e-Village Project Report

Hpa Yar Ngoke To CIC project

a joint study by and between JTEC of Japan and MCF of Myanmar

January 2017

Japan Telecommunications Engineering and Consulting Service

Myanmar Computer Federation

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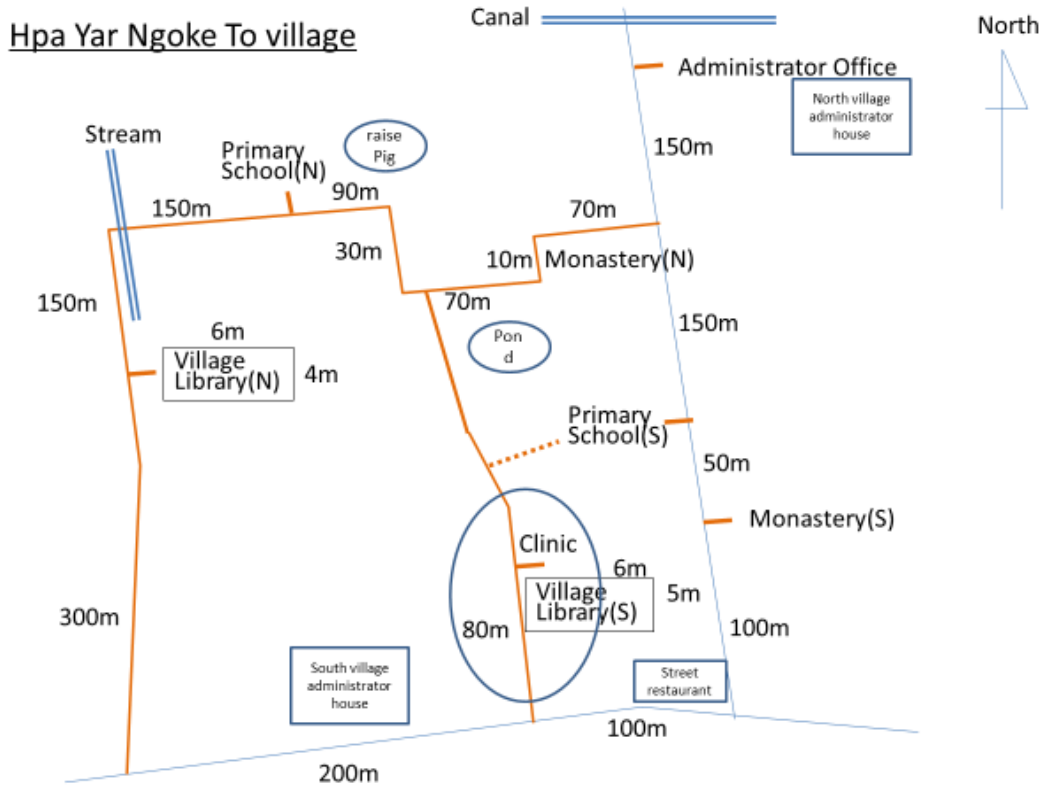

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	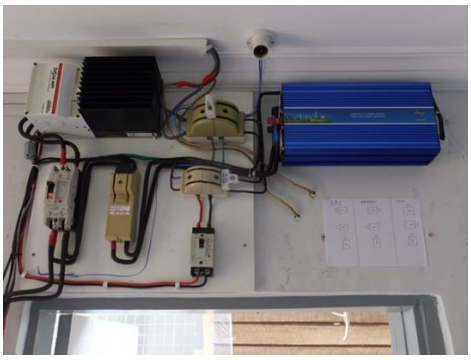
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Executive Summary

1. Project Information

1.1 Backgrounds

Japan Telecommunications Engineering and Consulting Service (hereinafter referred to as "JTEC") sent a high-level mission composed of high level delegates from Japanese ICT companies to Myanmar and organized ICT workshop at Naypyidaw and Yangon in July, 2012 to exchange views on development and possible cooperation of ICT under support of Ministry of Communications, Posts and Telegraphs[1] of Myanmar. Wide range of expectations to Japan were expressed from Myanmar in the workshop. Among expectations, JTEC had been considering the potential problem near future in Myanmar such as building telecommunication access to a rural area and easing so-called digital divide, and decided to conduct a pilot project on ICT utilization in rural area.

1.2 Objectives

The project objectives is to conduct a joint research by and between Myanmar an Japan in order to investigate and identify an applicable ICT system for narrowing digital divide in rural areas, and in order to propose concrete measures for ICT dissemination in rural areas.

1.3 Formation

JTEC plays a coordinating role for Japan side, while MCF plays a coordinating role for Myanmar side. Then, the related organizations of each country participate in the project through JTEC and MCF.

1.4 Subjects of joint research

Subjects of joint research are as follows.

(1) To research useful configuration/equipment, lead time and cost of ICT system in rural areas
(2) To research useful way of ICT system to provide villagers with benefit
(3) To research how to keep sustainability of ICT system operation
(4) To propose an ICT system dissemination plan in rural areas

1.5 Schedule

This pilot project at the projet site started from November 2013 and ended in the end of August 2016.
This pilot project was conducted in two phases. The first phase was to install an ICT system at the project site. The second phase was to operate the installed ICT system. The center in which ICT system was installed was named "Community ICT Center" (hereinafter referred to as "CIC").

1.6 Time and Manpower needed

The number of man days input from November 2013 to August 2016 is 464 man days from Japan side and 165 man days from Myanmar side.

1.7 Cost

[1] Organization name is that as of July 2013.

The total cost for installation and operation of CIC is below.

(1) Installation cost: approximately USD20,000

Main expenditure items (in order of expensive item): Electric power, ICT facilities, library renovation, Satellite communications facilities, Furniture

(2) Operation cost (duration: from April, 2014 to August, 2016): approximately USD12,000

Main expenditure items (in order of expensive item): Internet access, Salary for operator and ICT engineer, consumables

2. Project implementation and research results

The joint research results of subjects (1) – (3) in section 1.4 is shown in this chapter, whereas the joint result of subject (4) in section 1.4 is described in chapter 3.

2.1 Subject of study (1): Implementation of ICT system

WG researched ICT system implementation from the view point of quick delivery and inexpensive internet access in the rural area.

(1) Project site

Hpa Yar Ngoke To south village in Twantay Township in Yangon Region Government was selected, because WG would like to select a pilot site where neither telecommunication access nor commercial power supply was available and where strong support from Minister of Yangon Region Government is available.

When WG made research of this village in November 2013, though this village was covered by MPT CDMA2000 and GSM, signal was weak and call-enabled area was only at the place with good visibility. Internet access by mobile phone from this village was available only from 4am to 6am and 3 users in this village accessed Internet by mobile phone.

WG investigated the existing facilities such as monastery, elementary school and library for ICT system implementation. WG found that monastery did not have an empty space and elementary school was locked and became peopleless after school and in the weekend. Thus, WG selected the library.

(2) Configuration of implemented ICT system

Internet access through VSAT, computers, printer, VoIP Telephone

(3) Main research results

By bearing affordability and sustainability in mind, WGs had the following research results.

1) Electric power

   A gasoline engine generator was implemented at first and electricity became available. Two months after the generator was operated, it was relplaced by solar panels because of reasons such as avoidance of noise to surrounding houses.

2) Internet access

   Internet access was implemented through VSAT. Speed of 512kbps and enterprise service by Ku band was selected. Internet access were delibered in 3 weeks.

3) Zero Client PC

For low power consumption and easy operatin by central management for plural computers, 6(six) zero clients' PC from Ncomputing based on virtualization technology were implemented. They were delivered in a week and ran stably in the project.

2.2 Subject of study (2)：Benefit for villagers by ICT system

WG confirmed benefits which villagers got by ICT system and considered possibility of further benefits.

(1) Manner of CIC operation

1) A charge for use of CIC

A charge for use of CIC was not collected, because villagers in that village have a low income

2) CIC operation system

- Four operators were hired locally to generate ownership mind for CIC among villagers.
- One ICT engineer was hired from Yangon once a week for 10 months to improve ICT skills of local operators.

(2) ICT services using CIC

WG provided with (a) information portal page, (b) internet access and VoIP service, (c) printer and (d) ICT learning application such as writer, spread sheet, drawing and typing.

(3) Results of CIC usage

136 villagers used CIC from March 2014 to August 2016. This is equivalent to 20% of all 685 population in this village. Furthermore, by age bracket, 77% of all users is less than 30 years old.

(4) Obtained benefits

1) Knowledge of agriculture, healthcare and education was enhanced by children for utilizing the information portal page.
2) Internet such as News service, YouTube and Facebook became available like in city.
3) Villagers got the desired information such as market price of vegetables and the path of a cyclen.
4) ICT literacy of children was improved.
5) Performance of children in school was improved.
6) Villagers were able to talk with family and friends abroad by free call application.
7) Printer was used considerably and contributed to improvement of livelihood.
8) Experiencer of computer provided students with computer training course without salary.

(5) Promotion of ICT system utilization

1) Training for villagers

ICT system training to villagers was held three times and a total of 63 villagers participated.

2) Workshop

Workshop to villagers who never visited CIC and was more than 20 years old for promotion of ICT system utilization was held. 23 villagers of which more than 90% were housewives, participated. Participants were interested in (a) the view of Hpa Yar Ngoke To village at Google Map, (b) the photos at news web, and (c) video contents which instructed the methodology of cultivating rice.

(6) Obtained other benefits than those from ICT utilization ICT

1) Private mobile phones could be charged at CIC.
2) CIC was utilized as a gathering place for hearing survey.

(7) Information transfer

1) To effectively provide with information which villagers require and to create such a system that information of the portal page is updated as needed is important.
2) To set a certain information which higher local government agencies would like to disseminate to villagers into the information portal page is efficient for governmental activities. It is worth considering that dessimination committee members periodically visit villages to update information of portal page for dessimination of ICT system in the rural area in the future.

2.3 Subject of study (3) : Sustainability of ICT system

Issues and solution for ICT system sustainability were studied.

(1) Establishment of village CIC operational committee and self-sustaining operation

1) Objectives

Autonomous CIC operation by villagers is necessary for ICT system sustainability. Therefore, establishment of CIC operational committee was proposed to village administrator by WG. We worked to gradually reduce the direct involvement of the CIC operation itself and mainly support the committee as advisors. The direct involvement by JTEC and MCF in CIC operation was gradually reduced. JTEC and MCF tried to play a role of advisors in CIC operation.

2) Enlightment and Human Resource Development activities for self-sustaining operation

- Case of agricultural product sales in the village by using Internet in other countiries were introduced by MCF and JTEC to encourage villagers for self-sustaining operation.
- However, as business experiencer did not exist in the village, considering business activity by utilizing CIC is difficult for operational committee. Therefore, an Australia social enterprise which raised entrepreneurs and 7 persons in Twantay town who completed its free entrepreneurship class over 6 weeks were visited and high effectiveness of this class was confirmed. Although one of operational committee was recommended taking this class, taking this class was not realized.

3) Autonomous activities by villagers

Following ideas were proposed and were conducted by operational committee. Expected effect appeared.

- Children sometimes stay in CIC long time, as they got aborbed in computer utilization. Children sometimes could not concentrate on work at home, because they want to go to CIC. Computer utilization time by children was restricted.
- Workers cannot use CIC in case that opening hours is 10:00am to 4:30pm. After opening hours were changed into 3 pm to 10 pm as, new users visited CIC and number of users in a day increased.

4) Motivation

Exposure through Inernet of excellent benefits which were obtained from ICT system may earn applause. Pick up of excellent benefits at township news may lead to morale improvement of village administrator and operational committee members. These activities must be effective.

(2) Development of operator and ICT engineer

1) Two local operators were hired to give priority to encouragement of a sense of ownership of CIC. In

addition, other two operators were hired from a nearby town where commercial power supply is available to give users instruction on prevention method of electric shock. These four operators were provided with basic computer training and they also played a role of trainers of basic computer training to villagers.

2) One ICT engineer was hired once a week from Yangon for 10 months to support operators.
3) Two young monks and a manager in the road construction supervision office were computer experiencers. They supported beginners of computers by request from CIC operational committee.
4) CIC operational committee asked MCF for development of ICT engineers. KMD which MCF asked for support provided two representatives of village with 10 days' basic computer training for free of charge.

(3) Challenge for obtaining CIC operation fee

By following the cases in other countries, WG proposed to devote a part of increased revenue from expansion of agricultural products sales by utilizing CIC to CIC operation fee. In particular, expansion of sales destination and increase of sales price was considered not by agricultural product sales through broker but by direct marketing of agricultural products to users in Yangon with utilizing Facebook at CIC. Though CIC operational committee created a Facebook account of "Hpa Yar Ngoke To e-Village", any achievements were not made during peiod of this pilot project in Hpa Yar Ngoke To village, due to lack of participants from the villagers, lack of members who could continuously coordinate the adequate activities for it.

3. Proposal for CIC dissemination

A model CIC which will be a center for ICT utilization in the rural area and its dissemination plan is proposed.

3.1 CIC model

As a CIC model, basic ICT system, basic services and operation are proposed below.

3.1.1 Basic ICT system

(1) Zero Client PC（to harness local Information portal page and to learn the basic PC utilization）
(2) Multifunction printer
(3) Internet access and Wi-Fi access point

Internet access with 512 kbps by the satellite service is proposed as a model. In addition, Wi-Fi access point is proposed, because privately owned smart phones are spread in Myanmar rapidly and internet access by smart phones are very effective for promotion of ICT utilization.

3.1.2 Basic service

Following basic services at the minimum are proposed.

(1) Local Information portal page

Local Information portal page is a fundamental service at CIC. Contents of portal page are considered to compose of common portion for all villages and portion which will vary village by village.

(2) ICT literacy training

It is very helpful to provide with ICT literacy training to children and adults respectively. Thus, ICT literacy training at CIC will lead to ease the digital divide.

(3) Printing service

3.1.3 Operation

For sustainable CIC operation, following activities are proposed.

(1) Operation by CIC operational committee
(2) Development of operator and ICT engineer
(3) PC training to villagers

3.1.4 Proposal to utilize CIC successfully as a rural development hub

(1) Realization of localization. Contents must be created in Myanmar language.
(2) Provision of Internet access with a low price
(3) Activities to increase farmers' incomes by promoting sales of agricultural products, craft products etc. using web and Social Network Service such as Facebook
(4) Quick action to correspond to requirements, complaints etc. from users and taking measures to increase CIC utilization

3.2 CIC dissemination

Joint study working group considered such case that a certain village cannot secure budget for CIC operation by itself and public aid conducts CIC installation and operation. Working group also simulated the annual budget for CIC project in this proposal

3.2.1 Number of CICs to be supported by public aid

The number of CICs to be supported by public aid is about 3, 200, by working group simulation.

3.2.2 Funds for public aid

(1) Utilization of Universal Service Obligation Fund (USF)

USF, which has been considered by Ministry of Transport and Communications of Myanmar (hereinafter referred to as "MoTC") is proposed to apply to implementation of telecommunication access to rural area and dissemination of CICs.

(2) Simulation of the annual income budget for CIC project

The annual income budget for CIC project is estimated at 25 Million USD.

3.2.3 Organization for CIC project

For efficiency and transparency, following organizations is proposed to manage CIC project.

(1) ICT rural development team in MoTC

This organization has responsibility of developing the implementation plan of telecommunication access to rural area and the dissemination plan of CICs.

(2) USF Operation Institution

An independent entity in Union government which manage USF, has responsibility of implementing telecommunication access to rural area and disseminating CICs by following the implementation plan developed by ICT rural development team in MoTC.

3.2.4 Simulation of CIC dissemination

(1) Schedule

The number of 3,200 for CIC dissemination is a big number and it is difficult to implement them in a short period. Therefore, working group set a target of 90% completion in a time span of 12 years, that is, 2,880 CICs and a target of 100% completion in a time span of 15 years.

(2) Simulation of the annual expenditure budget for CIC project

The annual expenditure budget for CIC project is estimated at 23 Million USD at most.

(3) Possibility of sustainability

Based on the simulation above, the annual income budget for CIC project is estimated at 25 Million USD and the annual expenditure budget for CIC project is estimated at 23 Million USD at most. Therefore, CIC project could be operated sustainably year by year.

Following exchange rates are used in this report.

1 Myanmar Kyat = 0.0007336 USD (As of January 20, 2017)

1 Myanmar Kyat = 0.08416 Japanese YEN (As of January 20, 2017)

1. Project Information

1.1 Backgrounds

Japan Telecommunications Engineering and Consulting Service (hereinafter referred to as "JTEC") sent a high-level mission composed of high level delegates from Japanese ICT companies to Myanmar and organized ICT workshop at Naypyidaw and Yangon in July, 2012 to exchange views on development and possible cooperation of ICT under support of Ministry of Communications, Posts and Telegraphs[2] of Myanmar. Wide range of expectations to Japan were expressed from Myanmar in the workshop. Among expectations, JTEC had been considering the potential problem near future in Myanmar such as building telecommunication access to a rural area and easing so-called digital divide, and decided to conduct a pilot project on ICT utilization in rural area.

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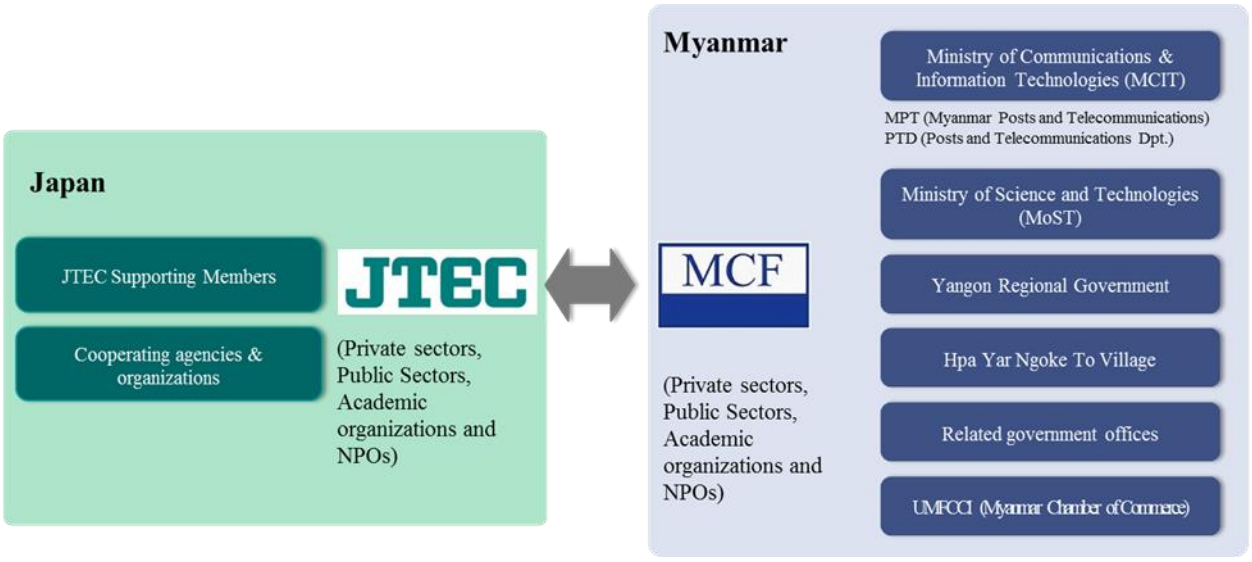


1.4 Subjects of joint researh

Subjects of joint research are as follows.

(1) To research useful configuration/equipment, lead time and cost of ICT system in rural areas

(2) To research useful way of ICT system to provide villagers with benefit

(3) To research how to keep sustainability of ICT system operation

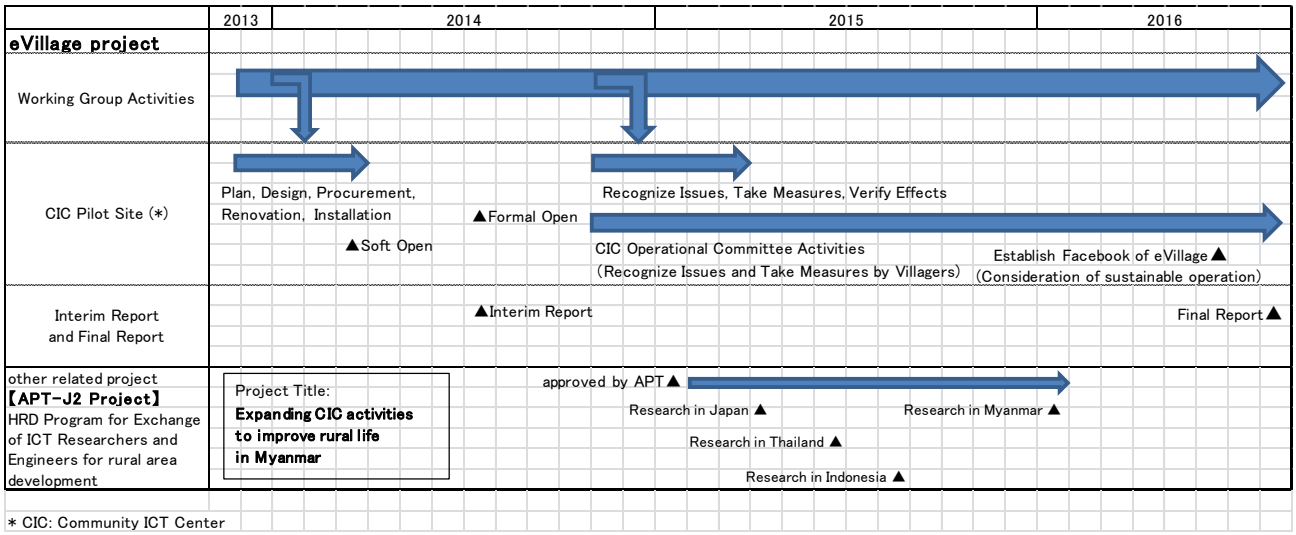
(4) To propose an ICT system dissemination plan in rural areas

[2] Organization name is that as of July 2013.

[3] Organization names in the diagram are those as of Mar. 2014.

1.5 Schedule

This pilot project was conducted in two phases. The first phase was to install an ICT system at the project site. The second phase was to operate the installed ICT system. The center in which ICT system was installed was named "Community ICT Center"[4] (hereinafter referred to as "CIC"). Detail schedule is as below.



1.6 Time and Manpower needed

The number of man days input from November 2013 to August 2016 is 464 man days from Japan side and 165 man days from Myanmar side.

1.7 Cost

The total cost for installation and operation of CIC is below.

(1) Installation cost

Description	Cost
Electric power	
Battery (deep cycle, 105Ah x 4)、Battery Charger Controller (MPPT, DC 150V, 45A, 24V)、Inverter (Pure Sine Wave, 1.5KW, IN24V/OUT230V)、Installation work	$5,354.00
Solar Panel (1,530W = 255W x 6)	$1,020.00
Gasoline Engine Power Generator 2.2kVA	$752.00
The others	$49.00
ICT facilities	$6,756.00
Library renovation	$3,030.00
Satellite communications facilities	$1,339.00
Furniture	$983.00
WiFi hot spot equipment	$220.00
The others	$164.00
Total	$19,667.00

[4] In this report, we assume that CIC can access to Internet.

(2) Operation cost（duration：from April, 2014 to August, 2016）

Description	Cost
Internet access	$5,046.00
Salary for operator and ICT engineer	$5,600.00
The others	$1,500.00
Total	$12,146.00

2. Project implementation and research results

The joint research results of subjects (1) – (3) in section 1.4 is shown in this chapter, whereas the joint result of subject (4) in section 1.4 is described in chapter 3.

Following exchange rates are used in this report.

1 Myanmar Kyat = 0.0007336 USD (As of January 20, 2017)

1 Myanmar Kyat = 0.08416 Japanese YEN (As of January 20, 2017)

2.1 Subject of research (1)：Implementation of ICT system

WG researched ICT system implementation from the view point of quick delivery and inexpensive internet access in the rural area.

(1) Project site

- Hpa Yar Ngoke To south village, which has 685 population and 160 family units as of November 2013, in Twantay Township in Yangon Region Government was selected, because WG would like to select a pilot site where neither telecommunication access nor commercial power supply was available and where strong support from Minister of Yangon Region Government is available.

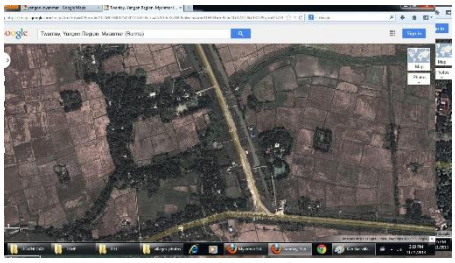


Photo of Hpa Yar Ngoke To south village（Google Map）

- When WG made research of this village in November 2013, though this village was covered by MPT CDMA2000 and GSM, signal was weak and call-enabled area was only at the place with good visibility. Internet access by mobile phone from this village was available only from 4am to 6am and 3 users in this village accessed Internet by mobile phone. Fixed phone was available at the post office in Twantay town which is 10 kilometers far from this village.

User of mobile phone

- WG investigated the existing facilities such as monastery, elementary school and library for ICT system implementation. WG found that monastery did not have an empty space and elementary school was locked and became peopleless after school and in the weekend. Thus, WG selected the library.

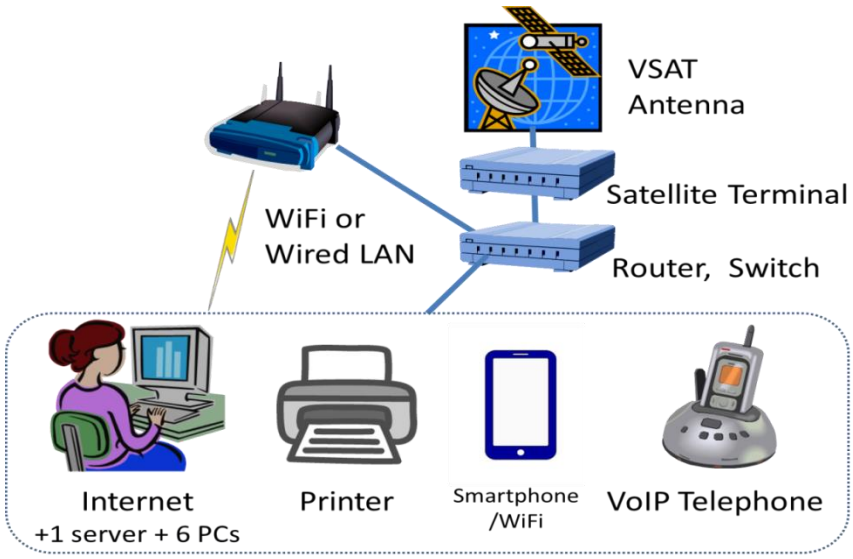
Right cabin is library. Left building is clinic (Sub Regional Health Center)

Inside of library

(2) Information of village and villagers

- 20% of family units own farmland. 60% of family units are tenant farming. Some villagers go to Yangon for day-labor jobs.
- There are two elementary school (0-4 grade) in the village. One school has 86 students and 5 teachers. The other one has 28 students. Junior high school (5-8 grade) and High school (9-10 grade) exist in Kanbe village which is 2 kilometers away from Hpa Yar Ngoke To south village. A villager mentioned that because teachers are busy during class, they may not have time to use computers, even if school has.
- There is a midwife in the clinic which is Sub Regional Health Center in the village and she supports 3 villages, that is, Hpa Yar Ngoke To north village, Hpa Yar Ngoke To south village and Kabein village. She visits pregnant houses and patients. She provides medical care in the clinic. Most of family units are low-income households and cannot pay for hospital delivery and most pregnants have a baby in her home. Number of childbearing in a total of 3 villages in year 2016 was 40.
- Some houses own solar panel and battery of motorbike and generate electric power. They use electricity for TV set and charge of mobile phone. They don't have refrigerator. There is a popular product, that is, a package of solar panel, battery and inverter with USD200 as of November, 2013.
- The monthly cost of eating for 3 adults and 1 small child for a certain family is USD88. In case that only one person has an income, the monthly cost of eating sometimes exeed the income.

(3) Configuration of implemented ICT system



Appendix 7 shows a list of purchased products.

(4) Main research results

By bearing affordability and sustainability in mind, WGs had the following research results.

1) Electric power

- As for electricity generation, a gasoline engine generator which has capacity of 2.5kVA after calculation of load（Appendix 8）was implemented at first.
- The generator was relplaced by solar panels because of avoidance of noise to surrounding houses, avoidance of burden of refuel and avoidance of securement of manpower for generator operation. For the calculated load, 6 sets of 255-watt solar panel were implemented with the configuration of three parallel for circuit of series of two panels (Appendix 9).
- By the assumption of no sunlight for two straight days in rainy season, 4 sets of 12V 105Ah battery were implemented with the configuration of two parallel (210Ah) for circuit of series of two batteries (24V).
- Current Stabilizer and Uninterruptible Power Supply system (UPS) were implemented to protect electric equipment against unstable electricity.
- Inverter was unstable soon after implementation. Then, it was replaced by another type of equipment. Selection of inverter requires caution.

2) Internet access

- Because no public data communicatin service was available at Hpa Yar Ngoke To south village, Internet access was implemented through VSAT. In advance, web-brousing speed was evaluated at the ISP office by changing the service menue and speed. Then, speed of 512kbps and enterprise service by Ku band was selected with considering affordability.
- Though standard delivry time of VSAT antenna and transmit equipment is one month, they were delibered in 3 weeks.
- Though it is said that Ku band is weak against rain, Internet access was not very influenced by rain.

- As villagers who had a mobile phone increased in 2015, one WiFi hotspot is implemented outside CIC for internet use.
- As for access restriction to offensive sites and adult sites, any filters were set at computers. Instead, operator in CIC called users' attention not to access harmful sites and looked around a room to protect users from harmful sites.

3) Zero Client PC

For low power consumption and easy operatin by central management for plural computers, 6(six) zero clients' PC from Ncomputing based on virtualization technology were implemented. They were delivered in a week and ran stably in the project. Because of low power consumption and manpower reduction, zero client PC can be adopted in an ICT model for rural area.

Zero Client

4) PC server

Driver software did not come with PC server and the related driver software was found through the internet. Four days' effort was needed to install driver software and multi point server OS properly. Procurement of PC server requires caution.


Engineer from Myanmar Information Technology made a great effort for PC server installation.

5) Myanmar font

Myanmar fonts for Office applicatin, Web browse and Facebook were not installed as standard. Assistance by knowledgable person was needed for installation of Myanmar fonts.

6) Electric wiring

To prevent an electric shock at wet floor in the rainy season, electric wiring was implemented not to put on the floor.

7) ICT system installation cost and affordability

ICT system installation cost was approximately USD20, 000. However, by usage of an existing building without renovation, reduction of equipment cost and volume purchasing, ICT system installation cost can be reduced to USD 2,800 including cost of solar panel and satellite antenna as of August, 2017. (See section 3.2.6)

8) Equipments which have difficulty in operating

- When the outside WiFi hotspot broke down, to initialize equipment and set parameters in plural configuration pages was not an easy task for operator.
- When the parameter configuration of zero client PC was changed by user's operation mistake and PC was unavailable, to change the parameter configuration back to original one was not an easy task for operator.
- To install fire wall Linux box of providing with portal page to WiFi users was not an easy task for operator nor ICT engineer.
- To install HTTP proxy cash server feature of reducing HTTP traffic and manage the policy of its feature was not an easy task for operator.

9) Consideration of sustainable ICT equipment

- While computer is delivered to rural area, hard disk may break down because of bump. Hard disk also may break down, because of mis operation by users who are not faimiliar with computer. PC server has enough empty space evem two years after project started. Therefore, high-capacity storage space in PC server is not needed for CIC. On the other hand, many kind of PCs with Solid State Drive (SSD) exist in the market and the price of these PC become cheaper as of 2017. Therefore, instead of PC with hard disk, PC with SSD is desirable for ICT system in rural area to avert failure riks as much as possible.
- LED light was adopted to reduce power consumption for this project. LED light is desirable for ICT system.
- Instead of server type PC which has stability, tower type PC was adopted for this project, because (a) operator is always in the center and can reboot PC in case of failure, (b) space in CIC is narrow and sound of computer fan in server type PC is very noisy for users and (c) environment to keep server type PC cool under a certain temperature is not available. Tower type PC in CIC runs for two years without failure. Thus, tower type PC is adequate for ICT system in rural area.

10) Consideration of affordable ICT system

Instead of Microsoft Office, license free Open Office, which is compatible with Microsoft Office was adopted for this project. It can be a model to save license fee.

2.2 Subject of study (2)：Benefit for villagers by ICT system

WG confirmed benefits which villagers got by ICT system and considered possibility of further benefits.

(1) Manner of CIC operation

Soft opening was on March 31, 2014. Grand opening was on July 5, 2014.

A day of soft opening

1) Opening hours
   - 10:00am to 4:30pm (Close on Monday. Open on holidays)
   - 3pm to 10pm (Changed on November, 2014 by workers' requirement)
2) A charge for use of CIC

   A charge for use of CIC was not collected, because villagers in that village have a low income. A charge for use of printer was not collected either. VoIP service provided by ISP was available by wired handset. Users can make a domestic call only. Rate for a call was USD 0.04 per minute.
3) CIC operation system

   (a) Operator
   - Permanent staff: 2 people from April 2014 to March 2015
     Number of Employees: 4 people from April 2014 to June 2014
     3 people from July 2014 to March 2015
   - Permanent staff: 1 people from April 2015 to August 2016

   (b) ICT engineer
   - Once a week: 1 people from June 2014 to March 2015
   - Temporary support (a fee-based service) from April 2015 to August 2016
     In case that CIC operator cannot solve troubles

(2) ICT services using CIC

WG tried to implement not only internet access but also application which provides villagers with benefits. After ICT application cases of education, agriculture and healthcare in Japan and other countiries were collected and list of application idea were prepared, WG asked for villagers' requirements and opinions. Then, by considering the feasibility of requirements and opinions, WG provided with (a) information portal page, (b) internet access and VoIP service, (c) printer and (d) ICT learning application such as writer, spread sheet, drawing and typing.

(3) Results of CIC usage

Average number of CIC users per day is as below, excluding the number of lots of Wi-Fi access point users. 136 villagers used CIC from March 2014 to August 2016. This is equivalent to 20% of all 685 population in this village. Furthermore, by age bracket, 77% of all users is less than 30 years old.

Period	From March, 2014 to October, 2014	From November, 2014 to May, 2015	From June, 2015 to August, 2016
Average number of CIC users per day including Saturday and Sunday, excluding the number of lots of Wi-Fi access point users	14（Maximum number of users per day is 30.）	11	3

(4) Obtained benefits

Following benefits were obtained by villagers by using above ICT services.

1) Knowledge of agriculture, healthcare and education was enhanced by children for utilizing the information portal page.

Information portal page which were created by this project

a. Bakcgrounds of Information portal page provision

・ Information which had been transferred to Dissemination committee member of agriculture, healthcare and education in the township from local government agencies had not transferred

to villages, because of lack of human resources.

- When WG visited Hpa Yar Ngoke To south village for investigation with the comic books in Myanmar language for teaching know-how of freshwater fish farming created by JICA and Fishery department, members of village committee devoured them and said that they read such agricultural instruction documents for the first time and they were eager to get not only them but also any agricultural instruction documents.
- As books, magazines and brochures were not seen in the thatched houses in this village, children must be hungry for printed words.

b. Implementation of Information portal page

- WG devised ways of creation of Information portal page at following two points. One point is that methodology of a simple mouse-click is adopted for even users who are unfamiliar with a key board and computer to be able to easily access information. The other point is that only contents with Myanmar language were adopted. Information portal page has 24 tiles for a mouse-clikd and all the information portal page is displayed without being scrolled.
- The information portal page is stored in the local PC server in CIC and is accessible only from intranet in CIC.
- This portal page has a variety of contents such as instruction of cultivating farm products like rice, bean, how to create a pond for cultured fishes and how to raise them, instruction for basic healthcare in a village without any doctors, circulation agriculture, and education of disaster mitigation as off-line contents. Myanmar newspaper and weather forecast can be accessed through this portal page as on-line contents.
- Variety of contents were collected, based on requirements from villagers and stored in PC server as video file and PDF. Video contents and brochures for agricultural and healthcare instruction which were recommended by township dissemination committee were collected from higher rank local government agencies and other materials were collected from JICA (Japan International Cooperation Agency) Yangon Office, NPOs, etc.

Children read aloud contens of information portal page.

Children on a waiting list for computer usage read aloud the donation book for circulation agriculture.

2) Internet such as News web, YouTube and Facebook became available like in city.

Before this project starts, Internet access by mobile phone from this village was available only from

4am to 6am in this village. However, Internet access became available even in the daytime.

3) Villagers got the desired information.
   - Some villagers checked market price of vegetables and considered timing of shipment.
   - Some villagers who had suffered from the Cyclone Nargis which had caused at least 130,000 fatalities checked the path of a cyclen in detail. Elderly people who did not use computer got weather information from CIC users.
   - Some villagers knew news in detail by browsing photos and video streams after listening to news by radio.

4) ICT literacy of children was improved.
   - Computer is expensive for villagers and villagers don't have computer. Most villagers had no experience to use Computer. Therefore, basic computer training was provided. Villagers actively learned ICT application such as writer, spread sheet, drawing, and typing. They also learned how to print, utilizee the information portal page and how to set up and use e-mail application.
   - Students study the subject of basic computer in junior high school and study computer in Mathematics class in high school. By using ICT learning application such as writer, spread sheet, drawing and typing, children in this village were able to review lessons in school and many of children were in a higher class of basic computer or Mathematics in school. On the other hand, a student in another village, who does not have a computer in his/her house go to computer private school. However, he/she cannot review lessons in his/her house.
   - English typing lesson application which introduces a game element is popular with students.

5) Performance of children in school was improved.
   - By getting in touch with the outside world through the information portal page and the Internet, children were intrigued by the outside world and increased desire to learn. Then, many of students of junior and high school from this village were in a higher class of not only basic computer class but also all other subjects in school.
   - A parent said that reading contents of the information portal page and donated books seemed to realize the improvement of school performance.
   - Student who graduates from public elementary school takes a national exam. Two students in Hpa Yar Ngoke To south village got grade A. It was also two students that got grade A in Kanbe village which has access to electricity and has 7 times larger students than Hpa Yar Ngoke To south village.

6) Villagers were able to talk with family and friends abroad by free call application.
   - WG recognized that free call application through WiFi access point is the effective communication means. In fact, family members who had migrant workers in Korea or Malaysia often talked over the free call application such as VIBER.
   - On the other hand, villagers did not use VoIP service provided by ISP, because it was charged and only domestic call was available. However, in the area where public communication means are not available, VoIP service provided by ISP is still effective.

7) Printer was used considerably as below and contributed to improvement of livelihood.
   - At first of soft opening, many children found characters from keyboard with taking a lot of time

and typed names of family members in Myanmar language and in alphabetical scripts, printed them out and bringed paper back to their houses with joy.

- Previously, villagers needed to go outside village to ask for printing to print shop. After this project started, villagers can print documents by the printer at CIC. Especially, 9 university students in the village often used it.
- Students typed together a lecture from monks regarding Dharma teachings of Buddha in Myanmar language, printed and delivered it to villagers. Students were appreciated truly by villagers and also contributed to community vitalization.

8) Following contents were created by students who learned computer skill and were stored in the local server as a village information sharing site and were able to be browsed.
   - Annaul schedule of the village
   - Rule in CIC
   - Web page created by students
9) MCF and JTEC held an application contest to get more application which is benefitial for villagers. Application which won prizes are for off-line and on-line healthcare information provision and was delivered to village and was contributed to knowledge enhancement for villagers. Village midwife advised that application becomes increasingly better if it is tightly in liaison with instruction by township hospital. A coordinating mechanisum between medical setting and application developer needs to be created for getting increasingly better application.

(5) Effort of ICT skill improvement for study in university and for getting a job

A manager who was staying and working in the road construction supervision office at the corner of the main street of Hpa Yar Ngoke To south village (a) had an idea that students had better learn computer especially for getting a job, (b) agreed with the spirit of e-Village and (c) proposed a computer training for students without salary. WG gladly asked him to provide students with computer training.

- His training program named “ICT Academy” consisted of 3 months’ duration with 24 courses on every Saturday and Sunday from 17:30 for 120 minutes only for first course, afterwards for 90 minutes. Two university students in the village who had already completed the same computer training course at the road construction supervision office, took part in this training as assistant teachers. This manager had the experience to complete the same computer training course in Yangon city in youth and had such a motivation that he wanted to share his learning with students.
- This manager requested to use the text book of computer training, created by Myanmar Computer Professionals Association (MCPA) and written in Myanma language and the project bought text books at a unit price of USD1.00.
- Event idea at the time of completion of computer training course

  This manager had such an idea that workshop is held to show output by using computer application and

invited parents to build awareness for ICT.

(6) Promotion of ICT system utilization

This project conducted many activities for promotion of ICT system utilization and got a lot of feedbacks.

1) Activitis for attracting villagers to ICT system (for awareness improvement)
   - Creation and delivery of propaganda leaflet for ICT system（Appendix-11）
   - Opening ceremony was held at Hpa Yar Ngoke To south village with more than 160 participants including President of Yango Region Governmet (Appendix-12）
   - International workshop for rural ICT development was hosted at MICT park in Yangon with more than 60 participants including Patron of MCF (Appendix-12）
2) Training for villagers

   ICT system training to villagers was held three times and a total of 63 villagers participated.
3) Workshop

   - Workshop to villagers who never visited CIC and was more than 20 years old for promotion of ICT system utilization was held on Sunday, February 15, 2015. 23 villagers of which more than 90% were housewives, participated. All of their children had experienced of CIC utilization and their children became key persons to enlighten parents on ICT system utilization. Participants were interested in the following things.
     - ➢ the view of Hpa Yar Ngoke To village at Google Map
     - ➢ the photos at news web such as Ms. Aung San Suu Kyi and an accident scene
     - ➢ video contents which instructed the methodology of cultivating rice
   - A participant required the instruction video or document for new mushroom without cultivation experience, when WG asked for requests for new contents of information portal page. After workshop, despite the inquiry at the agricultural office in township and other related organization, Instruction video or basic instruction text book with cartoon was not found.
   - Village administrator said, “Participants were satisfied with workshop very much. Villagers will gradually become interested in ICT system. I hope workshops will be held many times.”

Mushroom WITH cultivation exeperience

(7) Obtained other benefits than those from ICT utilization ICT

1) Private mobile phones could be charged at CIC.
2) CIC was utilized as a gathering place for hearing survey.

(8) Potential benefits

Though following demands were not conducted, they were confirmed during this project.

1) Disseminatin committee of agriculture, healthcare, and education in this township can transfer information to villagers by using a projector at CIC.
2) A lot of educational contents for children such as “Putet”（http://www.putet.com.mm/）which is

popular in Yangon and is paid educational content with cartoon base for smart phone are created and are used for children's knowledge enhancement.（This is a comment from a minister of Yangon region government who visited CIC.）

3) Mid wife in Hpa Yar Ngoke To south village attended the primary health instruction course by a doctor of township hospital and recorded an important part of explanation in a session by her smart phone. She reviews the video at the clinic. Furthermore, she can hold a primary health instruction course by herself at CIC with using the recorded video for villagers' knowledge enhancement.
4) Event information can be seen at monastery and primary school in the village. If whole this village is covered with WiFi network and village event information in PC server is maintained by CIC operator and can be accessed by villagers' smart phone from home, it has a major impact.
5) WG would like to educate entreprenor in the village about application development. WG thinks application developer who is in the office in the city without studying village life cannot develop application which is useful to village.

(9) Information transfer

1) The number of CIC users decreased toward the end of this project, because contents in the information portal page were not updated. To effectively provide with information which villagers require and to create such a system that information of the portal page is updated as needed is important.
2) To set a certain information which higher local government agencies would like to disseminate to villagers into the information portal page is efficient for governmental activities. It is worth considering that dessimination committee members periodically visit villages to update information of portal page for dessimination of ICT system in the rural area in the future.

2.3 Subject of study (3)：Sustainability of ICT system

Issues and solution for ICT system sustainability were studied.

(1) Establishment of village CIC operational committee and self-sustaining operation

1) Objectives

Autonomous CIC operation by villagers is necessary for ICT system sustainability. Therefore, establishment of CIC operational committee was proposed to village administrator by WG. We worked to gradually reduce the direct involvement of the CIC operation itself and mainly support the committee as advisors. The direct involvement by JTEC and MCF in CIC operation was gradually reduced. JTEC and MCF tried to play a role of advisors in CIC operation (Appendix-13).

2) Formation of CIC operational committee (Age is as of 2014)
   a. Chairman： Mr. Win Oo, village administrator (50 years old)
   b. Vice-chairman： Mr. Tin Shwe, vice-chairman of village development committee, Clerical of CIC operational committee
   c. Committee member：

      Mr. Lu Han, computer volunteer, manager in the road construction supervision office (56 years old), Mr. Zaw Myo (current CIC operator), Mr. Than Htite Zaw, student of West Yangon University, previous CIC operator (20 years old), Mr. Nyi Nyi Min（22 years old）, Mr. Zaw Moe

Lwin, cook of his own restarrant in the village (38 years old)

d. Adviser

Mr. Ko Lin Lin, resident of Twantay town, experiencer of Internet Café management,

Mr. Munesto, JTEC

3) self-sustaining CIC operation by operational committee

a. Enlightment and Human Resource Development activities for self-sustaining operation

- Case of agricultural product sales in the village by using Internet in other countiries were introduced by MCF and JTEC to encourage villagers for self-sustaining operation.
- However, as business experiencer did not exist in the village, considering business activity by utilizing CIC is difficult for operational committee. Therefore, an Australia social enterprise which raised entrepreneurs and 7 persons in Twantay town who completed its free entrepreneurship class over 6 weeks were visited and high effectiveness of this class was confirmed. Although one of operational committee was recommended taking this class, taking this class was not realized.

- Although there are several university students in the village, their involvement in the project is unfortunately limited, as they were busy for family chores, school work and part-time job.

b. Autonomous activities by villagers

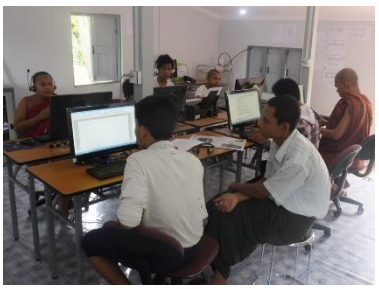
- Children sometimes stay in CIC long time, as they got aborbed in computer utilization. Operator felt that long time useage of computer is harmful to eyes and waist. Children sometimes could not concentrate on work at home, because they want to go to CIC. Existing play with other children is also important. Computer utilization time by children was restricted to 3 pm to 5 pm.
- Village administrator said that workers cannot use CIC in case that opening hours is 10:00am to 4:30pm. He proposed a new opening hours such as 3 pm to 10 pm, as CIC has charged battery by solar panels, to increase number of adult users of CIC. Once opening hours were changed as village administration suggested, new users visited CIC and number of users in a day increased. Then, CIC was continuously operated with the new opening hours.
- Operators exercised their ingenuity in removing the unused equipments from outlets to save electricity consumption from battery at night.

4) Motivation

Exposure through Inernet of excellent benefits which were obtained from ICT system may earn applause. Pick up of excellent benefits at township news may lead to morale improvement of village administrator and operational committee members. These activities must be effective.

(2) Development of operator and ICT engineer

1) Though operators were originally considered to be hired from Yangon for English capability and ICT experience, two local operators were hired to give priority to encouragement of a sense of ownership of CIC. In addition, other two operators were hired from a nearby town where commercial power supply is available to give users instruction on prevention method of electric shock. These four operators were provided with basic computer training and they also played a role of trainers of basic computer training to villagers.
2) One ICT engineer was hired once a week from Yangon for 10 months to support operators and he transferred ICT skill to operators.
3) Two young monks and a manager in the road construction supervision office were computer experiencers. They supported beginners of computers by request from CIC operational committee.



4) CIC operational committee asked MCF for development of ICT engineers. KMD which MCF asked for support provided two representatives of village with 10 days' basic computer training for free of charge.
5) Though CIC experienced one big trouble during project, CIC operational committee fixed the problem by the cooperation of ICT engineer from Yangon, operators, above-mentioned monks and a manager in the road construction supervision office.

(3) Challenge for obtaining CIC operation fee

CIC montly operation cost is USD 300. Breakdown of the cost is (i) USD 174 for Satellite Internet access fee and (ii) USD 126 for operator's salary. It is almost impossible for CIC operational committee of a village which has specialty for neither sightseeing nor specialty products to bear such cost. However, as awareness of CIC's value increased, WG considered the following business models with utilizing CIC by introducing viewpoint of business to realize sustainability of CIC.

① CSR activities of companies

Plan which was benefitial for companies' CSR activities was not designed.

② Sightseeing tour

Though a planner tried to create sightseeing tour for village, concrete and feasible plan was not created.

③ By following the cases in other countries, WG proposed to devote a part of increased revenue from expansion of agricultural products sales by utilizing CIC to CIC operation fee. In particular, expansion of sales destination and increase of sales price was considered not by agricultural product sales through broker but by direct marketing of agricultural products to users in Yangon with utilizing Facebook at CIC. As internet payment is not popular, Facebook introduces agricultural products only, provision of agricultural products and payment for them is conducted face-to-face. Though CIC operational committee created a

Facebook account of "Hpa Yar Ngoke To e-Village", any achievements were not made during peiod of this pilot project in Hpa Yar Ngoke To village, due to lack of participants from the villagers, lack of members who could continuously coordinate the adequate activities for it. The main reason came from lack of business experience, lack of finance and shortfall of human resources and no business training by utilizing Facebook.

④ WG should have considered possibility of inclusive business with asking following persons in the village or near village to utilize CIC.

- Related persons of e-Women project in Hpa Yar Ngoke To village whose donner came from other country. This project is for women's livelihood improvement by breeding and sales of little pig

- Company which provides women in the village with sewing machine and requests them to sew underwear for women
- To provide Small Medium Enterprises near village with fee-based printing service at CIC.
- To request previously mentioned entrepreneurship class to include CIC or request one who finished entrepreneurship class to use CIC in case that one founds company.

⑤ The other idea

Idea to make a sale of stationery and top-up of SIM card at the entrance of CIC was provided.

(4) Consideration for reduction of internet access fee

WG considered cheaper internet access than Satellite internet access.

- In case of using mobile internet access by using mobile-WiFi router, Window update procedure and download of stream from YouTube by users consume all data of which amount is defined at prerpaid SIM Top-up in a short time and management of data consumption is difficult. Therefore, WG recognized that operation of mobile-WiFi router and prerpaid SIM Top-up is unrealistic.
- WG considered long-distance Wi-Fi by following assumption.

  In the tall building in Dala town which is 15 kilometers far from Hpa Yar Ngoke To village, ADSL with 512kbps is implemented. Table below shows price of MPT ADSL Basic Services as of July, 2016. Antennas for long-distance Wi-Fi with 4.9GHz are implemented on top of the above-mentioned building and Hpa Yar Ngoke To village and connection is established between two antennas. Though the installation cost of poles for antennas and implementation fee is needed, operation cost is cheaper than that of Satellite Internet access fee. Operation cost for ADSL is assumed to be paid by adult volunteers in Hpa Yar Ngoke To village.

  By interview with villagers in Hpa Yar Ngoke To village, average of monthly usage fee for SIM by adults who have an income in the village is 5,000 Myanmar Kyats. This is only for voice usage, because they use data through WiFi at CIC. On the other hand, average of monthly usage fee for SIM by adults who work outside village is 10,000 Myanmar Kyats. This is for voice and data usage, because they use some data when they are outside village and use data through WiFi

at CIC when they come back to Hpa Yar Ngoke To village.

As of July 20, 2016, adult's population in Hpa Yar Ngoke To south village is 504 and total population is 720.

WG assumed that number of adult volunteers is 50, that is, this is 10% of adulut's population and average of monthly usage fee for SIM by those volunteers is 5,000 Myanmar Kyat.

In case that all 50 volunteers donate 10% from their usage fee for SIM to CIC every month,

CIC can get 300,000 Myanmar Kyat per year by 5,000 Myanmar Kyat per month x 10% x 50 volunteers x 12 months.

On the other hand, yearly operation fee for ADSL with 512kbps is 254,000 Myanmar Kyat by 50,000 Myanmar Kyat for Annual Fee and 17,000 for Monthly Fee x 12 months.

As a conclusion, yearly donation fee by 50 volunteers is higher than yearly operation fee for ADSL with 512kbps. Therefore, sustainable operation of CIC is possible.

MPT ADSL Basic Services (As of July, 2016)

Class	Initial Fee	Annual Fee	Monthly Fee (for 12times)
512kpbs	50,000 Ks	50,000 Ks	17,000 Ks (204,000 Ks)
1Mbps	50,000 Ks	50,000 Ks	34,000 Ks (408,000 Ks)
1.5Mbps	50,000 Ks	50,000 Ks	50,000 Ks (600,000 Ks)
2Mbps	50,000 Ks	50,000 Ks	65,000 Ks (780,000 Ks)
2.5Mbps	50,000 Ks	50,000 Ks	80,000 Ks (960,000 Ks)

However, WG confirmed that utilization of long distance Wi-Fi is prohibited around Hpa Yar Ngoke To village, because of administrative reason. WG was not able to find solution to reduce Internet access fee.

Map of Twantay town, Hpa Yar Ngoke To village and Dala town

(5) The other research results

① WG understands that it is not easy for general village to obtain CIC installation fee and operation fee. Some villages in Myanmar which have specialty products, not only agricultural products but also crafts, which can expand sales destination with utilizing CIC by introducing viewpoint of business and which can increase revenue and devote a part of increased revenue to CIC operation. On the other hand, other villages deliver sightseeing information with utilizing CIC, get tourists and

increase revenue. At the villages which have resources and can sell them by utilizing CIC, there is a possibility for entrepreneurs to start operating CIC as their business. On the other hand, at the villages which do not have such resources, it is impossible to keep sustainable operation of CICs only by private sectors' effort and such villages need some kind of financial aids.

② WG understands that Internet access fee at CIC in village with less means should not be variable depending on amout of data but be fixed, and villagers should make every effort to cover CIC operation cost including Internet access fee by inclusive business.

③ WG understands that volunteer in the village with computer experience should be involved in CIC operation to activate ICT utilization by villagers and through ICT events in which children take part, ICT awareness of parents, who are not familiar with ICT, should be generated and CIC operation must be recognized as whole villagers' activity and entire village may have a possibility to be activated.

④ Original small building renovated for this project is a typical building in rural area and in 20 months of this project the basement of this building become exposed by flow of rainwater and walls got cracked. To prevent the building from getting further damage, exposed basement and cracks were fixed by Japanese-descended company. WG understands that choice and operation of building for CIC requires considerable attention.

⑤ WG understans that to explain to upper administrative agency of the target village, such as region or state government and township government about the project, to make them understand the significance of the project and to get cooperation from them is mandatory for smooth project execution.

(6) CIC operation after finishing pilot project at Hpa Yar Ngoke To village

① Backgrounds

Because project objectives is achieved, Hpa Yar Ngoke To CIC project was finished with period of 2 years and five months and project finished payment of salary for CIC operator and Internet access fee. On the other hand, villagers and CIC operational committee decided to continue to operate CIC by themselves to keep following benefits which they got in the period of project.

a. ICT literacy of children was improved. Parents and adults understand that ability of utilizing computer look good on taking a job.
b. Villagers want to continue to use printer. Previously, villagers needed to go outside village to ask for printing to print shop. Villagers can reduce print cost by the printer at CIC.
c. Even if Internet is not accessible by cancellation of Internet access contract, off-line contents of Information portal page are accessible and they are useful for children's knowledge enhancement.

② New effort

a. CIC does not pay for Internet access fee. Internet access through mobile network is realized and paid by individual. Though Facebook, Gmail and free call and message application such as VIBER is utilized as number of packets is relatively small, YouTube is not utilized as number of packets is much.

b. As there is strong demand to utilize printer mainly among university students in the village, CIC will charge the usage fee to procure ink for refill and paper for printing. CIC operational comittee will consider the usage fee by checking the usage fee at print shop. For example, as of January 2016, a print shop in Hlaingthaya Township which is 20 kilometer far from Hpa Yar Ngoke To village has a price list of (i) 100 Kyat per sheet for printing file and (ii) 25 Kyat per sheet for copying sheet.

c. CIC Opening hours
4pm to 10pm (Close on Monday. Open on holidays)

d. CIC Operator
Plural villagers operate CIC by rotation. They open and close CIC and manage furniture, ICT equipment and consumables, and collect printer usage fee.

③ Comment from villager

Village is connected to world and academic achievement of students is improved through this project. Villagers are extremely grateful for JTEC.

3. Proposal for CIC dissemination

Based on the study results described in the section 2 and the case analysis of the other ASEAN countries, a model CIC which will be a center for ICT utilization in the rural area and its dissemination plan is proposed.

3.1 CIC model

As a CIC model, basic ICT system, basic services and operation are proposed below.

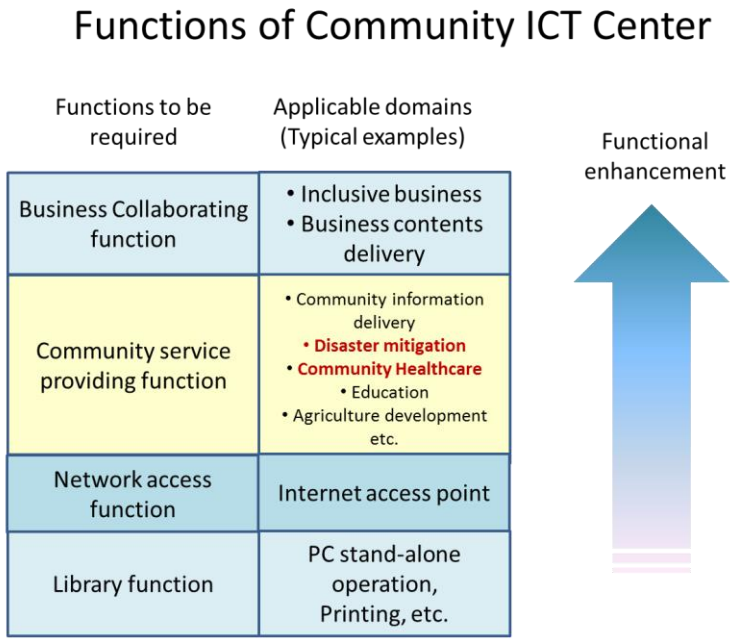
3.1.1 CIC function

CIC has 3 (three) functions as a diagram below. The 1st function layer named "Library function" is the basic function of CIC. The main feature of the 1st layer is that of PC itself. This layer enables users to create documents and print them. This layer also enables users to browse and print the stored contents from the portal page. This layer function can be useful for ICT education such as the primary ICT literacy training.

The 2nd function layer named "Network access function" is the function to connect with the outside world. This layer enables users to make internet phone call and access to Internet. This layer enable users to browse and download all kinds of information from all over the world and enable users to communicate with each other by e-mail or Social Network System. This layer function can be useful for ICT education such as the primary ICT literacy training.

The 3rd function layer named "Enhanced function" is necessary to utilize CIC for business. That is, increase in the number of PCs, installment of sophisticated multifunction printer, business application, business Web page and secured ICT facilities are indispensable.

This joint study mainly studied the 1st and the 2nd function layers. In the section 3, we propose a CIC model which mainly supports the 1st and the 2nd layer function. However, it is deserved to dissemiss CICs which support only the 1st function layer in the area where it takes time to deploy internet.



3.1.2 Basic ICT system

A minimum configuration below as basic ICT system is proposed. This configuration costs approximately USD 2,800 per CIC (See section 3.2.6). Even though the lead time differs according to the situation of each site, one week seems to be enough for installation and adjustment of equipment after procurement and delivery to a target village.

(1) Zero Client PC（to harness local Information portal page and to learn the basic PC utilization）

We propose the Zero Client PC which realizes low power consumption and makes maintenance easier. We propose one main PC and two Zero Client PCs for three users under budget limit.

(2) Multifunction printer

Printing environment is necessary and the multifunction printer which has a feature of printer, copy and scanner is useful.

(3) Internet access and Wi-Fi access point

Though there are several options of Internet access from a technological aspect, wireless access services such as satellite service, mobile telecommunication service are realistic because of a short lead time and Internet access with 512 kbps by the satellite service is proposed as a model. In addition, Wi-Fi access point is proposed, because privately owned smart phones are spread in Myanmar rapidly and internet access by smart phones are very effective for promotion of ICT utilization.

3.1.3 Basic service

Following basic services at the minimum are proposed.

(1) Local Information portal page

Local Information portal page is a fundamental service at CIC. Contents of portal page need to meet villagers' demands and need to contain information which governemnet wants to delivery. Contents of portal page are considered to compose of common portion for all villages and portion which will vary village by village. It is not realistic and not efficient for each village to develop its own portal page. Therefore, it is effective and efficient to develop portal pages respectively for a certain coherent group such as region government, state or ethnic minority for sustainable operation and easy dissemination.

(2) ICT literacy training

It is very helpful to provide with ICT literacy training to children and adults respectively. Thus, ICT literacy training at CIC will lead to ease the digital divide.

(3) Internet access and Wi-Fi access point

Internet access with 512 kbps via a satellite and Wi-Fi access point are proposed.

(4) Telephone service

VoIP service provided by ISP is preparable. Users can also utilize free call application on Internet.

(5) Printing service

Printing service is proposed, as demand is high,

(6) Application awarded by the national contests

Useful application for rural livelihood which is awarded by the national contests should be provided to promote ICT utilization

3.1.4 Operation

For sustainable CIC operation, following activities are proposed.

(1) Operation by CIC operational committee

CIC operational committee needs to be established and needs to take responsibility of CIC operation. Members are desirable to be selected in the village. CIC operational committee must be leaded by a leader who is full of passion.

(2) Development of operator and ICT engineer

Two or three operators need to be developed to operate CIC and assist users. Another two or three ICT engineers need to be developed to maintain ICT facilities and fix the failure.

(3) PC training to villagers

Periodic PC training needs to be provided villagers with.

(4) Budget Securement for CIC operation

Depending on the level of economic power of each village such as existence of industry and size of population, following measures need to be taken.

1) Public aids are essential in case a village cannot secure budget for CIC operation by itself.
2) Public aids are not essential in case a village can secure budget for CIC operation by itself.

3.1.5 Proposal to utilize CIC successfully as a rural development hub

Many activities as below need to be conducted to utilize the CIC successfully as a rural development base. Especially, we highlight an importance of leadership, sustainable operation and continuous effort to improve manner of CIC utilization.

(1) Enlighten leaders of CIC operational committee about effectiveness of CIC for rural development
(2) Development of ICT engineers
(3) Realization of localization. Contents must be created in Myanmar language.
(4) Provision of Internet access with a low price
(5) Activities to increase farmers' incomes by promoting sales of agricultural products, craft products etc. using web and Social Network Service such as Facebook
(6) Quick action to correspond to requirements, complaints etc. from users and taking measures to increase CIC utilization

3.2 CIC dissemination

Joint study working group considered such case that a certain village cannot secure budget for CIC operation by itself and public aid conducts CIC installation and operation. Working group also simulated the annual budget for CIC project in this proposal.

3.2.1 Number of CICs to be supported by public aid

There are approximately 64, 000 villages all over Myanmar. This joint study and case studies of other ASEAN countries show that the level of economic power such as existence of industry and size of population, and the existence of telecommunication access inexpensively are major factors whether village can secure budget for CIC operation by itself. In the drastic manner, we classified the 64,000 villages into three segments from the

viewpoint of economic power and telecommunication access. Even though we may need to implement plural CICs depending on the village size and its geographical situation, we assume one CIC per village. Thus, the number of CICs to be supported by public aid is about 3, 200.

Classification	Segment 1	Segment 2	Segment 3
Number of villages (CICs)	Approx. 32, 000	Approx. 28, 800	Approx. 3, 200
Definition of Classification	Village has a sufficient economic power and is covered with 3G mobile network. As village seems to be able to be developed by private-sector initiative, village belongs to the group in which the public aid is unnecessary.	Village has small economic power and is covered with 3G mobile network. As villagers seem to bear the expenses for CIC, village belongs to the group in which public aid is unnecessary.	Village has little economic power, does not have access to commercial power supply and is not covered with 3G mobile. As village seems to have no possibility to be developed by private-sector initiative, village belongs to the group in which the public aid is necessary.
【Reference】 The relation to 3 layers of CIC	Support three layers	Same as on the left	Support the layer 1st and 2nd

3.2.2 Funds for public aid

(1) Utilization of Universal Service Obligation Fund (USF)

USF, which has been considered by Ministry of Transport and Communications of Myanmar (hereinafter referred to as "MoTC") is proposed to apply to implementation of telecommunication access to rural area and dissemination of CICs at villages in segment 3.

(2) Simulation of the annual income budget for CIC project

Based on the following assumption by working group, the annual income budget for CIC project is estimated at 25 Million USD.

1) Annual gross profit of all telecommunication operators is 5 (five) Billion USD.
2) 2% of annual gross profit of all telecommunication operators is used as USF.
3) 25% of USF is allocated to budget for CIC project.

3.2.3 Organization for CIC project

For efficiency and transparency, following organizations is proposed to manage CIC project.

(1) ICT rural development team in MoTC

This organization has responsibility of developing the implementation plan of telecommunication access to rural area and the dissemination plan of CICs.

(2) USF Operation Institution

An independent entity in Union government which manage USF, has responsibility of implementing telecommunication access to rural area and disseminating CICs by following the implementation plan developed by ICT rural development team in MoTC.

3.2.4 Simulation of CIC dissemination

(1) Schedule

The number of 3,200 for CIC dissemination is a big number and it is difficult to implement them in a short period. Therefore, working group set a target of 90% completion in a time span of 12 years, that is, 2,880 CICs and a target of 100% completion in a time span of 15 years.

(2) Simulation of the annual expenditure budget for CIC project

Based on the following assumption by working group, the annual expenditure budget for CIC project is estimated at 23 Million USD at most. (See Table 3.2.4)

1) CIC installation and maintenance

（a）In Thailand, Telecentre project had such experience that it had a plan to implement many telecentres even in the first year of project and it did not proceed as planned. By considering advice from Thailand expert, CIC project is proposed to start with small size such as 20 CICs in the first year of project. Then, project must be evaluated and improved to prepare for mass CIC implementation.

（b）The number of CIC implementation increase gradually such that 200 CICs are implemented in the 2nd year of project and 400 CICs are implemented in the 3rd year of project.

（c）After 4 years of each CIC implementation, each CIC facility will be renwed.

2) ICT rural development team in MoTC

（a）headcount： 5 in the first year of project (same as Telecentre project in Thailand). 10 in the 4th year of project, because CIC renewal starts from the 5th year and scope of work of CIC project increases.

（b）Manpower cost： 1,000 USD per man-month （12,000 USD per man-year）

（c）Data center initial fee: 3,000USD

（d）Web server procuremet fee: 12,000USD (Web server renewal fee is same)
Breakdown： 10,000USD for PC, 2,000USD for software license

（e）Data center running fee: yearly 4,900 USD
Breakdown： 400USD for Data center usage monthly fee (running),
100USD for software license yearly fee

（f）Fee for outsourcing application development to university such as Information portal page: yearly USD24,000

（g）Fee for outsourcing application maintenance to university: monthly 200USD

（h）Training plan fee: yearly 12,000 USD

（i）Training implementation fee: 3,000USD per CIC
Breakdown： 1,000USD per man-CIC for travel cost, accommodation cost and daily allowance cost. (3 people are assumed to join.)

（j）Salary of CIC operator： 300 USD per man-month (3,600 USD per man-year)

3) USF Operation Institution

（a）headcount： 5 in the first year of project (same as Telecentre project in Thailand). 10 in the 4th year of project, because CIC renewal starts from the 5th year and scope of work of CIC project increases.

（b）Manpower cost： 1,000 USD per man-month （12,000 USD per man-year）

（c）CIC procurement cost： 2,800 USD per CIC

Breakdown is as below.

Items	Amount
Desktop PC (Ubuntu) x 1	US$340
19.5 inch LED display x 3	US$210
Ncomputing L300 x 2	US$350
WiFi router	US$100
Skynet (Corporate: 512kbps)	US$890
poles	US$80
Solar Panel (500W)	US$220
Sinewave Inverter 24～220V 800VA	US$170
Battery (12V 100Ah)	US$140
CIC Installation cost	US$300
Total	US$2,800

（d）CIC yearly maintenance cost： 50 USD per CIC-month （600 USD per CIC-year）

（e）CIC renewal cost： 1,000 USD per CIC

Breakdown is as below.

Items	Amount
Desktop PC (Ubuntu) x 1	US$340
Ncomputing L300 x 2	US$350
Sinewave Inverter 24～220V 800VA	US$170
Battery (12V 100Ah)	US$140
Total	US$1,000

（f） Satellite internet running cost： 200 USD per CIC-month (2,400 USD per CIC-year)

Table 3.2.4

Simulation of annual budget for CIC project

(Unit: USD)

Year of Project		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
【annual income】																					
Annual gross profit of all telecommunication operators (previous fiscal year)		5,000,000,000	5,000,000,000	5,000,000,000	5,000,000,000	5,000,000,000	5,000,000,000	5,000,000,000	5,000,000,000	5,000,000,000	5,000,000,000	5,000,000,000	5,000,000,000	5,000,000,000	5,000,000,000	5,000,000,000	5,000,000,000	5,000,000,000	5,000,000,000	5,000,000,000	5,000,000,000
USF percent		2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
USF annual income budget		100,000,000	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000
CIC project percent		25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%
CIC project annual income budget		25,000,000	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000
【number of CICs】																					
number of CIC implementation newly		20	200	400	400	400	300	300	300	300	100	100	100	100	100	86	0	0	0	0	0
number of CIC in operation		20	220	620	1,020	1,420	1,720	2,020	2,320	2,620	2,720	2,820	2,920	3,020	3,120	3,206	3,206	3,206	3,206	3,206	3,206
number of CIC renewal(the 1st time)						20	200	400	400	400	300	300	300	300	100	100	100				
number of CIC renewal(the 2nd time)										20	200	400	400	400	300	300	300	300	100	100	100
number of CIC renewal(the 3rd time)														20	200	400	400	400	300	300	300
【annual expenditure】																					
Description	unit price																				
ICT rural development team in MoTC																					
headcount		5	5	5	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Manpower cost	12,000	60,000	60,000	60,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000
Data center initial cost		3,000																			
Web server procuremet cost		12,000				12,000				12,000				12,000				12,000			
Data center running cost		4,900	4,900	4,900	4,900	4,900	4,900	4,900	4,900	4,900	4,900	4,900	4,900	4,900	4,900	4,900	4,900	4,900	4,900	4,900	4,900
outsourcing application development cost		24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000
outsourcing application maintenance cost		2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400
Training plan cost		12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000
Training implementation cost	3,000	60,000	600,000	1,200,000	1,200,000	1,200,000	900,000	900,000	900,000	900,000	300,000	300,000	300,000	300,000	300,000	258,000	0	0	0	0	0
Salary of CIC operator	3,600	72,000	792,000	2,232,000	3,672,000	5,112,000	6,192,000	7,272,000	8,352,000	9,432,000	9,792,000	10,152,000	10,512,000	10,872,000	11,232,000	11,541,600	11,541,600	11,541,600	11,541,600	11,541,600	11,541,600
USF Operation Institution																					
headcount		5	5	5	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Manpower cost	12,000	60,000	60,000	60,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000
CIC procurement cost	2,500	50,000	500,000	1,000,000	1,000,000	1,000,000	750,000	750,000	750,000	750,000	250,000	250,000	250,000	250,000	250,000	215,000	0	0	0	0	0
CIC Installation cost	300	6,000	60,000	120,000	120,000	120,000	90,000	90,000	90,000	90,000	30,000	30,000	30,000	30,000	30,000	25,800	0	0	0	0	0
CIC yearly maintenance cost	600	12,000	132,000	372,000	612,000	852,000	1,032,000	1,212,000	1,392,000	1,572,000	1,632,000	1,692,000	1,752,000	1,812,000	1,872,000	1,923,600	1,923,600	1,923,600	1,923,600	1,923,600	1,923,600
CIC renewal cost	1,000						200,000	400,000	400,000	420,000	500,000	700,000	700,000	720,000	600,000	800,000	800,000	700,000	400,000	400,000	400,000
Satellite internet running cost	2,400	48,000	528,000	1,488,000	2,448,000	3,408,000	4,128,000	4,848,000	5,568,000	6,288,000	6,528,000	6,768,000	7,008,000	7,248,000	7,488,000	7,694,400	7,694,400	7,694,400	7,694,400	7,694,400	7,694,400
Total (annual expenditure)		426,305	2,775,305	6,575,305	9,335,310	11,987,310	13,575,310	15,755,310	17,735,310	19,747,310	19,315,310	20,175,310	20,835,310	21,527,310	22,055,310	22,741,710	22,242,910	22,154,910	21,842,910	21,842,910	21,842,910

(3) Possibility of sustainability

Based on the simulation above, the annual income budget for CIC project is estimated at 25 Million USD and the annual expenditure budget for CIC project is estimated at 23 Million USD at most. Therefore, CIC project could be operated sustainably year by year.

4. Acknowledgment

We thank all villagers who positively participated in e-Village project. We are also very grateful to following organizations, companies, associations and individuals who considerably provided us with cooperation, help, advises and suggestions.

Japan side（in Japanese alphabet order）

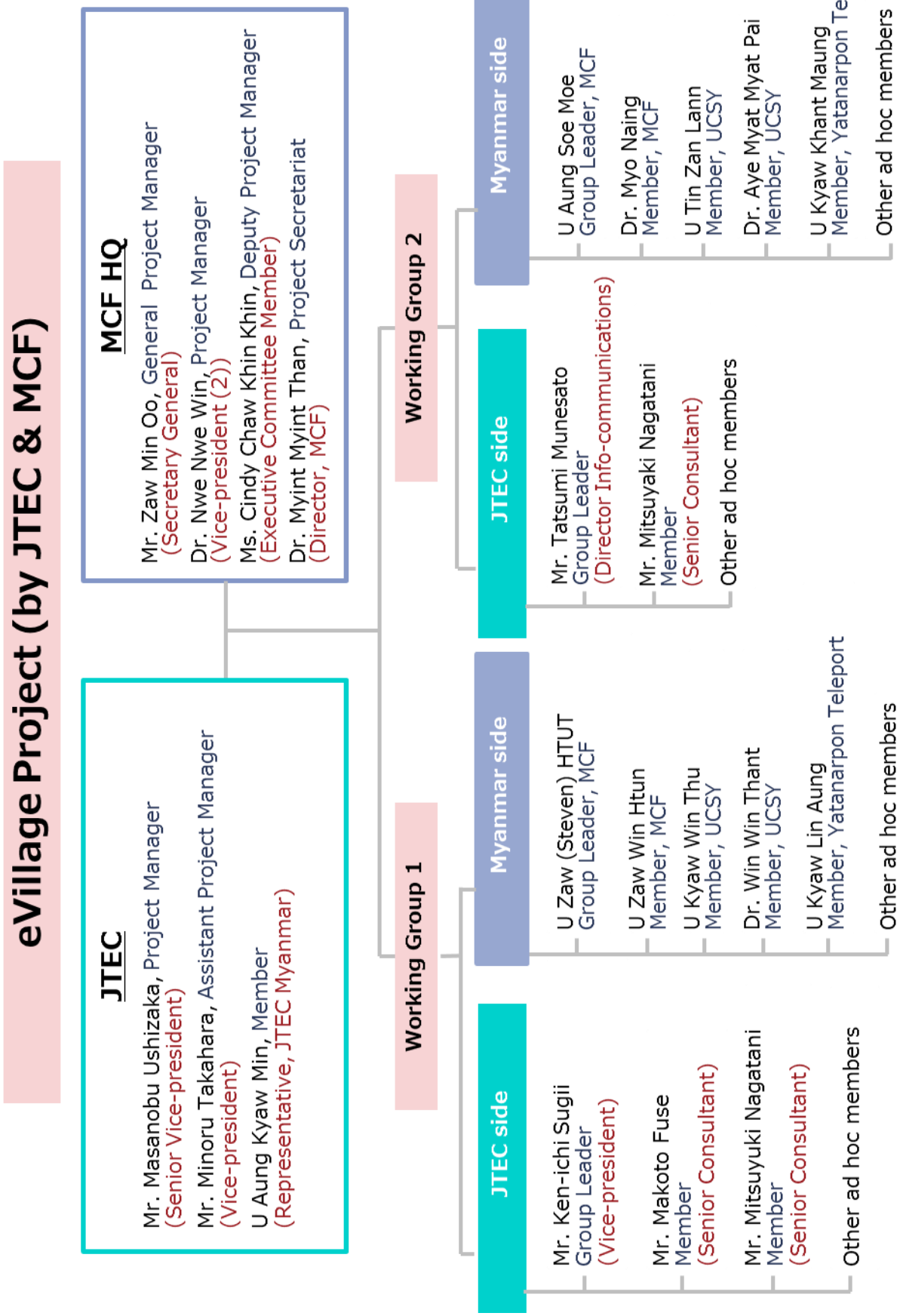
- IPSTAR Japan Company Limited.「Consultation for Satellite internet service utilization」
- Mr. Hiroshi Kadokawa「Advice for design and installation of solar power generation system with batteries」
- Kinan Densetsu Co., Ltd.「design and installation of solar power generation system with batteries」
- Nihon Dengyo Kosaku Co., Ltd.「Provision of wireless system named Falcon WAVE 2.4G」
- Nippon Telegraph and Telephone East Corporation「Provision of laptop computers」
- MIRAIT Information Systems Co., Ltd.「Advice for hiring operator in Myanmar」

Myanmar side（in alphabetical order）

- U Lu Han「Volunteer base computer teacher at CIC」
- Daw May Than Nu「Dispatch of 9 models to opening ceremony with special price」
- MIRAIT Information Systems Myanmar Co., Ltd.「Support of System integration」
- Myanmar branch of MUSASHI FUSOU CORPORATION「Provision of information in Myanmar and advice on project management」
- Myanmar Information Technology Pte. Ltd.「Support of PC server installation」
- Myanmar branch of Panasonic Asia Pacific Pte. Ltd.「Provision of new model of solar panel with special price」
- Myanmar office of SEEDS Asia (International NGO)「Provision of contents for education of disaster risk reduction」
- Yangon office of Terra People Association「Provision of information and advice on Agriculture」
- U Ye Lwin「Provision of books in Myanmar language」
- ZMH Universal Trading Co., Ltd.「Provision of gasoline engine generator with special price」
- KMD「provision of two village ICT enginers with basic computer training for 10 days with free of charge」

Appendix

Appendix - 1 **Formation**



Appendix - 2 **Table of Joint Study Item and Task**

Joint Study Item and Task from Nov. 2013 to Mar. 2015

WG1 (Promotion and Public Assistance Working Group)

No.	Item		Task	Schedule	
				Nov. 2013 to Feb. 2014	Mar. 2014 to Mar. 2015
1	Sustainable Operation and Management	1-1 Place and Environment	-Determination of the village for Joint Study -Extraction of the general conditions for place and environment	-End of Nov.: Determination of the village for Joint Study	-Extraction of the general conditions for place and environment to make the activity sustainable through the joint study
		1-2 Benefit Service for rural resident	-Consideration of the beneficial service for rural resident	-Nov to End of Jan : Consideration of service -By End of Feb: Determination of service for Phase 1 and 2	-Consideration and Determination of new services
		1-3 Model	-Creation, Practice and Verification of Model which is affordable and sustainable	-By End of Feb: Creation of Model for Phase 1 and 2	-Mar. to Jun: Practice and Verification of Phase 1 Model -May to Mar: Creation, Practice and Verification of Phase 2 Model and new model
		1-4 Maintenance Plan	-Creation, Practice and Verification of Maintenance Plan for Community ICT Center (which is tentative name)	-By End of Feb: Creation and Practice of Maintenance Plan	-Verification of Maintenance Plan
		1-5 Human Resource Development and Promotion of ICT system	-Enlightenment to local Government who promotes ICT system in rural area	-By End of Feb: Consideration and Practice	-Verification
			-Operation Training for End user	-By End of Feb: Operation Training of PC and Internet access	-Operation Training of Application
		1-6 Easy to Use	-Localization for Myanmar language and Verification	-By End of Feb: Consideration and Practice	-Verification
		1-7 Case Study	-Introduction of Case Study in Japan , Indonesia and Thailand	-Jan: Introduction of Case Study in Japan , Indonesia and Thailand(J)	
			-Work shop		-Mar. 2014: Work shop of Case Study
2	Public Relations of Project	2-1 Campaign	-Request for Auspices of Related Ministries in Myanmar and Japan	-By End of Feb: Gain of Auspices	
			-Public Relations in Myanmar	-By End of Dec: Create website contents by Translation in Myanmar -By End of Feb: Public Relations in the village	
			-Public Relations in Japan	-By End of Nov: Setup the Portal website of Project	
		2-2 Ceremony	-Tape Cutting Ceremony	-By End of Feb: Preparation	-Mar. 2014: Ceremony

NOTE:

Phase 1: Utilization of VSAT. Utilization of basic application（WEB browser, e-mail and Internet telephony） or more.

Phase 2: Utilization of long distance Wi-Fi system and Optical Fiber in addition to VSAT. Utilization of new application in addition to basic application

WG2 (ICT System Working Group)

No.	Item		Task	Schedule	
				Nov. 2013 to Feb. 2014	Mar. 2014 to Mar. 2015
1	Optimal and Affordable Communication System	1-1 Proposal of Optimal and Affordable Com System	-Proposal of Affordable and Sustainable Com System		-May: Creation of Proposal (J) and discussion in WG -Jun: Determination and Proposal
2	Installation and Maintenance of a model ICT system based on the conditions required by WG1	2-1 Com System	【Phase1】VSAT base Com System		
			-Design	-By End of Jan: Gain of permission for Equipment Installation place (M) -Nov to End of Jan: Design -By End of Jan: Purchase Order of Com System (J) -By End of Feb: (a)Progress Management of procurement (M), (b)Receipt and Storage of Equipment.(M)	
			-Installation	-By End of Feb: Installation (M) and Acceptance Test (J)	
			-Tape Cutting Ceremony	-By End of Feb: Preparation	-Mar. 2014: Ceremony
			【Phase2】Long distance Wi-Fi system and Optical Fiber base Com System		
			-Design	-By End of Mar: Gain of permission for Equipment and Optical Fiber Installation place (M)	【Wi-Fi】-By End of Apr: Design and Purchase Order
					【Optical Fiber】-Apr to End of May: Installation Design -End of Jun: Purchase Order
			Export and Import of Com System	-By End of Dec: (a)Survey of custom clearing process (M), (b)Request for Simplification of custom clearing process (M), (c)Gain of quotation of custom clearing fee and transportation fee to the village (M) -By End of Dec: (a)Survey of type approval gain process for Long Distance Wi-Fi and Optical Fiber (M), (b)Request for Simplification of type approval gain process (M) -By Beginning of May: Gain of Type Approval (M)	【Wi-Fi】End of Jun: Export and Import
					【Optical Fiber】Beginning of Oct: Export and Import
			-Installation		【Wi-Fi】End of Jul: Installation
					【Optical Fiber】Mid of Oct: Installation
		2-2 Application System	-Installation of Application System	-Installation of Application system, if WG1 prepares one in this time frame	-Mar. to Jun: Installation of Application system for Phase2
		2-3 ICT system	-Maintenance of ICT system	-Maintenance of ICT system based on Maintenance Plan created by WG1	
3	Transportation of skill and Know-how	3-1 Transportation of skill and Know-how on installation and maintenance	-Case Study	-Jan: Introduction of Case Study for ICT system in rural area of other countries	
			-Creation of the guideline	-By End of Jan: Creation of draft guide line for Design, Installation, Maintenance and application operation manual (J) -By End of Feb: Completion and Practice	
			-Transportation	- Transportation of skill and Know-how by Experience of Design, Installation and Maintenance activity for Phase1 and Phase 2	

NOTE: 'Communication System' is described as 'Com System' in short. (J) stands for the assigning tasks for JTEC and (M) stands for the assigning tasks for MCF.
ICT system comprises (1) Communication System and (2) Application System.
Communication System contains VSAT, long distance Wi-Fi system, Optical Fiber, PC, phone and etc.
Application System contains e-health system, for example, PC servers, application, software and etc.

Appendix - 3 **Technology Transfer**

To contribute to the development of rural areas in Myanmarby introducing ICT utilization in villages, JTEC (Japan) and MCF (Myanmar) cooperate in installation and operation of a pilot rural ICT center, and conduct a joint study on systems, technical capabilities as well as measures for sustainable operation.

- Technical Transfer through Joint Study
  - Japan side (Working Groups) provides Myanmar side (Working Groups) with the experience, know-how and knowledge for useful application in rural areas.
  - Myanmar side (Working Groups) provides Japan side (Working Groups) with the information such as custom in Myanmar.
    - The reason for taking the "Joint Study" style is because JTEC has plenty of experience of seeing the not-good project either by JTEC or by other foreign parties by forcing the providers' own idea and application without getting the specific information in those countries and without discussing with people in those countries.
    - "Joint Study" style can realize the technical transfer and Myanmar side (Working Groups) can learn how to create or modify the specific useful application in rural areas in Myanmar by themselves like Japanese vendors do under the specific custom and social conditions in Japan.
- Method of Technical Transfer

  JTEC will recommend taking the following steps.

  (Step1) Demand Analysis for Hpa Yai Ngoke To (What is his/her most biggest concern to be solved?)

  (Step2) Consideration of the concerns among above ones which may be able to be solved by ICT application

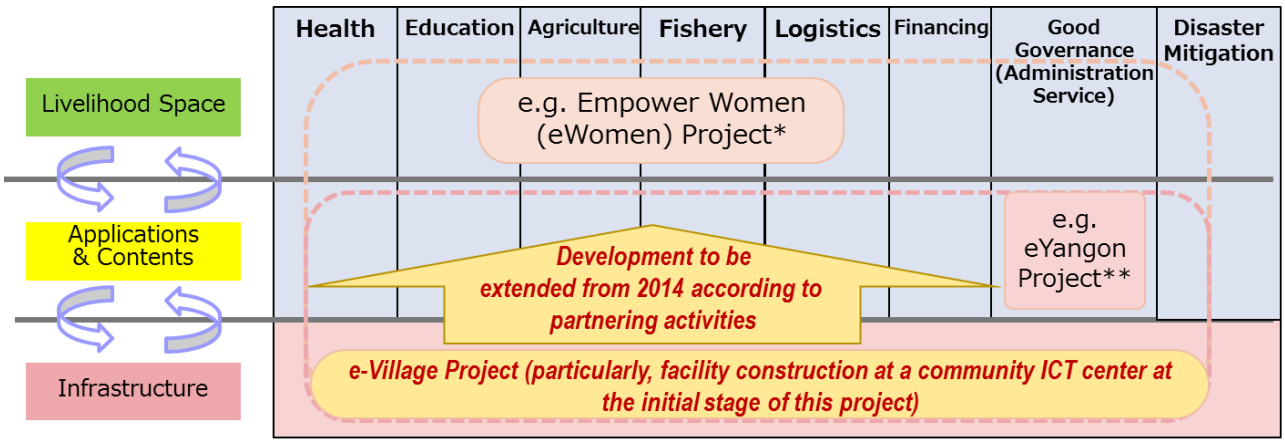
  (Step3) Prioritizing the items which may be able to be solved by ICT application

  (Step4) Create and Install ICT application. Then, operate it and get the feedback and improve it.

  (Step5) Promote the improved application over all Myanmar as a model which is suitable in rural area and affordable and sustainable.

  - To learn the Case Studies including those in the planned International Work shop can assist the above steps.

e-Village Project evolves by partnering with other activities so that functionality of the e-Village ICT center will be utilized to yield a sort of synergic efforts, which must be helpful for creating well-being livelihood space for village dwellers.



The following two projects may be cooperative and collaborative projects with e-Village Project at the moment. It is expected that such a project will increase in proportion to activities of the e-Village Project from now in the fields of health, education, agriculture, fishery, logistics, financing, good governance service (administration services by local government), and disaster mitigation.

* eWomen Project: this project targets empowerment of women in 11 villages located in Yangon Region Government area

** eYangon Project: this project aims at facilitating administration services of the central government, setting up a helpful and useful portal site.

Appendix - 5 **Site Survey**

Result of the survey as of November 2013

Item \ Village	Hpa Yar Ngoke To north village, Twantay township	Hpa Yar Ngoke To south village, Twantay township	Kanbe village, Twantay township
Commercial power supply	Not exist	Not exist	Available
Number of houses	Combined 300 houses between north villageand south village		1,300
Number of mobile phone	50	38	uninvestigated
Population	479	685	5,000
School	One elementary school (0-4 grade)	Two elementary school	Some students go to school in the morning and the others go in the afternoon. Number of students is 1,948 which includes high school students of 505. Number of teacher is 16.
Other facility	One library	One library	One library
Number of Clinic	Not exist	1	1
Number of Doctor	0	0	0
Number of Midwife	0	1	1
Number of Monastry	1	1	6
Number of Policeman	0 (Policemen at the side of roads are delivered from Twantay town)		
Village officer	One administrator and 10 officers	One administrator and 16 officers	One administrator and 10 officers
Number of Entrepreneur (eWomen)	9	9	Not exist
Mobile network coverage	Cdma400MHz, which is long-reach, is provided. However, signal is weak and call-enabled area is only at the place with good visibility.		
Wired internet access such as ADSL or Optical fiber	Not exist	Not exist	Not exist
Number of Hotel	0	0	0
Candidate place for Computer installation	School, Monastry	School, Monastry	School, Monastry

Location in front of library of Hpa Yar Ngoke To south village

Latitude 16 degrees and 43.259 minutes north and Longtitude 96 degrees and 1.798 minutes east

Remark: Population composition of Hpa Yar Ngoke To south village as of July 20, 2016

Total population：720

【Breakdown】

children before entering into elementary school: 60, elementary school students (0-4 grade): 67, Junior high school (5-8 grade): 65, High school (9-10 grade): 15, Univercity: 9, the others: 504

Appendix - 6 **Scope of library renovation**

1. Roof

Repair a leaky roof

2. Ceiling

Install a ceiling newly to keep out the intense heat of sunlight

3. Floor

Keep it as is

4. Internal wall and external wall

Keep it as is

5. Window

Repair broken windows and install the simple key at windows

6. Front door of library

Repair the broken front door and install the key at door

7. Other

Fill a gap at roof and walls for trash not to enter the library, as sensitive equipments such as computers will be installed.

Appendix - 7 Purchase List

1. PC Hardware

No.	Description	Qty
1	PC Hardware (Dell Optiplex 9010) ● Intel Core i7-3770, 16GB RAM, 2 x 1TB HDD ● 1GB Graphic ● Dell Keyboard ● Dell Mouse ● 1 Year Warranty	1
2	20" Monitor	1
3	SonicGear Headset HS 405	1
4	SonicGear Speaker Morro3SDU	1
5	Myanmar Keyboard + Mouse	1

2. PC Software

No.	Description	Qty
1	MS Multipoint Server 2012 English version	1
2	MS Windows Multipoint Server CAL	6
3	MS Windows Server CAL	6

3. Zero Client

No.	Description	Qty
1	Zero Client Control Software with Licenses	1
2	Ncomputing L300	6
3	20" ViewSonic LED Monitor+ Myanmar K/B+ Mouse+ SonicGear HS405 Headset	6

4. Laptop PC

No.	Description	Qty
1	Laptop PC (Toshiba L855) ● Intel Core i3-3210M , 15.6" Screen, 640GB HDD, 4GB RAM ● 1 Year Hardware Warranty ● Genuine Windows 8 only (NOT include MS Office)	2
2	Epson L210 color inkjet multifunction printer	1
3	Spare Ink Set (C,M,Y,K)	1

5. IP network equipment

No.	Description	Qty
1	LAN Switch : D-Link, 16-PORT GIGABIT SWITCH (DGS-1008A)	1
2	WiFi indooor router : Linksys Wi-Fi Router E1500	1
3	WiFi outdoor router : Ubiquiti Networks, NanoStationM2 (180 degree support/unit)	2

6. Electrical equipment

No.	Description	Qty
1	Gasoline Engine Power Generator 2.2kVA	1
2	Stabilizer 5kVA	1
3	Online UPS 1.0kVA	2
4	LED Lighting (Outside)	1
5	LED Lighting (Indoor)	6

7. Skynet/IPSTAR

No.	Description	Qty
1	Skynet MPS Equipment ● Outdoor Unit ● Indoor Unit ● Accessories ● Installation	1
2	VoIP, phone minutes	1
3	Skynet MPS Service Monthly Fee (3 months)	3

8. Furniture

No.	Description	Qty
1	Desk and Chair	7
2	Rack Cabinet with 12U height with lock	2
3	Vinyl carpet (2m x 18m)	1
4	analog phone	1
5	Lock	1

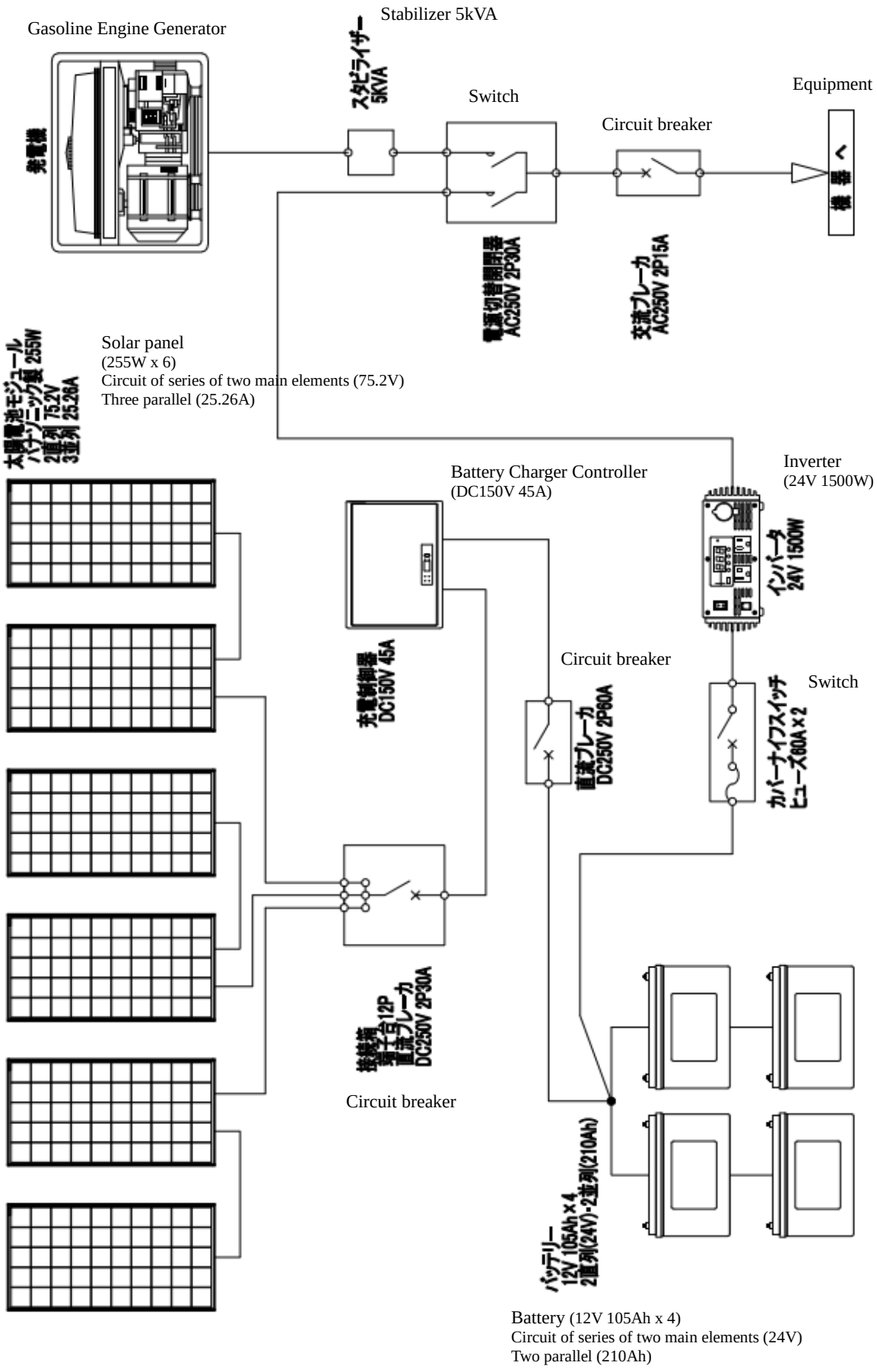
9. Solar Panel and Battery

No.	Description	Qty
1	Solar Panel 255W	6
2	Battery 105Ah	4
3	Battery Charger Controller	1
4	Inverter	1
5	Installation Work	1

Appendix - 8 Electric energy Estimation

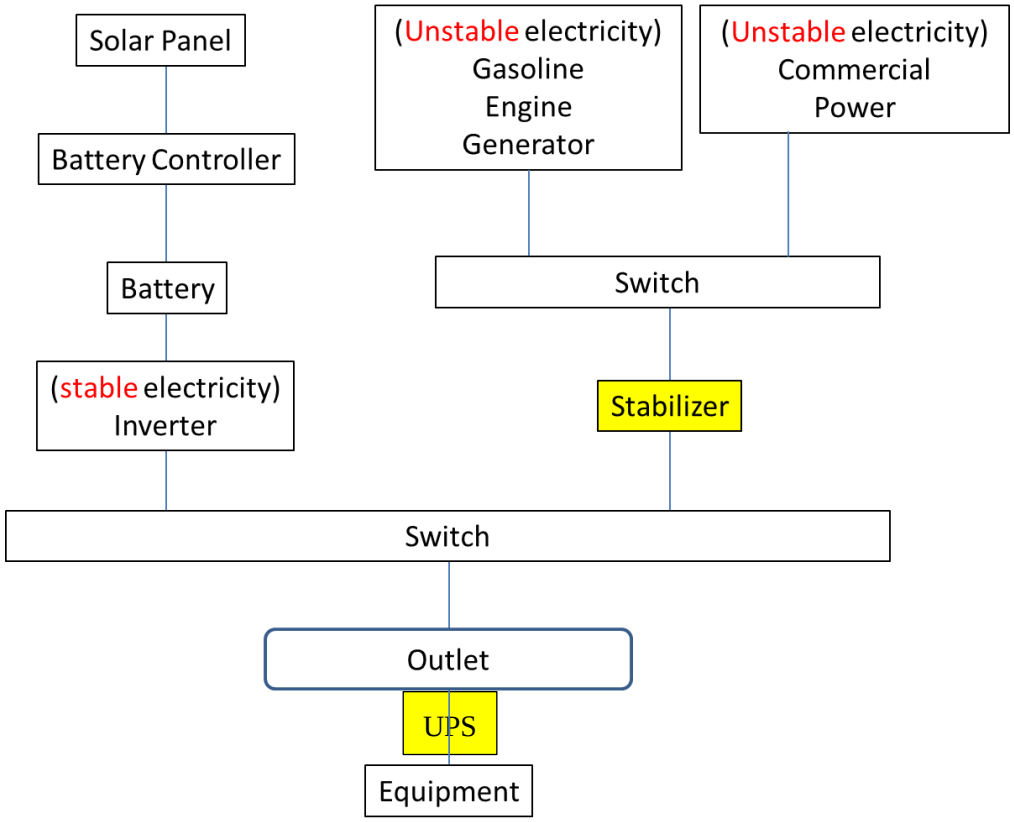
No.	Load Description	product name	Max. Watt (W)	Normal Watt (W)	Qty	Total Max. Watt (W)	Total Normal Watt (W)	Hours	Total Max. Watt Hour (Wh)	Total Normal Watt Hour (Wh)
1	Satellite Terminal (IDU)	M4 (Skynet)	75	60	1	75	60	6.5	487.5	390.0
2	Analog Telophone Adapter	ATA(Skynet)	5	4	1	5	4	6.5	32.5	26.0
3	LAN switch-1	D-Link, 8-PORT GIGABIT SWITCH	4.5	3.6	1	4.5	3.6	6.5	29.3	23.4
4	WiFi router	Linksys Wi-Fi Router E1500	3.9	3.12	1	3.9	3.12	6.5	25.4	20.3
5	PC Server	Dell Optiplex 9010	275	220	1	275	220	6.5	1,787.5	1,430.0
6	LED Monitor (Display)	DELL 20″ monitor	22	17.6	1	22	17.6	6.5	143.0	114.4
7	LAN Switch-2	ProLink, 16-PORT GIGABIT SWITCH	4.5	3.6	1	4.5	3.6	6.5	29.3	23.4
8	Zero Client Box	Ncomputing L300	5	4	6	30	24	6.5	195.0	156.0
9	LED Monitor (Display)	20″ ViewSonic LED Monitor	32	25.6	6	192	153.6	6.5	1,248.0	998.4
10	Lap-Top	Toshiba L855	65	52	2	130	104	1	130.0	104.0
11	WiFi outdoor Hotspot	Ubiquiti Networks, NanoStationM2	8	6.4	2	16	12.8	6.5	104.0	83.2
12	Long Distance WiFi	NIHON Dengyo Kosaku, Falcon Wave	5	4	1	5	4	6.5	32.5	26.0
13	Printer	Epson L210 color inkjet mul	13	10.4	1	13	10.4	0.25	3.3	2.6
14	LED Lighting (Outside)		20	16	1	20	16	0	0.0	0.0
15	LED Lighting (Indoor)		15	12	6	90	72	6.5	585.0	468.0
16	Buzzer Alarm		5	4	1	5	4	0	0.0	0.0
	total					890.9	712.72		4,832.1	3,865.7

Appendix - 9 Electric schematic diagram

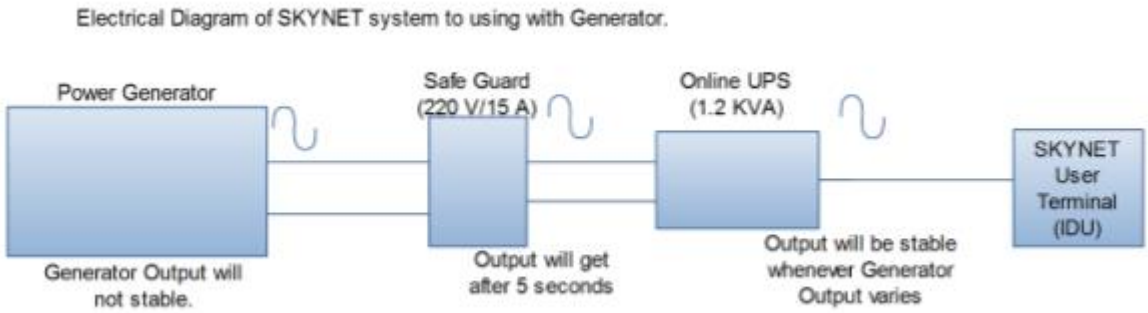


Appendix - 10　Current Stabilizer and Uninterruptible Power supply System (UPS)済

Position of the Stabilizer



UPS needs to be deployed between outlet and Equipment.



Appendix - 11 Advertisement leaflet for Community ICT Center

Myanmar "eVillage" ICT Center
Opening Ceremony & International Workshop
-- Program –

ICT Center Opening Ceremony

Saturday, 5th July 2014

"Hpa Yar Ngoke To" South Village, Twantay Township, Yangon

09:00	Registration
10:00	Welcome Speech U Khun Oo, President, MCF (10 Min)
10:10	Opening Speech Dr. Yoshio Utsumi, President, JTEC (10 Min)
10:20	Photo Session, Ribbon Cutting Ceremony (30 Min)
10:50	Demonstration of Computer Applications (20 Min)
11:10	Concluding Remarks by VIPs
	Refreshment

International Workshop

Monday, 7th July 2014

MCF Conference Hall, MICT Park, Hlaing Township, Yangon

09:30	Registration and Refreshment
10:10	Opening Speech U Myint Swe, Chief Minister, Yangon Region Government (10 Min)
10:20	Opening Speech Dr. Yoshio Utsumi, President, JTEC (10 Min)
10:30	Keynote Speech Prof. Nwe Nwe Win, PhD, Vice President (2), MCF (25 Min) Mr. Yasuhiko Kawasumi, Vice-Chair/ITU-D SG1, ITU Association of Japan (25 Min)
11:20	Presentation of Invited Speakers Dr. Fumihiko Tomita, Vice President, NICT, Japan (25 Min) Dr. Thusanai Piarabutr, Ex SEVP, TOT, Thailand (45 Min) Mr. Marvels Situmorang, Director, MCIT, Indonesia (45 Min)
13:15	Q and A, Wrap Up (MCF)
13:30	Closing Address U Khun Oo, President, MCF
	Luncheon (13:35--14:50)

(Note) From 14:00pm, the NICT Workshop will be held at the same venue.

Co-organizers: Japan Telecommunication Engineering and Consulting Service, Myanmar Computer Federation

Supporting organization: Ministry of Internal Affairs and Communications (Japan)

1. Background

   It is really difficult to realize CIC of ***villagers, by villagers and for villagers,*** unless otherwise operated on their own motive under participation of the villagers concerned. To be ready to cope with such difficulty after JTEC transfers CIC facilities to local administration, it is now required to set up an operational committee at Hpa-Yar-Ngoke-To Village.

2. Objective

   The Operational Committee is to impel and promote further utilization of CIC facilities, including upgrading and expanding of applications/contents, smooth operation and maintenance, etc. – which is keenly needed for self-reliant way of operating CIC in principle.

3. Structure of the Operational Committee

   The Committee consists of a steering committee as high-level group and an O&M group as subordinate working group.

   For the time being, JTEC an MCF will join the steering committee for advisory purpose on ad hoc basis so as to assist the Committee.

   Steering committee members:
   Chairperson, Vice chairperson and 3 members, including influential individuals.

   O&M group members:
   This working group consists of 6 to 10 young people, including university students and high school students. Usually, 2 persons will work together as turn of duty.

   JTEC and MCF should consider giving those members sufficient training for PC operation, network engineering including WiFi, solar power system, engine generator.

4. Scope of the Operational Committee

   - Discussion on the requirement and issues（which can be solved by villagers/which need the outside assistance）
     - Determination of ICTcenter opening hours (Currently, open 9:30 to 16:30, close Monday)
     - Determination of the O&M persons
   - Decision of the cost plan (which can be solved by villagers/which need the outside assistance)

     In case that the Operational Committee needs the outside assistance, JTEC and MCF ask for the aid to the companies.

     Currently, JTEC pays below.for the salary of O&M persons (Mr. Zaw Myo and Mr. Zaw Min Oo) and the ICT engineer (Mr. Ye Thu Naungdwe) and VSAT fee.
     - the monthly salary of O&M persons (Mr. Zaw Myo and Mr. Zaw Min Oo): 150,800 KYAT
     - the monthly salary of the ICT engineer (Mr. Ye Thu Naungdwe): USD 150
     - the monthly Internet fee of 512kbps (Corporate Service): USD174 (cf. The fee for

512kbps Consumer Service is 70 USD.)

- Have an interview with MCF/JTEC on the activity of Operational Committee

5. Starting time: as soon as possible

6. Expected hurdle
   It will be rather difficult to convince villagers, including the village chief. So, JTEC should appropriately and exactly transfer its idea and consideration about necessity of establishing the Committee. Advisory work should be continued with patience, since "endurance makes you stronger".

7. Actions to be taken
   - ✓ Percussion to the village chief, nomination of committee members
   - ✓ Unofficial committee meeting for preparatory work for officially setting up the Committee

Appendix - 14 Activities and Events

Time	Activity and Event
Nov. 2013	● Signing of MOU on e-Village project ● Working Group kick off ● Start of joint research in the village
Mar. 2014	● Renovation of library in Hpa-Yar-Ngoke-To south Village ● Start of soft operation of Community ICT Center (CIC)
May	● Installation of Solar panels and batteries
June	● President of Yangon Region Government visited CIC ● CIC operator fixed a leak in a roof at his own expense
July	● Hold of opening ceremony at village with more than 150 participants. Start of actual operation of CIC on Saturday, July 5th ● Hold of international workshop at the city with more than 80 participants on Monday, July 7th
Sep.	● Hold of e-Village Mobile Application Contest
Nov.	● Install application in the village which won prizes at e-Village Mobile Application Contest ● Start of consideration for establishment of CIC operational committee in Hpa-Yar-Ngoke-To south Village ● Opening hours of CIC was changed into 3pm to 10pm from Nov. 20
Feb. 2015	● Establishment of CIC operational committee in Hpa-Yar-Ngoke-To south Village ● Hold of workshop for promotion of ICT utilization for housewives in Hpa Yar Ngoke To south village
Mar.	● Hold of awards ceremony of e-Village Mobile Application Contest
June	● Failure of printer and its replacement
Aug.	● Landfall of Cyclone Komen at Bangladesh brought record heavy rainfall and Hpa-Yar-Ngoke-To south Village was flooded. CIC operator evacuated batteries for preventation of electric shock
Oct.	● Start of discussion by CIC operational committee about CIC transfer ● Failure of power unit in PC server and repairment at service center in Yangon city
Dec.	● Repair work of CIC from December 7th to December 12th
Jan. 2016	● WG exchanged idea and opinions with experts of rural ICT development from Indonesia and Thailand who visited Myanmar for APT-J1 project and got advice from experts on ICT development in Myanmar and sustainable CIC operation ● KMD provided two village ICT enginers with basic computer training for 10 days with free of charge
Aug.	● Hold of CIC transfer ceremony with participant of deputy township administrator