



CHAPTER III. TRAINING, EXTENSION AND INFORMATION GROUP



3.1 Information and Communication Technology (ICT) in Mechanization Sub-program



III. TRAINING, EXTENSION AND INFORMATION GROUP

3.1. Information and Communication Technology (ICT) on Mechanization

3.1.1 Enhancement of Agricultural Mechanization through Information and Communication Technology (ICT)

The project aims to establish the Philippine Agricultural Mechanization Information Network which is a specialized and accessible information system through the World Wide Web to deliver information resources on agricultural mechanization. The resources, among others include current and popular agricultural mechanization technologies; academic, research and development institutions; roster of experts and consultants; information materials and electronic magazine; commercial, government and non-government organizations.

Many of the information are largely scattered in the archives of various organizations. Accessing these repositories, if not difficult, is costly in terms of time, money and efforts. As a result, a technology fails not because of its inability to answer the intended needs, but because it is not readily accessible to end-users. With the advent of Internet, we can use it as a stable platform for information delivery. Many agencies had already acquired the means to access Internet even if they are at the provincial or municipal level. However, one component lacking in the picture is a central facility where one could access the Philippine agricultural mechanization information databases.

The conceptualization of the project started since 2002 spearheaded by AMDP. Due to some priorities and concerns of the program, the project was left unchanged thus a decision was imposed to temporarily stop the project. The increasing demand of technical information by the researchers especially in agricultural sectors shows that the project must continue to immediately serve each individual from the professionals down to the students. Hence, the project was continued under the present leadership of AMDP.

Targets

To accomplish this goal, the following targets have been set as guide.

1. Development of databases for the following in Microsoft Access:
 - 1.1. Information materials related to Agricultural Mechanization
 - 1.2. Agricultural Mechanization technologies (machines, processes, applications)
 - 1.3. Manufacturers and sellers of Agricultural Mechanization equipment



- 1.4. Researchers, Experts and Stakeholders of Agricultural Mechanization.
2. Development of the Web-based information infrastructure for Mechanization in the Philippines
 - 2.1. Improvement of the home page of CEAT
 - 2.2. Design and creation of the web pages
 - 2.3. Arrange for hosting of the website
 - 2.4. Posting of the web pages to the site
3. Upgrading of the ICT facility
 - 3.1. Evaluation of the ICT developmental needs of AMDP
 - 3.2. Acquire the ICT components
 - 3.3. Organize the existing and new ICT components into one cohesive network.

Accomplishments

From the 2nd week of June to September 2004, the following activities were undertaken:

- a. Selection of favorable site has been considered to setup the college server. The New electrical building where the VSAT is housed has been considered as the place where the Pentium 4 computer server will be installed. Such computer has already been requested and specifications have been considered for possible acquisition. From the original plan of acquiring a server for the college, the P4 computer will be used temporarily to meet the requirements for storing data and also to function as a server up to certain extent.
- b. Reconstruction of the Web Page.

Analysis of the existing website in accordance to the developments, concerns and thrust of the college together with the other units, particularly AMDP, shows that major improvement must be made to serve its clients. The following are the results of investigations made:

 - ❖ In the existing web pages, too many access points for single information can be used, thus tedious work during maintenance will be experienced.
 - ❖ The rate of data transfer from the existing host server is slow. As response to the following investigations, the web page of the college at this moment is under construction and by the end of October or early November it will be posted to serve researchers,



professionals, students, and other web browsers. The site will contain all information regarding the entire college, its departments and units. Other sites like the AMDP web page are likewise under development and will soon be uploaded together with the web pages of other units of the college.

c. Creation of a web committee

A group represented by members from different units of the College to provide the necessary information needed in the construction of the web pages was formed during a meeting at the CEAT Dean's Office on July 2004. Regular development of the site is now possible. Moreover, the technical assistance of Engineer de Ramos was tapped for the updates and development of the AMDP webpage.

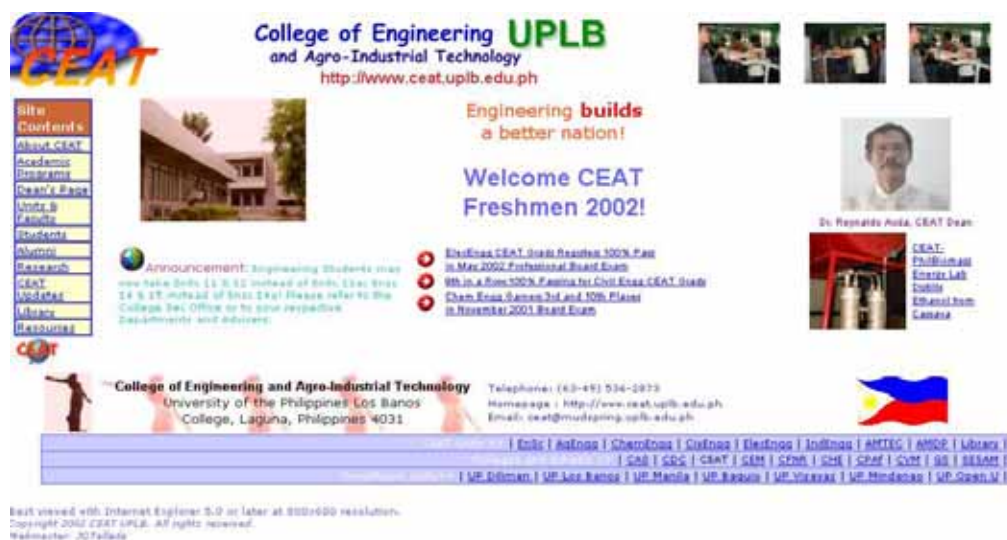


Figure 3-1 The CEAT web page under revision.

Plans and recommendations

The project is in the still in the initial stage where improvements and creation of web pages and data bases are the main concerns, after which visible output will be seen. Since new technologies, information and breakthroughs will continue to pour out, regular update and development of the site will be made. Other concerns of the study leader are listed below:

a. Development of databases in Microsoft Access

Since AMDP is an institution that provides technical information in agriculture needed by various sectors, data base will be created to collect and organize this information.



b. Design and creation of the web pages

Web pages for the different units of the college such as the academic departments and others will also be created. Moreover, the completed AMTEC Web page will be incorporated into the CEAT Web page.

c. Arrangement for hosting of the website and posting of the web pages to the site

To achieve the mission of the college particularly the AMDP, web pages will be temporarily uploaded to the UPLB site while in search for another reliable and faster host. This transition will be made to extend the services at shorter period of time.

Problems encountered

The only problem that can be considered as of this time is the immediate acquisition of equipment for the working station, server and other accessories.

3.1.2 Corn Plant Disease Recognition Using Machine Vision

Objectives:

With the developments in conducting the study, the objectives were refined as follows:

- a. To develop prognostic technique for plant disease by identification using machine vision.
- b. To assess and develop existing hardware and software components into a viable and functional prototype.
- c. To conduct tests to establish the performance of the prototype.

Accomplishments:

The following activities were undertaken for 2004:

- a. Several schemes were outlined on how to best implement the prognostic technique using machine vision as follows:

Scheme 1– Capture corn plant disease image using stand-alone digital camera with image processing and identification on a separate desktop computer.



- Scheme 2– Capture corn plant disease image using digital camera and laptop computer with on-site image processing and identification.
- Scheme 3– Capture corn plant disease image using cellular phone to cellular phone. Download image to a separate desktop computer for image processing and identification.
- b. Digital image capture of corn disease was tested using a branded cellular phone with a digital camera accessory.
- c. A computer program is for completion, pending acquisition of licensed computer software. The computer program will allow extraction of corn disease image properties, particularly color in the red, green, blue (RGB bands).



3.2 Training and Extension Sub-program



3.2 Training And Training Manual Development

Development of Training Manuals

- Operation, Repair and Maintenance (ORM) of Agricultural Machinery
- Fabrication of Agricultural Machinery
- Trainer's Training

Conduct of Training:

- Training on the Operation, Repair, Maintenance of Agricultural Machinery
- Training on the Fabrication of Agricultural Machinery
- Trainer's Training

Objectives:

This activity generally aims to develop manpower for the extension; operation, repair and maintenance and fabrication of agricultural machines for the promotion of agricultural mechanization in the different areas in the country. Specifically, it has the following objectives:

1. to create awareness on the benefits derived from agricultural mechanization;
2. to promote available mechanization technologies; and
3. to demonstrate the operation of some small to medium machineries.

Accomplishments:

As an offshoot of the trainings conducted last year, the extension group drafted training course proposals for possible collaboration and funding from other institutions.

A training syllabi was drafted on the Operation Servicing and Maintenance of Agricultural Machinery Technology which was intended for agricultural technical schools under the manpower development program of TESDA. It consists of 50 hours lecture and 108 hours practicum and plant immersion. Moreover, the active participation of the program in exhibiting agricultural machinery during the Albay Agro-industrial fair led to an initial talk with the TESDA Albay that is interested in a possible collaborative training activity for Agro-industrial capability building in the province. The extension group developed training modules as shown in **Table 3-1**. The target clients of these training courses are farm technicians, farm machinery operators, small metal craft manufacturers and fisherfolks in the province of Albay.

**Table 3-1 Training Course Title and Description.**

NUMBER	COURSE TITLE	DESCRIPTION	NO. OF DAYS
1	Familiarization Training Course for Farm Technicians on the Operation of Farm Machinery Technology	Design and features of various agricultural machinery including operating performance	5
2	Training on Post-Harvest Technology and Processing of Farm Products	Design, features and operation of various post-harvest machines including processing of various farm products.	3
3	Training on the Fabrication of Farm Machines, Tools and Implements	Design, features of UPLB machines, its actual/hands-on fabrication including field test.	2
4	Training on the Production of Organic fertilizer, and Operation and Maintenance of Production Machinery	Actual production of Organic Fertilizer including operation and maintenance of production machinery.	3
5	Training on the Operation, Simple Repair and Maintenance of Small Engine for Farmers and Fisherman	Actual/hands-on on the assembly and dis-assembly of small engines including simple repair of unit.	2

Another training proposal was drafted for the Metal Industry Association of the Philippines (MIAP) in Naga City for the second quarter of the year. This is a three-day training course on the Fabrication of the UPLB Upland Hand Tractor which was intended for the agricultural machinery manufacturers of the Bicol Region.

The third quarter of the year was devoted in the institutional arrangements with the collaborating agencies in the possible conduct of the different training courses. Further, initial drafting of the manual on Farm Power Unit was undertaken.

Another training proposal on the Fabrication of the UPLB Hand Tractor was submitted to the Altiora Quaero Foundation, Inc. in Negros Occidental for possible funding. The three day training course includes 8 hours lecture and 16 hours hands-on fabrication of component parts of the UPLB Hand Tractor.

3.3 Staff Development

Objectives:

1. To conduct in-house seminars as venue for learning, exchange of ideas and consultation among AMDP staff.
2. To encourage participation/attendance of AMDP staff to conventions, conferences, short courses, study tours and exhibits as manpower resource development.



Accomplishments:

3.3.1 In-house seminar/workshops

Two in-house workshops were conducted at AMDP training room for the year 2003. The first one was intended as a planning workshop while the second workshop was conducted as a mid-year evaluation review. A Techno-Demo on Corn Mechanization Technologies was conducted in the 3rd quarter during the Los Baños Bañamos Festival.

3.3.2 Participation to seminars, trainings, conventions, conferences, short courses, study tours and exhibits

As part of the Program's continuing manpower resources development, 8 AMDP staff attended 14 seminars/trainings/meetings/conferences as participants, resources persons, delegates, or plenary speaker.

3.4 Publications

Objectives:

The main objective of this activity is to extend and popularize different agricultural mechanization and related technologies produced by AMDP through the production of print and audio/video materials, which serve as materials for information dissemination. The following are the specific objectives:

1. To publish the Philippine Journal of Agricultural and Biosystems Engineering, which is a referred journal that aims to serves as national venue for disseminating information about recent completed researches and development in the field of Agricultural and Biosystems Engineering;
2. To publish the Philippine Agricultural Mechanization Bulletin, which is a semi-technical bulletin that serves as a venue for researches on agricultural mechanization and other related fields;
3. To produce the Mechanization Updates which promote RD&E activities of AMDP and other agricultural mechanization research institutions and serves as venue to disseminate significant and interesting information on mechanization.
4. To publish other print media materials such as power point presentations, leaflets, brochures, fliers, operators' manuals, etc for information dissemination.



Accomplishments:

3.4.1 Philippine Journal of Agricultural & Biosystems Engineering

The editorial staff met twice this year. They convened last 13 February to discuss matters that pertain to the publication of PJABE. Another meeting was done in 20 April to finalize the new composition of the Editorial Staff and discuss the prospective authors/articles for the next issue of PJABE.

Call for papers for the 2004 issue was disseminated to prospective authors during the second quarter of the year. Five papers were received by the Editorial Staff. Out of the five only four papers were accepted for review of the referees. Two of the papers have been reviewed by referees and were returned to the authors for revision. The other two papers are still with the referees for review.

The Editorial staff is still accepting additional papers for initial screening and evaluation. The final layout of the next issue of PJABE is expected to be finished by the end of the year. The sample cover layout is shown in **Figure 3-2**. Moreover, three new referees were also included in the pool of experts for 2004.



Figure 3-2. Sample cover layout of the 2004 issue of PJABE



3.4.2 Philippine Agricultural Mechanization Bulletin

The PAMB Editorial Staff convened twice for 2004. With the new composition of the Editorial Staff, topic for each quarter of PAMB issue was set.

1. The second, third and fourth quarter issues of PAMB 2003 was printed during the year and was circulated to the different clienteles of the Program. The first and second quarter issues of PAMB 2004 (**Figure 3-3**) were off the press first week of November and were also distributed to the different subscribers.

The third quarter issue of PAMB 2004 (**Figure 3-4**) is now ready for printing.

Collection of the articles for the fourth quarter issue of PAMB 2004 is now on going. The topic will be focused on the available energy sources in the farm. It is expected that the final layout will be done by the end of the year.

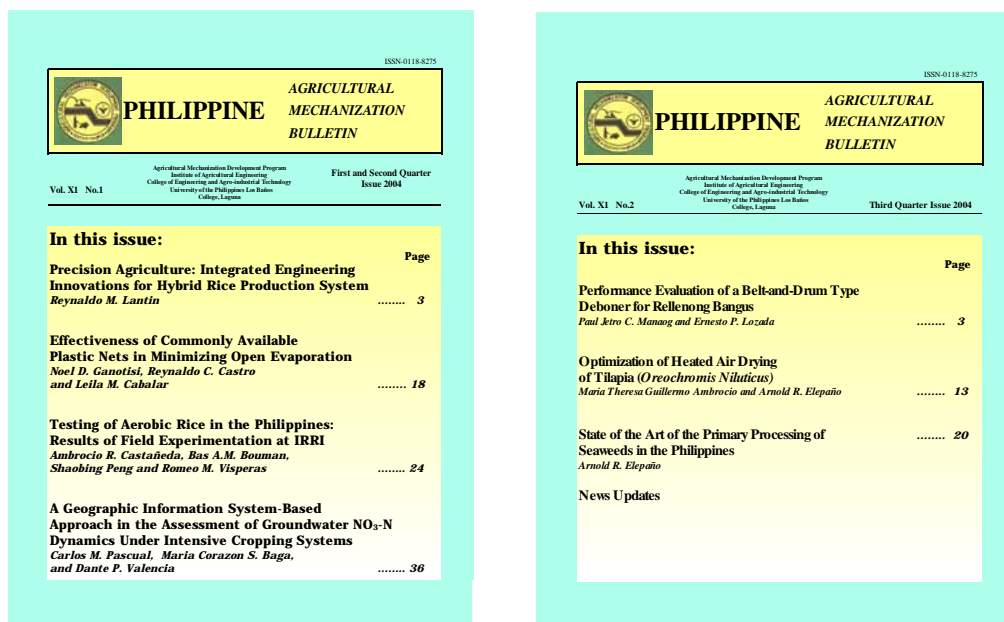


Figure 3-4. 3rd quarter issue of PAMB 2004.

3.4.3 Mechanization Update

The Mechanization Update 3rd & 4th quarter issue (July-December) 2003 was off the press first quarter of the year (**Figure 3-5**). This



was circulated to the different clients of the Program. By the third quarter of the year, the Editorial Staff was reorganized.

The 1st & 2nd quarter issue of 2004 was off the press last October and was circulated to subscribers (**Figure 3-6**). The articles for the 3rd quarter issue (July-September) 2004 are now being collected for editing.



Figure 3-6. 1st & 2nd quarter issue 2004.

3.4.4 Print/Audio/Video Media Production

Thirty two (32) power point presentations were prepared for year 2004. On the other hand, a total of 30 (A3 size) posters were prepared which were used for the different exhibits participated by the program. Moreover, the AMDP brochure was produced for the first quarter of the year. The revised version was also produced during the last quarter of the year (**Figure 3-7**). The AMDP organizational chart featuring the new program management was finalized during the third quarter of the year. It is now displayed at the office for information of the different visitors and clients of the Program.



Figure 3-7. The revised AMDP Brochure.

Leaflets for information dissemination were also finalized for year 2004 (**Figure 3-8**). Six leaflets are now ready for printing. Other print media produced by AMDP consisted of 32 powerpoint presentations, 10 posters of agricultural machines (3 sets) and 1 organizational chart. Further, a total of 12,033 pieces of publications were disseminated for 2004. The circulated AMDP publications included bulletins, leaflets, catalogues, journal, operator's manual for agricultural machines, primers, brochures, handbook, fabrication and user guide, among others.



Figure 3-8. Some of the AMDP leaflets produced in 2004.

3.5 Exhibits And Other Extension Activities

Objectives:

The main objective of this activity is to extend and popularize different agricultural mechanization technologies through technology dissemination. The following are the specific objectives:



1. To showcase different agricultural mechanization technologies produced by the program through the maintenance of a display area;
2. To showcase different agricultural mechanization technologies produced by the program through active participation in different exhibitions/ fairs/ technology demonstrations/ farmers field days;
3. To popularize the different technologies through the dissemination of machinery designs and blue prints; and
4. To extend and popularize mechanization technologies through expert services

Accomplishments:

3.5.1 Maintenance of Machinery Display Area

The AMDP display area (**Figure 3-9a to 3-9c**) houses different agricultural mechanization technologies designed and developed by its competent engineers and part-time CEAT faculty. Agricultural machines used from production to post production operations for different agricultural crops are on display. These are being showcased to walk-in visitors and other clients of the Program.



(a)



(b)

**Figure 3-9a to 3-9c
The AMDP
Display Area**



(c)

3.5.2 Participation in Exhibitions/ Fairs/ Demonstrations

One of the activities of extension group in technology dissemination is through the participation of exhibitions/ demonstrations/ fairs/ field days sponsored by other agencies. Three exhibitions were participated by AMDP for 2004 (**Figure 3-10 to 3-14**) These include the 2nd Agro Industrial Fair in Lipa City, Batangas; the 2nd Agri-Fiesta sa Albay in



Legaspi City and the Tuklas Agham during the Bañamos Festival in Los Baños Laguna. Ten (10) agricultural machines were exhibited during the said events as shown in **Table 3-2**. Moreover, machines were also demonstrated during the last exhibits attended by the Program that include the hand-held corn sheller, the crank type manual corn sheller, the ZDSDP manual corn sheller and the newly developed corn mill.



Figure 3-10. AMDP exhibits during the 2nd Agro Industrial Fair in Lipa City, Batangas



Figure 3-11. AMDP exhibits during the 2nd Agri-Fiesta sa Albay in Legaspi City





Figure 3-13. Actual demonstration of the AMDP Corn Mill during the Tuklas Agham, Bañamos Festival in Los Baños Laguna



Figure 3-14. Actual demonstration of the Manual Corn Shellers during the Tuklas Agham, Bañamos Festival in Los Baños Laguna

Table 3-2. Machines Exhibited/ Demonstrated for 2004.

Machine	No. of Times Exhibited	No. of Times Demonstrated
UPLB Hand Tractor	2	
UPLB Upland Hand Tractor with Steering Clutch	1	
IITA Corn Sheller Crank Type	3	1
ZDSDP Manual Corn Sheller	3	1
Hand Held Corn Sheller	3	2
Hand Jabber	3	
Two Drum Corn Sheller	1	
Ethanol Distilling System	1	
Corn Mill	1	1
Fertilizer Applicator	1	



3.5.3 Dissemination of Machinery Designs/Blue prints

One of the activities of the program is to disseminate machinery designs and blue prints to interested manufacturers. The program also assists the manufacturers in interpreting working drawings. For the 2004, twenty machine drawings were finalized ready for dissemination as presented in **Table 3-3**.

Table 3-3. Working drawings produced.

Machine	Parts	Project Engineer	Prepared by
Power tiller with steering clutch	Main Assembly and Parts Detail	Engr. J.D. De Ramos	Engr. J.D. De Ramos
Riding Type Toolbar for Power Tiller Attachment	Main Assembly and Parts Detail	Engr. J.D. De Ramos	Engr. J.D. De Ramos
Greenhouse	Irrigation System, Electrical System, Misting System, Canopy Rolling Mechanism & Structure	Engr. J.B. Reponte	Engr. J.B. Reponte
Furnace (Second Model)	Main Assembly and Parts Detail	Engr. J.B. Reponte	Engr. J.B. Reponte
Dryer	Drying Bin Parts Details	Engr. J.B. Reponte	Engr. J.B. Reponte
Corn Mill	Main Assembly and Parts Detail	Engr. V.A. Rodulfo, Jr.	Engr. V.A. Rodulfo, Jr.
Manure Applicator	Main Assembly and Parts Detail	Engr. V.A. Rodulfo, Jr.	Engr. V.A. Rodulfo, Jr.
Wind Mill	Rotor Assembly and Transmission System	Engr. R. S. Pangan	Engr. R. S. Pangan
Muscuvado Processing Equipment	Main Assembly and Parts Detail Furnace and Evaporator	Engr. R. S. Pangan	Engr. R. S. Pangan
Row marker/Seeder	Schematic Drawing	Dr. R.M. Lantin	Mr. H. R. Ramos
In Field Dryer	Schematic Drawing, Sectional/Top View, Isometric and Parts Detail	Dr. R.M. Lantin	Mr. H. R. Ramos
Shredder	Schematic Drawing, Isometric Drawing Detailed Drawinfg of Shelling Drum Assembly	Mr. B. C. Geronimo	Mr. H. R. Ramos
UPLB two drum corn sheller IITA Corn Sheller Hand Jabber UPLB Lowland Weeder CS3 Three Drum Corn Sheller Sharp Crested Weeder Rice Drum Seeder Six Row Transplanter	Isometric, Assembly drawing	Engr. R. C. Amongo	Mr. H. R. Ramos



3.5.4 Expert services

Expert services like conducting feasibility studies, procurement of machines and consultancy services were also extended to the different clients of the Program. Visitors were given technical assistance on the different AMDP-developed machines such as agricultural machines, tools and implements. They were also briefed with the different on-going research and extension activities of the Program. Twelve (12) technical staff of the Program provided expert services on different occasions to 63 units/organizations consisting of farmer-cooperatives, manufacturers, local/provincial government unit officials, feed millers, orn seed producer, non-government officers, SCUs, government agencies (e.g. DA, DA-BAR, PhilRice, other government research agencies, etc.). Moreover, **Table 3-4** shows the type of visitors briefed and entertained by the program for 2004.

Table 3-4. Visitors/Clients provided with briefing of agricultural mechanization technologies expert services/technical assistance for 2004.

TYPE OF VISITORS	1 st Qtr	2 nd Qtr	3 rd Qtr	Total
Faculty	15	2	48	65
Students (from UPLB and non-UPLB Colleges/Universities)	96	52	1427	1575
Government Organization	3	13	34	50
NGO/Farmers	39	67	59	165
Manufacturers	4	3	3	10
Foreigners	4	-	1	5
Private Company	21	5	20	46
Researcher	3	8	72	83
Politician/LGU	16	12	28	56
Total	201	162	1,692	2,055

3.6 Maintenance of Agricultural Mechanization Reading Room

Objectives:

To keep abreast with the recent trends in the field, the Program maintains a reading room where books, journals, other reading materials and electronic data are made available to clients. Acquisition of material and information exchange among cooperators is strongly cultivated as an institutional building activity.

Accomplishments:

The AMDP Reading Room (**Figure 3-15**) is a specialized depository of agricultural mechanization technology information. For year 2004,



various reading materials related to agricultural mechanization were collected or received (as part of information exchange) from various government agencies and non-government institution.

Furthermore, the AMDP Reading Room received about 122 visitors composed mostly of students, farmers, NGOs, and government officials/staff. About 122 Professionals, manufacturers and foreign visitors were also provided with reading room services. Some of these visitors were provided with reading room services, while others were provided by the Extension Staff with technical and/or expert services concerning farm mechanization.



Figure 3-15. The AMDP Reading Room.

3.7 Establishment of Pilot Farm for the Introduction of Corn Mechanization Technologies in Region 7

Objectives:

1. To demonstrate farm mechanization technology suitable to the specific location;
2. To generate data on actual farm utilization of various mechanization technology suitable to the specific locality;
3. To determine the on-farm performance of machines and mechanization technologies in Cebu and other parts of Region 7;
4. Develop new machines; improve/modify existing machines to suit the requirements of the area.

Accomplishments:

The following machines were brought to the pilot site in Tongo, Argao, Cebu for suitability testing and demonstration to farmers (**Figure 3-16**): (a) power tiller, (b) mechanical corn sheller, (c) hand-held corn sheller, (d) fertilizer applicator, (e) ethanol production system, and (f) rain-harvesting system. Machinery shed was constructed by a Farmer-Scientist Training



Program (FSTP) cooperative in Tongo to house these machines and to serve as showcase of the available corn mechanization technologies introduced in the area. A farmer-cooperator was assigned to operate the power tiller for land preparation in his farm every season, and the corn sheller for shelling corn harvest in the locality. Data on utilization of these machines were gathered every season. Field performance data of the power tiller was also obtained by conducting test of the machine on the farmer's field. The farmer-cooperator was also interviewed for his comments on the use of the machines in the area.



Figure 3-16. Machines and equipment brought to the pilot site in Tongo, Argao, Cebu as part of the introduction of corn mechanization technologies in the pilot farm: (a) power tiller, (b) corn sheller, (c) ethanol extraction system, (d) organic fertilizer applicator, and (e) collector for rain harvesting system.

The mechanical corn sheller was used from September 2003 to October this year for the shelling of the seasons' harvest. The machine was used in shelling more than 10 tons of corn (10,635 kgs). The range of the capacity of the machine was from 880.65 kg/hr to 1240 kg/hr. The lowest shelling capacity was obtained when shelling newly harvested hybrid corn. A higher capacity was obtained when corn in cobs was field-dried prior to shelling. The amount of corn brought by farmers for shelling was also relatively of lower quantities, which is representative of the shelling practice in the area. The white corn variety is used as food, and it is the practice of the families in the locality to shell and mill only the amount they would need for a season, which can range from 1 to 5 sacks.



Other feedback from users showed that the machine had a relatively cleaner output than some of the shellers in the neighboring towns or barangays. This is attributed to the design of the method of shelling. Majority of the commercial shellers are of the crushing type, which crush corn cobs during the shelling process. These crushed cobs are an additional load to the cleaning and separation system, and have to be separated from the shelled corn. The AMDP corn sheller is one of the few shellers that are not of the crushing type, thus cleaning and separation is more efficient. The drawback, however, is a lower shelling capacity compared to the crushing type. This did not pose a problem in the pilot area because yield for the white corn "Tiniguib" variety is relatively low, especially in Cebu. Generally the farmer-cooperator in charge of the machine felt that the machine is just about right for their current scale of operation.

The manual corn shellers (400 pieces) sold to the Municipality of Ginatilan were distributed to the farmers by the Ginatilan LGU. Feedback on the use of the sheller will be obtained during subsequent trips.

With regards to the power tiller, **Table 3-5** shows the results of the field tests in terms of performance indices: tillage depth, tillage width, turning time on headlands, time to traverse length of field, total number of passes to complete the field, total operating time, and fuel consumed during the whole operation.

Table 3-5. Field test results of the power tiller at Tongo, Argao (31 March to 1 April 2004).

Parameters	Trial 1	Trial 2	Average
Length of Field, m	35	28	
Width of Field, m	20	10	
Field Condition	dry, stony, clean, slightly rolling		
Last Crop	Corn, harvested Nov 2003		
Location	Tongo, Argao, Cebu		
Hand Tractor Specification	Honda PT with steering clutch, 10 hp diesel engine, with single-bottom upland moldboard plow		
Field Capacity, ha/hr	0.025	0.026	0.025
Depth of Tillage, cm	8.700	8.600	8.600
Width of tillage, m	0.225	0.250	0.240
Turning Time, sec	7.950	12.810	7.100
Speed of plowing, km/hr	1.430	1.280	1.350
Fuel Consumption, gm/hr			247

Machine operation was relatively easy. Turning at headlands was greatly facilitated by the steering mechanism of the power tiller. The



operator was able to operate the power tiller continuously for two hours without rest, indicating that the machine reduced drudgery in land preparation operation.

The depth of tillage was maintained at 8 cm. Speed of plowing was slow at 1.3 kph due to the presence of stones in the field which obstructed the plow and required the operator to either maneuver the machine or raise the plow to avoid the obstruction. This reduced field capacity to about 0.025 ha/hr or about 0.15 ha/day for a six-hour operation per day. Maneuverability, however, was relatively easy requiring about 7 seconds to turn the machine around. This is an advantage especially for sloping fields and stony grounds.

Interviews with the farmer-cooperator showed that the machines (power tiller and corn shellers) were suitable for the conditions of the Tongo area. The farmer has confided that ever since the power tiller was brought to his farm he has stopped using animals for land preparation and instead used the power tiller for this purpose. With regards to the corn sheller numerous inquiries from other farmers in the area were received by the cooperator regarding the use of the sheller during the coming harvest season. We encourage the farmer-cooperator to custom-hire the machines in the neighboring fields to further assess the suitability of the machines and get feedback from other farmers. A local manufacturer also expressed interest in fabricating corn sheller units.

The following are recommendations for the proposed activities of this project:

1. The initial results of the piloting activity showed that the two machines can be suitably adopted for the area of Tongo, Argao. It is therefore recommended that the machine be allowed to be continually used in the area so as to further expose the farmers to its use.
2. Continuous monitoring of the results is further needed. Socio-economic data on the use of the machines should also be gathered to come up with a complete assessment of the suitability of the machines in the pilot area.
3. It is also recommended that these activities be replicated in other areas within Cebu. This will not only widen the base of information that the project can gather during each trip to Cebu, but will also expose farmers in other areas of Cebu about the availability of these machines and about AMDP's role in promoting mechanization technologies for small- and medium-scale corn farms in the Region.