PEREZ-GUERRERO TRUST FUND FOR ECONOMIC AND TECHNICAL COOPERATION AMONG DEVELOPING COUNTRIES

(G77 Project)

Final Report

On

Application and Dissemination of Reinforced Fiber Glass Biogas Digester in Remote and Low Income Household

BIOMA

Biogas Institute of Ministry of Agriculture (BIOMA), P.R.China

/FAO Reference Center for Biogas Research and Training

May 2019, Chengdu, China

G77 PGTF Project Final Report

Introduction
The Group of 77 approved the project entitled "Application and Dissemination of Reinforced Fiber Glass Biogas Digester in Remote and Low Income Household" for funding from Perez-Guerrero Trust Fund (PGTF)-Reference Number INT-10-K04 at the 33rd Annual Ministerial Meeting of the Group of 77 (New York, 25 September 2009), which was submitted by Biogas Institute of Ministry of Agriculture (BIOMA), P. R. China, P. R. China (hereinafter referred to as BIOMA). The duration of the project was 1 year, started on April 2011, and was allowed to be postponed to the end of 2018.

The Final Report included the project implementation activities and expenses and other related content.

I. Project Overview
1. Project Title: Application and Dissemination of Reinforced Fiber Glass Biogas Digester in Remote and Low Income Household
2. Abstract: Aiming at the energy recycling and environmental protection, this project proposes to (1) provide five 8m3-Reinforced-Fiber-Glass Biogas Digesters to remote, low-income communities not targeted by grid extension, natural gas or coal in Philippines and Bangladesh respectively; (2) hold a training on the installation and operation of biogas digesters for the local technicians and officials in agriculture and environment sectors in Philippines and Bangladesh respectively.
3. Background Analysis:
Despite global rural efforts of environmental protection and energy exploitation, the poorest, most remote communities remain suffering from the lack of power and fuel for logistical and financial reasons for a long time. Reinforced Fiber Glass Biogas Digester is a proven technology, capable of supplying clean, renewable (sustainable) energy to remote, low-income communities worldwide and effectively treating agricultural waste. There is an estimated market of over 4 million family users of the cheapest brick-made biogas digester systems in Philippines, Bangladesh, but due to poor quality and inadequate maintenance, they are not viable.

Reinforced Fiber Glass Biogas Digester system attracts people for its low cost and easy installation. It has been put into use as a replicable technology for the community model in rural areas. At the beginning, necessary capital funds need to be input to instigate such projects, and certain grants are required to launch the service delivery program. This project would enable users to benefit from the advantages of Reinforced Fiber Glass Biogas Digester. The village communities would own the systems and provide users with a crucial maintenance service. Farmers use the system for free. Furthermore, village communities would be created to organize training on management, maintenance and manufacturing of the reinforced fiber glass biogas digesters.

This project proposes to provide 8m^3 Reinforced Fiber Glass Biogas Digester systems to remote, low-income communities not targeted by grid extension, natural gas or coal. It is planned to set up 5 Reinforced Fiber Glass Biogas Digester systems in Philippines and Bangladesh respectively where abundant agricultural and domestic waste as well as suitable fermentation temperature can be available. The systems are efficient, reliable, and easy to operate/maintain, and have a lifespan of approximately 40-50 years. This project will be able to sustain itself far beyond the funding phase through right management and maintenance. As soon as the equipment is purchased and installed, the project will start to save fuel and electricity consumption and the cost on environmental protection and disease control. The money saved can be transferred onto training on operation, maintenance and manufacture of the digester, and soon retrieve investment of the manufacturing factory. The yearly profit of the digester factory may be estimated as $1000-5000, which will cover operational costs and maintenance. The business plan estimates that by the end of the fourth year, income will be able to cover the cost of 300 replacement systems. This project can continue to provide energy without the need for additional external funds. The excess income will be gradually reinvested into further systems. Assuming an average system of 7 years, the business plan that follows the four-year project estimates that after 7 years, another 10 systems could be installed.

II. Implementation

The project was planned to collaborate with the Department of Agriculture Bureau of Animal Industry (BAI) of Philippines and the Ministry of Youth and Sports of Bangladesh. BAI of Philippines keeps cooperative, while the Ministry of Youth and Sports of Bangladesh turned down to continue being the partner in this project as the approval came in 2011, two years after the project proposal in 2009, the official who was in charge of this project shifted to other positions and the successors had no response to BIOMA's inquiry emails. The project was suspended.

In this circumstance, BIOMA applied to UDNP headquarter and was allowed to change the partner in Bangladesh into Rural Development Academy in 2017. And after full preparation, BIOMA restarted the project in 2018.

Partner Institutions:
Bureau of Animal Industry (BAI), Philippines
Rural Development Academy (RDA), Bangladesh

• Phase 1: Procurement and shipment of fiber plastic digesters to Philippines and Bangladesh by BIOMA.
• Phase 2: Selection and compilation of training materials, allocation of lecturers by BIOMA, and recruitment of participants by partners in Philippines and Bangladesh.
• Phase 3: Organization of the hands-on trainings on biogas technology, and

installation of digesters in Philippines and Bangladesh by BIOAM and local partners.
• Phase 4: Activation of anaerobic fermentation of animal waste and biogas production at households on site by BIOMA.
• Phase 5: Trouble shooting inspection by the local technical group of partners in Philippines and Bangladesh.

Benefits:
• Construction: 5 high-quality Reinforced Fiber Glass Biogas Digesters with volume of 8m^3 were installed in Philippines and Bangladesh respectively.
• Households: 5 remote, low-income households got access to biogas as cooking fuel and bio-slurry as fertilizer in Philippines and Bangladesh respectively.
• Environment: agricultural and domestic waste was treated in an environment-friendly way with COD, BOD_5 discharge reduced.
• Economy: Farmers could save money on LPG which is replaced by biogas and chemical fertilizer, and increase income by using the bio-slurry as the bio-fertilizer.
• Employment: more job opportunities were created for local people being biogas technicians.
• Awareness of protection to natural forests from tree cutting
• Village committees enhanced leadership to training of locals in system installation and maintenance of fiber glass digester

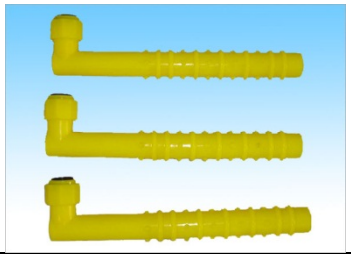
III. Completed Activities

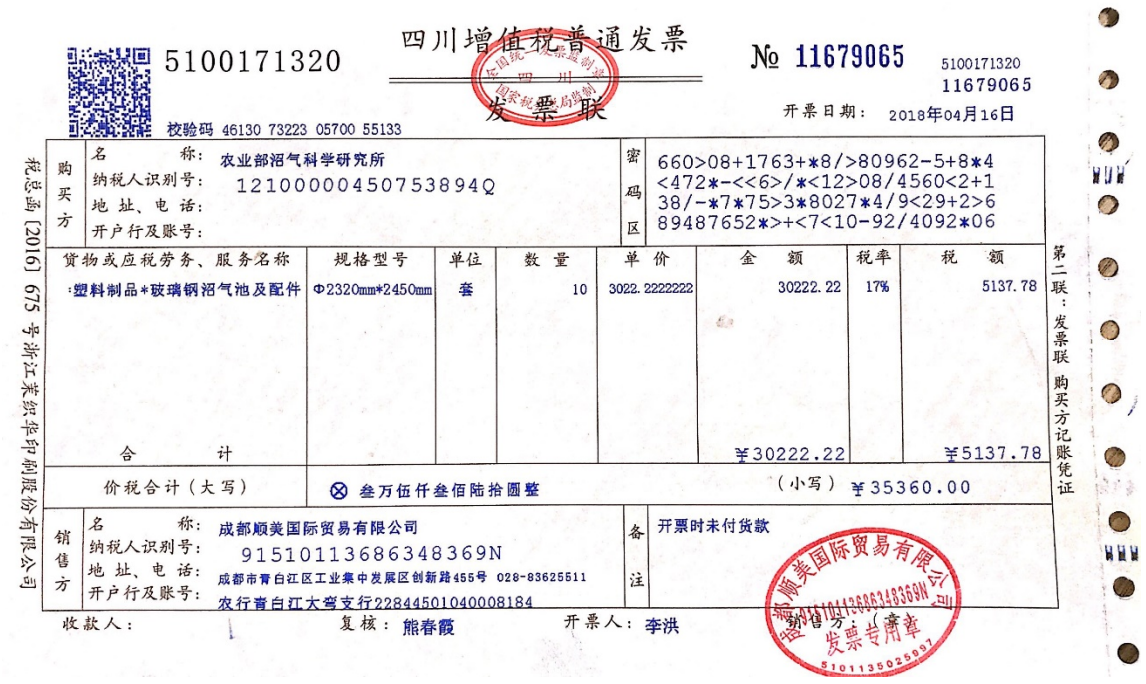
Time: May-July, 2018
Location: China, Philippines, Bangladesh
Participants: BIOMA (procurement and shipment), BAI and RDA (cargo pickup and transport to villages)
Implementation: five fiber plastic digesters and auxiliary parts were procured and shipped to Philippines and Bangladesh respectively by BIOMA, and the local partners were informed to pick up the cargo on time.

• Phase 1: Procured and shipped 5 fiber plastic digesters to Philippines and Bangladesh respectively by BIOMA.

Tab. 1 List of equipment procured in China

Products to purchase	Specific Name	Photo of samples	Total quantity
Biogas Digester	φ2320mm×2450mm		5 sets
Biogas stoves	Electronic twin-stove		5 sets
Biogas pipeline fittings	Φ16mm PE pipe		150 meters
	PVC soft pipe		10 meters
	valve(reducing)		15
	straight-through valve		10
	straight-through /two-way valve		12
	three-way valve		15

	Reducing pipeline fittings		35
	wire fixer (with nails)		250
	pipe collar		50
Desulphurization products			5 sets
Desulphurization agents	Fe_2O_3		10 kg
Fiber-glass cloth	Width=90cm		1m



5100171320 四川增值税普通发票 № 11679065

发票联

校验码 46130 73223 05700 55133

开票日期：2018年04月16日

购买方	名称：农业部沼气科学研究所 纳税人识别号：12100000450753894Q 地址、电话： 开户行及账号：	密码区	660>08+1763+*8/>80962-5+8*4 <472*-<<6>/*<12>08/4560<2+1 38/-*7*75>3*8027*4/9<29+2>6 89487652*>+<7<10-92/4092*06

货物或应税劳务、服务名称	规格型号	单位	数量	单价	金额	税率	税额
*塑料制品*玻璃钢沼气池及配件	Φ2320mm*2450mm	套	10	3022.2222222	30222.22	17%	5137.78
合计					¥30222.22		¥5137.78
价税合计（大写）	⊗叁万伍仟叁佰陆拾圆整				（小写）¥35360.00		

销售方	名称：成都顺美国际贸易有限公司 纳税人识别号：91510113686348369N 地址、电话：成都市青白江区工业集中发展区创新路455号 028-83625511 开户行及账号：农行青白江大弯支行22844501040008184	备注	开票时未付货款

收款人： 复核：熊春霞 开票人：李洪 销售方：（章）

税总函[2016]675号浙江美欣华印刷股份有限公司

第二联：发票联 购买方记账凭证

Fig. 1 Invoice for procurement of equipment and auxiliary parts RMB35360 (US$5519.48059
)

5100172320 四川增值税普通发票 № 19787083

发票联

校验码 74537 53963 21255 82220

开票日期：2018年08月28日

购买方	名称：农业部沼气科学研究所 纳税人识别号：12100000450753894Q 地址、电话： 开户行及账号：	密码区	<097<9**32160371-7->9/7637/ 0186*<0>+/4>><<10278/152005 -217415>-<51*40-0>77/5-3994 42>193+6*+4>-*83+6<34+3<423

货物或应税劳务、服务名称	规格型号	单位	数量	单价	金额	税率	税额
*鉴证咨询服务*服务费	无	次	1	14467.924528	14467.92	6%	868.08
合计					¥14467.92		¥868.08
价税合计（大写）	⊗壹万伍仟叁佰叁拾陆圆整				（小写）¥15336.00		

销售方	名称：成都顺美国际贸易有限公司 纳税人识别号：91510113686348369N 地址、电话：成都市青白江区工业集中发展区创新路455号 028-83625511 开户行及账号：农行青白江大弯支行22844501040008184	备注	

收款人：熊春霞 复核：熊春霞 开票人：李洪 销售方：（章）

税总函[2016]675号西安西正印刷有限公司

第二联：发票联 购买方记账凭证

Fig. 2 Invoice of consultancy fee (US$2393.856144)

5100162320

四川增值税普通发票

№ 02800293

5100162320
02800293

校验码 65948 51911 17867 58687

开票日期：2018年04月03日

购买方	名称：农业部沼气科学研究所 纳税人识别号：12100000450753894Q 地址、电话：成都市人民南路四段13号 开户行及账号：中国建设银行成都领事馆路分理处 51001479066050741464	密码区	7-52/05-710+630511>94*6+809 0<0/93*/67-23+8<66*<*862*88 **++/99+>7*68717739373*9/6* -0950*2/978/767<628*2<88520

货物或应税劳务、服务名称	规格型号	单位	数量	单价	金额	税率	税额
*运输服务*运费	无	KG	3200	2.027027027	6486.49	11%	713.51
合计					¥6486.49		¥713.51

价税合计（大写）⊗ 柒仟贰佰圆整 （小写）¥7200.00

销售方	名称：上海超赶物流有限公司成都分公司 纳税人识别号：91510114MA6CQ6QY0B 地址、电话：成都市新都区新都街道汉城村四、五、六社 - 开户行及账号：中国农业银行股份有限公司新都三河支行22824701040005818	备注	成都-上海 货物名称：玻璃钢沼气池及配件

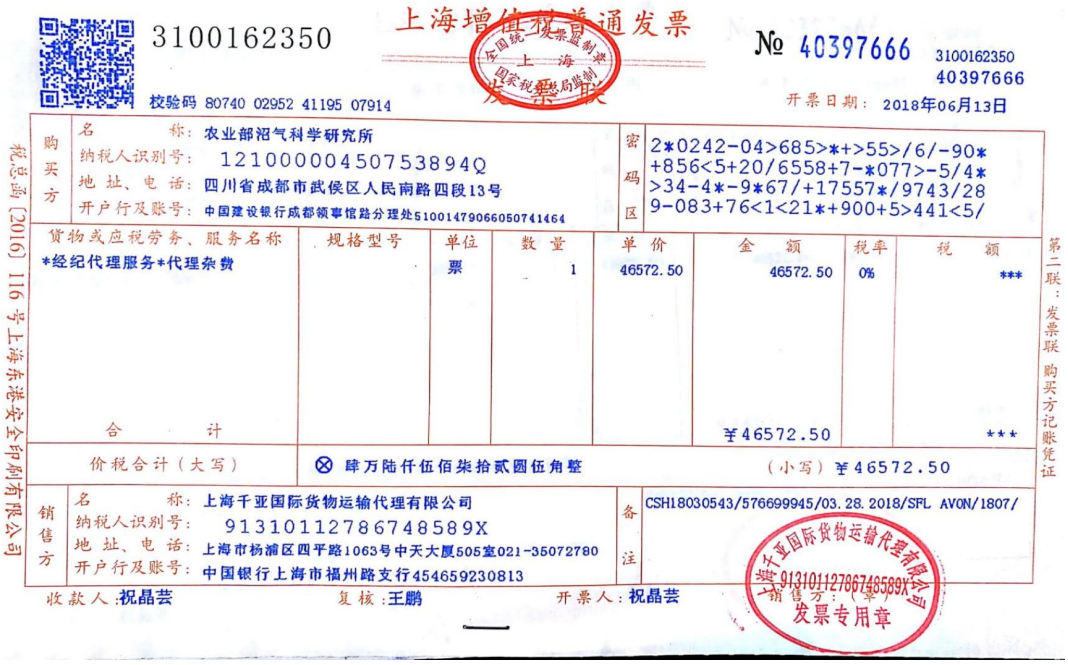
收款人： 复核： 开票人：王建邦 销售方：（章）

上海超赶物流有限公司成都分公司 91510114MA6CQ6QY0B 发票专用章

税总函〔2015〕663号东港股份有限公司

第二联：发票联 购买方记账凭证

Fig. 3 Invoice for land transportation from Chengdu to Shanghai, China (US$1123.876124)



3100162350

上海增值税普通发票

№ 40397666

3100162350
40397666

校验码 80740 02952 41195 07914

开票日期：2018年06月13日

购买方	名称：农业部沼气科学研究所 纳税人识别号：12100000450753894Q 地址、电话：四川省成都市武侯区人民南路四段13号 开户行及账号：中国建设银行成都领事馆路分理处51001479066050741464	密码区	2*0242-04>685>*+>55>/6/-90* +856<5+20/6558+7-*077>-5/4* >34-4*-9*67/+17557*/9743/28 9-083+76<1<21*+900+5>441<5/

货物或应税劳务、服务名称	规格型号	单位	数量	单价	金额	税率	税额
*经纪代理服务*代理杂费		票	1	46572.50	46572.50	0%	***
合计					¥46572.50		***

价税合计（大写）⊗ 肆万陆仟伍佰柒拾贰圆伍角整 （小写）¥46572.50

销售方	名称：上海千亚国际货物运输代理有限公司 纳税人识别号：91310112786748589X 地址、电话：上海市杨浦区四平路1063号中天大厦505室021-35072780 开户行及账号：中国银行上海市福州路支行454659230813	备注	CSH18030543/576699945/03.28.2018/SFL AVON/1807/

收款人：祝晶芸 复核：王鹏 开票人：祝晶芸 销售方：（章）

上海千亚国际货物运输代理有限公司 91310112786748589X 发票专用章

税总函〔2016〕116号上海东港安全印刷有限公司

第二联：发票联 购买方记账凭证

Fig. 4 Invoice 1 for shipment part I from Shanghai, China to Manila, Philippines

3100162350

上海增值税普通发票

№ 40397667

3100162350
40397667

开票日期：2018年06月13日

校验码 70230 44526 11128 82136

发票联

购买方	名称：农业部沼气科学研究所 纳税人识别号：12100000450753894Q 地址、电话：四川省成都市武侯区人民南路四段13号 开户行及账号：中国建设银行成都领事馆路分理处51001479066050741464	密码区	12711<-55*42+0484*43*-58287 -63682<-7+659>71*>><7/83+4* 0>-572*+9+78-25>+84>2<5>*>0 +083241686+-6-+9*77387-8<6<

货物或应税劳务、服务名称	规格型号	单位	数量	单价	金额	税率	税额
*经纪代理服务*代理杂费		票	1	6700.00	6700.00	0%	***
合计					¥6700.00		***
价税合计（大写）	⊗ 陆仟柒佰圆整				（小写）¥6700.00		

销售方	名称：上海千亚国际货物运输代理有限公司 纳税人识别号：91310112786748589X 地址、电话：上海市杨浦区四平路1063号中天大厦505室021-35072780 开户行及账号：中国银行上海市福州路支行454659230813	备注	CSH18030543/576699945/03.28.2018/SFL AVON/1807/

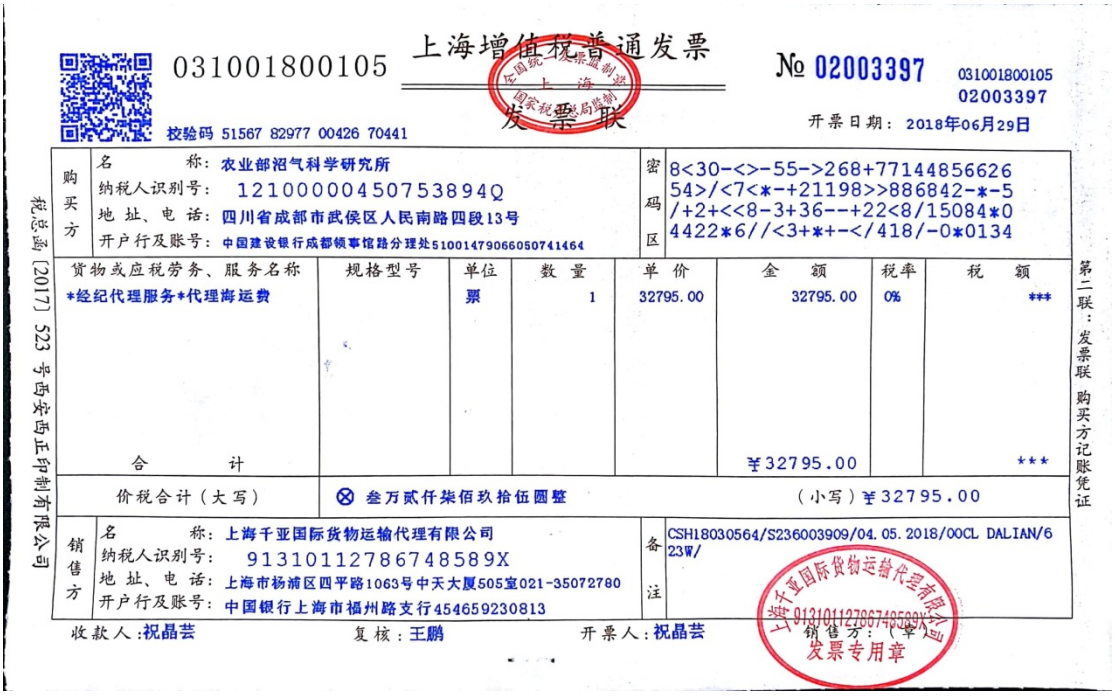
收款人：祝晶芸　　复核：王鹏　　开票人：祝晶芸

上海千亚国际货物运输代理有限公司 91310112786748589X 发票专用章

税总函〔2016〕116号上海东港安全印刷有限公司

第二联：发票联 购买方记账凭证

Fig. 5 Invoice 2 for shipment part II from Shanghai, China to Manila, Philippines



031001800105

上海增值税普通发票

№ 02003397

031001800105
02003397

开票日期：2018年06月29日

校验码 51567 82977 00426 70441

发票联

购买方	名称：农业部沼气科学研究所 纳税人识别号：12100000450753894Q 地址、电话：四川省成都市武侯区人民南路四段13号 开户行及账号：中国建设银行成都领事馆路分理处51001479066050741464	密码区	8<30-<>-55->268+77144856626 54>/<7<*-+21198>>886842-*-5 /+2+<<8-3+36--+22<8/15084*0 4422*6//<3+*+-</418/-0*0134

货物或应税劳务、服务名称	规格型号	单位	数量	单价	金额	税率	税额
*经纪代理服务*代理海运费		票	1	32795.00	32795.00	0%	***
合计					¥32795.00		***
价税合计（大写）	⊗ 叁万贰仟柒佰玖拾伍圆整				（小写）¥32795.00		

销售方	名称：上海千亚国际货物运输代理有限公司 纳税人识别号：91310112786748589X 地址、电话：上海市杨浦区四平路1063号中天大厦505室021-35072780 开户行及账号：中国银行上海市福州路支行454659230813	备注	CSH18030564/S236003909/04.05.2018/OOCL DALIAN/623W/

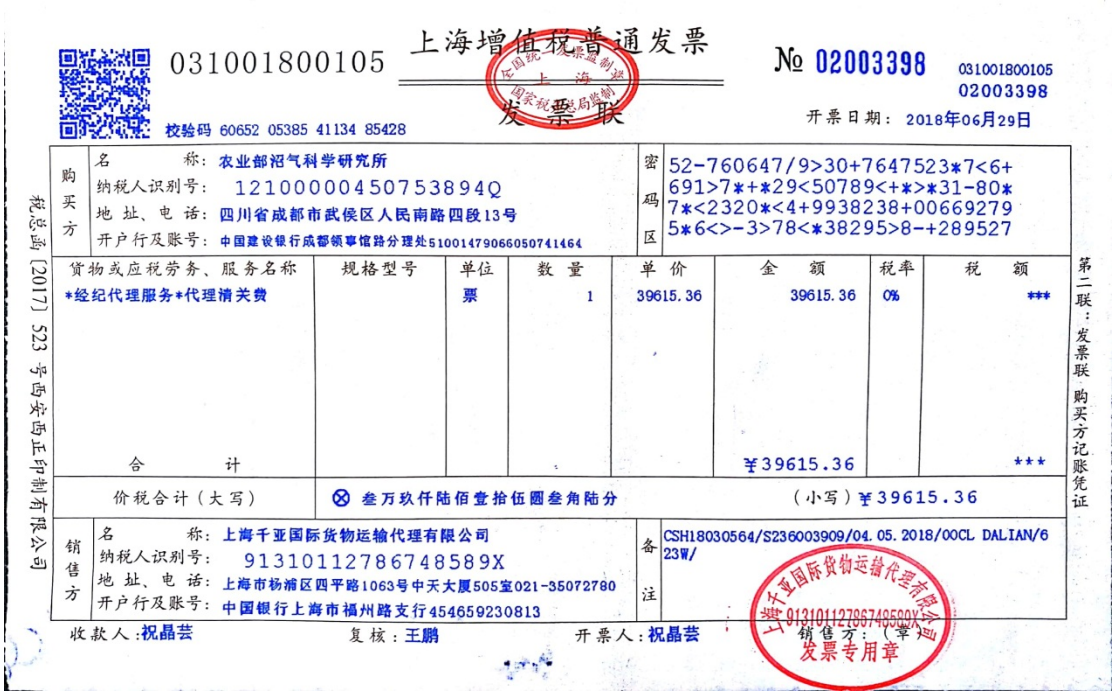
收款人：祝晶芸　　复核：王鹏　　开票人：祝晶芸

上海千亚国际货物运输代理有限公司 91310112786748589X 发票专用章

税总函〔2017〕523号西安西正印制有限公司

第二联：发票联 购买方记账凭证

Fig. 6 Invoice 1 for shipment part I from Shanghai, China to Bogra, Bangladesh



031001800105 上海增值税普通发票 № 02003398

031001800105
02003398

校验码 60652 05385 41134 85428

发票联

开票日期：2018年06月29日

购买方	名称：农业部沼气科学研究所 纳税人识别号：12100000450753894Q 地址、电话：四川省成都市武侯区人民南路四段13号 开户行及账号：中国建设银行成都领事馆路分理处51001479066050741464	密码区	52-760647/9>30+7647523*7<6+ 691>7*+*29<50789<+*>*31-80* 7*<2320*<4+9938238+00669279 5*6<>-3>78<*38295>8-+289527

货物或应税劳务、服务名称	规格型号	单位	数量	单价	金额	税率	税额
*经纪代理服务*代理情关费		票	1	39615.36	39615.36	0%	***
合计					¥39615.36		***
价税合计（大写）	⊗ 叁万玖仟陆佰壹拾伍圆叁角陆分				（小写）¥39615.36		

销售方	名称：上海千亚国际货物运输代理有限公司 纳税人识别号：91310112786748589X 地址、电话：上海市杨浦区四平路1063号中天大厦505室021-35072780 开户行及账号：中国银行上海市福州路支行454659230813	备注	CSH18030564/S236003909/04.05.2018/00CL DALIAN/623W/

收款人：祝晶芸　　复核：王鹏　　开票人：祝晶芸　　销售方：（章）

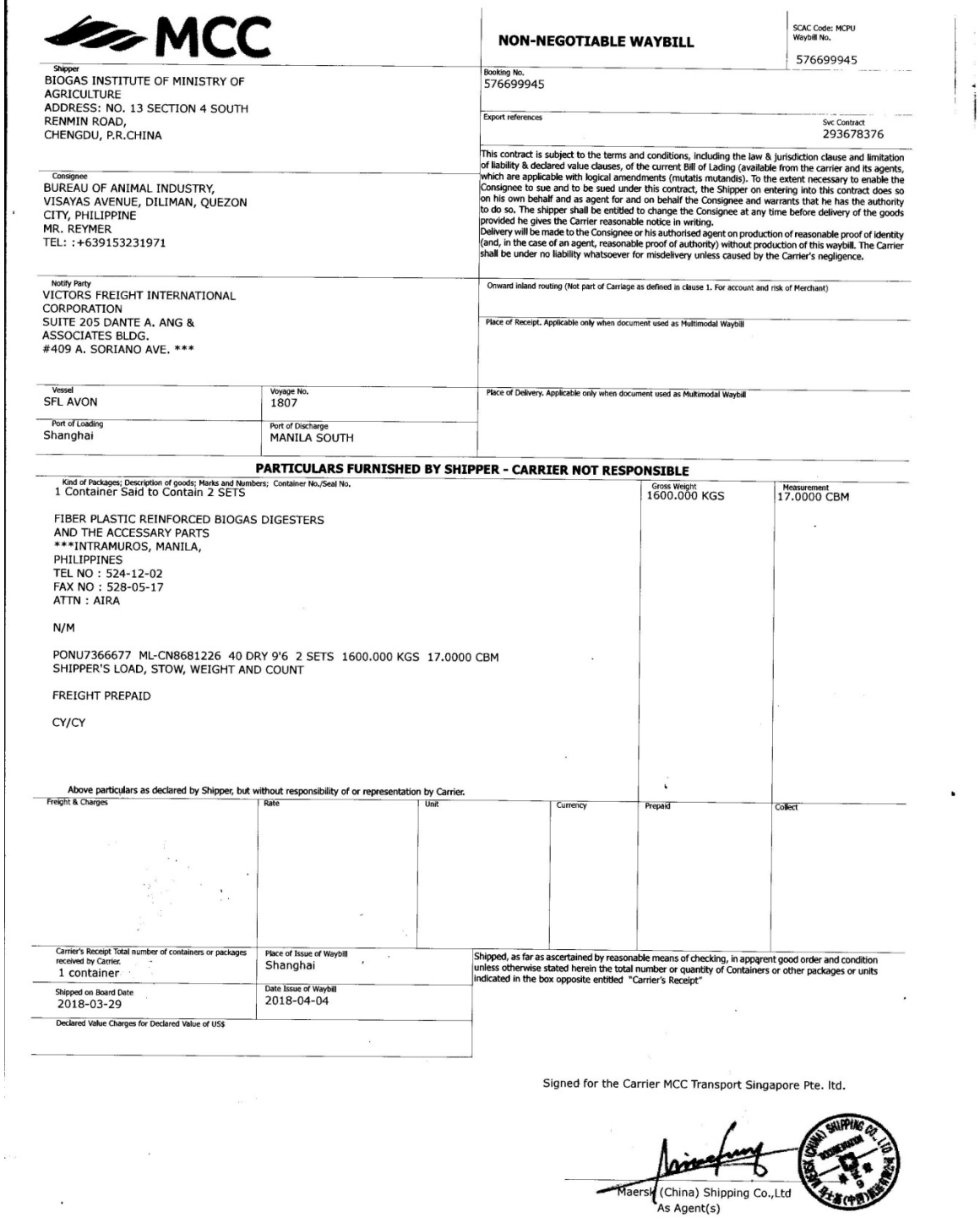
上海千亚国际货物运输代理有限公司 91310112786748589X 发票专用章

税总函〔2017〕523号西安西正印制有限公司

第二联：发票联 购买方记账凭证

Fig. 7 Invoice 2 for shipment part II from Shanghai, China to Bogra, Bangladesh

Total shipment: US$19618.2505



MCC

NON-NEGOTIABLE WAYBILL

SCAC Code: MCPU
Waybill No.
576699945

Shipper
BIOGAS INSTITUTE OF MINISTRY OF AGRICULTURE
ADDRESS: NO. 13 SECTION 4 SOUTH RENMIN ROAD,
CHENGDU, P.R.CHINA

Booking No.
576699945

Export references

Svc Contract
293678376

This contract is subject to the terms and conditions, including the law & jurisdiction clause and limitation of liability & declared value clauses, of the current Bill of Lading (available from the carrier and its agents, which are applicable with logical amendments (mutatis mutandis). To the extent necessary to enable the Consignee to sue and to be sued under this contract, the Shipper on entering into this contract does so on his own behalf and as agent for and on behalf the Consignee and warrants that he has the authority to do so. The shipper shall be entitled to change the Consignee at any time before delivery of the goods provided he gives the Carrier reasonable notice in writing.
Delivery will be made to the Consignee or his authorised agent on production of reasonable proof of identity (and, in the case of an agent, reasonable proof of authority) without production of this waybill. The Carrier shall be under no liability whatsoever for misdelivery unless caused by the Carrier's negligence.

Consignee
BUREAU OF ANIMAL INDUSTRY,
VISAYAS AVENUE, DILIMAN, QUEZON CITY, PHILIPPINE
MR. REYMER
TEL: :+639153231971

Notify Party
VICTORS FREIGHT INTERNATIONAL CORPORATION
SUITE 205 DANTE A. ANG & ASSOCIATES BLDG.
#409 A. SORIANO AVE. ***

Onward inland routing (Not part of Carriage as defined in clause 1. For account and risk of Merchant)

Place of Receipt. Applicable only when document used as Multimodal Waybill

Vessel	Voyage No.
SFL AVON	1807
Port of Loading	Port of Discharge
Shanghai	MANILA SOUTH

Place of Delivery. Applicable only when document used as Multimodal Waybill

PARTICULARS FURNISHED BY SHIPPER - CARRIER NOT RESPONSIBLE

Kind of Packages; Description of goods; Marks and Numbers; Container No./Seal No.	Gross Weight	Measurement
1 Container Said to Contain 2 SETS FIBER PLASTIC REINFORCED BIOGAS DIGESTERS AND THE ACCESSARY PARTS ***INTRAMUROS, MANILA, PHILIPPINES TEL NO : 524-12-02 FAX NO : 528-05-17 ATTN : AIRA N/M PONU7366677 ML-CN8681226 40 DRY 9'6 2 SETS 1600.000 KGS 17.0000 CBM SHIPPER'S LOAD, STOW, WEIGHT AND COUNT FREIGHT PREPAID CY/CY	1600.000 KGS	17.0000 CBM

Above particulars as declared by Shipper, but without responsibility of or representation by Carrier.

Freight & Charges	Rate	Unit	Currency	Prepaid	Collect

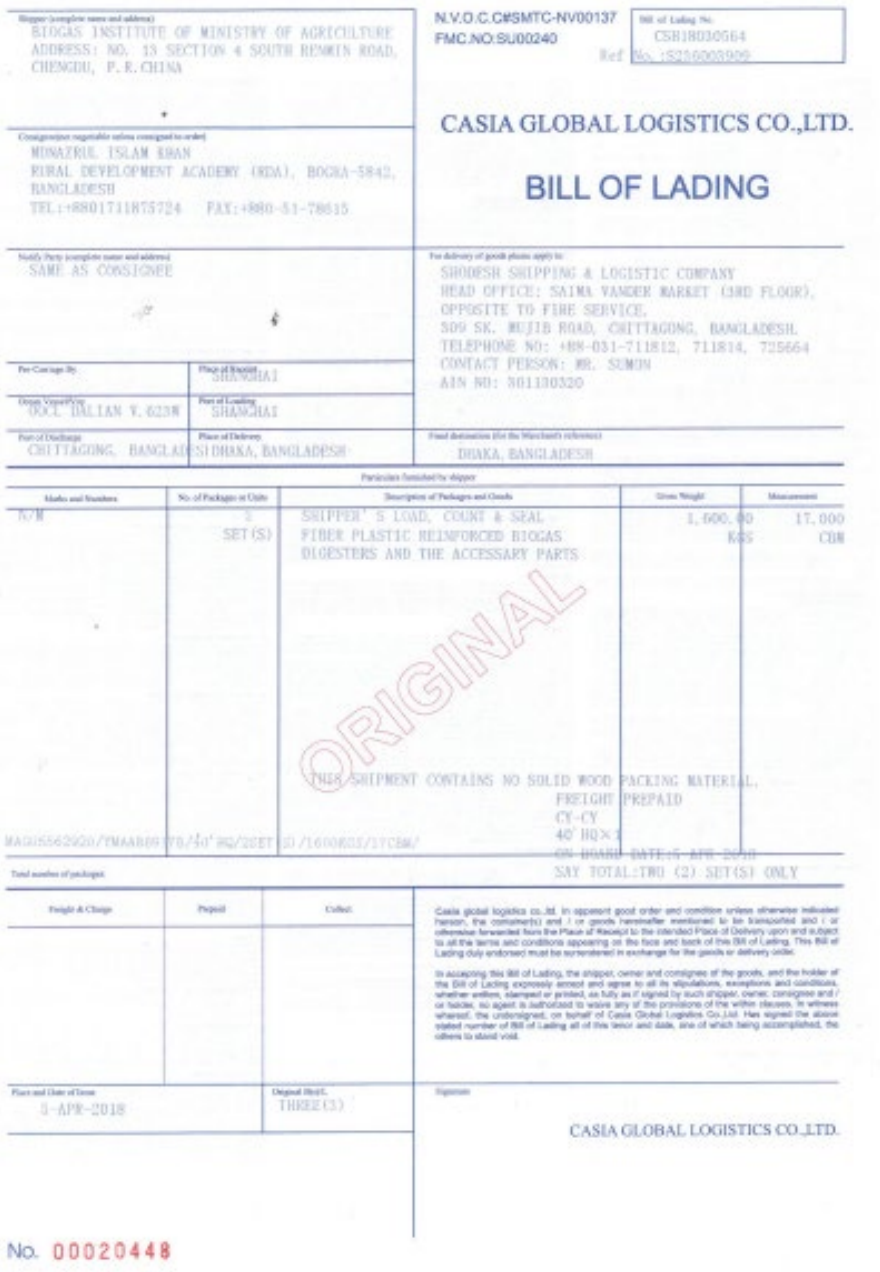
Carrier's Receipt Total number of containers or packages received by Carrier.	Place of Issue of Waybill
1 container	Shanghai
Shipped on Board Date	Date Issue of Waybill
2018-03-29	2018-04-04
Declared Value Charges for Declared Value of US$	

Shipped, as far as ascertained by reasonable means of checking, in apparent good order and condition unless otherwise stated herein the total number or quantity of Containers or other packages or units indicated in the box opposite entitled "Carrier's Receipt"

Signed for the Carrier MCC Transport Singapore Pte. ltd.

Maersk (China) Shipping Co.,Ltd
As Agent(s)

Fig. 8 Bill of lading from BIOMA to BAI, Philippines



BIOGAS INSTITUTE OF MINISTRY OF AGRICULTURE
ADDRESS: NO. 13 SECTION 4 SOUTH RENMIN ROAD,
CHENGDU, P.R.CHINA

N.V.O.C.CMSMTC-NV00137
FMC.NO:SU00240

CSB18030564

CASIA GLOBAL LOGISTICS CO.,LTD.

BILL OF LADING

MUNAZIRUL ISLAM KHAN
RURAL DEVELOPMENT ACADEMY (RDA), BOGRA-5842,
BANGLADESH
TEL:+8801711875724 FAX:+880-51-78615

SAME AS CONSIGNEE

SHODESH SHIPPING & LOGISTIC COMPANY
HEAD OFFICE: SAIMA VANDER MARKET (3RD FLOOR),
OPPOSITE TO FIRE SERVICE,
509 SK. MUJIB ROAD, CHITTAGONG, BANGLADESH.
TELEPHONE NO: +88-031-711812, 711814, 725664
CONTACT PERSON: MR. SUMON
AIN NO: 301130320

SHANGHAI
SHANGHAI
CHITTAGONG, BANGLADESH
DHAKA, BANGLADESH
DHAKA, BANGLADESH

Marks and Numbers	No. of Packages or Units	Description of Packages and Goods	Gross Weight	Measurement
N/M	2 SET(S)	SHIPPER'S LOAD, COUNT & SEAL FIBER PLASTIC REINFORCED BIOGAS DIGESTERS AND THE ACCESSARY PARTS	1,600.00 KGS	17.000 CBM

ORIGINAL

THIS SHIPMENT CONTAINS NO SOLID WOOD PACKING MATERIAL.
FREIGHT PREPAID
CY-CY
40' HQ×1
ON BOARD DATE:5 APR 2018
SAY TOTAL:TWO (2) SET(S) ONLY

Freight & Charge	Prepaid	Collect

Casia global logistics co.,ltd. In apparent good order and condition unless otherwise indicated hereon, the container(s) and / or goods (hereinafter mentioned to be transported and / or otherwise forwarded from the Place of Receipt to the intended Place of Delivery upon and subject to all the terms and conditions appearing on the face and back of this Bill of Lading. This Bill of Lading duly endorsed must be surrendered in exchange for the goods or delivery order.

In accepting this Bill of Lading, the shipper, owner and consignee of the goods, and the holder of the Bill of Lading expressly accept and agree to all its stipulations, exceptions and conditions, whether written, stamped or printed, as fully as if signed by such shipper, owner, consignee and / or holder, no agent is authorized to waive any of the provisions of the within clauses. In witness whereof, the undersigned, on behalf of Casia Global Logistics Co.,Ltd. Has signed the above stated number of Bill of Lading all of this tenor and date, one of which being accomplished, the others to stand void.

5-APR-2018
THREE(3)

CASIA GLOBAL LOGISTICS CO.,LTD.

No. 00020448

Fig. 9 Bill of lading from BIOMA to RDA, Bangladesh

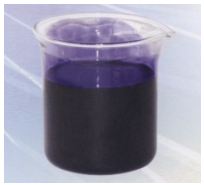
Fig. 10 Biogas digester parts and in a 40'' HQ container and cargo pickup by local partners

- Phase 2: Selected and compiled training materials, allocation of lecturers by

BIOMA, and recruitment of participants by BAI and RDA.

(1) Materials and tools prepared for hands-on training on installation of FRP digesters, prepared by local partners including BAI and RDA.

Tab. 2 Material purchased locally

Material	**Pic.**	**Type**	**Amount for 1 set**	**Total amount (5 sets)**
Resin		191# Generic type unsaturated polyester resin	3kg	15kg
Talc powder		Or called “French chalk” or “saponite”	5kg	25kg
Methyl ethyl ketone peroxide (MEKP)		(Hardening agent)	0.09kg	0.5kg
Cobalt naphthenate		(Accelerant)	0.09kg	0.5kg

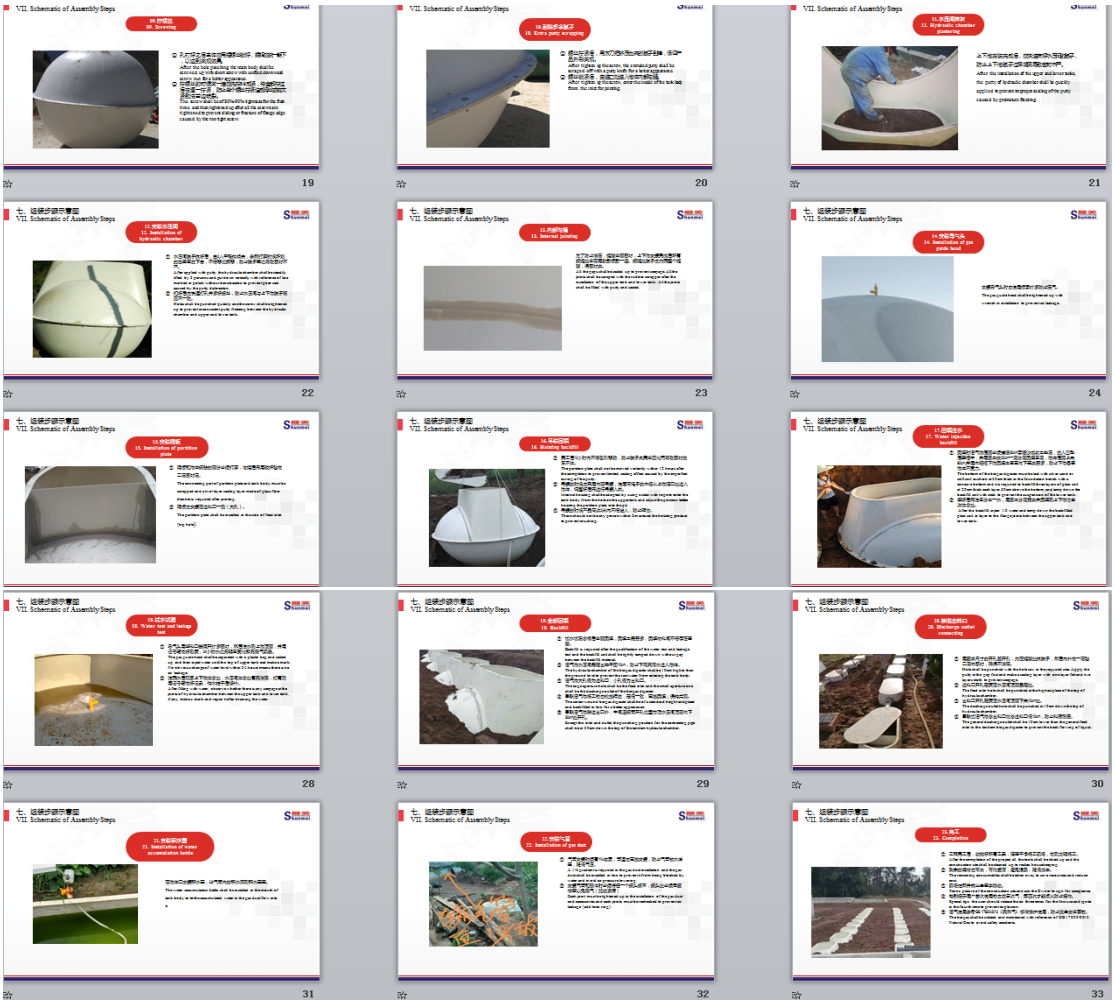
Tab. 3 Tools rented locally

Tools	**Pic.**	**Type**	**Amount**
Electro drill		Drilling bit 0.85cm	1
Grinder			1
Plaster tool			1

Wrench		14*17 (not adjustable wrench)	1

(2) Training material prepared for in-door lecture, prepared by BIOMA, China

Lecture 1. Installation and operation of FRP digester



Lecture 2: Fermentation Process of Rural Household digesters (Annex)

• Phase 3: Selected recipients of digesters and participants of training, organizing hands-on trainings on biogas technology, and installing digesters in Philippines and Bangladesh by BIOMA, BAI and RDA..

BAI and RDA completed the following respectively:

(1) identified five (5) farmer co-operators and verified their willingness, location and sustainability;
(2) facilitated the conduct of a hands-on training;
(3) twenty-four participants in Philippines and ten participants in Bangladesh were selected from Regional Coordination / Technician, biogas technician and other NGO/institute/agency engaged in biogas technology.

The hands-on trainings were both successfully completed.

Philippines:

On-site lecture about installation

Learning from handouts

Completion of installing a digester

Closing ceremony

Bangladesh:

On-site lecture about installation

• Phase 4: Activated anaerobic fermentation of animal waste and biogas production at households on site by BIOMA.

After assembling and installing the digesters, BIOMA guided participants to feed agricultural waste including animal manure and crop straw into the digesters, and mix the waste with water at a certain ratio. The soonest biogas production was observed 3 days after feeding.

• Phase 5: Conducted trouble shooting inspection by the local technical group of BAI and RDA.

This part was completed after the trainings were ended. Local technicians paid regular visit to the recipients and checked the piping, biogas pressure and the operation of biogas appliances.

IV. Follow-ups

In order to equip participants with knowledge on biogas and animal waste treatment, and to improve their understanding of theoretic knowledge, BIOMA invited one participant of BAI and one participant of RDA to China to attend a training course and a forum . The events were under the Framework of the FAO-China South-South Cooperation (SSC) Program, held at BIOMA, Chengdu, China, involving two parts:

(1) Training Course on Biogas Technology and Animal Waste Treatment and Utilization during 7-20 January, 2019;
(2) Workshop on Experience Sharing and Lessons Learned in Animal Waste Treatment and Utilization during 21-25 January, 2019.

The participants are:

Mr. SAMIR KUMAR SARKAR, PhD, Environmental science, RDA, Bangladesh

Mr. Gareth Bayate, Department of Agriculture Regional field Office 6, Agriculturist II, BAI, Philippines

As a result, the above participants worked out a Concept Notes on Enhancement of Biogas Technology and Animal Waste Management through FAO-South East Asia-China Cooperation in South East Asia, along with other participants. The Concept Note was submitted to FAO for further assessment.

BIOMA will keep focusing on the progress of collaborative project establishment with Philippines and Bangladesh in biogas and wastewater treatment field.

V. Financial Costs and Expenses.

The project costs are strictly based on financial budget. Financial staffs were invited for evaluation and review of the economy for the project. Project manager monitored the cost for each activity. Director General of BIOMA supervised the whole procedure.

No.	Items	Expense (yuan)	Total (USD)	PGTF Fund (USD)	BIOMA Fund (USD)
1	Procurement of equipment	35360	5519.480519		
2	Consultancy fee and per diem to a technician from digester supplier	15336	2393.856144		
3	Consultancy fee and per diem to an expert from BIOMA	19615	3061.781968		
4	Land transportation	7200	1123.876124		
5	Shipment	125682.36	19618.2505		
	Total	203193.36	31717.24525	29000	2717.245255

Bank Information:
CHINA CONSTRUCTION BANK CORP, SICHUAN BRANCH
51014008100221000419
SWIFT: PCBCCNBJSCX
TEL.: +86-28-84470350
ADDRESS: 19/F, CCB SICHUAN BLDG, NO. 86 TIDU ST, CHENDU, SICHUAN, CHINA

VI. Conclusion

The resurgence of stricter Local Government ordinances and enforcement plus the increase of prices of fossil fuel have revigorated interest in biogas technology and other technology on animal waste management in the Philippines and Bangladesh. Most of the animal farms have to abide the requirements to secure business permit. The reinforced fiber glass digester premise of minimal or no failure rate is a good incentive to be explore and these recipients and trained technicians will be the advocate of this digester design to their community and respective offices

To boost the biogas technology in the developing countries need the infusion of profound knowledge pool coupled with sound policies and financial support.

Collaborative endeavor with other Institution in the field of Anaerobic Digestion like BIOMA will catalyze biogas development in the developing countries. Should there be a local established Center of excellence, efficient, modular, multi-feedstock and large scale reactors can be realized to rapidly propagate in the country side.