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AMA

AGRICULTURAL MECHANIZATION IN ASIA, AFRICA AND LATIN AMERICA

SPECIAL ISSUE 1983

ABSTRACTS AND INDEX, 1971–1980

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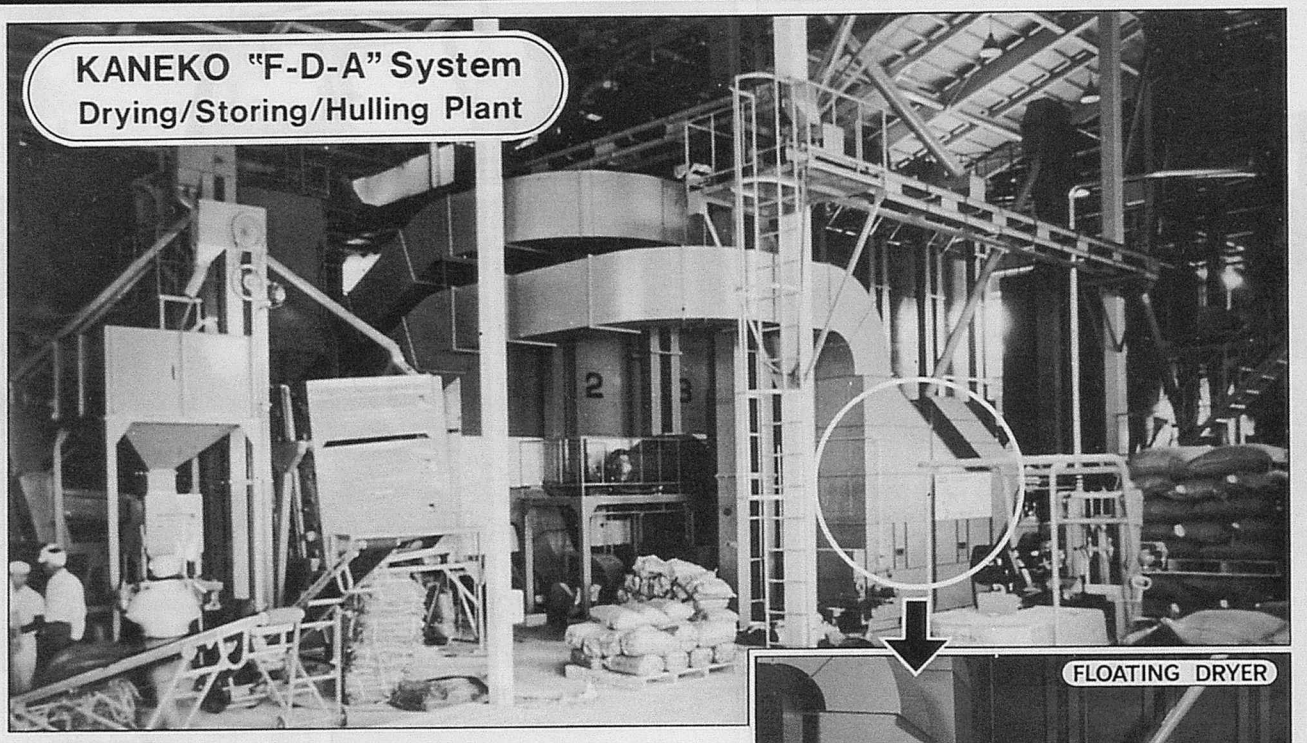

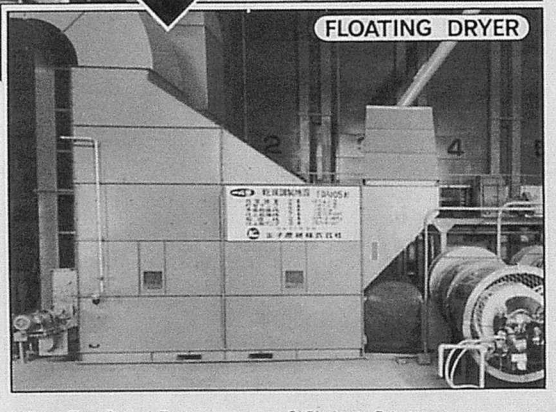

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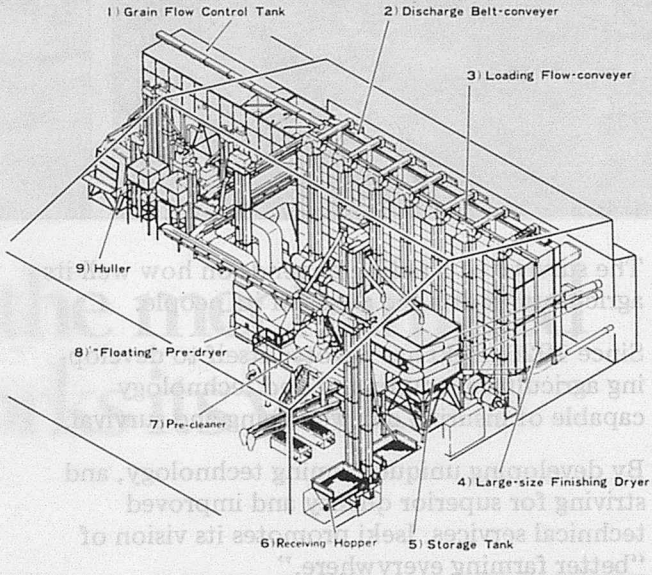

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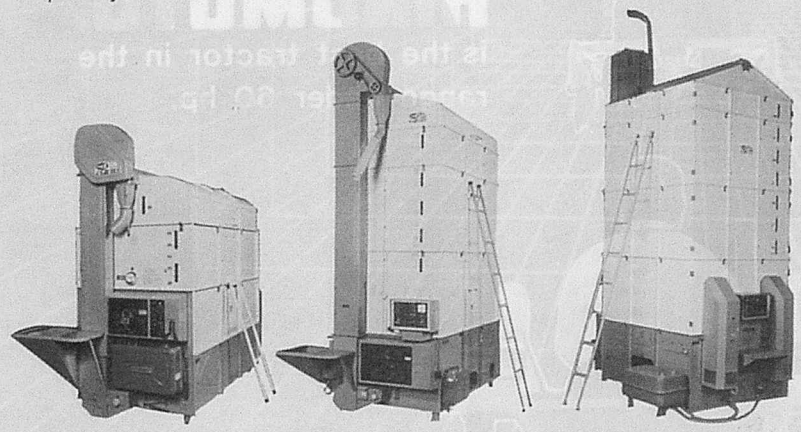

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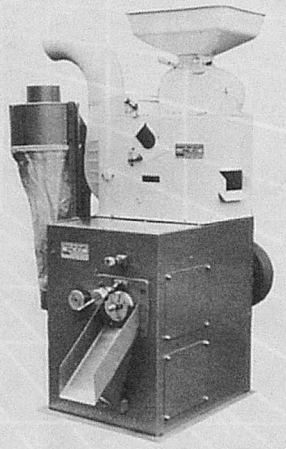

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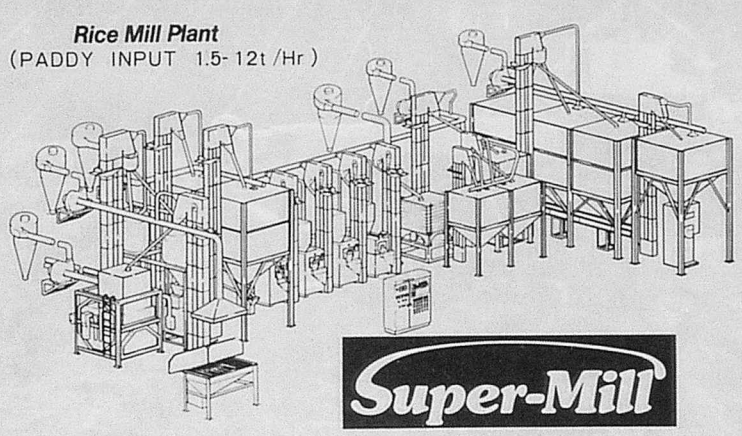

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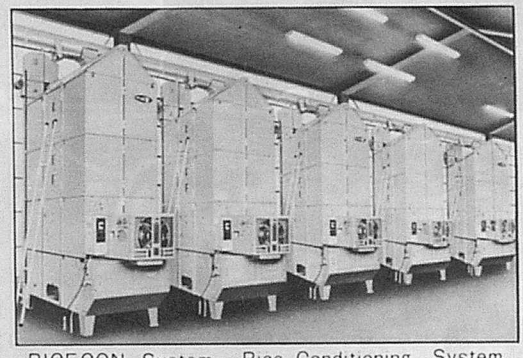

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International specialized medium for agricultural mechanization in developing countries

AMA

AGRICULTURAL MECHANIZATION IN ASIA, AFRICA AND LATIN AMERICA

SPECIAL ISSUE 1983

ABSTRACTS AND INDEX, 1971–1980

Edited by

YOSHISUKE KISHIDA

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Foreword

It has been 12 years now since the maiden issue of the AMA was published in the spring of 1971 under the name "Agricultural Mechanization in Southeast Asia." Since then, some 400 authors from 50 countries have contributed many useful and informative papers and articles that kept the AMA fulfilling its mission of promoting farm mechanization not only in the Asian region but in many other parts of the world as well. Those contributions have since generated a wealth of information that needed to be catalogued in order to be utilized efficiently, hence the publication of the present volume entitled "A Decade of AMA Abstracts and Index".

Behind this publication stands tall the name of Dr. Megh R. Goyal, one of AMA's cooperating editors, who unselfishly put in a great deal of efforts and patience in organizing the format and making the abstracts. The AMA management is indeed appreciative of his kind efforts.

There is no doubt that over the last 12 years, mechanization of agriculture made remarkable progress either in absolute or relative terms on a world-wide basis. In the face of this progress, the prevalent views entertained by many ran something like: "Mechanization will only generate rural unemployment." and "Small agricultural machines are not economical compared with the high-powered ones". These views, however, are changing as even the critics of farm mechanization are realizing more and more that the supply of appropriate machines and the adoption of appropriate technology are the key factors of development in many countries.

At the present time, the AMA has 50 cooperating editors in 36 different countries all of whom are making efforts to promote farm mechanization through various means in their respective countries. They exchange valuable information and experiences on the subject of agricultural mechanization with one another. This unique link among these experts of a common interest is expected to grow stronger and bigger in the coming years.

The AMA management is hopeful that this volume will find use and meaning to various individuals who subscribe to the idea of agricultural mechanization as one proven alternative to increasing agricultural productivity, hence food availability.

Many thanks are hereby reiterated to the many authors who contributed and continue to contribute articles to keep the AMA going and to Dr. Goyal for his efforts in helping prepare this Abstract and Index.

Yoshisuke Kishida
Chief Editor

June, 1983
Tokyo

UNIVERSITY OF PUERTO RICO
COLLEGE OF AGRICULTURE AND MECHANIC ARTS
COLLEGE OF AGRICULTURAL SCIENCES
MAYAGUEZ, PUERTO RICO - 00708

April 20, 1982

Mr. Yoshisuke Kishida
Farm Machinery Industrial
Research Crop.
7, 2 - Chome, Kanda Nishikicho
Chiyoda - Ku, Tokyo, 101 Japan

Dear Mr. Kishida:

It is with pride that I extend my greetings to editorial staff of "Agricultural Mechanization in Asia, Africa and Latin America AMA" and Dr. Megh R. Goyal for putting together this reference "Annotated Bibliography-AMA (1971-80), Vol. I". All of you should be commended for your efforts in publishing at this time this excellent bibliography on a very important and timely subject. The book appears to be well-prepared, comprehensive and rich in reference material that would be very useful to many workers throughout the world.

I trust this will allow to solidify solutions to problems in agricultural mechanization and extract from this a more ample promise of development for the entire world. With best of you.

Cordially,

Alejandro Ayala
Decano y Director

Preface

The world has at its disposal 1.5 billion ha of crop land on which one or more crops per year are grown. Another 0.5 billion ha could be added by reclamation mainly in Africa and South America. Additionally, there are some 3 billion ha of natural land and forests. Farming is practised by 315 million farmers of which 80%, mainly in Asia and Africa, utilize only hand tools, 15% utilize simple animal-drawn implements and only 5% use highly developed tractor-powered implements. More than 50% of the cultivated area is still tilled by hand tools and animal-drawn equipments. Industrialized nations have 12% of the total number of 4-wheel tractors compared to 88% in the rest of the world. These statistics stress the ever-widening gap between scientific farming and traditional farming.

Agriculture in less-developed countries is characterized by low farm income, small farm holdings and low cost labor. The farmers' purchase and utilization of equipment is largely influenced by fragmented field demarcations, his economic status, insufficient mechanical knowledge and training, inexistence of reasonable distribution system, low reliability of replacement parts, inadequate credit facilities, poor transportation and poor marketing facilities. The problem of developed countries is really one of 'selective mechanization' and one of determining the kinds and types of machines that are suitable to local conditions. With the popularization of high yielding varieties and increasing area under multiple cropping, it becomes essential to increase the power availability on farms.

This comprehensive reference on annotated bibliography for AMA for the decade 1971-80 was compiled to bridge the technology gap among the developed, less-developed, and industrialized countries of the world. The technical papers published in AMA during the 1971-80 decade have indicated that the use of machinery and mechanical power in agricultural production can lead to significantly increased production per unit area per year, better quality produce and more economical and efficient utilization of farm inputs. The use of farm machines i) provides quality control; ii) optimizes the use of inputs; iii) allows improved precision of farm operations; iv) provides power for operations for which conventional power may be inadequate; v) maximizes the quantity and/or quality of harvested products; and vi) substitutes for labor during peak demand periods when labor is either unavailable or undependable. Animal power, on the other hand, offers certain advantages over mechanical power such as low operating costs, easy management, multi-purpose functions, minimal cash payments, and low fixed costs and is universally available. However, productivity is low.

In the preparation of this bibliography, I came across useful suggestions and recommendations which may assist in alleviating farm machinery management problems in a typical developing country. These are: 1) Organization of a network of Farmers' Training Centers at block level; 2) Establishment of a National Institute for Training in Agro-Services; 3) Establishment of a National Farm Equipment Council to bring together the industry, government, institutions and farmer; 4) Reorganization of concerned government departments on farm machines and equipments so as to evolve an effective authority on this matter; 5) Establishment of agro-service centers not only for retail sales of inputs but also for contract and

custom services of a wide variety; 6) Ensuring uninterrupted power supply at least during the peak periods; 7) Compilation of classified lists of input manufacturers and suppliers; 8) Survey of farmer's needs on equipment and services; 9) Setting up of farm equipment committees by local professional societies patterned after the ASAE; 10) Establishment of service-clinics, check-up camps, service contracts, 24-hour service centers during the season, and inspection agencies; 11) Ensuring proper after-sales services on farm equipment, including warranty services, prompt supply of spare parts, training in operation, supply of well illustrated operators' manual and spare parts' catalogues in local languages; 12) Ensuring reduction in hazards due to use of farm machines and greater use of chemicals; 13) Making available of proper credit facilities; 14) Subdivided agricultural lands into regions so that regional needs can be better identified and market and machinery management data should be collected for these regions; 15) Setting up of "On the spot demonstration" in each block; 16) Reinforcement of standards controller of farm machines to ensure adoption of standards by all manufacturers; 17) Seetting up farm fuel advisory services to deal with problems connected with fuels and lubricants for farm prime-movers; 18) Establishment of a Farm Equipment Institute patterned after the Farm and Industry Equipment Institute in U.S.; 19)Development of Petrol-pumps in rural areas into agro-service centers; 20) Establishment of a mobile van service in each block; 21) Increasing utilization of farm machines and power units through consolidation of holdings, cooperative farming and custom-hire services; 22) Encouraging local experimentation in the development of new techniques suitable for a particular condition; 23) Relating research, design, and development activities to local conditions; 24) Enacting legislation which would require the manufacturers to make machines as per established standards; 25) Making available western farm machines and western machinery management data to serve as guideline in local conditions; 26) Establishment of regional testing stations should take up comparative testing of similar machines to establish test codes; 27) Consideration of a vegetable and nursery mechanization scheme and special efforts by way of research, testing and evaluation in adapting machines developed in other countries; 28) Collection of data and formulation of new programs for the efficient land utilization with respect to farm machinery utilization and increasing the food grain production as a whole; 29) Making available imported components for the imported machines; 30) Provision of incentive, such as prize contests for the development of certain kinds of machines or financial assistance in the establishment of model farms, laboratories and especially to refinement of technology which are necessary in promoting firm machinery use. (For more details of these incentives readers may refer to ASAE No. 79-1028)

This annotated bibliography draws from a review of all the technical papers published in editorial, (Volumes I to XI) of the AMA, including the foreword/ preface/447 bibliographical references with abstract/subject index/author index.

I remain greatly indebted to Mr. Yoshisuke Kishida, Chief Editor of AMA, for assigning me this major responsibility.

I express my deepest admiration for the moral support rendered by my family (Subhadra, Vijay, Neena and Vinay) especially for execusing me from family obligations during holidays. I am also thankful to the editorial staff of AMA, all of whom have been most helpful.

I concur with the AMA Chief Editor who once wrote in the editorial of AMA that "Time is life". I would like to add "The time has come to talk of vegetable farming and nursery mechanization in future issues of AMA, and of agriculture research in space".

Megh Raj Goyal

Megh R. Goyal, Ph.D, P.E.
Cooperating Editor, AMA

March 1, 1982
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About the Author

Megh R. Goyal, ph.D., P.E.
Project Leader
Agricultural Experiment Station
University of Puerto Rico
Juana Díaz, PR 00665, U.S.A.

Dr. Megh R. Goyal is an Agricultural Engineer at the Agricultural Experiment Station, College of Agricultural Sciences, University of Puerto Rico. Previously he had worked for Department of Agricultural Engineering of The Ohio State University,USA (1976-79), The Haryana Agricultural University, India (1973-75) and Soil Conservation Department, Punjab, India (1971-72), specializing in Agricultual Engineering. He received his MS and PhD degrees from The Ohio State University, and his BS from Punjab Agricultural University, India.

He holds active membership in American Society of Agricultural Engineers, American Society of Agronomy, Soil Science Society of America, International Soil Science Society, Caribbean Food Crops Society, Puerto Rican Society of Agricultural Sciences, Council for Agricultural Science and Technology. He is also member of honor societies: Gamma Sigma Delta, Alpha Epsilon and Phi Kappa Phi. He is recipient of Agricultual Scientist Award 1981 (SOPCA) Rev. Paul Taiganides Award 1976 (OSU), Best student paper award 1969 (ISAE).

Dr. Goyal has published more than 60 publications during 1971-81 in the area of Power and Machinery, Soil-Plant-Water Relations. He has authored "Bibliography-Drip/Trickle Irrigation by National Agricultural Plastics Association USA" and "Soil Crusts vs Seedling Emergence: Review, in winter 1982 issues of AMA". The book on "Annotated bibliography-AMA (1971-80) by Farm Machinery Industrial Research Corporation" is an another attempt by him to bridge the technology gap in Agricultural Mechanization in the World.

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AGRICULTURAL MECHANIZATION IN ASIA, AFRICA AND LATIN AMERICA

Special Issue, 1983

Abstracts and Index, 1971–1980

★ ★ ★

What They Say About This Publication

During the past 12 years of the AMA publication, it has contributed significantly not only in bridging the technology gap between the developed and developing nations, but also in exchanging technologies among them. The publication of the AMA ABSTRACT AND INDEX OF ARTICLES is yet another milestone in the AMA's positive effort of technology transfer and dissemination of improved farming technology. There is no doubt that this publication will serve the millions of scientists and farmers in their food production efforts. It is with great pleasure and pride, that I, as a co-operating editor or AMA, send this congratulatory message to the publishers of AMA.

Arumugam Kandiah
Irrigation Specialist
Food and Agricultural Organization of
the United Nations

It is an honour and a great privilege for me to have the opportunity of writing this message to the AMA on the occasion of this important publication, "AMA Abstracts and Index of Articles for the Decade 1971-80". It had been a pleasure for me to work since 1973 with a dedicated group of editorial staff of AMA, particularly with Mr. Yoshisuke Kishida, Cheif Editor and pioneer founder of AMA.

The AMA's mission to promote better communication and dissemination among the experts and to help develop and supply the technologies to enable the farmers of developing countries to engage in agriculture more profitably and efficiently with greater productivity and prosperity has been achieved to a large extent since its inception in the spring of 1971. The AMA has become an international journal. During this decade, agricultural mechanization and its dissemination made a great progress throughout the world – the AMA has contributed its rightful share for such a progress.

The AMA's encouragement for R & D activities resulted in agreeing that the promotion of agricultural mechanization is not only a necessity but a must for a country to deveop its agriculture, in particular, and its economic development, in general. As a result, many developing countries of the world adopted mechanization as the most important policy of agricultural dvelopment. This digest and index of articles would surely encourage further R & D activities in this direction.

I wish AMA continued success.

Md. Shahansha-ud-Din Choudhury
Principal Research Fellow
Institute for Agricultural Research
Ahmadu Bello University
Nigeria

First of all, I congratulate the Shin-Norinsha Co., Ltd. on its 50th Anniversary!

The Shin-Norinsha Co., Ltd. has always promoted the cause of agricultural mechanization by bringing out an esteemed magazine 'AMA' which equally serves the researchers, agricultural planners, farmers, and machinery manufacturers around the world, in general, and, in particular, caters to the needs of the agricultural community in the Third world. We expect more and more in this regard in the years to come.

To mark the occasion, the 'AMA' is bringing out a digest entitled 'Abstracts and Index of Articles for the Decade 1971-80'. I am sure this digest will be useful to all those interested in agricultural mechanization. I congratulate the editorial staff of the 'AMA' for bringing out the digest and wish them all the success in their future endeavour.

Jitendra P. Mittal
Dept. of Agricultural Engineering
Ahmadu Bello University
Zaria, Nigeria

Note: Arranged alphabetically by country from Africa, the Americas, Asia and Oceania and Europe.

The OAU Lagos Plan of Action auspiciously accorded a priority role to agricultural mechanization in its prescriptions for increasing agricultural procution in Africa. But, agricultural mechanization policies must avoid further increase of the dependency of African countries on the developed countries of Europe and America. It is well known that much of the failure of agricultural mechanization in Africa may be traced to the near total dependence on alien machinery and equipment which are generally unsuitable to African clime and crops and are often so complex and costly that they are beyond the technical competence and financial reach of the African farmers. It is my considered opinion that for agricultural mechanization to succeed in Africa, it has to rely more and more on machines and gadgets designed and manufactured within the region, for African farms and farmers.

As recently resolved at a UNIDO Regional Consultation meeting, the agricultural machinery manufacturing industry should be made a major component of the Industrial Development Decade for Africa. I unreservedly laud AMA because it shares all the above sentiments and opinions. AMA's singular devotion to disseminate relevant information on agricultural mechanization activities, developments, problems and prospects, emanating from the homologous countries of Asia, Africa and Latin America, is almost a mission that deserves every praise.

Therefore, it is with a great deal of joy and gratitude that I received the news of the publication of "AMA ABSTRACTS AND ARTICLE INDEX, 1971-1980" – joy in being associated with AMA and gratitude for AMA's immense success in the last decade.

Wishing AMA and its Management greater achievements in the next decade.

E. U. Odigboh
Professor, Dean, Faculty of Engineering,
University of Nigeria, Nsukka,
Anambra State, Nigeria.

The Agricultural Mechanization in Asia, Africa and Latin America (AMA) has made a tremendous impact in the developing countries of Africa, Asia and Latin America. As an international specialized medium for information on agricultural mechanization in developing countries, AMA has been instrumental in disseminating information on agricultural mechanization to farmers, engineers specialists and policy makers in countries grappling for solutions to pressing problems in agriculture.

Between 1971 and 1980, the AMA has published many informative papers on a wide range of topics related to every field of agriculture and agricultural mechanization. It has been especially useful in allowing contributors from all parts of the world the opportunity to put forward their findings on matters relating to agriculture and agricultural mechanization, and thus building up a fairly large body of co-operators and contributing editors, world-wide.

This digest will be a very convenient one for specialists in the field as it is a useful source of information on the development and promotion of agricultural mechanization in both developed and developing countries.

N.G. Kuyembeh
Dean of Agriculture
University of Sierra Leone
Sierra Leone

I am really not the least surprised to know about the new achievement which will add more prestige to the advancement of the AMA. To me it is quite obvious, as I am sure of such marvellous deed. As I look back to more than 10 years ago when I became acquainted with Mr. Yoshisuke Kishida during scientific conference, I recall. That reminded me the persistence and confidence that he reflected the future of the AMA. His dedication, together with the help of his wisely selected co-editors will definitely initiate more incentive towards brighter future to the AMA.

The new digest of the AMA abstracts will be a reliable reference for all of us co-editors and for many interested in farm mecahnization.

I wish the parent company of Shin-Norinsha Co. Ltd. continued success.

Abdien H. Abdoun
F.A.O. Farm Machinery Training Expert
Riyadh, Saudi Arabia

I am very happy to learn that you are publishing a digest of the articles published in AMA during the last 10 years. I am sure this would be a very valuable reference to all parties and institutions interested in mechanization in developing countries. Your parent organization has done a lot of good to the cause of mechanization and this digest is one more important addition to these efforts. My sincerest congratulations to you personally for all your efforts in furthering and promoting mechanization of agriculture as a means of increasing production in developing countries.

Mohamed A. Bedri
Director, Industrial Projects Implementation Admin.
Ministry of Industry
Projects Bureau
P.O. Box 715, Khartoum, Sudan

I feel much pleasure to know that Shin-Norinsha Co. Ltd. is going to celebrate its 50th Anniversary and on this gracious occasion the AMA Management will publish an AMA Abstract and Index of Articles published during 1971-1980 decall.

It is recognized that mechanization of agriculture is a key factor in expanding cultivable lands as well as obtaining high yeilds within a short period of time.

Through the tireless efforts of the AMA staff, thousands of professionals, scientists, researchers, teachers and students of agriculture, agricultural engineering, agricultural mechanization including the manufacturers and farm machinery and implements have been benefitted.

It can be aptly said that the AMA has been serving as an international agent of inter-communication of information and knowledge regarding agricultural mechanization throughout the world and directly helping in the solution of food crisis.

I congratulate Shin-Norinsha Company on its 50th Anniversary and wish the publication of "AMA Abstracts and Index of Articles for decade 1971-1980" all the success it deserves.

Ahmed Hossain Mirdha
Visiting Professor,
Dept. of Agricultural Engineering,
Faculty of Suprior Studies-Cuautitlan,
National Autonomous University of Mexico
Mexico

The publication of AMA has opened new channels of communication for the field of mechanical technology for agriculture in developing countries. This journal has been of an international nature from the very first issue. This is of much credit to those who developed the concept of this publication and to the advertisers who have supported it. The expanding world-wide interest in this journal is evidence that it has met a unique and growing need for the exchange of technical information and ideas among workers in this field who might otherwise be isolated from others working toward similar objectives. Because of the expansion in readership and coverage, this Extra Edition of AMA will allow all its current readers to participate fully in the informational exchanges that have taken place since the first issue of this outstanding journal.

William J. Chancellor
Professor of Agricultural Engineering
University of California
Davis, California 95616, U.S.A.

Agricultural Mechanization in Asia, Africa and Latin America (AMA) has made a great contribution to agricultural production with appropriate mechanization during its first decade, 1971-1980. The AMA journal has proved to be the primary repository for technical literature related to agricultural mechanization in developing countries.

AMA, with its extensive circulation in the developing countries, reaches the professionals in these countries who are actively engaged in the development, promotion and application of appropriate agri-

cultural mechanization. Furthermore, a majority of the technical articles in the journal are authored by the agricultural mechanization researchers and developers in the developing countries. President Kishida's policy of appointing cooperating editors from many countries has stimulated the contribution of articles as well as utilization of journal issues as a timely and reliable source of references.

I personally have found my file of all of the 1971-1980 AMA issues to be an excellent reference source for the students in my graduate course here at Michigan State University titled "Appropriate Agricultural Mechanization in Developing Countries". I also have found AMA to be the best publication in the broad field of agricultural mechanization, for publishing technical articles that will reach the active professionals in the developing countries. My graduates and I have published an average of at least one article per year in AMA during its first decade.

I see an even greater future for AMA in the second decade now that its title and distribution have been broadened from Asia to include Africa and Latin America. The broad distribution with the increased number of issues per year, makes it indisputably the foremost international journal in the field of agricultural mechanization in developing countries.

Merle L. Esmay
Professor and Coordinator of
Graduate Programs in Agricultural Engineering
Michigan State University
East Lansing, Michigan, U.S.A.

It is a privilege on my part to welcome this special edition of AMA and congratulate the Shin-Norinsha Co. Ltd. for arranging this special publication on the occassion of its 50th anniversary.

The AMA has been rendering a very vital and commendable service towards the development of mechanised agriculture in the developing regions of Asia, Africa and Latin America. The status of agriculture in these regions varies, including the centuries-old traditions as well as most sophisticated farming processes. The service of AMA in providing the agricultural engineers and scientists with an unique opportunity for exchanging information on their ideas, problems, works and achievements has been helping all concerned to reach the goal of solving problems related to agricultural mechanization. The publication of AMA papers in an abstract form along with indexes is a praise-worthy step and this special issue is likely to become a standard reference matieral.

Once again I congratulate the Shin-Norinsha Co. Ltd. for completing its first 50 fruitful years and for this special edition of AMA and wish them prosperity in the coming years.

Shah M. Farouk
Dean, Faculty of Agricultural Engineering and
Technology
Bangladesh Agricultural University
Mymensingh, Bangladesh

I am very glad to know that a digest entitled "AMA Abstracts and Index of Articles for the decade 1971-80" is going to be published on the eve of the 50th anniversary of Shin-Norinsha Co. Ltd. Many of the less developed countries of the world suffer from chronic food deficits, which could be alleviated through selective mechanization in the farm sector depending on the prevailing socio-economic condition of the region. One unique speciality in AMA is the fact that most of the paper deals with small scale farm mechanization as compared to large sized farm mechanization in USA and other developed countries. Most of the farms indeed are small in size and it is very worthy to promote selective mechanization. AMA has provided an effective forum through which innovations, ideas and views of scientists and engineers are disseminated. Obviously during the past decade, this had a positive contribution towards maximizing farm output in Asia and also in other less developed regions of the world.

I expect the AMA will continue to maintain its pioneering role in the future. It is my belief that this publication would prove of lasting value to other scientists and engineers who share similar interest and concerns.

K.C. Roy
Senior Scientific Officer
Bangladesh Agricultural Research Institute
Joyedebpur, Dacca, Bangladesh

Twelve years have already passed since the first volume of AMA was published. A lot of changes have since occured. Developed countries are now facing recession and developing countries are still facing the shortage of food. The AMA has played a significant role in promoting the agricultural mechanization in developing countries providing information on problems and prospects of agricultural mechanization.

The Shin-Norinsha Co. Ltd., the parent company of AMA, and Mr. Yoshisuke Kishida, chief editor of AMA, have contributed significantly by publishing AMA to meet the needs of agricultural development in developing countries. On this grand occasion of the 50th anniversary of Shin-Norinsha Co. Ltd., the publication of AMA Abstracts and Index of Articles for the decade 1971-1980 will again provide a valuable reference for researchers and planners in agricultural development.

I wish to thank Mr. Kishida and the Shin-Norinsha Co. Ltd. for his endeavour in publishing the AMA Abstracts and Index.

Bilash Kanti Bala
Associate Professor
Farm Power and Machinery
Bangladesh Agricultural University
Mymensingh, Bangladesh

I am very much delighted to express my best wishes and congratulations for the publication of the special issue of the AMA containing abstracts of the articles, indices of the subject and the authors of the last 10 years. I am also sincerely congratulating the Shin-Norinsha Co. Ltd. on the occasion of its 50th anniversary. The AMA has been publishing many excellent articles focusing on agricultural mechanization of the developing world during the last decade. The AMA digest will be a very valuable reference for students and practitioners of agriculture and agricultural engineering, thus extending its horizon of publications to its innumerable readers and well-wishers throughout the world.

M.A. Mazed
Dept. of Agricultural Engineering
Oklahoma State University
Stillwater, Okla-74074, U.S.A.

I am very glad to learn that Shin-Norinsha Co. Ltd. will publish the Digest of the papers of AMA published in the last 10 years. I think it is an important and meaningful event. The authors, from more than 50 countries, basing on the different conditions of their own countries and localities, have contributed valuable papers on agricultural mechanization, agricultural equipment design and test, etc. All these papers have contributed greatly for mutual understanding, exchange of experiences and acquisition of the appropriate knowledge. The publication of the AMA Digest should further enhance the role that the AMA has been playing.

I would like to express my congratulations to the publication of the Digest, to the 50th anniversary of Shin-Norinsha Co. Ltd. to the founder of the Company, Mr. Yoshikuni Kishida and the present president Mr. Yoshisuke Kishida for their splendid work in editing and publishing periododicals, books and materials on agricultural machinery as well as agricultural mechanization for so many years now.

Wang Wanjun
Chief Engineer of Chinese Academy of Agricultural Mechanization Sciences
Vice-President of the Chinese Society of Agricultural Machinery
No, 1 Beishatan, Deshengmen Wai, Beijing, China

It gives me great pleasure to learn that the Shin-Norinsha Co. Ltd., Tokyo is celebrating the 50th Anniversary of its establishment. I am further delighted to learn that it has been planned to bring out an AMA-Digest giving the Abstracts, Subject-Index and Author-Index of the papers published in this important Journal during the period 1971-1980. The journal – Agricultural Mechanisation in Asia, Africa and Latin America – popularly known as AMA, has already earned the reputation of being one of the most popular journals, indeed, the foremost International Journal in the field of farm mechanisation. Even

though this Journal publishes the scientific papers of pointed interest to different countries in the Asia, Africa and Latin America, it also caters to the interests of the more advanced countries as well. The AMA enjoys an excellent reputation. The Journal is serving the cause of promptly disseminating very useful information on a wide range of topics relating to farm mechanisation. Its style and printing are superb.

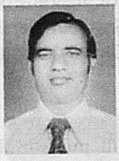
The credit for the excellent editing of the AMA goes to the missionary zeal and dedication of Mr. Yoshisuke Kishida, Company President and Chief Editor of the AMA and his beloved father. On the auspicious occasion of the 50th Anniversary of the establishment of the Shin-Norinsha Co. Ltd., I send my very best wishes for the future growth and success of the Company. I hope in the years to come it will attain still greater heights in the field of scientific journalism. The idea of bringing out the Digest of the AMA giving the Abstracts of the papers published during 1971-1980 is a laudable one and it would, I hope, be well received by all concerned.

I wish a grand success to the venture.

S.R. Verma
Dean, College of Agricultural Engineering
Punjab Agricultural University
Ludhiana, India

I am extremely happy to know from the publication headquarters of AMA that their parent company, Shin-Norinsha Co., Ltd., Tokyo, Japan is bringing out "AMA Abstracts and Index of Articles for the decade 1971-80." My association with AMA is six years old now and I have been on the list of their Co-operating Editors when I was working in the Ministry of Agriculture and Fisheries, Fiji as an Indian Expert and Head, Agricultural Engineering Research from 1976-80. I can confidently say that this is the only journal today devoted to agricultural mechanisation in Asia, Africa and Latin America which understands the package of practices of agriculture and has really helped in the transfer of agricultural technology from the lab-to-land and thus it has made a great contribution in the increase of production of food and fiber in these continents.

I wish a grand success for the publication of this learned journal and the AMA Abstract and Index of Articles for the decade 1971-80.



A.P. Sharma
Farmers Advisory Service Centre
Haryana Agricultural University
Bhiwani, India

It is my pleasure to congratulate the Shin-Norinsha Co., Ltd. on the occasion of its 50th anniversary and publication of the AMA abstract and index of articles published over a 10-year period. AMA is the only English magazine of specialized agricultural machinery and mechanization fields, published in Japan. President Kishida and his editorial staff should be commended.

The science of agricultural machinery consists of two main fields: how to make a farm machinery and how to used that farm machinery. The former field consists of structural and operational principles of agricultural machinery, including design theory and technology of farm machinery performance. The latter field consists of better mechanized farming structure based on social and natural sciences the purpose of which is to have a correct philosophy of effective utilization for agricultural machinery and better establishment of mechanized farming.

The AMA has since been disseminating useful information in this regard, hence deserves congratulations!

I believe that the AMA is an effective information source to understand mutual relation and situation of local agriculture and farm machinery conditions. I hope that we are able to promote mutual understanding and collaboration for the development of agricultural mechanization and farm machinry science through the AMA.

Jun Sakai
Professor
Agricultural Engineering Department
Kyushu University
Fukuoka, Japan

The AMA journal during the last decade has done an outstanding job in disseminating important technical information and releasing innovations and research findings to many countries throughout the world. This contribution is significant and of great use, in particular to developing countries such as Lebanon.

Of particular value, the AMA has served as an excellent reading material to both our undergraduate and graduate students. Many M.S. degree students have found useful the many scientific articles published in the AMA which have been contributed by many scientists throughout the world with diverse talents and experiences.

1983 will be a difficult year by any projection or prediction. The world economy will continue to confront itself with inflation and unemployment. Stagflation will be a common feature of many societies. But this situation can be counteracted by unity and courage by everybody concerned. Furthermore, research will be needed to develop new technology that will reduce operating costs of firms and increase their competitiveness. In this direction the AMA has an important role to play. By publishing scientific articles from professors throughout the world it can serve as a forum for discussion and, more importantly, as a Catalyst of information.

I wish AMA, its management team and staff further success. They deserve the congratulations of everybody as they have done a tremendous job for contributing to the economic development of many countries.

Paris Andreou
Associate Professor and Chairman
Dept. of Agricultural Economics
Faculty of Agricultural & Food Sciences
American University of Beirut
Beirut, Lebanon

Agricultural mechanization can play a vital role in helping small farmers increase their total food production. It can also increase the production efficiency of large agricultural plantations. Its primary goal is to encourage timeliness of operations that will permit farmers to take advantage of the potential of modern varieties and of crop intensification.

Suitable technologies have been developed to make crop intensification possible through mechanization, by performing promptly such operations as land preparation, harvesting and planting, thereby markedly reducing turn-around time between the harvest of one crop and the planting of the subsequent one. AMA has played a vital part in disseminating these technologies, especially those developed for and within the developing world. This AMA abstracts and index of articles for the decade 1971-1980 will enable us to review and examine what has been developed during that decade. It should then be used as a base and incentive for more intensive work in agricultural mechanization with the main goal of bringing food production into balance with the world's population.

M. Zohadie Bardaie
Assoc. Prof. and Head
Dept. of Power & Machinery Engineering
University of Agriculture
Serdang, Malaysia

I am a regular reader and contributor of articles in AMA for the last one decade. The standard of articles published in this journal of international repute, both qualitatively and quantitatively, now has been improved to an appreciated level. The research work published is of applied nature and dwells on current problems of food and agriculture, particularly in developing countries. However, in these countries the fields of scientific research normally undertaken by university professors have been severely affected by poor working conditions. Teaching loads are high, job security is low, libraries are poor or no-existent, workshop and laboratory facilities are restrictive, administrative red tape is excessive, intellectual stimulation is limited, standards for academic promotion are wanting, and technical and secretarial remain scarce. These conditions, of course, do not prevail at the same level in all the institutions, and active research programme often flourishes in difficult circumstances due to the energies of a few researchers.

The impact of any research and development programme can only be envisaged if the trio consisting of policy makers, manufacturers, and farmers (the consumers) work together. The lack of integration among these three sectors has resulted in high investment with low output.

In this era of energy crisis, contributors to AMA need to stress in two important fields of agricultural mechanization, namely, i) direct drilling of crops, ii) fluid planting of crops. Some countries have achieved energy-savings of more than 70% by adopting direct drilling techniques instead of conventional methods of cultivation. Therefore, it will be a great service to all the nations of the world if research were conducted and published in the above cited fields of crop production.

A. D. Chaudhary
Chairman
Department of Farm Machinery and Power
University of Agriculture
Faisalabad, Pakistan

I congratulate the Shin-Norinsha Co., Ltd. on the occasion of its 50th anniversary of establishment. Being the parent company of AMA, I acknowledge its services for mankind.

It gives me a great pleasure to know that the publisher of the renowned journal "Agricultural Mechanization in Asia, Africa and Latin America" is publishing a digest "AMA Abstracts and Index of Articles for the Decade 1971-1980".

As a regular reader of AMA and its Co-editor, I appreciate all those concerned with the journal, in general, and Mr. Yoshisuke Kishida, in particular, for his commendable services for the hungry world. His personal contacts and presence in world forums and continued efforts for a long period now deserve appreciation and encouragement. The 12 years of the journal have published numerous papers, especially on Farm Mechanization which surely paved the way for the introduction of machine technologies in many developing countries.

I pray for future development of the journal and long life of Mr. Kishida for his untiring services.

Bherulal T. Devrajani
Associate Professor,
Faculty of Agricultural Engineering
Sind Agriculture University,
Tandojam, Pakistan

I wish to cogratulate the Shin-Norisha Co., Ltd. on the occasion of its 50th Anniversary. The publication of the Agricultural Mechanization in Asia, Africa and Latin America (AMA) digest is a fitting activity to celebrate the company's Golden Jubilee. The AMA contains a wealth of information on agricultural mechanization aimed at increasing food supply around the world, especially in tropical Asia, Africa and Latin America and doing it with marked efficiency, productivity and effectivity through appropriate mechanical technologies developed for and in these areas.

The AMA digest will be a handy reference material for students of agricultural mechanization. Since 1971 the AMA has proved itself to be valuable in agricultural development as a source of technological information. Indeed, the AMA is a significant contribution to the world's constant effort in producing the basic need of man – food.

Reynaldo M. Lantin
Dean and Professor
Institute of Agricultural Engineering and Technology
University of the Philippines at Los Baños
Laguna 3720, Philippines

The publication of the digest compiling all articles published in the AMA during the last ten years is a cornerstone signalling the increasing popularity of the AMA publication among researchers, scholars and engineers all over the world. The digest would make many valuable articles more accessible to more people.

I also greet Shin-Norinsha's 50th Anniversary on this occasion. Shin-Norinsha has contributed a great deal to the development and modernization of farm mechanization, not only in Japan but also in other Asian countries as well. The AMA publication, on the other hand, has been a pioneer in the field by pro-

viding a medium for channelling information in agricultural mechanization. The Shin-Norinsha has grown and expanded over the years.

The AMA has further undertaken the task of introducing their experience and skills to different Asian countries as well as to the countries of Africa and Latin America. I feel that it has truly contributed significantly to the development of farm mechanization by organizing researchers, scholars and engineers to exchange their ideas, experiments and new discoveries.

I appreciate the efforts put in by Chairman Yoshikuni Kishida to create the Shin-Norinsha and the efforts of President and Chief-Editor Mr. Yoshisuke Kishida to popularize the AMA and to carry on the Shin-Norinsha's mission.

Chul Choo Lee
Project Engineer
Agriculture and Rural Development Department
Asian Development Bank
P.O. Box 789, Manila Philippines

New technologies in agriculture are becoming increasingly vital for improving food production capacity that is necessary to meet the demands of the rapidly expanding population of the world. Also, the developing countries have to improve their own food production techniques and practices for making themselves self-sufficient. In this connection, research activities are undertaken in many research institutions, universities and industrial concerns throughout the world. However, the process of technology transfer and information exchange is incomplete unless the existing information reaches the individuals concerned.

With the constantly expanding volume of literature, one is often faced with a problem of sorting out an immense volume of literature in order to find out material pertaining to one's particular requirements and a need is felt for concise information that could be readily used. Also a condensed information would become more necessary for research to continue and prosper in future. In fact, the development and utilization of new technologies in agriculture involve many challenging problems and we should be prepared to deal with them successfully.

Mohmoud H. Abdel-Aziz,
Professor and Head,
Agric. Engineering Dept.,
College of Agriculture, Riyadh University,
Saudi Arabia

I am pleased to provide a message in this special issue of AMA. Such a journal is appropriate in Sri Lanka where agricultural mechanization plays a significant role in agricultural development. The Department of Agricultural Engineering in the University of Peradeniya provides the necessary man-power and actively contributes towards the design and implementation of developmental projects.

The AMA is a comprehensive Asian journal of agricultural mechanization and is popular in our Institute. It is extensively read in studies and research of undergraduate and post-graduate students, as well as our University staff. The range of research publications in each volume of AMA indicates diverse interests of researchers involved in agricultural mechanization in developing countries. For us in teaching and research, the AMA provides an invaluable service of collecting a wealth of information on research in Asia, Africa and Latin America. Also, AMA is perhaps the only reputed journal where we, in the developing world, could publish our research findings. We are fortunate to be provided with these two services through AMA.

I wish to congratulate the Shin-Norinsha Co., Ltd., on its 50th Anniversary and wish it the best in the future. It is an appropriate moment to thank its President and Chief Editor of AMA, Mr. Yoshisuke Kishida for this valuable publication, "AMA Abstracts and Index of Articles for the Decade, 1971-1980" and for providing us the opportunity of contributing to and reading AMA.

Sarath G. Ilangantileke
Head/Dept. of Agric. Engineering,
University of Peradeniya,
Peradeniya, Sri Lanka

Agricultural mechanization, together with other technological inputs has a major role to play to increase domestic food production in developing countries. Agricultural mechanization includes not only the design and development but also the manufacture, distribution and operation of tools, implements and machines for land development, agricultural production and post harvest operations. Human, animal and mechanical are the main sources of power used for agricultural mechanization.

The advent of AMA which started in 1971, has published over six hundred articles from more than 50 countries. These articles are related to every field of agriculture and agricultural mechanization. These articles are very valuable for the agricultural engineers, agronomists, economists and sociologists and the industries engaged in the mechanization research to interchange technical knowledge and to strengthen their corporation in this field.

The abstract of the 1971-1980 AMA articles will be a valuable publication not only to the countries in the region of Asia, Africa and Latin America, but also to the countries in the other parts of the world.

I wish every success that your publication deserves and to your parent company the Shin-Norusha Co., Ltd., for its 50th Anniversary.

S. Kathirkamathamby
Head
Agricultural Engineering Research &
Development Division,
Department of Agriculture
Peradeniya, Sri Lanka

It is my great pleasure to greet the Shin-Norinsha Co., Ltd. on its 50th anniversary. The Company has become world-wide known since the publication of AMA which transfers valuable technology for the development of agricultural mechanization in both under-developed and developing countries.

During the past decade AMA has published so many articles, which come first from Asia and then from Africa and Latin America and are mostly written by prominent scholars or specialists. It features not only a high level of beneficial papers but a fine host of cooperating editors – 48 in about 40 countries and regions. Through AMA we, co-editors, have been able to get up-to-date information on agricultural mechanization and also have a better understanding of each other's advancements. Closer cooperation and stronger friendship between us are expected with the growth of AMA in the future.

With the best regards.

Tien-song Peng
Senior Specialist
Farm Machinery, Dept. of Agricultural Production
Council for Agricultural Planning and Development
Executive Yuan
Taipei, Taiwan

After 10 years of cooperation with the Shin-Norinsha Co., Ltd., the Chief Editor of Agricultural Mechanization in Asia, Africa and Latin America and his staff, it is a great pleasure to congratulate them on the celebration of the 50th Anniversary of the Shin-Norinsha Co., Ltd. and the 10th Anniversary of AMA.

It was ten years ago when a splendid idea started an international quarterly publication on agricultural mechanization and right from the beginning it was a success.

The extension of its area of activity from Asia to all A-continents of our world also proved to be an excellent follow up. AMA demonstrated to be the leading medium on exchange of high level information on the development and the progress of appropriate mechanization of agriculture in Asia, Africa and Latin America.

Ten years ago there was much misunderstanding about the role of agricultural mechanization in the process of development of the low income countries of the world. Now it is no longer a matter of yes or no but to apply the proper strategy of mechanization of agriculture in development. Agricultural mechanization is now accepted world-wide as a key component in development. AMA has greatly contributed to these developments in policy and approach to progress.

For the future I wish the Shin-Norinsha Co., Ltd. every success for its wide area of activities in agricultural publications both on the national as well as the international level.

I hope that AMA will continue to be a medium for actual important information on agricultural mechanization geared toward an increased food production and well being of all people in the world – now and in the future.

Adrian Moens
Professor, Head of Department of
Agricultural Engineering,
Agricultural University,
Wageningen, the Netherlands

The AMA has now become one of the most important journals worldwide which deals with all aspects of mechanisation and agricultural engineering as applied to agriculture. It places particular emphasis on the problems and possible solutions for the small farmer in poorer countries where the greatest need for improved food production is felt. As Senior Lecturer in Farm Machine Design at the National College of Agricultural Engineering, Silsoe, Bedford, England, I am pleased to be associated with the AMA work.

J. Kilgour
Senior Lecturer in Farm Machine Design
National College of Agricultural Engineering
Silsoe, Bedford MK45 4DT, England

A NOTE TO AMA CONTRIBUTORS

The Editorial Staff of the AMA requests contributors of articles for publication to observe the following editorial policy and guidelines in order to improve communication and to facilitate the editorial process :

Criteria for Article Selection

Priority in the selection of articles for publication is given to those that –

a. are written in the English language ;
b. are relevant to the promotion of agricultural mechanization, particularly for the developing countries ;
c. have not been previously published elsewhere, or, if previously published are supported by a copyright permission ;
d. deal with practical and adoptable innovations by small farmers with a minimum of complicated formulas, theories and schematic diagrams ;
e. have a 50 to 100-word abstract, preferably preceding the main body of the article ;
f. are typewritten, double-spaced, about 4,000 words (approximately equivalent to 8 pages of AMA-size paper) ; and those that
g. are supported by authentic sources, reference or bibliography.

Rejected/Accepted Articles

a. As a rule, articles that are not chosen for AMA publication are not returned unless the writer(s) asks for their return and are covered with adequate postage stamps. At the earliest time possible, the writer(s) is advised whether the article is rejected or accepted.
b. When an article is accepted but requires revision/modification, the details will be indicated in the return reply from the AMA Chief Editor in which case such revision/modification must be completed and returned to AMA within three months from the date of receipt from the Editorial Staff.
c. "The AMA does not pay for articles published. However, the writers are given collectively 5 free copies (one copy air-mailed and 4 copies sent by surface/sea mail) of the AMA issue wherein their articles are published. In addition, a single writer is given 25 off-prints of the article and plural writers are given 35 off-prints (also sent by surface/sea mail)"

Procedure

a. Articles for publication (original and one-copy) must be sent to AMA through the Co-operating Editor in the country where the article originates. (Please refer to the names and addresses of Co-operating Editors in any issue of the AMA). However, in the absence of any Co-operating Editor, the article may be sent directly to the AMA Chief Editor in Tokyo.
b. Contributors of articles for the AMA for the first time are required to attach a passport-size ID photograph (black and white print preferred) to the article. The same applies to those who have contributed articles three years earlier. In either case, ID photographs taken within the last 6 months are preferred.
c. The article must bear the writer(s) name, title/designation, office/organization, nationality and complete mailing address.

Format/Style Guidance

a. Whether the article is a technical or popular contribution, lecture, research result, thesis or special report, the format must contain the following features :
   i) a brief and appropriate title ;
   ii) the writer(s) name, designation/title, office/organization ; and mailing address ;
   iii) an abstract following ii) above ;
   iv) body proper (text/discussion) ;
   v) conclusion/recommendation ; and a
   vi) bibliography
b. The pages must be numbered (Arabic numeral) successively at the top center. Tables, graphs and diagrams must likewise be numbered. Table numbers must precede table titles, e.g., "Table 1. Rate of Seeding per Hectare". Such table number and title must be typed at the top center of the table. On the other hand, graphs, diagrams, maps and photographs are considered figures in which case the captions must be indicated below the figure and preceded by number, e.g., "Figure 1. View of the Farm Buildings".
c. Tables and figures must be preceded by texts or discussions. Inclusion of such tables and figures not otherwise referred to in the text/discussion must be avoided.
d. Tables must be typed clearly without vertical lines or partitions. Horizontal lines must be drawn only to contain the sub-title heads of columns and at the bottom of the table.
e. Express measurements in the metric system and crop yields in metric tons per hectare (t/ha) and smaller units in kilogram or gram (kg/plot or g/row).
f. Indicate by footnotes or legends any abbreviations or symbols used in tables or figures.
g. Convert national currencies in US dollars and use the later consistently.
h. Round off numbers, if possible, to one or two decimal units, e.g., 45.5kg/ha instead of 45.4762kg/ha.
i. When numbers must start a sentence, such numbers must be written in words, e.g., Forty-five workers . . . , or Five tractors . . ." instead of 45 workers . . , or, 5 tractors.

ABSTRACT AND INDEX

Abstract

Subject Index

Author Index

User's Guide

①5 ②Stevens, Robert D. and Ahmad, Bashir, ③Agricultural Mechanization and Rural Welfare in South and Southeast Asia. Spring ④1971. ⑤1(1): 29-32, 57.

The paper is considers the mechanization of small farm holdings which represent the vast majority of farmers in Southeast Asia. The economic characterisitcs of rural Asia that influence or inhibit agricultural mechanization, elements of a comprehensive analytical framework for agricultural mechanization, and the need for multidisciplinary research are discussed and analysed.

① Serial number (from 1 to 447)
② Author(s), surname comes first
③ Title
④ Date of Publication
⑤ 1(1): 29-32, 57 means Vol. 1 No. 1, pp. 29-32 & 57

Abstract

1 Kishida, Yoshisuke, Preface. Spring 1971. 1(1): 13.

Agricultural mechanization is the basic power necessary to meet the demands of increasing food supply with limited time resources. Agricultural mechanization is associated with "Time is life". The first issue was named 'Agricultural Mechanization in Southeast Asia'.

2 Ogura, Takekazu, Message. Spring 1971. 1(1): 18.

Agricultural mechanization is the key element in the 'Green Revolution'. Steps to promote agricultural mechanization in Southeast Asia are discussed.

3 McColly, Howard F., A Proposal for Agricultural Mechanization in the Developing Countries of Southeast Asia. Spring 1971. 1(1): 21-25.

Topics in the proposal are i) increased agricultural productivity; ii) better use of labor; iii) farm mechanization objectives; iv) aids to progress; v) agricultural machinery situation; and vi) machinery management and selection.

4 Ozaki, Chujiro, Some Problems on Policy for Agricultural Mechanization. Spring 1971. 1(1): 26-28.

Problems associated with monsoon, land tenure systems, size of holdings, and the introduction of new crop varieties are discussed. The author introduces cooperative farming as a new approach to increasing the scale of economies. He proposes that standardization of machinery parts should reduce manufacturing cost.

5 Stevens, Robert D. and Ahmad, Bashir, Agricultural Mechanization and Rural Welfare in South and Southeast Asia. Spring 1971. 1(1): 29-32, 57.

The paper considers the mechanization of small farm holdings which represent the vast majority of farmers in Southeast Asia. The economic characteristics of rural Asia that influence or inhibit agricultural mechanization, elements of a comprehensive analytical framework for agricultural mechanization, and the need for multidisciplinary research are discussed and analysed.

6 Stewart, Robert E., International Cooperation of Agricultural Engineering for Mechanization in South East Asia – from the standpoint of ASAE. Spring 1971. 1(1): 33-34.

The role of the ASAE in international relations is discussed in greater detail in this paper.

7 Khan, Amir U., Machinery Development for Tropical Agriculture. Spring 1971. 1(1): 35-37.

Major constraints in the introduction of farm machineries, development bottlenecks, research and development priorities, development challenges in Asia, and the role of established manufacturers and manufacturing potential are discussed in relation to Southeast Asia conditions.

8 Kaburaki, Hideo, International Cooperation of Agricultural Engineering for the Mechanization in Southeast Asia – from standpoint of Japan. Spring 1971. 1(1): 38-39.

The progress of agricultural mechanization generally comes in three stages: i) testing and evaluation of imported machines under local conditions; ii) modification of imported machines to meet local needs; and iii) need for development of new machines. The role of Japan in the development of agricultural machinery is discussed in the paper.

9 Swamy-Rao, A. A., Agricultural Machinery and Implements Industry in South East Asia and Related Activities of UNIDO. Spring 1971. 1(1): 40-44, 63.

Discussions on i) the present and future demands for agricultural implements; ii) the present status of manufacturers of agricultural machines; iii) problems and needs of industries, and iv) the highlights of the UNIDO activities in this regard are presented.

10 Kishida, Yoshikuni, Establishment of the Plan to Promote Agricultural Mechanization in Southeast Asia and Problems on Growing Agricultural Machinery Industry. Spring 1971. 1(1): 45-47.

So long as natural features, climate, crops, customs, economic power, technical level, and educational situations are different with countries, the policies for promoting agricultural mechanization must be different accordingly. And what is most important is that the plan must be made by each country voluntarily and the supporting countries should respect the situations and independence of the supported countries.

11 Jonson, Loyd, Promotion of Agricultural Mechanization on an Energy Concept. Spring 1971. 1(1): 50-51.

Agricultural mechanization can and should be promoted on an energy concept. This energy concept should include all phases of energy and consider the possible social effects. The Japanese people are perhaps the best example of a group's application of energy to increase their standard of living. Perhaps they can assist Southeast Asia and other underdeveloped countries to apply power rationally to agricultural and urban problems. Original paper on "Is mechanization possible where rice is king?" appeared in agricultural engineering Vol 47, No.8, pp 132-135. March, 1966.

12 Wu, Ming-Wu, The Importance of Mechanization Indicated by Agricultural Production Function in the Rice Region of Taichung Area, Taiwan. Spring 1971. 1(1): 52-53, 25.

The author discusses a production function that he has developed of particular application is rice cultivation. As might be expected, he takes into account the functions of land, human and animanl labor and capital.

13 Bradfield, Richard, Mechanized Maximum Cropping Systems for the Small Farms of the Rice Belt of Tropical Asia. Spring 1971. 1(1): 55-57.

Rotational crops such as sweet potatoes, soybeans, corn, sorghum around rice at IRRI are discussed. In tropical countries with a 365-day growing season, where farms are small and land is scarce and high priced, one of the best ways for farmers to increase their incomes is to grow high yields of 4 to 5 crops a year by intensive maximum cropping methods of the type described in this paper. The widespread adoption of such systems of farming could increase the supply and improve the quality of food available to people with low incomes and could remove the threat of widespread hunger in these heavily populated tropical areas, for at least another generation.

14 Chancellor, William J., The Tractor Contractor System in Southeast Asia and the Suitability of Imported Agricultural Machinery. Spring 1971. 1(1): 58-60.

Information on the features of tractor contractor systems in both Thailand and West Malaysia was obtained through a survey conducted in these two countries between August 1968 and May 1969. The survey involved 432 interviews, primarily with tractor sales agents, tractor contractors, and farmers who hire tractor service.

15 Friedrich, K. H. and Van Gilst, W. J., Proposals for the Development of Economic Models of Rice Mechanization. Spring 1971. 1(1): 61-63.

The authors outline the mathematical culculation procedure in determining the actual and imputed cost of mechanizing a hectare of rice field and the cost of a kg of clean paddy.

16 Esmay, Merle L., A Second-Generation Problem of the Green Revolution — Food Grain Storage. Spring 1971. 1(1): 64-66.

Food grain storage, drying, handling and transportation for Asian countries is a matter of properly adapting and utilizing already available technology. The critical objective is to minimize food grain losses in our food-short world. Technological developments must be planned carefully in view of the social and economic conditions peculiar to each country. Mechanization must be introduced slowly and cautiously in labor-surplus countries. Labor intensification mechanization should be developed and promoted initially. A mechanized operation should only be introduced as it becomes impossible to continue doing the operation in the old traditional way. Drying the increased yields of paddy rice during rainy season harvest periods is an example. Meaningful mechanization makes multicropping of new food grain varieties more feasible and thus, brings about increased labor utilization in growing the extra crops.

17 Hoa, Te Sun, Agricultural Mechanization in Cambodia and its Problems. Spring 1971. 1(1): 85-88.

In order for Cambodia to reconcile a harmonious development between the industry and agriculture, it will require the political will of the government and active participation of society, particularly the farmers whose involvement will be crucial.

18 Wikramanayake, V. E. A., Ceylon – Mechanization of Agriculture, The Present Position and Future Development. Spring 1971. 1(1): 89-92.

This article covers a broad picture of present and projected development of farm power in Ceylon where the lack of farm power is one of the most important factors that limits agricultural production. The need to develop agriculture is urgent and the State has to step in, if rational application of farm power is desired. This is more pertinent in circumstances where power involves the expenditure of large sums of foreign exchange, and where the impact of mechanization has to affect social organizations. A definite policy on power has been enunciated by the Ceylon Government and the implementation of this policy is under way.

19 Nakata, Takeji, Agricultural Mechanization in Laos and its Problems. Spring 1971. 1(1): 93-96.

The present status of agriculture, agricultural mechanization and its problems in relation to land preparation, power source, threshing, rice pearling mill, smithery, internal combustion engine and oil are analyzed.

20 Ahmed, N., Mechanization of Agriculture in Pakistan, Present Status and Future Prospect. Spring 1971. 1(1):97-102.

Soil, topography and agriculture of East and West Pakistan, economic condition of farmers, need for farm mechanization, present status of farm machines, and bottlenecks associated with mechanization are discussed.

21 Lantin, Reynaldo M., The Present Problem and the Future of Farm Mechanization in the Philippines. Spring 1971. 1(1): 103-107, 37.

In the three island groups of the Philippines, namely, Luzon, Visayas, and Mindanao, the main source of livelihood is farming. Yet, in spite of the modern age of machines, agriculture in the Philippines has been only barely touched by mechanization although some progress has been made during the last decade.

22 Peng, Tien-song, Present Problems and the Future of Agricultural Mechanization in Taiwan, Republic of China. Spring 1971. 1(1): 109-112.

A four-year plan has been set for accelerated extension of mechanized farming in order to offset the labor shortage which is being increasingly felt in Taiwan.

In the implementation of the program, however, there are still many technical and socio-economic problems, such as insufficient number of qualified technical personnel, limited capital input of local agricultural machinery manufacturers, high cost of production, family-sized farms and fragmentation of land, diversified and intensified cropping system, low purchasing power of individual farm families, and lack of mechanical sense on the part of the average farmer.

23 Boon-it, Anusorn, The Present Problems and Future Agricultural Mechanization in Thailand. Spring 1971. 1(1): 113-117.

The major problems related to agricultural land, population, agri-business, agricultural credit, agricultural man-power, agricultural institutions, and future of agricultural mechanization are presented utilizing pertinent data.

24 Truong-Dinh-Huan, Present Situation and Future Problems of Farm Mechanization in Vietnam. Spring 1971. 1(1): 118-120.

Technical problems for various farming operations, government policies for agricultural mechanization, and present and future aspects of research activities in the country are discussed.

25 F. M. I. R. C. Present Situations and Future Problems on Farm Mechanization in India, Indonesia, Malaysia and Nepal. Spring 1971. 1(1): 120-124.

Highlights of a symposium on 'Farm Mechanization' held in Tokyo, on Oct. 12-17, 1970 are reported in this article by the Farm Machinery Industrial Research Cooperations in these countries.

26 F.M.I.R.C., The Status Quo and Problems of Farm Mechanization in the Developing Countries. Spring 1971. 1(1): 125-130.

It is not easy for the developing nations to fulfill their farm mechanization project, because they must, before anything else, settle a number of

problems such as the adjustment of agricultural foundation, countermeasures against surplus labour, economic improvement of farm households, advancement of mechanical knowledge, betterment of distribution structure, promotion of research and experiment, technique of cultivation, etc.

For the purpose of grasping more clearly such controversial phenomena, categorical analyses on the status quo of the developing countries have been made. These data came from "The Status Quo of Farm Mechanization in the Countries of the Southeast Asia", a report submitted to the "Symposium on Study concerning the Tropical Agriculture in 1970" sponsored by the Ministry of Agriculture and Forestry of the Japanese Government. Eight countries participated in the Symposium; namely, Republic of China, India, Indonesia, Malaysia, Pakistan, the Philippines, South Vietnam and Japan. The analyses on Korea and Laos have been picked up from different data and source.

It is needless to mention that these analyses should be done from another view point, they might become different ones. Consequently, encouragement of farm mechanization could be carried out by means other than ours. In this sense, the analyses cited here are intended to give the developing nations various problems common to them – problems with which farm mechanization are confronted.

27 F.M.I.R.C., Main Indicators for Agricultural Mechanization in South East Asia. Spring 1971. 1(1): 131-134.

Data on main indicators such as gross national product, income per capita, exports, imports, population, agriculture population, land use, number of farm holdings, cropped area, production of main crops, livestock, tractor and power tiller status were compiled for Burma, Cambodia, Ceylon, Taiwan, India, Indonesia, Laos, Malaysia, Nepal, Pakistan, Philippines, Thailand, Republic of Vietnam.

28 Kishida, Yoshisuke, Preface. Autumn 1971. 2(1): 13.

The theme of this issue is "Growth of the agricultural machinery industry in Asia: –Production Problems". The AMA meaning for the second time was changed from "Agricultural Mechanization in Southeast Asia" to "Agricultural Mechanization in Asia".

29 Saito, Makoto, A proposal for Agricultural Machinery Industry in the Region of Asia. Autumn 1971. 2(1): 16.

To promote mechanization in agriculture in the Asian region, it is desirable to consider i) high utilization of land; ii) development of industry, and iii) cooperative efforts of all agencies.

30 Giles, G.W., How to Promote Agricultural Machinery Production in Asia. Autumn 1971. 2(1): 19-24.

This paper has suggested that the future successful promotion of agricultural machinery production is thru effective demonstrations of a good machine that the farmers need, and by providing adequate and timely repair and maintenance services. Increased machinery production will come about only when the farmers need and demand the machine. The farmers will demand the machine more quickly when it is convincingly demonstrated. And the machine will continue to be in demand if the after-sale services are statisfactory.

31 Kobayashi, Keisaku, Outline of the Government Policy for the Development of Agricultural Machinery industry in Asian Developing Countries. Autumn 1971. 2(1): 25-33, 52.

The government policies in Ceylon, China, India, Indonesia, Iran, Malaysia, Nepal, Pakistan, Philippines, Singapore, Thailand, and Vietnam cover measures to attract foreign capital, incentives for investment, tax concessions and custom tariffs.

32 Kishida, Yoshikuni, Historical View of the Development of Agricultural Machinery Industry in Japan. Autumn 1971. 2(1): 34-41.

Historical changes and view of farm machinery production during 600-1971 A.D in Japan are presented. The agricultural tools of Japan dates back to 644 B.C.

33 Halter, Harold B., Key Role of Implement Manufacturers from American Experience. Autumn 1971. 2(1): 42-45.

Some thoughts about how items of farm machinery compatible to the land, climate, labor situation, distribution and farm size conditions may find their way to Southeast Asian farms in the next 10 to 20 years are discussed.

34 Kamijo, Morio, Some Points to Improve Machinery for Rice Production in Asian Developing Countries. Autumn 1971. 2(1): 46-52.

Several design requirements for rice production machinery (engines, pumps, tractors, transplanters, drillers, fertilizing machines, weeder, pest control machines, reaper, binder, threshers, combine harvestors, paddy cleaner, hullers, separators, dryers, rice polishers) are discussed and the cooperation among design engineers and local users is stressed.

35 Smerdon, Ernest T., Some Critical Steps in Achieving Agricultural Mechanization in Developing Countries. Autumn, 1971. 2(1): 53-59.

Mechanization in developing countries reduces the labor requirement and can contribute to improving the standard of living in these countries.

For the benefits of mechanization to be realized, it must be recognized that mechanization is only one input into a highly efficient and productive agriculture. All these inputs must be kept at an appropriately high level.

Farmer education, establishment of service centers with adequate repair parts and skilled mechanics, and agricultural engineer and technician training for research, education and work in the manufacturing industry should be developed.

The labor displaced must have opportunities for being trained for work elsewhere. Mechanization must not proceed so rapidly as to create adverse unemployment problems.

Total mechanization of a developing country cannot happen overnight. The process must be orderly if all the benefits which can accrue to the agricultural industry in developing country are to be realized.

36 Farm Machinery Research Corp., Basic Index for System Analysis of Agricultural Mechanization. Autumn 1971. 2(1): 60-66.

Data on status of agriculture, trend in agricultural production, present status of mechanization, agricultural machinery industry, farm household income, diffusion of durable goods during 1945-1970 are tabulated for easy reference.

37 Han, Sung Kum, The Present and Future of the Farm Machinery Industry in Korea. Autumn 1971. 2(1): 85-90.

Topics discussed in this paper include present status of Korean farm mechanization, plan of increased food production and mechanization, trend in the farm machinery industry, present status of farm machine industries, pricing and marketing of farm machines, and plan of mechanization.

38 Cabanos, Phil, Jeepney Manufacturing in the Philippines, a Model for Developing the Agricultural Machinery Industry. Autumn 1971. 2(1): 91-97.

The vital ingredients in the mix that promote an agricultural machinery industry are identified using the successful experience of indigenous mechanics and artisans in developing the well-known, versatile jeepney in the Philippines.

39 Takasaka, Tomotake, Multiple Characteristics of Farm Implements and Machinery Production in the Republic of China. Autumn 1971. 2(1): 98-104.

The author discusses homemade traditional farm tools and some episodes that took place during 1955-70 in Taiwan.

40 Jain, B. K. S., Production of Agricultural Machinery in India. Autumn 1971. 2(1): 105-109.

Progress of some important items such as tractors, power-tillers, agricultural implements, engines, pumps are presented.

41 Rafi, Mohammad, Need of National Farm Equipment Industry in Pakistan. Autumn 1971. 2(1): 110-111.

To keep on mechanizing our agriculture from alien sources will amount to allowing those alien sources to harvest the fruits of this input in our agriculture. For obvious reasons, no effort and no investment would be too great to furnish a sound base for own farm equipment industry and to eliminate dangerous dependence on foreign sources.

42 Kishida, Yoshikuni, Present Status of Agricultural Machinery Industry in Thailand. Autumn 1971. 2(1): 112-116.

The present stage of agricultural machinery industry in Thailand mainly consists of production of implements of the two-and four-wheel tractors, and domestic two-wheel tractors and special riding puddling machine.

43 Shin-Norinsha Co., Ltd., The Latest Mechanization of Rice Transplanting in Japan. Autumn 1971. 2(1): 119-124.

History, availability, classification, efficiency, problems of mechanization and popularization, and prototypes of mechanization transplanting are presented.

44 Shin-Norinsha Co., Ltd., The Recent Tendency Toward Mechanized Harvesting of Rice Plant. Autumn 1971. 2(1): 125-133.

General history of mechanized harvesting, basic principle on introduction of combines, government policy, financial arrangements, efficiency, advantages and disadvantages, list of available binders and combines are presented.

45 Shin-Norinsha Co., Ltd., Transportation Manual in Steep Slope Land Developed by Japanese Technology (Small Self-Propelled Track Carriers). Autumn 1971. 2(1): 134-140.

Monorail car for track carriers on steep slope land is presented. Sources of these versatile carriers are also indicated.

46 Kanazawa, Masazo, Agricultural Mechanization in Japan "Yanmar Farm Village Factory". Autumn 1971. 2(1): 141-146.

The reason why "Yanmar Farm Village Factory" has attained success can be summarized thus:
(1) Good timing, management policy and guides for the establishment of farm village factory.
(2) Good geographical conditions.
(3) A mature, independent enterprise.
(4) Facilities were made available from parent factory.

47 Kishida, Yoshisuke, Preface. Spring 1972. 3(1): 13.

'How the agricultural machinery industry must grow and how the marketing problems should be solved was the theme of this issue. The author stressed that production and distribution are inseperable aspects in developing the agricultural machinery industry.

48 Frederic, Charles R., History of Marketing of Agricultural Machinery in U. S. A. and the Role of NFPEDA. Spring 1972. 3(1): 17-22.

Comments in this paper are based upon development of the farm equipment retailing industry in the USA which dates back to 200 years when the blacksmiths had surplus tools.

49 Mackson, C. J. and Hausmann, C. T., Product Planning for Developing Nations. Spring 1972. 3(1): 23-26.

Four phases of development and marketing of a new product are discussed: i) product formulation; ii) preliminary design; iii) final design; and iv) design of manufacturing and marketing systems.

50 Kishida, Yoshikuni, Establishment and Improvement for Marketing System of Agricultural Machinery in Asia. Spring 1972. 3(1): 27-31.

Topics presented in this paper are the role of agricultural machinery dealers, pattern and characteristics of marketing system, how marketing margins should be considered and organizing the dealers' association of farm implements.

51 Kline, Cernyw K. and Mackson, C. J., A Systems Approach to Technical Training in Developing Countries. Spring 1972. 3(1): 32-36.

The systems approach presented in this paper pertains to technical training programs which emphasize defining/formulating objectives, analysis of learning tasks and test development, design of program and implementation, and adjustments.

52 Lee, Chul Choo, The Present Status and Problems of Marketing Farm Machinery in Korea. Spring 1972. 3(1): 38-43.

The present status of Korean farming, farm machinery production, future plans for the supply of farm machines, and problems of marketing farm machines are discussed.

53 Bergmann, Theodor, Mechanization as a Factor in Agricultural Change—Potentialities and Limits. Spring 1972. 3(1): 46-53.

Increased productivity of farming in highly industrialized countries results from various factors: bio-technical and mechanical-technical progress, changed farm organization, socio-economic and socio-psychological change. Starting from a different point of departure in India, the hypothesis is suggested that mechanization can be one of the factors for the progress of agriculture. After pointing out the advantages and problems of new farm technology, the prognoses of tractor demand are compared and analyzed.

54 Fujimura, Junichiro, History of Farm Machinery Sales in Japan. Spring 1972. 3(1): 54-58.

The paper traces the Japanese farm machinery history which dates back to the middle ages. Pioneers of farm machinery sales, farming situation during the war years, distribution routes, and reorganization of sales system are well presented.

55 Kline, Cernyw K., Appraising and Improving Vocational and Technical Agricultural Education Programs. Spring 1972. 3(1): 75-89.

If provision for education and training of nationals of a country is not built into every project, not included as an integral part of every plan, not taken for granted as a part of every step forward, the ultimate goals can never be reached. The road to development is already littered with abandoned projects and the debris of misapplied efforts which failed because the people for whom they were planned and initiated were not sufficiently trained to take them over, run them and make the fullest possible use of the benefits they might have conferred. The basic problem is one of selection, emphasis and priority rather than inability to do anything. Physical resources alone cannot provide an improved standard of living without the competence to develop them – and such competence in agricultural production and related enterprise can only be learned through agricultural and technical education and training.

56 Koga, Yasumasa, Some Suggestions for Rice Mill Modernization in Developing Countries. Spring 1972. 3(1): 90-94.

More than 10% of harvested grains are being lost during transportation, drying, storage, milling, packing, etc. in developing countries. Measures for modernizing rice milling are discussed.

57 Michael, A. M., Present Situation and Problems on Marketing of Agricultural Machinery in India. Spring 1972. 3(1): 95-99.

The impact of the green revolution, trends and supply of agricultural machines, imbalance in inputs for mechanization and bottlenecks in the farm machinery industry are discussed.

58 Shin-Norinsha, Model Layout for Repair Shop of Agricultural Machinery. Spring 1972. 3(1): 100-110.

Standards for the construction of agricultural machinery repair shops, facilities for repair, plan layouts, and safety emphasis are indicated.

59 Manufacturers' Opinion, Spring 1972. 3(1): 111-119.

Monitoring the performance of distributors by David Brown Tractor (Sales), Ltd.,; Support to local manufacturers by Mitsubishi Heavy Industries, Ltd.; Permanent representation in Asia by Auto Tractor; Asia as a big market for engines by Ishikawajima Harima Heavy Industries Co., Ltd.; Self-sufficiency in food through a tractor use by Toyosha Co., Ltd.; What is a profitable machine by New Holland International Division; To increase production on the spot by Yanmar Diesel Engine Co., Ltd.; The diffusion of practical knowledge by Iseki Agricutlural Machinery Mfg. Co., Ltd.; and Production based on special condition by Satoh Agricultural Machine Mfg. Co., Ltd. are discussed.

60 Shin-Norinsha Co., Ltd., KUBOTA's Technical Training System and its Practical Condition. Spring 1972. 3(1): 120-122.

Founded in July, 1949, the Kubota's Technical Training System serves a training workshop for agents from all over the world, The main emphasis is on the use of farm machineries for rice production.

61 Gaury, Ch., What is C.E.E.M.A.T. doing on Agricultural Mechanization in Tropical Countries? Spring 1972. 3(1): 123-126.

Research and experimental center for agricultural mechanization in the tropics (CEEMAT), founded in 1962, offers training courses and seminars for specialists from developing countries.

62 Esmay, Merle L. , Agricultural Engineering International Program of Michigan State University. Spring 1972. 3(1): 127-131.

The international program of the Agricultural Engineering Department at Michigan State University (MSU) is dedicated to improving the food supply, the economic base of agriculture and the rural living conditions in the less developed countries of the world. For implementation of these broad objectives, the department has developed as a center for the study and enhancement of meaningful agricultural mechanization in developing countries.

63 Kishida, Yoshisuke, Preface. Summer 1972. 3(2): 13.

The theme of this issue is R and D which is an essential factor in promoting agricultural mechanization in developing countries.

64 Esmay, Merle L. and Faidley L. W., Agricultural Mechanization and Labor Utilization in Asia. Summer 1972. 3(2): 15-22.

This paper presents a concept and discusses the parameters and constraints of a system model for the evaluation of present and future agricultural mechanization. Three Asian countries are included as examples for discussion purposes. Two are labor surplus countries (Indonesia and Bangladesh) and one (Korea) is becoming a labor scarce country. Conditions differ from country to country, however, the hypothesis taken here is that there is enough commonality for the formulation of one simulation model that would be applicable to many, if not all, developing countries.

65 Sakai, Jun, Study and Discussion on Several Problems for Farm Mechanization in Developing Countries. Summer 1972. 3(2): 23-32.

The paper analyzes the market price concept of imported farm machinery in developing countries using the Philippines experience as a case in point.

66 Kishida, Yoshikuni, Establishment of the International Agricultural Mechanization Institute in Asia. Summer 1972. 3(2): 33-35, 40.

The paper proposes the establishment of a regional center on farm mechanization in Asia and discusses the mechanics of fund raising, structural organization, function of research division, information service center or other facilities.

67 Kobayashi, Keisaku, A Proposal for the Establishment of the Asian Agricultural Machinery Institute. Summer 1972. 3(2): 36-40.

The need for the establishment of an Asian Agricultural Machinery Institute is stressed in this paper in order to organize a directed effort in the development and selection of machines within economic limitations of Asian farms.

68 Michael, A. M. and Khanna, S. K., Implements for Moisture Conservation in Unirrigated areas. Summer 1972. 3(2): 41-44.

Deep tillage and subsoiling to conserve moisture in the monsoon season, surface tillage equipment to conserve moisture in the winter, and stubble-mulch tillage are featured in this paper.

69 Lee, Chul Choo, The Merry Tiller as a Practical Farm Machine for Korea. Summer 1972. 3(2): 45-47.

The merry tiller is suitable to Korean farm conditions. It can be improved with new manufacturing techniques. It would be also possible to successfully distribute the merry tiller throughout the country, if produced in large quantity and with government subsidy.

70 Deutsch, Allan, New Weed Control Equipment and Techniques. Summer 1972. 3(2): 48-54.

The need for and methods of weed control are presented in this report.

71 Mohan, Shri, Equipment Needs for Irrigation Development in India. Summer 1972. 3(2): 55-59.

With a systematic planning, irrigation will develop steadily to feed the millions of India. There is a large scale need for various irrigation equipment such as pump sets and drilling equipment and new techniques such as drip irrigation. With the development of industry, it will be possible to meet most of the equipment needs indigenously.

72 Verma, S. R., Bird's Eye View of Agricultural Machinery Research and Development in India. Summer 1972. 3(2): 62-66.

The research and development in agricultural machinery in India has been briefly reviewed. Bird's eyeview of the manufacture of the various equipment has also been attempted. For each category of equipment, the scope for further development and improvisation is unlimited.

73 Ojha, T. P., Status of Rice Processing Research and Development in India. Summer 1972. 3(2): 83-86.

The results obtained from the seven modern rice mill units have amply demonstrated that benefit of modernisation could be extended further. The present number of 200 modern rice mills in India is perhaps due to that. It is hoped that the experience gained and success achieved in the process of modernization can be shared with

other Southeast Asian countries. The training and research facilities available at the RPEC,IIT, Kharagpur, India, are open to the industry and research organisations.

74 Rahman, Mustafizur, Applicability of Japanese Agricultural Development to the Developing Countries, especially Bangladesh. Summer 1972. 3(2): 87-101.

Japanese agricultural, industrial, and economic practices are, if wisely adapted, suitable to all the developing nations, specially to those with little or no natural resources. The reason why the developing nations cannot adapt these practices is the lack of analysis of Japanese systems from all minute perspective. Introduction of advanced technology and facilities is the vital element of the solution, but creation of base to absorb technology is the prerequisite to the effective introduction of technology. Again, even if technology is available, modernization and industrialization is not possible unless the income level of the majority of the people, specially, the farmers is raised.

75 Indian Society of Agric. Engineers, Bottlenecks in Agricultural Engineering Industry and Trade. Summer 1972. 3(2): 102-103.

On the occation of the 10th Annual Convention held at Jabalpur, the Indian Society of Agricultural Engineers arranged a special session on 3rd February 1972 on problems of the industry. The session was well attended by members representing all the concerned sectors such as the industry, the Government, the agro-industries corporations, and the academy, whose interest, in particular, lies in research and development.

76 Nivon, Mordechai (Weinblum), Agricultural Mechanization in Israel: Research, Development and Application. Summer 1972. 3(2): 105-112.

Agriculture in Israel is one of the central pillars of the economy and the society and will remain so for many years to come. However, in the modern economy, the tendency is toward greater food production, with emphasis on variety and processed produce, ready for immediate consumption, without the time consuming labour for preparation by the housewife. These demands present agriculture with unprecedented technological challenges. The agriculture of the future will be mechanized and industrialized. Already today, there are in the world, including Israel, certain types of crops which are grown under completely controlled conditions, where all the climatological factors are automatically regulated by computers according to previously supplied data.

77 Ezaki, Haruo, Research Activities in the Institute of Agr. Machinery. Summer 1972. 3(2): 113-117.

The organization and activities of the I.A.M. in Japan are reviewed.

78 Khan, Amir U., New Agricultural Equipment from the IRRI. Summer 1972. 3(2): 118-121.

The International Rice Research Institute is attempting to develop an appropriate rice mechanization technology with the development of simple agricultural equipment to suit the manufacturing capabilities of the LDC. This program is primarily focused towards the requirements of the 2-to -10 hectare tropical farms which are too large to work with animals and uneconomic to work with the farm equipment originating from the industrialized countries.

79 Kishida, Yoshisuke, Preface. Spring 1973. 4(1): 13.

Multiple-cropping increases land productivity and labor requirements and is coupled with mechanization for solving food problems.

80 Ozaki, Chujiro, Changes in Cropping Patterns in APO Member Countries. Spring 1973. 4(1): 15-26.

Changes in crop varieties and increase in production, importance of diversification changes in cropping patterns, problems of these changes, percentage distribution of crops, agricultural production index in APO member countries are reviewed in detail.

81 Banta, G. R., Mechanization, Labor and Time in Multiple Cropping. Spring 1973. 4(1): 27-30.

Timing in intensive cropping system for rice growing areas in the tropics is critical. Mechanization will permit farmers to use available farm power more efficiently.

82 Pal, M., Pandey, S.L. and Mathur, B.P., Cropping Patterns in Multiple Cropping System. Spring 1973. 4(1): 31-36.

The paper attempts to put together available information on the elements of multiple cropping system under Indian conditions.

83 Mahapatra, I. C., Leeuwrik, D. M., Singh, K. N. and Dayanand, Green Revolution through Multiple Cropping in India. Spring 1973. 4(1): 37-42.

Some of the prospects such as attaining high yields with modern technology, economics of multiple cropping, employment potential, limitations to green revolution, and basic needs to sustain the green revolution have been traced in this paper.

84 Lee, T. H., Agricultural Diversification and Development. Spring 1973. 4(1): 43-53.

This paper examines i) the relationship between farm income and land productivity in a labor-surplus economy, ii) technological and economic interpretations of agricultural diversification, iii) cropping systems with high labor-absorbing capacity and iv) the conditions necessary for promoting diversification with labor-intensive farming as exemplified by Taiwan.

85 Johl, S. S., Farm Size, Economic Efficiency and Social Justice (A Case of Punjab). Spring 1973. 4(1): 54-61.

This paper examines the questions i) whether the farm size distribution makes any difference and, if so, in what direction and degree with respect to yield and marketed surplus per unit of land; ii) how far economic efficiency moves in complementary fashion with social justice; iii) is there any relationship of employment with farm size distribution; and iv) whether the step to lower the level of ceilings on farm size can be justfied on grounds of economic efficiency and social justice.

86 Esmay, M. L. and Faidley, L. W., Multiple Cropping and the Small Farmers. Spring 1973. 4(1): 62-65.

The objective of agricultural development programs in many of the developing countries of Asia is to increase total agricultural production and the standard of living in the rural areas. The results of this Comilla case study indicate that irrigation, mechanization, and the use of improved plant varieties all may contribute to multiple cropping and increased total production. More importantly, however, is the ability of the very small farmers, those with less than 4 hectares (10 acres) of land, to effectively utilize these improved methods to increase their multiple cropping ratios and their levels of living. These small farmers were only able to realize all of these benefits through special organization of farmers' cooperatives. Cooperative organizations have limitations, but without them small farmers have little potential for improving their substance level of existence. Thus, rural development planners in the countries of Asia must include the small farmers in the agricultural modernization plans.

87 Chancellor, W. J., Tractor Custom Hire Service in Multiple Crop Farming. Spring 1973. 4(1): 66-68.

Increases in multiple cropping on small acreage farms in Southeast Asia, and the use of tractor custom hire services on these farms, are mutually complementary steps in agricultural development.

Tractor power appears best suited to tillage operations for the field crops in the multiple cropping sequence.

Further potential for simultaneous development of multiple cropping and tractor power use appears to lie in low-land rice areas. There other crops can be planted after rice harvest if tractors can economically produce alternate ridges and furrows in the field surface, and subsequently produce a level field surface once the off-season crop had been harvested.

88 Harris, W. L. and Bender, F. E., A System for Selection of Agricultural Machinery. Spring 1973. 4(1): 85-88.

The authors urge that future benefit-cost analysis include linear programming models of farmer decision-making. However, before such models could provide meaningful results, it will be necessary to begin to systematically collect cost and performance data on the types of agricultural equipment that will be considered.

89 Sakai, Jun, History of the Development and Classification of Japanese Power Tillers and Hand Tractors of Multipurpose Performance (Part I). Spring 1973. 4(1): 89-94.

It took about 40 years, from 1920 to 1958 to develop all necessary models of Japanese power tillers and hand-tractors. Real diffusion of farm mechanization in Japan began to grow rapidly in 1955 to 1958, when every kind of farm work could possibly be done by machines instead of animal power. These Japanese machines have so many different characteristics from western machines, that made their classification also different.

90 Sakai, J. and Salas Sr., C. G., Conceptional Performance of Japanese Power Tillers and Hand Tractors for Multipurpose Farm Work (Part II). Spring 1973. 4(1): 95-100.

This paper compiles from various sources useful information and statisfical data about the performance of Japanese power tillers and hand tractors for multi-purpose farm work.

91 Matsuyama, Atsushi, Important Role of Reversible Nippon Plows for Multiple Cropping in Asia. Spring 1973. 4(1): 101-105.

Improvement of plows, power tillers and related attachments is essential for developing agriculture and the agricultural machinery industry in the developing countries just like they are being improved in Japan.

92 Johnson, L. and Diaz, A., A continuous Rice Production System. Spring 1973. 4(1): 109-112.

The production systems outlined are illustrations of the potential production and employment opportunities for management, machine operators, and laborers working together daily; each performing his part and participating in an income from continuous utilization of the available resources. No one method is universally good, however, the availability of land, water, favorable temperatures, and labor supply that are underutilized should lead to the organization of rice production systems in some of the tropical American areas which will set patterns for the future. The other implication is that there are obviously potential advantages in sizing units to reduce the equipment and managerial costs per hectare.

93 Michael, A. M., Increasing Water Use Efficiency in Multiple Cropping. Spring 1973. 4(1): 113-117, 105.

An irrigation at the crown root initiation stage stimulates root development and tillering in wheat. Tiller initiation, preflowering, flowering and grain development are normally critical stages in crop growth. When there is shortage of water, it is better to take care first of the critical stages to obtain increased water use efficiency.

94 Takenaga, Takashi, Trend in Pesticide Applicators. Spring 1973. 4(1): 120-127.

This paper focuses on topics of savings of labor and high capacity applicators, development of applicator, soil incorporation of granule herbicides, ULV sprayers, oral-dermal toxicity-drift and residues.

95 Choudhury, Md. Shahansha-ud-Din, Agriculture and Agricultural Mechanization in Bangladesh. Spring 1973. 4(1): 128-138.

Since agriculture is the basis of Bangladesh economy emphasis in agricultural sector is the key determinant of the rapidity with which overall economic growth will take place. Therefore, considerable attention should be given to all aspects of agricultural growth for education, training, research and development, manufacture of agricultural inputs, transportation and communication, processing, preservation, storage, and marketing in parallel with other sectors of development commensurate with the available resources of the country.

96 Dalrymple, D. G., Review of Recent Country Data. Spring 1973. 4(1): 139-155, 138.

Brief reviews of the multiple cropping situation in 25 less developed nations and Japan are presented. Emphasis is put on recent data on the extent to which multiple cropping is being practised.

97 Kishida, Yoshisuke, Preface. Autumn 1973. 4(2): 13.

The theme of this issue is 'Rice drying and storage' and 'Multiple cropping and Mechanization'.

98 Pal, M., Turkhede, B. B., Kaushik, S. K. and Ram, Sewa, Possibilities of Multiple Cropping in the Rainfed Areas of India. Autumn 1973. 4(2): 15-21.

Multiple cropping in dry land conditions, is by far, an uphill task yet it is not impossible provided technical know-how available in various dis-

ciplines of agricultural science is properly integrated for its practical utilization. The gaps in the existing research information are to be identified and filled up through initiation of appropriate studies to execute multiple cropping programme in various countries/regions.

99 Pandey, S. L., Pal, M. and Sinha, A. K., Cropping Patterns and Irrigation Problems in Multiple Cropping. Autumn 1973. 4(2): 22-26.

This paper is an attempt to touch upon the existing and anticipated irrigation problems with reference to multiple cropping. The authors largely based their view points on the available research information under Indian conditions. This information, however, can be monitored to help solve similar problems in any country of the world which has similarity to the specific instance.

100 Dakshinamurti, C., Recent Trends in Water Management. Autumn 1973. 4(2): 27-28, 30.

It is water and not land that might limit future agricultural production. The goal is to increase in production per unit of water or more crops per drop of irrigation water.

101 Burrill, L. C., Pest Control and Multiple Cropping. Autumn 1973. 4(2): 29-30.

Basic background information is now available on the interaction between chemical pesticides and plants. The challenge remains: to use the knowledge to best fit the pesticides into a multiple-cropping system.

102 Khanna, S. K., Design Considerations of Harvesting Equipment in Multiple Cropping. Autumn 1973. 4(2): 31-34.

The development of the Pusa reaper and its operation are presented. Tractor-operated and animal-drawn models are compared.

103 Singh, K. and Mohan, S., A Case Study on the Economics of Multiple Cropping in Delhi State. Autumn 1973. 4(2): 35-40.

This paper throws light on the economics of various crop rotations tested in the union territory of Delhi. Multiple cropping boosts not only financial returns per hectare of land per year but also generates enough employment for the unemployed rural masses since the system is labour intensive.

104 Harris, W. L. and Bender, F. E., Performance Data Needed for Selection and Management of Machinery. Autumn 1973. 4(2): 41-46.

The authors focused attention on performance, operating costs, and cost of production since these present the greatest obstacles to national planning that aim to achieve farm mechanization objectives in Asia.

105 Singh, K., Farm Size, Mechanization and Labour Employment:Some Dynamic Issues. Autumn 1973. 4(2): 47-56.

The issue put forward in this article is that the existing agrarian structure (the existing level of ceiling and the size distribution of holdings) is more favourable for creating employment in the long run and that the system itself has adjusted over time in the best interests of economic efficiency.

106 Wang, Jaw-Kai and Liang, T., A Multiphase Strategy for Agricultural Mechanization. Autumn 1973. 4(2): 57-63.

This paper investigated how government could better use its influence and resources in bringing about mechanization when mechanization is deemed desirable. They hope to provide a rational method of analysis by which government planners may seek an optimal rate or an optimal route for agricultural mechanization.

107 Mukherjee, K. K., Rice Mill Modernization, Management and Government Policy in a Developing Economy. Autumn 1973. 4(2): 75-79.

It has been emphasized that the development of proper marketing centres is intimately linked with the programme of modernization. In these centres there will be provision for auction platforms, office building, wholesale shops and storage areas. The objective of organizing these centres is to help the farmers get a fair price for their products. This will not only promote increased production but also ensure a large marketable surplus. The latter will benefit the millers in as much as they are assured of a large supply of food grains at a reasonable price.

108 Soemangat, M., Esmay, M.L. and Chancellor, W. J., Rice Drying with Waste Engine Heat. Autumn 1973. 4(2): 80-85.

This paper concludes that i) the use of auxilary heat can increase the throughoput of a drying system but it also increases capital investment and operating cost. The efficiency with which purchased energy is used in the drying process decreases with the use of auxillary heat because the drying capacity of the ambient air represents a decreased proportion of the total drying capacity used; ii) energy requirement for grain drying can be minimized with the use of large drying bed area (100 to 200 sq. ft.), low air temperature in the 90s, and low air velocity (10 cfm/fft^2) through the bed as compared to the use of higher air temperatures and velocities with smaller drying areas, and iii) 95°F drying air temperature can be attained under most tropical conditions with waste engine heat thus, no additional capital investment nor operating cost is necessary for the supplemental heating of drying air.

109 Esmay, M. L. and Thomforde, D., A Farm and Village Paddy Rice Dryer for Less Developed Countries of the Tropical and Semi-Tropical Regions. Autumn 1973. 4(2): 86-93.

This paper presents a functional plan for a small batch-type, slow dryer that uses waste heat from the fan engine to enhance the drying of paddy.

110 Ramachandran, M., Selective Mechanization of Farming Suggested. Autumn 1973. 4(2): 94-95.

Views expressed by notable speakers in the preceding ISAE Annual Meeting are evaluated with reference to selective farm mechanization.

111 Jain, B. K. S., Prospects of Farm Equipment Industry. Autumn 1973. 4(2): 95-98.

The state of the farm equipment industry in India was reviewed by the author on the eve of the Annual Meeting of the Indian Society of Agricultural Engineers.

112 Venturina, R. P., Trend and Prospects on the Design and Manufacture of Agricultural Machinery and Equipment for Rice Production in Developing Countries of Asia and the Far East Region. Autumn 1973. 4(2): 99-107.

A comprehensive conference report on the Expert Group Meeting on the Design and Manufacture of Wetland (Rice) Mechanization, Harvesting and Threshing Machinery in Developing Countries of Asia and the Far East Region held at the International Rice Research Institute, Los Banos, Laguna on March 12-17, 1973.

113 Venturina, R. P., Other News from the Philippines. Autumn 1973. 4(2): 108-109.

Other news from the Annual Meeting of Philippine Society of Agricultural Engineers (1973) is summarized in this report.

114 Gurung, Shri M. B., The Present Status of Agricultural Mechanization in Bhutan, Autumn 1973. 4(2): 110.

Drawbacks in agricultural mechanization in Bhutan are indicated.

115 Shrestha, B. K., Agricultural Development Bank of Nepal. Autumn 1973. 4(2): 111.

This bank provides loan to purchase farm inputs and agricultural machines during 1971-1972.

116 Kishida, Y., Preface. Summer 1974. 5(1): 11.

This issue refers to a wide range of problems relating to farm mechanization which should be solved on a worldwide basis.

117 Stout, B. A. and Downing, C. M., Selective Mechanization : A Hope for Farmers in Developing Countries. Summer 1974. 5(1): 13-17.

Selective mechanization requires not only stabilization or an increase in labor per unit of area, but also must reduce cost and increase production per man. Development is for people and the only means of improving the welfare of people through an increase in the productivity of labor (real income).

118 Singh, G. and Chancellor, W. J., Studies on Relations between Farm Mechanization and Crop Yield. Summer 1974. 5(1): 18-21, 85.

There is little evidence to show that the mere substitution of mechanical power for animal power in farm operations can effect a significant increase in crop yields.

Under certain circumstances, the availability of mechanical power for high rates of application during specific operations permits farmers to use different production strategies than used when restricted to economic levels of animal

power. These new strategies can result in increased annual production of food or commercial crops per unit of land area.

119 Harris, W. L., Bender, F. E. and Esmay, M. L., Agricultural Mechanization as Related to Increased Yields and Production. Summer 1974. 5(1): 22-24.

The end of cheap energy might be the end of mechanized American agriculture. For the next 25 years, efforts at land grant universities should be directed to conserving energy for agricultural production.

120 Ali, S. A. and Agrawal, R. C., Impact of Farm Mechanization on Labour Use in Developing Agriculture under New Technology. Summer 1974. 5(1): 25-28.

In this study an attempt has been made to determine the relationship of mechanization and farm labour employment in the context of new technology in the TARAI region in India.

121 Pillainayagam, M. G., Mechanization of Rice Cultivation in Sri Lanka. Summer 1974. 5(1): 29-34.

Animal and human power continue to be used in farm areas and mechanized power will be used in newly developed arable lands where human labor is short during peak periods.

122 Fankhauser, F., A Small Development Project in Northern Thailand. Summer 1974. 5(1): 35-36.

It is not easy to change people's way of working whose religion is animistic and mixed with ancestral worship. In a Christian village there is less opposition in this respect.

123 Rafi, M., Jumah, H. F., Ismail, L. K. and Asrar, M., Need of Training Manpower for Mechanized Agriculture in Iraq. Summer 1974. 5(1): 37-41.

There is an acute shortage of trained manpower at all levels for mechanized agriculture in Iraq which is so essential for successful and perpetual mechanization in the country. Enormous efforts are needed to remedy this condition.

124 Schneider, R. M.and Mackson, C. J., The Educational Role of the Agricultural Equipment Industry in Developing Countries. Summer 1974. 5(1): 42-46.

An instrument was developed to study and determine the appropriate educational role of the agricultural equipment industry in developing countries. The individuals who participated all had experience in developing countries and were involved in mechanization training.

The statistical analysis of the responses showed that industry can make the greatest contribution by developing software such as slides, charts, movies and bulletins and making the materials available to secondary and higher educational systems.

125 Lalkaka, R., Acquiring Technology for Manufacturing Agro-Equipment. Summer 1974. 5(1): 59-67.

It is necessary to develop and introduce farm machines with higher hp/ha for tropical farmland to suit the farmer, his resources and his habits.

126 Jain, B. K. S., Marketing Farm Equipment. Summer 1974. 5(1): 68-71.

The marketing organizations in India are aware of new challenges and are fast developing skills for a successful penetration and development of markets for farm equipment.

127 Kishida, Y., The Development of Farm Mechanization in Japan. Summer 1974. 5(1): 72-74.

The introduction of an unmanned farm machine is a new challenge to engineers but the author cautions the engineers to provide safety in the machine operation.

128 Ezaki, H., How to Develop the Harvesting Mechanization. Summer 1974. 5(1): 75-78.

Harvesting machines in Japan (combines), and research projects to develop combines are discussed.

129 Kaminaka, M. S., Capacitive Performance of a Japanese Rice Combine with Respect to Field-Crop Conditions and Operator Background. Summer 1974. 5(1): 79-85.

This paper describes a preliminary effort to determine the feasibility of utilizing some of the techniques of Response Surface Methodology to derive a quantitative description of the

influence of the operator and the influence of field-crop conditions upon the field capacity of a particular farm machine.

130 Kishida, Y., Historical Development of Agricultural Machinery and Implement in Japan. Summer 1974. 5(1): 86-90.

The history of improvement of engines, tillers, development of farm machines after World War II, and the development of the combine, and rice planter is reviewed in this paper.

131 Choudhury, M. S. U., The Present Status of Agricultural Machinery Development in Bangladesh. Summer 1974. 5(1): 47.

Research and development programs in agricultural machines at the Directorate of Agriculture are reported in this paper.

132 Esmay, M. L., Agricultural Mechanization News from America. Summer 1974. 5(1): 47.

The agricultural engineer must be one of a team, along with agricultural economists, agronomists, social scientists and systems analysts who do the feasibility evaluation, abstract modeling, planning, implementation and initial operation.

133 Chancellor, W., World-wide Focus for U. S. Agricultural Engineers. Summer 1974. 5(1): 48.

World-wide development with multinational leadership, foundation and institutional assistance, private industry merchandising world-wide were the subjects discussed at the 1974 Winter Meeting of the American Society of Agricultural Engineers.

134 Kishida, Y, Preface. Spring 1975. 6(1): 13.

This issue concentrates on the problems of after-service and supply of spare parts in mechanized agriculture. It also includes topics on general agricultural mechanization.

135 Wu, Ming-wu and Esmay, M. L., Adoption of the Drum Thresher for New Rice Varieties in Asia. Spring 1975. 6(1): 15-19.

This paper discusses and presents an analysis of shattering loss minimization through the use of a foot-pedal, drum-type thresher in the field near the point of harvest. Inasmuch as immediate field threshing of timely harvested rice presents a grain paddy drying problem, selected drying methods and techniques are also be discussed.

136 Wijewardene, R., Engineering Research M.A.R.D.I. for Malaysia's Farming Future. Spring 1975. 6(1): 20-24.

Twenty five years after tractors were introduced to Malaysian farming, mainly imported from Europe and with some 15 years experience of power tillers from Japan, the question is now appropriately posed "Whither mechanization for Malaysia's farming?"

The experience of the past merits analysis for the bearing it has on policy for the future.

137 Reddy, V. R., Power Tiller Industry in India. Spring 1975. 6(1): 25-26.

The reasons for inadequate growth of the power-tiller industry in India and versatility of power-tiller are discussed.

138 D. B. Tractor, Ltd., After-Service Activities and New Products of David Brown Tractor. Spring 1975. 6(1): 27-29.

The after-service operation, education and training after servicing, and features of the new tractors are presented in this paper.

139 Khan, A. U., Mechanization Technology for Tropical Agriculture. Spring 1975. 6(1): 30-36.

This paper describes the characteristics of tropical agricultural mechanization, reasons for the slow pace of mechanization, new agricultural machines from IRRI, role of indigenous industry, and IRRI machinery development program.

140 Jain, B. K. S., The Role of Professional Societies in Development of Agricultural Machinery Manufacture in Asia and the Far East. Spring 1975. 6(1): 37-44.

To accelerate the progress of the agricultural machinery industry, it is recommended that institutions like the Farm and Industrial Equipment Institute and the Indian Society of Agricultural Engineers be established in developing countries. UNIDO should assist in setting up such institutions on a national as well as regional basis. Effective liaison is required with

the government, the financing institutions, the academy, the users and other professional groups and/or voluntary organizations.

The modern agricultural machinery industry in developing countries in Asia and the Far East is young and requires to be carefully developed. It is a 'growth' oriented industry, with potential for creating vast employment opportunities, improving productivity per worker and per hectare, removing the drudgery from hard farm work and raising the standards of living of the people.

141 U.S. Dept. of Agriculture, The World Agricultural Situation. Spring 1975. 6(1): 46-50.

This paper summarizes the indices of agricultural production in the world, index of producer prices of agricultural products in selected countries, consumer price index, world grain production and consumption trends, and world milled rice production, disappearance and net trade during 1969-1975.

142 Pedersen, T. T. and Takai, H , Agricultural Engineering Research in Denmark. Spring 1975. 6(1): 59-60.

Research in agricultural engineering in Denmark is reported at the Agricultural Engineering Institute at the Royal Veterinary-and Agricultural University, the Governmental Testing Station for Agricultural Machinery, the Danish National Institute of Building Research, which has a special department for agriculture buildings, and at the Biotechnical Institute.

143 Faidley, L. W., Misener, G. C. and Hughes, H. A., Computer-Aided Selection and Costing of Farm Machinery Systems. Spring 1975. 6(1): 61-68.

The machinery model selects a machinery compliment, including power units, which is capable of performing all field operations at a rate sufficient to achieve a successful cropping. The model begins by estimating horsepower needed for the cropping operations. Second, the tractors are selected and assigned to field operations. Third, machine size is matched to operation requirements. Finally, yearly use, operating costs and fossil fuel requirements are determined.

144 U.S. Dept. of Agriculture, Attacking Salinity on Irrigated Lands. Spring 1975. 6(1): 69-71.

At the US Salinity Laboratory, Riverside, Calif, ARS scientists found that in studies of crop response to salinity more emphasis should be placed on the salinity of the irrigation water rather than on the salinity of the soil water as in the past.

145 Willett, J. W., The Ability of the Developing Countries to Meet Their Own Agricultural Needs in the 1980s. Spring 1975. 6(1): 72-79.

Key points of world food problems, the changes for the past 20 years, future of world food situation, green revolution in developing countries, and agricultural output are discussed.

146 Van Gilst, W. J., Farm Mechanization in Developing Countries. Spring 1975. 6(1): 80-82.

This paper presents an overview of farm mechanization, availability of power to farmers, constraints of introducing farm mechanization, mechanization and employment, farm mechanization and energy crisis, and national mechanization programs.

147 Kisu, M., Driverless Field Operation Apparatus. Spring 1975. 6(1): 83-85.

Labor shortage, safety problems, necessity of unmanned operation, method of unmanned farming, merits and economy of driverless field operation apparatus under Japanese conditions are discussed.

148 Yoshino, S. and Terada, T., Computerized Control System for a Large-scale Horticulture Facility. Spring 1975. 6(1): 86-92.

In a computerized environmental control system, the computer may be compared to the brain of a man, the automatic control units, to the limbs. Even if the computer has been loaded with proper programs, no satisfactory results can be expected without appropriate control units and a controling center to put the programs into practice. What is ugently needed is, therefore, more and more of further studies and development in this field, especially the development of techniques to convert into electrical signals various growth stages of a living plant without destroying its biology.

149 F.M.I.R., Transplanter and Harvesting Machines for Rice-Plant. Spring 1975. 6(1): 93-96.

Yearly production of rice transplanter and

harvesting machines, on-farm data, specification of selected rice planters and head feed combine along with a list of manufacturers are indicated.

150 Kishida, Yoshisuke, Preface. Autumn 1975. 6(2): 13.

The opinion that mechanization creates unemployment is no longer valid. Every person related to agricultural mechanization should have a long view in this area in the developing countries.

151 Giles, G. W., The Reorientation of Agricultural Mechanization for the Developing Countries. Autumn 1975. 6(2): 15-25.

This paper has suggested that the world, particularly many of the underdeveloped countries, must reorient their agricultural mechanization programs to help increase yields and yearly production of food crops, and increase the utilization of labor.

152 Faidley, L. W. and Esmay, M. L., Systems Analysis as a Guide to Technology Transfer. Autumn 1975. 6(2): 26-31.

This paper has presented systems application to selective mechanization of the tillage operation. This, however, is only one of the problems facing farmers in developing countries. To effect change in the broad range of problems facing agricultural development, an interdisciplinary approach involving agricultural economists, social scientists, systems analysts and agricultural engineers is necessary.

153 Kobayashi, K., Progress on the Establishment of the ACAM. Autumn 1975. 6(2): 32-37.

Progress and objectives on the establishment of Asian Center for Agricultural Machinery (ACAM) are presented.

154 Curfs, H. P. F. and Boshoff, W. H., Agriculture and Mechanization in West Africa and Southeast Asia: A Comparison. Autumn 1975. 6(2): 38-40.

In Southeast Asia, the higher yield levels and double cropping brought about by the Green Revolution, has had the ultimate effect of making mechanization economically feasible. In West Africa, on the other hand, low and fluctuating yield levels, inadequate marketing arrangements and the absence of a developed farming system to enable continuous cropping whilst maintaining soil fertility, have restricted the scope for mechanization.

There are strong indications that the eventual break-through in West Africa would be associated with the use of four-wheeled tractors.

155 Harrington, Roy E., Agricultural Engineering and Productivity. Autumn 1975. 6(2): 41.

The relation of farm mechanization to food production was examined for various geographic and economic settings. The wise use of available land, labor and capital inputs determines whether the farmer will use mechanization primarily to improve the productivity of his labor or the productivity of his land.

156 Mehta, Parkash, Resource Productivity on Selected Farming Areas of Punjab. Autumn 1975. 6(2): 59-63.

The results which emerge from this inquiry is that the policy makers should encourage adoption of tractors in the study area. But they should keep an eye on social justice and concern for labour employment opportunities for the rapidly growing labour force. Thus, such policy measures are desirous which neither encourage nor discourage tractorisation and which might not cause displacement of labour in the near future, if it is desired that unemployment is to be reduced.

157 Patel, S. L., Recent Advances in Application Techniques, Autumn 1975. 6(2): 64-71, 82.

This paper covers such topics as the importance of plant protection, application techniques, pesticide equipments, integrated control, and economic value of pesticides in Japan.

158 Singh, K. N. and Singh, P. N., Level of Tractor Power Utilization on Different Operations. Autumn 1975. 6(2): 72-75.

In this study, a detailed analysis of tractor utilization on a 4,500 hectare mechanized farm has been made. This farm maintains tractors in 75 HP range for tillage and other heavy operations and 35 HP range for light duty work like operations with a seed drill, fertilizer distributor, trailor, sprayer etc. Taking 5 tractors in 75

HP range, their use on various farm operations over a period of 7 years have been calculated using the figures from the log books of these tractors. Similarly, by taking 5 tractors in 35 HP range the various figures of use over a period of 3 years have been estimated.

159 Segler, George, Agricultural Technique in India as Example of a Development. Autumn 1975. 6(2): 76-82.

As guideline for the development of an agricultural technology adjusted to the Indian conditions, mechanization taking into consideration the energy input, is recommended.

160 F.M.I.R., Parts Supply System with Computer in Kubota, Autumn 1975. 6(2): 83-85.

The use of "Route-retailing information system" is stressed.

161 Ahmed, Iftikhar, Green Revolution with or Without Tractors: The Case of Sri Lanka. Autumn 1975. 6(2): 86-90.

There is evidence that in the shortage of tractors and the prohibitive hire costs of tractors, there is an increasing demand for buffaloes, particularly for ploughing. If this is ture, then the old argument that agro-climatic conditions were unfavourable for buffalo ploughing does not appear to be conclusive. It might be possible to find the appropriate technological answers that would make buffalo ploughing efficient.

162 Chakkaphak, Chak, Summary Report on Agricultural Mechanization and Development in Indigenous Farm Machinery Production in Thailand. Autumn 1975. 6(2): 99-102.

The status of the development of small machines, commercial production of local machines, machine shop types, opportunities for indigenous farm machines and list of farm machinery manufacturers in Thailand are presented.

163 Vo-Sang-Nghiep, Outline of the Policy for the Development of Agricultural Machinery in Viet-Nam. Autumn 1975. 6(2): 103-104.

With its new policy, the Director of the Agricultural Machinery Directorate will try to set up a solid basis for agricultural mechanization and hope to bring to Viet-Nam farmers higher income, easier working conditions and higher standard of living in the rural areas.

164 Kishida, Yoshisuke, At the IRRI International Conference. Autumn 1975. 6(2): 105-109.

This conference held during May 6–9, 1975 at the International Rice Research Institute, Philippines discussed how to transfer information, technology and talent of developed countries to the developing countries.

165 Kishida, Yoshisuke, Preface. Winter 1976. 7(1): 13.

Extension of multiple-cropping methods is essential for solving agricultural problems in developing countries and all resources should be timely and efficiently utilized.

166 Esmay, Merle and Gaiser, David, The Interdependence of Selective Agricultural Mechanization and Local Manufacturing in Developing Countries. Winter 1976. 7(1): 15-20.

The interdependence of selective agricultural mechanization and appropriate local manufacturing has been substantiated. Intermediate technology selected for maximizing land productivity and labor utilization is fortunately most adaptable to local manufacturing as compared to complex, expensive machinery. No country on a long term basis can afford the imbalance of payments drain and dependency status associated with the importation of agricultural mechanization technology for food production.

167 Singh, Gajendra and Chancellor, William J., Changes in Energy Use Patterns from 1971 to 1974 on Selected Farms in a Farming District in Northen India. Winter 1976. 7(1): 21-24.

Farms (in the Meerut district of India) using all levels of technology made dynamic changes in their operations during the three-year period examined. The main change was the increased use of irrigation water from electrical or diesel-powered tubewells. There was a general increase in intensity of production and the use of energy-supplying inputs. These included permanent labor, and draft animal power as well as electric motors, diesel engines and tractors.

168 Moens, A., Development of the Agricultural Machinery Industry. Winter 1976. 7(1): 25-31.

The transfer of capacities and experiences on all levels of agricultural mechanization training from the industrialized world to the industrializing countries is essential.

Regional and national committees and centres for development of mechanization strategies and acting as information centres on agricultural mechanization should be considered.

169 Weil, W. S., Mechanization of Agriculture in Relation to Development in Developing Countries. Winter 1976. 7(1): 32-37.

The author elaborates on the direction of agricultural mechanization in Burma, Israel and Iran.

Burma: Introduction of mechanization of agriculture on a national scale could not attain the expected "break-through" as soon as it met the traditional farm and village structure, without the support of a basic and overall development effort. On the other hand, well planned settlement on a modern basis showed an anticipated result, although on a comparative small scale (at that stage).

Israel: Large-scale mechanization, backed by all the means and facilities of modern planned agriculture, attained the look for "break-through"; increasing agricultural production by many hundred percent, freeing a large percent of labour, formerly employed in agriculture, to shift to industry or any other form of production.

Iran: Concentrated a very large amount of the nationally available skilled personnel in one comparatively small district to implement a "Master Plan" which could serve as a trial and training project for the whole country.

170 Johnson, Loyd, Mobility Equations for Pneumatic Tire Performance in Soft Clay Soils. Winter 1976. 7(1): 38-46.

The development of accurate prediction equations for pneumatic tires on plastic clay soils is possible and equations for pull and rolling resistance under different soil parameters are useful but primitive prototypes.

171 Jain, B. K. S., Professional Consultancy Service in Agro-Industrial Development. Winter 1976. 7(1): 47-50.

In the context of the need to raise agricultural production and productivity, organizing professional technical consultancy services in the agro-sector will make a significant contribution.

172 News. Winter 1976. 7(1): 59-65.

Quick, easy soil salinity measurements. IRRI names two new rice varieties. New wheat provides valuable protein. Edouard Saouma of Lebanon elected Director-General of FAO.

173 IRRI Publications. Winter 1976. 7(1): 67-71.

The publications from International Rice Research Institute in the area of irrigation, tillage, fertilization, planting, pest control, weeding, harvesting, rice milling, drying, mechanization in agriculture development, economics of mechanization, economic studies of rice production and machinery marketing are listed.

174 Shin-Norinsha Co., Ltd., Remarkable Machinery and New Products – Show Report from Europe. Winter 1976. 7(1): 72-73.

The report summarizes the highlights from the 6th EIMA (Esposizione Internazionale delle Industrie di Macchine L'Agricoltura) held at Bologna, Italy, Dec 19–23, 1975. Some 670 companies from 125 countries participated.

175 Kishida, Yoshisuke, Preface. Spring 1976. 7(2): 7.

The AMA Editor stresses that the most important point is to bring up specialists, especially design engineers in order to accelerate the technology transfer in farm mechanization to the developing countries.

176 Kilgour, J., Low Cost Primary Cultivation – a Proposed System for Developing Countries. Spring 1976. 7(2): 9-19.

This paper discusses the "small" tractive system to enable the traditional farmer in a developing country to achieve timeliness of cultivation at a price but profitable farming nevertheless.

177 Nagahiro, Jinzo, Agricultural Mechanization Program of China to be Realized in 1980. Spring 1976. 7(2): 20-25.

The main targets of the Fifth Five-Year Plan are to carry out large scale agricultural civil construction work named the "Farmland Capital Construction" to the full extent, to complete agricultural mechanization by leveling

up degree of implementation to about 70% from 30% at present thus modernizing agriculture and increasing food production efficiently and to attain self-sufficiency of food and to establish sufficient food storage system by 1980.

178 Jain, B. K. S., Transfer of Agricultural Engineering Technology to Rural Masses. Spring 1976. 7(2): 26-29.

Agricultural engineering technology, agencies responsible for the transfer of technology, and rural masses are identified under Indian conditions as the key elements in agricultural engineering advances.

179 Ulusoy, Ediz, Agricultural Mechanization in Turkey. Spring 1976. 7(2): 30-33.

This paper presents an overview of the research and development needs of agricultural machines, trends in machinery use and present state of mechanization in Turkey.

180 Patel, S. L., Demonstration and Calibration of Sprayers. Spring 1976. 7(2): 34-37.

The major emphasis in the paper is calibration of hand compression and knapsack sprayers.

181 Koga, Yasumasa, Topics on and Around Post-Harvesting Stage of Rice —Is Small Rice Mill Wasteful? Spring 1976. 7(2): 38-40.

Expansion in paddy fields and other improvements on the productivity of land cannot be attained without much cost. Compared to these, the reduction of wastage can be much cheaper to attain with the same result. The development of advanced type of small-scale rice mills should be encouraged.

182 Peng, Tien-song, Agricultural Mechanization in Taiwan. Spring 1976. 7(2): 47-59.

This paper attempts to describe briefly the process of agricultural mechanization in Taiwan and the related problems. Positive measures to bring about an expansion of the size of private farms, improvement of farmers' organizations and encouragement of joint or cooperative farming are considered essential.

183 Khan, Amir U., Agricultural Mechanization and Machinery Production in China. Spring 1976. 7(2): 60-65.

The author sees no major technical bottlenecks to the mechanization of agroclimatic zones of China.

184 News. Spring 1976. 7(2): 70-73.

Rural development experiment finds frustrations, successes. World Foodgrain Outlook, 1975-76. New technique saves irrigation water.

185 Kishida, Yoshisuke, Preface. Summer 1976. 7(3): 13.

Mechanization of agriculture in the developing countries is an urgent problem which is not likely to be resolved without cooperation from the developed countries.

186 Feinberg, Wilburt, Agricultural Implements and Hand Tools Industry Survey in Thailand. Summer 1976. 7(3): 15-20.

Implements in use, being produced and sold for local farming conditions; production techniques and processes; implements for future development surveyed in the Northern Region of Thailand is the subject of the report.

187 Balis, John S., An Analysis of the Options for Farm Mechanization. Summer 1976. 7(3): 21-27.

This paper briefly reviews the current state of the art of farm mechanization and describes options open for development assistance by USAID.

188 Jain, B. K. S., New Agricultural Techniques. Summer 1976. 7(3): 28-30.

Progress made on various fronts in India's agriculture during 1966–1976 is reviewed by discussing the inputs such as seeds, fertilizers, farm mechanization, irrigation, plant protection, education and farm sizes.

189 Campbell, J. K., Development and Manufacture of a Thresher for Developing Countries of Southeast Asia. Summer 1976. 7(3): 31-34.

This paper describes some of the design parameters and manufacturing conditions required for the successful design of a thresher for use in the rice producing areas of Southeast Asia.

The thresher described is the 7-hp axial-flow thresher developed by the International Rice Research Institute (IRRI) in the Philippines.

190 Ishihara, Akira, Study and Discussion on Several Problems for Farm Machinery Education in Iran. Summer 1976. 7(3): 35-46.

The author feels that one of the most important problems in the development of rural vocational education in Iran is increased farm machinery education.

191 Konaka, Toshio, Agricultural Mechanization in China. Summer 1976. 7(3): 47-50.

The author reports on his experience during a three-week trip to China as a participant in the Japan-China Exchange Mission in the Summer of 1975.

192 Tunaligil, B. G., The Agricultural Mechanization Activities in Turkey. Summer 1976. 7(3): 55-60.

Bottlenecks influencing the agricultural mechanization in Turkey are indicated. Mechanization is helpful for the development of Turkey provided it is organized carefully.

193 Yamashita, Ritsuya, Problems at Paddy Drying and Rice Whitening in the Philippines. Summer 1976. 7(3): 61-72.

The paper reports on the author's investigation at defining the proper method that decreases rice grain losses in an after-reaping process in the Philippines. The investigation was focused especially at the whitening loss of rice and problems on drying and storing.

194 Koga, Yasumasa, Topics on and around Post-Harvesting Stage of Rice. Summer 1976. 7(3): 73-74.

The author stresses that agricultural mechanization may progress step by step according to natural and socio-economic situations encouraging the use of indigenous devices.

195 News. Summer 1976. 7(3): 77-80.

The news briefly describes i) Korean Society of Agricultural Machinery activities; ii) start of the kenaf projects in Sudan; and iii) root zone placement stretches scarce agricultural chemicals at IRRI.

196 Kishida, Yoshisuke, Preface. Autumn 1976. 7(4): 11.

The abnormal weather of 1976 in Europe and Japan indicated that timely farm work was most important and it was possible only with mechanization.

197 Crosson, Pierre R., Institutional Obstacles to Expansion of World Food Production. Autumn 1976. 7(4): 13-19.

The essential condition for increasing yield in less developed countries is that farmers increase their use of non-land inputs per unit of land.

198 Janzen, Daniel H., Tropical Agroecosystems. Autumn 1976. 7(4): 21-31.

The author lists the ways in which the lowland tropics are not such a warm and wonderful place for the farmer, some of the reasons why it may be unreasonable to expect them to cope with the problems.

199 Vyas, R. K., Sprinkler Irrigation for Water Conservation in India. Autumn 1976. 7(4): 32-34.

The wise use of water and water conservation in connection with irrigation involves effective utilization of a total supply of fresh surface water and ground water. Central and State Governments should help all those who are willing to spread the techniques of conserving water by sprinkler irrigation and join the war against the national waste of water, developed at a very high cost. In the national interest every drop of water should be utilised as beneficially as is possible. Sprinkler irrigation is one of the means of accomplishing this objective.

200 Srivastava, A. C., Strategy of Farm Mechanization in India. Autumn 1976. 7(4): 35-40.

The 'Gray Revolution' is the only supplement to 'Green Revolution' for increasing the food-grain production in India. Estimated demand of tractors per year is expected to shoot up to 77,000 units by 1978-79 from 39,100 of 1973-74. Such increase in power input to agriculture helps in increasing the net utility of land. Though there are a number of machineries

available for farming but the suitable match to specific region placed another limitation towards the efficient use of power input. The paper emphasizes the qualitative and quantitative need of mechanization in India.

201 Uichanco, Edilberto A., Mechanization and Increased Efficiency in Sugarcane Production: An Industry Goal. Autumn 1976. 7(4): 41-44.

The author does not advocate complete mechanization at the outset but rather a gradual and sensible change for the mechanization of sugarcane production in the Philippines.

202 Cabanilla, Liboro S., Economies of Size in Sugarcane Farming. Autumn 1976. 7(4): 51-55.

This study at Negros Island in the Philippines indicates that three major factors of production (land, labor and capital) earned higher returns on the large farms than on the small farms.

203 Larson, G. H., Jensen, J. C. and Schield, V. L., Evaluation of Small 4-Wheel Riding Tractors for Developing Countries. Autumn 1976. 7(4): 56-58.

Where there is need to increase food production the small farmer could possibly expand his operation by means of the small tractor provided some means or scheme can be worked out to handle the high initial investment of equipment.

204 Esmay, Merle L., Wilkinson, Robert H. and Illangantileke, Sarath. Traction Assist for a Two - Wheeled Paddy Tractor. Autumn 1976. 7(4): 59-64.

The principle of the cable and winch, as a traction aid proved to be workable mechanism for efficiently moving a two-wheeled tractor through soft soils with low trafficability. Adaption of this mechanism in soft unproductive and abandoned lands would help utilize limited land resources to a maximum, so as to contribute to the increase in total rice output of a nation. The extra expenditure incurred in adapting this system seems justifiable.

205 Sakai, Jun, Historical Review of the College/ University Education in Agricultural Machinery and Mechanization in Japan. Autumn 1976. 7(4): 71-81

In the first part of the report, the general development process of the whole education system in Japan is described, including the historically important national background. The historical development process of college/ university education and research system in the fields of agricultural machinery and mechanization as a part of agricultural engineering field, is explained in the last part of the report.

206 Iseki Agricultural Machinery Mfg. Co., Ltd., Driver-Less Combine Harvester. Autumn 1976. 7(4): 82-89.

The ISEKI's driver-less combine harvester Model X-HD 1500D is designed to enable three types of operations. The machine is operated in a conventional way with an operator on it. A partially automatic operation is also possible. And, full automatic operation is, of course, available.

207 Kaneko Agr. Machinery Co., Ltd., Technical Data for Floating Dryer. Autumn 1976. 7(4): 90-95.

The technical purpose of floating dryer is that, "The received combine harvested paddy should be promptly dried to a half dried condition so that an existing dryer system can perform its drying operation as planned".

This company has developed the floating dryer based upon the flow layer drying system, which is the most suitable means for the above-mentioned purpose.

208 Kishida, Yoshisuke, Preface. Winter 1977. 8(1): 11.

The AMA Editor realizes the importance of communication among people concerned and their efforts so that various problems on agricultural mechanization can be cleared up in cooperation with every person concerned with agricultural mechanization in the world.

209 Simon, J. L. and Love, Douglas, Is Population Growth Really Bad for LDC s in the Long Run? Winter 1977. 8(1): 13-20.

A model that embodies other elements discussed in the qualitative literature as being important; demand effects on investment (emphasized by the historians of England), the work-leisure choice, variations in work

activity as a function of differences in needs and standards of living, and economies of scale. The model also embodies elements recognized elsewhere in the development literature as important: intersectoral shifts in labor, depreciation, and land building.

210 Myers, Claudia A. and Stout, Bill A., Solar Energy Use in Agriculture. Winter 1977. 8(1): 21-27.

This paper discusses solar energy applications with emphasis on agricultural use.

211 Mckell, Cyrus M., Arid Land Shrubs—A Neglected Resource. Winter 1977. 8(1): 28-36.

In this article the author discusses some misconceptions about shrubs, adaptive features of shrubs that enhance their success in arid lands, and some ways in which shrubs can be used to the betterment of mankind.

212 Sanchez, P. A. and Buol, S. W., Soils of the Tropics and the World Food Crisis. Winter 1977. 8(1): 37-43.

This article outlines the salient properties of soil in the tropics and the role of these soil types in world food production.

213 Bruwer, Jabez J. and Crosby, Charles T., Agricultural Mechanization in the Republic of South Africa. Winter 1977. 8(1): 45-50.

In this paper a short description is given of the agricultural situation in the Republic of South Africa and the present status of agricultural mechanization. The research, testing and extension activities of the Division of Agricultural Engineering of the Department of Agricultural Technical Services are reviewed. The agricultural engineering educational programs offered are mentioned and the status of the profession in the country is discussed. The important role mechanization will play in the future is highlighted.

214 Hussain, A. A. Mainul, Present Agricultural Situation in Bangladesh and Future Strategies. Winter 1977. 8(1): 55-59.

It is argued that mechanization of land preparation would result in better quality of land preparation and timeliness of sowing and transplanting operations. This form of mechanization would be able to increase yield per unit of land area and increase this intensity of cropping from the present level.

215 Uichanco, Edilberto A., Technological Aspects of Large-Scale, Corporate Rice Projects: A Pioneer Industry. Winter 1977. 8(1): 60-62.

Large-scale rice production at present offers exciting challenges in Philippines. It can reap great rewards or it can incur losses of higher magnitudes. Corporations are accepting this challenge because a well-fed population will generate a healthier business climate.

It cannot be over-emphasized that proper drainage is the key to obtaining efficiency in large-scale crop production. Efficient management likewise can spell success or failure of a project.

216 Yadav, R. C., Stand Establishment of Pearl Millet in Relation to Seed Drills. Winter 1977. 8(1): 63-65.

Field studies on the evaluation of seed drills components involved in the processes of seed metering, furrow opening and post sowing compaction for proper stand establishment were conducted in loamy sand soil. Seed drill with fluted roll metering device, hoe type furrow opener and 'V' shape solid iron press wheel was found to result in the highest grain yield. Post sowing packing resulted in better germination and seedling emergence and higher grain yield in India.

217 Ghosh, Biswa N., A Bicycle Operated PTO Unit for Small Farms. Winter 1977. 8(1): 66-68.

The bicycle as source of power can be utilized for agricultural mechanization purposes where electricity or internal combustion engine is neither available nor practicable due to fairly high capital and maintenance costs.

218 Bedri, Mohamed A., Study of Assembly and Manufacture of Motor Vehicles, Tractor and Agricultural Machinery in Sudan. Winter 1977. 8(1): 69-74.

This paper provides an overview of the agricultural economy, production and mechanization and market projections for agricultural tractors and implements in the Sudan.

219 Kishida, Yoshisuke, Preface. Spring 1977. 8(2): 9

Although the standard of living in developing countries is getting high, the gap between these countries and advanced countries is getting large, on the other hand. Through communication, one can approach the objective, i.e., comfortable and peaceful life for mankind.

220 Choudhury, Md. S. U., Al-Fakhry, Abdullah A. K., Ismail, Laith K. and Vartanian, Karekin Y., Mechanized Tillage—Dryland Farming in Iraq. Spring 1977. 8(2): 11-16.

The concept of minimum tillage appears very attractive for Iraq since there is a possibility of reducing the costs and also gaining benefits from the standpoint of soil and moistre conservation. Investigations should be conducted to find the best tillage practice for the particular regions of Iraq so that optimum crop production can be achieved with available soil and moisture conditions.

221 Uichanco, Edilbert A., Mechanizing the Sugarcane Industry in the Philippines. Spring 1977. 8(2): 17-20.

The author does not propose a complete mechanization at the outset but rather a gradual and rational change in operations like tillage, crop care, land forming and drainage, irrgation, harvesting and post harvest, and crop handling in mechanizing the sugarcane industry in the Philippines.

222 Jain, B. K. S., Agricultural Engineering in India — Its Relevance and Importance. Spring 1977. 8(2): 21-24.

Agricultural engineering has to play a very important role in national programs of India and projects in the area of agriculture, irrigation, rural electrification and development, and mechanization.

223 Mahmud, Zahid and Thanh, Ngiyen Cong, Tapioca Chips and Pellets—An Improved Technology. Spring 1977. 8(2): 25-30.

The purpose of this study was to investigate the parameters affecting the drying and pelletizing of tapioca chops in order to obtain a good product with constant and optimal quality under conditions typical of rural areas in Thailand and similar agro-economic regions of Southeast Asia.

224 Mahmud, S. H., Prospects of Appropriate Technology Applications on the Farm Front in Pakistan. Spring 1977. 8(2): 31-34.

The development of a productive small farm will contribute to integrated rural development and national growth as these small farms in return create market demand for the consumer goods and tools necessary for the growth of national industries. To this end, one may look forward to foreign aid, but should not depend on it.

225 Khan, Amir U., Small Farm Mechanization in Pakistan,. Spring 1977. 8(2): 35-37.

Pakistan must place a major emphasis on the development and local manufacture of appropriate tractors and farm machines which could meet the needs of the medium size farmers (10-50 acres) and which could be manufactured by small scale metal working firms in the country.

226 Bala, Bilash Kanti, Agricultural Mechanization in Bangladesh. Spring 1977. 8(2): 40-44.

Agricultural mechanization in Bangladesh should not adopt the complex, labour efficient mechanical power units and equipments. As Bangladesh has too many people to feed, she must adopt selective mechanization.

227 Sakai, Jun, Some Design Know-hows of Edge-curve Angle of Rotary Blades for Paddy Rice Cultivation. Spring 1977. 8(2): 49-57.

The author developed an ideal edge-curve of rotary blades for Asian paddy rice cultivation. There is apt to have machine trouble of grass and straw around blade and axle.

228 Hussain, A. A. Mainul, Use of Parameter Influence Coefficient in Model Matching Technique of Human Operator. Spring 1977. 8(2): 58-61.

Tests in which the transfer function of human pilot has been measured show that the pilots change their transfer function whenever any element of the control loop is changed. However, fairly consistent results in terms of closed loop characteristics are obtained. Display sensitivity, controlled element dynamics, break frequency of the random signal all of these effect the transfer function of human pilot. The method described in this article matches

the unknown parameters automatically with the human pilot so that error criteria function is minimized. Thereby a mathematical representation of the dynamic response characteristics of human pilot is obtained. This is of great importance in developing control element dynamics for aircraft, automobile and satellite.

229 Sharma, A. C., Farm Mechanization in Punjab. Spring 1977. 8(2): 62-64.

This paper investigates the present and projected pattern of mechanization and examines its economic implications in the Punjab state of India.

230 Singh, Karam and Sondhi, Rajinder, Institutional Growth and Disparities in a Growing Economy—The Punjab Case. Spring 1977. 8(2): 65-72.

The authors investigated the gaps in the cooperative loans between various districts of Punjab state (India), including the other institutional factors along with their contribution which led to the gap in the cooperative credit.

231 Farm Machinery Industrial Research Corp., The Collection of Photos and Specifications—The Recent Condition of Tractor, Transplanter and Combine in Japan. Spring 1977. 8(2): 73-83.

Items included in this collection are: 32 wheel tractors, 13 rice transplanters and 21 head-feed combines.

232 Kishida, Yoshisuke, Preface. Summer 1977. 8(3): 11

The problem of starvation in the world involves farm mechanization in the developing countries. Without this revolution, man's dream of living in space will never come true.

233 Mahmud, S.H., New Power Tiller Developments at the International Rice Research Institute. Summer 1977. 8(3): 13-20.

This report outlines the design and development efforts in producing a second generation IRRI power tiller. The first commercial design released in 1972 used a gasoline engine and a transmission system utilizing sprockets and chains which enabled local production at low cost. The sharp increases in fuel prices in recent years have caused a measurable change to diesel power for the prime mover. Farmers using the early IRRI power tiller experienced difficulty in maintaining and operating the machine resulting from a lack of durability and maneuverability. These two major considerations led to the design of a new 6-8 hp tiller which accommodates a diesel engine and a simple set of steering clutches of novel design.

234 Zandstra, H.G. and Carangal, V.R., Crop Intensification for the Asian Rice Farmer. Summer 1977. 8(3): 21-30.

Cropping systems research can provide substantial benefits in increased food production and increased incomes for the Asian rice farmers. The cropping systems research process developed by the Asian Cropping Systems Working Group provides a useful framework in which to attack the complex interactions between cropping systems performance and environmental conditions.

235 Toquero, Z., Ebron, L., Maranan, C. and Duff, B., Assessing Quantitative and Qualitative Losses in Rice Post-Production Systems. Summer 1977. 8(3): 31-40.

The authors estimated the degree and nature of grain loss in several components of the rice post-production system. There is need for further replication of the trials to verify the reliability of the methodology and to investigate factors other than technology which affect the efficiency of these operations. Considerable work is required at the mill level to assess comparative milling performance and to quantify the utility of milling services by location, size and type of service provided.

236 Heinrichs, E.A., Arboleda, J., Aquino, G.B., Navasero, N.N., McMennamy, J.A., and Arce, R., Increasing Insecticide Efficiency in Lowland Rice. Summer 1977. 8(3): 41-47.

Cooperative research among engineers and entomologists led to the development of an applicator for injecting insecticide into the root-zone of rice plants. Root-zone placed insecticides provided more effective insect control and higher profit than foliar sprays and broadcasting of granules, and was compatible with paddy fish culture.

237 Mainul Hussain, A.A., Effect of Tractor Tire on Soil Compaction. Summer 1977. 8(3): 55-56.

The author found that moisture content of the soil increases the compaction considerably and maximum compaction takes place under the center line of the tire. Increased compaction of the soil is reflected in the increased bulk density of the soil, decreased infiltration, permeability, void ratio and porosity, and increase in the mechanical strength of the soil.

238 Koga, Y., Rice Post-Harvest Process in Japan. Summer 1977. 8(3): 57-60.

This paper discusses rice harvest and post-harvest operations by farmers; rice procurement, processing and marketing; by-product utilization, and post-harvest loss of rice in Japan.

239 Ghosh, Biswa N., Recent Advances in the Processing of Cocoa Beans. Summer 1977. 8(3): 61-66.

The new drying system designed and developed for cocoa beans has helped to solve the most difficult problem encountered during the farm processing of the cocoa crop in Brazil, where the main requirement for maintaining quality of the end product is that drying should be a continuous operation without interruption or slowing down and that the crop is handled with extreme care to avoid bean damage.
The newly developed glass-roof dryer uses solar energy and/or artificial heat in the same installation to produce an excellent product. Also, the gas drying system can be used to adapt traditional *barcacas* and wood burning artificial dryers.

240 Takai, H., New Method for Conservation of Rice. Summer 1977. 8(3): 67-75.

The new method reported is a pilot type of the doze system based on gas-sorption principle and tested the efficiency of the dose system performed with use of propionic acid, and illustrated the feasibility of rice storage by means of chemical methods under tropical and subtropical conditions.

241 New Publications. Summer 1977. 8(3): 87-89.

Tools for Agriculture, The Green Book, Four Language Trade Mark Guide of Dutch Agricultural Machinery, IRRI Publications, Employment and Technology Choice in Asian Agriculture, and Energy for World-wide Agriculture are briefly described.

242 Kishida, Yoshisuke, Preface. Autumn 1977. 8(4): 11.

The AMA Editor reports on the highlights of the Tokyo Farm Machinery Show '77, EIMA Farm Machinery Show (Italy), and the Orange Show (Australia).

243 Bala, Bilash Kanti, Simulation and Modeling Techniques of Agricultural Systems. Autumn 1977. 8(4): 13-15.

Simulation technique possesses sufficient potentiality that it can be applied in engineering analysis, design and research. This includes simulation of grain drying, simulation of corn drying, as a research and management technique to increase the efficiency of agricultural production. Simulation of crop-irrigation, simulation of farm machinery selection, simulation of commodity production systems etc. fall in this category.

244 Patel, Sharad L., National Problem of Agricultural Engineering for Rural Development. Autumn 1977, 8(4): 16-22.

Agriculture and agro-industry are interdependent and for the development of each one. "The agriculture supports the industry and the industry develops the agriculture".

245 Yadav, B.G., Potential for Mechanization in Developing Country. Autumn 1977. 8(4): 23-28.

The following brief conclusions were drawn from the study at Orissa (India):

(1) With the use of improved implements and cultural practices saving in time will result;
(2) Cost of cultivation will be reduced;
(3) Advancement in sowing dates will be achieved. Timely planting will permit multi-cropping with high yielding varieties resulting in extra yield benefits; and
(4) Improved cultural practices, in line sown paddy will permit cross cultivation, increase aeration and improve the activity of micro-organism which will help the release of nutrients for plant use.

246 Kudo, Zyuro, Operating Cost of Rice Harvesting Patterns in Japan. Autumn 1977. 8(4): 29-32.

This study was made to determine the labor requirements and machinery costs in selected rice harvesting machinery combination in Saga Central Plain Area which is one of the most mechanized in Japan. These data are especially useful when evaluating the economic feasibility of owning and operating rice harvesting machines, as compared with hiring performance of specific operation.

247 Zachariah, P. John, Farm Equipment Standardization for Agricultural Development. Autumn 1977. 8(4): 33-37.

The present situation warrants priority attention to standardization of items that promote use intermediate/appropriate technology, code of practices for improving efficiency in the operation and utilization of farm equipment, and those that would result in reduction in initial cost, problems of maintenance and servicing and ensure operators' safety and comfort.

248 Ahmed, Iftikhar, Appropriate Rice Production Technology for Bangladesh. Autumn 1977. 8(4): 38-43.

If the national food deficit has to be reduced, agricultural unemployment and underemployment is to be diminished, the gap in the country's trade deficit is to be narrowed and the pace of agricultural growth has to be accelerated then clearly a great deal of emphasis will have to be placed on rice production in Bangladesh. Of course, improvement in any of the above indicators would largely rely on the choice of appropriate rice production technology.

249 Sarker, R.I., Artificial Drying of Rice Using a Contra-Flow Dryer. Autumn 1977. 8(4): 45-50.

This study concludes that the energy saved in the use of contra-flow drying is much higher than the static-bed drying. About 50% more grain can be dried by utilizing the same amount of heat using the contra-flow drying.

250 Ito, Nobutake, Farm Use Terrain Vehicle with Hydraulic Articulated Steering. Autumn 1977. 8(4): 55-58.

The purpose of this study is to reduce the heavy duty work in transportation and improving the difficult work in loading and unloading. Most of the conditions considered above can be satisfied with the application of hydraulic power unit. Similar vehicles can be seen in military use.

251 Ishihara, Akira, Abwalli, Abdolhossein and Arbabi, Salahadin, Farm Implements in Iran. Autumn 1977. 8(4): 59-63.

The authors made a field investigation about the farm mechanization in Iran and studied not only modern farm mechanization by using large machines but also old hand implements or animal drawn implements.
In this paper they reported about small implements in Mazandaran-, Gilan- and East Azerbaijan-state of Iran.
These results are of value for reference in discussing and making future plan for farm mechanization in Iran.

252 Sakai, Jun, Development Currents of Agricultural Machinery for Japanese Rice Cultivation and Farming Structure. Autumn 1977. 8(4): 66-78.

The development processes of the mechanization in Japan, including some failures, and the farming methods as the background of the necessities to those processes are explained, using statistical data and many pictures, in order to have the up-to-date machines for paddy cultivation in Japan understood well.

253 Azuma, Yukio, Present State of Dry Field Farming Mechanization in Japan. Autumn 1977. 8(4): 79-82.

Dry farming mechanization in the production of wheat, barley, sweet potatoes, potatoes, soybeans and peanuts is presented.

254 F.M.I.R. Corp., The Present Condition of Farm Machinery Industry. Autumn 1977. 8(4): 83-87.

The movement of farm machine manufacturers, trend of farm machinery production and distribution, and export/import trends are discussed along with problems for export/import of farm machines in Japan.

255 F.M.I.R. Corp., Tokyo Farm Machinery Show '77 (Recent Farm Machinery in Japan). Au-

tum 1977. 8(4): 88-93.

The report reviews selected products from about 900 exhibits by 62 manufacturers at this show to be held during Nov. 23-29, 1977 at Harumi, Tokyo.

256 News and New Publications. Autumn 1977. 8(4): 96-98, 101.

News relating to the Kings "instant, dustless blackboard chalk method," BW-78 rice variety for low country wet zone, tubewell irrigation project in Bangladesh, and Kishida International Award are outlined. The impact of HY Rice Varieties in Latin America, Tropical Yams and their Potential, and Multiple Cropping are new books reviewed in this issue.

257 Kishida, Yoshisuke, Preface. Winter 1978. 9(1): 9.

The AMA Editor stresses the need for more efforts about storage and distribution of agricultrual products so that surplus food in advanced countries can be used in developing countries.

258 Chang, H.S., Solar Energy Utilization in a Greenhouse Solar Drying System. Winter 1978. 9(1): 11-15.

The greenhouse solar drying system was effectively used for curing and drying tobacco with solar energy utilization. The result show that the solar system achieved an overall fuel savings of 37% as compared to a conventional bulk curing barn. The solar system can be also converted to a greenhouse to grow horticultural plant and crop seedlings. However, further design optimization of the solar system such as modification of solar energy collection and storage equipment, is necessary for making it more efficient in performance and more economical.

Solar energy research in agriculture should be encouraged so that the abundance of solar energy will be better utilized and benefit agricultural production.

259 Wijewardene, Ray, Solar Energy Power Light Crop Sprayer. Winter 1978. 9(1): 17-18.

A simple solar energy collector was used to provide all the power needed for shoulder-mounted back sprayer.

260 Esmay, M.L., Hall, F.W., Flegal, C.J., Sheppard C.C. and Zindel H.C., A Supplement Solar Heater for Egg Production. Winter 1978. 9(1): 19-22.

A low cost, flat plate, single air pass solar collector was constructed to provide supplemental heating for a 5000 - bird poultry laying house in Michigan. This heat is to be used to maintain 70°F environmental temperature, increase feed efficiency of the laying hens, maximize in-house excreta drying and minimize undesirable odors.

261 Hossain, A.A. Mainul, Solar Energy and Its Application. Winter 1978. 9(1): 23-24.

The form of energy available from the solar radiation reported so far are still more of scientific than commercial interest. The cost and complication of the devices are prohibitive compared to other conventional sources of energy now available. Harnessing of solar energy in different forms needs further investigation so as to reduce the operating and fixed costs of the devices compared to other conventional devices. However, in the immediate near future desalination of water and production of salt, and drying of agricultural products by using solar energy seem to have a promising future.

262 Khan, Amir U., Appropriate Technology for Rural Development. Winter 1978. 9(1): 25-28.

There seems to be an excellent understandng of the broader issues of appropriate technologies, however, the subject is not as well understood in its elements. Consequently, appropriate technology development efforts have been spotty and uncoordinated. Organizations concerned with the introduction of appropriate technologies need to focus their attention to solving specific bottlenecks for rural industrialization rather than spreading their limited resources too thinly in all directions.

263 Mahmud, Zahid, New Concepts in the Optimization of Irrigation Mechanization. Winter 1978. 9(1): 29-32.

In this paper, gated pipe, center pivot, drip irrigation and traveling gun sprinklers were discussed.

264 Devrajani, Bherulal T., Mechanized Tillage — Better Use of Irrigation Water. Winter 1978.

9(1): 33-38.

This article reviews and appraises the role of agricultural machinery in better use of irrigation water in Pakistan.

265 Abdoun, A.H. and Mohammed, I.A., Testing MF-400 Combine Harvester under Conditions of the Sudan. Winter 1978. 9(1): 39-42.

This study determined the best adjustment for the MF-400 combine in order to minimise the losses in certain parts of the machine. It is evident that the characteristic of grain sorghum could affect threshing performance. Air blow has good influence in the rate of loss.

266 Barton, P.S., Some of the Engineering Aspects of a Simple, Low-Cost Rice Bran Stabilizer. Winter 1978. 9(1): 43-46.

This paper concentrates on the engineering aspects of rice bran stabilizer using dry heat treatment and moist-heat treatment.

267 Takai, Hisamitsu, Storability and Palatability of the Propionic Acid-Treated Rice. Winter 1978. 9(1): 51-57.

In the experiments described in this article, evaluation of storability of rice treated with propionic acid by the new dosing method was carried out, and palatability of the acid treated brown rice was tested, but solely by Danes.

268 Jain, B.K.S., Focus on Agriculture in India. Winter 1978. 9(1): 58-62.

Agriculture will require a dynamic unconventional approach calling for new strategies. Though there is lot of scope for application of traditional skills and knowledge, but new techniques and modern methods will have to be employed. Our agricultural universities have done a lot of useful work, but this work has remained within their premises. It is only through extensive training and fast spreading of education that we will be able to take development to the farmer's door-step.

269 Ishihara, Akira, The Present Status and Research on Farm Mechanization of Sandy Land Agriculture in Japan. Winter 1978. 9(1): 63-70.

In this paper, the author introduces the present status and research on the farm mechanization of sandy land in Japan. The author believes that this information is very effective and useful for cooperative activity in the field of arid land agriculture development in the world in the future.

270 Yadav, R.C. and Singh, R.P., Tillage and Practices for Arid Lands of Rajasthan (India) — A Perspective. Winter 1978. 9(1): 71-76.

Arid zone soils are mainly wind blown aeolian deposits and being cohesionless and non-plastic in nature, are subject to wind erosion. Conservation and emergency tillage have an important role to play in reducing or stopping the surface soil from drifting. Stubble mulch farming and plough plant practices are of special advantage to arid zone situation. Mould board ploughing before rains and across harrowing before sowing and sowing with improved seed drill with V-shape packers has resulted in maximum yield (36 q/ha) of bajra grains at Jodhpur.

271 Weil, W.S., Machinery and Equipment for Intensive Fish-Breeding. Winter 1978. 9(1): 77-85.

The machinery and equipments developed in Israel are briefly described, including concrete lock, slaughterhouse refuse chopper, automatic feeder, mobile sorter, electric boat, hand net and aeration equipments.

272 News, New Products and New Publications. Winter 1978. 9(1): 88-96.

Seminar on mechanization of individual farms in the tropics (Feb. 1977) at Sudan, first Expo Africa '78 (Nigeria), International Agricultural Show (West Germany) 1978, 9th International Congress of Agricultural Engineering (Michigan), and Engineering for food production in developing countries at NIAE (England) are reported. New books include Farm Machinery Directory, Agricultural Education in Europe, Agriculture Handbook No. 418, Applying Pesticides, Hand-pump Maintenance, and Annual Report of Farming Systems Research Program.

273 Kishida, Yoshisuke, Preface. Spring 1978. 9(2): 9.

To increase the production on a macro-level is a matter of great importance, but it is more important to spread the technology of agricultural mechanization to the production and consump-

tion of food on an area level.

274 Duff, Bart, The Economics of Small Farm Mechanization in Asia. Spring 1978. 9(2): 11-23.

In this paper, the author answers five basic questions relating to the use of mechanization on small farms:

1) At what point in development does a country need mechanization? 2) How do we define the size, magnitude and characteristics of the small-farm mechanization issue? 3) What types of machinery are needed on small farms? 4) What are the alternative institutional arrangements for mechanizing small farms? 5) What policies can be employed to ensure the optimal choice in both the technique and the sequence of adoption.

275 Patel, Sharad L., Plant Protection Equipment for Small and Marginal Farmers. Spring 1978. 9(2): 24-30.

To feed the future generation of India, adoption of modern farm technology and HYV is a must even if farmers adopt plant protection practices or not.

276 Hanna, George Bassily, Prospects of Farm Mechanization on Small Holdings in U.A.R. Spring 1978. 9(2): 31-34.

Small size land holdings in Egypt representing more than half the cultivated area, offer the biggest obstacle towards an agriculture run on an economical and business enterprise basis. As 70% of the national animal wealth is concentrated in holdings of less than 5 feddans, the expected increase in milk and meat production would compensate largely the machinery investment, let alone the other great benefits of the appropriate mechanization will eventually provide after its successful introduction in the small holdings.

277 Devrajani, Bherulal T., Mechanized vs Bullock Cultivation — Consumptive Water Use. Spring 1978. 9(2): 35-39.

This study in Sind Province of Pakistan was confined to i) time for applying irrigation; ii) acre inches of water applied; iii) interval of irrigation; iv) loss of water through evapotranspiration; v) consumptive use of water and its coefficients; and vi) physical differences of soil and plant growth.

278 Satake, Robert S., Status of the Rice Milling Sector. Spring 1978. 9(2): 40-44.

In the developing countries post-harvest operations must be modernized to alleviate existing food shortages as well as defer if not prevent any future serious deficits such as the one recently predicted for the mid 1980's by the Asian Development Bank. This modernization can only be accomplished by the governments of the developing countries taking an active leading role with the assistance of the developed countries which must provide sufficient financial and moral support for this important undertaking.

279 Sharma, A.C., Impact of Tractorization on Production Pattern, Cropping Intensity and Farm Income in India. Spring 1978. 9(2): 49-52.

This study furnishes some evidence to indicate that tractorization does influence the production pattern, intensity of cropping and farm income.

280 Hussain, Md. Daulat, Solar Pond and Storage of Solar Energy. Spring 1978. 9(2): 53-58.

This work investigates the potential use of solar ponds for supplying energy to operate solar-powered equipment.

281 Policarpio, Jose S. and McMennamy, John A., The Development of the IRRI Portable Thresher — A Product of Rational Planning. Spring 1978. 9(2): 59-65.

The performance of the IRRI portable thresher was compared with different types of mechanical threshers.

282 Bala, Bilash Kanti, Ziauddin, A.T.M. and Hossain, Md. Mosharaf, Resistance of Paddy to Air Flow. Spring 1978. 9(2): 66-68.

An attempt was made to obtain data on the resistance to the passage of air flow through three varieties of paddy, namely; Nazirsail, BR-3 and Chandina. These data would be useful to the designers of natural and mechanical ventilation systems.

283 F.M.I.R., New Publications and Report from

Overseas Shows News. Spring 1978. 9(2): 69-81, 84-86.

Around 200 new products were introduced at the Royal Smithfield Show, Dec. 5-9, 1977 (London) and unusal machines included a revolutionary tractor, a pea harvestor and potato selector equipment. News about the world agricultural situation; IDA assistance to India; Tobacco transplanter development, International exhibition of solar technology and equipment (Oct. 19-22, '78 at Italy); and the IX CIGR Congress, are reported. New books includes the Green Book, World Food and Nutrition Study, Farm Water Management for Rice Cultivation, Approaches to National Economic and Industrial Planning for the Developing Countries with Special Reference to Development Process of Japan, and Unused Resources in Agriculture – Japan.

284 Kishida, Yoshisuke, Preface. Summer 1978. 9(3): 9.

The highlights of the international conference on 'Agricultural Technology for Developing Nations; Farm mechanization alternatives for 1-10 ha farms held at Univ. of Illinois, USA, on May 23-24, 78' are reported.

285 Esmay, Merle L., Intermediate Agricultural Mechanization in East Asian Countries. Summer 1978. 9(3): 11-18.

The observations and impressions are presented as a part of the survey of agricultural mechanization for semi-arid tropical crops undertaken for ICRISAT (International Crop Research Institute for Semi-Arid Tropics) in the countries of Japan, South Korea, Taiwan, Indonesia and the Philippines in October and November, 1977. The five-country study is a part of the worldwide survey undertaken by ICRISAT. The objective is to bring together information on locally manufactured and utilized machinery as well as those being developed in various countries of the world. The focus was on agricultural machinery applicable to rain-fed agriculture and appropriate for small farms in the range of 10 hectares and less.

286 Bala, Bilash Kanti and Hussain, A.H.M. Sakhawat, Farm Size, Labor Employment and Farm Mechanization in Bangladesh. Summer 1978. 9(3): 19-23.

This paper aims i) to find the relationship between farm size and labor employment for different degree of mechanization; ii) to study the role that farm size plays in modernizing agriculture; and iii) to find the conditions and situations required for exploiting the potentials of the farmers.

287 Crotty, Raymond, Economies and Diseconomies of Scale in Malaysian Agriculture. Summer 1978. 9(3): 24-32.

An effective marriage of capital with smallholder labour for tree-crop production is likely to raise the cost of labour in Malaysia to a level which makes padi production with traditional smallholding technology prohibitively expensive. Large scale mechanised padi-growing is likely, under these circumstances, to be the most efficient means of meeting Malaysia's growing requirements. The efficient organisation of Malaysia's agriculture requires smallholdings to concentrate on tree-cropping and padi-growing to be undertaken by large farms, which is the reverse of the accepted view of the respective roles of small and large farms in Malaysian agriculture.

288 Rijk, A.G., Guidelines for Agricultural Mechanization in Northern Thailand. Summer 1978. 9(3): 33-38.

The present situation of agricultural mechanization in northern Thailand along with the impact of mechanization on crop yield, employment and guidelines for realistic choices are briefly discussed.

289 Chinapant, Ungthip, Demand for and Marketing of Domestically Produced Small Farm Tractors in Thailand. Summer 1978. 9(3): 39-45.

The overall objectives of this paper are to describe and analyze the marketing of small farm tractors that are produced in Thailand. Marketing is used in the broad sense; namely, all aspects of the movement of products from the producers to the final consumers.

290 Kawamura, Noboru, The Japanese Small Tractors. Summer 1978. 9(3): 46-50.

Water-proofing at the brake system, front and rear axles, PTO shaft and rotary tiller shaft; and safety and comfort of operator are big problems for the small tractors.

291 Hussain, Md. Daulat and Sarker, Md. Rafiqul Islam, Performance Studies of Country Ploughs in Bangladesh. Summer 1978. 9(3): 55-60.

With a view to collecting some information on existing country ploughs, some experimental investigations were carried out at the Bangladesh Agricultural University farm which included the measurement of drawbar horsepower, specific draft, width of cut, depth of ploughing, etc.

292 Sharma, A.P., Design and Development of a Paddy Winnower. Summer 1978. 9(3): 61-62.

Under the scheme of low-cost cultivation machinery research for mechanisation, a paddy winnower suitable to local conditions of Fiji was developed.

293 Shrivastava, N.C. and Dyck, F.B., Development of a Single-Row Safflower Harvester. Summer 1978. 9(3): 63-65.

A single-row safflower harvestor suitable for dry areas in western Madhya Pradesh of India has been developed and the authors indicate that this machine is faster and efficient than the traditional Indian sickle.

294 Van Ruiten, Harry, A Description of the Integrated Rice-Processing Complex of the Kamol Kij Company, Ltd. in Thailand. Summer 1978. 9(3): 66-68.

Commercial final products for marketing are: head rice (parboiled and unparboiled), large brokens (same), medium brokens (same), small brokens (small), brewer's rice bricks, white ash, rice bran oil (not refined), feed for livestock, pigs/pork (after installation of the slaughter house), eggs, broilers, fish, bananas and vegetables.

295 Goyal, A.K., Maheshwari, R.C. and Maiti, H.S., Process Development and Testing of Ceramic Materials from Rice Husk-Ash. Summer 1978. 9(3): 69-72.

Considering the low temperature of sintering and various properties of the ceramic specimens prepared in the preliminary investigation, it was concluded that it will be economical to produce electrical insulators containing rice husk ash as major constituents. Besides, tiles, potteries and white wares can also be produced economically.

296 Mazed, M.A. and Rahman, M.S., Introduction of Decortication of Green Jute Plants in Bangladesh and Its Prospect. Summer 1978. 9(3): 73-74.

A machine to separate green ribbons from green jute without breaking the stems has been developed and tested by the authors.

297 Lohani, B.N. and Thanh, N.C., Statistical Modelling of Tapioca Drying in Thailand. Summer 1978. 9(3): 75-80.

Regression equations have been developed to relate ambient and floor temperatures for different types of drying media. Statistical equations have also been established which relate moisture content and hours of drying by the use of polynomial regression models which can be used for tapioca drying.

298 Lewis, R.T., Engineering for Food Production in Developing Countries — Are Small Tractors Appropriate? Summer 1978. 9(3): 81-86.

This paper summarizes the proceedings of the 1978 Spring National Conference of Institutions of Agricultural Engineers held at NCAE, U.K. to discuss the economic and technical requirements of small tractors and to see how far these are met by present designs and to propose a policy for their future development.

299 New Publications and New Products. Summer 1978. 9(3): 90-95.

New publications reviewed in this issue are: Introduction to crop processing machinery, Korean agricultural machinery catalogue, AIT research summary 75-77, engineering for appropriate technology, and heuristic strategy for scheduling farm operations.

300 Kishida, Yoshisuke, Preface. Autumn 1978. 9(4): 9.

An organization is required to look back upon the history of agricultural mechanization for the last 100 years to dig up research data, patents and publications.

301 Weil, W.S., Agricultural Machinery Service Company. Autumn 1978. 9(4): 11-20.

The author participated as adviser (Consulting

Engineer) in a very large agricultural development project. The development of agricultural machinery was operated as a government department during the beginning of the project. The operation of the machinery was turned into a Service Company (non-profit) as the scope of the project expanded.

The experience, organisation and operation of this Agricultural Machinery Service Company can be valuable to other developing countries.

302 Sarker, N.N. and Singh, Gajendra, Field Study of Agricultural Mechanization in the Comilla District, Bangladesh. Autumn 1978. 9(4): 21-24.

The objectives were to compare the yields, labor use and cropping intensity on rainfed and irrigated fields and also to determine the effect of tractor tillage on yields, labor use and cropping intensity on both rainfed and irrigated fields.

303 Devrajani, Bherulal T., Ansari, Abdul Qadir and Butler, James L., Appraisal of Mechanization in Sind Province of Pakistan — A Research Approach. Autumn 1978. 9(4): 25-32.

This paper is based on a 3-year study determining the contribution of farm machinery in the production function on progressive farms using farm machines against traditional farms using indigenous implements. Efforts have been made to evaluate timing efficiences, field and economies of machine use in crop production.

304 Ojha, T.P., De, Dipankar and Rajput, D.S., Energy Requirements for High Intensity Cropping Pattern in Rice Growing Regions and Its Effect on Employment Pattern. Autumn 1978. 9(4): 33-40.

This case study (India) seeks to define areas where different power sources (human, bullock, power tiller, tractor) can be used assuming that (i) total labour demand approaches the labour availability and (ii) monthly labour fluctuation is minimum.

305 Khair, Abul and Hussain, Md. Daulat, Low-Cost Linings for Irrigation Canal. Autumn 1978. 9(4): 41-44.

A study was conducted with a view to finding out low-cost lining materials for irrigation canals. Different types of natural indigeneous materials were used for this purpose. Seepage losses through the different types of linings were measured by ponding method.

306 Kandiah, Arumugam, Some Technical and Social Problems in the Irrigation Projects of Sri Lanka. Autumn 1978. 9(4): 49-53.

Most irrigation schemes in Sri Lanka are characterized by low level of production, low water use efficiency, and low farm income. The problems are many, but one of the basic problems is the lack of effective water management at the field level. In most schemes much effort and money has been spent on the head works and hydraulics of the system with little or no attention paid to improving on-farm irrigation methods and socio-economic conditions of the farmers.

307 Bilash, Kanti Bala, Post Harvest Losses of Paddy in Bangladesh. Autumn 1978. 9(4): 54-56.

This paper gives an account of production, import, price, threshing, drying, distribution pattern and storage of paddy in Bangladesh. An account of estimates of probable quantitative losses of paddy at each stage from harvesting to retailing is also given.

These estimates are crude and suggest that scientific assessment of post harvest losses be made. It concludes that the quantitative and qualitative losses can be reduced by improved threshing, drying and storage facilities at the farm level.

308 Sheikh, Ghulam Sarwar, Ahmed, Syed Iqbal and Chaudhry, A.D., Comparative Performance of Tillage Implements. Autumn 1978. 9(4): 57-60.

A comparative study of tillage implements like subsoiler, disk harrow, disc plow, moldboard plow and field cultivator was carried out with a view to assessing their performance for a given soil and crop.

309 Sheikh, Ghulam Sarwer, Optimum Design Specifications for Planting Equipment. Autumn 1978. 9(4): 61-62.

In this study, research experiments were conducted for determining the optimum depth of planting and soil impedance for a particular

soil and wheat crop.

310 Chaudhry, A.D., Design and Development of Self-Propelled Multicrop Reaper. Autumn 1978. 9(4): 64-66.

The conventional method of wheat harvesting with sickle is a most labor intensive operation. The socio-economic and agro-climatic conditions of Pakistan have prevented the adoption of Western-type mowers and combines for harvesting grain crops. Careful investigations of grain crop harvesting with special reference to farm size in Pakistan led to development of a simple, self-propelled and multicrop reaper at the University of Agriculture.

311 Yamashita, Ritsuya and Hao, Nguyen, Utilization and Energy Conversion Furnaces of Rice Husk. Autumn 1978. 9(4): 67-72.

The fundamental properties of rice husk, its utilization and energy conversion furnace of rice husk are introduced in this paper.

312 Yadav, B.G., Potential of Bullock Cart Transport in Orissa – A Case Study. Autumn 1978. 9(4): 73-76.

Potential problems and possible solutions for bullock cart transportation in Orissa State of India are described.

313 Singh, Rajvir, Shrivastava, R. and Singh, Bhagwan, Design and Testing of Groundnut Decorticator. Autumn 1978. 9(4): 77-81.

The paper describes the design and fabrication of different components of groundnut decorticator. The various parameters such as blower speed, airflow rate, eccentric speed, cylinder speed and feed rate have been studied during the experiments. The highest decorticating efficiency (98 percent) was obtained at 100 rpm cylinder speed, 150 kg/hr feed rate and 15 percent moisture content at a clearance of 1.5 cm.

314 News, New Products and New Publications. Autumn 1978. 9(4): 84-89.

News on Kishida International Award, EIMA Specialized Farm Mechanization Exhibition 1978 (Italy), SIMA '79 (France), The Royal Smithfield Show '78 (London); and books such as UNIDO directory of financial resources, Technology for solar energy utilization, AVRDC international cooperator's guide, Equipment for rural workshops, Ferrocement water tanks and their construction, Proceedings of agricultural machinery workshop – 1974, and Muda irrigation scheme – Malaysia are briefly discussed by F.M.I.R.C.

315 Kishida, Yoshisuke, Preface. Winter 1979. 10(1): 9.

The criticism of unemployment problems due to farm mechanization is no longer valid. The gaps in agricultural mechanization can be minimized through the efforts of concerned governments, firms and technical experts.

316 Ismail, Laith K. and Saeed, Mohammad, Effect of Supplemental Irrigation by Sprinkler on Wheat Yields in Northern Iraq. Winter 1979. 10(1): 11-12.

The objective of this study was to find out the extra yield that can be obtained by the use of supplementary irrigation with sprinklers, hence determine the feasibility of sprinkler irrigation for supplementing the rainfall winter crops in northern Iraq.

317 Singh, Gajendra and Yadao, Grenaldo S., Field Study of Agricultural Mechanization in Central Mindanao, Philippines. Winter 1979. 10(1): 13-15.

A study was undertaken in 1976-77 to suggest an appropriate system of mechanization for the rice and maize crops based on farm size, cropping intensity, production and net income per unit area.

318 Devrajani, Bherulal T., Ansari, Abdul Qadir and Butler, James L., Efficiency of Machines in Sugarcane Production: Progressive vs. Traditional Farming. Winter 1979. 10(1): 16-22.

The study tried to determine the suitability of farm machinery under varying types of soil, and effects, functions and efficiency of machines on various field operations and to appraise the economic efficiency in crop production in Sind province of Pakistan.

319 Hussain, Md. Daulat, Ziauddin, A.T.M. and Bala, Bilash Kanti, Performance of Wheat Milling Process. Winter 1979. 10(1): 23-26.

Wheat milling process consists of several units

of operation. The efficiency of milling is a function of individual performance of operations throughout the milling process. The overall performance may be obtained by multiplying the performance index of each operations.

320 Weil, W.S., Rural Comprehensive Development: A Regional or District Approach. Winter 1979. 10(1): 27-32.

The existence of "Two Pole" economy, produces social and political tension. It not only products tension but is a process of mutual poisoning. Industrial and commercial development undertaken by the first group, in the big cities, destroys the economic structure of the "hinterland" and the people of the second group, of the large rural areas, take their revenge (unconsciously) by massmigration to the big cities and poisoning them.

321 Jindal, V.K. and Murali, N.S., Influence of Available Soil Moisture on Soybean Size and Its Resistance to Breakage. Winter 1979. 10(1): 33-36,41.

In this study, the soybean samples obtained through the various field experiments were analyzed to check for any possible interrelationship between the availability of soil moisture during various stages of growth and the resulting soybean size. The resistance to breakage of soybean samples was determined by a simple mechanical breakage test using a food blender and related to the representative bean size of the test sample.

322 Koga, Yasumasa, Prospects and Problems in the Promotion of Industrial Manufacturing of Rice Post-Harvest Processing Machines and Equipment in Southeast Asia. Winter 1979. 10(1): 37-41.

Without good market prospects, no industry will initiate the manufacture of post harvest machines and without distinct benefit, no farmer will be eager to use such machines.

323 Pollard, S. and Morris, J., Economic Aspects of the Introduction of Small Tractors in Developing Countries. Winter 1979. 10(1): 49-54.

It is the authors' contention that to date small tractor development has largely not answered the less developed countries' need for great farm power.

324 Demian, Tawfig F., Design Measures for Cotton Stalk Clearing Machines. Winter 1979. 10(1): 55-58.

The main objective of the present study is to examine the fundamental conditions which affect the mechanization of this operation and to provide data for guidance of future attempts where the practices of cultivation and planting need to be considered. The main procedures were to collect some basic data from actual field conditions which include measurement and assessment of cotton plant spacing and the density of plants in a row.

325 Singh, Bachchan and Thakur, Tara Chandra, Sugar Beet Hand Drill for Small and Marginal Farmers in Developing Countries. Winter 1979. 10(1): 59-63.

A hand-drawn sugarbeet drill was designed and developed for planting beets on flat ground and ridges under Indian conditions.

326 Van der Sar, T. Hand-Operated Cassava Harvesters. Winter 1979. 10(1): 64-68.

When cassava is harvested by hand, mostly simple implements are used, for example, a fork or a boom with halter to lift the roots out of the soil.
In this paper two types of cassava harvesters are described. After cutting off the stem the plant is gripped by a self-clenching pair of tongs. The difference between the two types is that the first design requires two persons and the second design can be operated by one man.

327 Patel, Sharad L., Aspee Micronizer Nozzle for Motorised Mist Blower. Winter 1979. 10(1): 69-75.

The experiments were performed by changing the conventional spray jet nozzle (AMN) in a motorised mist blower. The performance of AMN was compared with that of spray jet nozzle (SJN) and was observed that the AMN nozzle is superior. The effective swath increases when applied with AMN nozzle. The control droplet application (CDA) technique can be achieved in a better way by the use of AMN nozzle.

328 Samajpati, Jatindra Nath, Design and Construction of Deep Vertical Food Silo in Bangladesh. Winter 1979. 10(1): 76-78.

The construction of modern food silos involves large capital and is only possible for the government organizations. This type of construction will not be possible in the construction firms in Bangladesh as it will require large number of automatic equipments of civil construction.

329 Khan, Amir U., Shakoor, Abdul, Chaudhry, A. D., Chaudhry, Fateh Mohd. and Rehman, Habibur, Modification and Testing of Korean Paddy Transplanter in Pakistan. Winter 1979. 10(1): 79-85.

In 1976-77, the Democratic Peoples' Republic of Korea shipped as gift 50 machines to Pakistan. The first installment of 5 machines was airlifted. These machines were assembled at the Rice Research Institute, Kalashah Kaku, Punjab. A three member Korean technical group came to Pakistan in the summer of 1976 to assist in their initial trials.

330 News, New Products, and New Publications. Winter 1979. 10(1): 86-91.

News such as IDA to lend US$ 50 million for fertilizer plant in Pakistan, pilots trained for a war on bird pests, international symposium on Chinese cabbage, international winged bean trials; and publications such as FAO production year book (1977), Yanmar diesel engine instruction book, food and social policy, world food problem and US food politics and policies, the agricultural tractor (1855-1950) are briefly reviewed.

331 Kishida, Yoshisuke, Preface. Spring 1979. 10(2): 9.

It is necessary to produce low-priced machines for under US$500.00 for successful agricultural development in Asia.

332 Kiamco, Lawrence and McMennamy, John, Reflection of the Energy Requirements of Small Rice Farmers. Spring 1979. 10(2): 11-16.

There is a need to develop rational energy programs and policies based on a comprehensive understanding of the alternatives that will balance industrial and agricultural growth.

333 Ojha, T.P., Post-Graduate Agricultural Engineering Education in India. Spring 1979. 10(2): 17-21.

Agricultural engineering postgraduate programs at the Allahabad Agricultural Institute, GB Pant University of Agriculture and Technology, IARI, Punjab Agricultural University, Indian Institute of Technology, Udaipur University and Tamil Nadu Agric. University are reviewed by the author.

334 Sarker, R. I. and Sarker N. N., Agricultural Mechanization Strategies in Bangladesh. Spring 1979. 10(2): 22-28.

The authors believe that agricultural mechanization in Bangladesh will find momentum if devices such as repair and service centers, training and vocational centers, R & D facilities, and job opportunities center are developed. Imported implements need to be tested under local conditions.

335 Jain, B. K. S., Rural Development : Scope for Voluntary Service Organizations. Spring 1979. 10(2): 29-32.

The indicative but not exhaustive list of possible projects which can be taken up by voluntary organizations for rural development in India are described.

336 Hussain, Md. Daulat, Hussain, Md. Mosharaf, Gafur, Md. Abdul and Zahir Uddin, Md. Design and Construction of Multi-Row Seed Drill for Jute Cultivation. Spring 1979. 10(2): 33-36.

A three-row manually operated jute seed drill was designed and developed by the Farm Power and Machinery Department, Bangladesh Agricultural University.

337 Kouwenhoven, Jan Karel, Simple Relief Meter for Soil Cultivation Studies. Spring 1979. 10(2): 37-39.

To measure surface shape of ridges, beds and furrows, a relief meter was designed and developed by the author.

338 Sharma, A. P., Studies on the Mechanized Harvesting of Cassava in Fiji. Spring 1979. 10(2): 39-41.

In this paper some of the results of the studies conducted on the mechanized digging of cassava roots are reported.

339 Crossley, C. P., Theoretical Design of Small

Tractors. Spring 1979. 10(2): 49-54.

A small tractor designed for use on direct traction in developing countries needs to be robust and heavy, with large tyres, good ground clearance and an engine power of at least 9 kW. The initial and operating costs of such a unit are likely to be high and prior to an application would require careful investigation to establish whether the economic and social environments were suitable. As with all engine powered mechanization devices, the successful introduction of a small tractor would be dependent upon the existence of, or early potential for, repair and maintenance facilities, extension, credit arrangements and marketing system.

340 Sheikh, Ghulam Sarwar, Sial, Jehangir and Afzal, M., Comparative Performance of Two-Wheel and Four-Wheel Tractors. Spring 1979. 10(2): 55-58.

This study was undertaken to assess and compare the performance of different types of tractors for wheat cultivation in Pakistan.

341 Yonemura, Junichi, Farm Machinery Marketing and After-Sale Service Network in Japan. Spring 1979. 10(2): 59-63.

This paper discusses the disbribution, prices, after-sale service and distribution problems of agricultural machinery in Japan.

342 Chaudhry, A. D., On-Farm Scale System of Leaf Protein Extraction Process. Spring 1979. 10(2): 64-68.

An investigation was made to look into the economic feasibility of leaf protein extraction process on real arable farm in U.K. It was observed that a farm system that includes, as an activity, the extraction of leaf protein from forage crops for feed on the farm affecting little the farm operation, has an economic advantage, over systems with conventional forage feed production, over a wide range of cost and resources condition.

343 Sharma, K. D. and Devnani, R. S., Threshing Studies on Sunflower and Mustard. Spring 1979. 10(2): 69-72.

The objective of this study was to determine the optimum cylinder tip speed and concave clearance for the threshing of sunflower and mustard in India.

344 Goyal, Megh R., Byg, Delbert M. and Singh, Kanwar, Appropriate Technology for Cotton Production in India. Spring 1979. 10(2): 73-78.

This paper reviews the possibility of mechanizing various operations in cotton cultivation like sowing, inter-cultivation, plant-protection, defoliation, topping and harvesting. The present status of each operation in India is compared with that in the U.S.A. and U.S.S.R. Acid-delinting was done effectively by treating 1 kg of seeds with 112.5 cc of commercial grade sulphuric acid for 20-25 minutes of manual stirring. The cost was Rs. 0.50 to 0.60 per kg. There was no effect on seed germination and crop yield was increased by about 24% using acid-delinted seeds. Conventional practices consume more energy as compared to improved practices. Post-harvest technology problems, which hinder mechanization, are also discussed.

345 Bala, Bilash Kanti, Alarm, Md. Iftekharul, Paul, Amal Chandra and Shome, Aleek, Tobacco Curing in Bangladesh. Spring 1979. 19(2): 79-82.

A tobacco curing machine was designed, developed and tested by the authors.

346 F. M. I. R., Farm Machinery Production in Japan. Spring 1979. 10(2): 83-87.

Statistics about the status and trend in the manufacture of farm machineries in Japan are presented.

347 News, New Products and New Publications. Spring 1979. 10(2): 88-93.

News such as 9th session of EIMA (Italy), Agritech '79 (Israel), Solar energy symposium (Tokyo), ASAE established the new international department, and new publications 1979 farm machinery year book, price guide to agricultural machinery sales, sunshine project (Japan), Agricultural development in Taiwan (1948-78), agricultural technology for developing nations (1-10ha) are reported.

348 Kishida, Yoshisuke, Editorial. Summer 1979. 10(3): 9

The 1973 energy crunch hit hard the agricultural activities which established the need for continuing research for design and development of energy efficient machines.

349 Stout, B. A. and Myers, C. A., Energy for Worldwide Agriculture. Summer 1979. 10(3): 11-18.

This comprehensive manual is designed to put energy use in agriculture in perspective. Energy resources are tabulated and the principles and efficiency of various conversion processes are discussed along with their applications in the food system. Energy flow in the food system and energy requirements for each operation in production, processing and delivery are also presented. The paper is a summary of the FAO books available from Agric. Engineering Services, FAO, Rome, Italy 00100.

350 Chandra, S., Energetics of Crop Production in Fiji. Summer 1979. 10(3): 19-24.

This paper outlines the concept of the energetics of crop production based on actual farm data derived from Sigatoka Valley, Fiji. The energetics concept is then used to describe the case of food production on Fijian and Indian farms and how farm operating efficiency in semi-subsitence situations can be compared. Finally some policy conclusions are drawn from these measures.

351 Rijk, A. G., Experiences with Solar Powered Communication System to Support Agricultural Development. Summer 1979. 10(3): 25-27.

The objectives of this project were to establish within the Ministry of Food, Agriculture and Irrigation a permanent data and documentation center for hill agriculture; to provide technical and financial support to hill agricultural development activities; to plan projects and programmes related to hill agriculture development and to formulate a long-term development policy and plan for hill agriculture.

352 Chandra, S and Sharma, A. P., Current Status of Agricultural Mechanization in Fiji. Summer 1979. 10(3): 28-32.

The level of agricultural mechanization in Fiji is low and is likely to remain so because of the small holding system of agriculture which does not exhibit a need for capital – intensive agricultural development. In the long-run the world price of fossil fuel is likely to discourage farmers from buying tractors and other fuel consuming machines. The most appropriate production technology in Fiji may be a combination of manual, animal and tractor based systems which is already practised on most of the sugarcane and some vegetable farms.

353 Singh, Gajendra and Pedersen, T. Tougaard, Effect of Speed on Specific Draft of Moldboard and Disc Plows in Bangkok Clay. Summer 1979. 10(3): 33-38.

The effect of speed on specific draft and power requirement of a moldboard plow and a disc plow was determined. By conducting the experiments in the field the relations were developed between speed and specific draft for disc plow. No specific relationship was found between speed and specific draft for moldboard plow. Power requirement increased with speed for both moldboard and disc plows. Draft and depth were linearly related with some random deviations along the test run.

354 Devrajani, Bherulal T., Ansari, Abdual Qadir and Butler, James L., Operation of Agricultural Machinery in Developing Countries. Summer 1979. 10(3): 39-42.

This study was initiated in response to a set of coincidental concerns relating to the Pakistan mechanization program. It examines the effects of the introduction of tractor technology to farms in Sind.

355 Iyer, R. Mahalinga, Tractor Requirement in Sri Lanka. Summer 1979. 10(3): 47-50.

The number of tractors required for paddy cultivation in Sri Lanka can be estimated using the existing data giving a realistic value. The number of existing tractors can then be estimated given the supply and demand situation.

356 Ahmad, Bashir, Bullock Farming vs. Tractor Farming. Summer 1979. 10(3): 51-54.

Tractor farms and bullock farms were compared with respect to land use, cropping pattern and intensity, yield rate, farm expenditure and income, water use and fertilizer, and response to water and fertilizer in Pakistan.

357 Musignisarkorn, Charnchai, Cost-Benefit Analysis of Irrigation at the Chanasutre Land Consolidation Project, Thailand. Summer 1979. 10(3): 55-58.

The present paper reports on the results of a cost-benefit analysis of the Chanasutre Land

Consolidation Project (herein abbreviated, CLCP). The study involved analyses of economic changes brought about by investigating a selected group of farmers who have been assumed representative of all farmers in the total area. More specifically, it seeks to, by use of the cost-benefit analysis technique, estimate the costs and returns of the project which are expected to be realized from both private and social viewpoints.

358 Chowdhury, M. Y., Ali, M. A., Hamidi, A. and Hossain, M. I., The Combined Effect of Organic Manures and Inorganic Fertilizers on Quality and Yield or Boro Rice IR-8. Summer 1979. 10(3): 59-64.

The present investigation was undertaken to study the response of IR-8-288-3, a high yielding variety of rice of Boro season, to the different organic manures with various combination of supplemental NPK fertilizer application on the yield and quality, in a typical rice growing soil of the Brahmaputra alluvium at Mymensingh (Bangladesh).

359 Sharma, A. C., Decisions for Stationary Machine Operation on Medium-Sized Peasant Farms in India: An Exercise in Systems Analysis. Summer 1979. 10(3): 65-71.

This study aimed at (i) choosing among the alternative power units and their allied machinery for mechanizing stationary operations on medium-sized peasant farms in India, following systems analysis; and (ii) examining possible adjustment opportunities in the farms operated with the power unit and its associated machinery system thus selected.

360 Khan, Md. Abdul Hannan and Hussain, Md. Daulat, Effect of Stage of Harvest on the Yield and Quality of Seed and Fibre in Jute. Summer 1979. 10(3): 72-76.

The aim of this study was to investigate the effects of the method of planting and the stage of plant growth at harvest on the yield and quality of seeds and fibre in jute.

361 Tripathi, S. K., Status of Post-Harvest Handling Operations for Food Grains and Proposed Mechanization of Grain Markets in India. Summer 1979. 10(3): 77-80.

The savings from the proposed systems No. 1 & 2 in Khanna, Jagraon and Moga are considerable and the savings of this high magnitude can not be ignored. The cost of all equipment, including storage structure can be recovered within a period of 4 to 5 years out of the savings.

362 Mazed, M. A. and Khan, B. R., Use of Cow Dung Gas in Tobacco Curing. Summer 1979. 10(3): 81-82.

Tobacco is one of the most important cash crops in Bangladesh. The curing of tobacco at present is done mostly by sun drying and flue-curing. In flue-curing, coal and wood are used as fuel, but these are becoming scarce and very costly. Considering the growing scarcity of wood and coal, the use of gobar (cowdung) gas in tobacco curing is recommended.

363 Hoki, Makoto and Esmay, Merle L., Soybean Production and Processing in the Developing Countries. Summer 1979. 10(3): 83-85, 87.

The introduction of soybeans in developing countries should be done through a package program. Acceptable high yielding and disease and insect resistant varieties must be selected. Adequate cultural and weed control practices need to be developed and followed. Harvesting and post-harvest operations must be carried out in such a way as to minimize losses and maintain quality. Utilization of the crop may need to be developed in order that adequate demand for human consumption exists for the establishment of an effective marketing system.

364 News, New Products and New Publications. Summer 1979. 10(3): 86-90.

This issue includes news regarding AMA chief editor joins FAO expert panel, IRRI recommends improved rice huller. And books entitled Can Japanese Agriculture Survive? and FAO bulletin 31 – Rice husk conversion to energy are reviewed.

365 Kishida, Yoshisuke, Editorial. Autumn 1979. 10(4): 9.

There is an urgent need for international bodies, research institutions and economic analysis to undertake the reclassification, effort to group the countries of the world today into some realistic levels of economic development attainment.

366 Sakai, Jun, Some Principles of Mechanization Development for Small-Scale Family Farming. Autumn 1979. 10(4): 11-17.

Some principles for the effective diffusion of farm machinery and mechanization in developing countries that have small-scale farming systems of rice cultivation similar to Japan are discussed on the basis of the national historical experience of family farms.

367 Musignisarkorn, Charnchai, Comparative Farm Returns: A Case of the Project and Non-Project Farms in the Chao Phya Basin of Thailand. Autumn 1979. 10(4): 18-22.

The primary objective of this study is to analyze the relative rates of return to resource use and the distribution of farm income under different production circumstances.

368 Peng, Tien-song, Farm Mechanization in the Republic of China. Autumn 1979. 10(4): 23-26.

This paper describes briefly the status of farm mechanization and measures adopted in the Republic of China.

369 Rahmoo, Shaukai Ali, Henderson, Harry D., and Thierstein, Gerald E., Costs of Owning and Operating Tractors in Tharparkar District of Sind, Pakistan. Autumn 1979. 10(4): 27-30.

The main objective of this study was to ascertain the overall cost of tractors on per hour basis by individual owners, including considerations for different annual use, age of tractors, size of farms and different makes of tractors. The study was to be a guideline for optimum annual use of tractors for minimizing cost per hour. The effect of tractor age on costs should be helpful in making decisions for replacing an old with a new one at a certain age.

370 Jain, B. K. S. & Associates, Tractors in Indian Agriculture — Their Place and Problems. Autumn 1979. 10(4): 31-34.

Tractorization will improve the power input and result in higher crop production provided that the industry, government and research institutions work together.

371 Sharma, R. N., Sandardization and Quality Certification of Farm Machinery and Power: Perspective and Challenges. Autumn 1979. 10(4): 35-41.

The farm machinery and power industry is set for large scale expansion in the near future to meet the domestic demand as well as to fulfil the commitments for export. In consonance with this growth, there is a reasonable demand for the formulation of Indian Standards. Though standardization activity was started and geard to meet this demand a deeper understanding of the problem and "spade work" is necessary, before the country reaps the full benefits from national standardization which has to be a joint venture of the industry, research bodies, testing units and the ISI.

372 Hanna, George Bassily, Maksoud, Salah Eddin Abdel and Wahab, Mohamed Kadry Abdel, Effect of Field Size on Machine Field Efficiency and Ploughing Costs. Autumn 1979. 10(4): 42-46.

This paper reports on the result of investigation on the field capacity and operating cost in relation to field shape and area using two types of tractors: the standard 4 wheel type, 65 HP tractor and the small walking type tractor of 18 HP under Egyptian conditions.

373 Goyal, Megh R. and Drew, Leland O., Chisel Plowing vs. Moldboard Plowing. Autumn 1979. 10(4): 51-56.

Chisel plowing, in certain cases, offers a high capacity, low-cost alternative to MB plowing. One should match both the implements and the use to field requirements. Energy required to pull the chisel plow is less than for MB plow and chiselling is more economical. From the technical review, it is concluded that chiselling is better than MB plowing in Midwest U.S.

374 Pervez, Khalid and Jensen, Max C., Determination of the Design Capacity of Irrigation Systems Through Extreme Evaporation Technique. Autumn 1979. 10(4): 57-59.

Extreme evaporation occurences were evaluated for 11 stations in Washington State, U.S.A. where 15 or more years of usable records had been taken. Evaluations were made by applying the theory of extreme values (Fisher-Tippet Type I distribution), and the equations for the best fit line describing each function were

obtained by the method of least squares. These functions can be interpreted into design capacities of irrigation systems.

375 Dad, Monayem and Khan, Hamidur Rahman, Recent Morphological Changes in the Ganges River. Autumn 1979. 10(4): 60-62.

Some of the major rivers in Bangladesh are undergoing great morphological changes. The present study was undertaken to quantify such changes for the reach of the Ganges from Rajshahi to Gualunde. Data for this 129-km reach of the Ganges were collected from different offices of the Bangladesh Water Development Board and analyzed.

376 Andreou, Paris, Socio-Economic Factors Affecting Low-Lift Diesel Engine Pumps Irrigation Machinery in Bangladesh. Autumn 1979. 10(4): 63-66.

Studies have shown that farmers having lands up to 2.5 acres are the most progressive in adopting modern technology. Formation of the managing committees and selection of site for fielding the pump sets have direct bearing on the capacity utilization.

377 Chaudhry, Muhammad Aslan, Wheat Losses at the Threshing and Winnowing Stages. Autumn 1979. 10(4): 67-70.

The focus of the present study is the determination of produce losses in wheat at the post-harvest stage of threshing and winnowing. The factors contributing to losses are manifold and varied. They range from biological, chemical, engineering and ecological in nature to imperfect market processes.

378 Demian, Tawfig F., Hand-Pullers of Cotton Stalks of the Gezira, Sudan. Autumn 1979. 10(4): 71-74.

The experiments with the variable pulling-arm and hand-puller tend to show that an improvement has been made and the rate of work has been increased.
Further improvement of the tool needs to be considered with regard to costs and durability.

379 Exell, R. H. B., Kornsakoo, Sommai and Thiratrakoolchai, Sombat, A Low Cost Solar Rice Dryer for Farmers in South-East Asia. Autumn 1979. 10(4): 75-78, 82.

This paper describes a flat-bed dryer designed to enable the rice farmer in South-East Asia to dry his second crop in the wet season harvest. It holds 1/2 tonne of threshed paddy and has a simple solar air heater made from burnt rice husks and clear plastic sheet. The paddy can be dried in one or two days and is protected from rain. The cost of the demonstration unit was U.S.$ 120, this can be halved by using cheaper materials.

380 Sirohi, U. S. and Ojha, T. P., Systems Approach to Solving Problems of Small Farms. Autumn 1979. 10(4): 78-82.

Although 70% of the total land holdings are marginal and small yet area-wise they account for only 21% of the total cultivated area. The green revolution, more or less, did not have perceptible effect on these holdings. A mechanization programme which will allow these farmers to participate at par with big farmers in agricultural development programme is needed. In view of large number of failures in various mechanization programmes, a system approach is suggested to design and develop a mechanization programme for marginal and small farmers in India.

381 News, New Products and New Publications. Autumn 1979. 10(4): 83-89.

Bruce H. Anderson received the Kishida International Award. The alternative transportation fuels data library was set up by the US Dept. of Energy. The new publications, reviewed in this issue, are mechanization of Indian farming, protein energy requirements under conditions prevailing in developing countries, post harvest rice systems (Korea), research highlights for 1978 (Nigeria), Asian Development Bank report (1978), 1979 Agricultural Engineer's Yearbook, and a report on rice post-production technology project (1978-Philippines).

382 Kishida, Yoshisuke, Editorial. Winter 1980. 11(1): 9.

The agricultural engineers in developing countries have greatly increased in number during the 70s. However, effective communication among them has yet to be established during 80s. The chief editor stresses the need to promote farm mechanization through mutual cooperation more than ever before.

383 Moss, Charles J., The Challenges of Asian Farming to the Engineer. Winter 1980. 11(1): 11-16.

Engineers have immense challenges to face. They need a well developed sense of priorities and perspective but feeling confident that they can do much in the coming decades to play a part in feeding the ever-increasing populations of Asia even though there is little new land to be brought into cultivation.

384 Peng, Tien-song, Acceleration of Farm Mechanization Through More Adequate Financing in Taiwan. Winter 1980. 11(1): 17-18.

Unit labor productivity can be raised with the use of machines to conduct farming operations. Therefore, farm mechanization could make up for the ever-decreasing rural labor, on one hand, and promote an effective utilization of national manpower to allow a shift of the labor force from agricultural to other sectors, on the other.

385 Sakai, Jun, Research and Development Process of Designing Agricultural Machinery: Tractor as Example. Winter 1980. 11(1): 19-25.

This paper introduces the efficient research and development process of a new agricultural machinery, especially a design process of developing a power tiller and/or tractor.

386 Sharma, R. N., SI Units in Agricultural Engineering. Winter 1980. 11(1): 26-32.

The SI system is not entirely a new system. It is rationalized and coherent and non-gravitational form of the metric system. The Government of India through the revised Act on Weights and Measures have recognized this system as the only legal system in all fields of activities. It is intended that people engaged in the field of agricultural engineering would make use of SI units in their trade and profession.

387 Jain, B. K. S. & Associates, Power Tillers in Indian Agriculture — Their Place and Problems. Winter 1980. 11(1): 33-36.

The power tiller is a new technology to which the Indian farmer is being exposed. The acceptance has been slow but is catching up. For puddling of paddy fields, the power tiller has amply proven its utility. Its use on plantations, hilly terrain and small farms will considerably increase. Users of power-tillers are really torch bearers and their experience will in fact spread the technology. The cost of a power-tiller should be within reach of many Indian farmers who need a small size, low-cost unit with matching ground tools to suit local conditions.

388 Bukhari, S. Attaullah Shah, Koondhar, I. D. M. and Devrajani, Bherulal T., Tubewell Irrigation System — Installation, Operation and Cost of Water. Winter 1980. 11(1): 37-42.

The main objective of the present research was to appraise tubewells in terms of installation, operation and cost with major focus on pumping cost per unit volume of water delivered. The variation in cost per acre foot of water with annual use in hours and annual pumping in acre feet was also evaluated and appraised.

389 Baqui, Mohammad Abdul, Development of Diaphragm Pump for Low Lift Irrigation. Winter 1980. 11(1): 43-46.

A hand-operated diaphragm pump consisting of two suction chambers has been developed at the Agricultural Engineering Division of the Bangladesh Rice Research Institute (BRRI) for low lift irrigation.

390 Sheikh, Ghulam Sarwar and Pervez, Khalid, Modelling of Farm Irrigation and Drainage Structures. Winter 1980. 11(1): 51-55.

This study on modelling of irrigation and drainage structures was undertaken with a view to developing prediction equations with the help of the principles of similitude for predicting the performance of pumping machines, open channels porous media, underground drains, pipes and sewers. It was found that viscous forces for pumping machines, gravitational forces for open channels and pressure head with gravity for underground drains are the most important parameters for making predictions.

391 Islam, Md. Nurul, Ahmed, Kamal Uddin and Moniruzzaman, A. K. M., Design and Construction of Manually Operated Seed Cleaning and Grading Machine. Winter 1980. 11(1): 56-58.

This report pertains to a seed/grain cleaning and grading machine developed at the Bangladesh Agricultural University.

392 Sharma, A. P., Design, Development and Evaluation of Tractor-Drawn "Dalo" Planter in

Fiji. Winter 1980. 11(1): 59-61.

A recently developed tractor drawn "dalo" (taro) planter being used for experimental purposes to mechanize dalo production is described here. Field evaluations have indicated that this planter requires 7.5 man-hours to plant 0.4 hectare (one acre) of dalo whereas the traditional method requires a minimum of 80 man-hours to plant a similar area.

393 Singh, Gajendra, Thunyaprasart, Niyom, Cowell, P. A. and Agarwalla, J. K., A Manual Seeder for Soybean. Winter 1980. 11(1): 62-64.

In an effort to increase the use of paddy land during the dry season, farmers in Taiwan and Thailand plant soybean directly into rice stubble, thus avoiding the need for tillage. Most of the work is performed by women and is both back-breaking and time consuming. In order to improve the planting both in efficiency and convenience, a simple manually operated soybean seeder with a roller metering device was developed. The seeder is being tested, both on experiment stations and in farmers' fields, in Taiwan and Thailand and the results are very promising.

394 Sharma, K. D. and Devnani, R. S., Threshing Studies on Soybean and Cowpea. Winter 1980. 11(1): 65-68.

Threshing trials on soybean and cowpea were conducted in order to determine the effects of cylinder tip speed and concave clearance on threshing parameters and the optimum operating conditions of the thresher. With increase in cylinder tip speed, feed rate, grain output, threshing efficiency, energy consumption and grain damage increased. By increasing the concave clearance, the feed rate and grain output increased, threshing efficiency and grain damage decreased and the energy consumption remained constant.

395 Samajpati, Jatindra Nath and Sheikh, Md. Sawkat Ali, Paddy and Rice Storage in Bangladesh with Emphasis on Insect Infestation. Winter 1980. 11(1): 69-72.

The estimated storage losses in paddy and rice in Bangladesh is about 20% which is due to lack of know-how in storage technique and inadequate facilities. This paper reports on grain storage practices in transit Bangladesh and the causes of waste and loss which are mainly insects, rodents, and birds. Preventive measures are recommended.

396 Nath, Surya and Jhonson, William H., Development of Soil-Moisture Model to Predict Soil Moisture and Tractability for Harvesting. Winter 1980. 11(1): 73-78.

This model was developed taking hydrological phenomena in consideration for clay soil growing a sorghum crop. The climatological data for 1976 were taken as input data for this model. The model is very sensitive to rainfall and it predicted the soil moisture very well in the month of September; however, in October it significantly overpredicted the soil moisture.

397 Rahman, Siddiqur, Sanajpati, Jatindra Nath and Rashid, Md. Abdur, Design and Development of Hand-Operated Grain Harvester. Winter 1980. 11(1): 79-80.

Harvesting is one of the most labour-consuming farm operations in Bangladesh. Efficient harvesting is a main factor that reduces grain loss. A harvester, the subject of this report has been designed in such a way that one man can operate it easily and reap grains efficiently.

398 Chaudhry, A. D., Hanif, A. H., Rajput, M. A., Ansari, A. G. and Yasin, Mohammad, Design and Development of Jute Decorticator. Winter 1980. 11(1): 81-84.

Jute is becoming more popular amongst the farming community as it is an important source of foreign exchange earning. Preparation of jute fibre by conventional method is uneconomical and laborious as it requires large amount of water for retting. To overcome this problem separation of jute ribbon prior to retting can be done with the help of jute ribbon separating machines designed and fabricated by Pakistani engineers.

399 Hussain, A. A. Mainul, Hussain, Md. Daulat and Hossain, Md. Mosharaf, Design and Development of Neckharness for Cattle in Bangladesh. Winter 1980. 11(1): 85-89.

An experimental investigation was carried out at the Bangladesh Agricultural University Farm in order to design and construct harnesses. They were tested in the field for their hp-output, rate of work, specific draft and speed of

work. A particular harness (No. 3) was found comparatively better for field work and is recommended for commercial manufacture and use in Bangladesh.

400 News, New Products and New Publications. Winter 1980. 11(1): 90-99.

News regarding new program for international contest of agricultural cinema in Zaragoza, international farm machinery exhibition in Korea, ¥1.5 billion granted for facilities to be set up in Paraguay, Royal Smithfield 1979 show, 5th international conference on mechanization of field experiments (August 4–8, 1980) at Netherlands – are outlined. RNAM-Digest (April 1979), development forum business edition, Nebraska tractor test reports and summary booklets, farm power and machinery management, economics of tractors in Southeast Asia, and computations for studies of soil fertility and fertilizer requirements are new books reviewed in this issue by FMIRC.

401 Kishida, Yoshisuke, Editorial, Spring 1980. 11(2): 9.

The promotion of agricultural mechanization is a continued process and is important to the development of agriculture. AMA contributed its rightful share in agricultural mechanization during the 1980s.

402 Singh, Jai, McMennamy, J.A. and Singh, Gajendra, Evaluation of Selected Upland Crops Establishment Techniques. Spring 1980. 11(2): 11-16.

Three different experiments were conducted on three different crops, namely upland rice, corn, and mungbean at the IRRI experimental farm. In the tillage plots no herbicide was used for weed control while for zero tillage (used for IITA punch planter), paraquat at a rate of 0.75 kg a.i./ha was sprayed for weed control. Before starting all the experiment, the weeds and residue of the previous crops were mowed.

403 Krause, Rüdiger, Tillage and Energy Demand: Irrigated Crop Production in Semi-Arid and Arid Regions. Spring, 1980. 11(2): 17-22.

Soil cultivation and management have a basic function in irrigated crop production. Proper timing, decisive for a high productivity, is related closely to the workability and trafficability of soil. The efficiency of tillage equipment is increasing with the level of mechanization but at the same time the energy input related to the yields is increasing. Plot size and accessibility of fields are preventing an efficient use of four-wheel tractors.

404 Jafri, Kausar Ali, Bukhari, Sheruddin, and Devrajani, Bherulal T., Farm Mechanization Facilities in Hyderabad, Sind Province, Pakistan. Spring 1980. 11(2): 23-28.

This study is an effort to appraise the mechanization facilities available to farmers or in an area.

405 Bautista, Roberto C. and Castro, Jr., Eugenio C., Hand Tractors Manufactured in the Philippines. Spring 1980. 11(2): 29-38.

There are 65 known hand tractors manufactured in Philippines which command a growing share of domestic market. Hp range is 5 to 16 using imported engines.

406 Hirata, Kozo, Orchard Machinery in Japan. Spring 1980. 11(2): 39-41.

Tillage, topworking, fertilizing, intercultivation, pest control, irrigation, haulage, and harvesting machines for citrus and apple are discussed.

407 Wijewardene, Ray, Energy-Conserving Farming Systems for the Humid Tropics. Spring 1980. 11(2): 47-53.

As the mandate for research at IITA, Nigeria was clearly oriented towards the small farmer, the objective of this study was to slide down to an alternative and more appropriate system of farming that might be adopted by the small, 'non-mechanical' farmers in the developing tropical world.

408 Swain, S. and Ojha, T.P., Systems Approach in Scheduling Harvest and Post-Harvest Operations. Spring 1980. 11(2): 54-56.

The cost of production per unit yield decreases with increase in farm size for a particular combination. The traditional method of manual harvesting and threshing are suitable for 1 hectare holding. Improved machines utilizing human and bullock power are suitable for 2-hectare holdings. Power tiller harvestor, power

tiller-operated thresher with sundrying are most appropriate combination for holding in the range of 5 to 10 hectares. The combines are suitable for farms of 25 hectare or larger.

409 Sharms, A.C. and Setia, P.P., Time and Costs of Loans for Pumping Sets/Tubewells for Small-Holders. Spring 1980. 11(2): 57-60.

This paper is an attempt at investigating the pattern of loans for the small holders in India through the SMFALA for the purpose of installing pumping sets/tube-wells and the time and money costs involved in obtaining these loans with a view to identifying the need for the rationalization of the prescribed procedure.

410 Khan, Md. Motiur Rahman, Effect of Parameters of Heat Balance Method Upon Irrigation Water Requirement of Cotton Plants. Spring 1980. 11(2): 62-64.

This paper discusses the effects of parameters of heat balance method upon the irrigation water requirement of cotton plants. The loss of heat 'LE' due to evaporation depends upon the vegetative growing stages of cotton. Two years of field experimental results show that the minimum loss of heat 'LE' due to evaporation was 50, 110 and 75 percent of net heat radiation, 'R' during pre-flowering, flowering to formation of cotton bolls and during the period of maturation of cotton bolls, respectively. The cotton plant requires more irrigation water during the period of flowering to formation of cotton bolls than those of pre-flowering or maturation of cotton bolls.

411 Khan, L.R., Tingsanchali, Tawatchai and Arbnabirama, Anat, Estimation of Ground Recharge in a Basin Water Balance Study. Spring 1980. 11(2): 65-68.

In this paper attempts have been made to indicate a procedure for estimating groundwater recharge in a basin by simplified solutions of water balance equation. This will be useful in making preliminary evaluations of groundwater resources of a basin for providing optimum utilization and management of aquifers. An estimate of the availability of groundwater at the Upper Chao Phraya River Basin in Thailand was carried out using this method.

412 Bala, Bilash Kanti, Hussain, Md. Daulat, Saif, S.M. Hossain and Hussain, Md. Iqbal. Spring 1980. 11(2): 69-71.

This study determined the effects of moisture content on quantitative losses (harvesting and threshing), milling quality and nutritive value of wheat. The loss was influenced by the moisture content. Milling quality and nutritive value were independent of the moisture content during harvesting under Bangladesh conditions.

413 Thakur, Tara Chandra, Singh, Raj Deo, and Singh, Bachchan, Development and Evaluation of a Simple Tractor-Mounted Digger for Sugar Beet. Spring 1980. 11(2): 72-76.

The digger was developed in 1978 and was used over an area of 50 ha on farmers' fields in Pantnager (India) – with encouraging results.

414 Khan, M.A. and Ari, Irshad, Traction Potential of Pneumatic Tire for Tractors. Spring 1980. 11(2): 77-82.

The project "Traction Potential of a Pneumatic Tire" was undertaken at the Allahabad Agriculture Institute, Allahabad to test the Beaver Tractor Tire in the laboratory with varying drawbar pull, and wheel weights on concrete surface at a constant rotating speed of the tire.

415 University and Institute Activity News, New Products and Book Review. Spring 1980. 11(2): 83-89.

Castor bean-cum-sunflower seed dehuller have been developed at Bangladesh Agricultural University using locally available materials. Agricultural Engineering at Michigan State University is reviewed. Book reviews, in this issue are the post-harvest (Italy), glimpses of agricultural mechanization in China, rice post-production technology in the tropics, AIT research summary (Thailand), and conceptual and policy framework for industrial technology (Austria).

416 Yoshisuke Kishida, Editorial. Summer 1980. 11(3): 9.

The Chief Editor indicates his plan to publish this magazine on a bimonthly basis in near future provided financial position is reinforced - AMA also looks ahead for manuscripts on energy resources.

417 Andreou, Paris and Akramul, Aziz, An Economic Evaluation of Bangladesh's Bamail Cooperative Farming Project. Summer 1980. 11(3): 11-13.

The specific objectives of the study were: 1. To find out the comparative cost of production per "maund" of paddy in the cooperative farm and farms operated under individual management in similar conditions; 2. To determine the returns and relative net profitability of the two systems of farms. 3. To examine the causes of success/failure of the cooperative farming project.

418 Sharma, R.N., Role of Standardization in the Power Tiller Industry Development. Summer 1980. 11(3): 14-16.

The power tiller industry in India is growing and promises to contribute significantly in the mechanization of small holdings, paddy cultivation and in hilly areas. However, the high cost of the machine is a constraint in its popularization. The standardization of components and material has been recognized as one of the solutions for reducing the cost which can be achieved only if the standards already evolved are implemented.

419 Sakai, Jun and Lam Van Hai, Production Technology of Japanese Rotary Blades for Rotary Tillage. Summer 1980. 11(3): 17-23.

The objective of this paper was to review and offer a conceptional technology of production-line of rotary blades (NATA ZUME) in Japan. (NATA ZUME is the name of rotary blades in Japanese).

420 Saxena, Naresh Chandra, The Palm Oil Industry in Malaysia and Its Need for Agricultural Engineers. Summer 1980. 11(3): 24-30.

The palm oil industry in Malaysia is the second largest export earner and very well established technologically and economically. The government has recently established several agencies to develop and make the palm oil a most competitive enterprise. Future projections of both production and export of crude and refined products are very encouraging. The uses of palm oil, besides traditional ones like foodstuff and cooking media, are also being expanded rapidly in the industrial areas.

This paper stresses the need for qualified agricultural engineers to fully exploit the potential of the palm oil industry as regards optimum productivity and the right environment.

421 Oritz-Cañavate, J. and Salvador, I., Effects of Different Mechanization Levels in Spanish Dryland Farms. Summer 1980. 11(3): 31-36.

Five levels of mechanization are established for the agricultural farms, and particularized for four cases of cereal dryland farms. Based on the equivalent unit of work "Ent", an index of mechanization is defined, considering the human work and that of the machinery. Very simple expressions define work-capacity, productivity and energy consumption. The variation of these items is studied for Spanish cereal dryland farms in relation to the index of mechanization.

422 Sharma, A.P., Agricultural Mechanization in Tonga. Summer 1980. 11(3): 37-38.

There is need to develop suitable mechanization package of practices for some of the important crops in the country through the establishment of an agricultural engineering and farm mechanisation research programme.

423 Moniruzzaman, A.K.M., Appropriate Agricultural Engineering Technology for Bangladesh. Summer 1980. 11(3): 39-41.

Farming in Bangladesh is still traditional. Local technology is less efficient and less effective but can be improved. Labour, draft power and local technology are the main concerns for the development of an appropriate technology for Bangladesh and after determining the status of these components, possible solutions may be found. These solutions then can be brought into shape by following appropriately designed programmes keeping in view the socio-economic conditions of the farmers, types of soil and the available draft power.

424 Yadav, B.G., Human and Animal Energy and Farm Power Needs in Developing Countries: the Case of India. Summer 1980. 11(3): 47-50.

The land holding capacity of the average farmer is quite low and tractorization and use of other form of energy being well beyond the reach of peasant farmers in the country,

any intensified agricultural production programme may stem from that adoption of improved agricultural practices with improved tools. The animal and human energy may continue to be the most suitable power mode for many years to come. Only a few cases may be exception to this.

425 Senapati, P.C. and Das, G.K., Benefits from Dug Well Irrigation – A Case Study in Some Districts of Orissa (India). Summer 1980. 11(3): 51-54.

An assured irrigation is essential for raising crops to meet the food requirement of a growing population. As the economy of Orissa is poor, small lift irrigation projects can well replace big flow irrigation projects. Different banks are now extending loans to finance the construction of dug wells.

426 Bhuiyan, Sadiqul I., Irrigation and Agricultural Development in Bangladesh. Summer 1980. 11(3): 55-62, 65.

This paper examines some of vital issues, especially in the context of water supply from rainfall and irrigation development which is the primary requirement for agricultural mechanization and modernization.

427 Kumar, Sivala and Senapati, P.C., Irrigation Potential in Orissa – A Need for Better Planning and Utilization. Summer 1980. 11(3): 63-65.

The lack of farmers' experience with irrigation was found to be a serious limitation in achieving high production under many irrigation schemes.

428 Iqbal, Muhammed, Sheikh, Ghulam Sarwar and Sial, Jehangir Khan, Harvesting and Threshing Losses of Wheat with Mechanical and Conventional Methods. Summer 1980. 11(3): 66-70.

Mathematical models were developed for the harvesting and threshing losses of wheat in the field. The harvesting losses with manual operations increased linearly with time, ranging from 3% in the first week to 7% in the third week, after the ripening of crop, indicating that a delay of two weeks in harvesting can seriously affect crop yield. Further, grain losses from the conventional winnowing operations were as high as 10% decreasing in a non-linear fashion with distance, and becoming negligible beyond a distance of 2.50 meters. With mechanical threshers, the grain losses ranged from 2% to 6% for the different locally made winnowers.

429 Kulkarni, S.D. and Sirohi, B.S., Effect of Improved Sickle on Field Capacity and Wheat Harvesting Drudgery. Summer 1980. 11(3): 71-74.

This study was undertaken to determine necessary changes in the use of sickles developed at Indian Agricultural Research Institute. Studies were made on farmers' field and suggestions for modifications were noted.

430 Samajpati, J.N. and Sheikh, Md. S.A., Conventional Rural Storage Structures: Bangladesh Experience. Summer 1980. 11(3): 75-79.

Rural storage structures are frequently of poor construction and are susceptible to rodent and insect attack. Farmers store paddy, rice, pulse, oilseed, etc. for their own need, normally for a period of one year. Traditional storage structures like "gola", gunny bags, "dole" and steel drum are generally used in different districts of Bangladesh. Food grains are kept in all these storage structures and in most cases the structures are made air-tight by placing lids in their opening, plastered with mud and cowdung. The structures are normally kept on platforms 30 to 40 centimetres above the ground level to avoid dampness.

431 Musa, A.M.A., A Study of the Performance of Planters on Wet Clay Soils. Summer 1980. 11(3): 83-84.

The objective of this study was to evaluate mechanical planting under wet clay soils in relation to:– a) plant population or seedling emergence, b) soil compaction before and after use of planter, c) tractor slippage, d) ridge dimensions, and e) moisture content at time of planting.

432 News, New Products and Book Review. Summer 1980. 11(3): 85-93.

The news regarding 56th DLG-exhibition (West Germany), EIMA-international exhibition of farm machinery industry, 12th international conference on agricultural mechanization (Spain), regional network for agricultural ma-

chinery (Tamil Nadu, India), Israelis battle bugs with love trap, G. Wallace Giles receives Kishida Award; and the new books such as monograph on appropriate technology No. 4 (Austria), development and transfer technology series 12 (Austria), energy for world agriculture (Italy), Nebraska tractor test data 1980 and approved practices in beef cattle production (USA) are briefly reviewed.

433 Kishida, Yoshisuke, Editorial. Autumn 1980. 11(4): 9.

The theme of this issue is on cushioning the detrimental effects of the energy problems both the developed and developing countries. The universal drive for farm mechanization technology and its transfer to needy areas must go unabated despite the vagaries of nature.

434 Wieneke, W., Bin Drying of Grain and Grass with Solar Heated Air. Autumn 1980. 11(4): 11-14.

The tests carried out had the purpose of suggesting suitable solar air collectors for bin drying of grain and hay and to examine and optimize the complete system of air collector and drying plant.

435 Mann, H.S., Singh R.P. and Pande P.C., Utilizing Solar Energy for Agriculture and Development in India: Problems and Prospects. Autumn 1980. 11(4): 15-19.

A coordinated research program on operational reserach in solar energy utilization in agriculture has been recently (1979) initiated in India, with five cooperating centres, viz., the CAZRI; Punjab Agricultural University, Ludhiana; Tamil Nadu Agricultural University, Coimbatore; University of Udaipur, Udaipur; and the Central Rice Research Institute, Cuttack, in collaboration with USA. The coordinating unit is located at the CAZRI. The main objective of the project is to utilize solar energy effectively for a few selected and important agricultural applications which would have an impact on both crop production and post-harvest operations. The main thrust of the programme consists in designing, developing and field testing of solar grain dryers, besides solar energy utilization biogas plants.

436 Huq, Md. Maminul, Availability of Solar Energy in Thailand. Autumn 1980. 11(4): 20-22.

The time series of daily totals of width 100 cal/cm^2 d. Comparisons of the simulations by the process by dividing the daily totals of solar radiation into six classes of width 100 cal/cm^2 d. Comparisons of the simulations by the purely random model and the Markov chain model with the observed series of six radiation classes for different seasons of the year were made. Dividing the daily totals of solar radiation into classes of width 100 cal/cm^2 d and the hourly radiation into classes of width 10 cal/cm^2 d, fluctuations in the hourly solar radiation among these classes were examined for different seasons of the year.

437 Ghosh, Biswa Nath, Some Practical Applications of Alternative Energy Sources in Guyana. Autumn 1980. 11(4): 23-30.

The various alternative sources which are considered practical for development in the context of Guyana at present have been discussed in this report, along with a discussion of those projects which are actually under development for the purpose. It is seen from this report that a number of other potential areas of development exist where work could be initiated immediately to advantage. Two of the most important constraints in this respect are lack of finance and local expertise; further, considerable local ingenuity and a commitment to developing the potential of the country in the field of alternate energy utilization is also very urgently needed.

438 Singh, Rajvir, Maheshwari, R.C. and Ojha, T.P., Efficient Use of Agricultural Wastes for Energy Production. Autumn 1980. 11(4): 31-37.

In order to exploit the potential benefits of rice husk energy in India, the authors undertook this study on utilizing energy from agricultural wastes such as rice husk.

439 Mazed, M.A., Roy, K.C. and Satter, M.S., Performance Evaluation of Modern and Traditional Ploughs in Bangladesh. Autumn 1980. 11(4): 38-40.

This paper describes a newly designed bullock drawn mouldboard plough to enable farmers in the country to cultivate their land more efficiently. A comparison of performance of the new "Chashi" plough and the traditional

"Deshi" plough was made in June, 1979 in fallow and tilled land of different texture and consistency. The "Chashi" plough performed better in all the tests except in hard clay soil.

440 Sheikh, Ghulam S., Sial, Jehangir and Afzal, M., Disk Harrow – An Appropriate Tillage Implement. Autumn 1980. 11(4): 41-44.

In this investigation, the comparative performance of different tillage implements like tine cultivator, disk harrow and sweep cultivator was studied for wheat and corn planting on sandy loam soil. It was observed that narrow tine cultivator produced the highest penetration resistance of soil. The shear strength of soil was found lowest for operation with disk harrow and sweep cultivator. Disk harrow superseded tillage operations with narrow and sweep cultivator, as regards soil tilth and emergence/yield of crop. Further, the economic analysis indicated that two passings of the disk harrow were superior to the three passings of the narrow tine cultivator.

441 Bardaie, M. Zohadie, Economic Farm Size for Rice Combine Harvester in Malaysia. Autumn 1980. 11(4): 49-52.

Malaysian agriculture has expanded into a major contributor to the nation's economy. The introduction of modern agricultural machinery is necessary for its continued expansion. One machinery being introduced is the rice combine harvester. The economics of operating the combine can be a deciding factor for the viability of the machine in Malaysia. This factor is discussed in this paper with special emphasis given to the economic farm size. The methodology used can be applicable to other agricultural equipments as well.

442 Joshi, Hem Chandra and Singh, Kailash Narain, Development of Pantnagar-IRRI Multi-crop Thresher. Autumn 1980. 11(4): 53-63.

The objective of this study was to develop a multi-crop thresher which can thresh paddy, wheat and other grain crops successfully and make "bhusa" on wheat threshing. The basic parameters of the new thresher were decided, the components designed and fabricated and the thresher was tested for its performance on paddy and wheat crops.

443 Koga, Yasumasa, Small-Scale Rice Bran Oil Extraction System Using an Expeller. Autumn 1980. 11(4): 65-68.

These industries not only create job opportunities in rural society but also help to improve technical knowledge and skill of rural people. They help rice monoculture around the area change into multi-crop rotation farming combined with animal/fish raising, resulting in higher agricultural productivity and farmers' well-being. Agricultural cooperatives might take up such type of activity with high priority.

444 Manandhar, R.B. and Rijk, Adrianus G., On-Farm Grain Storage in Nepal. Autumn 1980. 11(4): 69-74.

Storage losses in Nepal vary considerably according to the climatic conditions, type of product stored and storage practices. In higher hill areas the only storage loss is caused by rodents while in lower areas, where higher levels of humidity and temperatures and longer storage periods are common, many of the storage problems are related to high moisture of the stored grain.

445 Sievers, Manfred, Development of the Indian Tractor Industry. Autumn 1980. 11(4): 75-84.

The main subject of this study was an analysis of the development of the Indian tractor industry between 1960 and 2000. Within this context at first the criteria of microeconomic and macroeconomic prerequisites are particularly described to develop an indigenous tractor industry restricted to Indian conditions. One criterion is an international comparison of the land and labour productivity of agricultural production and prices paid for tractors in several countries.

The sector is described by the market shares of single firms, the development of tractor prices is compared to agricultural product prices and the locations of the facilities. The growth path of the tractor industry during the next two decades is discussed under the framework of the political impacts of the Government's targets in agricultural and economic policy.

446 Kishida, Y., Letter from the editor. Autumn 1980. 11(4): 68.

446-447

The acronym AMA will no longer mean 'Agricultural Mechanization in Asia' but instead 'Agricultural Mechanization in Asia, Africa and Latin America' beginning with 1981 Winter issue of this magazine. This is attributed to the usefulness of this magazine worldwide.

447 News, New Products and Book Review. Autumn 1980. 11(4): 85-90.

Regional seminar on appropriate mechanization for rural development (Jan. 26-31, '81 at Jakarta), international symposium on sweet potato to be held in Taiwan (March 23-27 '81), Pakistan society of agricultural engineers organized, international seminar on mechanization of small peasant farming are the news indicated in this issue. Book reviews include CIAT report 1980, components for harvesting pineapple stumps (USA), Agricultural Engineers Yearbook (1980-81).

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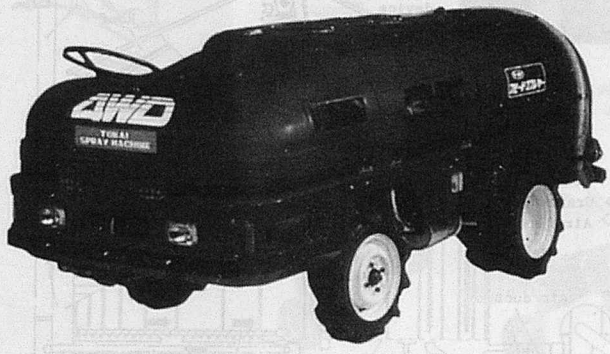

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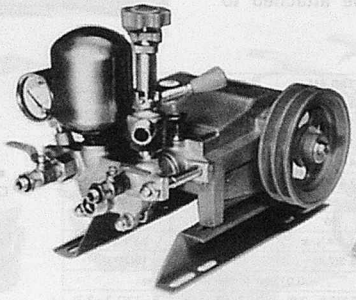

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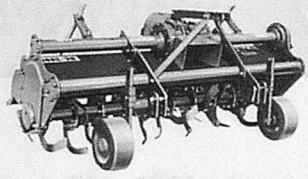

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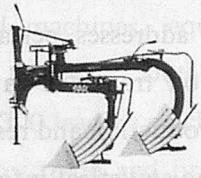

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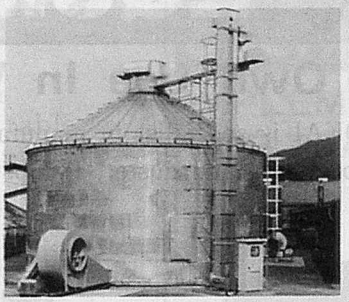

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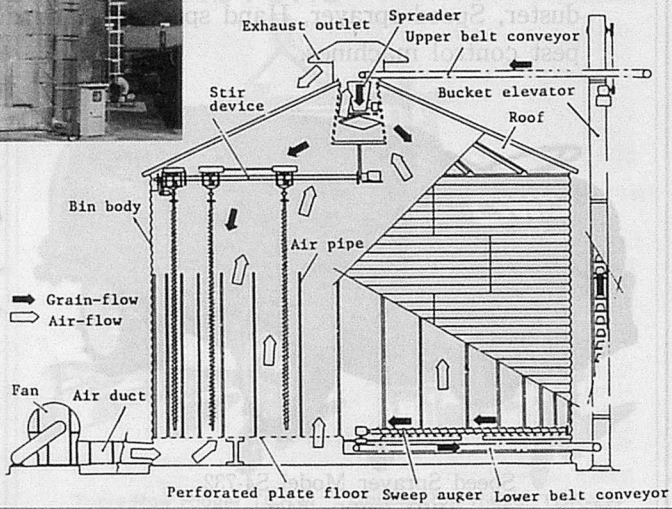

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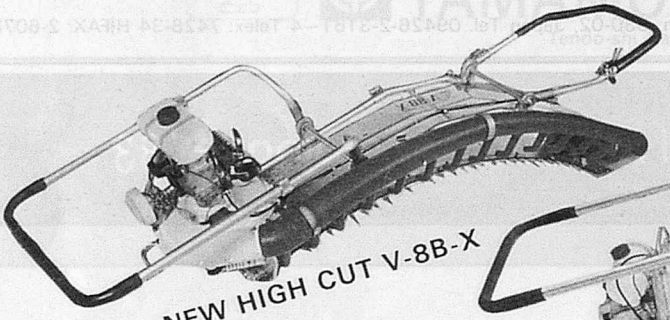

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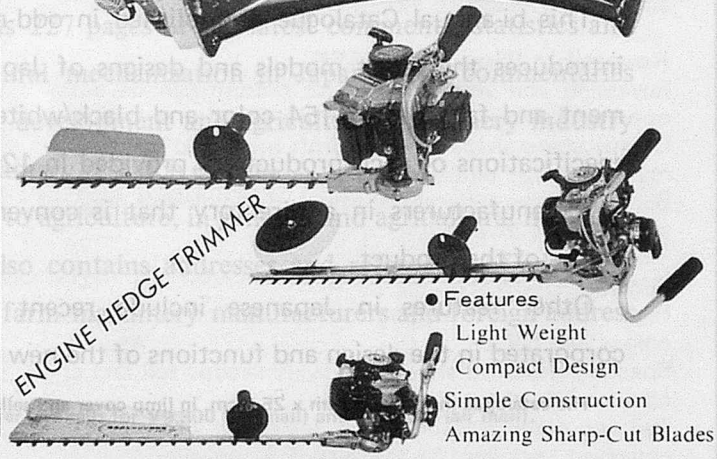

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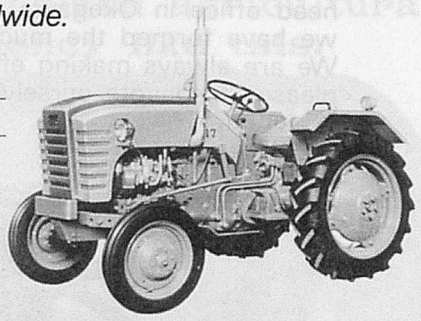
S-17 (1960)

A full-fledged tractor with a water-cooled, 17 HP diesel engine. Capable of pulling rotary or small-sized plows. Several manufacturers, besides Shibaura, start development of tractors in Japan.



S-700 (1970)

Shibaura tractor with a 2-cylinder, water-cooled 15 HP diesel engine. The first model of Shibaura's four-wheel-drive series, winning a great reputation for its greater traction force as well as stability in a slant. Currently, Shibaura offers a complete 4-wheel-drive lineup ranging from 15 HP through 105 HP.

S-2000 (1965)

Shibaura tractor with a 4-cylinder, water-cooled 30 HP diesel engine. Capable of pulling rotary plows and mowers. Shibaura aggressively extends its market abroad.

SE-2540 (1975)

Shibaura tractor with a 2-cylinder, water-cooled 25 HP diesel engine. The first model of Shibaura's SE series exclusively developed for exports. The SE series ranges from 13 HP to 40 Hp models, gaining reputation worldwide in European and South-east countries including Australia.

SD-5040T (1980)

Shibaura tractor with a water-cooled, 50 HP diesel engine. Provided with a turbocharger, it's superior in fuel economy. Worldwide attention is focussed on this turbocharged tractor. Shibaura offers 6 turbocharged model versions ranging from 28 Hp through 105 HP.

IHI-SHIBAURA

Ishikawajima-Shibaura Machinery Co., Ltd.

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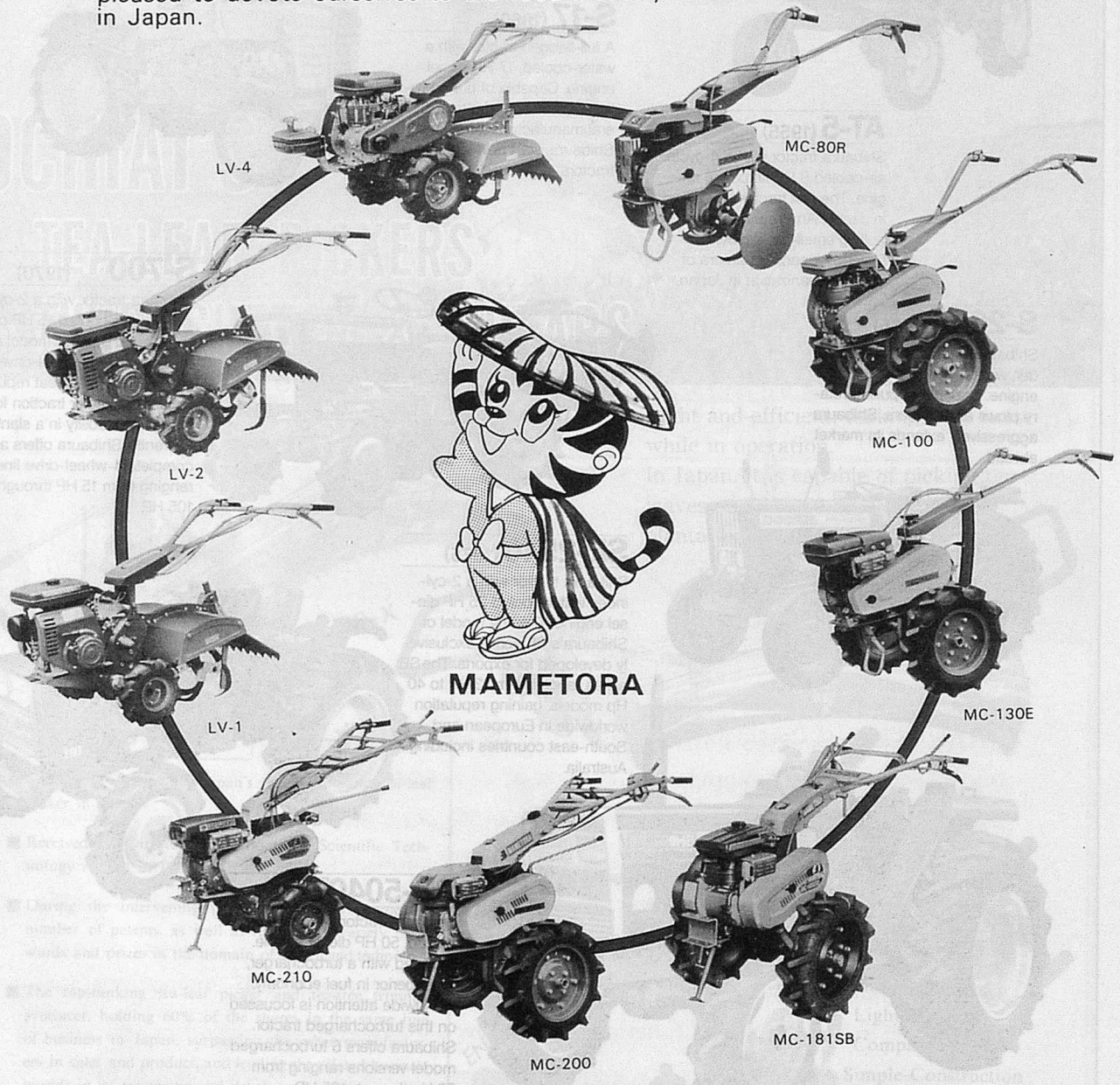
Telex: 02322128 (2322128 ISMTOK J)
02322254 (2322254 ISMTOK J)

MAMETORA DEDICATES TO AGRI

It is the motto of MAMETORA that we manufacture goods in order to meet customer's benefits with originality' trusty and hearty. In addition to the head office in Okegawa' Kisakata Factory has been established. Now that we have formed the much steadier basis as a comprehensive manufacturer. We are always making efforts to manufacture goobs of high quality and are pleased to devote ourselves to the food industry in the world as well as that in Japan.



MAMETORA AGRIC. MACHINERY CO., LTD.

HEAD OFFICE ADD:9-37, NISHI-2 CHOME, OKEGAWA-SHI, SAITAMA-KEN, JAPAN.
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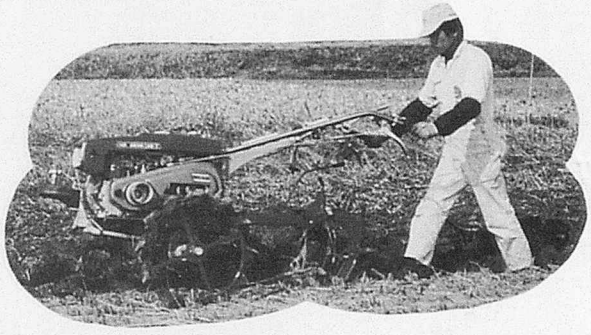
CULTURE ALL OVER THE WORLD

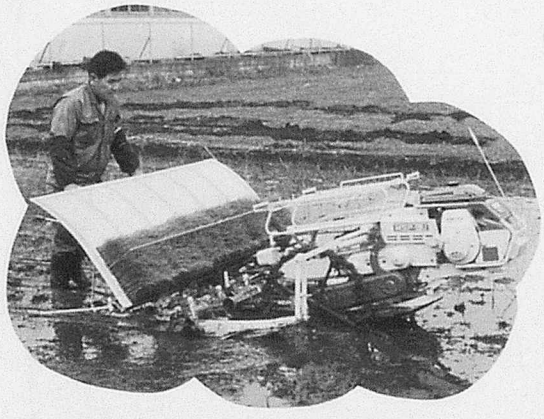
○ Preeminent above the rest for economical efficiency. Rational design. Nothing but small-sized agricultural machinery displays opration efficiency like this.

This is the first Full Automatic Transplanter TPA-1 that Engineering Division of Mametora Noki Co., Ltd. has developed for the first time in the world.
This is cassette type transplanter only to put in seedling boxes. Suitable for Chinese cabbage, lettcue, cabbage and cauliflower.

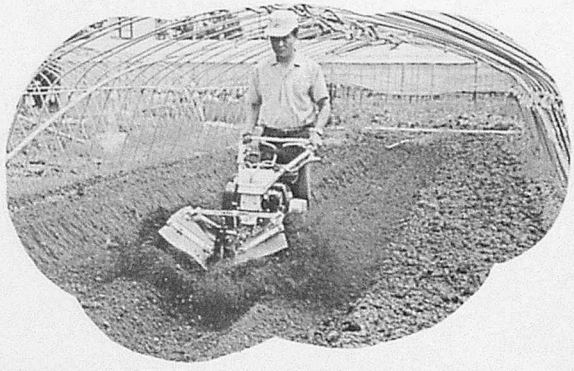
Tobacco transplanter that is mostly used for trans planting tobacco in Japan.



Plowing operation by Mametora Tiller.



Oil pressure is largely introduced to this planter, and so this Mametora Planter is easy to use. This can be used for planting all Kinds of seedlings from small to large.



Operation in a greenhouse by Return Cultivator SR Type. This has wide application for seedbed, ridge and cultivation in orchards.