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Ethiopian Institute of Agricultural Research

Agricultural Mechanization Research Directorate

Research Directory

2009-2010

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Project I: Assessment and promotion of agricultural mechanization technologies

Objectives

General

The overall objective of the project is to contribute to the food security development goal of the nation through the sharing of improved agricultural mechanization technologies among the prominent stake holders

Specific

The objective of the study is to enhance knowledge sharing and scale out/up of improved agricultural mechanization technologies and implements among the researchers, manufacturing and user community at the front line level in the different parts of the country. Its specific objectives are:

- To register and assess existing agricultural mechanization technologies;
- To batch produce selected implements;
- To train farmers and manufacturers in the use and manufacturing of improved implements; and
- To conduct frontline demonstration and scale out suitable technologies at some selected sites.

Activity	Duration	Location	Responsibilities		Expected Output
			Centers	Investigators	
Consultation meeting	2008/09	Melkassa	MRC	Friew Kelemu, Laike Kebede, Workneh Abebe	Document on inventory of proven technology in the country (ACCOMPLISHED)
Screening	2008/09	Melkassa	MRC	Friew Kelemu, Laike Kebede	Document on short listed technologies (ACCOMPLISHED)
Fabrication of prototypes (4 types of technologies; 5 from each)	Jan. 2010 –June 2010	Melkassa	MRC	Laike Kebede, All workshop technicians	At least 20 prototypes
Training of farmers, DAs and subject mater specialists (SMS)	June –Sept/2010	Melkassa, Wolenchiti, Adamitulu	MRC	All agri. mechanization research staffs at MRC	Trained farmers, DAs & subject mater specialists (SMS)
Testing and evaluation	June –Dece/2010	Melkassa, Wolenchiti, Adamitulu,	MRC	All agri. mechanization research staffs at MRC	Performance and users feed back report
Packaging of technologies	Nov –Dec/2010	Melkassa	MRC	All agri. mechanization research staffs at MRC	Operation manual , manufacturing guide line

Project II: Introduction of different tillage and crop establishment techniques for problematic soils

Objectives

General

The overall objective of the project is to contribute to the improved livelihood of the population at large through the development of a sound and environmentally friendly land preparation and crop establishment mechanization technology, which suit the major climatic and edaphic condition of the country.

Specific

- To improve and make available suitable land forming technology for the major Vertisols areas;
- To test and adapt a proper lime spreading equipment;
- To introduce a proper minimum tillage technology for fragile soils;
- To develop a proper tillage and crop establishment technology for tef.; and
- To select and adapt a deep tillage technology to minimize soil impedance for root development.

Activity	Duration	Location	Responsibilities		Expected Output
			Centers	Investigators	
Modification of the animal drawn BBM	2008 – 2011	Melkassa	MRC	Friew K. & Bisrat G.	Improved vertisol land forming equipment
Development of BBM suitable for tractors	2008 – 2011	Melkassa,	MRC	Friew K. & Bisrat G.	Tractor drawn broad bed making technology
Batch production and on- farm evaluation	2010 – 2011	Melkassa, Ginch and D/Zeit	MRC	Friew K., Bisrat G., Teshome B. & Workshop technicians	Technology popularized and extended
Selection of deep tillage equipment	2008 – 2011	Melkassa	MRC	Fitsum A.& Kinfeme H.	Deep tillage technology to minimize soil impedance for root development
Testing and evaluation	2008 – 2011	Welenchiti, Melkassa	MRC	Fitsum A.& Kinfeme H.	Deep tillage technology to minimize soil impedance for root development
Selection and adaptation of proper lime spreader	2010 – 2011	Melkassa	MRC	Friew K., Meseleworq	Lime-spreading equipment for acid soil areas
Testing and evaluation	2010 – 2012	West Wollega & Melkassa	MRC	Friew K., Meseleworq	Performance and users feed back report
Selection and adaptation of minimum tillage equipment	2008 – 2011	Melkassa & Asossa	MRC	Friew K., Meseleworq T. & Teshome B.	Manually operated minimum tillage equipments
Development of suitable harnesses and matching equipment for equines	2008 – 2011	Melkassa & Asossa	MRC	Friew K., Meseleworq T. & Teshome B.	Suitable harness for donkey & minimum tillage equipments drawn by donkey
Testing and evaluation	2008 – 2011	Melkassa & Asossa	MRC	Friew K., Meseleworq T. & Teshome B.	Suitable harness for donkey & minimum tillage equipments drawn by donkey
Reviewing the extent and type of Vertisols, acid soil and lime potential of Ethiopia	2008 – 2011	Melkassa & A.A.	MRC	Friew Kelemu,	Document

Project III: Introduction of multipurpose mechanical power sources for small to mid level agricultural system

Objectives

General

The goal of the project is to contribute to food security of the producer and consumer through improved seedbed preparation, crop production, processing, transportation, and marketing by using small tractors and associated implements.

Specific

- Evaluate the performance of mechanical power technology (single axle walking tractors) with associated equipment;
- Study the cost and returns from the investment in small horse power tractor (single axle walking tractors) and associated equipment; and
- Promote suitable mechanical power technology in the form of cooperatives and machinery pool system.

Activity	Duration	Location	Responsibilities		Expected Output
			Centers	Investigators	
Verification of specifications & controlled engineering tests	July 2009 – January 2010	Melkassa	MRC	Bisrat G., Meselework T., Fitsum A., Asenafi T., Laike K. & Yonas	Test result document (ACCOMPLISHED)
Field performance testing	May, 2010-September 2011	Melkassa and D/Zeit	MRC	Bisrat G., Meselework T., Fitsum A., Laike K., Asenafi T. & Yonas	Field performance report
Preliminary survey and socio economic data collection	2008-2011	Melkassa, Jijiga, Mekele, Bako & Bahir Dar	MRC	Laike K., Bisrat G. and Derege M.	Scio-economic information and recommendations on the technology
Economic analysis	2008-2011	Melkassa	MRC	Laike K., Bisrat G. and Derege M.	Report on the profitability/ feasibility of the technology
Identification of target locations & participant farmers	2008-2011	Melkassa, Fentale, Welmera & D/Zeit	MRC	Laike K., Bisrat G. and Derege M.	Active farmers participating in the research
Demonstration & feedback collection	2008-2011	Melkassa, Fentale, Welmera & D/Zeit	MRC	Laike K., Bisrat G. and Derege M.	Familiarization of the agro technical aspect of the technology

Project IV: Selection of appropriate post harvest handling technologies of cereals and pulses

Objectives

General

The overall objective of this project is to increase labor productivity by maintaining grain quality and minimizing grain losses through introduction of pulses and cereals post harvest-handling technologies, mainly food grains threshing/shelling and cleaning machine as well as rice dehulling and milling technologies thereby improve the livelihoods of farmers and other relevant stakeholders.

Specific

- To compare performance and economics of mechanical cereal and pulse threshers and popularize appropriate threshers for major food grains;
- To improve, fabricate and test a multi crop thresher developed for major cereal crops at Melkassa; and
- To adopt and demonstrate rice dehulling and mulling equipments and technologies.

Activity	Duration	Location	Responsibilities		Expected Output
			Centers	Investigators	
Prototype collection	2008-2011	Melkassa,	MRC	Seyoum W., Fitsum A., Laike K. & Bisrat G.	Prototype equipments will be available
Testing and evaluation of available cereal and pulse threshers	2008-2011	Melkassa, Asella, Adamitulu and D/Zeit	MRC	Seyoum W., Fitsum A., Laike K., Bisrat G. & Yonas L.	Suitable cereal & pulse thresher selected
Demonstration of technically accepted & economically feasible equipment	2010-2011	Melkassa, Asella, Adamitulu and D/Zeit	MRC	Seyoum W., Fitsum A., Bisrat G & Yonas L.	Familiarization of the agro technical aspect of the machines
Prototype collection/importation	2009-2010	Addis Ababa	MRC	Yonas L., Kinfemikeal H. & Laike K.	Sample rice milling and dehulling equipment will be available
Testing and evaluation of the available rice dehullers and milling machines	20010-2011	Melkassa, Pawe	MRC	Yonas L., Kinfemikeal H. & Laike K.	Performance evaluation report
Demonstration of technically accepted & economically feasible equipment	2010-2011	Gura Ferda, Chewaka,	MRC & PARC	Yonas L., Kinfemikeal H.	Familiarization of the agro technical aspect of the machine
Design improvement	2008-2010	Melkassa	MRC	Seyoum W., Fitsum A.	Improved multi-crop thresher/Sheller design
Prototype fabrication	2008-2011	Melkassa,	MRC	Seyoum W., Fitsum A., & Workshop technicians	Improved multi-crop thresher/Sheller developed
Testing and evaluation	2008-2011	Melkassa, Asella, Adamitulu and D/Zeit	MRC	Seyoum W., Fitsum A. & Yonas L.	Compiled test results and evaluation report
Demonstration and popularization	2008-2011	Melkassa, Asella, Adamitulu and D/Zeit	MRC	Seyoum W., Fitsum A., Laike K. & Yonas L.	Familiarization of the agro technical aspect of the machine

Project V: Introduction of post harvest handling and solar drier technologies for fruits and vegetables in the Central Rift Valley of Ethiopia

Objectives

General

The overall objectives of this project are to contribute to the improvement of the livelihood of the producers, retailers and wholesalers by making available technologies that retard postharvest quality deterioration and maintain market value, to generate income to the people living in rural and urban areas through adding values to raw fruits and vegetables and to contribute to food self-sufficiency by reducing postharvest losses and increasing their shelf life.

Specific

- To evaluate the efficiency of the existing transport boxes/packages (being used for few fruits and vegetables) and make the necessary improvements and modifications for more fruits & vegetables;
- To introduce and adapt the evaporative cooling technology for storage of economically important fruits and vegetables; and
- To introduce and adapt sun drying cabinet technology for fruits and vegetables.

Activity	Duration	Location	Responsibilities		Expected Output
			Centers	Investigators	
Survey on the existing handling techniques	2008-2011	Merti, Meki & Zeway	MRC	Ashenafi T., Meseleworq T.	Rough estimation on the existing postharvest losses of the commodities
Lab. study on the physical properties of the commodities	2008-2011	Melkassa	MRC	Ashenafi T. & Meseleworq T.	Information on the physical properties of the commodities
Design and development	2008-2011	Melkassa	MRC	Ashenafi T. & Meseleworq T.	Appropriate transport boxes
Survey and data collection on the existing storage techniques	2008-2011	Addis Ababa & Melkassa	MRC	Kinfemikeal H., Meseleworq T. & Ashenafi T.	Information on the existing evaporative cooling facilities
Design and development	2008-2011	Melkassa	MRC	Kinfemikeal H., Ashenafi T., & Meseleworq T.	Appropriate evaporative cooling storage technology
Field evaluation and socioeconomic assessment	2008-2011	Merti, Meki & Zeway	MRC	Kinfemikeal H., Meseleworq T. & Ashenafi T.	Scio-economic information and recommendations on the technology
Investigation into the designs and merits of locally and elsewhere available solar driers and solar drying techniques	2008-2011	Melkassa	MRC	Meseleworq T., Ashenafi T. & Workneh A.	Solar drying technology options
Design and development	2008-2011	Melkassa,	MRC	Meseleworq T., Ashenafi T. & Workneh A.	Equipment for small scale processing- solar drying cabinet
Field evaluation, improvement and socioeconomic assessment	2008-2011	Merti, Meki & Zeway	MRC	Meseleworq T., Ashenafi T. & Workneh A.	Scio-economic information and recommendations on the technology

Project VI: Scaling up/out of agricultural mechanization technologies in Ethiopia

Objectives

General

The overall objective of the project is to help increase agricultural production and productivity through the promotion of improved agricultural mechanization technologies among the prominent stake holders.

Specific

- To promote locally available improved agricultural mechanization technologies to end users;
- To establish sustainable linkage systems among different stakeholders;
- To enhance technical capacity of manufacturers;
- To establish a mechanism to assure quality and standard;
- To document experience and draw policy recommendations for transfer of agricultural mechanization technologies; and
- To establish sustainable technology multiplication and technical backstopping scheme in the sector.

N.B.: This project is a national project which is being jointly executed by agricultural mechanization research processes of EIAR, ARARI, ORARI & TRARI and it is financed by RCBP. Each regional research institute has signed MoU with EIAR on the management of its respective part/component of the project.

Activity	Duration	Location	Responsibilities		Expected Output
			Centers	Investigators	
Selection of technologies to be scaled out (through participatory work shop)	June, 2009	MRC	MRC, ARARI, ORARI & TRARI	Ag. mech. research staffs of MRC, ARARI, ORARI & TRARI	Technologies in use and extended (ACCOMPLISHED)
Batch production and Multiplication (250 units of pre-harvest technologies and 9 units of threshers and 50 enset decorticators)	2008-2010	Melkassa, Bahirdar, Mekele Bako & Jimma	MRCARARI, ORARI & TRARI	Ag. mech. research staffs and workshop technicians of MRC, ARARI, ORARI & TRARI	produced implements
Training of farmers, DAs and subject mater specialists (SMS) involved in the participatory evaluation	2009-2010	Adama, Boset, Arsi negele, Shala, Shashemene, Silte, Gurage, Sidama, Assosa & three Woredas under each RARI	MRC & Agri. mechanization research processes of ARARI, ORARI & TRARI	Ag. mech. research staffs of MRC, ARARI, ORARI & TRARI	Practical training on how to use/operate the technologies (ACCOMPLISHED)
Participatory evaluation	2009-2010	Adama, Boset, Arsi negele, Shala, Shashemene, Silte, Gurage, Sidama, Assosa & three Woredas under each RARI (ARARI, ORARI & TRARI)	MRC & Agri. mechanization research processes of ARARI, ORARI & TRARI	Ag. mech. research staffs and workshop technicians of MRC, ARARI, ORARI & TRARI	Evaluation and recommendation reports on imported technologies
Training of 70 manufacturers	2010-2011	MRC, Bhairdar, Mekele & Bako	MRC & Agri. mechanization research processes of ARARI, ORARI & TRARI	Ag. mech. research staffs and workshop technicians of MRC, ARARI, ORARI & TRARI	Alleviation of shortage of manufacturers who are capable of manufacturing the technologies to be scaled out
Multiplication of technologies	2010-2011	To be decided after selection of the manufacturers	MRC & Agri. mechanization research processes of ARARI, ORARI & TRARI	Ag. mech research process center representatives, process directors of EIAR, ARARI, ORARI & TRARI	At least 1500 units of technologies
Technology Dissemination	2010-2011	Adama, Boset, Arsi negele, Shala, Shashemene, Silte, Gurage, Sidama, Assosa & three Woredas under each RARI (ARARI, ORARI & TRARI)	MRC & Agri. mechanization research processes of ARARI, ORARI & TRARI	Ag. mech. research staffs of MRC, ARARI, ORARI & TRARI	At least 1500 farmers will participate and further demand will be created across the nation
Documentation and Wrap up work shop	December 2011	MRC	MRC & Agri. mechanization research processes of ARARI, ORARI & TRARI	Ag. mech research process center representatives, process directors of EIAR, ARARI, ORARI & TRARI	Agri. mechanization technology scaling out approaches & policy recommendations

Project: Evaluation and promotion of 25 to 35 HP tractors for Ethiopian agriculture

Objectives

General

The goal of this project is to make available appropriate mechanization technologies which will help to increase agricultural production of the country on sustainable basis through improved seedbed preparation, crop production, processing, transportation, and marketing by using small horse power tractors and associated implements

Specific

- Appropriate size small horse power tractor with multi purpose attachments identified;
- Low power tractor investment cost and income known;
- Category of farmers who should have this tractors suggested;
- Awareness in target areas for all stakeholders created and machine most suitable to farmer's condition promoted. Extension materials (guidelines, posters) prepared;
- Appropriate method of extension for such mechanical power sources and farm implements identified; and
- Feed back from farmers of different socioeconomic background and other stakeholders collected

Expected Outputs

- To compare the field performance of low power (25 to 35 HP) tractors and select suitable ones for Ethiopian condition;
- To evaluate economic and social acceptance of low power tractors;
- Promote suitable mechanical power technology in the form of cooperatives and machinery pool system; and
- To generate data for further studies

