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Information Document

AGRICULTURAL MACHINERY AND IMPLEMENTS 00112

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VII. AGRICULTURAL MACHINERY AND IMPLEMENTS

A. Summary

179. It was recognized that mechanization is as essential a part of the agricultural production input package as high yielding seeds, fertilizers, pesticides, irrigation, etc. Higher incomes of agricultural workers also only come through increases in productivity which again only come through mechanization. Each developing country must therefore work towards a judicious and steady upgrading of its mechanization technology.

180. Mechanization was then discussed in terms of

(a) The three distinct levels in developing countries;
(b) Choices of product groups; and
(c) Choices of manufacturing technologies.

181. Based on the level of mechanization in each developing country, the applications vary from purely manual agriculture in some of the least developed countries to fairly advanced levels of mechanization in the more developed of the developing countries. Therefore, each country should draw up an agricultural mechanization plan, appropriate to its social, economic and technological needs.

182. Recognizing the importance of mechanization for upgrading rural living standards in developing countries, the Group came up with a policy planning and programme of action at the national, sub-regional, regional and international levels in product choice, approach to local manufacturing and appropriate production technologies. It also highlighted the manner in which co-operation between the developing countries could be fostered, so that the experience gained by some in the adoption, adaptation and development of technologies could be shared by other developing countries. It was recognized that the technology transferred through other developing countries would be more appropriate to the socio-economic needs of developing countries.

B. Policy objectives

183. Within the framework of national development plans, and with due consideration to allied agricultural development and industrialization plans, a national agricultural mechanization plan should be prepared. The socio-economic development of peoples and nations should form the basis of such a plan. The agricultural mechanization plan should be

translated into viable agricultural machinery and implement development programmes on a short-term basis. It should consider national requirements and give due consideration to the possibilities of regional co-operation.

184. In formulating the plan, the following areas should receive attention:

(a) Appropriate farm mechanization and the review of long-term trends in production;

(b) Programmes for development of trained manpower for R and D, manufacture, repair, maintenance and operation and extension of agricultural machinery services should be organized;

(c) Local manufacture of agricultural machines and tools;

(d) Development of supporting industries such as foundry, forge and heat-treatment shops and promotion of integrated metallurgical and ancillary industries;

(e) Provision of credit, training, repair and maintenance and service facilities for farm equipment.

185. Policy planning and implementation machinery for manufacture and use of agricultural equipment should be established at the national level and should include ministries of agriculture, industry, planning, finance, labour and employment and research groups. Decisions made at the political, administrative and industrial levels should lead to the adoption of a technical model for manufacture appropriate to local conditions. Therefore, the establishment of appropriate inter-ministerial committees on agricultural machinery should be given serious consideration.

186. Design, testing and development centres at national and regional levels should be set up, in close co-operation with agricultural institutions and small- and medium-scale manufacturers, to inspire and guide a continuing programme of work on the evaluation and production of the types of agricultural machines geared to the specific conditions in any developing country. The objectives of such centres should be adaptation and transformation into manufacture and commercialization.

187. In developing country organizations, scientists and technical personnel working on appropriate technology should be freely permitted to exchange information, drawings and experimental data among themselves. The Governments of developing countries should encourage the flow of this useful information between the developing countries.

188. National Governments should put more emphasis on the expansion of education in rural areas and give special attention to technical education with the objective of raising the productive capacity of operators and

technicians, and of improving the quality of products, i.e. to work towards the creation of an industrially-conscious rural community.

189. Rationalization of manufacturing programmmes, standardization, quality control and import substitution are the responsibility of the national Governments. Enforcement of test codes, testing and certification are important. Appropriate institutions should be strengthened or established.

190. With reference to agricultural tools, manually-operated products, animal-drawn implements and simple machinery, national Governments of developing countries should make it a point to upgrade and/or install indigenous manufacturing bases, in order that the country may become self-sufficient. Manufacture should preferably be undertaken in rural areas by rural artisans and small industries.

191. Regarding intermediate types of agricultural machinery and implements, developing countries should be encouraged to adapt, develop and locally manufacture selected products with emphasis on co-operation among developing countries for technology transfer from the relatively more advanced developing countries.

192. Regarding more sophisticated equipment such as tractors, engines and combined harvesters, Governments of developing countries and manufacturers of industrialized countries and selected developing countries should be encouraged to foster long-term arrangements to phase out imports and replace them with locally manufactured products with emphasis on production technology, training, repair and maintenance under licensing agreements.

193. Developing countries which propose manufacturing sophisticated equipment should take up manufacture under arrangements with some of the other developing countries who have already begun manufacturing similar products and who have gone through the experience of absorption and local adaptation and whose technology may be more appropriate to conditions in developing countries.

194. National and regional policy and planning for agricultural machinery in developing countries, including sub-regional and regional bodies, could be greatly assisted by UNIDO's activities in and for the development and transfer of technology, the Industrial and Technological Information Bank (INTIB), sectoral studies, technical assistance and, above all, the First Consultation Meeting on Agricultural Machinery, as part of the Worldwide System of Consultations on selected industrial sectors. The objectives of the Consultation System are to promote co-operation between developing and

industrialized countries and among developing countries themselves and establish a forum of negotiations on arrangements for viable and appropriate technology transfer.

195. Mechanization systems and production programmes need to be assessed on a country-by-country and region-by-region basis by grouping countries with similar soil, climatic and crop conditions together. The identification of common problems, sharing of experience, adaptation of machinery on a regional or sub-regional basis, and the role of R and D institutions need to be considered.

C. Programme of action

196. Integrated programmes at national levels:

The Governments of developing countries should undertake an in-depth analysis of the available options for agricultural mechanization, and formulate programmes for the development and manufacture of appropriate agricultural machinery and implements giving due consideration to policy, planning, financial, R and D, institutional, technological manufacturing and service aspects. It is recommended that agencies such as the Food and Agriculture Organization of the United Nations (FAO), the International Labour Organisation (ILO) and UNIDO should, on request, provide assistance and publish "model case studies" based on experience for the benefit of other developing countries.

197. Promotion of the manufacture of hand-tools and animal-drawn implements and allied simple machinery:

UNIDO should:

(a) Through specific case studies in selected developing countries, develop manufacturing profiles and guidelines on the development and manufacture of simple agricultural tools and machinery; and

(b) Based on its past and present work, in co-operation with donors, interested developing countries and interested developed countries, establish rural pilot manufacturing plants in some of the least developed countries for local production of simple agricultural tools and implements.

198. In promoting the above two activities, UNIDO should not only make aware the Governments of developing countries of the following criteria but also incorporate these in the programme of action:

(a) The manufacture of simple hand-tools needs to be encouraged in countries where such equipment is at present imported;

(b) More productive results could be achieved by improving manufacturing quality rather than carrying out R and D on new equipment. Efforts should be concentrated on introducing and testing tools from other countries with similar agro-climatic conditions;

(c) The manufacture of simple hand-tools should be organized on a decentralized basis in the rural areas. Small rural entrepreneurs and artisans should be the major suppliers. Large centralized plants are not advisable from a social standpoint;

(d) Government policies must be reoriented to assist artisans in rural areas. Major efforts are needed to encourage and revive the production of hand tools by village artisans through the provision of loans at concessional rates; technical assistance; the provision of simple designs and marketing assistance;

(e) Unavailability of suitable material is one of the major constraints faced by rural artisans. Raw material Banks, which supply small quantities of suitable materials to artisans, should be organized.

199. Promotion of the manufacture of intermediate equipment such as power tillers and low-cost tractors:

(a) There is a need to analyse the successful development and manufacture of equipment based on indigenous designs carried out in Argentina, Brazil, China, India, the Republic of Korea, the Philippines, Swaziland, Thailand (the list of countries is not necessarily exhaustive) and to publish the results. Investment promotion and technology transfer activities for countries wishing to manufacture such equipment should be organized through workshops and the exchange of technical personnel and prototypes, such as UNIDO arranged in co-operation with the Government of Swaziland;

(b) There is a need to explore the possibilities for co-operation between small- and medium-sized manufacturers in the developed as well as the developing countries in product development and manufacture and marketing of appropriate products. The United Nations system, for example UNIDO, in co-operation with manufacturers' associations in developed countries, should promote this co-operation;

(c) The establishment of supporting industries, such as small foundries, forge shops, heat treatment units and the integrated metal-making sector, is very important for the promotion of this category of equipment. UNIDO should promote this integration by taking specific countries as case studies.

200. Promotion of the manufacture of tractors, engines and allied equipment:

(a) Governments of developing countries should establish machinery to analyse technological choices and the feasibility of projects to meet national objectives. Governments may wish to request the assistance of UNIDO and the FAO;

(b) The United Nations system should undertake an analysis in those developing countries that have gained sufficient experience in manufacturing this category of equipment and develop case studies of experience of local development and manufacture and make them available to other interested developing countries;

(c) Appropriate United Nations agencies, such as UNIDO, should prepare model tenders and specifications for international bids for setting up manufacturing plants in developing countries and assist in the evaluation of offers and negotiations for the transfer of technology;

(d) UNIDO should develop a manual for local manufacture under licence and/or technology transfer covering such aspects as royalties, patents, training, management, technical services, fees, obligations of various parties, penalties, to serve as a guide to developing countries;

(e) UNIDO should, in co-operation with the Economic and Social Commission for Asia and the Pacific (ESCAP) assist the Association of South East Asian Nations (ASEAN), on request, in formulating and developing regional complementarity in local manufacture on a case-study basis. Such a study would serve as a model for regional co-operation in other zones. In this connexion, UNIDO might also organize a workshop for regional organizations and groups;

(f) UNIDO should promote the development of integrated supporting industries such as foundries, forge and heat-treatment shops and other ancillary industries.

201. Design, development and commercialization:

There is a need for international co-operation in promoting, establishing and strengthening R and D and its commercialization in agricultural mechanization in international agricultural centres such as the International Centre for Agricultural Research in Dry Areas (ICARDA); the International Centre for Corn and Wheat Improvement (CIMYT); the International Centre for Tropical Agriculture (CIAT); the International Crops Research Institute for Semi-Arid Tropics (ICRISAT); the International Institute of Tropical Agriculture (IITA); the International Laboratory for Research and Animal Deseases (ILRAD); the International Livestock Centre for Africa (ILCA); the International Potato Center (CIP); and the International Rice Research Institute (IRRI), as mechanization is an important component of technology. Such centres should serve as links between manufacturers in developing and developed countries. The United Nations system, including UNIDO, should take initiatives in this direction.

202. It is essential to encourage international manufacturers to earmark certain resources and funds - preferably as a percentage of sales in developing countries - to promote adaptation and local manufacture. UNIDO should foster this.

203. At the regional level

(a) Networks such as the Regional Network for Agricultural Machinery (RNAM) in the Philippines should be established in other areas to disseminate information on agricultural machinery and to provide prototypes;

(b) A fully-fledged agricultural engineering research centre should be established to provide high calibre R and D and assistance to national centres. The networks of international agricultural research institutions can be instrumental in this effort;

(c) Regional and international networks should provide training opportunities for R and D workers with an emphasis on practical application;

(d) A journal should be published on R and D in agricultural machine design;

(e) Regional and international research centres, in co-operation with UNIDO, should organize international meetings and workshops annually for increased co-operation;

(f) Travelling exhibitions of high quality and appropriate agricultural machinery and implements that are manufactured locally and by neighbouring countries should be organized in rural areas in co-operation with the United Nations system, including FAO, ILO, UNIDO and the regional commissions, to educate farmers and assist in market extensions by local small- and medium-scale manufacturers.

204. At the national level

(a) Funds allocated for developing local production of agricultural machinery should be augmented to reflect the special relationship between total agricultural production and imports of agricultural machinery;

(b) Linkages between R and D institutions and manufacturing units should be strengthened, so that the technology they develop eventually reaches the farmers. Training should be provided in product development and commercialization. Market research, industrial extension and agricultural engineering extension should be organized;

(c) R and D work on tractors and other machinery should emphasize the possible extension of their use to all seasons of the year through application of power take-off, belt pulley, irrigation pumps, and other mechanical applications such as operating threshers, grinding mills as well as generators for producing electricity;

(d) Patents should be recognized as important instruments for encouraging innovation and providing recognition. But at simple and intermediate levels, information and drawings should be made freely available to all developing countries;

(e) Professional associations and societies should be strengthened. FAO, ILO, UNIDO and regional commissions should foster regional co-operation.

(f) The use of alternative sources of energy, such as solar energy, should be promoted in agricultural mechanization. Developing countries should be encouraged to manufacture equipment locally to produce and apply alternative sources of energy: biogas to drive engines, windmill pumping sets for irrigation, and solar driers. FAO, UNESCO and UNIDO should foster this activity.

205. At the international level, decentralized repair and maintenance facilities, with appropriate training and extension services should be established. Industrialized countries could assist both technically and financially. United Nations agencies including FAO, ILO and UNIDO should promote this activity.

206. Information analysis and dissemination: in addition to the dissemination of information that may arise out of above recommendations, UNIDO's IETIB should undertake programmes to analyse the development of agricultural machinery manufacture in developing countries.

207. Major issues in local manufacture of simple equipment, evaluation of advanced technologies, long-term licensing agreements, bilateral and regional measures, creation of agricultural machinery committees, R and D, training etc. should be crystallized during the preparatory activities for the First Consultation Meeting on Agricultural Machinery scheduled for 1979.

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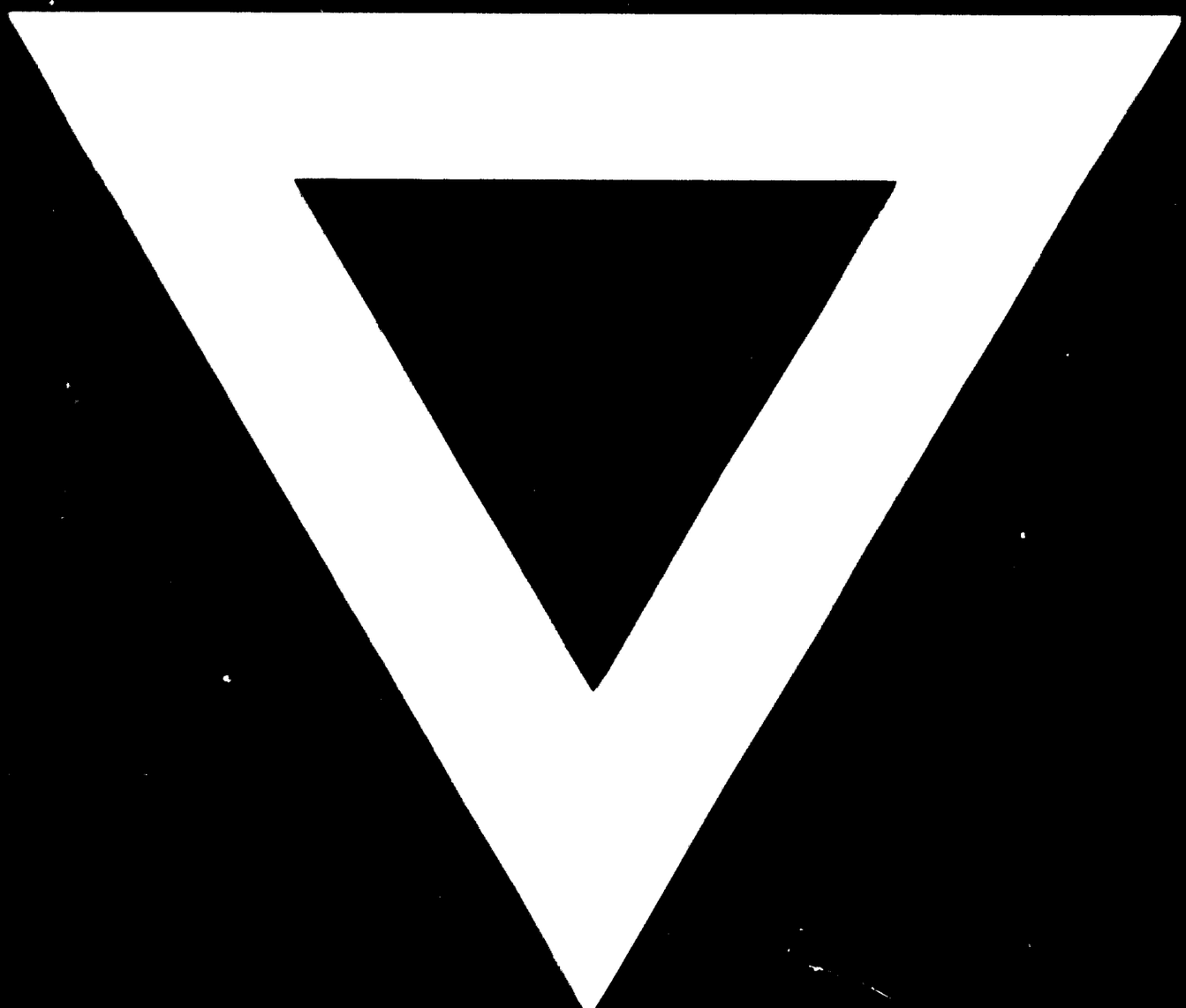

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