Establishing the Agricultural and Fisheries Agricultural Engineering Resource Network in the Philippines

Rossana Marie C. Amongo, PhD
Director and Program Coordinator

Maria Victoria L. Larona, PhD
University Researcher II

Agricultural Mechanization Development Program
Institute of Agricultural Engineering
College of Engineering and Agro-industrial Technology
University of the Philippines Los Baños
College, Laguna Philippines

Paper presented at the
10th Session of the Technical Committee of CSAM &
Regional Workshop on Establishing a Regional Database of
Agricultural Mechanization in Asia and the Pacific

17-19 November 2014
Siem Reap, Cambodia

Establishing the Agricultural and Fisheries Agricultural Engineering Resource Network in the Philippines[1]

Rossana Marie C. Amongo, PhD[2] and Maria Victoria L. Larona, PhD[3]

ABSTRACT

The paper presented an overview of the available agricultural mechanization databases or information in the Philippines, the role of the UPLB in the AFMech Law, the agricultural and fisheries engineering resource network (AFMechERN); discussed the issues and constraints in the establishment of the AFMechERN, and provided recommendation to address the identified issues and constraints. The establishment of the agricultural and fisheries engineering resource network will involve various government and private agencies of the country. Identified issues and constraints pertained to the establishment of the network, its operationalization, upgrading and consolidation of information. Full cooperation and commitment of the institutions involve in the network, and funding and logistic support from the government should be in place to address the challenges in the establishment, operation, maintenance and management of the resource network.

[1]Paper presented during 10th Session of the Technical Committee of CSAM and Regional Workshop on Establishing a Regional Database of Agricultural Mechanization in Asia and the Pacific held at Sokhalay Angkor Resort& Spa, National Road N. 6A, Kaksekam Village, Sro Nger Commune, Siem Reap, Cambodia, on 17-19 November 2014.

[2]Director and AMDP Program Coordinator and [3]University Researcher II, Agricultural Mechanization Development Program (AMDP), Institute of Agricultural Engineering (IAE), College of Engineering and Agro-industrial Technology (CEAT), University of the Philippines Los Baños (UPLB), College, Laguna, 4031 Philippines.

1.0 INTRODUCTION

The role of information technology (IT) in the current generation is very useful and powerful. IT has become a vital and integral part of every sector of society. IT can fast track communication process and the main prime mover of data which are vital in strategic planning and policy-making. With the application of IT, one can make sophisticated and comprehensive databases that can contain all imaginable pieces of data it can store, update and even analyze information that serves as bases for solutions to current or future problems.

In the Philippines, the agricultural sector has been enjoying the benefits of IT in the exchange of information particularly in agri-business transactions, policy formulation and even in just simple information dissemination of the latest trends, and developments in agriculture.

The enactment of RA 10601 otherwise known as the Agricultural and Fisheries Mechanization (AFMech) Law of 2013 that supports the implementation of the Agricultural and Fisheries Modernization in the country. The law promulgates policy measures for the advancement of the agricultural and fisheries sector and provides six policy declarations to wit:

a. Promote the development and adoption of appropriate mechanization technologies to improve farm productivity and efficiency for the achievement of food security, safety, and increased farmersôand fisherfolksôincome.
b. Provide an enabling environment for the improvement of the local assembly and manufacturing industry to enhance agri-fisheries production, processing, and marketing.
c. Ensure the quality and safety of local and imported agri-fisheries machines through the development and enforcement of machinery and machine performance standards; regular testing and evaluation; registration; and the accreditation and classification of suppliers, assemblers, and manufacturers to ensure compliance with prescribed quality standards.
d. Strengthen support services in terms of credit facilities; research, training, and extension programs; rural infrastructure; postharvest facilities; and marketing service.
e. Harmonize, integrate, and strengthen the implementation and coordination of RDE in the agri-fisheries mechanization program.
f. Provide integrated support services to farmers, fisherfolk, and stakeholders; and assist them to viably operate and manage agricultural and fisheries projects and enterprises.

The law emphasizes the legal basis on how to improve the agriculture and fisheries sector through mechanization. Hence, it is a challenge to the government on how to implement and genuinely master its efforts and resources for the benefit of the ultimate beneficiariesð the farmers and the fisherfolksð to improve productivity and efficiency for the achievement of food security and safety and uplifting the lives of farmers/fisherfolks by increasing their income.

One of the support services being emphasised in the law is the need to create an agricultural and fisheries engineering resource network for general information and reference; resource analysis, planning and allocation and for policy studies, decisions and advocacy as indicated in Article III, Section 10, Rule 10.2.

The paper aimed to: (1) present an overview of the agricultural mechanization databases or information in the Philippines, the role of the UPLB in the AFMech Law, the agricultural and fisheries engineering resource network (AFMechERN); (2) discuss the issues and constraints in the establishment of the AFMechERN, and (3) provide recommendation to address the identified issues and constraints.

2.0 AVAILABLE AGRICULTURAL MECHANIZATION DATABASES/INFORMATION IN THE PHILIPPINES

Agencies with existing agricultural mechanization database

BAS (Bureau of Agricultural Statistics) is the principal government agency for the efficient collection, processing, analysis and dissemination of official statistics on agriculture and fisheries as inputs to policy and decision towards a sustainable agricultural development. It envisions itself to be a credible agricultural statistical organization delivering high quality products and services by a competent workforce, using appropriate technologies to support the information needs of stakeholders. At present, BAS website is now operated by the Philippine Statistics Authority (PSA), and its contents are being integrated into the PSA website. Among the many information available in the BAS website are the performance of agriculture; situationer of crops, livestock and poultry, fisheries and monthly regional agricultural situation report; agricultural price and trade, statistical databases, publications and technical papers (http://www.bas.gov.ph/?ids=profile&bid=2, 2014).

DA-BAFS (Bureau of Agriculture and Fisheries Standards), ñin coordination with the DTI, the DOST, the BoAE and the AMTEC, and in consultation with the accredited associations of farmers and fisherfolk, agricultural machinery assemblers, manufacturers and distributors and agricultural engineers shall develop standards specifications and test procedures of agricultural and fishery machinery and equipment. These standards should be in conformity with the International Standards Organization (ISO) and shall be part of the existing Philippine Agricultural Engineering Standards (PAES)ò (Article 5, Section 21 of R.A. 10601). Section 21 also states that ñthe DA and the LGUs, in collaboration with the BoAE, shall enforce the above standards on the manufacture, sale and distribution of agricultural and fisheries machinery and equipment, and its accreditation system for agricultural and fisheries facilities and establishmentsò. Thus, the important information that will be made available by BAFS shall be the standards specifications and test procedures of agricultural and fishery machinery and equipment.

DA-BAFE (Bureau of Agricultural and Fisheries Engineering) is created as a regular bureau of the DA as part of Strengthening the DA Agricultural and Fishery Engineering Groups and pursuant to Section 46 of Republic Act No. 8435, otherwise known as the "Agriculture and Fisheries Modernization Act of 1997" (Article V, Section 24 of R.A. 10601). Among the important roles of BAFE as stated in Article 5, Section 18 of R.A. 10601 is the maintenance of a certification registry of equipment and machinery as well as a registry of those denied certification (Rule 18.2 of the IRR of R.A. 10601), and that the certification registry of BAFE shall include machines that have passed the minimum standards under PAES and other standards set pursuant to Section 21 of the AFMech Law (Rule 18.2.1 of the IRR of AFMech Law).

DA-BAR was established to lead and coordinate the national agriculture and fisheries R&D in the country. It is committed to consolidate, strengthen, and develop the agriculture and fisheries R&D system for the purpose of improving its effectiveness and efficiency by ensuring customer satisfaction and continuous improvement through work excellence, teamwork and networking, accountability, and innovation. (www.bar.gov.ph, 2013). Some of the important information included in the DA-BAR website is their R&D thrusts and programs, research projects being funded, and guidelines and procedures in the approval of research projects

DA-BFAR (Bureau of Fisheries and Aquatic Resources) is the government agency responsible for the development, improvement, management, and conservation of the countryôs fisheries and aquatic resources. Its website include significant information on its current programs, laws and regulations related to aquatic and fisheries, statistics on fishery resources, and service offered. Some of the important services offered are on export permits and related clearances, licenses and other permits, and industry information (e.g. list of importers and accredited aquaculture farms) (http://www.bfar.da.gov.ph/).

DA-PCAF (Philippine Council for Agriculture and Fisheries, formerly the National Agriculture and Fishery Council - NAFC) aims ñto ensure participatory broad-based decision making in agriculture and fisheries by providing quality services to its nationwide network of private sector-led consultative councils toward the formulation of sound policy and program recommendations for sustained countryside agricultural and fishery development.ò It envisions itself ñas an effective and efficient catalyst and generator of private-sector commitment and participation in developing the agriculture and fisheries sectors as a basis of a vibrant national economy.ò It values people empowerment and good governance (www.nafc.da.gov.ph/mv.html, 2013). Among the many information available at PCAF are the directory of its agriculture and fishery councils by region, programs and projects per region, and the sectoral committees which include the agriculture and fishery mechanization sector. This committee tackles important sectoral issues and concerns that are published in their website (http://nafc.da.gov.ph/NAFCNEWs/2013/ccc.html, 2014).

DA-PHilMech is a major player in RDE on ABE activities for various crops or commodities. Its RDE activities focus on the generation, extension and commercialization of appropriate and problem-oriented agriculture and fishery production, postharvest and mechanization technologies (www.philmech.gov.ph as cited in Amongo et al., 2013). The following agricultural mechanization information can be found in PHilMechôs website:

Mechanization and postharvest technologies

The center has continuously designed and developed mechanization and postharvest technologies and systems to answer the problems facing the industry for various crops/commodities which include among others rice, corn, high-value crops, cashew, coffee, cassava, mango, and onion. These technologies and systems were developed through years of research and development and which are being promoted to the various stakeholders.

Other information

Other mechanization related information included in PHilMechôs website is their accredited manufactures, training courses offered, rice mechanization technologies, and agricultural infrastructure system.

DA-PhilRice is the countryôs lead government agency in rice science and development. In recent years, PhilRice has focused its efforts on improving rice production and increasing land productivity. Current research and development (R&D) programs are focused on coping with climate change, high-value products from rice and its environment, farming without fossil fuel, intensified rice-based agri-bio systems, and future rice (www.philrice.gov.ph, 2013, as cited in Amongo et al., 2013).

The PhilRice website includes important agricultural mechanization related information such as: available R&D programs; training programs; products such as seeds available in their seed bank, rice mechanization technologies that are developed and are being promoted in the farm; as well as other products or available technologies such as new knowledge, diagnostic tools, bio-control (e.g. bio fertilizers), rice-based products (e.g. rice wine), among others. These rice technologies include machines for land preparation, crop establishment, harvesting, postharvest, and biomass use.

DOST-PCAARRD is one of the sectoral councils under the Department of Science and Technology (DOST). It formulates policies, plans and programs for science and technology-based research and development in the different sectors under its concern; coordinates, evaluates, and monitors the national research and development (R&D) efforts in the agriculture, aquatic and natural resources sectors; and also allocates government and external funds for R&D and generates resources to support its program. Moreover, the council is actively involved in partnerships with international, regional, and national organizations and funding institutions for joint R&D, human resource development and training, technical assistance, and exchange of scientists, information

and technologies The following databases are being maintained by the council (http://www.pcaarrd.dost.gov.ph, 2014):

Farmers Information and Technology Service information System (FITS IS)

- Farmers' Information and Technology Services (FITS) Information System, a web-enabled system, allows simultaneous updating of data by various FITS centers nationwide. In this manner, collection of important data and information in the agriculture, aquatic and natural resources (AANR) sectors is fast and easy.

Short Message Service (SMS)

- PCAARRD SMS enables clients to send queries as text messages over a mobile phone or computer and get a quick response to their questions.

Research and Development Management Information Systems (RDMIS)

- On-line system containing comprehensive inventory of new, ongoing and completed AANR R&D projects evaluated and approved by PCAARRD & undertaken by the agencies in R&D network.

Human Resources Information System (HRIS)

- On-line system to collect systematizes process and retrieves relevant and updated information pertaining to human resources in AANR. The system will pave the way for improved planning, implementation, monitoring and evaluation of human resource development.

The Agricultural Machinery Manufacturers and Distributors Association Foundation, Inc. (AMMDA) is one of the recognized private agricultural assemblers, manufacturers and distributors in the country. The members of the association are involved ñin the manufacture, assembly, distribution and servicing of farm machinery, namely 4-wheel tractors (standards and compact) and their implements; power tillers and their attachments; irrigation equipment; postharvest equipment; processing equipment; gasoline and diesel engines; crop maintenance and protection equipment; and other agricultural machineryò (www.philippinecompanies.com, 2013 as cited in Amongo, 2013). It coordinates with DA, UPLB, IRRI, DOST/PCAARRD, AMDP, BSWM, PhilRice, PHilMech, Philippine Society of Agricultural Engineering (PSAE) through the Agricultural and Fisheries Committee of PCAF to formulate policies on agricultural mechanization in the country (www.philippinecompanies.com, 2014). Some of the available information in the association include: available local and imported agricultural machines, equipment and accessories available in the local market, sales of agricultural machines, and location and information about the members.

UPLB-AMDP was established in 1979 as the research and extension arm of the IAE-CEAT. For 35 years, it has been supportive of the three major functions of the university on instruction, research, and extension. It has developed, designed, tested, and promoted affordable farm machinery for farmers; conducted technology and information dissemination through exhibits, pilot testing, demonstration of machines, and publication of extension materials (bulletins, refereed and non-refereed journals, leaflets, etc.); and conducted training for different target beneficiaries. It has the overall goal of improving the farmersô quality of life, continues to develop more affordable technologies; provide technical assistance; and promote farm technologies to improve farm operations, reduce farmersôdrudgery, and provide value-added to farmersôcrops. The AMDP rice mechanization R&D efforts have yielded technologies that include upland and lowland power tillers and implements, mechanical rice transplanter, lowland weeders, thresher, rice harvester, and village-scale rice mill (AMDP, 2013). The information being maintained by AMDP related to mechanization is the following:

- On-going research activities
- Machines developed and being extended by the program
- Abstracts of articles published in the Philippine Journal of Agricultural and Biosystems Engineering (PJABE) - refereed journal published by AMDP-IAE-CEAT, UPLB
- Abstracts of articles published in the Philippine Agricultural Mechanization Journal (PAMJ) - non-refereed journal published by AMDP-IAE-CEAT, UPLB

- Manpower complement of the program involved in agricultural mechanization
- Agricultural mechanization needs and analysis database for selected crops and regions of the country

UPLB-AMTEC-CEAT was established in 1977 by virtue of a memorandum of agreement between DA and UPLB in recognition of the need for an official testing agency to promote a self-reliant agricultural machinery industry for the benefit of the Filipino farmers. It envisions the establishment of a national center that will test and evaluate the performance of agricultural and fisheries machinery. Its current mission is to establish standards of performance of machinery; conduct laboratory and field tests of machinery; evaluate the results using rationalized criteria; and disseminate the information to concerned agencies, farmers, and fisherfolk. Testing of machines is however, voluntary and only manufacturers participating in government bidding for agricultural machinery are required to submit their machines for testing. Furthermore, AMTEC is not mandated to issue certificates of performance for machines tested (AMTEC 2010 as cited in Amongo et al., 2013).

Among the important agricultural mechanization related information available at AMTEC are: Philippine Agricultural Engineering Standards Volumes I to VIII for various agricultural machines, catalogue of selected machinery, test results upon request of concerned party, and agricultural machinery manufacturersôcatalogue.

3.0 ROLE OF THE UPLB-AMDP and UPLB-AMTEC IN THE AFMECH LAW OF 2013 (R.A. 10601)

The University of the Philippines Los Baños (UPLB) through the Agricultural Mechanization Development Program (AMDP, Institute of Agricultural Engineering (IAE) and Agricultural Machinery Testing and Evaluation Center (AMTEC) of the College of Engineering and Agro-industrial Technology (CEAT) provided significant inputs in the drafting and enactment of the AFMech Law of 2013. Moreover, these two (2) units of CEAT provided active participation in the drafting and formulation of its Implementing Rules and Regulation until its approval in December 2013. Among the specified roles of AMDP and AMTEC in the law are enumerated below and summarized in Figure 1.

- The UPLB and other State Universities and Colleges (SUCs) shall be involved in the formulation of the National Agri-fishery Mechanization Program (NAMP). The formulation of (NAMP) will be spearheaded by the Bureau of Agricultural and Fisheries Engineering (BAFE) in coordination with other concerned agencies and the private sector. The NAMP will be formulated every 5 years by the concerned parties (Article 2, Rule 5.1).

- UPLB-AMDP will be involved in the formulation of the a unified National Agricultural and Fisheries Mechanization Research and Development and Extension Agenda (NAFMechRDE) in consultation with the members of the Agricultural and Fishery Mechanization RDE Network (AFMechRDEN) (Article 3. Sect 7). The formulation NAFMechRDE agenda will be spearheaded by the Center for Postharvest Development and Mechanization (PHilMech) (Article 3, Sec. 7, and Rule 7.1).

- The PHilMech, in coordination with members of AFMechRDEN including UPLB-AMDP shall, within six (6) months after the effectivity of the AFMech IRR, formulate the necessary guidelines for the operation of the network (Article 3, Sect 8, and Rule 8.4).

- The UPLB-AMDP shall be strengthened and institutionalized to lead and coordinate the agricultural and fishery mechanization RDE program of all academic institutions in the country. As stated in Article 3, Sec 8, Rule 8.7, the DA in coordination with UPLB-AMDP shall ensure the

a. formulation of the necessary guidelines for the operation of all academic institutions in the AFMechRDEN;
b. integration, consolidation and harmonization of all agricultural and fishery RDE programs and promote collaborative RDE programs of all academic institutions in the AFMechRDEN; and
c. Submission of project proposal with the corresponding funding requirements for additional manpower complement, equipment, supplies and other logistical requirements for inclusion in the Annual General Appropriation Act (GAA). The funding support is intended to strengthen the capability of UPLB-AMDP for the implementation, coordination and monitoring of AFMechRDEN activities of all academic institutions in the country.

- The UPLB-AMDP shall be part of the Agri-fisheries Mechanization and Engineering Resource Network. This network shall be linked to other existing information and database networks of the DA, the Agricultural Machinery Information Network of the Department of Science and Technology (DOST), the UPLB-AMDP and other concerned government agencies (Article 3, Section 10).

- Agricultural Machinery Testing and Evaluation Center (AMTEC) shall test and evaluate Agricultural and Fisheries Machinery and Equipment to be sold in the market shall pass through in accordance with the national policies and guidelines to be promulgated by the Secretary. (Article 5, Sect. 18, Rule 18.1). In view of this, AMTEC shall:

  a. test the model of the machine and any modification thereof and shall pass the prescribed quality and performance standards in accordance with the Philippine Agricultural Engineering Standards (PAES), before an agricultural machinery and equipment can be assembled, manufactured and commercially sold in the market (Rule 18.1.2).
  b. undertake regular testing and evaluation of new models and designs of agricultural and fisheries machinery to be sold in the market shall be. A re-testing shall be done after every five years to check/monitor the performance of machines tested (Rule 18.1.3).
  c. undertake field tests agricultural and fisheries machinery sold in the market to ensure consistent quality of test units as well as on the commercial units, with the assistance of the RAEDs and Agricultural Engineering Division/Section of LGUs (Rule 18.1.4).
  d. provide test result only to the party who requested for testing. The testing of agricultural and fishery machinery and equipment shall be based on PAES (Rule 18.1.5).
  e. promulgate an evaluation scheme for the test results within six months after approval of this IRR in consultation with BAFE and NAFC-AFMech. The Results of test will be evaluated based on prescribed quality and performance standards as stated in PAES (Rule 18.1.6).

- AMTEC shall be involved in the development of standards specifications and test procedures of agricultural and fisheries machinery and equipment, working hand in hand with concerned agencies. The standards development and formulation shall be spearheaded by BAFS in coordination with concerned government and private agencies (Article 5, Rule 21.1). AMTEC shall:
  a. conduct initial research to develop standards specifications and test procedures of agricultural and fisheries machinery and equipment in collaboration with PhilMech and concerned agencies (Rule 21.1)
  b. Be part of the Technical Working Group (TWG) which also includes representatives from government and other concerned agencies, corporations and associations (Rule 21.1).
  c. develop new standards and update existing standards under the Philippine Agricultural Engineering Standards which include irrigation, farm-to-market, post harvest facilities and other agricultural engineering facilities and equipment (Rule 21.2).

- BAFS, in collaboration with AMTEC, NAFC, PHILMECH and other concerned agencies, corporations and associations shall develop standards for agriculture and fishery machinery, tools and equipment, shall conduct initial research to develop standards for agricultural and fisheries machinery and equipment. The standards to be developed should be towards the attainment of international standards and shall be part of the existing PAES (Article 6, Rule 26.1).

- AMTEC of CEAT-UPLB institutionalized and designated as the premier and reference testing center in the country, and for purposes of functional coordination and integration, shall closely coordinate its activities with the BAFS and BAFE. As the premier testing center, it shall assist the BAFS in the formulation of quality, safety and performance standards of agricultural and fisheries machinery and of accreditation guidelines for testing centers. It shall also provide technical assistance in the establishment of testing centers in other parts of the country (Article 6, Sec 27). UPLB-AMTEC shall:

  a. prepare an Organizational Structure and Staffing Pattern with corresponding number of permanent plantilla positions as well as its annual budgetary requirements to effectively carry out its mandated functions under this Act not later than two (2) months after the approval of this IRR. (Rule 27.1)
  b. submit to DBM the new organizational structure and staffing pattern of AMTEC not later than three (3) months after the approval of this IRR. (Rule 27.2)
  c. shall closely coordinate its activities with BAFE and BAFS. It shall assist the BAFS in the formulation of quality, safety and performance standards of agricultural and fisheries machinery and accreditation guidelines for testing centers and shall coordinate with BAFE on the establishment and operationalization of the testing centers (Rule 27.3)

- UPLB-AMDP shall be involved in the national project on contiguous farming which shall be spearheaded DA together with DAR and other agencies concerned, to increase land, labor and crop productivity utilizing agricultural mechanization technologies (Article 9, Rule 34.1). It shall be involved in:
  a. conduct of consultations on the formulation of guidelines for the implementation of Contiguous Farming (Rule 34.2).
  b. formulation of mechanisms and criteria that will serve as the guidelines in the operationalization of the Contiguous Farming (Rule 34.3).
  c. undertaking farm development planning and implementation of the Contiguous Farming (Rule 34.4).
  d. strengthening of farmersô cooperatives and associations through capability building and institutional development for the implementation of the Contiguous Farming (Rule 34.5).
- The DA shall set aside funds from the Agricultural Competitiveness Enhancement Fund (ACEF) for grants to upgrade the AMTEC and to establish one (1) testing center in Visayas and one (1) testing center in Mindanao (Article 9, Section 38).
- The AMTEC shall submit to DA the project proposal with the corresponding funding requirements for the upgrading of AMTEC and the establishment of one testing Center in Visayas and in Mindanao not later than 2 months after the approval of this IRR (Rule 38.2)
- The UPLB shall propose for additional funds for inclusion to its General Appropriations Act for the operation of AMTEC including the creation of plantilla positions and the institutionalization of AMDP as mandated by this Act (Article 9, Rule 38.8).

Strategic Policy Goals of AFMech Law

1. **Goal 1- Provide Access to Farmers and Fishermen to appropriate and affordable Agri-Fishery Machinery and Equipment.**
   - Establishment of Agri-Fisheries Machineries and Equipment Service Centers in SAFDZs and ARCs (Sec.8)
     a. Custom plowing, harrowing, etc.; b. Repair and trouble-shooting services; c. Training, after sales service & warranty
   - Contiguous Farming and Infrastructure Support for economies of scale of machineries (Sec. 34 and 36)
   - Promotion of Local Manufacturing and Assembling to lower down the cost of Agricultural and Fishery Machinery and Equipment (Sec. 15 and 16)
2. **Goal 2- Provide Protection/ Support to Agri-Fishery Machinery Buyers, Owners, Manufacturers and Distributors**
   - provision of After –Sales Service and Warranty by suppliers to their clients/buyers (Sec. 17)
   - mandatory testing and evaluation by AMTEC on all agri-fishery machinery sold in the market in accordance with the DA guidelines (Sec. 18)
   - Standards Development and Enforcement (Sec. 21)
   - Registration of Agri-Fishery Machinery Owners according to DA guidelines and procedures (Sec. 19)
   - Registration, Classification and Accreditation of Agri-Fishery Manufacturers, Distributors , Dealers and Importers (Sec. 20 and 22)
   - Imposition of Penalties and Sanctions for Prohibited Acts i.e. selling of machinery which are substantandard or without warranty or after sales service. Sec. 30 and 31
3. **Goal 3- Strengthen Support Services and Institutions for the development of Philippine Agri-Fisheries Mechanization**
   - Formulation and Implementation of National and Local AFMech Program (Sec. 5,6 and 33)
   - Formulation and Implementation of Unified Agri-Fisheries Mechanization RDE Agenda (Sec. 7) and Organization of the AFMechRDE Network
   - Strengthen the Agri-Fisheries Mechanization and Engineering Resource Network (Sec. 10)
   - Institutional Strengthening (NAFC, PHilMech, BAFS, UPLB-AMDP, UPLB-AMTEC, DA Ag. Engage Groups
   - Manpower Complement requirement of ag'l engrs. & agri-fishery machinery technicians and operators in Agri-Fishery Machinery Service Centers in accordance with BOAE and DOLE guidelines (Sec. 13)
   - Upgrading of agri-fisheries mechanization and engineering laboratory facilities and faculty training program of concerned State Universities and Colleges (SUCs) through research grant and funding support (Sec. 11 and 38) (Source: Rico, 2013)

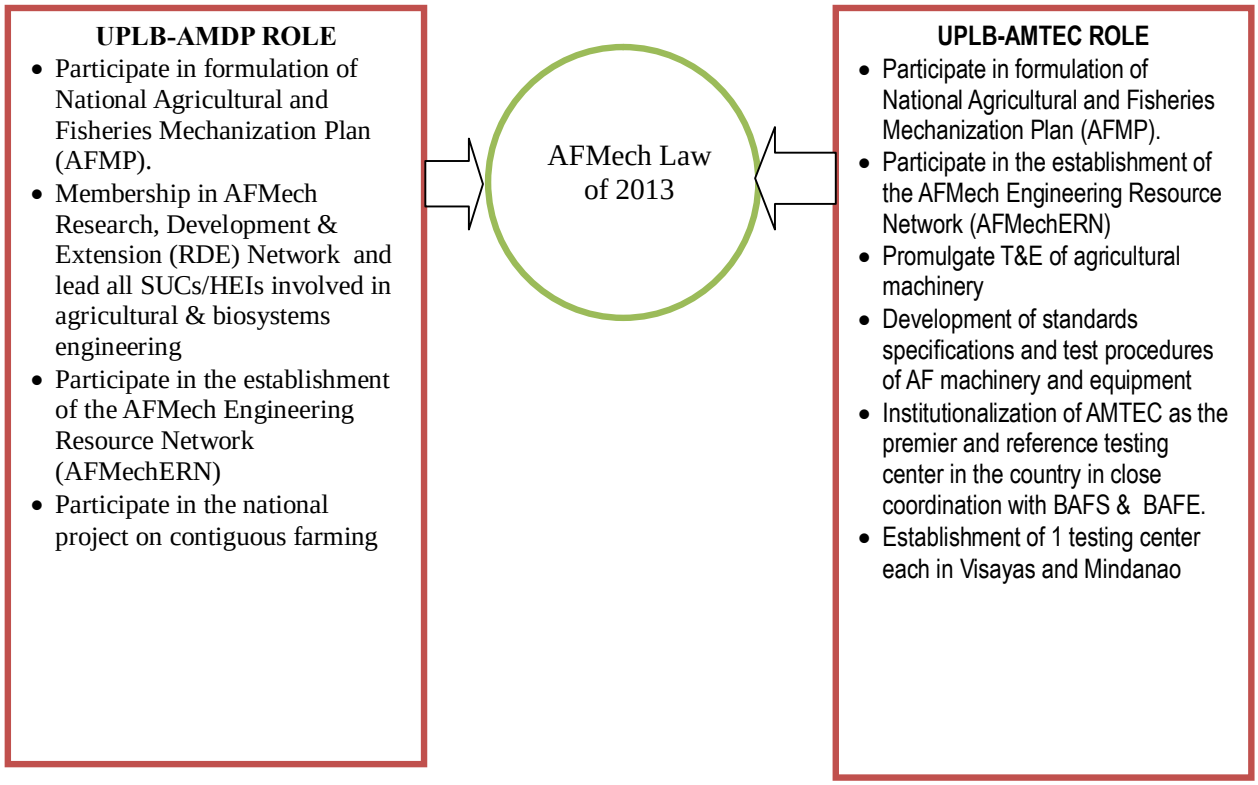

Figure 1. Strategic goals of AFMech Law and the corresponding roles of UPLB-AMDP and UPLB-AMTEC

4.0 AGRICULTURAL AND FISHERIES MECHANIZATION DATABASE IN THE PHILIPPINES

4.1 Agricultural and Fisheries Engineering Resource Network (AFMechERN)

The agricultural and fisheries mechanization database of the country will be part of the Agricultural and Fisheries Engineering Resource Network (AFMechERN) as described in AFMech Law of 2013. Article III, Section 10 of AFMech law states that:

"The existing agricultural machinery information and database of the Philippine Center for Postharvest Development and Mechanization (PHilMech) shall be strengthened into an agri-fishery mechanization and engineering resource network. It will also be used or tapped as a facility for the online registration of agri-fisheries machinery and equipment, and monitoring of agri-fisheries mechanization and infrastructure projects. This network shall be linked to other existing information and database networks of the DA, the Agricultural Machinery Information Network of the Department of Science and Technology (DOST), the Agricultural Mechanization Development Program (AMDP) of the UPLB and of other government agencies."

Moreover, of the IRR of the law indicates that the following information and databases will form part of the AFMech Resource Network (Article 3, Sect. 10, and Rule 10.1).

(a) Inventory of agricultural and fisheries machinery and postharvest facilities of the country;
(b) Agricultural and fisheries mechanization technologies, data and information generated by DA, DOST, other government RDE Institutions, LGUs, UPLB-AMDP, UPLB-AMTEC and other SUCs through their research and development programs, projects and activities;
(c) Government investments on agri-fisheries mechanization from various sources of funds such as grants, loans and local or international donors among others;
(d) Agro-industrial processing technologies;
(e) Human Resource Information System to include Registry of Agricultural Engineers and Resource Persons and Experts on Agri-fishery Mechanization;
(f) Agri-fishery Machinery and Equipment Manufacturers, Assemblers and Distributors; and
(g) Academic institutions offering Agricultural Engineering or Agricultural and Biosystems Engineering and Agri-fishery Mechanization courses.

The above information shall provide basis for general information and reference; resource analysis, planning and allocation and for policy studies, decisions and advocacy as indicated in Article III, Section 10, Rule 10.2.

4.2 Organization, Operation and Management

To operationalize the AFMechERN, DA, in coordination with the UPLB, Department of Science and Technology, Board of Agricultural Engineering of the Professional Regulation Commission (PRC), Philippine Society of Agricultural Engineering (PSAE), recognized national organization of agricultural assemblers, manufacturer and distributors, shall create a National Committee on AFMechERN to be chaired by PHilMech and co-chaired by DA-Information Technology Center Information Technology Center for Agriculture and Fisheries (ITCAF). The members of the resource network shall include the following government and private agencies (Article III, Sect. 10, and Rule 10.3):

1. DA-Bureau of Agricultural and Fisheries Engineering (BAFE)
2. Philippine Rice Research Institute (PhilRice)
3. Bureau of Agricultural and Fisheries Standards (BAFS)
4. Bureau of Fisheries and Aquatic Resources (BFAR)
5. Philippine Council for Agriculture and Fisheries (PCAF)
6. UPLB-AMDP
7. DOST-Philippine Council for Agriculture, Aquatic and Natural Resources, Research and Development (PCAARRD)
8. Philippine Society of Agricultural Engineers (PSAE)
9. Recognized national organization of agricultural assemblers, manufacturer and distributors or other private agri-fishery machinery manufacturers, assemblers and distributors.

4.3 Design, Development and Maintenance of the Web-based Information System

The National Committee on AFMechERN is tasked to design and develop a ñweb-based system that links all data and information cited in Rule 10.1 of these IRR coming from PHilMech, UPLB-AMDP, DA, DOST-PCAARRD, DA-ITCAF, other government and RDE institutions. Moreover, the National Committee shall design an online system of registration of agricultural and fishery machinery and equipment and monitoring of agri-fisheries mechanization and infrastructure projectsò, as stated in (Article III, Sect. 10, Rule 10.4).

The operationalization and maintenance of the resource network shall be done by DA through PHilMech in coordination with the DA-ITCAF (Article III, Sect. 10, Rule 10.4). As such, according to Article III, Sect. 10, Rule 10.4, the following activities will be implemented:

(a) Formulate a capability enhancement plan for the upgrading of the IT manpower complement and the existing equipment for data gathering, storage and management such as, but not limited to the installation of additional servers, computers, network connections and other necessary hardware and infrastructure facilities;
(b) Enhance the web-based information system of the network;
(c) Make the data accessible to all government and non-government partner agencies and organizations like the DA, DOST, DTI, UPLB-AMDP, SUCs and other government agencies, recognized national organization of agricultural assemblers, manufacturers and distributors and other private organizations involved in the development, production, promotion and marketing of agri-fishery machineries and equipment; and
(d) Ensure the data security of the website by establishing standards and protocols for the implementation of the online registration, data access and data sharing.

5.0 ISSUES, CONSTRAINTS AND RECCOMENDATIONS IN ESTABLISHING THE NATIONAL AGRICULTURAL AND FISHERIES MECHANIZATION DATABASE

One of the major constraints in establishing the National agricultural and fisheries mechanization data base is how to organize and link all the institutions involve to work as one network. The institutions identified in the law are coming from the different sectors of the government and the private sector with varied interests. Although the leadership was given to PHilMech, organizing all the institutions into one is really a challenge. To date, initial works have been done but there are still no clear specific guidelines on how the structure will be organized. To facilitate the establishment of such network the Department of Agriculture through PHilMech should first finalize the organizational structure of the AFMechERN. All institutions involve should be encouraged to participate in such project with strong commitment to make the network operationalize. They should allow open access of the different crucial information needed by the different stakeholders.

The operationalization of the system is another challenge for the implementation of the network. This is because it involves upgrading of the various components such as human resources, infrastructures e.g. facilities and equipment and the implementation of a harmonized website and database structure, among others. As presented earlier, most of the institutions involve have already existing databases. Most of their personnel are already tied up with their work assignments. Additional work to be imposed by the network may affect the efficiency of the assigned personnel if no additional human resource will be hired to solely attend to the requirements of the network. On the other hand, the upgrading of facilities and equipment needed for the network to efficiently work involves a huge amount of funding. Although, it is stated in the law that this may be supported by the government however, legal implications may arise specially in the transfer of funds from the government to the private sector. Hence, human resource complement, infrastructure development and upgrading and other requirements should be looked into by the network. The logistic and funding support from the government to establish such network should be explored. Support from other local and foreign institutions should also be explored such as manpower training and funding.

The website and database structure is another concern. Most of the institutions have their own web designs, websites, database language and structures. Two school of thoughts are being considered: one is that the institutions will maintain their own websites and will just hook up to the main frame which will be maintained by PHilMech as stipulated in the law; or second is to come up with a harmonized website and database structure for all the institutions involve to adopt and implement. Whichever is to be implemented needs additional funding and human resources. What is important is that all institutions involve should be harmonized and work as one network.

Once the network has been established, updating and consolidation will be another challenge. The institutions involve should have an up-to date-information in the website so as to really guide the stakeholders. It should present the latest trends and developments on the different aspect of the agricultural sector such as prices of good and commodities, weather related data, agricultural machinery standards, inventory of machinery and facilities, available technologies in the market, recent technological breakthroughs, among others. Updating the data in the system is a huge task to be done and the available data network should cope up with changing time. Hence, for the network to be truly operational, all the key players and the needed support should be in place. The government should take the lead role to harmonize all the stakeholders and lay down workable guidelines for the establishment of the AFMechERN.

6.0 CONCLUSION

The establishment of the Agricultural and Fisheries Engineering Resource Network in the country is a challenge for the institutions involve in implementing the AFMech Law. However, if the network will be operationalized, not only the government and its line agencies and the private sector will benefit but the whole wide world. However, the establishment of the network requires voluminous work and effort but once it is there, it will benefit humankind. Most importanly, Full cooperation and commitment of the institutions involve in the network, and funding and logistic support from the government should be in place to address the challenges in the establishment, operation, maintenance and management of the resource network.

7.0 REFERENCES

Agricultural Machinery Testing and Evaluation Center (AMTEC). 2010. Three-Year Report. College of Engineering and Agro-industrial Technology, University of the Philippines Los Baños, Los Baños, Laguna, 4031 Philippines.

Agricultural Mechanization Development Program (AMDP). 2013. Accomplishment Report from 1979 to 2013. Document submitted to the Office of the Vice Chancellor for Research and Extension, University of the Philippines Los Baños, Los Baños, Laguna, 4031 Philippines.

Amongo, R.M.C., M.V.L. Larona, Resurreccion, A.N., Gavino, R.B., Sicat, E.V., Rico, A.C., Macalintal, F.M. and R. Fernandez. 2013. Research, Development and Extension (RDE) and Manpower Development In Rice Mechanization: Status, Trends and Opportunities in the Philippines. Paper presented during the ARF Annual Rice Forum 2013: BSWM, DA, Visayas Ave.Quezon City, Philippines. November 22, 2013.

Amongo, R.M.C., M.V.L. Larona, R.C. Guarte, R.B. Gavino, N. Revilla. 2014. Agricultural and Biosystems Engineering Research Development and Extension of Higher Education Institutions in the Philippines. Paper presented during the 3rd meeting of the ASEAN Universities Consortium on Food and Agro-based Engineering and Technology (AUCFA) to be held on October 15-17, 2014 in Bogor, Indonesia.

Elepaño, A.R., M.V.L. Larona, and R.M.C. Amongo. 2013. Overview of Mechanization in Rice Farming: Status, Challenges, And Opportunities. Paper presented during the ARF Annual Rice Forum 2013: BSWM, DA, Visayas Ave.Quezon City, Philippines. November 22, 2013.

Republic of the Philippines. Agricultural and Fisheries Mechanization Act of 2013 (Republic Act No. 10601).

Republic of the Philippines. Implementing Rules and Regulations of the Agricultural and Fisheries Mechanization Act of 2013 (Republic Act No. 10601).

Rico, A.C. 2013. Overview of Agricultural and Fisheries Mechanization Act (Republic Act No. 10601). Powerpoint presentation for the public consulation of AFMech Law.

Website references

http://www.bar.gov.ph. Accessed November 19, 2013.

http://www.bas.gov.ph/?ids=profile&bid=2. Accessed November 15, 2014.

http://www.bfar.da.gov.ph. Accessed November 15, 2014.

http://www.nafc.da.gov.ph/mv.html. Accessed November 19, 2013.

http://nafc.da.gov.ph/NAFCNEWs/2013/ccc.html. Accessed November 15, 2014.

http://www.pcaarrd.dost.gov.ph, 2014. Accessed November 14, 2014.

http://www.philmech.gov.ph. Accessed November 14, 2014.

http://www.philrice.gov.ph . Accessed November 14, 2013 and November 14, 2014