations was to operate, including its principles, objectives and characteristics, notably:

(a) The System of Consultations should be an instrument through which UNIDO would serve as a forum for developed and developing countries in their contacts and consultations directed towards the industrialization of developing countries; 3/

(b) Consultations would also permit negotiations among interested parties at their request, at the same time as or after consultations; 4/

(c) Participants of each member country should include officials of Governments as well as representatives of industry, labour, consumer groups and others, as deemed appropriate by each Government; 5/

(d) Final reports of the Consultation should include such conclusions and recommendations as were agreed upon by consensus by the participants; the report should also include other significant views expressed during the discussions. 6/

1/ Report of the Second General Conference of the United Nations Industrial Development Organization (ID/CONF.3/31), chap. IV, "The Lima Declaration and Plan of Action on Industrial Development and Co-operation", para. 66.

2/ See Draft rules of procedure for the System of Consultations (ID/B/258), annex.

3/ Official Records of the General Assembly, Thirty-fifth Session, Supplement No 16 (A/35/16), vol. II, para. 151(a).

4/ Ibid., para. 151(b).

5/ Ibid., para. 152.

6/ Ibid., Thirty-second Session, Supplement No 16 (A/32/16), para. 163.

Three Consultations, one of which was regional, have been convened on the agricultural machinery industry. The First Consultation was held at Stresa, Italy, in October 1979; 7/ The Second Consultation took place at Vienna, in October 1983. 8/ The Regional Consultation, which dealt with the problems of Africa, was held at Addis Ababa in April 1982. 9/ The Industrial Development Board, at its eighteenth session, held in May 1984, 10/ took note of the conclusions and recommendations of the Second Consultation and decided at its nineteenth session, held in May 1985, that an interregional consultation on the agricultural machinery industry should be held during the biennium 1986-1987. 11/

Twenty-eight Consultations have been convened since 1977, covering the following industries and topics: capitals goods, agricultural machinery, iron and steel, fertilizers, petrochemicals, pharmaceuticals, leather and leather products, vegetable oils and fats, food-processing, industrial financing, training of industrial manpower, wood and wood products and building materials.

7/ Report of the First Consultation Meeting on the Agricultural Machinery Industry, Stresa, Italy, 15-19 October 1979 (ID/239).

8/ Report of the Second Consultation Meeting on the Agricultural Machinery Industry, Vienna, Austria, 17-21 October 1983 (ID/307).

9/ Report of the First Regional Consultation Meeting on the Agricultural Machinery Industry, Addis Ababa, Ethiopia, 5-9 April 1982 (ID/285).

10/ Report of the Industrial Development Board on the work of its eighteenth session (Official Records of the General Assembly, Thirty-ninth Session, Supplement No 16 (A/39/16) para. 84 (1).

11/ Report of the Industrial Development Board on the work of its nineteenth session (Official Records of the General Assembly, Fortieth Session, Supplement No 16 (A/40/16) para. 89 (3).

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INTRODUCTION

1. The Third Consultation on the Agricultural Machinery Industry was held at Belgrade, Yugoslavia, from 29 September to 3 October 1986. The Third Consultation was attended by 161 participants from 46 countries and seven international and other organizations (see annex I).

Background to the Third Consultation

2. The consultation process with regard to the agricultural machinery industry began by an examination of basic considerations for the development of the agricultural machinery industry in developing countries and by the identification of the main problems of this sector at the country and global levels. Progress was made in the examination of more complicated issues, such as those related to the concept of multi-product manufacturing of agricultural machinery and implements suitable to local conditions, long-term arrangements and mobilization of small- and medium-scale enterprises in the sector.

3. At the First Consultation, issues related to a strategy for the development of the agricultural machinery industry in developing countries and the basic facilities required for the production of agricultural machinery were discussed and recommendations made. In that context, UNIDO was requested to strengthen its technical assistance programme in the field of agricultural machinery, taking account of the conditions prevailing in developing countries.

4. The Second Consultation concentrated on issues related to a multi-product approach to manufacturing and long-term arrangements, and recommendations were made regarding the formation of an international group of experts on multi-product manufacturing and the need to prepare guidelines for the import, assembly and manufacture of agricultural machinery, including training, which would be appraised by an international group of experts.

5. The Second Consultation also requested UNIDO to give consideration to the problems of Africa, in line with the recommendations of the First Regional Consultation on the Agricultural Machinery Industry, in relation to increased food production and increased industrialization.

6. In order to implement the recommendations related to a multi-product approach to manufacturing, UNIDO organized, in co-operation with the Government of China, a meeting of an international group of experts, which was held at Guangzhou, China, from 13 to 18 November 1984 (ID/WG.449/4). The main outcome of the meeting was a recognition of the advantages of promoting a multi-purpose approach to the manufacture of agricultural machinery, rural equipment and other related capital goods in many developing countries. It was recommended that UNIDO should collect information for the preparation of guidelines for a multi-product approach to the manufacture of agricultural machinery. It was further recommended that the multi-product approach should be supported by the introduction of measures covering training, infrastructure, raw materials and finance. On the basis of a study of plants and institutions in African and Asian countries, a document on reference guidelines for the establishment of multi-product agricultural machinery plants was prepared for presentation to the Third Consultation (ID/WG.462/4).

7. With regard to guidelines for the import, assembly and manufacture of agricultural machinery, including training, a series of analytical reports were prepared (ID/WG.443/1-7). The reports compared relevant provisions in the codes of national and international institutions. On the basis of these reports, guidelines were prepared and reviewed by a meeting of international experts, which was held at Vienna from 9 to 12 September 1985. The meeting agreed that it would be better to elaborate the guidelines and to include model or illustrative clauses rather than to establish model forms of contract. The experts' suggestions were reflected in an updated version of the guidelines (ID/WG.462/3/Rev.1), so as to provide guidance in solving the negotiating and drafting problems most commonly faced by the parties concerned.

8. In preparing for the Third Consultation, which, at the request of the Industrial Development Board, was of an interregional nature, special emphasis was given to an examination of the industrial aspects of the food problems of Africa. In that context, alternative development strategies were analysed for the local production of agricultural machinery in developing countries, particularly in Africa, with emphasis on hardware for irrigation. Strategies for the stimulation of the agricultural machinery industry and the intensification of agricultural mechanization in developing countries were studied in selected developing countries (ID/WG.462/7). A study was also undertaken on the problems of water management in agriculture and the need to develop the manufacture of pumping systems for irrigation, drainage and rural water use, taking into consideration the varying degrees of technological dependency in developing countries (ID/WG.462/1).

9. A study was undertaken to assess the influence of local conditions on the selection of appropriate irrigation technology for the manufacture of irrigation equipment and on the transfer of technology between small- and medium-scale enterprises of developed and developing countries (ID/WG.462/8).

10. In accordance with the interregional nature of the Third Consultation, emphasis was given to preparing a study on the prospects for interregional co-operation in the development of the agricultural machinery industry (ID/WG.462/9). This study, which was based on a survey of manufacturers, particularly in the small- and medium-scale sectors, and institutions in Africa, Asia, Europe and Latin America, focused on the requirements for establishing a framework for co-operation in such areas as trade, training, finance and the transfer of technology.

11. In the light of the conclusions and recommendations reached at the two previous Consultations and the Regional Consultation and of the follow-up activities carried out by the Secretariat, as well as world economic developments in general and changes in the agricultural machinery industry in particular, the following two issues were presented to the Third Consultation for its consideration:

Issue 1: Perspectives of interregional co-operation in the agricultural machinery industry, with emphasis on small- and medium-scale enterprises.

The issue is based on an examination of the potential for co-operation between the more advanced developing regions, Asia and Latin America, and Africa and the possible contribution of developed countries to the promotion of such co-operation.

Issue 2: Strategies for an integrated development of agriculture with local production of irrigation hardware and other agricultural equipment by small- and medium-scale manufacturers.

This issue tackles the problem of achieving an integrated development of agriculture and the agricultural machinery industry. It focuses on the need for agricultural mechanization, rural development and the building up of indigenous capacities for the production of agricultural machinery, particularly irrigation equipment.

I. AGREED CONCLUSIONS AND RECOMMENDATIONS

Issue 1: Perspectives of interregional co-operation in the agricultural machinery industry, with emphasis on small- and medium-scale enterprises

Conclusions

12. Under issue 1, the Consultation agreed the following conclusions:

(1) The Consultation recognizes that the local production of agricultural machinery, equipment and tools in developing countries is a desirable activity when it is successful in achieving national self-sufficiency in food. Such local production should be designed primarily to satisfy the needs of farmers and to improve the working conditions of farmers, especially small farmers who predominate in many developing countries. Special attention should be paid to the needs of women involved in farming in rural areas with a view to manufacturing appropriate tools and equipment.

(2) The establishment in rural areas of small- and medium-scale enterprises for the production of agricultural machinery and equipment provides numerous advantages. These enterprises, located where possible within industrial estates, need to be provided with extension services, including training, so as to improve their efficiency and to help them meet the needs of the small farmers they serve.

(3) There is a need to assess the effective demand for agricultural machinery and equipment. International organizations, such as the Food and Agriculture Organization of the United Nations (FAO) and UNIDO, as well as countries or groups of countries, could render assistance to developing countries in carrying out such assessments.

(4) For the development of the agricultural machinery industry, it is essential to avoid wide fluctuations in demand. It is therefore important that measures be taken to transform potential demand into effective sustained demand. These measures may include support for training, infrastructure and the creation of co-operatives or other forms of association of small farmers. Other measures may include the provision of long-term agricultural credits to these co-operatives for the purchase of equipment and tools. Small- and medium-scale enterprises in the sector may also need some form of industrial insurance to protect them against possible seasonable fluctuations in demand caused by external factors, such as poor climatic conditions. The viability of providing such insurance coverage needs to be investigated further.

(5) Taking account of the technological disparities in the agricultural machinery industry in developing countries, it is recognized that national agricultural institutions are often in a better position than regional institutions to advise local authorities on the formulation of mechanization policies for developing countries and to assess the needs of local farmers. These national institutions can also perform a useful role in the testing of both locally produced and imported agricultural equipment, as well as in the adaptation of imported technologies, the development of indigenous technologies, the dissemination of information, quality control and the promotion of safety standards. International organizations, particularly FAO and UNIDO, may be called upon to support national institutions or to assist in their creation in other countries. It may be feasible to set up a subregional institution to serve a number of smaller countries.

(6) At a regional level, two organizations (the African Regional Centre for Engineering Design and Manufacturing (ARCEDEM) in Africa and the Regional Network for Agricultural Machinery (RNAM) in Asia and the Pacific) have been established to co-ordinate and to promote agricultural mechanization. Such organizations require support (without prejudice to the establishment of other regional organizations) so that they may fulfil their vital role in providing assistance and technical expertise in support of mechanization programmes. International organizations, such as FAO and UNIDO, may also promote co-operation between regional organizations, which could include the exchange of information and the training of manpower. Co-operation between regional organizations and manufacturers of agricultural machinery is also a desirable objective. UNIDO can play a leading role in promoting this form of co-operation to the mutual benefit of all parties concerned. Through such an arrangement, data banks to monitor the inventory, condition, application, manufacture and testing of agricultural machinery in various areas may be established at these regional organizations, with the co-operation of FAO, UNIDO, regional commissions, transnational corporations and other members of the international community.

(7) It is important that manufacturers co-operate more closely with national and regional research centres. In addition, manufacturers of sophisticated machinery should be prepared, under mutually agreed conditions, to provide technical support, including training activities, and to participate in setting up service and spare parts centres in the developing countries that would ensure the proper application and regular upkeep of the machinery supplied.

(8) In order to facilitate international industrial co-operation, it is essential that appropriate measures be taken at the national level to create the proper environment for private-sector investment in the agricultural machinery industry.

(9) The agricultural machinery industry provides an important linkage between agriculture and industry. Co-ordination of activities between international organizations, especially FAO and UNIDO, is to the benefit of Member States in that it ensures the optimum utilization of resources.

(10) International financing institutions, such as the World Bank, and regional development banks, should consider increasing their financial assistance under conditions that will promote and sustain agricultural mechanization projects in developing countries.

(11) Proposals emanating from the meeting on training in the agricultural machinery industry and multi-purpose plants, which was held at Rosario, Argentina, from 9 to 14 December 1985, constitute an important contribution to developing training activities in the agricultural machinery industry.

Recommendations

13. Under issue 1, the Consultation made the following recommendations:

Policy recommendations to Governments and/or those concerned, where appropriate

(1) Developing countries are called upon to formulate appropriate national policies to foster agricultural mechanization and the domestic manufacture of agricultural machinery and implements. They should also provide the necessary institutional and legal framework for the implementation of such policies, including the protection of industrial property where such laws do not yet exist.

(2) An analysis of demand for agricultural machinery in developing countries should be carried out and efforts should be made to meet that demand in an adequate and consistent manner. Appropriate measures should be taken to stimulate a sustained demand for agricultural machinery and implements.

(3) Where appropriate, action should be taken to facilitate the organization of small farmers and small industries into co-operatives or other forms of association to allow for the sharing of equipment, facilities and services, including maintenance and repair, and access to credit.

(4) Governments are called upon to disseminate the reports emanating from Consultation meetings to all relevant institutions, enterprises and government bodies so that the information can be disseminated further to manufacturers and farmers.

(5) After-sales service and the availability of spare parts should be considered in sales contracts for agricultural machinery.

(6) Extension services should be created in order to ensure the provision of training and material support to rural craftsmen and artisans in the repair and maintenance of equipment.

International co-operation

(7) In strengthening South-South co-operation, countries with an established agricultural machinery industry should co-operate with other developing countries in the establishment of a national agricultural machinery industry.

(8) Appropriate mechanisms should be developed to promote co-operation agreements between the small- and medium-scale enterprises of the developed countries and their counterparts in the developing countries for the stimulation of the transfer of appropriate technology and trade.

UNIDO and other international organizations

(9) UNIDO and other United Nations agencies should, upon request, take action to strengthen the capacities of national and regional institutions in the fields of technical support and mutual co-operation. These national institutions should be developed into competent organizations to provide the necessary research and development, engineering, training and design services to the agricultural machinery and implement industry; to serve as standardization, testing and quality control centres; to carry out surveys to assess the needs of the agricultural sector and the resources available; and to serve as national counterparts for regional organizations.

(10) UNIDO should co-ordinate with other specialized agencies in the United Nations system with regard to activities concerning the promotion and development of agricultural mechanization in developing countries, and make the results of such work known to Member States through appropriate means.

(11) In keeping with the agreement reached with the Latin American Integration Association (ALADI) within the framework of the sectoral meeting on agricultural machinery industry, which was held at Mar del Plata, Argentina, from 1 to 5 July 1985, UNIDO, should, in co-operation with ALADI, organize a regional meeting in Latin America to consider specific issues regarding the promotion of the agricultural machinery industry in that region.

Issue 2: Strategies for an integrated development of agriculture with local production of irrigation hardware and other agricultural equipment by small- and medium-scale manufacturers

Conclusions

14. Under issue 2, the Consultation agreed the following conclusions:

(1) National policies and strategies are required for agricultural mechanization, the design, manufacture and maintenance of agricultural machinery, including irrigation equipment, the intensification of local small- and medium-scale industries and the development of human resources.

(2) Governments of developing countries should establish permanent national focal points for agricultural engineering and the allied metalworking sector for the integrated development of agriculture and the agricultural machinery industry. This objective could be achieved by, inter alia, the promotion of small- and medium-scale multi-purpose production units. Consideration should be given, when appropriate, to the local manufacture of irrigation and drainage equipment and spare parts, and to repair and maintenance activities.

(3) International, regional and subregional co-operation is of paramount importance for the integrated development of the agricultural machinery industry. Specific constraints, such as the shortage of raw materials, spare parts, skilled manpower and repair and maintenance facilities, need to be overcome.

(4) Co-operation between the industrialized and the developing countries, and between the developing countries themselves, in the form of joint activities, including joint venture projects, may be stimulated by bilateral and multilateral aid programmes. Consideration should be given to upgrading and rehabilitating existing agricultural machinery plants.

(5) Finance from international, regional and national organizations is necessary to provide support, including credit, to existing plants, especially those in need of rehabilitation, and to promote small- and medium-scale industries.

(6) UNIDO and other international organizations, as appropriate, should, in close co-ordination, provide assistance in the design and manufacture of agricultural machinery and equipment, with special emphasis on Africa.

Recommendations

15. Under issue 2, the Consultation made the following recommendations:

Policy recommendations

(1) It is recommended that Governments and/or those concerned, where appropriate, should:

(a) Formulate, within the framework established by national development objectives, goals and policies, a national agricultural engineering strategy, including programmes of action and projects for their implementation;

(b) Establish as soon as possible the following permanent bodies:

(i) A national focal point for co-ordination, consultation and advice in the integrated development of agriculture and agricultural engineering, which may vary from country to country, e.g. an institute, a committee, a commission or an advisory board. This body must be provided with an appropriate secretariat;

(ii) A national centre for agricultural engineering whose task would be to carry out technical studies, testing and the design and development of prototypes. Where they already exist, such centres should be strengthened;

(c) Give priority to allocating funds, including foreign exchange, for the purchase of raw materials and components needed by manufacturers;

(d) Encourage that, in rural areas, new factories and workshops and those that are being upgraded are multi-purpose in orientation. Major activities of such plants should be, inter alia:

(i) The manufacture of irrigation and drainage equipment as a priority in existing and potential irrigation areas;

(ii) The repair of agricultural equipment and machines and the supply of spare parts for existing irrigation and drainage systems.

International co-operation

(2) It is recommended that Governments, international organizations and others, where appropriate, should:

(a) Provide logistical and technical support and other special assistance to increase co-operation between small- and medium-scale industrial enterprises in developed and developing countries, and between such enterprises in the developing countries themselves, in such activities that they may not yet be able to carry out on their own;

(b) Support the establishment of mechanisms to facilitate contacts between small- and medium-size enterprises in developing countries and those in developed or other developing countries using bilateral and multilateral assistance when appropriate. This could include assistance in the organization of regional meetings that would allow for the maximum participation of representatives of developing and developed countries, particularly industrial entrepreneurs. Such meetings would facilitate the exchange of experience, the identification of requirements and opportunities for technical co-operation and the development of appropriate technology, as recommended by the Second Consultation in 1983. The Third Consultation recommends that a regional consultation for Latin America should take place as soon as possible.

(3) In international co-operation in new ventures between enterprises in industrialized countries and enterprises in developing countries, or in new ventures between the developing countries themselves, the parties concerned should:

(a) Seek the most concrete forms of co-operation, particularly in the manufacture of agricultural components and equipment and the maintenance and repair of existing equipment;

(b) Co-ordinate and support their activities by training programmes adjusted to different levels of users, making use of the most effective techniques;

(c) Request, if necessary, the support of UNIDO and other international organizations, particularly international and regional financing institutions.

Technical assistance by UNIDO and other international organizations

(4) Considering the close relationship between the design and manufacture of agricultural machinery and equipment and their use in agriculture, it is recommended that FAO, UNIDO and bilateral agencies should:

(a) Co-operate in supporting developing countries in the design and manufacture of agricultural machinery and equipment and, in particular, in taking joint action to encourage that provision be made in the fourth United Nations Development Programme cycle for the creation and strengthening of national centres in the design and engineering of agricultural machinery and equipment;

(b) Establish workshops and rehabilitate existing ones, where necessary, and provide industrial and technical extension services as a matter of priority with a view to increasing the awareness in rural communities of the need to maintain agricultural machinery and irrigation equipment and to assisting them in doing so.

(5) It is recommended that FAO, UNIDO and other organizations should, when requested:

(a) Assist in the introduction of mobile workshops and demonstration exhibits capable of travelling from village to village to demonstrate the use and maintenance of water supply and irrigation equipment and other agricultural machinery;

(b) Support the establishment of a network of research and development centres for agricultural engineering in developing countries, such as that already in existence in Asia, with particular emphasis on that currently being considered for Africa;

(c) Provide assistance in training engineers in agricultural engineering centres and industry in design, manufacturing, testing and maintenance;

(d) In co-operation with the International Labour Organisation, provide assistance in the training of technicians at all levels for the different tasks involved in the design, manufacture, testing and maintenance of agricultural equipment;

(e) Provide assistance in the testing and development of agricultural machinery, including irrigation equipment and materials, in regional centres, particularly those situated in arid zones in Africa.

II. ORGANIZATION OF THE CONSULTATION

Opening of the Consultation

Statement by the President of the Federal Committee for Energy and Industry, Yugoslavia

16. The President of the Federal Committee for Energy and Industry, Yugoslavia, said that enduring self-sufficiency in food production could be attained only by developing the potential of local agriculture. Experience had shown that the agricultural potential of a country could only be fully utilized by a wider application of agricultural machinery. In the case of Yugoslavia, only the local production of agricultural machinery and equipment could secure the range of mechanization best suited to local ecological, technical and social conditions. Possibilities for promoting co-operation between developing countries were underlined, a number of which, including Yugoslavia, were in a position to offer technology and machinery that were appropriate to the conditions prevailing in developing countries.

Statement by the Director-General of UNIDO

17. The Director-General of UNIDO pointed out that developing countries were more than justified in regarding the development of their agriculture machinery sector as crucial, not only to intensifying cropping for the attainment of self-sufficiency in food, but also to providing an essential link in the expansion of overall industrial production. A vital point, deserving the fullest consideration by Governments on the one hand and private-sector enterprises on the other, was that a satisfactory correlation should exist between the various forms of farming and the appropriate level of mechanization, including all the other industrial inputs necessary for agricultural development. The Director-General directed the attention of participants to three solutions involving interregional co-operation: (a) assessing specific possibilities for interregional co-operation and the main elements of a framework that would promote it; (b) advancing the efforts of developing countries to enlarge their markets through intensified co-operation between developing countries and the contribution of the industrialized countries to promoting that co-operation; (c) assisting in the promotion of research and development and the creation of suitable conditions for the financing of the transfer of technology and the training of manpower for the agricultural machinery industry.

Statement by the Director of the System of Consultations Division

18. The Director of the System of Consultations Division urged participants not simply to discuss the issues but to carry them through to practical recommendations that could be implemented. He invited participants also to take advantage of the opportunity of making contacts with other participants with a view to setting up joint ventures, creating new enterprises or rehabilitating old ones. The System of Consultations, he said, was a unique instrument for fostering international co-operation based on mutual interest.

Election of officers

19. The following officers were elected:

- Chairman: Jovan Todorovic (Yugoslavia), Professor, University of Belgrade
- Rapporteur: Mussa Hassan (United Republic of Tanzania), Assistant Commissioner of Agriculture, Ministry of Agriculture and Livestock Development
- Vice-Chairmen: Chak Chakkaphak (Thailand), Director, Agricultural Engineering Division, Department of Agriculture, Ministry of Agriculture and Co-operatives
- Giulio Grilli (Italy), Chief, International Development Projects, Fiat Trattori SpA
- Willibald Fredersdorff Madrigal (Nicaragua), Director, Research and Development, Metal and Mechanics Branch, Ministry of Industry
- Czeslaw Stefaniak (Poland), Deputy Director, Central Union of Work Co-operatives

Adoption of the agenda

20. The Consultation adopted the following agenda:

1. Opening of the Consultation
2. Election of the Chairman, Vice-Chairmen and Rapporteur
3. Adoption of the agenda and organization of work

4. Presentation of the issues by the Secretariat
5. Discussion of the issues

Issue 1: Perspectives of interregional co-operation in the agricultural machinery industry, with emphasis on small- and medium-scale enterprises

Issue 2: Strategies for an integrated development of agriculture with local production of irrigation hardware and other agricultural equipment by small- and medium-scale manufacturers

6. Other matters
7. Conclusions and recommendations
8. Adoption of the report of the meeting

Establishment of a programme of work and working groups

21. Following the adoption of its programme of work, the Consultation established two working groups to discuss the issues and to propose conclusions and recommendations for consideration at the final plenary. The working group on issue 1 was chaired by Hugo Oscar Purinan (Argentina). The working group on issue 2 was chaired by Tjortj Tjortjevits (Greece).

Parallel activities to the Third Consultation

22. A member of the Secretariat gave two presentations on the investment promotion activities of UNIDO, held individual meetings with participants from both developing and developed countries and disseminated information on industrial projects in developing countries for which foreign co-operation was being sought.

23. Another member of the Secretariat briefed the participants on the procedures governing the formulation and implementation of technical assistance by UNIDO, describing current and pipeline projects in general and projects in the field of agricultural machinery in particular. Reference was also made to the type of co-operation arrangements that UNIDO had made with Governments, technical institutions and other international organizations.

24. A brief presentation of the activities of UNIDO in the development and transfer of technology was given by a member of the Secretariat, who outlined the services provided by the Industrial and Technological Information Bank and the programmes relevant to the issues being discussed at the Consultation. Several participants showed interest in those activities and requested more detailed information, which was provided.

Documentation

25. During the Consultation, several papers were distributed, including a description of the work of the Centre d'études et d'expérimentation du machinisme agricole tropical, France, and of ARCEDEM, Nigeria; reports prepared by the delegations of Belgium and Yugoslavia; a report of a working group meeting on training needs in the agro-machinery industry, held at Rosario, Santa Fé, Argentina from 9 to 14 December 1985; and a paper entitled "Planning the demand for agricultural machinery". Documents issued before the Consultation are listed in annex II below.

Adoption of the report

26. The report of the Third Consultation was adopted by consensus at the final plenary on 3 October 1986.

Concluding remarks

27. In their concluding remarks, participants expressed their appreciation for the generous hospitality that had been provided by the Government of Yugoslavia. Satisfaction was also expressed with the way in which the Consultation had been conducted. Participants agreed that the spirit of co-operation and cordiality that had prevailed throughout the Consultation had done much to facilitate the unanimous acceptance of its conclusions and recommendations, and that this was due in large measure to the ability and efforts of the Chairman.

28. A representative of Industrija masina i traktora (IMT), Belgrade, announced that IMT had decided to donate to UNIDO, for use by developing countries, a complete set of documentation and engineering drawings covering the design and production of six items of agricultural equipment, including ploughs and a single-axle trailer and the scaffolding needed for structures connected with agriculture, such as dams. This documentation would be made available to developing countries through UNIDO.

III. REPORT OF THE PLENARY SESSIONS

Presentation of the issues

29. In introducing issue 1, a representative of the Secretariat drew attention to some priorities for promoting intraregional and interregional co-operation, which included: (a) the identification and implementation of national policies for the development of agriculture, and the agricultural machinery industry in particular, in co-ordination with subregional and regional programmes; (b) the maintenance and the reconditioning of existing agricultural machinery, which would provide a basis for training workers and for developing production units; (c) the removal of trade barriers where agricultural machines and components within subregions were concerned, and the promotion of long-term co-operation and the integration of markets; (d) the establishment of a tentative timetable for the implementation of measures that would create the necessary conditions for investment in developing countries.

30. In introducing issue 2, a representative of the Secretariat suggested some points for discussion by the participants, which included: (a) measures to promote international and interregional co-operation in the local manufacture of pumps and other hardware for irrigation; (b) the merits of a dynamic self-reliant/dependent relationship with regard to foreign investors as a realistic strategy for technological progress; (c) the manufacture of pumps as a focal point for the integrated development of industry and agriculture in rural areas, using the multi-product approach; (d) the limitations of small- and medium-scale manufacture and the extent to which they could be overcome by large-scale manufacture; (e) recommendations for future action by UNIDO and other international organizations.

Summary of discussion

31. A number of participants stressed the importance of adapting agricultural machinery to suit local requirements. One participant pointed out that rather than providing the machinery itself, it was preferable to provide guidance to local institutions in the development of their own machinery. Reference was made repeatedly to the advantages of usable, simple and cheap technology. Several participants alluded to the necessity of integrating local and foreign manufacture to ensure a continuous supply of raw materials, components and finished products. Many participants touched on the importance of planned maintenance, which was often neglected in industrial plants but even more so as far as agricultural machinery was concerned.

32. In designing plants for the production of agricultural machinery, proper economies of scale and feasibility should be achieved. Agricultural machinery should be produced profitably and cheaply, bringing it within the reach of farmers and peasants. A balance should be created between the number of manufacturers of a particular type of agricultural machine; on the one hand, competition could be healthy and lead to a wide choice of equipment, on the other hand, a proliferation of plants could cause problems with regard to the availability of spare parts. One participant discussed the merits of the horizontal integration of small plants compared with the vertical integration of large plants. The need to study the potential of the local market to absorb agricultural machinery and to avoid wasting resources was mentioned by more than one participant. Several participants commented on the difficulty of obtaining financing on appropriate terms and conditions for their enterprises; it was considered that smaller plants experienced more difficulties than larger plants in that respect. The need for adequate training and good management, and the difficulties developing countries experienced in obtaining them, featured prominently in the statements made by a number of participants.

33. The participants stressed that good design was important even for simple and robust machinery. Attention also had to be given to the quality of the materials used. The advantages of agricultural machinery had to be seen in relation to its cost and the financial resources of farmers. In that context, questions relating to employment opportunities were also important. Several participants pointed out that, as a result of the lessons learnt from their own mechanization, including questions related to costs and the availability of spare parts and energy, animal-drawn equipment was now being widely reintroduced. One participant said that in his country the Government had made agricultural machinery available to farmers but that, as a result of consecutive bad harvests, the farmers had defaulted in their repayments and the machinery had been left to deteriorate. Another participant said that it could take 15 years or more to develop the agricultural machinery sector, a view held by several participants, and he pointed out that, during that period, it was the Government's duty to nurture and protect the industry.

34. Developing countries, including those with a higher degree of industrialization, should adopt a long-term perspective towards the development of the agricultural machinery sector. A high degree of integration within the sector took a long time to achieve. One participant stressed the importance of providing a stimulating local environment and an adequate basic infrastructure. Variations in local conditions could determine the success of the manufacture of agricultural machinery. Co-operation between national centres in different countries should be encouraged.

One participant spoke of the importance of industrial co-operation in rural areas. Representatives of two regional institutions in Africa and Asia described the work of their institutions, the facilities they offered and indicated that they would give a more detailed account of their activities during the discussions of the working groups.

35. A representative of the International Trade Centre (UNCTAD/GATT) described the activities of the Centre in connection with its study entitled "The development of trade in selected agricultural machinery and implements among developing countries".

IV. REPORT OF THE WORKING GROUP ON ISSUE 1:
PERSPECTIVES OF INTERREGIONAL CO-OPERATION IN THE AGRICULTURAL
MACHINERY INDUSTRY, WITH EMPHASIS ON SMALL- AND MEDIUM-SCALE ENTERPRISES

36. Several participants gave an account of the status of the agricultural machinery industry in their countries, highlighting their experiences in the development of the sector. The stage of development of the industry varied greatly from one country to another. In some developing countries, particularly the smaller ones, the industry was virtually non-existent, being limited to the fabrication of very simple hand tools by rural craftsmen and artisans. Other developing countries had reached the stage where relatively sophisticated agricultural machinery, such as tractors and harvesting equipment, was being produced.

37. A number of participants from developed countries as well as the more industrialized developing countries expressed the willingness of their countries to co-operate with developing countries in the transfer of technology, training, joint ventures, the exchange of information and other forms of co-operation in the agricultural machinery industry.

38. A participant described the efforts of certain industrialized countries to respond in a flexible and reliable way to the needs of developing countries with regard to maintenance and repair, training and, in particular, the linking of small- and medium-scale enterprises with complementary activities. It was considered that such activities should be supported.

39. Many participants from developing countries gave an account of the difficulties their countries had been and were facing in securing maintenance and repair services for imported agricultural machinery, especially tractors. A number of examples were given of imported tractors that had become inoperable after only a short period of service owing to the lack of spare parts and repair facilities. Some participants proposed that all purchasing arrangements for the import of agricultural machinery should include a provision for the supply of spare parts for a minimum period of from four to five years after the machinery had been delivered. Thus a certain percentage of the cost of the machinery, to be mutually agreed upon by the buyer and the supplier, could be retained by the supplier at the time of purchase, and used to effect the delivery of spare parts as required.

40. The issue of assessing the effective demand for farm implements and machinery was stressed by several participants. International organizations, such as FAO and UNIDO, were called upon to assist developing countries in carrying out studies for the effective assessment of demand.

41. A participant stressed the importance of transforming potential demand into effective demand and suggested some measures that could be taken for the development and stabilization of demand for agricultural machinery. The measures proposed ranged from the creation of co-operatives, grouping a number of small farmers, to the provision of special long-term credit facilities to those co-operatives. This view was supported by many participants from both developed and developing countries.

42. Several participants emphasized the importance of determining the real needs of small farmers who predominated in many developing countries. Policies for mechanization and the agricultural machinery industry should therefore be designed to fulfil those needs. In that respect, national institutions for technical support were better suited to assessing needs and to advising the authorities concerned on policy matters for the development of the agricultural machinery industry. International organizations were requested to support those national institutions.

43. Several participants stressed the importance of national agricultural centres, as well as testing stations for the design, construction and application of agricultural machinery. The importance of such stations was not restricted to the development of appropriate technology; advice might also be given on complex and expensive imported machinery.

44. A representative of ARCEDEM gave an account of the Centre's objectives and activities. ARCEDEM invited the international community, particularly UNIDO, to render it additional support. ARCEDEM was also willing to co-operate with a regional institution for Asia and the Pacific, namely RNAM. A representative of RNAM described the activities of that institution.

45. A number of participants suggested that existing regional institutions should be strengthened before the creation of new ones was considered. Other participants, from Latin America and the Caribbean in particular, felt that a regional institution for that region was also desirable, considering the crucial role those institutions might play in supporting the agricultural machinery industry in particular and the metalworking industry in general.

46. Participants from the Latin American region requested UNIDO to organize a regional meeting on the agricultural machinery industry in Latin America.

47. On the issue of training, many participants called for the implementation of the recommendations of the working group meeting on training needs in the agro-machinery industry, which had been held by UNIDO in Argentina in December 1985.

48. Several participants expressed a wish to be informed of the activities of UNIDO in the agricultural machinery industry and the progress made in the implementation of the recommendations of the Second Consultation on Agricultural Machinery. The Secretariat reported on the progress of the implementation of the recommendations of the Second Consultation.

49. A participant representing a federation of mainly small- and medium-scale enterprises in an industrialized country described the various opportunities offered by those enterprises for the promotion of industrialization in developing countries.

50. Considering the complementarities of the mandates of international organizations in the field of agricultural machinery and mechanization, several participants called upon those international organizations to co-ordinate their work further so as to ensure the optimum utilization of resources. FAO and UNIDO were specifically requested to take appropriate measures towards achieving that objective.

51. International financing institutions, such as the World Bank, and regional development banks were called upon to increase the availability of finance under favourable conditions so as to promote the agricultural machinery industry and agricultural mechanization in developing countries.

V. REPORT OF THE WORKING GROUP ON ISSUE 2:
STRATEGIES FOR AN INTEGRATED DEVELOPMENT OF AGRICULTURE WITH LOCAL
PRODUCTION OF IRRIGATION HARDWARE AND OTHER AGRICULTURAL EQUIPMENT
BY SMALL- AND MEDIUM-SCALE MANUFACTURERS

52. A participant stressed the need to formulate policies and strategies for the development of agriculture in the developing countries of Africa. There was an urgent need to identify steps to increase food production, and he drew attention to the imbalance between population and food supply. Those steps might include placing more emphasis on agricultural development in national plans, forecasting the demand for different types of machinery and equipment and measures at the local level regarding: land use; transport; improvement of water management systems; extension services; improved animal-drawn equipment to replace tractorization; promotion of industrial joint ventures; manpower training; improvement of maintenance and the supply of spare parts; provision of finance and credit facilities to farmers; design of and research on equipment; and establishment of subregional networks.

53. The representative of a regional institute highlighted the importance of integrating design and manufacture to enlarge the market potential of equipment. It was noted that tractors imported into Africa too often broke down or were abandoned owing to a lack of spare parts. Integrated programmes for management and co-operation in the African region were needed, including more national centres for engineering design and manufacture, some of which could be converted into subregional centres. Farmers, non-governmental organizations, development banks and other interested partners from developed and developing countries should be associated with the work of such centres. FAO and UNIDO should give assistance as a matter of priority to such centres, whose activities would include the promotion of the manufacture of pumps for irrigation.

54. It was generally agreed that the manufacture of agricultural equipment and tools, including irrigation equipment, the provision of technical assistance and know-how and other related aspects, had to be suited to local conditions. One participant noted that the degree of durability and suitability of machinery and equipment affected the amount of spare parts that needed to be stocked, and he explained that there was a need for mechanization to be introduced as a package; the involvement of national experts in domestic manufacturing was also important. There was a need for co-operation in promoting new, small-scale industries and in upgrading existing industries. Several participants stressed the advantages of multi-product production in expanding the range of agricultural machinery, tools and equipment. One participant recommended the bulk purchase of common raw material inputs for small- and medium-scale enterprises.

55. In discussing the activities of his organization, the representative of FAO stressed the need to formulate strategies, policies and plans for the development of agricultural mechanization by the developing countries. A master plan for the interlinked development of agriculture and industry should be created, since external co-operation could only be effective after plans and strategies had been established at the national level. This was a task in which international organizations could provide assistance.

56. Another participant pointed out that, in adapting agricultural machinery, the views of the local farmers who would be using it should be taken into account.

57. It was suggested that a survey and inventory of machinery and equipment, products, institutes, training needs, and requirements for spare parts etc. for the developing countries should be undertaken. The representative of FAO pointed out, however, that the undertaking of such a study would be an expensive and time-consuming task.

58. Many participants drew attention to the important role that rural blacksmiths and small enterprises played in the manufacture of agricultural machinery and to the importance of establishing small- and medium-scale enterprises in the African region. Such enterprises, located in rural areas, should be geared to producing agricultural equipment. The manufacture of irrigation pumps and related products required back-up facilities such as casting and forging. Such products as pumps, diesel engines and other irrigation equipment could be manufactured economically at the subregional level if access to markets in neighbouring countries was provided.

59. Some participants suggested that, at the national level, farm mechanization centres and engineering design and manufacturing centres should be integrated into single centres. Such combined centres could develop prototype designs apart from testing agricultural machinery products.

60. Several participants offered assistance on a bilateral basis for the manufacture of pumps and other irrigation equipment.

61. Some participants considered that local authorities should encourage rural blacksmiths in particular and rural industries in general, and promote the use of their products by rural populations. Small- and medium-scale industries should be provided with a suitable policy framework and infrastructure providing extension services, training, management development, credit facilities etc. Developed countries could offer training facilities in those areas to small- and medium-scale industries. Moreover, international co-operation should be established between small- and medium-scale industries in developing countries in the maintenance and repair of equipment.

62. Several participants highlighted the importance of introducing watershed management, pumping and tillage techniques and various types of irrigation, including the construction of canals, reservoirs and wells. The urgent need to provide training in irrigation techniques along banks of rivers and creeks in Africa was emphasized. Participants further stressed the need for closer co-ordination between research institutions and manufacturers.

63. Several participants highlighted the importance of metal workshops, extension services and repair and maintenance for agricultural and irrigation machinery. Some participants supported the suggestion that mobile demonstration or exhibition workshops fitted with pumps and related irrigation equipment should be set up to upgrade the capabilities of farmers in carrying out maintenance. FAO and UNIDO should intensify on-the-job training, and follow up the training given externally. Such programmes could include training in the design of prototypes, where appropriate. One participant offered assistance in the manufacture of prototypes, including a detailed design for a low-lift pump that could be easily manufactured in developing countries.

64. Several participants highlighted the importance of renewable sources of energy and their utilization for irrigation purposes, and considered that joint venture projects should be promoted.

65. Some participants, including the representative of FAO, pointed out that irrigation must be combined with drainage systems. It was suggested that an inventory of traditional technologies existing in developing countries should be compiled by individual countries.

Annex I

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Specialized agencies and other organizations
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Food and Agriculture Organization of the United Nations

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Other intergovernmental organizations

European Economic Community

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Regional Network for Agricultural Machinery

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Non-governmental organizations

Fédération internationale des petites et moyennes entreprises industrielles

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Annex II

LIST OF DOCUMENTS

Issue papers

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Strategies for an integrated development of agriculture through local manufacture of machinery and equipment related to water conservation and conveyance, irrigation and drainage by small- and medium-scale manufacturers in Africa ID/WG.462/10

Report of the First Consultation Meeting on the Agricultural Machinery Industry, Stresa, Italy, 15-19 October 1979 ID/239

Report of the First Regional Consultation Meeting on the Agricultural Machinery Industry, Addis Ababa, Ethiopia, 5-9 April 1982 ID/285

Report of the Second Consultation on the Agricultural Machinery Industry, Vienna, Austria, 17-21 October 1983 ID/307

Agricultural machinery and rural equipment in Africa: a new approach to a growing crisis. Sectoral Studies Series No. 1 UNIDO/IS.377

The agricultural machinery industry in the 1980s: Factors for international co-operation ID/WG.400/1

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