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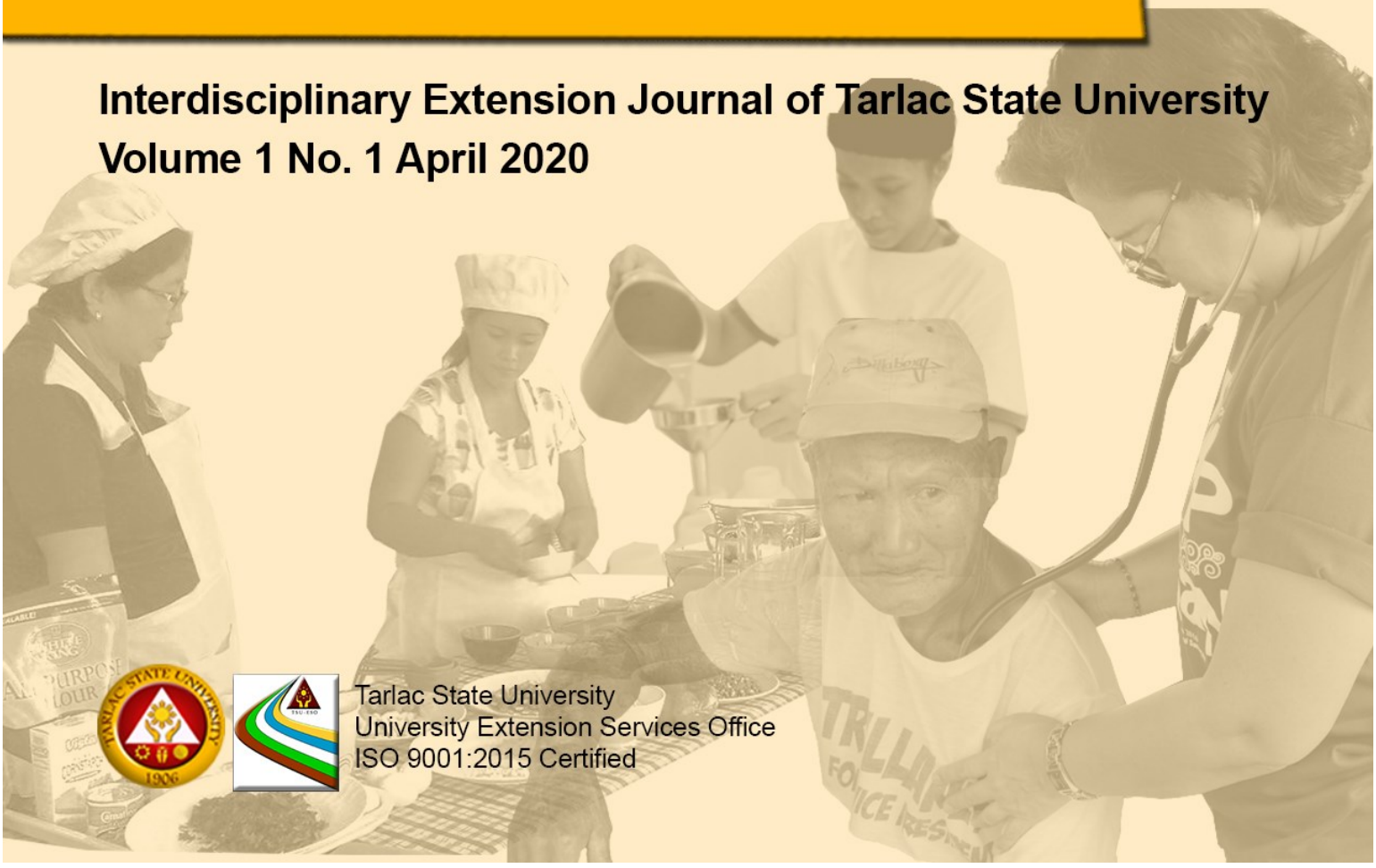

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FOREWORD

Guided by the framework “extension is quality service”, the Tarlac State University (TSU) through its implementing office, University Extension Services Office (UESO), provides high-impact extension projects and activities in different field of interest relevant to regional and national development. A human rights-based approach was carefully observed in technical forum to analyze and realize inequalities which lie at the heart of development problems, redress discriminatory practices and unjust distributions of power that impede development progress.

Recognize the value of Extension Services Providers (ESPs) in extension service delivery, TSU will now continually implement the Annual University Extension In-House Review of Completed Extension Projects. The activity serves as a venue to impart interdisciplinary extension programs to ESPs since they constitute vast manpower in attaining sustainable development and client empowerment. This year’s in-house review showcases the qualified completed extension papers cutting across the offered programs of TSU for the school year 2016 to 2018. The review and critiquing by the esteemed panel of evaluators transcend based on the contribution or impact to sector development, the uniqueness of the tools and approaches used, the methodology adopted and project sustainability and replicability.

This year’s University Extension In-House Review of Completed Extension In-House Review of Completed Extension Projects instigates four (4) categories which are **1) Community Development** integrates all the necessary factors to development affiliated on economics, social-cultural, physical, technological and environmental condition of the subject community. It is a planned effort to build assets, matching it with the capabilities of the university which empower the community and increase the capacity to improve their quality of life; **2) Industry Development** focuses on the expansion of micro-cottage, small and medium enterprises (MSMEs) through technical advises and consultancy services either leading to productivity enhancement compliance to statutory regulation process improvement; **3) Human Resource Development** incorporates the use of skills training, knowledge transfers and professional training by which individuals, organizations and communities are empowered; and **4) Extension Tools and Approaches** identifies and describes specific developed tools and unique approaches such as methods, models and instruments or tools used in extension that can be disseminated, improved and adapted by the university.

TABLE OF CONTENTS

TABLE OF CONTENTS

ASSESSMENT OF THE COMMUNITY NEEDS OF TRINIDAD, TARLAC CITY: BASIS OF EXTENSION PROGRAM DEVELOPMENT

Dr. Cynthia G. Quiambao[1] and Dr. Alma M. Corpuz[2]

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Abstract

This is a survey of the community needs of Barangay Trinidad, Tarlac City. Respondents were 10% of the 500 total households or 50 mothers, 5 barangay leaders, 8 teachers, including the school head and 175 pupils out of 300 total population. Data were gathered via interview, fielding of questionnaires, physical and laboratory examinations among the pupil participants. The survey data revealed the community needs which the researchers divided into five areas; namely: health education and intervention need, environmental development needs, livelihood skills training for mothers, community leadership and teacher development needs. An extension need-based program was developed, recommended for implementation. Likewise, budget for the extension programs must be provided through TSU management support and linkage with health professional organizations (e.g. DOH, PAMET, PNA) and other private organizations must be strengthened. Extension program leaders must involve the expertise of other colleges to address the needs of the community.

Keywords: *community leadership needs, environmental development needs, health intervention, livelihood needs, needs assessment, teaching development needs*

INTRODUCTION

Schools are mandated to conduct extension services to help a struggling community attain a level of development. Viable extension programs are borne out of a needs survey assessment (Community Tool Box, 2017; Guy, 2014). Needs survey will help narrow down services to effectively address priority needs. In addition, needs survey is a way to acquire community participation in the process of asking the members about their opinions. The needs survey phase will motivate people to participate in future activities.

In this survey, the community profile was determined. These include the demographic and socio-economic profile of the households. The profile comprised the number of children of families, work of parents and their income, educational attainment of parents and the health or medical history of the families. These are deemed essential baseline information to determine family needs on health, psychological, economic and social education and empowerment and literacy. This was affirmed by Williams (2014) when he stated that "population is an issue because if women stay at home and bring up children -being their chief role, they will have more children than those who work and they have to knowledgeable about home management and child rearing".

The profile of the households also served as the basis of determining livelihood prospective livelihood skills training and programs that will help the families earn income to sustain their daily needs. In addition, the knowledge and awareness of the respondents on emerging diseases was also determined in this survey. The findings determined the extent of health education to extend to the community. Likewise, physical examination of pupils involving the skin and scalp was carried out; stool samples were analyzed and record of the nutritional status were obtained. These are necessary for the health intervention measures to conduct in the community.

Moreover, teachers' needs were included in this study. It is by far undisputed that education is the fuel that will empower children to become productive in the community. Because of the vital role of education in community development, teachers must possess high level of competence to enable them to discharge the roles expected from them. The importance of education was highlighted in the World Forum (2017), it was stated, "Addressing the fact that an estimated 250 million children worldwide are not learning the basic skills they need to enter the labor market is more than a moral obligation. It amounts to an investment in sustainable growth and prosperity. For both countries and individuals, there is a direct and indisputable link between access to quality education and economic and social development. "The importance of education and the teachers' competence in development, is therefore glaring. This is the reason why teachers' needs are included in this needs survey.

Extension is thus, needed to reach out to communities that are struggling for development. Higher

Educational Institutions are mandated to carry such programs. This community needs survey is therefore, the initial phase of extension program development in barangay Trinidad Tarlac City. This barangay was recommended for adoption by the city government since most families are poor.

The output of this assessment survey is an extension program geared towards an attempt to address the needs of the barangay.

OBJECTIVES

General Objective: To identify the needs of barangay Trinidad, Tarlac City.
Specific Objectives:

1. Describe the profile of the community based on:
   1.1 Number of Children
   1.2 Work of parents
   1.3 Monthly income of family
   1.4 Educational Attainment
   1.5 Health history
   1.6 Knowledge about emerging diseases
   1.7 Health Intervention Practices
   1.8 Environmental protection Practices
2. Identify the needs of the community along:
   2.1 Health
   2.2 Environment
   2.3 Livelihood
   2.4 Teacher improvement
   2.5 Community leadership
3. Develop extension program based on the needs identified.

METHODOLOGY

Design. The research and development design was used in this study since an analysis of needs was conducted first before the development of extension program.

Research Environment. The assessment of needs was conducted in barangay Trinidad, Tarlac City. One of the poor communities of the municipality. Approximately, Trinidad comprises 500 households. Most fathers are engaged in fishing, farming and animal raising while mothers are mostly plain housewives.

Respondents. To provide data for the needs assessment survey, 10% of the 500 total households was included as respondents or 50 mothers were interviewed, 5 barangay leaders, 8 teachers, including the school head and 175 pupils out of 300 total population were subjected to laboratory and physical examinations.

Research Instruments. For the mothers, they were interviewed using a structured interview guide. The interview guide contained questions that elicited the health, environment and livelihood needs of the mothers. Barangay leaders were also interviewed. For the teachers, they were given questionnaires about their needs. For the pupils, they were subjected to physical examination and their stools were analyzed for intestinal parasitism.

Data Gathering Procedures. The researchers set a day for the needs assessment survey. Barangay leaders and parents were invited to Trinidad Elementary School for data gathering. Pupils were asked to submit their stools for examination. Medical Technologists were invited to do the laboratory analysis including the examination of skin and hair for wounds and head lice.

Statistical Tools. Frequency and percentage were used to analyze the data gathered.

RESULTS AND DISCUSSIONS

1. Community Profile

The profile of the community was determined and analyzed.

1.1 Number of Children

The number of children for each family was determined and is shown in Table 1.

Table 1. Number of Children

Number Range	f	%
0-1	3	6
2-3	21	42
4-5	11	22
6-7	11	22
8-9	4	8
TOTAL	50	100

Table 1 shows the number of children in a family. Based on the interview with 50 mothers, 42% claimed to have from 2-3 children, followed by 22% for mothers having 4-5 and 6-7 children. Findings indicate that families are learning to exercise family planning as indicated by the data in Table 1. However, there are still considerable number of families with large family sizes. This means that parents need follow-up information on the advantages of family planning.

1.2 Work of Parents

Work of parents was a part of the needs assessment survey. Data are shown in Table 2.

Table 2. Work of Fathers

Work	f	%
Driver	20	40
Farmer	14	28
Construction Worker	5	10
Laborer	2	4
Barangay Leader (Tanod)	5	10
Line man	1	2
None	3	6
TOTAL	50	100

Based on the data in Table 2, most fathers are drivers (40%) or farmers (28%). Some are construction workers (10%); laborers (10%); barangay leaders (10%); lineman (2%); and 6% had no means of earning income.

Table 3. Work of Mothers

Work	f	%
Driver	20	40
Farmer	14	28
Construction Worker	5	10
Laborer	2	4
Barangay Leader (Tanod)	5	10
Line man	1	2
None	3	6
TOTAL	50	100

Based on the table, mothers in the barangay were mostly plain housewives who depended on their spouses for their financial needs. Few mothers were into vending while others were barangay health workers who are only given meager allowances from the government.

1.3 Monthly Income of family

The monthly income of families was also determined in this survey. Data are shown in Table 4.

Table 4. Monthly Income of Families

Monthly Income	f	%
Less than 1000	5	10
P 1,000 -Less than P 3,000	20	40
P 3,000- Less than P 5,000	19	38
P 5,000- Less than P 7,000	2	4
P 7,000-Less than P 9,000	2	4
P 9,000 0 Less than P 11,000	1	2
P 11,000 and up	1	2
TOTAL	50	100

Table 4 shows that the bulk of families had monthly income of P 1,000 to less than P 3,000 and P 3,000 to less than P 5,000. This means that most families are earning less than the poverty threshold. The Philippine Statistics Authority (2015) reported that a family of five needed at least PhP 6,329, on average, every month to meet the family's basic food needs and at least PhP 9,064, on average, every month to meet both basic food and non-food needs. These amounts represent the monthly food threshold and monthly poverty threshold, respectively. This means that most families in barangay Trinidad had incomes below the poverty threshold.

1.4 Educational Attainment of Parents

Educational attainment of parents was also included in the profile survey and is show in Table 5 and 6.

Table 5. Educational Attainment of Father

Educational Attainment	f	%
College Undergraduate	3	6
High Graduate	15	30
High School Undergraduate	10	20
Elementary Graduate	20	40
Elementary Undergraduate	2	4
TOTAL	50	100

Based on the data in Table 5, the bulk of the fathers in barangay Trinidad are elementary graduates (40%). Some reached high school level and few were elementary undergraduates. According to the fathers, their parents were financially incapable to support them to school. Others were forced to quit schooling because they had to help their parents earn a living. Findings show the need for assistance to the fathers on literacy needs.

Table 6. Educational Attainment of Mothers

Educational Attainment	f	%
High Graduate	10	20
High School Undergraduate	15	30
Elementary Graduate	25	50
TOTAL	50	100

Data in Table 6 show that majority of the mothers were elementary graduates (50%). Others pursued high school but no one had enrolled in the collegiate level. Findings likewise indicate the need to provide literacy assistance to the mothers.

1.5 Health/Medical History

Part of the needs assessment survey was the health or medical history of the families. Data are shown in Table 7.

Table 7. Health/Medical History

Ailments	f	%
Coughs and Colds	50	100
Fever	50	100
Toothache	41	82
Diarrhea	38	76
Sore eyes	32	64
Head ache	30	60
Stomach Ache	26	52
Asthma	19	38
Boils	19	38
Chicken Pox	19	38
Hypertension	18	36
Skin Disease	18	36
Measles	15	30
Pneumonia	11	22
Diabetes	9	18
Dengue	8	16
Heart Disease	8	16
Tuberculosis	7	14

Table 7 shows the health or medical history of the families of the respondents. The top five healthabnormalities experienced by the members of the families were coughs and colds (100%); fever (100%); toothache (82%); diarrhea (76%); sore eyes (64%); headache (60%); and stomach ache (52%). These ailments are highly contagious; hence, families need health education to prevent spread of diseases within the family.

Others ailments include stomach ache, asthma, boils, chicken pox, hypertension, skin disease, measles, pneumonia, diabetes, dengue, heart disease and tuberculosis. Some of the diseases are fatal so that the community must be warned to educated about the need to consult health professionals.

Aside from asking the respondents of the ailments experienced by the family members, pupils in the school were also examined for the presence of head lice, skin wounds and parasites. Medical technologists went to the area to perform the laboratory analyses and physical examination. Fecalysis was conducted and examination of the presence of lice and wounds on the skin. Table 8 show the data.

Table 8. Physical Examination Results
N= 140

Indicators	f	%
Head Lice	110	79
Skin wounds	76	54
Dirty nails	95	68
Intestinal parasites		
Ascaris	48	34
Trichuris	34	24
Giardia cyst	17	12

Based on the data in Table 8, most of the pupils in Trinidad Elementary School had head lice (79%). This is higher than the findings of the Gboeloh and Elele (2013) among primary pupils in Nigeria. Out of 726 school children investigated, 331(45.6%) were found infested with young and adult head lice. This shows the need

to provide intervention for the pupils in Trinidad Elementary School.

According to Brown (2011), sleep is bothered for children with lice because of the constant itching. They become irritable and are less able to concentrate at school. They often become isolated because their peer group would not interact with them, so there are all sorts of pressures put on the children as well as their families. When head lice feed from the blood of the scalp they pump into the veins a small amount of anti-coagulant to stop the blood from clotting in their feeding tube, and it is the buildup of this in the body which causes the constant itching.

Moreover, majority of the pupils had skin wounds (54%). In fact, some pupils had fresh wounds on their scalps. Most pupils had dirty and unclipped nails. Others had intestinal parasites (34%). Most parasites were *Ascaris lumbricoides, Trichuris trichura and Giardia lamblia* cysts. Pupils had to take anti-helminthic drugs to purge the intestinal parasites. Under health history, pupils' nutritional status was also obtained. Table 9 shows the data

Table 9. Nutritional Status

Nutritional Status	f	%
Severely Wasted	7	2
Wasted	31	10
Normal	267	88
Total	305	100

Table 9 shows the nutritional status of the pupils in Trinidad Elementary School. Data show that there are severely wasted and wasted pupils. These are pupils whose Body Mass Indices are below the normal values considering their ages.

1.6 Knowledge about Emerging & Endemic Diseases

Parents and pupils were interviewed about their knowledge of emerging diseases. Findings are shown in the preceding tables.

Table 10. Knowledge of Respondents about Emerging and Endemic Diseases
N=50

Emerging Diseases	F (Yes)	%
Meningitis		
Do you know about the cause of meningitis?	4	8
Do you know that meningitis is communicable?	2	4
Do you know that meningitis can be fatal?	3	6
Do you know that meningitis has already claimed lives of some children?	3	6
Do you know that meningitis can be prevented?	3	6
Dengue		
Do you know that dengue is caused by bite of mosquito?	50	100
Do you know that dengue is fatal?	45	90
Do you know how to prevent dengue infection?	25	50
Do you know the signs and symptoms of dengue?	26	52
Do you know the home remedies for dengue?	38	76
Parasitism	23	46
Do you know how parasites infect the body?	21	42
Do you that parasites can be avoided?	12	24
Do you know that your children can acquire parasites from their classmates?	15	30
Do you know that parasitism can lead to complications?	10	20
Do you know that parasitism can be fatal?		
Human Immunodeficiency Virus		
Do you know that HIV/AIDS is becoming a problem in the Philippines?	12	24
Do you know that there are cases of HIV/AIDS in Tarlac?	9	18
Do you know that teens as young as 15 are already being infected with HIV/AIDS?	13	26
Do you know how HIV/AIDS are transferred?	11	22
Do you know that HIV/AIDS has no cure yet?	12	24

Table 9 shows the knowledge of the respondents about some diseases which are becoming threats to the community. As seen, respondents barely knew about meningitis as only very small percentage indicated *"yes"* to the statements.

On the other hand, all respondents knew that dengue is causes by mosquito bites. Most of them also knew that dengue can be fatal if not attended to immediately. In fact, most parents knew about the tawa-tawa, which can be used to cure dengue. However, there were fewer parents who did not know the signs and symptoms of dengue.

As to parasitism, not all respondents indicated their knowledge of the cause of parasitism and how it is spread. This is also true to HIV/AIDS. Very few respondents have knowledge about HIV/AIDS. In fact, most of them did not know that there are already cases of HIV/AIDS in Tarlac.

1.7 Health Intervention Practices

The respondents were asked about their health intervention practices when a member of the family gets sick. Table 11 shows the data.

Table 11. Health Intervention Practices

Health Intervention Practices	f	%
Seek medical help from the health center when a member of a family gets sick.	32	64
Seek medical help from the hospital when a member of a family gets sick.	20	40
Seek help from herbolario when a member of a family gets sick.	21	42
Buy medicines without doctors' prescription.	12	24
Take herbal medicines	15	30

Table 11 shows the health intervention practices of the respondents when a member of the family gets sick. Majority of the respondents seek the help of health professionals in the health center (64%). For serious illnesses, the respondents indicated that they bring their sick family member at the hospital (40%). There are still a large percent of those who seek the help of herbolario (42%). Some just buy medicines over the counter for simple head aches and fever while others use herbal plants such as sambong and oregano.

Findings indicate the need to educate the respondents of what to do when somebody gets sick in the family since some still consult herbolarios for their treatment. In addition, teachings on herbal medicines can be helpful since only 30% indicated that they resort to taking herbal plants. The Department of Health had approved at least 10 medicinal plants to cure common illnesses such as fever, cough and colds and some skin infections. These will be helpful to the parents.

1.8 Environmental Protection Knowledge and Practices

Environment is a determinant factor in the status of health of the community. If the environment is not clean, people will suffer from health abnormalities. Table 12 shows the knowledge of the respondents about environmental protection.

Table 12. Respondents' Knowledge and Practices of Environmental Protection

Environmental Protection	f	%
Do you clean your house regularly?	30	60
Do you clean your surroundings regularly?	21	42
Do you control insects or rodents in your surroundings?	12	24
Do you cut grasses in your surroundings?	15	30
Do you plant trees?	1	2
Do you throw your waste in proper bins?	8	16
Do you segregate waste at home	6	12
Do you know about waste management?	9	18

Table 12 shows the knowledge and practices of the respondents on environmental protection. As seen, majority of the respondents claimed they cleaned their houses regularly (60%). But only 42% indicated that they cleaned their surroundings regularly.

As to insect control, only 24% claimed they try to control insects and rodents such as mosquitoes, flies and rats. These are potential sources of diseases in the family.

Some also cut grasses in their surroundings (30%). Grasses are breeding places of some insects and rodents. Only 1 claimed he planted trees.

Few of the respondents are aware of the solid waste management program of of the barangay. Consequently, few also practiced proper disposal and waste segregation.

2. Community Needs

The needs assessment survey conducted in the target community led to the development of an extension program. Data from the interviews, focused group discussions, questionnaires, physical and laboratory examinations revealed that few respondents have knowledge of the causes, prevention and basic management of health ailments which included, meningitis, dengue, parasitism, and HIV/AIDS. In addition, only few parents use herbal medicines for common ailments. Most pupils have human lice; some pupils are positive for intestinal parasites; some pupils have visible wounds on scalp and skin; and some pupils are severely wasted and wasted.

In addition, some respondents have no knowledge on proper waste segregation and disposal; some do not clean their surroundings regularly and only 2 indicated to have participated in tree planting. There was no visible herbarium in the area which could have been helpful in the community's health needs and will also support biodiversity. Vegetable gardens were not also seen, which could have supplied their healthy food needs. Most respondents, who were mothers, had no income-generating activities.

For the teachers, all indicated they needed seminar workshop on the five areas of their work responsibilities through a survey questionnaire. Top five of the teachers' needs were teaching strategies; how to develop and conduct an action research; professionalism towards work; and assessment.

Barangay leaders interviewed indicated their desire of expanding their knowledge and awareness of strategies to motivate the community to participate in barangay programs.

The strategy used by the extensionists in conducting the needs of the community and the programs and activities developed are shown in Figure 1 and elaborated in Table 13.

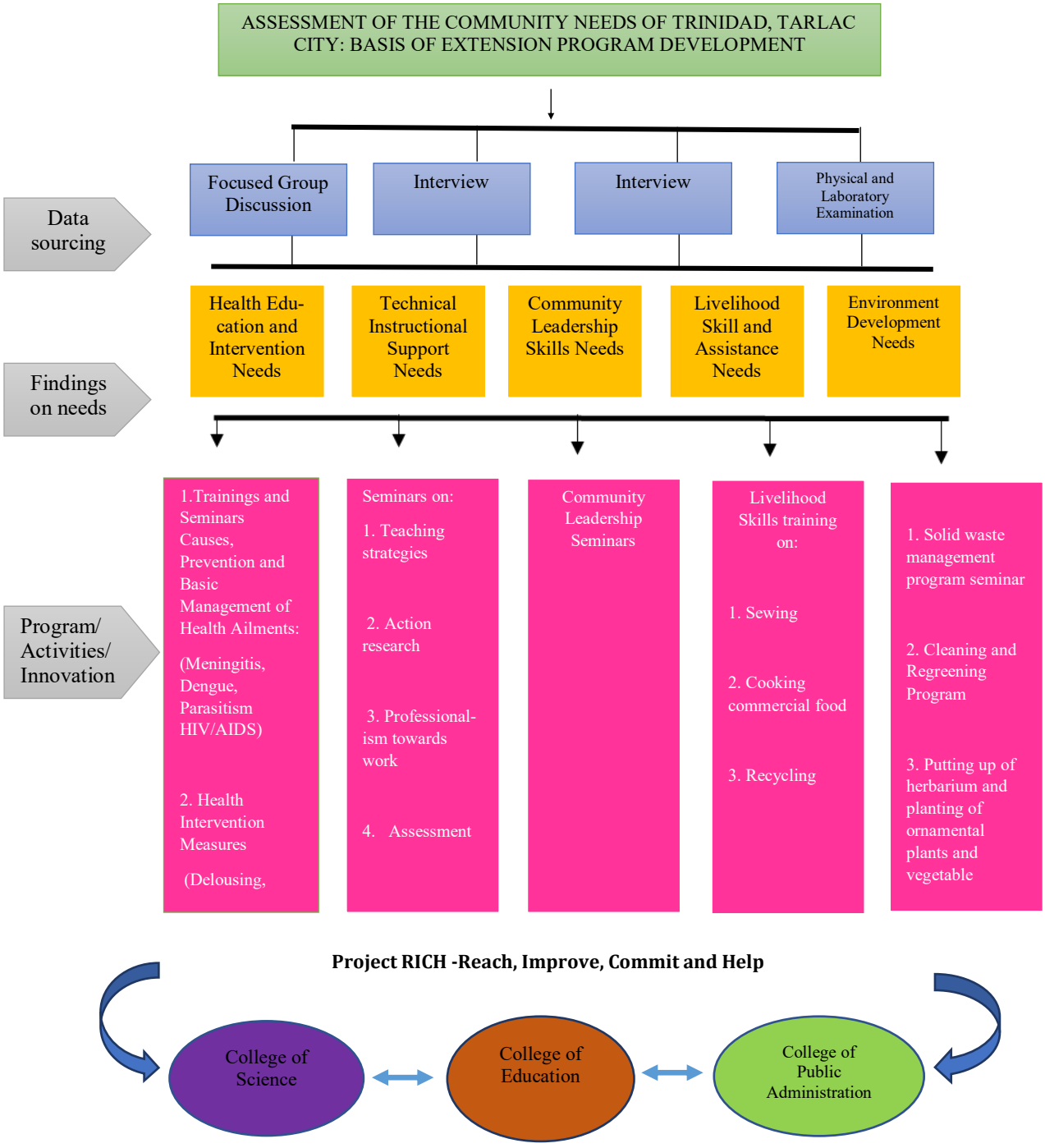

Figure 1. Community Needs and Extension Programs Developed

Table 13. Community Needs

Health Needs	Basis	Means of Verification
Health Education Trainings and Seminars	1.Few respondents have knowledge of the causes, prevention and basic management of health ailments. -Meningitis -Dengue -Parasitism -HIV/AIDS 2. Only few parents use herbal medicines for common ailments	Attendance to seminars Assessment of knowledge of health acquisition Anecdotes of parents' experience in using herbal medicines
Health Intervention Measures Delousing Deworming Treatment of wounds on skin and scalp Feeding Program	 Most pupils have human lice Some pupils are positive for intestinal parasites Some pupils have visible wounds on scalp and skin Some pupils are severely wasted and wasted	 Elimination of head louse through visual inspection Healing of skin wounds Comparison of BMI before and after feeding
Environment Development Solid waste management program seminar Cleaning and Regreening Program Putting up of herbarium and planting of ornamental plants and vegetable Gardening	Some respondents have no knowledge on proper waste segregation and disposal Some respondents do not clean their surroundings regularly and only 2 indicated to have participated in tree planting Herbarium will not only help the community's health needs but will also support biodiversity. Vegetable gardens will teach the community to produce their own food.	Solid waste are managed Presence of trash bins Clean surrounding Trees growing Herbarium is visible Vegetables are grown in the school and house environments
Teachers' Needs Seminar and workshop on: Teaching strategies Action research Professionalism towards work Assessment	All teachers indicated they needed seminar workshop on the five areas of their work responsibilities through a survey questionnaire. Top five of the teachers' needs.	Attendance to seminars Certificates in the seminars
Livelihood Skills training Sewing Cooking commercial food Recycling	Most mothers are plain housewives	Mothers have acquired skills or have put up small retail business
Community Leadership seminars	Barangay leaders interviewed indicated their desire of expanding their knowledge and awareness of strategies to motivate the community to participate in barangay programs.	Attendance to seminars
Other needs: Gender and Development	Seminars of GAD and human rights needs	

3. Extension Programs Developed

Based on the findings, an extension program for the community is developed and the detailed activities are attached in Appendix A. the researchers put all the extension services into what they called the Project RICH (Reach, Improve, Commit and Help). The specific programs are seen in Figure 1.

The Project/Service Goal: To conduct extension services within the expertise of the faculty members under the Community Development Program through the help of the students and support groups towards sustainable development of the school and community.

The sources of support are government and non-government agencies. The target agencies are Philippine Association of Medical Technologists (PAMET), Rural Health Units (RHUs), Pioneer Project REACH and other agencies.

CONCLUSIONS

Most families in Trinidad, Tarlac City have large family sizes; fathers are mostly farmers while mothers are plain housewives; most families' monthly income is below the poverty threshold; and most parents only reached up to high school level. The top five causes of illness are coughs and colds, fever, toothache, diarrhea, and sore eyes. Most pupils have head lice while some are positive with intestinal parasites. Some have wounds on their skin and scalp. There were 36 severely wasted pupils. Most parents are not knowledgeable of emerging and endemic disease. When a family member gets sick, some go to health centers and hospitals for medical interventions while others still consult herbolarios. Some parents use herbal plants to treat common ailments.

On environmental protection, most parents clean their houses but only some regularly clean their surroundings. Some made effort to control insects and rodents. Only few are acquainted with the solid waste management program in the barangay. Only few also claimed to have planted trees.

The needs of the community on health include health education and health intervention. On environment, the community needs to be thoroughly oriented with the solid waste management program of the barangay; they need to participate in cleaning and regreening of the environment through tree planting, herbarium development; and vegetable gardening. As to livelihood needs, mothers need to be trained on livelihood skills since they are mostly housewives. On the teachers' needs, they indicated their desire for seminar-workshop on teaching strategies, action research, professionalism towards work and assessment. On community leadership, the barangay leaders indicated their desire of expanding their knowledge and awareness of strategies to motivate the community to participate in barangay programs.

Extension program areas developed are divided into five programs which include, health education and intervention, environment development, livelihood skills training, teacher development and community leadership.

RECOMMENDATIONS

1. The Extension program developed as a result of the needs survey analysis must be implemented.

2. Budget for the extension programs must be provided through TSU management support and linkage with health professional organizations (e.g. DOH, PAMET, PNA) and other private organizations must be strengthened.

3. Extension program leaders must involve the expertise of other colleges to address the needs of the community.

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EXTENSION IN A TARLAC COMMUNITY CENTRAL LUZON, PHILIPPINES: BEST PRACTICES AND LESSONS LEARNED

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Abstract

The school principal and the barangay captain were very supportive of the extension programs. They encouraged the teachers, parents, youth and pupils to actively cooperate in the extension activities. They also provided other resources which they have in the community. The services extended were deemed vital in the development of the community of La Paz based on the survey of community needs conducted by the college. The extension program was discussed among the community leaders and school staff through a focused group discussion. After the FGD, a Memorandum of Agreement (MOA) was forged between La Paz officials and the president of Tarlac State University which signaled the start of the extension services. Figure 1 shows the kick off program conducted in LES through MOA signing. This study then aimed to evaluated the response of the community and the outcomes of the extension services provided to Laungcupang, La Paz. The objective is to identify the best and weak practices or the lessons learned, in the course of providing extension in the community. Findings of the study will be helpful in conducting extension services in other adopted communities. The best practices identified in the study will be modeled while the weak practices will be improved in other communities.

Keywords: *community development. community extension programs, environment development, health interventions, school-based management, teaching strategies*

INTRODUCTION

Extension, through educational programs, plays a large part of community development. Schools were challenged to include delivery of extension services to under resourced communities as one of its functions, aside from instruction and research. This is true not only in the Philippines but in educational institutions abroad. In America, some universities reorganized to give extension an important place as an institutional function paralleling instruction and research (Encyclopedia Britannica, 2017). In Hongkong, community extension is incorporated into their community nursing health course. The schools provided in-depth health services to those in need in the community (Chan, Fung & Chan , 2017). In the Philippines, the CHED (2016) categorically mandated all Higher Educational Institutions to include extension as one of three important functions.

In response HEIs conduct extension to less fortunate communities and this is gaining appreciation by community beneficiaries. For example, Erickson (2010) investigated the impact of a community extension which was called the PLaCE (Partnering Landscape and Community Enhancement) program in Iowa State University. The study included interviews with community stakeholders who were beneficiaries of the extension services. Findings revealed that the community services had provided physical improvements, expansion of community capacity, increasing project capacity, and stimulation of community dialogue, activities and creative capacity.

Another impact evaluation of community extension was conducted in USA. Jayaratne, Bradley & Driscoll (2009). The services provided were community development programs, gardening and horticulture, healthy lifestyle education, youth development, and environmental conservation. These programs were found to improve the skills of the community members and contributed to the development of the community's physical environment.

In addition, Rubio et.al. (2016) assessed the community extension of College of Business Administration students in one private HEI in Bulacan. Findings revealed that the extension program were well implemented. Extension activities included gift giving, alay lakad, charity day, book keeping, tree planting, coastal cleanup, feeding program, accounting tutorial, conducting seminars, red cross bloodletting, livelihood and microfinancing.

Moreover, Gonzales and Manghamil (2013) evaluated the impact of La Salle University's extension services. Findings revealed that extension has not only helped the community beneficiaries but the teachers who provided extension as well. Teachers claimed that they have turned into service -oriented individuals.

In Ifugao, Dugyon (2016), also investigated the impact of community extension programs on the residents of selected adopted barangays. Results revealed that while the beneficiaries had acquired varied skills, they still believed that improvements must be done in the extension by integration of extension packages based on needs assessment survey. Likewise, proper monitoring must be conducted to ensure that the extension programs are well implemented.

Other extension programs in the Philippines which were found to have benefited the communities were those conducted by Lyceum International Maritime Academy (Chua, et. al., 2014) in Batangas; Kalinga Apayao State College in Tabuk City (Ammakiw, 2013); Community extensions conducted by SUCs in Region IX (Bidad and Campisino, 2010); and in Lyceum of the Philippines, Batangas City among the residents of barangay Don Luis, Batangas (Daquis, Flores, Mercado & Plandez, 2016). The extension services included health education and giving of health kits; feeding programs; livelihood and literacy. The general recommendations of the cited studies include the need for strict monitoring of program implementation and more support in terms of funding for livelihood for it to be sustainable among the beneficiaries.

The cited studies and the present study had one goal, which was to evaluate whether the extension services the HEIs provided had helped address the needs of the communities.

OBJECTIVES

General Objective: This study evaluated the community extension services that COED, with its collaborating colleges and external partners, had carried out in Laungcupang, Pa Paz, Tarlac.

Specific Objectives:
1. Determine the extension services provided to the beneficiaries in Laungcupang, La Paz.
2. Evaluate the response of the community and outcomes of the extension services to the beneficiaries.
3. Identify the best practices and the weaknesses or the lessons learned.
4. Draw implications of the findings to community extension programs.

METHODOLOGY

Research Design

This is a study which evaluated the community response and the outcomes of the extension services in Laungcupang, La Paz, Tarlac, Philippines.

Research Locale

The study was conducted in Laungcupang, La Paz, Tarlac, one of the least resourced barangays in the municipality. There are 1,968 residents of this barangay as of 2013 and a land area of 423,050. Fathers are mostly farmers while mothers are plain housewives. Parents mostly earned elementary level of education.

Population and Sampling

The respondents of this study were seven (7) teachers, 50 mothers, 30 youths and 10 barangay leaders who were interviewed or were made to answer questionnaires to gather data. The complete enumeration technique was employed for the selection of teacher respondents and the barangay leaders. For the mothers, 50 were included in this study via purposive sampling since only mothers who attended community extension were the ones taken as respondents. For the young people, 30 were also selected as respondents using purposive sampling.

Instrument and Data Gathering Procedure

Interview

To gather data, the respondents were interviewed by the researchers during their free time. Mothers were interviewed usually in the afternoon. This is the time when they had finished the chores for the day. Some were interviewed while waiting for their children in school.

For the barangay leaders, they were interviewed Monday morning after the Flag Ceremonies. Barangay leaders were mostly complete during Mondays.

The youth were also interviewed. The researchers requested the barangay leaders to tell youth to go to the school for the data gathering.

Questionnaire

For the teacher respondents, they were given questionnaires by the researchers. They were allowed one week to answer the questionnaires. After a week, the questionnaires were retrieved.

Documentary Analysis

To determine the impact of extension to the teachers, documents of their school achievements were requested and analyzed in this study.

Research Ethics

To protect the rights of the respondents, informed consents were secured. The respondents were assured of the confidentiality of their identities. They were told that they can withdraw as respondents anytime if they wish so.

All data gathered were collated and subjected to statistical analyses.

Statistical Treatment

The frequency distribution and arithmetic mean were used to facilitate the analysis of data gathered in this study. For qualitative responses, these were analyzed using narrative technique. This technique of analyzing data presents stories as narrated by the respondents to analyze how they think and how they described the changes that happened to them after the trainings provided (Skills You Need, 2017).

RESULTS AND DISCUSSIONS

1. Community Services Extended

In this study, the community services extended to Laungcupag, La Paz was described.

Table 1. Extension Services Carried Out in the Community

Extension Service	Beneficiaries
Education:	
Computer Literacy	LES Teachers
Teaching Strategies and Classroom Management	Teachers
Preparation of Instructional Materials	Teachers
Legal Bases in Education	Teachers
Literacy in English and Filipino	Pupils
Numeracy	Pupils
Environment:	
What to do during a Natural Calamity	Barangay Officials, Parents
On-site Training on Waste Management	Community Members
Mind Grain Tips in Garbage Disposal	Community Members
Energy Conservation	Women, Barangay Officials, Youth
Tree Planting	Teachers, Youth, Parents

Table 1(continued).

Extension Service	Beneficiaries
Livelihood:	
Cosmetology	Women
Processing of Available Ornamental Plants	Parents, Pupils
Okra and Labong Burger	Parents
Community Development Seminars:	
Public Service Reform	Barangay Officials
Youth Empowerment Support	
Good Governance for Peace and Progress	
Consumer Rights Welfare Seminars	Barangay Officials, Parents
Others (Health Intervention and Youth Dynamism:	Community Members
Medical and Dental Mission	Community Members
Supplemental Feeding	Women, Barangay Officials, Youth
Awareness on Endo and Ectoparasites	Teachers, Youth, Parents
Values Formation in the Community	Parents, Barangay Officials
Sportsfest	Youth
Gender and Development	Community Members

Data in Table 1 show the extension services that COED provided to Laungcupang, La Paz. As seen, the extension services comprised four areas education, environment, livelihood, community development and others health programs.

Teachers and pupils were the beneficiaries of education services which comprised computer literacy, teaching strategies and classroom management, preparation of instructional materials, legal basis of education, literacy in English and Filipino, and numeracy.

Under computer literacy, teachers had hands on lessons about basic and advanced computer, expressive digital media and adaptive skills in multimedia. On teaching strategies and classroom management, teachers were given lectures on taxonomy of bullying behavior of pupils, how to become a shadow teacher, the integration of ICT in classroom instruction, the enzymatic effects of active parent involvement in school activities, the use of indigenous materials in teaching and the utilization of half-baked tools in elementary level. According to the teachers interviewed, they learned a lot from the seminar-workshops and had applied the skills they had acquired to their pupils.

As to the legal basis of education, teachers were lectured on distributed leadership in the whole school development and the updates about the implementation of the manual of the Department of Education. Teachers were enlightened about the new directives of the DepED, especially on the implementation of the K to 12 Curriculum.

On development of environment, barangay officials and parents received a lecture on what to do during natural calamities, on-site training on waste management, mind grain tips in garbage disposal, energy conservation, and tree planting. Barangay leaders, teachers and parents were grateful of the lectures on the tips during natural calamities especially that La Paz often experiences flooding. Parents, teachers and pupils were trained on livelihood activities to include cosmetology, processing of available ornamental plants, okra and labong burger. What the attendees liked most was the lecture on basic agriculture because farming is the main source of income community residents.

On community development, barangay officials, police, young people and parents attended seminars on public service reform, youth empowerment support, good governance for peace and progress and consumer rights welfare seminar. Young people were glad to have been included in the extension programs. They also had sports activities which they enjoyed a lot.

Other services extended were medical and dental mission which was conducted in December 16, 2017. Undernourished pupils in Laungcupang Elementary School were subjected to supplemental feeding which ran for one month. Pupils were also lectured about endo and ecto parasites. Values formation was also a part of the seminars extended to the community. And gender and development seminar was conducted.

The programs extended to the La Paz community were based on a needs survey conducted and from the results of focused group discussions with the barangay leaders, teachers and selected parents.

2. Response of the Community to the Extension Services

The response and outcomes of the extension services provided to Laungcupang, La Paz were determined. The researchers interviewed the beneficiaries and distributed questionnaires to gather data.

2. 1 Education Services

Teachers and pupils were the beneficiaries of the education services provided by COED.

Table 2. Teachers' Evaluation of the Computer Literacy Training

Seminar/Training	Weighted Mean	Verbal Description
The seminar on computer literacy had made filing of lessons, class records, and other school documents easier and faster.	3.87	To a great extent
Advance Computer literacy helped me compute and record the scholastic performance of my students through the excel program	3.67	To a great extent
Adaptive Skills for multimedia helped me in innovating my teaching strategies that improve the appreciation of pupils of the lessons and improve their learning acquisition.	3.61	To a great extent
Seminar on expressive digital media helped me in developing lessons that motivate pupils to listen and actively participate in class.	3.56	To a great extent
Basic Computer Literacy helped me in preparing my lessons	3.52	To a great extent
Grand Mean	**3.65**	**To a great extent**

Table 2 shows the evaluation of the teachers on the computer literacy training extended to them. As shown, teachers indicated that their training mostly had helped them to a great extent in their teaching and classroom management efforts.

Teachers claimed that filing of lessons, class records and other school documents were made easier and faster unlike in the past when the hard copies of their lessons filed in folders were damaged over time or were misplaced. The mean generated for this was 3.87, with a verbal description of "to a great extent." After acquiring computer skills, they now have soft copies of their lessons which they can always access anytime. They also have stored them in CDs or USBs for back up once their laptops or computers are corrupted. In addition, test papers were already computerized and soft copies were filed which they easily revised yearly.

Moreover, the teachers claimed the adaptive skills for multimedia helped the them to a great extent in innovating teaching strategies that improved the appreciation of pupils of the lessons and improved their learning acquisition (3.61). Teachers were able to use animated lessons in Science and English which the pupils appreciated much.

The grand mean generated was 3.65 which indicates that the computer literacy training provided to the teachers in LES helped them to a great extent in their grade computations, filing, developing their lessons and in doing other documents needed for their reports.

As to the impact of seminars on teaching strategies and classroom management, Table 3 shows the data.

Table 3. Teachers' Evaluation of the Seminars on Teaching Strategies and Classroom Management

Seminar/Training	**Weighted Mean**	**Verbal Description**
The integration of ICT in classroom instruction.	3.88	To a great extent
The taxonomy of bullying behavior pupils.	3.76	To a great extent
How to become a shadow teacher.	3.67	To a great extent
The utilization of half-baked tools in the elementary teaching.	3.59	To a great extent
The enzymatic effects of active parent involvement in school activities	3.56	To a great extent
The use of indigenous materials in teaching.	3.51	To a great extent
Grand Mean	**3.68**	**To a great extent**

As reflected in Table 3, teachers claimed that seminars they attended on teaching strategies and classroom management helped them to a great extent. Because of their seminar on computer literacy, teachers were able to integrate the use of ICT in their lessons. The school has an LCD projector, one computer set and all teachers have their own laptops.

Teachers were also enlightened about the bullying behaviors of the pupils. During the time of Education Secretary Luistro, DepED Order Number 40, series of 2012 was released. This is a response to the RA 10627 which protects students from bullying and other forms of violence that may be inflicted by adults, persons of authority as well as their fellow students. This DepED order provided the guidelines on the sanctions for teachers who humiliate students. Luistro reiterated to teachers that bullying must not be tolerated in the classrooms. The COED extension service, thus included bullying in the seminars they provided to LES and teachers acquired knowledge on the behavior of bullies and the pupils bullied.

In addition, seminar on the importance of parent-teacher relationship was also provided to the LES teachers. Teachers indicated that the seminar had helped them to a great extent (3.76). According to them, in the past, only few parents regularly attended PTA meetings and had hardly volunteered to help in school programs or projects. But after the seminar, they applied the strategies on how to effectively motivate parents to attend school programs. Teachers observed the increase of parent attendance in school affairs. In part, the COED extension was also one of the main reasons why parents had realized their important role in the school.

Another seminar on the use of indigenous materials in teaching was appreciated by the teachers. According to them, the seminar greatly helped them become resourceful in terms of selecting materials for teaching (3.51). In the past, teachers were burdened on where to get additional support to purchase their instructional materials but because of the training provided by the COED extension, they learned how to use local raw materials as instructional materials.

Moreover, the seminar on how to become a shadow teacher was likewise met positively. Teachers indicated that this had greatly helped them in assisting children with special needs.

Furthermore, teachers appreciated the seminar on the use of indigenous materials in teaching as

they were able to use raw materials in their surroundings in developing teaching aids. Dr. Julieta M. Lagasca, Director of Graduate School who served as a resource speaker on February 17, 2014. The teachers claimed the seminar had helped them to a great extent (3.51) and had reduced their burden of purchasing their own materials from the city.

The utilization of half-baked tools in the elementary teaching was also conducted by Dr. Rosalina C. Garcia and teachers claimed this seminar had helped them to a great extent (3.56). In this seminar LES teachers, were learned useful songs that they can use in teaching so that pupils become motivated and dynamic in the classroom. Figure 5 shows the seminar on half-baked tools with the speaker, Dr. Rosalina C. Garcia.

Over-all, with a grand mean of 3.68, teachers acquired assistance from the seminars provided to them to a great extent. The teachers had expanded their competencies in in developing and choosing instructional teaching strategies that helped deliver their lessons more interestingly to the pupils. They were also enlightened about some classroom management strategies which effectively made teaching and learning stimulating to the pupils.

Aside from seminars on teaching strategies and classroom management, teachers also had lectures on the legal bases of education. Data in Table 4 show the evaluation of the teachers.

Table 4. Teachers' Evaluation of the Seminars on the Legal Bases of Education

Seminar/Training	**Weighted Mean**	**Verbal Description**
Distributed leadership in Whole School Development	3.56	To a great extent
Updates in the Implementation of the DepEd Manual.	3.55	To a great extent
Grand Mean	**3.56**	**To a great extent**

Table 4 reflects the data on the teachers' evaluation of the seminar about distributed leadership in school development and the updates in the DepEd Manual relative to the K to 12 implementation. Teachers claimed that both seminars had helped them to a great extent. The DepED Order Number 45, series of 2015 strengthened the decentralization of school management (DepED, 2015). This has given power of the principal in managing the schools they are assigned to. This in effect, required teachers to play active roles to support the principal in school development. As to the updates in the DepED Manual, teachers were clarified about the changes in teaching approaches to include the spiral teaching; the use of Mother Tongue as a subject and a medium of instruction; the inclusion of the subject Music, Arts, Physical Education and Health in the Kindergarten to the Primary level, which used to be in the intermediate grades; the importance of full understanding of the Child Protection Policy provided under DepED Order Number 40, series of 2012.

Over-all, the grand mean of 3.56 was generated from the teachers' evaluation which indicates that the seminars had helped the teachers to a great extent. According to the teachers, the seminars had contributed to their competence and confidence in classroom management and teaching. They were more motivated to teach with new strategies to sustain the interest of the learners. They were able to draw support from the parents and were more enlightened on the need to support each other, especially their principal, in order to achieve their goals. Because of their renewed commitment and dedication to teaching, the school was granted Level 2 in the implementation of the School-Based Management Program. They ranked 2nd in the National Achievement Test (NAT) in the whole La Paz South District and 2nd place in a district-wide MTAP.

2.2 Environment Development Services

The extension services of the COED to Laungcupang community was not only focused on teachers' training and seminar on teaching strategies and classroom management but also in developing the physical environment of the school and the community.

There were five activities conducted in the community to improve their environment. These are shown in Table 5.

Table 5. Activities Conducted for Environment Development

Activity	Participants
On-site training on waste Management and Mind grain tips in Garbage Disposal	Community members
What to do during a natural calamity	Bgry officials and parents
Energy conservation	Women, brgy officials, youth
Tree planting	Teachers, youth and parents

Parents and barangay leaders who participated in the seminar on "On-site training on Waste Management,' were interviewed on the effect of this seminar to them. Table 6 shows the responses of the beneficiaries.

Table 6. Feedbacks from Interview Conducted Among the Beneficiaries on the Seminar About "On-Site Training on Waste Management"

Respondent	Informant's Answer	Formulated Meaning	Theme
Mother 1	*"Maganda kasi malaki ang tulong sa amin kung papaano mag segregate ng basura. Nagagawa namin sa aming bahay"* (It was nice because it helped a lot in our knowledge about segrega-tion).	Informant appreciated the seminar be-cause it helped her apply what she learned from the seminar in their household.	Practical Application of Knowledge learned
Mother 2	"Nakatulong sa amin kung paano ihiwalay ang nabu-bulok sa hindi nabubulok nab asura" (It helped us know how to segregate biodegradable from non-biodegradable waste)	Informant claimed she has learned waste segregation	Practical Application of Knowledge learned
Barangay Official 1	"Nakatulong ito ng Sobra dahil nalaman namin ang pagtapon ng maayos o paghi-hiwalay ng basura." (This helped a lot because we have learned how to dispose waste properly and segregate waste)	Informant indicated his appreciation of the seminar on waste segregation since the lecture enhanced his knowledge about waste management	Knowledge Generation
Barangay Official 2	"Nagpulong na rin kami sa barangay patungkol sa solid waste management pero mas naliwanan pa kami sa mga narinig namin tungkol sa paraan ng pagrecycle at com-posting." (We also had a meeting in the barangany about	Informant claimed he had prior knowledge about waste management, but he expressed to have learned more from the seminar extended by the COED	Knowledge Generation

Practical Application of Knowledge Learned

The importance of communicating or explaining waste segregation to the household managers is shown in the response of Mother 1. Successful implementation of the Solid Waste Management Plan (SWMP) entails talking about it to mothers who are usually the ones left at home to manage the household waste. This means that the outcome of the seminar is the practical application of the knowledge learned. The participants of the study started to segregate their waste and disposed them properly.

Knowledge Sharing

Another effect of the seminar on waste management was the knowledge shared to the participants. A barangay official admitted that Solid Waste Management is one of the mandatory programs that must be enforced in the community and they had taken this up in the council. However, his knowledge increased even more when the COED extensions had provided seminar to them. Mr. Jayson Punzalan and Prof. Evelyn Patio, COED faculty rendered lectures on Waste segregation. The participants of the SWMP seminar mostly agreed that before, they burned their waste in their backyard, together with dried leaves. But after their seminar, they stopped burning their waste.

Over-all, the seminar extended on waste management, not only benefited the school personnel but the community as well. The school started to provide waste bins with labels. Mothers also learned how to manage their waste at home. Barangay leaders increased their knowledge on SWMP.

Another seminar provided to Laungcupang community is entitled "What to Do During a Calamity." Table 7 shows the result of the interview.

Table 7. Feedbacks from Interview on the Seminar About "What to Do on a Natural Calamity"

Respondent	Informant's Answer	Formulated Meaning	Theme
Barangay Official 3	"Mas nagkaroon ako ng praktikal na kaalaman sa mga dapat paghandaan bago ang sakuna, sa araw ng sakuna at maatpos ang sakuna. " (The more I had acquired practical knowledge in what to do before, during and after a natural calamity.)	Informant expressed that he has acquired practical knowledge on what to do before, during and after a natural calamity.	Knowledge Acquisition
Barangay Official 4	" Madalas mabaha ang La Paz. Salamat sa kaalaman na ibinhagi sa amin dahil marami akong natutunan patungkol sa paghahanda sa sakuna." (Laz is always flooded. Thank you to the knowledge shared to us because I have learned a lot on what to prepare before a natural calamity.)	Informant was thankful of the seminar because he has learned about what preparations must be done in anticipation of a natural calamity.	Knowledge Generation
Mother 3	"Salamat sa mga taga TSU sa pagbahagi sa amin tungkol sa kung anu-ano ang gagawin sa araw ng sakuna." (Thank you to those from TSU who came to share to us about what to do during the day of natural calamity.)	Informant was l thankful to the seminar they had on what to do during natural calamity because she learned something about it.	Knowledge Generation

Knowledge Generation

The theme extracted from the respondents' feedback is knowledge generation. This means that the participants had broadened their know-how about the preparations needed before a natural calamity, such as during announcement of a coming super typhoon; what to do during a natural calamity and what to do after a calamity. The speaker emphasized the advantage of preparation and readiness and the need to evacuate, if needed, to ensure their safety and security.

Table 8. Feedbacks from Interview Conducted Among the Beneficiaries on the Seminar About "Energy Conservation"

Respondent	Informant's Answer	Formulated Meaning	Theme
Barangay Official 5	"Nakatulong sa amin ang naibigay na pagtuturo tungkol sa pagtitipid ng enerhiya. Nagagawa naming sa bahay at sa barangay." (The teaching on how to save energy was helpful. We do it at home and in our house.)	The informant claimed that he learned from the lecture on energy saving and he was able to apply them at home and in the barangay hall.	Knowledge generation Knowledge application
Barangay Official 6	"Noong naisagawa naming sa aming bahay ang mga natutunan naming patungkol sa pagtitipid ng kuryente at tubig, naobserbahan ko mejo bumaba ang aming binabayaran buwan-buwan." (When we applied what we learned about conserving electricity and water, I observed that our monthly bills were lowered.)	The informant was glad that they had lower bills on electricity and water when they applied the energy saving tips from the seminar.	Knowledge application Reduction of bills
Youth 1	" Naintindihan ko na ang kahalagahan ng pagtitipid ng kuryente at tubig. Lagi kaming pinagsasabihan sa bahay na magtipid para hindi tumaas ang bayarin sa kuryente. Ngayon nakakatulong ako sa pagtipid ng kuryente at tubig sa amin." (Now I understand the importance of saving on electricity and water. We were always told at home to save to avoid high bills. Now, I am able to help save on current and water).	Informant claimed he now understands the importance of saving on current and electricity. He also expressed that he is now able to help save current and water at home.	Knowledge generation
Mother 1	"Matipid kami sa paggamit ng kuryente. Ang tubig naman naming ay galling sa poso. Pero mas nakatulong pa sa aking kaalaman ang mga natutunan naming." (We are good in saving current. As to water, we get it from the well. But the seminar on energy conservation had helped us a lot.)	The informant claimed the seminar added to her prior knowledge about energy conservation	Practical Application

Based on the results from the interviews conducted with various participants, there were three themes generated which were "knowledge generation," "knowledge application," and "reduction of bills." These were the effect of the seminar on energy conservation provided to the participants.

Lastly, for environment development, COED also helped in tree planting in the community. Seedlings were donated from partner agencies and individuals.

It was in August 26, 2013, Prof. Evelyn C. Patio, Dr. Remedios D. Facun, Dr. Rosalina C. Garcia, Mr. Jayson Y. Punzalan, Dr. Cynthia G. Quiambao and the Officers and members of the Association of Future Science Educators (AFSE) conducted a Tree Planting Activity at Brgy. Laungcupang, La Paz. Tarlac. Fifty fruit-bearing trees were planted and gardening tools were donated to Laungcupang Elementary School.

The school campus looked more vibrant and refreshing compared to the time that there were few plants in the area.

2.3 Livelihood

Aside from educational seminars for the teachers and seminars on environment development, the extension of COED also included livelihood trainings in an attempt to equip interested community members, especially the mothers with income generating skills.

Cosmetology, Spa, Manicure and Pedicure

Women were taught with basic cosmetology, hair and foot spa, manicure and pedicure. Prof. Lourdes S. Briones also conducted SWAK (Self-Working Activity Knowledge) na Pangkabuhayan – Hair Spa among the members of the Parent-Teacher Association on September 23, 2013.

The trainer discussed the benefits and the precautionary measures in doing Hair Spa. There were fourteen participants in the said activity. Members of the Educators of Technology and Livelihood education were present and assisted in the demonstration of Hair Spa. On September 30, 2013, the demonstration on Hand Spa and Foot Spa was also conducted by Prof. Briones. The activity dealt on the discussions on the use and maintenance of tools and equipment used in giving hand spa and foot spa and hands-on in the performance of the hand and foot spa.

Mothers who attended the SWAK training used their skills to earn. All the twelve learned some tips in manicure and pedicure to the trainer. Dr. Carmelita R. Herrera, students and members of the Educators of Technology and Livelihood Education were also present during the training to demonstrate and assist parents in doing manicure and pedicure. They went house to house in the community for hair and nail services. Nobody put up parlor since they did not have money to use to erect one. According to Mother 8:

"Nagamit ko ang aking kaalaman sa SWAK upang kumita.Pumupunta ako sa mga baha-bahay."
(I used the skill I learned from SWAK to earn money. I went house-to-house).

Processing of Available Ornamental Plants

Mr. Joseph M. Melegrito and Mr. Judeo R. Herrera trained twenty-four male intermediate pupils of Laungcupang Elementary School in the Processing of Available Ornamental Products on September 9, 2013. The trainers discussed the principles of designing a bamboo and demonstrated the making of bamboo crafts.

The intermediate pupils learned the skill of project development. They were able to do arts using bamboos.

Okra and Labong Burger

Mothers were trained to make okra and labong burger. Although the training on okra and labong burger did not prosper as a business in the community, mothers were able to cook one for the family. They learned that these vegetable burgers were more nutritious than the meat burgers.

2.4 Community Development Seminars

As to the extension on community development, Table 9 shows the evaluation of participants.

Table 9. Evaluation of the Community Development Seminars

Seminar/Training	Participants	Weighted Mean	Verbal Description
Youth empowerment support	Youth (50)	3.71	To a great extent
Good Governance for peace and progress	Barangay officials and Barangay police (10)	3.67	To a great extent
Public Service reform	Barangay officials (7)	3.65	To a great extent
Consumer rights welfare seminar	Parents (50)	3.60	To a great extent
Grand Mean		3.66	To a great extent

Based on the data in Table 9, seminars on community development were accepted positively by the beneficiaries. More specifically, the seminar on youth empowerment gained a mean of 3.71 which has a verbal description of "to a great extent. "The participants acknowledged the knowledge they have acquired helped them understand the role in community development.

Mr. Ian Carlo T. Feliciano served as a speaker in the seminar "Youth Empowerment Skills and Practice" among the Out-of-School youths of Brgy. Laungcupang on January 27, 2014.

Mr. Christopher Ronn Q. Pagco emphasized in his talk among the Out-of School Youths on Voices Against Corruption and Advocacy towards Transparency on January 27, 2014.

As to the seminar on good governance for peace and progress, the participants claimed this has helped them to a great extent (3.67). Dr. Nicanor C. Caingat served as a Guest-Trainer among the Barangay Officials and Barangay Police in Laungcupang last March 17, 2014. Dr. Caingat lectured on integrity, honesty and transparency as the key elements in becoming good leaders in the community.

Moreover, seminar on consumer rights was provided to the participants by Mr. Jose Angel Zabala. This gained a mean of 3.60, which means that it has helped the participants to a great extent.

Over-all, the seminar of good governance was met positively as shown by a grand mean of 3.66.

2.5 Health Intervention Seminars and Youth Dynamism Activities

To add to community development, the COED also provided health intervention seminars and activities to contribute to youth dynamism.

2.5.1 Seminar on Parasitism

One of the programs that DepED had directed the principals to implement is deworming and feeding program. So, the COED deemed lecture on parasitism relevant to the pupils.

Dr. Alma M. Corpuz discussed a seminar on Endoparasitism "Iwas Bulate Tungo sa Mas Malusog na Pangangatawan at Kaisipan," on Septeber 30, 2013. She emphasized on the sources, pathogenesis and prevention of endoparasite infection. Thirty-six pupils of Laungcupang Elementary School participated in the seminar. Another seminar was conducted in the afternoon by Dr. Cynthia G. Quiambao on Ectoparasitism " Iwas Kuto Para Tumalino", by which the discussion covered the sources, pathogenesis and prevention from ectoparasite infestation. Both of the trainers distributed slippers and comb for nits (suyod) among the pupils of laungcupang Elementary school.

Pupils were attentive while Dr. Corpuz taught them the possible sources of parasites. Pupils were asked if they walk barefoot; swim in rivers; or wash their hands before eating.

On the Other hand, Dr. Cynthia G. Quiambao lectured on ectoparasitsm because pupils were observed to have teeming head lice. After the lecture of Dr. Corpuz and Dr. Quiambao, pupils received slippers and fine-toothed comb.

Pupils were happy to have new slippers after the lecture. They were also given suyod so they could regularly remove lice every after taking a bath.

2.5.2 Supplemental Feeding Program

DepEd Order No. 87, series of 2012 directing all schools to implement feeding program for the malnourished pupils. The COED requested for a list of pupils who were wasted and severely wasted. They were subjected to a feeding program for one month.

Table 10. Nutritional Status of the Pupils in LES

Before the Feeding Program			**After the Feeding Program**		
	f	%		f	%
Severely Wasted	13	22	Severely Wasted	0	0
Wasted	46	78	Wasted	3	5
Normal	0	0	Normal	56	95
Total	59	100	Total	59	100

Data in Table 10 show the number of pupils who were undernourished based on the computation of their body mass indices (BMI). There were 59 pupils who were undernourished. These pupils had undergone feeding program. Before the feeding program, fecalysis was performed and deworming was conducted to make sure that intestinal parasites will not compete with the nutrient intake of the pupils.

Part of the feeding program was vitamin supplementation to ensure that pupils are given vitamins they need to gain normal BMIs. COED students and faculty donated to provide the vitamins to the pupils.

2.5.3 Medical and Dental Mission

Medical and dental mission was a part of the extension activities in Laungcupang. The medical and dental clinic staff of TSU went to the community to perform tooth extraction and medical check-up. The medical and dental mission was attended by the TSU doctors and nurses.The Rotary Club of Tarlac donated medicines and vitamins also to the community. Antibiotics were also given to the patients. There were 100 adults and 100 children in the community who benefited from the medical and dental mission.

2.5.4 Other seminars conducted

Seminars were also provided on Gender and Development, Social Interaction Strategies and values formation. The evaluation of the implementation of these activities are shown in Table 11.

The participants of other seminars that were relevant to the community had been regarded to have helped them to a great extent since computed means had verbal descriptions of "to a great extent."

The seminar on GAD was given by the TSU GAD Director Dr. Rita E. Pulmano who explained to the community participants about gender equality and respect of gender preferences.

It was on February 24, 2014, that Dr. Rita E. Pulmano discussed Gender Orientation and Sensitivity among the community members of Brgy. Laungcupang, La Paz, Tarlac.

Table 11. Evaluation of the Community Development Seminars

Seminar/Training	Participants	Weighted	Verbal Description
Gender and Development	Community	3.56	To a great extent
Values formation in the community	Parents, teachers and youth	3.54	To a great extent
Development of Social Skills and Constructive Dialogue and	Community	3.53	To a great extent

Aside from GAD seminar, values formation was also discussed. Then Dr. Niño B. Corpuz tackled on the Development of social Skills among the community members of Brgy. Laungcupang last March 3, 2014.

Lastly, Prof. Louella C. Capitulo discussed among the Barangay Officials of Laungcupang about the Constructive Dialogue and Assessment on the Effectiveness of Barangay Activities last February 17, 2014. The participants were enlightened on what are the criteria in holding constructive development and assessment.

3. Best and Weak Practices or Lessons Learned

Based on the evaluation of the programs extended by the COED to Laungcupang community. There were best practices which surfaced. These are summarized in Table 12.

Table 12. Best Practices of COED Community Extension

Practice	Indicator
Leadership	The COED extension chair was able to plan programs that the community needs based on the needs assessment survey. She was able to distribute extension assignments to appropriate faculty whose expertise were aligned to the service needed. She was able to motivate the school head and barangay leaders to actively participate in the programs.
Support (Human and Material)	The materials and budget needed to carry out seminars and training were adequate. The dean of the COED strongly supported the implementation of the programs. Communication requests were approved or were promptly recommended to higher authorities for immediate approval. TSU Management provided transport to the COED Faculty who extended support.
Monitoring	The extension programs were properly monitored. The extension chair had tapped faculty and student leaders who were willing to assist in coordinating every activity.
Community Response and Participation	The School principal was very keen on the needs that they must to provide as a counterpart to the COED provisions. The brangay captain effectively lead the community to join the seminars.
Linkage and Network	The COED extension program was not only funded by TSU management but also by partner agencies such as the Rotary Club of Tarlac and the Philippine Association of Medical Technologists. There were also private individuals who donated for the feeding program.

As reflected in Table 12, COED community extension programs in Laungcupang were generally successful because of five best practices. Leadership was strong since the extension chairman developed a plan based on the needs identified in the needs assessment survey.

Moreover, there was an adequate support from the TSU management. The dean of COED was prompt in approving communications to facilitate activities.

Support were provided by partner agencies such as the Rotary Club of Tarlac, the Philippine Association of Medical Technologists and private individuals.

There was community participation who were always present in any program or activity. The principal of the school was very sensitive to the help that the COED needs to conduct every activity.

Moreover, there was effective monitoring of the programs. Volunteer faculty members and student leaders were there to help in the coordination of activities.

However, there were factors that affected the successful acquisition of the objectives of the livelihood program. Table 13 shows the weak practices.

Table 13. Weak Practices of COED Community Extension
(Lessons Learned)

Practice	Indicator
Provision of capital to start livelihood	No business was put up , except for house-to-house manicure and pedicure.
Transfer of knowledge and skills acquired.	Teachers , mothers, barangay leaders and youth failed to transfer the knowledge they learned to other community members or nearby barangay residents who did not attend any extension.

One of the objectives of the livelihood programs conducted was to see some participants put up small business in the community. However, they did not have the capital to start one. TSU extension mostly focus on knowledge transfer and skills training but not on provision of capital to start business.

In addition, the participants who were trained by the COED faculty members failed to share the knowledge and skills they acquired to other people within the barangay or to nearby places.

Table 14 shows the Issues/Challenges in the Implementation of the extension program in the community.

Table 14. Issues and Challenges in the Implementation of the COED Community Extension

Issues/Challenges	**Indicator**
Lack of Capital to start a business out of the livelihood skills training.	No business was put up.
Some mothers expected to join programs on community clean-up drive did not attend.	Only few mothers attended
Some community members were only present when there were goods provided by the extensionists or only during free medical-dental checkup but were absent during seminars.	Few attendees on seminars

Data in Table 14 show that parents who were taught livelihood skills wanted to put up business but were unable to do so because there was no capital provided. In addition, some parents expected to help in community clean-up drive did not show up. Moreover, some parents were only present when there were goods distributed or free medical-dental check up and free medicines.

4. Implications and significance of the Findings to Community Extension

The findings of the impact evaluation show that the extension services provided helped the community members in three ways: knowledge and skills acquisition; application of the knowledge and skills acquired; and lowering of expenditures as a result of application of the knowledge and skills acquired. The success of the extension programs conducted is attributed by strong leadership and support from the adopting school. Likewise, there were external linkages and network which were also sources of the funds and materials needed to implement a program or activity. Moreover, the faculty members who extended support had positive attitudes and they were so passionate about the voluntary services they extended. Their enthusiasm had been felt by the community members which was positively reciprocated.

Community extension services may model the best practices that were seen in this study. Indeed, for extension to be successful, people providing the help and assistance must show their genuine concern and burden to help the unfortunate. They must have the heart to contribute knowledge and skills to the community members.

Moreover, to develop a community, there must be adequate support in terms of experts and material resources. Schools must not only rely on their resources but must be able to facilitate linkage and network with external agencies which can help the community in terms of providing other resources that would help community beneficiaries use their knowledge and skills for gainful activities.

The study is significant since the findings and recommendations would serve as models for future extension program/services delivery. Insights from the study will guide future extension program development, implementation, monitoring and evaluation. The inputs will substantially improve community development efforts.

CONCLUSIONS

1. The extension programs implemented in Laungucupang community were varied and based from the needs assessment survey. Programs focused on seminars given to teachers to enhance their teaching strategies and classroom management; environment development which comprised seminars on waste management and

tree planting; seminars to develop the community; livelihood training on cosmetology, hair spa and making okra and labong burger; and health intervention programs that included health education, supplemental feeding and medical and dental mission.

2.The seminars helped the participants to a great extent in three ways. They acquired knowledge; they were able to apply the knowledge they acquired; they cut on cost or expenses at home , particularly on electric and water bills.

3. The COED community extension was generally successful because of best practices to include strong leadership, adequate support, effective monitoring, good community response and participation, and strong linkage and network. However, COED must work out its linkage with government financial institutions in order to help facilitate capital loans to start livelihood business in the community. In addition, the participants whom the COED faculty members trained failed to transfer the knowledge and skills they acquired.

RECOMMENDATIONS

1. COED must partner with TESDA and government financial agencies to help community members acquire capital for business through loans.

2. COED must emphasize the need for trainers to share the knowledge and skills they acquired to other members of the community and in nearby barangays within the municipality. The extension service program must provide an enabling environment which will train the trainees to become trainers as well. There must be extensive workshop, training and exposure of community people who show potential indicators to become trainers. They must be fully supported by the extensionists.

3. Further study must be conducted to look into the outcome of the good governance training.

4. Impact of training to pupils must be evaluated again to analyze long term effects to them.

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FOOD AND DRUG ADMINISTRATION-LICENSE TO OPERATE (FDA-LTO) CONSULTANCY PROJECT-TECHNICAL ASSISTANCE ON FDA-LTO DOCUMENTATION AND APPLICATION FOR MICRO FOOD ENTERPRISES OF TARLAC CITY - *Best Paper*

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Abstract

"FDA-LTO Consultancy Project" generally intends to provide technical assistance and guidance to micro food enterprises to prepare for License to Operate registration which is a legal requirement for food processors to comply. Such provided challenges among micro food processors due to lack of technical know-how on the preparation of requirements and the process of application itself. Thus, this extension project was implemented. It utilizes a multi model teaching approach specifically designed for the selected five (5) partner-beneficiaries as a pilot group. Customized write-shop modules are also developed and employed to guide them in the completion of the requirements for registration. These include among others, the business documentary requirements, the sanitation, production and quality policies, program and procedures and the needed records to be generated. Facility assessment is likewise provided which prepares the processing facilities of the partner-beneficiaries for the inspection. Continuing coaching and mentoring activities are provided to ensure readiness of the partner-beneficiaries. These boost out the confidence among the firms to proceed on their application and are all now on the pipeline for inspection.

Keywords: *license to operate registration, micro food processors, FDA-LTO requirements, business documentary requirements, compliance to FDA*

INTRODUCTION

According to the World Health Organization (WHO) unsafe food poses global health threats, endangering everyone. Infants, young children, pregnant women, the elderly and those with an underlying illness are particularly vulnerable. An estimated 600 million – almost 1 in 10 people in the world – fall ill after eating contaminated food and 420 000 die every year, resulting in the loss of 33 million healthy life years (DALYs).

In the Philippines, statistics from the Department of Health showed that in 2017 around 44,012 cases of food and water borne diseases were recorded. It comprised of 52.71% typhoid fever cases, 43.15% acute bloody diarrhea cases, 2.84% rotavirus cases, 1.01% Hepatitis cases and 0.30% cholera cases. Common causes of these diseases are unsafe sources of drinking water, improper disposal of human waste, unhygienic practices and unsafe food handling and preparation practices.

These alarming cases of food and water borne diseases speak for the need to further strengthen the implementation of food safety control system not just in the international context but more so on national and local levels. In order to reduce the incidence of such food associated illness, contamination of food with hazards such as Salmonella, Campylobacter and Listeria monocytogenes must be prevented, reduced and / or eliminated. This can be achieved through the implementation of effective food safety practices and controls (D. Bolton et.al,2015).

In the Philippines, food safety control system on national context includes accreditation and inspection under the Food and Drug Administration (FDA) for processed foods. This is to ensure that protection of consumer interest, prevention of adulteration, misbranding and fraudulent practices are controlled and food safety and quality problems are prevented. Under the FDA, as regulatory body, food manufacturers, traders and re-packers are mandated to apply for License to Operate (LTO). This LTO registration is also a pre-requisite for food manufacturer to acquire FDA Product Registration. As required by regulation implemented by FDA, no food products are allowed to be sold for public consumption from food manufacturers, traders and re-packers which are not registered to FDA. However, the actual scenario portraits that FDA LTO registration is mostly availed by small and medium food enterprises only and least by micro food enterprises who significantly comprised the food industry in the Philippines.

According to an interview at the Department of Trade and Industry-Tarlac (DTI), an estimated 5% of the DTI- registered food manufacturers, traders and re-packers have already acquired FDA –LTO registration. The 95%, which mostly comprise of micro food processors, are having different challenges and having a hard time to submit their business for LTO registration due to lack of technical know-how on the compliance of the requirement. This according to them negatively impacted to the marketability of the processors' products despite their market potential.

In response to this, different interventions like provision of GMP and other food safety related seminars, financial assistance for product analysis and coaching and mentoring activities were initiated and conducted by government agencies such as Department of Trade and Industry and Department of Science and Technology in collaboration with other government institutions like Tarlac State University in order to assist them in the acquisition of FDA – LTO registration. Despite these efforts, still, a high number of food processors have not acquired their license to operate registration yet.

Hence, a needs assessment in order to determine the reasons for the said status of food processors in terms of acquiring LTO was conducted by the Tarlac State University. Findings suggests that the primary needs of the food processors include technical assistance in the preparation and application for LTO application, customized and participatory capacity building on the preparation of documentary requirements, orientation on the process and requirements for FDA – LTO application and awareness on the facility requirements vis-à-vis FDA requirements.

Thus, an innovative approach or methodology of the conduct of the seminars and writeshop, customized modules with short lecture only and more on outcomes-based focus activity are identified to be the foundations of a program/project that could easily assist the food processors in obtaining their FDA-LTO registration. Ergo, to complement efforts of other government agencies in support to the implementation of the statutory and regulatory requirements in food processing and to address the needs of the partner-beneficiaries, this project on FDA-LTO registration consultancy to provide technical assistance on the documentation and application of micro food enterprises of Tarlac City, was conducted under the Industry-Academe Partnership of the University.

OBJECTIVES

1. Project generally aims to guide and assist selected micro food enterprises of Tarlac to comply with the legal requirements of Department of Health–Food and Drugs Administration on License to Operate certification through multi-model teaching approach. Specifically, this project aims to:

2. Provide technical assessment on the needs and gaps of micro enterprises to comply with the registration and certification requirements

3. Provide extension interventions to addressed the gaps and serve the needs of the micro enterprises on the preparation, application and implementation of the requirements of the accreditation and/or certification bodies which may include the provision of seminars, write-shop activities and coaching and mentoring sessions

4. Provide technical advices and guidance to food enterprises in the process of their application for registration and certification

5. Identify potential linkage/s funding support for food enterprises

6. Develop and copyright modules related to food safety and quality

7. Document approaches and challenges on the delivery of consultancy services to food enterprises; and

8. Provide avenue for research and industry immersion of the faculty members and food technology students.

METHODOLOGY

Training cum Consultancy Services on Documentation, Implementation and Registration Course for Food MSMEs of Tarlac City is basically a multi model teaching approach specifically designed for food micro

enterprises that wish to apply for LTO certification to FDA. It provided a hands-on learning experience for partner-beneficiaries as it was generally applied "learning by doing approach" in the on-line application process, preparation and implementation of the requirements for LTO certification such as but not limited to Good Manufacturing Practices (GMP), Sanitation Standard Operating Procedures (SSOP), Quality Control Standard Operating Procedures (QSOP) and Production Standard Operating Procedures (PSOP). Teaching approaches included were the provision of short lectures, write shops and activities, coaching and mentoring sessions and on-line and one-on-one consultancy activity.

The project generally provided technical assistance and guidance to micro food enterprises to prepare and successfully passed the LTO certification by FDA which is a legal /mandatory requirement for food processors to comply. This is likewise supporting the implementation of the RA 10611 or the Food Safety Act of the Philippines.

The project comprised of three phases: (1) Pre-certification and Pre-registration Phase (2) Certification/Registration Phase; and (3) Post Certification/Registration Phase.

Phase 1. Pre-registration Phase. This phase was the preparatory stage and covered about 60% of the total project deliverables. It focused on the preliminary activities such as assessment and identification of gaps from the requirements. This phase also covers the provision of multi-model teaching approaches such as short lectures, write shops, activities and coaching and mentoring activities to address the identified gaps in the facility layout, documents, required production and quality assurance process and records. More so, during this phase partner-beneficiaries were guided to process their on-online application and uploading of the requirements. Finally, in this phase they were assisted on the on-line follow up and monitoring of the status of their application until they received their notice for inspection/ audit.

Phase 2. Registration Phase. Those who successfully completed the Phase 1 of the project proceeded to the second phase. In this phase, partner-beneficiaries were given technical support during the time of certification audits on technical areas which might not be easily understood by the partner-beneficiaries when raised by the auditors/inspectors. Finally, during this phase, they provided help to interpret the findings of the auditors and in the development and implementation of the corrective actions, where applicable.

Phase 3. Post Registration Phase. This phase covered the monitoring and evaluation of the installation and/or implementation of the approved corrective actions of the firms. The phase covered the documentation of the project implementation which included the preparation of the terminal report. Submission of the reports to UESO and the partner-beneficiaries was done during this phase. Finally, modules were finalized and submitted for copyright application.

STRATEGIES OF IMPLEMENTATION

A. Partner-beneficiaries

This project was piloted to five (5) micro food enterprises of Tarlac who seek assistance on FDA LTO during the first Coffee and Collaboration activity of the Office of the Vice President for Research and Extension. These are as follows:

They were selected based on their commitment to submit their firms to FDA for certification and their financial capacity to take part on the project implementation as this undertaking entails some investment on the part of the micro enterprises.

B. Program Management

The projected was implemented by the College of Science which be administratively headed by the Dean, Prof. Mary Jane N. Rigor and technically supported by UESO. Project Leader, Project Co-Leader

and Team members were comprised of the following attached and full-time faculty members of the Department of Food Technology:

Role	Name of Faculty	Duties and Responsibilities
Project Leader	Dr. Lea B. Milan	Overall project coordination; ensures delivery of service based on approved proposal and work plan; ensures proper documentation and timely submission of reports /outputs; Reviews Modules and Writeshop Materials Serves as Consultant, Lecturer and Lead Facilitator on QSOP
Project Co Leader	Mr. Aljon Lusong	Serves as lecturer and consultant and Lead Facilitator on GMP Implementation and On-line Application Processing Prepare ad submit Post Activity Reports
Project Member	Ms. Mary Katherine Apolonio	Assist the project leader in project coordination and monitoring; Properly document the project implementation; Serves as lecturer, consultant and lead facilitator on SSOP
Project Member	Ms. Leah T. Matias	Serves as lecturer, consultant and lead facilitator on PSOP Prepare ad submit Post Activity Reports
Project Member	Ms. Kristine Mae Pagala	Serves as lecturer, Lead Facilitator and consultant and on GMP Implementation and On-line Application Processing Prepare ad submit Post Activity Reports
Project Member	Philippine Association of Food Technologists, Chi Chapter	Facilitators

C. Project Monitoring and Evaluation

Monitoring was done through the following guidelines set by UESO in submitting progress reports for long term projects. Work plan was reviewed every month by the project team leader vis-à-vis actual accomplishment. Re-planning was done as the need arise with justifiable reasons. On the other hand, evaluation of the project was done through UESO.

DISCUSSION/INNOVATION

1.**Pre – service Activity.** Focus Group Discussion (FGD) with the representative/s of various partner beneficiaries and the project team conducted, presented and discussed the Service Contract, Project Work plan and Mutual Non-Disclosure Agreement. It was found acceptable by both parties and signing of scheduled served as the basis on the start of the project implementation (Appendix A: FDA – License to Operate Needs Assessment Form)

2. **Assessment of the Partner-Beneficiaries vis-à-vis FDA Requirements.** Assessment of the existing system of the firm were done through firm visits, observation, document reviewed and interviews. Results of which were analyzed based on the requirements of FDA on LTO certification. Recommendations were drawned based on the analysis. This was documented through an Inception Report prepared by the project team. Copies of which were submitted to UESO and the firm beneficiary (Appendix B: GMP Compliance Checklist for Micro and Small Food Processors)

3. **Preparation of Modules and Write- shop Materials.** In reference to the inception report, necessary modules and write shop materials were prepared by the members of the project team based on their specific areas of concern. This was presented in FGD of the project team for additional inputs and to aligned the modules for each areas of concern (Appendix C: SSOP, QSOP, PSOP Modules).

4. **Conduct of short lectures and writeshop/activities.** Based on the prepared modules, conduct of short lectures and writeshops were scheduled with the firm beneficiaries. Common time was set and conducted at UESO Training Room at Villa Lucinda Campus. Lecture was delivered in light – informal setting and

break-up sessions were done during the writeshops. Depending on the topic, one of the members served as the lecturer and the other members served as Lead facilitators during break-up sessions together with the members of the PAFT. This ensured that each firm were properly guided during the writeshops as they prepared the actual documents needed for their application process. Take home assignments was provided, as the need arises, which was submitted as agreed (Appendix D: Photos of Actual Lecture and Appendix E: Sample of documented FOOD SAFETY MANUAL)

5. Firm Visits. Firm visits were scheduled twice a month during the Phase 1 and as the need arise to monitor and check documents and records and to ensure proper implementation of the recommendations. Coaching and mentoring were done during firm visits. Schedules was agreed based on the availability of the firm and the project team. Team member/s visited the firm was determined based on the needs and/or areas of concern. Post Activity Reports was submitted by team members to the project leader after each visit as reference in the preparation of the terminal report (Appendix F: Photos of Existing and Proposed Layout)

6. Provision of Technical Assistance on On-line application and Uploading of Requirements. Actual on-line application was facilitated by the team at TSU. Assistance from MISO will be sought for the use of available computers with reliable internet connection to ensure successful completion of the online application (Appendix G: Captured User Account and Password from FDA E-Portal)

7. Post Service Activities. This involves the preparation of the terminal reports, finalization of the modules and packaging of the approaches applied in the delivery of the service. The team will seek assistance from TTDCO for the application of copyright of the modules (Appendix H: Random Signed Extension Post Activity Report).

CONCLUSIONS

"FDA-LTO CONSULTANCY PROJECT "– Technical Assistance on FDA License to Operate documentation and application for micro food enterprises of Tarlac City, generally concluded to be used as an alternative approach of providing extension and technical services for MSME's FDA-LTO Registration acquisition. In addition, the following are concluded:

1. Awareness and familiarization of the MSME's on the FDA – LTO Compliance is achieved and realized as a target of every manufacturer towards Food Safety;

2. Upon orientation and assessment conducted by the team it is shown that MSME's has insufficient know-how of the FDA-LTO Registration Certification;

3. Identification and determination of information gap on the FDA – LTO compliance by the MSMe's;

4. Intervention on Food Safety Practices and Implementation was suggested and supplemented by the team to the MSME's as opportunities for improvement;

5. Conducted and introduced an innovative approach or methodology of the seminar and lecture series directly with output generation through writeshop, customized modules with short lecture and more on one on one consultation by the faculty;

6. Output generations by the MSME's created were the following: Sanitation Standard Operating Procedure Manual, Production Standard Operating Procedure Manual and Quality Standard Operating Procedure Manual respectively;

7. MSMEs developed a level of understanding on their own assessment of the setting and conditions of their in house practiced food safety implementation as compared with the regulatory standards;

8. The project may provide an avenue for research and industry immersion of the faculty members as well as food technology students as form of assistance and service under the Industry Development Extension;

9. The multi model teaching approach able to maximize faculty members in developing customized modules related to food safety and quality.

RECOMMENDATIONS

With the above discussions and conclusions, the following are recommended;

1. A target of 100% awareness, registration and compliance of the MSME's in the province regarding FDA – LTO certification;

2. Formulation, development and validation of FDA – LTO requirements and procedures promoting and implementing Food Safety among MSME's;

3. Develop and enhance the prototype model of FDA – LTO Certification Consultancy and Assistance Project to other food safety related pre-requisite programs such as Good Manufacturing Training and Certification, Certificate of Product Registration, Hazard Analysis and Critical Control Point towards International Food Safety Certification.

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EXTENSION– STRATEGIC NEEDS ASSESSMENT (SNA) FOR MICRO, SMALL AND MEDIUM ENTERPRISES (MSMEs)

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Abstract

Micro, Small, and Medium Enterprises (MSMEs) have a very important role in developing the Philippine economy. However, most MSMEs experienced various difficulties that, they start small and remain small not realizing their potential and full growth. This extension work explored the use of Strategic Needs Assessment (SNA) to examine performance improvement needs, undertake long-term performance improvement and identify the processes that do not add value to the selected metal manufacturing micro-cottage enterprise. Strategic needs assessment tools such as business issue worksheet, performance measure matrix, suppliers, input, process, outputs, customers SIPOC Diagram, Process Mapping, Fishbone Diagram, and Gap Analysis Worksheet were used in this extension work. The results of this extension work showed that the enterprise does not have any productivity measures to monitor labor, material and production requirements that lead to cancelled orders, unmet deliveries and uncontrolled production expenses. Thus, SNA is used to aid in the development of long-term solutions to existing performance problems and to solve problems that affect core business processes, such as order processing, product or service delivery, and product development.

Keywords: *MSME, productivity, productivity measure, Strategic Needs Assessment (SNA)*

INTRODUCTION

The selected micro-cottage enterprise located at Barangay San Roque, Lapaz, Tarlac is one of the thriving businesses in the Province. It manufactures Rice Hull "IPA" Stove and its products are being sold in the Visayas and Mindanao Region. Products are manufactured on a made to order basis. Currently, limited number of distributors is their main channel of distribution. With the quality of products and its economic benefit, sudden increases in quantity are ordered which makes it hard for the enterprise to deal, with the given existing capability of the enterprise. Hence, the purpose of this extension work is to conduct a strategic needs assessment to examine performance improvement needs linked to the business strategy, undertake long-term performance improvement or change incentives and determine processes that do not add value to the enterprise.

OBJECTIVES

The primary objective of this extension work is to help the enterprise determine its performance improvement needs in the production of Rice Hull "IPA" Stove. Specifically, it aims to:

1. Conduct Strategic Needs Assessment to determine which processes contributes to production problem, activities do not add value in the production of Rice Hull "IPA"Stove and which processes need performance improvement; and

2. Recommend techniques and/ or strategies to address the performance improvement needs of the enterprise.

METHODOLOGY

The Strategic Needs Assessment (SNA) that was conducted comprise of six (6) steps excluding the standard procedures implemented by UESO in conducting extension work. Steps are mnemonically grouped as E-I-D-A-D-S (See Figure 1 for the steps conducted).

A. *Enterprise Visit*

Upon receiving of the Notice to Proceed (NTP) and Special Order (SO) of the Extension Service Provider (ESP), the enterprise preliminary visit was conducted. The scope of extension project and Service/Commitment Contract was discussed and agreed by both parties. Series of firm visit from the month of January – May 2018 were conducted.

B. Interview

All eighteen (18) personnel of the enterprise were subjected to interview. There are fourteen (14) production workers/ welders, two (2) administrative staff and one (1) manager/owner.

The first subject of the interview was the Manager/Owner of the enterprise regarding its profile, present status and production process. The present problems being encountered by the enterprise were also asked.

The second subject of the interview process were the two (2) administrative staff of the enterprise. The first administrative staff oversees the marketing and selling of the products while the second administrative staff oversees the administration & finance aspect of the enterprise.

Quality Assurance Supervisor and the production workers/welders were also interviewed regarding their present production process. Problems being encountered in the production were also asked by the ESP.

Results of the interview were reflected in the Business Issue Worksheet as one of the tool in the conduct of SNA.

C. Documentary Review

Documentary review was conducted by the ESP to verify information gathered during the interview. Some of the records that were asked are subjected to documentary review includes the following: production and sales history, manpower and material utilization, utilities expense, material expense, equipment expense, wage expense, capitalization and other overhead expenses.

D. Actual Observation

Data gathered in the series of interview and documentary review were carefully evaluated and verified thru series of actual observation. This part of the extension work was the check and balance part between the initial findings gathered from the interviews and documentary reviews. Also, this step of the SNA reflected other important business factors which were not captured in the first three steps.

E. Data Analysis using SNA Tools

This is the most important and critical part of the Extension-SNA Project. The ESP used SNA Tools in this step to reflect the data gathered from the first four steps of this project. SNA Tools that were used by the ESP are the following: Business Issue Worksheet, Performance Measure Matrix, Suppliers, Input, Process, Outputs, Customers SIPOC Diagram, Process Mapping, Fishbone Diagram, and Gap Analysis Worksheet.

F. Strategic Needs Assessment (SNA) Report – Proposed Performance Improvement Plan (PIP)

Upon completion of the project, the Strategic Needs Assessment Report was submitted to the owner/ manager of the enterprise for his evaluation. A copy of the SNA report will be forwarded to the UESO once the partner-beneficiary provided his input on the SNA Report.

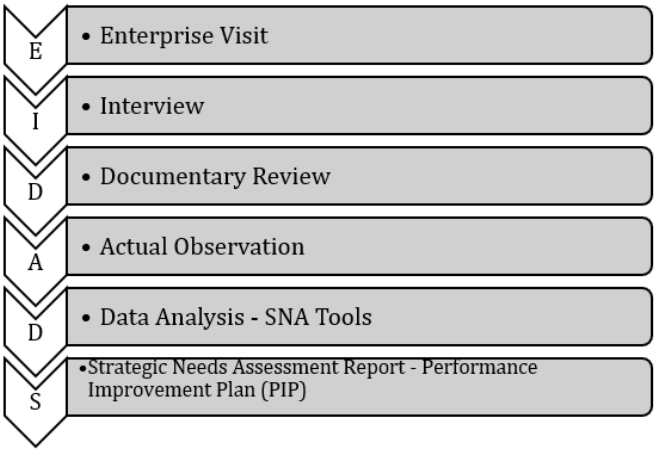

Figure 1 SNA Methodology

Figure 1 showed the Methodology used by the ESP in conducting the Strategic Needs Assessment (SNA) for the enterprise.

DISCUSSION/INNOVATIONS

I. Result of Series of Enterprise Visit, Interview, Documentary Review & Actual Observation

Table 1 Business Issue Worksheet (BIW)

Enterprise: Rice Hull" IPA" Stove Manufacturer Location: San Roque, Lapaz, Tarlac	
Questions	***Answers***
What are the key business issues that must be addressed?	a. Cannot accommodate or produce all the quantity required by customers;
	b. Unmet deadlines in the delivery of finished products. Two weeks or more lead time on the delivery of finished IPA Stove products to customers;
	c. Increased overtime costs and other operating cost.
What are the consequences of not acting?	a. Loss of customers.
	b. Long waiting/lead time may lead to cancelled orders.
	c. Due to long waiting time, customers may opt to buy substitute products or buy to other suppliers (competitors) of same product.
	d. No increase in profit.
Which business process are currently affect-ed?	a. Delivery & Sales
	b. Production & Quality Assurance
	c. Material Utilization & Management
What are the performance improvement goals?	a. Increase production of IPA Stove by 10%.
	b. Reduce order delivery time by 50%.
	c. Reduce number of rejects (currently 10%) by 5%.
	d. Reduce production costs by 10%
What prevents the achievement of business goals?	a. Lack of technical expertise on productivity measure/ assessment, monitoring and improvement;
	b. Lack of production forecasting to be used in the preparation of production schedule;
	c. Unavailability of benchmark data as basis for increasing production capacity (e.g. equipment and machine efficiency, material utilization);
	d. Unestablished time and workmanship standards in the production of IPA Stove;
	e. Lack of monitoring and testing of quality control parameters of IPA Stove;
	f. Poor production layout;
	g. Lack of knowledge on workplace ergonomics and occupational health safety; and
	h. Lack of established procedure and guideline in Product Development and Innovation.

The first SNA Tool used by the ESP to develop a better understanding of the enterprise current or future need is the Business Issue Worksheet. Results of the series of enterprise visit and interviews to all the personnel of the enterprise were reflected in the worksheet (items 1 to 4). Item 5 are based from the results of series of firm visits, actual observation and documentary review.

II. Data Analysis Tools

Table 2. Performance Measure Matrix (PMM)

Process	**Cost**	**Quality**	**Customer Time**	**Satisfaction**
Production & Quality Assurance	Average cost per unit	Number of defects produced per order/ delivery batch	Amount of orders shipped/ delivered on time	Number of returns per hundred units sold
	Direct Material Cost – Php 610.78 Direct Labor – Php 252.50	(10%) of total production per delivery batch	Average number of units delivered every delivery period (every two weeks) 68 units every two weeks (136 units per month)	No returns but common defects or problems in the use of the product and are communicated to the enterprise by the distributor; Rework/ replacement of defective parts are being addressed by the customers
Material Acquisition, Utilization & Management	**Percentage Scrap**	**Material Yield Percentage**	**Cost**	**Income/ Loss**
	29%	71%	Php 26,068 per month	(Php 312,808.50 per year)
Production Equipment & Layout	**Man-Machine Ratio**	**Travelled Distance-NPT**	**Travel Time-NPT**	**Effect of Accumulated NPT**
	4:1	168 meters per operator per unit	10.186 minutes/ operator/ unit	Unmet production cycle time

The second SNA Tool used by the ESP is Performance Measure Matrix (PMM). PMM shows performance measures that can be used to document business process activities of the enterprise. The ESP focused the performance measure of the enterprise in terms of the production and its related activities only. All personnel of the enterprise were interviewed and consulted during the preparation of the Performance Measure Matrix. Most of the concerns reflected in the PMM were brought out by the manager/owner, production/quality assurance supervisor and the two (2) administrative staff.

Table 3. Suppliers, Input, Process, Outputs, Customers (SIPOC) Diagram

Supplier	Input	Process	Output	Customer
Enterprise	Manpower (Administrative Staff)	Customer placed order	Order slip	User of IPA Stove Distributor
Enterprise	Manpower Transportation Travelling Expense	Canvassing & Acquisition of Raw Materials	Delivered raw materials Delivery receipt	Enterprise
Hardware	Empty Freon Tank GI Sheet 1.0 GI Sheet 1.5 GI Sheet 1.3 GI Pipe 4s20 GI Pipe ¾ Skytube GI Pipe ½ Skytube Round Bar 3/8 Angle Bar 1/4x1 Round Bar 1/4 Welding Rod Equipment Machinery	Production	List of number of IPA Stove to be produced	Marking & Tracing Process/Personnel
		Marking/ Tracing → Cutting	Marked and Cut Work in process	Drilling and Bending Process/Personnel
Enterprise		Drilling ⇢ Bending	Drilled and Bended WIP	Welding Process/ Personnel
Hardware		Welding/ Assembly	Welded WIP	Finishing, Painting, Drying & Storing Process/ Personnel
Enterprise	High Heat Paint Ordinary Silver Paint Blower Adaptor Manpower Equipment Machinery	Finishing → Painting → Drying → Storing	Finished Product Rice Hull IPA Stove	Shipping Process/ Personnel
Enterprise	Finished IPA Stove	Shipping		Distributors Walk in clients Other clients

The third SNA Tool used by way of the ESP is SIPOC Diagram. This tool displays the system view of the production of Rice Hull "IPA" Stove and is beneficial for discovering out and documenting the inputs, outputs, and workflows of a unique process.

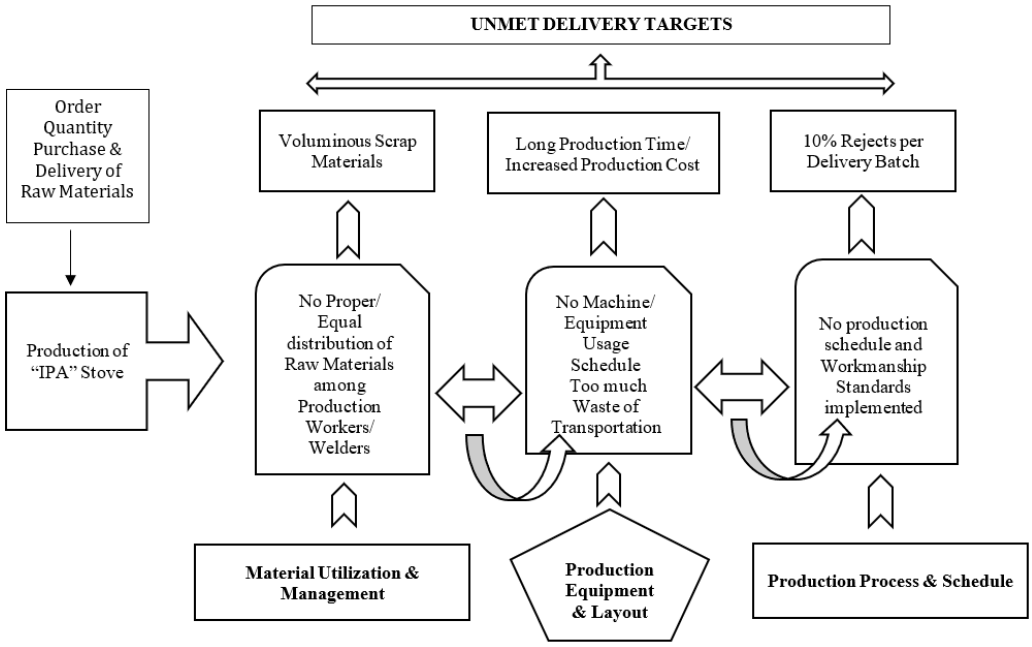

Figure 2. Production of Rice Hull" IPA" Stove Process Map

The fourth SNA Tool used by the PEC is PROCESS MAP (PM). As depicted in the figure, all activities related to the production of Rice Hull "IPA" Stove are reflected to see where or what activities contributed the performance gaps or non-value adding activities that resulted to waste, increased production cost, and product rejects.

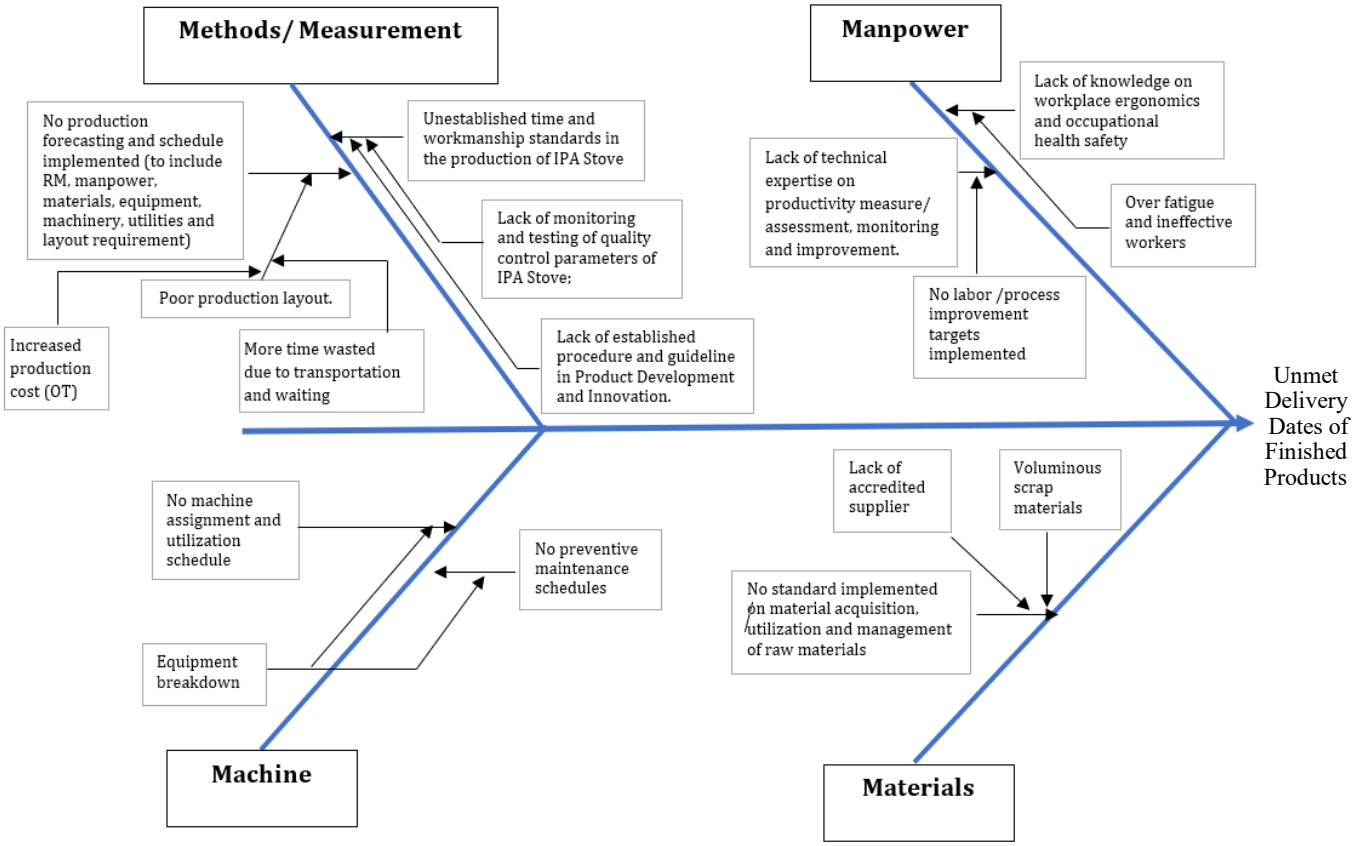

Figure 3. Fishbone Diagram (FD)

The fifth SNA Tool used by the PEC is Fishbone Diagram (FD). Fishbone diagram is used to uncover the root cause of the performance gaps or problems the enterprise thus leading to the development of solutions to address the long-term performance improvement needs of the enterprise. As seen in the figure, the result shows the relationships among identified and potential causes of the problem on unmet delivery dates of finished products.

Table 4.Gap Analysis Worksheet (GAW)

Firm/ Enterprise: Rice Hull "IPA" Stove Manufacturer		***Location: Barangay San Roque, Lapaz Tarlac***	
Process	**Current Performance Indicators**	**Performance Gap**	**Effect**
Order Taking & Processing	3 workings days	Customers expect quote within 2 days	Lost business; dissatisfied customers
Canvassing/ Acquisition of Raw Materials	5 working days	Not all materials are acquired within 5 working days due to lack of accredited suppliers	Inconsistent quality of raw materials
Material Utilization & Management	N/A	Upon delivery of raw materials, no standard implemented on proper dis-patching/distribution of raw materials to production	All production workers are cramming to get all the materials/ Run out of raw materials Voluminous scrap materials

Table 4 (continued).

Firm/ Enterprise: Rice Hull "IPA" Stove Manufacturer		*Location: Barangay San Roque, Lapaz Tarlac*	
Process	**Current Performance Indicators**	**Performance Gap**	**Effect**
Quality Assurance	Visual inspection conducted by the production supervisor	Not all produced products are inspected No report of rejects inspected, and no report of rework conducted No visual inspection report generated	Reject product parts delivered to customers
Shipping/ Delivery	5 working days	Customers expect the shipping/ delivery of products within 14 days after ordering	Unmet delivery targets (initial delivery)
Report and Record Keeping	3 working days after each delivery	Owner/ Manager expect reports 1 day after the scheduled weekly delivery	Sales and expenses reports are not prepared on time No analysis of sales and expenses reports conducted (to serve as basis for performance improvement) No production and quality assurance monitoring reports generated (only number of outputs produced and delivered)

The last SNA Tool used in this extension work is the Gap Analysis Worksheet (GAW). The ESP used GAW to transform mapped information from previous SNA Tools into performance improvement plan. The enterprise may use the data in GAW to select what interventions should be done that will most effectively support the enterprise long-term performance improvement targets.

III. Strategic Needs Assessment (SNA) Report – Performance Improvement Plan (PIP)

Table 5 Proposed Performance Improvement Plan (PIP)
Rice Hull "IPA" Stove Manufacturer

Project Identification: Production of Rice Hull "IPA" Stove Manufacturer
Project Description: Order Delivery Performance Improvement
Performance Improvement Goal: Reduce order delivery time from twenty-one days to ten working days
Critical Success Factors: Participation of purchasing, material utilization & management; Involvement of production, quality assurance in targeting increase in production and meeting lead time for product delivery; and Accuracy of records and reports on sales, shipping transactions.
Obstacles to Success: Current shipping performance; and Limited knowledge or technical expertise of the enterprise personnel.

Table 4 (continued)

Prerequisites for Starting the Project:
Improved understanding of customer needs;
Shipping distributor participation in sales planning; and
Capability Building/ Development of Personnel

Project Structure: Steering committee composed of unit heads from administrative office (purchasing, shipping, and sales), owner/ manager, consultant, extension service providers, and one analyst from each business unit who understands the processes.

Team Requirements: Knowledge of enterprise policies and two years' experience in the production process (organic personnel). Consultants in the fields Accounting and Financial Management, Industrial Engineering, Mechanical Engineering and Electrical Engineering.

Resources: Budget (amount of budget TBI), supplies and materials, manpower

Benefits:
1. Improved delivery time by 42.86% (21 working days to ten working days)
2. Increase production by 10%
3. Reduced number of rejects by 5%
4. Reduced production costs by 10%

Timeline

Milestone	**Expected Start Date**	**Expected Completion Date**
1. Discussion and Acceptance of the Recommended Performance Improvement Plan;	January 2019	February 2019
2. Hiring of Technical Person;	January 2019	February 2019
3. Capability Building/ Development Training of Enterprise Key Personnel a. Productivity Measurement (labor, materials, equipment, capitalization and utilities) b. Production Forecasting & Scheduling c. Total Productive Maintenance of Equipment & Machineries d. Establishment of Production Standard Time and Workmanship Standards e. Establishment of Quality Monitoring and Testing Parameters f. Supply Chain (Material Utilization and Management) g. Financial Management/ Book Keeping h. Ergonomics, Health and Safety of Working	March 2019	May 2019
4. Relay outing of the Production Area	January 2019	May 2019
5. Rollout Program or Pilot Run of the improved layout and used of proposed production monitoring tools	June 2019	December 2019
6. Coaching and mentoring, line monitoring, record keeping on the use of the following: a. Productivity measurement tools b. Raw Material Yield and Scrap Percentage Monitoring Form c. Time Study Observation Sheet d. Standard Operating Procedure and Workmanship Standards Form e. Quality Monitoring and Testing Parameters Forms f. Book Keeping Tools g. Incident/ Accident Monitoring Forms		
7. Analysis of Results 8. Impact Assessment 9. Gap or Performance Improvement Report	January 2020 February 2020 March 2020	January 2020 February 2020 March 2020

Prepared by: ESP **Reviewed by:** **Approved by:**
Date: Date: Date:

Table 5 showed the Proposed Performance Improvement Plan (PIP) prepared for the enterprise based from the results of the Strategic Needs Assessment (SNA) conducted by the Extension Service Provider (ESP).

CONCLUSIONS

1. Based from the existing set-up, the enterprise is inexperienced in terms of measuring and monitoring productivity metrics (e.g. labor productivity and does not have any idea on labor hour requirement per product). The management is clueless of the existing performance in terms of labor productivity likely explain that there is limited potential for mass production when the demand grows. Lack of technical expertise in computing, monitoring and evaluating enterprise productivity (labor, material, capitalization, etc.) may sacrifice preparation and implementation of an effective production schedule specifically labor hour requirement that would lead to cancelled orders, unmet deadlines in the delivery of finished products and increased overtime cost.

2. In It is concluded that monitoring of expenses of all the inputs including capitalization is needed by the enterprise. Upon monitoring, the enterprise will be able to apply multi-factor productivity improvement strategy and techniques to control the amount of money spent per month. As a result, the company will be able to save that will add up to its profit to aid in forecasting & planning of expenses. The monitoring will be an effective tool in targeting operation cost cutting and timing of expenses for capital expenditures and future or long-term investments.

3. Production forecasting is very vital for planning and decision making. The enterprise does not practice forecasting which will be of great help in the preparation of production schedule that include all resources needed in the production (raw material, manpower, materials, equipment, machinery, time, utilities and layout requirement). Currently, no production schedule being prepared by the enterprise to ensure achievement of production targets, thereby, often lead to overtime of workers and increased production cost.

4. Lack of benchmark data on equipment and machine efficiency may lead to frequent machine breakdown, ineffective preventive maintenance schedule and production stoppage and unachievable machine performance targets. Increasing capacity will be very hard for the enterprise without the said data.

5. Lack of standard implemented on material acquisition, utilization and management limits the enterprise from maximizing the used of raw materials, thereby resulting to voluminous scrap materials. Lack of accredited suppliers may affect the quality of raw materials being used in the production. Also, the non-implementation of proper dispatching or distribution of materials good for every working day production makes the production workers cram in getting all the raw materials they will use in the production of Rice Hull “IPA” Stove.

6. Unestablished time and workmanship standards in the production of Rice Hull “IPA” Stove makes the workers do whatever steps they find comfortable to start with. Workers worked based on their own phase, thereby affecting the cycle time of production. Lack of workmanship standards gives the workers freedom to make deviations from the acceptable limit. These activities directly affect the consistency of product quality.

7. Lack of monitoring and testing of quality control parameters in the production of Rice Hull “IPA” Stove makes it hard for the enterprise to monitor the quality of the product, its parts and accessories. The only parameter used to check the quality of the product is thru visual inspection. Not maintaining records of quality monitoring and testing will not evidence realistic measures of process capability and will make it hard for the enterprise to establish standard specifications of the product, its parts and accessories, thereby making it hard for the enterprise to target performance improvement for quality monitoring and testing. Also, in cases of product defects, if there are no records of quality monitoring and testing, traceability of activities to address the root cause of defects will be very hard for the enterprise.

8. Poor production layout leads to inefficiencies and accumulation of non-value adding activities in the production of Rice Hull “IPA” Stove. Bottlenecks, waste of transportation and idle time will be experienced by the enterprise. Poor production layout does not promote production efficiency.

9. Lack of knowledge on workplace ergonomics and occupational health and safety does not assure labor efficiency. Stress and fatigue brought about by the working conditions in the enterprise directly affects the performance of the production thereby affecting the cycle time in producing the products aside from the inefficiencies brought about by the poor production layout. Accidents and health hazards are at high risk in the production area of the enterprise.

10. The enterprise does not maintain performance of different models of ”IPA” Stove being produced. No document to evidence product development and innovation. Introduction of new “IPA” stove models is done without incubation, performance & quality monitoring which may sacrifice the quality of products to be offered in the market in the future. Such practice of the enterprise may affect its product marketability.

RECOMMENDATIONS

Based from the result of the Strategic Needs Assessment, the following strategies are recommended:

1. The enterprise may consider enhancing its capability in terms of understanding and using results of SNA Tools thru capabality building trainings or seminar-workshop;

2. The enterprise may consider measuring its single factor and multi factor productivity to aid in targeting long term performance improvement. Sales and expenses shall be strictly monitored and recorded to serve as basis the basis for decision making and future expansion projects. (See Appendix 1 for the recommended formula to be used in the computation of Single-Factor and Multi-Factor Productivity);

3. The Enterprise may consider forecasting its production based from its production history so that planning of actions to be undertaken will be appropriately expedited. It is recommended that production schedule shall be consistently done by the enterprise considering all inputs of production (raw material, manpower, materials, equipment, machinery, time, utilities and layout requirement) so that inefficiencies observed in the production shall be minimized (voluminous scrap materials, increased production cost (e.g. overtime cost), machinery and equipment downtime, bottlenecks, waiting and idle time);

4. The enterprise may consider monitoring equipment and machinery efficiency. Keeping of records is also being recommended to serve as guide in increasing production capacity, preparation of production schedule and preventive maintenance program and machineries and equipment;

5. The enterprise may consider establishing a supply chain strategy – accreditation of supplier to meet consistency of raw materials used and on time delivery of raw materials. The enterprise may also consider assigning a warehouseman in charge to manage & dispatch enough raw materials to production based from the production schedule limiting the production workers to get all the materials they can get from the delivered raw materials. Material utilization shall also be standardized to minimize the accumulation of scrap materials from excessive, substandard and unauthorized cutting of raw materials (See Appendix 2 for the Sample Raw Material Yield and Scrap Percentage Monitoring).

6. It is high time that the enterprise shall consider establishing standard time and workmanship standards in the production of “IPA” stove. It is recommended that Time and Motion Study should be conducted to establish standard time in the production of said stove to standardize the production process (See Appendix 3 for the Sample Time Study Observation Sheet). Workmanship Standards and quality monitoring & testing parameters should also be established to meet consistency of product parts and accessories specifications and workmanship/ quality (See Appendix 4 for the Sample Product SOP and Appendix 5 Sample Quality Control Parameters). Such tools are of great value in monitoring product quality, process capability and product development;

7.The enterprise may consider relay outing its production area to minimize bottlenecks, waste of transportation, idle time, health and safety risks. The enterprise may use the Systematic Layout Planning Method using its current capacity, space requirement and activity relationship to improve its production layout.

8. The enterprise may consider hiring of technical person to manage its production and prepare the

necessary production documents and reports needed for long term performance improvement.

9. Finally, thru the use of SNA Tools, the enterprise may consider using the findings of this SNA Report – Performance Improvement Plan (PIP), the enterprise may select which interventions to prioritize and implement based on their existing capability to to address its long-term performance improvement needs. The enterprise may also seek assistance of government and non-government agencies offering consultancy or practicing line of expertise being recommended in the SNA Report.

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INDUSTRY DRIVEN EXTENSION INTERVENTION ON FOOD SAFETY AND QUALITY ASSURANCE FOR CALAMANSI PROCESSOR OF PURA, TARLAC

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Abstract

This paper presents the identified needs and extension intervention provided for the calamansi processor of Pura Tarlac under the Industry Development Extension Program from April 2015 to June 2017. This consultancy project on food safety and quality assurance was requested by the partner-beneficiary for the purpose of improving the quality of their existing product and preparing their processing facility and system for application to FDA License to Operate (LTO). The data and information on the specific gaps on the quality of their products and on the requirement for their application in reference to AO 153 s. 2004 or the Good Manufacturing Practices (GMP) for Food Processors, gathered from the product and process mapping and participatory needs assessment conducted by the team, were analyzed and served as the basis for the design and implementation various extension interventions provided. These include among others the provision of short- and long-term recommendations; conduct of series of in-house capacity building activities using customized module designs on food safety and quality assurance ; improving product quality through Extension-Led Integrated Development (E-LID) Approach of product research and development; and the provision of series of coaching and mentoring sessions and on-line consultations to guide the firm in the implementation of the recommendations and on their application process for FDA-LTO. As an outcome of these extension interventions, the partner-beneficiary improved the quality of their products, developed various variants of their products and most importantly, the firm was able to secure their FDA-LTO Registration. On the other hand, as an outcome for the University, the project was able to generate technologies applied for utility model, transferred and adopted by the firm; developed an extension model and generated customized modules and worksheets copyrighted to the university which are all inputs for securing higher level of University standing under SUC Leveling Requirements of CHED.

Keywords: *MSMEs, calamansi processor, food safety, quality assurance, license to operate, Good Manufacturing Practices, FDA, License to Operate*

INTRODUCTION

According to the World Health Organization (WHO) unsafe food poses global health threats, endangering everyone In the Philippines, statistics from the Department of Health showed that for 2017 around 44,012 cases of food and water borne diseases were recorded. It comprised of 52.71% typhoid fever cases, 43.15% acute bloody diarrheal cases, 2.84% rotavirus cases, 1.01% Hepatitis cases and 0.30% cholera cases. Food and Water-borne Diseases is a group of illness caused by any infectious (bacteria, viruses and parasites) and non-infectious agents (chemical, animal and plant toxins). Common causes of which are unsafe sources of drinking water, improper disposal of human waste, unhygienic practices like spitting anywhere, blowing or picking the nose and unsafe food handling and preparation practices i.e. street vended foods.

In the Philippines, food safety and quality control system on national context include accreditation and inspection under the Food and Drug Administration (FDA) for processed foods and the Department of Agriculture for fresh produced (Republic Act No. 3720). Under the FDA, as regulatory body, food manufacturers, traders and re-packers are mandated to apply for License to Operate (LTO). This LTO registration is also a pre-requisite for food manufacturer to acquire FDA Product Registration. As required by regulation implemented by FDA, no food products are allowed to be sold for public consumption from food manufacturers, traders and re-packers which are not registered to FDA.

It is in this context that one of the calamansi processor of Pura Tarlac who ventures into processing of calamansi concentrates and ready to drink juice wishes to apply for License to Operate to FDA. However due to lack of technical capability on the needed preparation, they seek the assistance of TSU Extension Services Office. The request is mainly to assist them in improving the quality of their existing product, preparing their facility and establishing their food safety and quality control system for them to be ready and qualified for LTO application. According to them during LTO will not only increase confidence of consumers on their safe and quality products

development of their business from kitchen based to a micro or small size enterprise. Thus, the UESO positively responded to the request with the end goal of contributing on the development of the firm that could eventually contribute to the community through employment generation.

OBJECTIVES

The primary objective of the project is to provide consultancy services on food safety and quality for the partner-beneficiary. Specifically, the project aims to;

1. Assess the existing product quality and food safety and quality assurance practices of the partner-beneficiary relative to their request ;

2. Determine the gaps of the existing product quality and food safety and quality assurance practices of the partner-beneficiary on the requirements of AO 153.s.2004;

3. Provide technical advises /recommendations to address the identified gaps;

4. Deliver extension interventions to assist the firm in the implementation of the technical advises/ recommendations; and

5. Determine the outcome of the project for the partner-beneficiary, for the community and for the university.

METHODOLOGY

1. Receipt of Service Request

The partner-beneficiary initially express their need for technical assistance on their food safety and quality assurance system, specifically the assistance needed for documentation and application for License to Operate through an accomplished service request form submitted to the University Extension Services Office.

2. Processing of Service Request

Upon receipt of the request this was then processed following the protocol of the UESO in the review and approval of project activity proposal form with complete documentary requirements. These include among others the service contract and the Memorandum of Agreement as beneficiary of the Industry - Academe Linkage of the University. Upon approval of the project, the project team was given authority to proceed with the project through an approved special order from the Office of the President.

3. Delivery of Extension Service

The delivery of extension services is divided into two phases, the Inception Phase and Implementation Phase. Significant activities under each phase were discussed below;

3. 1 The Inception Phase

The inception phase covered the identification of the scope and specific needs of the partner-beneficiary. Although the project is basically requested or market driven, the requirement given by the partner-beneficiary is too broad thus need assessment was conducted by the team. The need assessment utilized a participatory approach, wherein the team conducted series of on-site meetings and focused group discussion with partner beneficiary. A need assessment tool based related literature and existing applicable statutory and regulatory guidelines (i.e. AO 153 s.2004; RA10611; PD 168; FDA Inspection Checklist) on was developed and used as a guide in the conduct of focused group discussion to assess the existing facility, equipment and the food safety and quality assurance practices, processes and documentation. On the other hand, process mapping and product evaluation was also done to assess the existing quality of the products.

After the assessment , data and information gathered were analyzed. Specific recommendations were made for each analysis that could possible address the findings from the assessment. These findings and recommendations were initially discussed and agreed with the partner beneficiary during the conduct of focused group discussion. Short term recommendations were actually outright adopted

adopted and implemented by the firm.

Finally, during this phase the findings, analyses and recommendations were documented into an inception report. Detailed therein also are the identified extension interventions needed by the firm for the implementation of the recommendations.

3. 2 The Implementation Phase

The results from the inception phase serve as an input for the implementation phase.
At this phase , the Extension -Led Integrated Development (E-LID) Approach was piloted as the main approach of project implementation. Using this approach , the identified technical capacity gaps for the improvement of the food safety and quality assurance system of the firm were addressed. It includes the provision of Science and Technology-based Consultancy Services, Informal/Unconventional Methods of Transferring Knowledge and Skills through conduct of in-house customized seminars and trainings and facilitated write shops. Continuing on-site, on-line and phone call coaching and mentoring activities were also employed throughout the implementation phase to ensure that recommendations were properly implemented.

At this phase also, the participatory action research process was employed to address the identified technological gaps in the existing process and quality of the products.

The phasing of the activities conducted is based on the response of the partner-beneficiary in the process of intervention. They were given enough time to practically apply the learnings before introducing new knowledge and/or starting the implementation of another recommendations.

Monitoring of the progress of the implementation of the partner-beneficiary was also conducted in this phase. The actual application of the imparted technical knowledge was immediately assessed by the Project team and follow up interventions were provided as needed.

During this phase also, the partner-beneficiary welcomed the idea of hiring an On-the -Job Trainee from the Food Technology Department of the Tarlac State University. The students served as a technical support for the firm in the conduct of in-line process monitoring, process and quality assurance documentation and product analysis and evaluation.

DISCUSSION/INNOVATIONS

1. The implementation of two phases under this extension project highlighted the following innovations and outcomes.

2. The role of Extension to lead technology generation and transfer was addressed and built sustainable technical capacity of the partner-beneficiaries. This is in terms of outputs, from the usual capacity building output from extension.

3. Various extension and research outcomes likewise unfolded from its implementation and resulted to capacity building of the partner-beneficiary through acquisition of technical know-how on the conduct of research and development of their food products and other technical capabilities on quality control, food safety and production management. It also generated and transferred technologies of improving the process, stability and quality of products.

CONCLUSIONS

1. Flexibility from the linear research-extension model;

2. Extension can lead technology development and transfer;

3. Faculty experts' potential can be further maximized;

4. Clients can play a vital role as partner-beneficiaries in the delivery of extension services and generation of market driven technologies.

RECOMMENDATIONS

With forgoing discussions and conclusions, the following are recommended;

1. Explore application of these phases to other industry sectors;

2. Continually validates these phases as applied to community development projects;

3. Explore integration of other methods of research as applicable to sectoral development of the community.

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WEBSITE DEVELOPMENT FOR SELECTED MICRO FOOD PROCESSOR OF TARLAC

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Abstract

Micro Food Processor is driven to enhance the senses of its consumers, especially their palate with the new taste that they can provide. They want their customers to express their feelings to their loved ones by the taste of the food they make. Micro Food Processor mission is to produce and supply high quality and safe traditional sauces and condiments with good taste and value to the market so that our customers can consume it with confidence and trust. The goal of this project is to help Selected Micro Food Processor of Tarlac on its drive and to achieve its mission by creating a website. The website contains the company profile, awards received, and their products. The initial dataset for the website is based upon data collected during interview and series of meeting with the client. The website was developed to provide an online catalogue where the customer can view the details of the products such as the name, availability and ratings; As a second purpose, the website was also developed to enhance the marketing of the client and to reach customer outside the province and region. As such, the website employs easy-to-use, relatively inexpensive, cloud-based tools and services, Zendesk chat and woo commerce. The website was accomplished and purpose-built using standard HTML, CSS, JavaScript and PHP programming languages considering the client's needs.

Keywords: *website development, company profile,, online catalogue, enhance marketing, cloud-based tool, Zendesk chat, woo commerce*

INTRODUCTION

Information and communication technologies simplify and boost development for all kinds of enterprises, yet in case of small and medium enterprises, the influence is far better visible. Activities such as searching for new markets become easy, companies find various economical barriers reduced, which in turn decreases costs of international operations. It is a subject of vital importance for both companies that can increase their competitive ability, as well as for the consumers, who gain access to wider array of products, services and information – all due to Internet access. It is also worth mentioning that in spite of significant advantages that new technologies provide for SME, those solutions are not free of flaws and they do have their own barriers and limitations (Miocevic D., Crnjak-Karanovic B. (2012)).

Technology extension provides direct assistance to small- and medium sized manufacturing enterprises (SMEs) by basing field engineers in local offices who proactively reach out to companies in their areas. It is a necessary complement to innovation policies for the many firms whose inability to learn from their own experiences or mistakes makes them incapable of sustainable innovation efforts. Extension services instill a company culture of continuous improvement. Technology extension, also referred to as industrial extension, is a form of assistance to private firms that aims to improve competitiveness, especially among manufacturing small and medium-sized enterprises (SMEs) (Juan D. Rogers, 2013). Its goal of providing technological innovation to promote the products and services of the SMEs and to reach the customer has improving.

Industry 4.0 became a high relevant and frequent discussed topic for companies, universities and research centers (Dais, S.,2013). The buzzword Industry 4.0 describes the fourth, currently taking place (Hermann, M., Pentek, T., Otto, B., 2015), industrial revolution which promises huge economical potential as well as provides promising ecological and social opportunities (Kagermann, H.,2014). Moreover, Industry 4.0 and its current concepts (i.e. Smart Factory, Cyber-Physical System (CPS), Internet of Things (IoT) and Internet of Services (IoS)) (Lasi, H., Kemper, H.-G., Fettke, P., Feld, T., Hoffmann, M., 2014) also cause a paradigm shift in work organization, business models and production technology . The factory of the future is characterized by smart, interconnected, integrated and real-time oriented processes and services (Kleinemeier, M, 2014). These characteristics enable on the one hand a vertical integration of the smart factory's IT systems in order to ensure flexible, dynamically reconfigurable and self-organized manufacturing systems and structures (Wang, S., Wan, J., Li, D., Zhang, C, 2015). Essential part of this vertical integration is the linkage of sensor and

actuator signals through various levels right up to the level of the Enterprise Resource Planning (ERP) system (Constantinescu, C.L., Francalanza, E., Matarazzo, D., Balkan, O, 2014). On the other hand, manufacturing and information systems in such smart and networked factories are not only networked within the factory but also connected to value networks and supply chains. These digital networks across the company's boundaries are mainly based on a tight interconnection of Enterprise Resource Planning systems and Manufacturing Execution systems (MES). As a result, systems in the factory of the future have to deal with an enormous amount of data and must share a large volume of information with each other (Kleinemeier, M, 2014).

Vast majority of Philippines' small and medium enterprises (SMEs) are posting strong trade growth boosted by the country's digital economy that is rapidly growing at a rate faster than the Asia Pacific (APAC) average, according to a study. Mobile commerce has high penetration among SMEs as well, with 89 percent using m-commerce to import goods and to find new customers. A significant 95 percent of SMEs used social platforms to reach new customers in other markets. Additionally, Philippine SMEs are quickly adopting new technologies with 8 out of 10 saying they use both mobile payments and software automation to make their supply chains and distribution channels more efficient. These numbers are even higher than the APAC average which is 77 percent for software automation and 73 percent for mobile payments (Bernie Cahiles-Magkilat, 2018).

The Industry Development Extension (InDEx) Program which supports the national agenda on Micro, Small and Medium Enterprise (MSME) Development served as one of the vehicles towards community development and a mandate of Tarlac State University (TSU). TSU is capitalizing on its expertise while continually innovating its extension approaches to deliver and support the MSME development extension agenda as a technological University.

Website Development (WeDev) approach was conceptualized to provide dated and timely extension cum research services to address technical capacity and technology gaps of MSMEs. This is to address further the problems of the Selected Micro Food Processor of Tarlac with the needs of technologies in e-commerce. A methodology was applied to guide the extensionists and researchers and the participation of the end user or client in every cycle of the methodology was included.

This paper presents and discussed the implementation of WeDev Approach in delivery of extension service to selected micro food processor of Tarlac.

OBJECTIVES

This paper generally aims to discuss the process of implementation of a Website Development for Selected Micro Food Processor of Tarlac. Specially, this paper aims;

1. To identify the need and enablers for Industry 4.0 application in Selected Micro Food Processor of Tarlac.

2. To design and develop a Website for Selected Micro Food Processor of Tarlac.

METHODOLOGY

Scrum is a framework that favours an iterative and incremental approach. Scrum methods were broken by keeping changing requirements of the clients in mind, and so Scrum has not only supported the adaptation of late requirements in software development but also supported self-organizing manner of work (Astha S., Divya G., 2014). As scrum seems so fruitful, in this paper, authors applied the scrum framework to develop the website.

1. Preparation

Stakeholders for this project met initially through the endorsement of University Extension Services Office (UESO) with a Service Request Form to the College of Computer Studies (CCS). The initial meeting was held on the CCS building and attended by the Owner of the selected micro food processor of Tarlac, Bachelor of Science in Information Technology (Chairperson), Associate Dean and the Program Extension Coordinator; where the team discussed about the needs of the selected micro food processor, current technologies used and terms of the project. A story was made after the meeting as shown in table 1.

Table 1. Stories made Based on the Initial Meeting of the Stakeholders

Story	Estimation	Priority
As a user I want to be able to view the list of products	10	1
As a user I want to be able to order products to the selected micro food processor	4	2
As a user I want to be able to send feedback or message to the selected micro food processor	2	3
As an administrator I want to manage the products (add, edit, update)	3	4
As an administrator I want to receive feedback from users through email, mobile and Facebook.	4	5

2. Product Backlog

After analyzing the requirements of the micro food processor, the authors planned and identified each requirements and categories them, group them per sprint, which serve as a guide throughout the development of the website. The requirements were broken down and the authors created a product backlog shown in table 2.

Table 2. Product Backlog

Sprint	Task	Estimated Hours
1	Project Planning	4
	Requirements Gathering	6
	Product Photoshoot	8
2	Database Design	10
	Product page design	20
	Message/Feedback feature	6
3	Home page design	6
	About and contact us page	5
	Deploying the prototype	5

3. Sprint planning meeting and Daily Cycle

This scrum process allows the team to check the progress of the project and match it in every sprint backlog, and each member carries a task per sprint and a list of need to produce as deliverable.

4. Product Increment and Sprint Review

Upon completing the task in a sprint, a meeting with the stakeholders held to discuss if the requirements were met. Feedbacks and suggestions were considered during the product increment to satisfy the beneficiary. This process also included the review of the sprint to check the target completion and if the increment is possible in a sprint. In this stage also, the product release can also happen, once all the sprints are met and the client is satisfied with the output. Where the product releases the technology generated, it is formally transferred to the partner-beneficiaries.

5. Sprint Retrospective

The last thing done in a sprint, the stakeholders to do it immediately after the sprint review, participation of the ScrumMaster and the client is a must. In this stage the stakeholders identified the elements of the process that worked or did not work during the sprint, along with potential solutions. This aims to continuously improve the process.

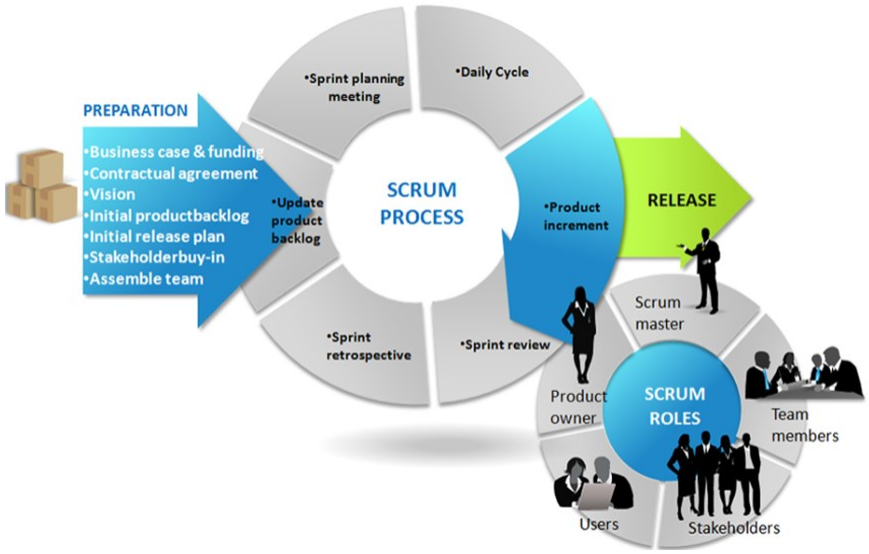

Figure 1. Agile Scrum Methodology

Figure 1 Agile Scrum Methodology shows the process on how the project was done from preparation to updating the product backlog, the sprints would show if there is an iteration in every deliverables and a scrum where stakeholders talk about the deliverables, and up to the release of the product.

DISCUSSION/INNOVATIONS

1. Data Flow Diagram of the developed Website for Selected Micro Food Processor of Tarlac

Figure 2.0 presents the processes of a customer to the developed website from the viewing of the products, logging in to the website to make order and send a feedback to the client/beneficiary.

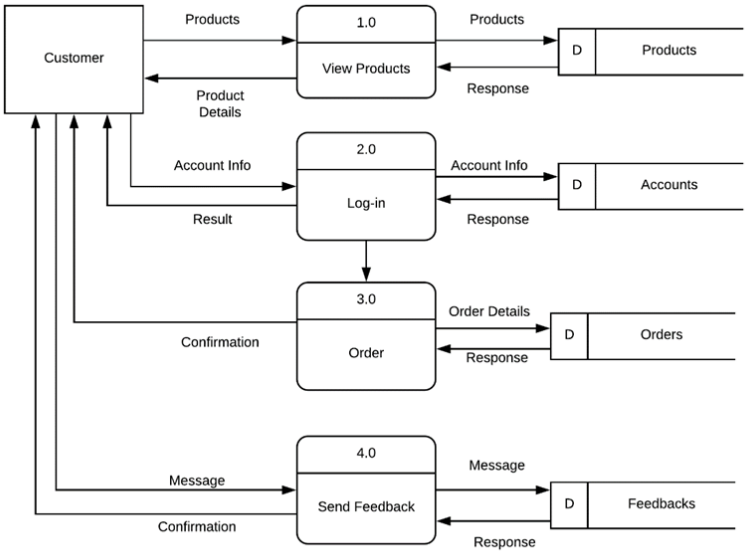

Figure 2. Data Flow Diagram (Customer)

The Data flow diagram highlights the process of a customer when using the developed website. The customer can search and view the list of products where the data are stored in a secured storage called "database" and this database response to the system via system query language (sql) depending on what sql query was requested and placed the result to the customer's view. An authentication feature is provided, where the user needs to login to order products and the customer can also send message to the beneficiary via leaving a message in the message feature.

CONCLUSIONS

In general, it can be included that the website developed is useful as a way to improve the marketing strategy of the selected micro food processor of Tarlac. More so, the following are concluded.

1. This paper introduced the Industry 4.0 and identified the need and enablers which can be applied in selected micro food processor of Tarlac. The collaboration with Industry 4.0 test environments increasingly essential allowed SMEs to reach and address the inquiries of their demanding customers.

2. The designed and developed website enabled the customer to view the product and its details, be updated about the selected micro food processor of Tarlac, and send feedback whenever needed.

RECOMMENDATIONS

1. With forgoing discussion and conclusions, the following are recommended;

2. The authors want to provide a general understanding about the upcoming challenges and opportunities for the quality management domain through the advent of Industry 4.0.

3. The SMEs can consider implementing Industry 4.0 where smart machines improve their business, offering the opportunity for manufacturers to optimize their operations quickly and efficiently.

4. Continually improve the website by providing features like online payment or similar facility from customer's feedback.

5. This application can be represented to other SMES or any nature of business and it is open for more improvement suit in the situation and need of certain SMES/Business.

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THE EFFECT OF BASIC STATISTICS TRAINING ON THE WORKPLACE OF BATANG-BATANG ELEMENTARY SCHOOL TEACHERS

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Abstract

This research aims to determine the relevance of Basic Statistics training in the workplace of Batang-Batang Elementary School teachers. People encountered data in everyday life like in news reports, sports averages, weather, elections, business reports, stocks to advertisements, economic conditions etc. Basic statistics proves highly beneficial to supplement the career of the teachers. Basic Statistics training is an opportunity for teachers' professional development in statistics.

Thus, the study concludes that the training contributes greatly to the teacher in analyzing data and it is relevant to their work responsibilities as teachers. Results revealed that training improve teachers' skills in basic statistics and employs the knowledge and skills obtained in the training at their work place specifically in school and class profiling. Similarly, it helps them also to do statistics computation for their action research. The study shows that training has positive impact on the performance of teachers in the field of statistics, thus before the training intervention given to the teachers, they have little knowledge of basic statistics but after the training they can do statistics computation using the Microsoft excel applications and SPSS.

Keywords: *statistics, class profiling, statistics computation, Microsoft Excel, SPSS*

INTRODUCTION

In most countries, statistics has been introduced into school from intermediate to college mathematics curricula. The teachers are responsible in implementing the curriculum in their classroom thus they should be equipped with the knowledge and skills in basic statistics.

Statistics is associated with stochastic and inductive spheres, where variation and real context are essential for teaching statistics (Estrella and Olfos, 2012).

In the teaching profession, teachers must be armed with knowledge in Statistics. It helps a teacher know when teaching has effectively done. This subject will help them to determine if the students understand the lessons or if they need to give remediation by giving assignments, seatwork or test.

Teachers must possess in-depth knowledge of basic statistics to increase the ability to criticize, analyze, and interpret data. Statistics is important for teachers not only on monitoring the progress of the students but also to keep the high quality of education, and they could use the knowledge and understating on basic statistics in doing their action research.

To improve the educational system, it is necessary for teachers and students at various levels to have statistical skills and reasoning necessary to interpret and use the information about institutions of learning.

Training begins when it is determined that there is a need. Training should be designed and implemented based on the needs of the recipient. It requires planning in order to conduct training. The training is a conceptualize planning which includes who is in need of training, what types of training are best suited for those in need, the preparation, which includes the training activities and equipment, the actual training, as well as the training budget and the follow up evaluation are all included in the training. Employee training is actually a solution to a company or an employee need. The success of the training is measured over time and is based upon whether or not the employee's knowledge or skills increased as a result of the training.

Training programs like Basic Statistics training is important for teachers and it is the oil that keeps their engine running smoothly. Professional learning and growth opportunities drive teacher's satisfaction.

Teacher's development and training programs are often overlooked, investing in training programs is very important in keeping the teachers happy, satisfied, and engaged.

The Tarlac State University College of Science offered a free training on Basic Statistics that would help teachers to overcome fear on statistics and applied the knowledge and skills learned in their workplace. The engagement of the department with the teachers in the skills training on Basic Statistics will help them to do the statistics computation and analysis of data collected for their Action Research which is one of the requirements of the Department of Education.

OBJECTIVES

The study aimed to determine the relevance of the Basic Statistics training in the workplace of Batang-Batang Elementary School teachers.

Specifically, it sought to answer the following objectives:

1. To enhance teacher's performance in the workplace.

2. To improve teacher's satisfaction and morale

3. To determine the impact of the training in their workplace based on:
    3.1 Class Profiling
    3.2 Application on Action Research

SCOPE AND LIMITATIONS OF THE STUDY

The study is limited on the relevance of the Basic Statistics in the workplace of teachers particularly in the area of teacher's performance in the workplace, satisfaction and morale and the impact of the training. This study was carried out in Batang-Batang Elementary School. There are 9 teachers including the principal who participated in the training.

METHODOLOGY

The study employed mixed methods, the quasi-experimental and qualitative research designs. The quasi-experimental is an empirical interventional study used to estimate the causal impact of an intervention on target population without random assignment. Quasi-experimental research shares similarities with the traditional experimental design or randomized controlled trial, but it specifically lacks the element of random assignment to treatment or control. Instead, quasi-experimental designs typically allow the researcher to control the assignment to the treatment condition, but using some criterion other than random assignment (Dinardo, 2008). On the other hand, Qualitative method was also used to determine the aptitude of the recipients regarding their specific knowledge and skills and change in positive attitudes after the training in basic statistics.

Since the school has only nine (9) recipients, complete enumeration was used.

The researchers administered pretest in basic statistics then employed series of trainings in statistics to the recipients. These series of trainings included measures of central tendencies and variability and basic statistical treatments necessary to their classroom profiling and action research. After the intervention has been done, a posttest was administered in order to determine if the training has an impact to their workplace.

Frequency counts and percentages was used to determine the initial performance in their workplace. Narrative analysis was used in describing the employee's satisfaction and morale. T-test correlated data was used to test the impact of training in basic statistics.

DISCUSSION/INNOVATIONS

The pretest given to the teachers of BBES showed that eight of the recipients performed poorly in basic statistics and 1got a rating of fair in the said test. This indicates that an intervention in terms of training in basic

the recipients rated very good and good performance of the remaining teachers were noted.

Teacher's Performance

The work performance of the DepEd teachers is based on the Performance appraisal which is divided into seven domains such as content knowledge and pedagogy; learning environment; diversity of learners; curriculum and planning; assessment and reporting; community linkages and professional engagement and; personal growth and professional development.

There are different ways that a teacher can enhance their personal and professional development. Most of the teachers will use a mixture of these like pursuing the post graduate, attending seminars and training, writing research and others. Those methods mentioned has been proven to be valuable in their overall development. The ways to improve the teachers' development are expensive, so few teachers pursue their post graduate and attend seminars and trainings which are beneficial to their growth and development. The College of Science offers free training on Basic Statistics in order to help the teachers improve their skills in this area and apply this in their workplace.

The seventh domain or personal growth and professional development like Basic Statistics Training is a must and benefit the teachers' competency. The respondents rated the need for personal, social growth and professional development like this training with a weighted mean of 4.625 interpreted as Very Important (VI). Teachers deem professional development relevant when it directly addresses their specific needs and concerns (Guskey, 1995), or when they see connection between a learning experience and their daily responsibilities (Tate, 2009; Flores, 2005). Furthermore, Diaz-Maggioli (as cited in González, 2005) asserted that teacher development is "an ongoing learning process in which teachers engage voluntarily to learn how best to adjust their teaching to the learning needs of their students". All the teachers of Batang-Batang Elementary School graduated with the degree in Master of Education. This indicates that the DepEd requires the teachers to pursue their masters' degree program. Earning master's units or completing the degree connotes higher degree of professional competence and a higher chance for promotion (Labada, 2010).

The difference between the pretest and posttest results found out that out of fifty (50) items, the pretest mean score was 11.22 while the posttest was 41.33. to test the significance of their mean score, using t-test correlated data, the t-coefficient (50.02) exceeded the critical value (2.306). The result further means that the null hypothesis was rejected. Thus, there is a significant difference between the pretest and posttest of teachers' performance in statistics, in favor of the posttest. This further indicates that the training has a big impact on their knowledge in statistics.

Teachers' Satisfaction and Morale

When teachers perform well in their work, generally their satisfaction increases and it improves their self-esteem improves. The training can also enhance their morale and loyalty to the school.

Teacher morale is an important part of the school community. The school administrators try to find ways to boost the morale of their teachers. The school districts are struggling to maintain happy and enthusiastic teachers (Cox, 2016). The teacher morale such as confidence, attitude, outlook, feelings of well-being and job satisfaction are confirmed to have a direct effect on good student. Measure of teacher's morale and satisfaction are dependent on the work environment. The teachers' morale and satisfaction have an over-all mean of 4.56 with a verbal description of strongly agree. This indicates that the teachers of BBES have high positive morale in their work place. The teachers considered the following factors: harmonious interpersonal relationship among teachers is evident in the work place; teachers feel that they are part in the decision making of the school head; interaction among teachers and with their school head is another significant factor to obtain high positive morale; and acknowledgment or appreciation from the school head for something done by the teachers whether it is big or small is evident. If the teachers are positive and happy about their workplace and feel appreciated in every works they extend, teachers' morale is positive and high. Thus, work place is a big contributor to the teacher morale.

Impact of Training

Based on the impact questionnaire, this was the only training they attended when it comes to basic statistics. Grading is one way to determine the performance of the pupils, example if 70 percent of pupils are failing in a class this means the exam is too hard or there is a problem either with the pupils or the

examination given to them.

The over-all mean for the impact assessment on the basic statistics training is 3.84 described as large impact (LI) as assessed by the BBES teachers. According to them, the knowledge acquired from the training, helped them a lot not only in their work place but also in their daily lives. In the workplace, they were able to statistically analyze the performance of their students by taking the mean, standard deviation and percentages. The teachers could statistically analyze the over-all performance of their pupils by taking the mean and standard deviation or median and quartile deviation of the pupils' scores on a test and graphing the grades of their pupils based on the examination results. According to them, the statistical analysis helped them decide whether to give another shot on the lesson or proceed to the next one. The teachers admitted that before they do not do the analysis of the results of the exam but rather ignore it and just proceed to the next lesson.

CONCLUSIONS

Statistics training is extremely essential to the growth of every teacher. It helps the teachers to organize, analyze and interpret data to make better decisions. The training does not only increase the teachers' abilities and knowledge but also strengthen the morale of the teachers.

Basic Statistics Training is an important aspect to the workplace of BBES teachers. It is necessary for teachers to be skilled and capable in analyzing data so that they will be competent when they acquire knowledge and skill of doing the task. It would provide opportunities to the teachers to improve the career life. The skilled teachers are the resources and assets of the school when it comes to statistics.

Thus, the study concludes that the training contributed greatly to the teacher in analyzing data and it is relevant to their work responsibilities as teachers. Results revealed that training improved teachers' skills in basic statistics and employed the knowledge and skills obtained in the training at their workplace specifically in school and class profiling. Similarly, it helped them also to do statistics computation for their action research. The study shows that training has positive impact on the performance of teachers in the field of statistics, thus before the training intervention be given to the teachers, they have little knowledge of basic statistics but after the training they can always do statistics computation using the Microsoft excel applications and SPSS.

RECOMMENDATIONS

In line with the findings and conclusions, the following recommendations are offered to the school administrator and teachers.

1. The school administrator should motivate the teachers to attend trainings not only in Basic Statistics but also in other areas in order to boost the morale of the teachers.

2. The school administrator should find ways on how to come up with free seminar or trainings to strengthen the knowledge and capabilities of the teachers,

3. The teachers should continuously attend skills trainings in statistics using other software.

4. The other elementary and secondary schools should collaborate with the College of Science – Mathematics department regarding the Skills Training on Basic Statistics intended for the teachers and also their students in order to be trained and become proficient in analyzing data.

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CAPACITATION OF PROFESSIONAL BODIES THROUGH ACADEME-LOCAL GOVERNMENT PARTNERSHIP

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Abstract

Building partnership between the university and government agencies cannot be underrated for these partnerships involve recognizing and including strategic alliances which involved recognition of strength and weaknesses as well as developing synergies for result-oriented activities. Tarlac State University (TSU) through the University Extension Office-Professional Development Services (UESO-PDS) and the Provincial Government of Tarlac (PGT) Human Resource Management has been partners in providing quality and need-based seminars and trainings aimed at strengthening good governance and enhanced public service. This article aimed to analyze the pattern of partnership between TSU and PGT, its impact achieved and developing model of cooperation between universities and provincial government in relation to human resource management. However, the implementation of cooperation was focused more on capacity building in the form of workshops and trainings of around 40-200 personnel and middle managers, the next in line and the staff for the past two years 2017 to 2018. As for the impact of the partnership that had been running mutually beneficial for both parties in the development of duties and functions of each. Related to this reality, the development of cooperation between the university and the provincial government developed a partnership model both in terms of capacity building in the context of need-based human engineering.

Keywords: *strategic alliances, developing synergies, academe-local government partnership, pattern of partnership, need-based human engineering*

INTRODUCTION

The performance of any organization hinges on its human resources and their competence (knowledge, skills and attitudes) and on the way in which human resources are provided with opportunities to develop and how they are managed. The development of human resources has often been neglected by organizations and regarded as a cost rather than an organizational investment with long-term benefits for the individual and the organization. The task of securing talent and building human resource capacity should thus be a priority in every organization (Manning, 2006:105).

Universities have the role as resources of intellectual capital and as institutions for educating future leaders, universities contribute to the vitality of global partnerships. As academic institutions, they often play a catalytic role in focusing national aspirations. Indeed, universities play an essential role for the incubation of ideas, innovations, initiatives and experiments. Universities can help to insert institutions into global partnerships, as well as to invent the core "content" around which partnerships are formed. Local government cannot underemphasize the importance of universities demonstrating effective governance and meaningful contributions to society. Due to this universities need to be open to government, industry and the public for two-way communications and Universities need to be open to new categories of students, notably by providing continuing education for working people like government employees.

Good governance involves strategic partnerships including all relevant stakeholders in a community to develop synergies for result-oriented activities. Institutions, citizens and organizations recognize the value of seeking out the best of each other's performance possibilities.

Building partnership between the university and government agencies cannot be underrated for these partnerships involve recognizing and including strategic alliances which involved recognition of strength and weaknesses as well as developing synergies for result-oriented activities. Tarlac State University (TSU) through the University Extension Office-Professional Development Services (UESO-PDS) and the Provincial Government of Tarlac (PGT) Human Resource Management has been partners in providing quality and need-based seminars and trainings aimed at strengthening good governance and enhanced public service.

OBJECTIVES

The main purpose of the paper is to analyze the pattern of partnership between TSU and PGT, specifically it seeks to answer the following questions:

1. How the partnership between TSU and PGT is described along processes?

2. How has the partnership benefited both PGT and TSU in terms of capacity building?

3. What model of cooperation was developed between TSU and PGT in relation to human resource management?

METHODOLOGY

This paper made use of observation, interview and documentary analysis to be able to gather an in-depth understanding of processes of the partnership between TSU and PGT. Documents were reviewed and analyzed to investigate the "why" and "how" of decision making. Besides this, the authors also examined the impact of the partnership through observations in numerical representations.

Using the past evaluation results of all the seminars conducted from 2017-2018, the authors analyzed the impact of the capacity building provided as well as look into the context that may have affected the partnership.

1. Scope of the Partnership

The request to provide capacity building seminars and trainings was forwarded by the Provincial Government of Tarlac through the Human Resource Management. Upon receipt of the request, the Professional Development Services Unit requested for a meeting with the HR Officer of PGT to discuss the requirements of the capacity building they are asking. Series of meetings were held to determine the scope and requirements of PGT as well as the content of the training seminar. The proposed content pass through the HR and the office of the governor for their approval. Every seminar was covered with a Commitment Form signed by the University President and the Governor of the Province. UESO, on the other hand, provides the qualified resource speakers, modules, pre-test and post-test. The resource speakers from the university as well as the ones outsourced were given special order to be the resource speakers. To determine the scope of the training seminar, the resource speakers conducted a requirement analysis which will determine the clients' requirements. This includes meeting with the HR department and some of the partner beneficiaries. After obtaining the needed data, the resource speakers proceeded in the designing of the seminar module.

2. Capacity Building Development

2.1 Consultation with the PGT Human Resource Focal Person on the minimum requirements of the Civil Service Commission.

There is a need to become familiar with the CSC requirements so that the training module prepared will be relevant and responsive which would include the needed contents and activities.

2.2 University-Local Government Cooperative Partnership Modelling

This modelling would include preparation of the capacity building seminar training including the preparation of the modules, the pre-test and posttest, the activities needing materials and the evaluation analysis.

2.3 Implementation of the Developed Capacity Building

The developed capacity building module and capacity building design would be used in the application phase where modifications may be possible due to other uncontrolled factors like the weather.

2.4 Monitoring and Evaluation of the Developed Capacity Building

The implementation of the capacity building module would be evaluated as to its plus and minuses.

DISCUSSION/INNOVATIONS

The established capacity building design is a methodology that would contribute to the achievement of good governance by capacitating its government personnel following the CSC Guidelines and the needs of the stakeholders.

1. The process of the establishing a partnership between TSU and PGT

The process of establishing the partnership of TSU being a university and PGT being a government agency practiced the open, transparent and accountable linkage. PGT and TSU brought on the table all the expectations and requirement openly and transparently during the planning and implementation in a way we are holding each other accountable for results of the capacity building seminars and trainings for the social and economic well-being of the stakeholders and for good governance.

The common approaches to Cooperation Model of Partnership must have first leadership, common understanding, purpose, culture and values, learning and development, communication and performance management. These were represented by the yellow boxes. Next to these boxes are the circles which were the wisdom and insights on partnership management derived from the interview and observations done during the conduct of the capacity building activities. These are open communication where all parties need to be open and willing to communicate honestly with one another. In resource management it is important that the concern parties understand the relationship and how decisions are made just like for TSU and PGT where meetings are held collaboratively to ease roadblocks and future conflicts particularly in resource management. Both parties need to define who makes the decision for concerns and how to manage possible conflicts.

The model also shows the different stages in the process of establishing and maintaining a university and local government partnership particularly in capacity building activities. The stages from one to four are all important steps in assuring that the partnership is mutual, respectful and built on trust.

Stage1 is the Preparation stage where TSU and PGT will agree on the purpose of the partnership, negotiate what each will contribute, how the activity will be conducted as well as meeting the requirement of the CSC.

Stage 2 is actual implementation of the capacity building activity where TSU through their assigned resource speaker will meet with the PTG-HR for final briefing regarding the process, roles and expectations. This is also the stage where each party will clarify the work of the other. This is also the time where the resource speaker submits the prepared module including the pre and posttest for reproduction.

Stage 3 is the post activity stage where the evaluation feedback is collated and analyze as well as the results of the posttest are shared, discussed and interpreted for future reference and for improvement.

Stage 4 is the action planning for alternative steps to take based on the evaluation results as well as the suggestions of both the requesting party and the clients.

Figure 1 shows the model of cooperation developed based on the partnership between TSU and PGT in relation to human resource management was adopted from the Assessment Strategic Partnership (Hardy, Brian; Bob Hudson, 2003) but was modified based on the TSU-PGT Experience.

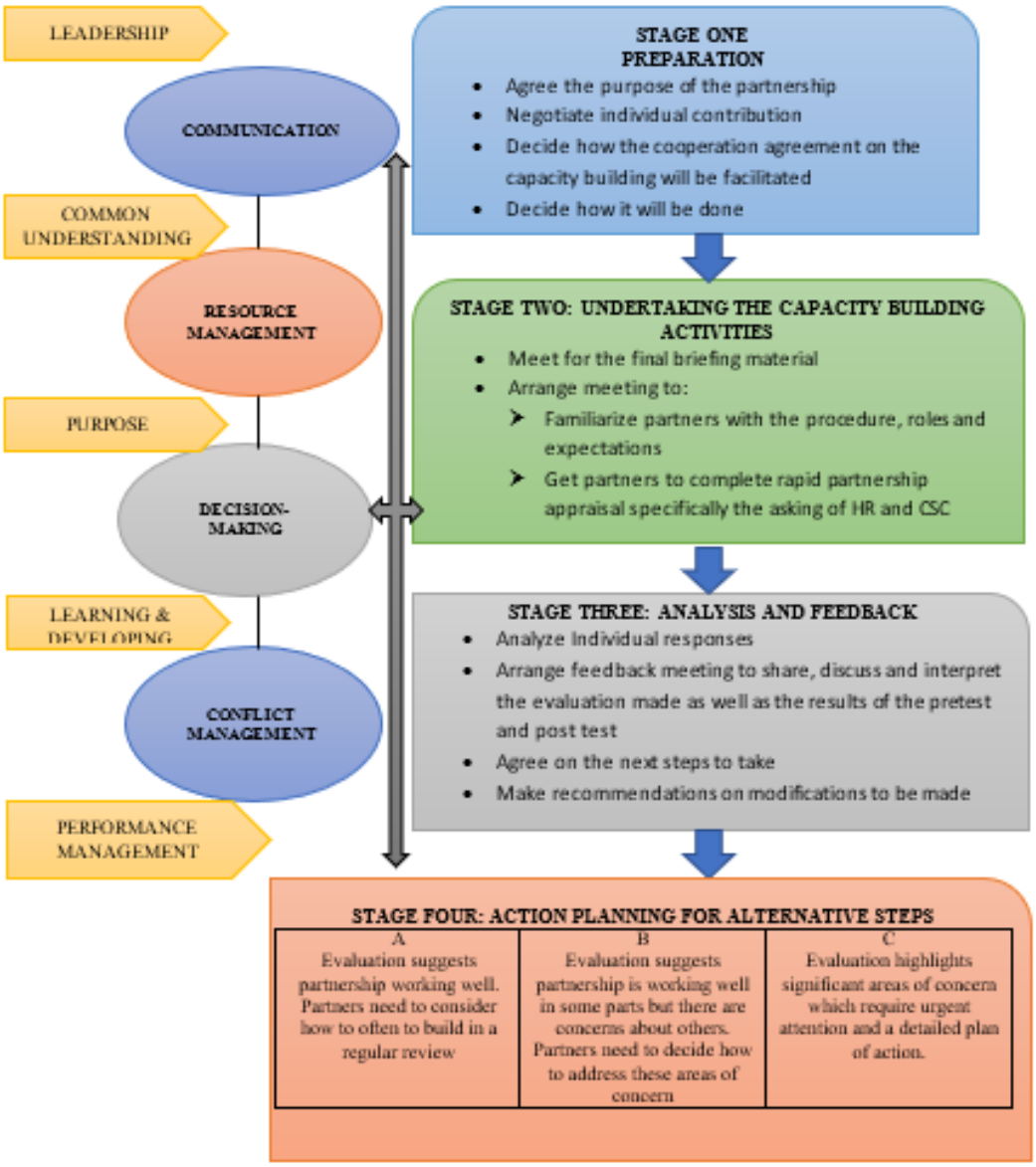

Figure 1. Stages in the Model of Cooperation of PGT and TSU

2. The partnership benefit both TPG and TSU in terms of capacity building.

Shifting patterns of cooperation by PGT with TSU UESO-PDS of the cooperative nature of the partnership, bringing a positive change for the development of both institutions. On the side of local government, as recognized by their HR Head, in addition to the partnership of cooperation to help the completion of development programs in the province, also provides its own color in the process of enrichment. according to them, sometimes it was a lot to get the latest information about a subject that is not found in the government.

Table 1. Results of the 2017-2018 Evaluation of the Capacity Building Seminars

TITLE	No. of Participants	Rating	Verbal Description
Civil Service Review -English	23	92.82	Extremely Satisfied
Civil Service Review -Math	24	96.82	Extremely Satisfied
Seminar-Workshop on Effective Leadership Skill - Need for Leadership Change and Management	24	94.33	Extremely Satisfied
Seminar-Workshop on Effective Leadership Skill-Management of Change	26	95.25	Extremely Satisfied
Seminar-Workshop on Effective Leadership Skill-Defining Leadership & Management	26	93.00	Extremely Satisfied
Seminar-Workshop on Effective Leadership Skill-Leadership Styles and Organizational Culture	24	93.25	Extremely Satisfied
Seminar-Workshop on Effective Leadership Skills	26	95.75	Extremely Satisfied

As shown in table 1.0, the data presented the evaluation results of the various seminars and trainings requested by PGT and conducted by TSU-ESO-PDS for the past two years (2017-2018) where the overall satisfaction rating garnered mostly extremely satisfied rating based from the tally of 24-26 participants.

Meanwhile, to strengthen the capacity of Human Resource through a series of cooperation with TSU, the HR Head admitted getting a lot of input in understanding of the commitment of cooperation is good and right in accordance with the CSC law, so that it can be more cautious in making cooperation with third parties, especially in the procurement of good s and services. Meanwhile, on the side of the TSU-ESO-PDS impact of such cooperation in addition to helpful in development of UESO-PDS could also be a means to develop of the university's capacity in strengthening professional capacities of the government employees. First, in all the seminars and trainings of the UESO-PDS could provide space for the development of professionalizing agenda. Second, TSU must be the director in making the grand narrative of professional enhancement and development. Third, through various researches and studies that can be done, the university can provide data on professional development findings and provide feedback tactical steps in accordance with the provisions of the Civil Service Commission. Meanwhile, from the strengthening of good governance.

Table 2. Results of the 2018 Capacity Building Seminars

TITLE	No. of Participants	Rating	Verbal Description
Supervisory Effectiveness 1	35	95.00	Extremely Satisfied
Supervisory Effectiveness 2	26	90.43	Extremely Satisfied
Supervisory Effectiveness 3	28	93.50	Extremely Satisfied
Seminar-Workshop on Writing Effectively	32	90.50	Extremely Satisfied
Seminar-Workshop on Oral Presentation Sills	32	92.50	Extremely Satisfied

Data presented in Table 2 shows that the evaluation of the participants is Extremely Satisfied as rated by 26-35 middle managers of PGT. The seminars and training given to them are results of the survey given by HR to be able to meet the needs of the clients. Likewise, the clients were also asked to write the topics and other skills training they would need. As shown in the data, the result of constant communication and consultation is a vital factor in the success of the cooperative partnership.

3. The model of cooperation developed based on the partnership between TSU and PGT in relation to human resource management

The purpose of cooperation is to increase the participation and role of higher education institutions from different disciplines to contribute to solve problems faced by the province. (Arifin,2016). The purpose of such cooperation is to apply the skills field in human resource management with the disciplines that occupied, guided by Tarlac State University (TSU) for the human development needs. In other words, the cooperation is carried out by both sides to bring benefits for the development of good governance and to bring broad benefits for the development of Provincial Government of Tarlac.

The data on the different capacity building seminars shows that in practice the agreement initiated by PGT with TSU is intended to empower the community. This indicates that the strengthening of cooperation within the context of consolidation of work programs oriented to the welfare of the province. While in the context of strengthening the capacity of human resources for the achievement of good governance is yet to be seen. As a solution, the local government sends staff and middle managers to attend trainings organized by both the PGT Human Resource and the TSU-ESO-PDS.

The data shows that the cooperation undertaken by the PGT include two things, namely in the context of the implementation of the basic tasks and functions in the field of legal requirements and supervision. Related to the duties and functions of government stipulated in the CSC Guidelines their functions included budget and supervision. Therefore, in strengthening the human resource capacity of PGT, TSU with PGT has designed model of training. This training scheme conducted by the government's desire to improve the understanding of the personnel, would be and present middle managers in performing tasks, functions, rights and obligations as an element of administration, has the right to follow the orientation and task knowledge.

Through the orientation of the scheme, the purpose of deepening the task of government workers is intended to improve the ability to perform basic task and functions of their work and to improve the attitude and spirit of dedication in carrying out the duties and functions as managers and personnel. In addition, the target to be achieved is to create synergy in the implementation of local government and increasing the quality of supervision of the delivery of local administration. Likewise, the purpose of education and training positions for Civil Servants is to improve service, quality, expertise, skills and abilities. The goal is related to knowledge, competence, dedication and loyalty to the province that has hired him.

Efforts to achieve the goal of education and training for civil servants was carried through two stages of training, namely, pre-service training and training of civil servants, as well as basic knowledge in order formation of national awareness, personality and ethics of civil servants, as well as basic knowledge of the system of governance, task areas, and its organizational culture to be able to carry out its duties and its role as a public servant.

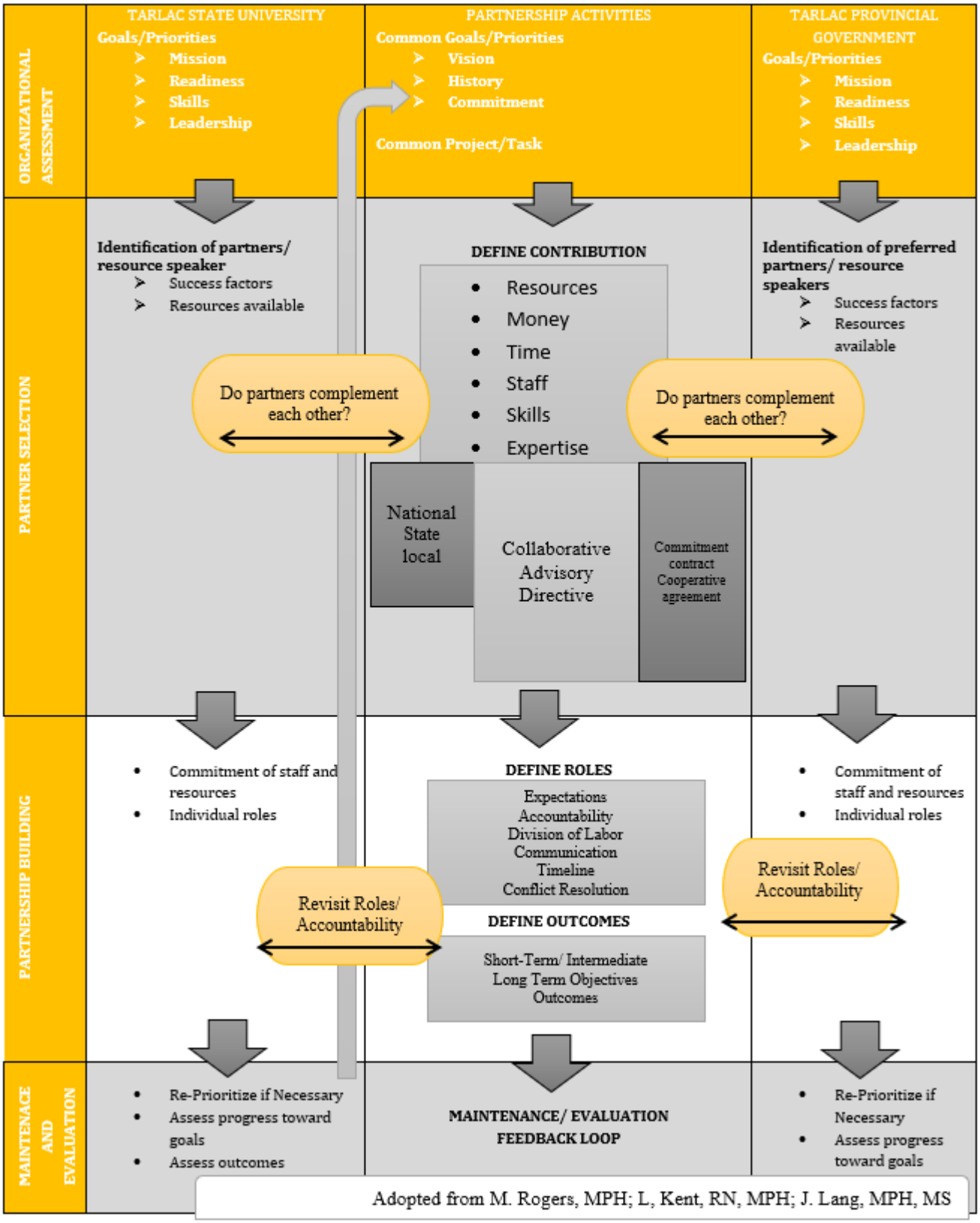

Figure 2.Cooperative Model of Partnership between PGT and TSU

Figure 2 shows the modified Cooperative Model of Partnership based form the TSU and PGT Experience. This was adopted from M. Rogers, MPH; L, Kent, RN, MPH; J. Lang, MPH, MS

The first column are the stages in choosing a partner and the necessary steps to take in order that cooperation between the two partners would be successful. The First Stage is Organizational Assessment where the partners need to see if they have commonalities in mission, if they are ready to partner, the skills needed are also there as well the leadership. These are considered for the success of the common project or task.

The next stage is Partner Selection where both parties assess the success factor of accomplishing the task with the other partner as well as if the resources needed could be met. At this stage, each partner will define the contribution each could give in terms of monetary, time, skills, expertise and other resources. They will have to examine both national, local and commitment they are going to bring on the table. When they complement, then they could already forge the commitment, Memorandum of Agreement or Understanding to seal the partnership.

On the third stage is the Partnership Building where each partner will define their roles and the outcomes they what to achieve in short or long-term objectives. These will be revisited regularly to keep the commitment of the staff and to revisit their individual roles.

Finally, the fourth stage is the maintenance and evaluation where the feedback loop is very essential for re-prioritizing when necessary as well as in assessing the progress towards goals and outcomes for TSU and PGT.

CONCLUSIONS

The following could be concluded based from the best practices of TSU-PGT Cooperative Model of Partnership:

1. TSU-PGT has established a Process of Model of Cooperation that considered factors influencing the emergence of effective partnerships, including recognition of the responsibilities, rights and limitations of partners, the need to focus on objectives and the relationship to results and the importance of different forms of coordination;

2. The need for appropriate guidelines and procedures for handling relationships and potential conflict, including skills in negotiation and conflict solution;

3. The importance of trust in relationships that are essentially voluntary and open communication especially in delivering the commitment of cooperation.

4. That there were benefits enjoyed by both TSU and PGT in the cooperative model of partnership which included the establishment of strategies, including adaptive, proactive and accommodating, to name three possibilities that can be combines over time in long-term relationships.

5. That a working Model of Cooperative Partnership was derived and modified based on the TSU-PGT experience.

RECOMMENDATIONS

Based on the findings, the following are recommended:

1. Adoption of the Model of Cooperative Partnership derived from the TSU-PGT may be used by other universities partnering with local government unit.

2. Finding commonalities and comparing perspectives should always be considered when finding a partner.

3. Linking stakeholders proactively to maximize outcomes and economies of scale would provide fresh

insights as well as ownership for those who will be participating.

4. Building capacity of all stakeholders and in their inter-relationship maybe considered as a priority especially for human resources.

5. Developing mutually-supportive policies, processes and operations to meet shared objectives and outcomes may be initiated.; and

6. Establishing moving targets of success and building on successes will always provide models to develop or modify as needed.

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EXTENSION-LED INTEGRATED RESEARCH AND DEVELOPMENT APPROACH FOR MICRO, SMALL AND MEDIUM ENTERPRISES

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Abstract

This paper presents the implementation of Extension-Led Integrated Research and Development (ELIRD) Approach for MSMEs. ELIRD Approach was innovated from the linear model of technology development and transfer from the researcher to extensionist to farmers which usually applied for agricultural extension. It highlights extension as driving force towards addressing technical capacity gaps and technology generation and transfer to address technological gaps and needs towards MSME development. It recognizes and build in the concept that ineffective participation of the end user or 'client' at various stages in the extension and research process limited their ability to proactively seek information and step up innovation. ELIRD Approach utilizes Multi-Model Extension Capacity Building Approach (MMECBA), Participatory Action Research (PAR) and Transfer of Technology (TOT) Model as inclusive and integral part of extension service delivery. The outcome from the implementation includes sustainable capacity building, industry-driven packaged technology and transferred and adopted technologies. This also addressed problems with generation of inappropriate technologies that are not suited the needs of the industry. It will bridge the weak links between research and extension. More so, it serves as an avenue of "learning by experience" both for the faculty experts and industry partner-beneficiaries while delivering timely and relevant technologies. Thus, this approach was found beneficial both for the university and the partner-beneficiaries as it builds strong industry-academe partnership that can significantly create changes and impact not only to the business sector but likewise to the community as whole.

Keywords: *MSMEs development, research and extension, approach in research and extension, industry-academe partnership*

INTRODUCTION

Extension is considered as a system that is integral and central to innovation system as it evolves (Davis and Heemsker,2012). Its focus of simply training the farmers has continuously evolves focusing on facilitating and learning of farmers. From the narrow and passive traditional role of agricultural technology transfer from research to farmers through extension services working for decades is being challenged relative to the changing situations within and beyond the areas of developing countries (Anderson and Feder, 2003).

The narrow and passive traditional role of improved agricultural technology transfer from research to farmers being played by extension services for decades is being challenged in view of changing situation both inside and outside developing countries (Adhikarya, 1994; Anderson and Feder, 2003). Public sector extension has come under increasing pressure to downsize and reform. Consequently, in a number of countries including Indonesia, Philippines, Ghana, Tanzania, Uganda, Colombia, Mozambique and Mexico (Anderson and Crowder, 2004). Other countries such as Iran, Malawi and Zimbabwe are considering decentralization of their extension systems (Venkatesan and Kampen, 2998). Various extension efforts and strategies from developing countries continuously evident as major concern towards agricultural development. In Costa Rica, the Government provides vouchers to farmers which they can use to purchase extension services from private practitioners. In Israel, extension is provided by the government and the private practitioners for meeting special extension needs Likewise in Uganda and Mozambique wherein the government attempt to come up with solutions to deliver services to farmers resulting to innovative contracting approaches and combined public and private institutional arrangements (Anderson and Crowder, 2004; Friis-Hansen, 2005).

In the Philippines, delivery of extension services continuously evolved from the agricultural extension concept during Spanish colonization period wherein establishment of model farms or the "Granjas Modelos" and later innovated into Settlement Farm Schools (Serrano, 1987). From these concepts the Government further strengthen the mandate of agricultural extension in the Philippines as it includes diffusion among the people of useful and practical information on and disseminating and imparting practical and scientific knowledge to stakeholders of the agriculture, aquatic, and natural resources (AANR) sectors on a typical illustration of a top-

down approach. It engaged various government line agencies including State Universities and Colleges who are mandated not just to deliver education but also to include Research and Extension.

In respond to this mandate, Tarlac State University (TSU) has proactively developed various programs and projects under its University Extension Services Office. One of which is the Industry Development Extension (InDEx) Program which supports the national agenda on Micro, Small and Medium Enterprises (MSME) Development as one of the vehicles towards community development. TSU as a technological University embraced the challenge to deliver and support the agricultural extension agenda through capitalizing on its expertise while continually innovating its extension approaches. It is from this context that an Extension-Led Integrated Research and Development (ELIRD) Approach for MSMEs was developed as an innovated extension approach for MSMEs' Development.

ELIRD approach was conceptualized to provide dated and timely extension cum research services to address technical capacity and the technology gaps of MSMEs. It draws inspiration and challenge from the linear model approach of technology transfer from researcher to the extensionist by highlighting the critical role of extension to lead technology generation and transfer while doing extension capacity building activities. This is to address further the problems with both generation of inappropriate technologies that are not suited to needs of the industry, farming conditions or social circumstances. It as well designed to address weak links between research and extension. It recognizes and build in the concept that ineffective participation of the end user or 'client' at various stages in the extension and research process has limited their ability to proactively seek information and step up innovation.

This paper presents and discussed the implementation of ELIRD Approach in the delivery of extension service to micro food enterprises of Tarlac.

OBJECTIVES

This paper generally aims to discuss the process of implementation of an Extension-Led Integrated Research and Development Approach for MSMEs. Specifically, this paper aims;

1. To discuss the process of implementation as applied to Micro Food Enterprises of Tarlac;

2. To describe the innovations from the ELIRD Approach;

3. To describe the outcomes from the application of ELIRD Approach to micro food processors of Tarlac;

4. To share the challenges and opportunities for improvement encountered in the implementation of ELIRD Approach to micro food processors of Tarlac.

METHODOLOGY

ELIRD Approach was initially implemented to micro food processors of Tarlac who seeks assistance of Tarlac State University to improve the process and the quality of their food products. Process of implementation of this integrated extension approach is discussed below;

1. Engaging Stakeholders

Stakeholders for the projects implemented using this integrated extension approach was done through the conduct of "Coffee and Collaboration Activity: Academe-Industry Partnership Program" through the collaboration of the University Extension Services Office (UESO), University Research Office (URO) and Technology Development, Transfer and Commercialization Office (TDTCO) headed by the office of the Vice-President for Research and Extension. In this activity, micro food enterprises of Tarlac were invited and research and extension programs of various colleges were presented through focused group discussions. Micro food processors who attended and signify interest signed a three-year Memorandum of Agreement and a Non-Disclosure Confidentiality Agreement between the University and the Partner-Beneficiaries. Service Request Forms were also made available to initiate service delivery.

2. Participatory Need Assessment

Planning of activities employed a participatory approach, since the micro enterprises themselves would benefit from the intervention provided to them. This approach evoked a sense of ownership on the part of the partner-beneficiaries as they were given the privilege to get involved and voice out their ideas. On-site consultation meetings and focus group discussions were employed and conducted with the partner-beneficiaries in order to solicit ideas or opinions that significantly mattered to them and incorporated these in the extension interventions delivered. From this participatory need assessment technology and technical capacity gaps were identified and packaged into Extension Project Proposal.

3. Extension Project Implementation through Extension-Led Integrated Research and Development Approach

From the identified technical capacity and technology gaps of micro food enterprises packaged in approved Extension Proposal, ELIRD Approach was implemented using the following methods;

a. Multi-Model Extension Capacity Building Approach

From these identified technical capacity gaps, technical assistance was provided through Multi-Model Extension Capacity Building Approach (MMECBA). This included science and Technology-based Consultancy Services, Informal/Unconventional Methods of Transferring Knowledge and Skills through customized trainings, facilitated write shops and coaching and mentoring activities. MMECBA also included holistic approach wherein activities conducted were focused not only on the development of knowledge and skills among micro food enterprises but also on the development of their attitudes, values, and outlook. The project team believes that technical knowhow is useless if not coupled with proper attitudes and values as well as a positive outlook. Finally, this multi-model approach encourages partner-beneficiaries to regard all project activities as an integral part of their daily lives. Such that, project terminates upon completion, but its target outcomes must become the beneficiaries' way of life.

b. Participatory Action Research

Identified technological gaps are addressed through the application of PAR along with MMECBA. Through the application of PAR, the faculty expert serves as extensionist and as a researcher at the same time with the partner-beneficiary as the co-researcher. Technology development was conducted through trial and error using the initial technology the partner-beneficiaries until the needed technology was generated. The process included the provision of concepts, experimental designs and other technical inputs by the faculty expert to the partner-beneficiary. This was done through on-site meeting, consultations and orientations with the partner-beneficiary wherein identified opportunities for improvements, possible causes or associated problems as well as the corresponding innovations are discussed in simplest form of interpretation. Notes were also given to serve as a guide in the process of technology development. To ensure that guidelines and directions provided are fully understood the faculty expert tasked partner-beneficiary to discuss the process to be undertaken prior its implementation. The partner-beneficiary, as co-researcher, implements and process the design and technical inputs provided following the guidelines, designs and concepts provided by the faculty expert. Unstructured data gathering was employed in the process of technology development. It focused more on the direct perception and observation of the partner-beneficiaries and their closed group customers and consumers as the expert panel who provided data and observations from each trial and error. Data and observations were processed and analyzed by the faculty expert and the partner-beneficiary. As the case required, results were validated through applicable test.

c. Packaging of Technology

Once the desired technology was achieved and the gap was addressed based on the need and available resources of the partner-beneficiaries, packaging of the technology was done. It included proper documentation of technology in coordination with the URO. This included among others the documentation of methods, data and observation and conclusion ready for patent application. Finally, the documented output is submitted to TDTCO to facilitate the patent application process.

d. Transfer of Technology

Alongside with the patent application, technology generated is formally transferred to the partner-beneficiaries through continuous facilitation by TDTCO and UESO. Transfer of technology was done through signing of a Non-Exclusive Technology Transfer Agreement between the University and the Partner Beneficiaries.

4. Project Sustainability Plan

As the extension intervention builds strong foundation with the partner-beneficiaries, preparation of sustainability plan became an integral part of the project implementation. The partner-beneficiaries provided their commitment as to application of their learnings on their business endeavors. On the other hand, UESO conducts monitoring and follow up "kamustahan" with the partner-beneficiaries.

5. Documentation Program

The documentation of the entire project implementation follows the established documentation system of the University in compliance to the requirements of its Quality Management System (ISO 9001:2015). More so, packaging of the documents complied with the minimum requirement for SUC Leveling and Program Accreditation Requirements.

DISCUSSION/INNOVATIONS

The implementation of the ELIRD Approach in the delivery of extension services highlights the following innovations and outcomes.

1. Innovations from Linear Model of Research and Extension to Extension-Led Integrated Research and Development Approach

Figure 1.0 below presents the innovation on the approach from the linear model of Research and Extension. The figure shows that from the usual model that Research comes first, the ELIRD Approach brought research as the center of extension intervention.

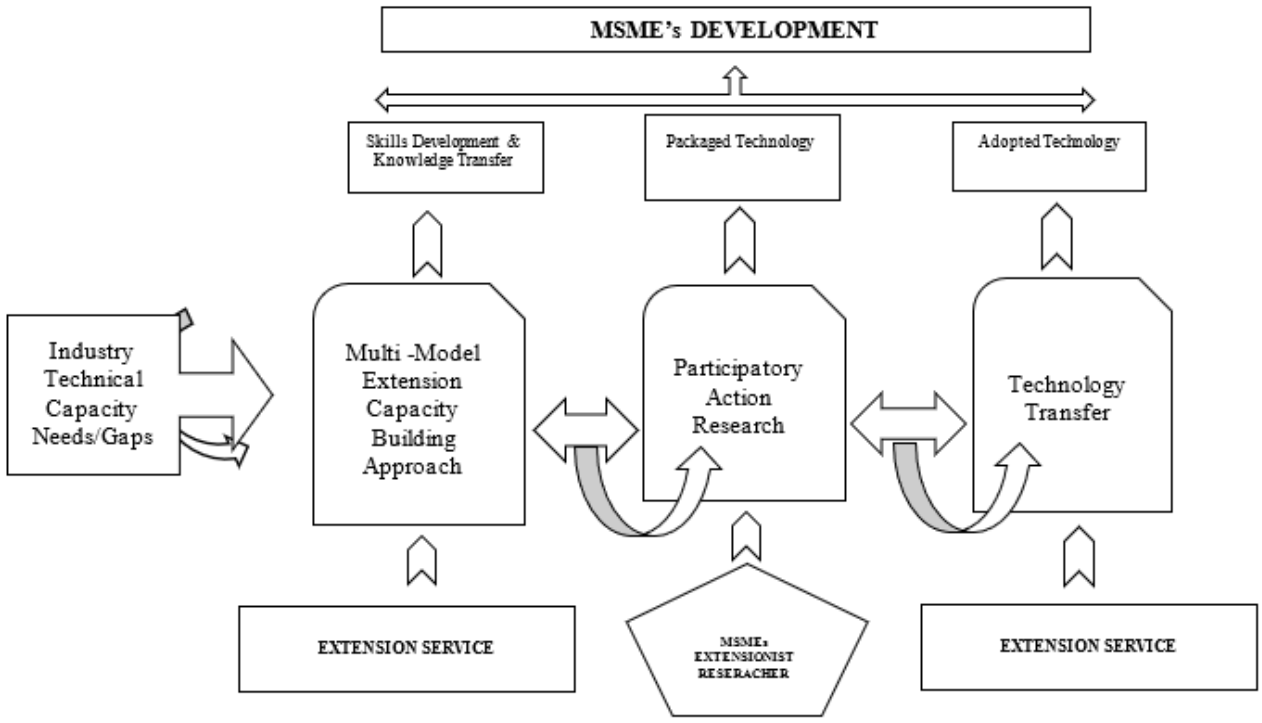

Figure 1. Extension-Led Integrated Research and Development (ELIRD) Approach

The ELIRD Approach highlights the role of Extension to lead technology generation and transfer as it address and builds sustainable technical capacity of the partner-beneficiaries. In terms of outputs, from the usual capacity building output from extension, ELIRD Approach unfolds packaged technology which are outright adopted and implemented by the partner-beneficiaries. Furthermore, ELIRD Approach introduces the following innovations from its implementation.

Table 1. Innovations from Linear Research-Extension Approach and ELIRD Approach

Parameter	Linear Approach	ELIRD Approach
Capacity Building	Focus on using the technology generated	Multi-model focusing on technical capacity and technology generation
Technology Interface	From research to extension to client	From extension with the client to research with the client
Technology Generation	Bureaucratic research process from proposal to approval to implementation by the academe	Participatory research process implemented by the partner-beneficiary and the academe
	Laboratory Generated Technology	Extension and Industry-Led generated technology
Technology Transfer	Market-matching	Market-driven
Faculty Role	Researcher and Extensionist	Extensionist cum mentor cum researcher
Documentation	From research proposal to extension proposal	Extension-Led Research Output
Client Role	Beneficiary	Partner- beneficiary cum co-researcher

Table 1 presents various innovations introduced by ELIRD Approach compare to the traditional linear research and extension model. It shows that using ELIRD Approach provide more room for flexibility and timely delivery of the services need from extension and research. It brought about changes on how extension can deliver more than just capacity building towards development. It builds stronger collaboration between the client and the academe as they work together as a team through the participatory approach. ELIRD Approach likewise provides sustainable capacity building and eliminates more waiting time of technology generation and transfer due to the usual bureaucratic process of funded research and extension activities. ELIRD Approach also facilitates easier and faster transfer of technology as it developed and validated by the target beneficiaries. Furthermore, it also unfolds possible interventions that can bring out the best from faculty experts and maximize their potential from plain extensionist to a researcher and a mentor. Finally, it boosts confidence and highlights the role and importance of beneficiaries not just as client but as partners, mentees and co-researchers.

2. Outcomes of ELIRD Approach

More than the above innovations on the approach, various extension and research outcomes likewise unfold from its implementation. Table 2.0 presents the outputs and outcomes of the ELIRD Approach implementation to micro food processors of Tarlac from 2016 to June 2018.

Table 2. Extension Outcomes from ELIRD Approach Implementation from 2016 to June 2018

Parameter	Output	Outcomes
Number of Extension Projects Implemented	10	Provided sustainable capacity building among micro food enterprises on areas of food safety, quality control and assurance system and product development
Number of Linkages Forged	15	Industry- Academe Linkage
Number of Technology Generated	15	2 with approved Utility Model from IPO, 8 patent applications, 5 for patent application
Number of Adopters	10	Business application; Employment Generation.

ELIRD Approach application resulted to capacity building of the partner-beneficiary through acquisition of technical know-how on the conduct of research and development of their food products and other technical capabilities on quality control, food safety and production management. It also generated and transferred technologies of improving the process, stability and quality of products.

CONCLUSIONS

In general, ELIRD approach is concluded to be used as alternative approach of providing extension services for MSMEs' development. More so, the following are concluded;

1. ELIRD Approach introduces flexibility from the linear research-extension model;

2. ELIRD Approach can be used to deliver timely and market driven capacity building and technology generation;

3. Extension can lead technology development and transfer;

4. Faculty experts' potential can be further maximized;

5. Clients can play a vital role as partner-beneficiaries in the delivery of extension services and generation of market driven technologies.

RECOMMENDATIONS

With forgoing discussions and conclusions, the following are recommended;

1. Explore application of ELIRD Approach to other industry sectors;

2. Continually validates ELIRD Approach as applied to community development projects;

3. Explore integration of other methods of research as applicable to sectoral development of the community.

4. Evaluate quantitatively the effectiveness of ELIRD Approach in the delivery of developmental extension projects.

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ELECTRICAL SYSTEM DESIGN ALGORITHM FOR MICRO, SMALL AND MEDIUM ENTERPRISES

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Abstract

An electrical plan is a crucial portion of plans for the construction of a facility because it is responsible for numerous building functions such as power, lighting, heating, cooling, ventilation and safety. It is imperative in the permitting needs for the Office of the Building Official in the local government unit (LGU) and for the electric utility company, a guide for electricians on the location and quantity of electrical devices, sizing of wires and overcurrent protection, and it provides information for the cost estimates and even as a reference for future expansion of the facility; all mentioned are statutory requirement of the Philippine Electrical Code. The paper presents an algorithm developed to meet the above minimum requirements of the Philippine Electrical Code on electrical design and safety. It comprises two important procedures, the pre-design phase and the design phase, while it concentrates on the objective of optimization of the electric system of the building in terms of circuit requirements and maximum protection at minimum sizing of conductors. To demonstrate the methodology developed, an extension support service has been carried out on the electrical assessment and layout for micro-food processor of Tarlac. It is envisioned that the methodology developed will be further enhanced in future applications.

Keywords: *electrical system, statutory requirement of the Philippine Electrical Code, electrical design and safety*

INTRODUCTION

The Bureau of Fire Protection (BFP) pointed out that fire is one of the worst killing accidents throughout the Philippines. From 2010 to 2015, every year the average fire incidents nationwide are 12,289, the average cost of fire damage is Php 3.67 Billion, the average injuries 793 and the average deaths is 268 (CNN Philippines, 2016). And fire incidents affecting business establishments are increasing from 2016 to 2017. The BFP said that the leading cause of these fire incidents in the past years were caused by electrical short circuits and overloaded circuit (Arado, 2017).

The electrical circuit in a building can become overloaded when too many electrical devices are plugged into the electrical system. The electrical circuit of a system is designed to handle a specific amount of electricity for the electrical devices and equipment and to provide protection to these properties and to the occupants. Addition of electrical equipment should be anticipated in the electrical system design.

The evaluation of the electrical design of a building is crucial because the safety of property and life depends on it. An electrical design is needed in the processing of building permit in the local municipality, a requirement in the application of electric meter in the electric utility, and a guide to the electrician which gives information on the location and quantity of electric devices and lighting. The electrical plan also provides the schedule of loads that indicates the sizing of wire and the maximum interrupting capacity of the breaker, a basis for cost estimates and also a reference for future expansion of the building. Therefore, an optimum electrical design of a building is one of the fundamental plans for construction that must be done in accordance with the safety standards.

In this perspective that the Micro, Small, Medium Enterprises (MSMEs) of Tarlac sought the technical assistance of the Tarlac State University Extension Services Office (UESO) in the preparation of their electrical layout compliant to safety standards. The request was mainly to provide them an electrical plan based from their load requirements. However, the process of the design analysis using the code requires time consuming computation and cross-referencing to the tables and sections of the code for the application of the demand factors, sizing of conductors and sizing of protective devices. To provide the technical assistance to these MSMEs, the extension providers thought of developing an algorithm in electrical design analysis which will produce faster and accurate computations in accordance with the safety standard of the Philippine Electrical Code (PEC).

OBJECTIVES

The main purpose of the project was to provide technical assistance in the preparation of electrical layout compliant to safety standard to the micro, small and medium enterprises (MSMEs) of Tarlac using the developed PEC-based electric system design algorithm. Specifically, the project aimed to:

1. Evaluate the load requirements of the micro, small and medium enterprises (MSMEs) of Tarlac;

2. Develop an electric system design analysis algorithm compliant to the requirement of the Philippine Electrical Code (PEC) for the micro, small and medium enterprises (MSMEs) of Tarlac; and

3. Implement the algorithm developed by estimation of the circuit requirements, maximum interrupting capacity of the overcurrent protection device, and minimum sizing of conductors of a micro, small and medium enterprise (MSME) in Tarlac.

METHODOLOGY

1. Scope of the Project

The request to provide technical assistance in the preparation of electrical layout was forwarded by the University Extension Service Office (UESO) as a result of the Coffee and Collaboration event- an academe and industry partnership building. The electrical plan is needed for the MSMEs in acquiring permit to operate and in their application of financial assistance to support their business. Upon receipt of the request, the faculty of the department submitted extension project proposal to the UESO and they were given special order to be the consultants of the project. To determine the project scope, the consultants conducted a requirement analysis which will determine the client load requirements. This included survey visit on the facility and on-site meeting with the partner beneficiaries. After obtaining the essential data, the consultants proceeded in the designing the electrical plan.

2. Algorithm Development

2.1. Review on the minimum requirements of the Philippine Electrical Code (PEC) 2017

Familiarization and review of the requirement of the PEC 2017 Edition was needed in designing the step-by-step methodology of the electrical analysis and computations to produce an electrical plan compliant to code standards.

2.2 Mathematical modeling

Mathematical modeling included preparation of the equation needed in the computation of load schedule and design analysis.

2.3 Implementation of the developed algorithm

The developed algorithm was used in the computation of the load schedule and design analysis of a MSME in Tarlac.

DISCUSSION/INNOVATIONS

The established electric system design algorithm is a methodology that produces a precise result in the estimation and calculation of the electrical design for single micro, small and medium enterprises (MSMEs) using the Philippine Electrical Code 2017 Edition.

1. Evaluation of the load requirements of MSMEs of Tarlac

An on-site survey and interview with the beneficiaries were needed to enumerate the load requirements of the MSMEs and to list the future loads they are planning to add in their facility. The electric service voltage of the distribution utility, number of phases, wires and frequency was also an important detail in the design.

2. The Electric System Design Analysis Algorithm

The general overview of the algorithm developed is presented in Figure 1.

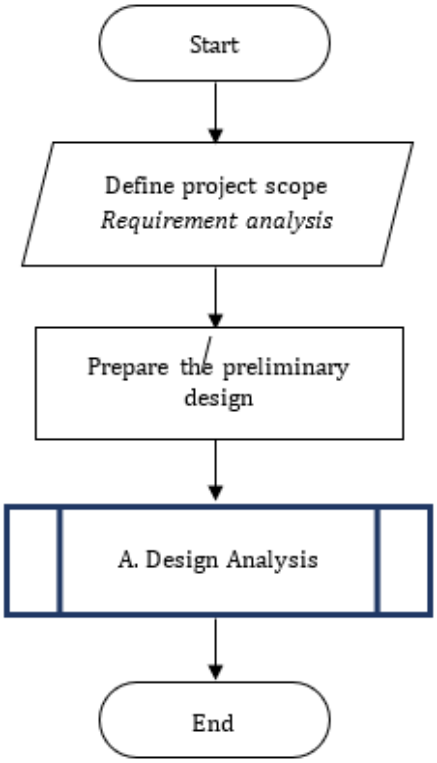

Figure 1. Electric System Design Algorithm Overview

The initial procedure in the algorithm is definition of the project scope. This comprises client requirement analysis which determines the type and the loads of the facility and the nature of electrical service, including the number of phases, number of wires and the frequency.

2.1 Preparation of the Preliminary Design

The preliminary design includes the load schedule which is tabulated information of the branch circuit number, description of electrical loads, quantity and their volt-ampere rating. The volt-ampere rating of each load is usually found in their nameplate.

2.2 Design Analysis

The design analysis shows the branch circuit and service entrance calculation, ratings and trip settings of overload protective devices and its interrupting capacity using the calculation of short circuit current and of voltage drops.

The algorithm's subroutine A is described in Figure 2. It consists of two main computations of loads- for the branch circuit and then for the service entrance. This computation of current loads will be the basis in the specification of conductors and protective devices based on the requirement of the PEC 2017 Edition. All articles and sections mentioned in this project were based from the PEC 2017 Edition.

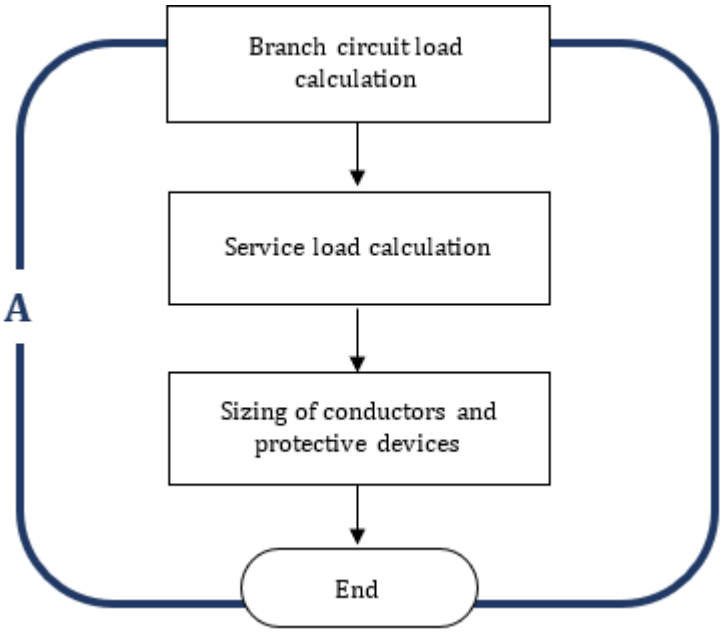

Figure 2. Flowchart for subroutine A-Design Analysis

2.2.1Branch circuit load calculation

The branch circuits are lighting, small appliance and the individual branch circuit like air-conditioning unit and kitchen rage appliance. These individual branch circuits are motor loads and specialized equipment that are high current loads. Each branch circuit load current in Ampere is calculated using Ohm's Law.

$$I = \frac{VA}{V}$$

Equation. Branch Circuit Load Current Formula

The Volt-ampere (VA) rating of each device is divided by the supply voltage (V) of the local distribution utility.

For single-phase motor rated in Horsepower, Table 4.30.14.2 Full-Load Currents in Amperes, Single-Phase Alternating-Current Motors specifies the full-load currents for system voltages ranges of 110 to 120 and 220 to 240 volts. These ratings will be the basis of the load of the branch circuit for individual single-phase motor loads.

2.2.3 Service load calculation

The calculated service load "shall not be less than the sum of the loads on the branch circuit supplied, after any applicable demand factors have been applied", as stated in Section 2.20.3.1 of Article 2.20.3Feeder and Service Load Calculations. And from (1) of Section 4.30.2.4 of Article 4.30.2 Motor Circuit Conductors, "conductors supplying several motors, or a motor(s) and other loads, shall have the ampacity not less than of 125 percent of the full-load current rating of the highest rated motor". From these requirements, the formula to be used to compute the service current is:

$$I_w = \frac{VA_{total} + (0.25 \times VA_{highest\ rated\ motor})}{V}$$

Equation 2. Service Load Current Formula

Where is the sum volt-ampere of the system, is thevolt-ampere rating of the highest rated motor and is the supply voltage of the electric distribution utility.

The current of the protective device computation is based from maximum rating or setting of motor branch-circuit short circuit and ground fault protective device. In accordance with Section 4.30.4.2 of Rating or Setting for Individual Motor Circuit, "a protective device that has a rating or setting not exceeding the value calculated according to the values given in the Table 4.30.4.2 Rating or Setting for Individual Motor Circuit shall be used. From these, the formula for the current of the protective device is:

$$I_{cb} = \frac{VA_{total} \times (Percentage\ of\ full\ load\ current \times VA_{highest\ rated\ motor})}{V}$$

Equation 3. Service Short-circuit Current Formula

2.3 Sizing of conductors and protective devices

2.3.1 Branch Circuit

The size of conductors for branch circuits shall have an ampacity not less than the maximum load to be served by the circuit as stated in Section 2.10.2.2 (A) (1) of Conductors- Minimum Ampacity and Size. While the branch circuit shall be protected by overcurrent device that have rating or setting not greater that complies with Section 2.10.2.3 (A) through (D), as will be discussed per type of branch circuits.

Using equation 1 as reference for the load of each branch circuit, the sizing of the conductor will be based from Table 3.10.2.6 (B) (16) Allowable Ampacities of Insulated Conductors Rated Up to and Including 2000 Volts, 60°C Through 90°C, Not More Than Three Current-Carrying Conductors in Raceway, Cable, or Earth (Directly Burried), Based on Ambient Temperature of 30°C. Then, the rating of the protection device shall not be greater than the ampacity of the branch circuit for lighting load. The standard rating of the circuit breakers is listed in Table 2.40.1.5 (A) Standard Ampere Rating for Fuses and Inverse Time Circuit Breakers.

The grounding conductor for the circuit will be determined from the rating of the protection device and its size will be based from Table 2.50.6.13 Minimum Size Equipment Grounding Conductors for Grounding Raceway and Equipment, in reference to the rating or setting of the protective device. To get the size of conduit, conversion of the size of wire from mm2 to AWG will be based from Appendix C- Conduit and Tubing Filling Tables for Conductors and Fixture Wires of the Same Tube. The sizing of the conduit is in accordance from Table C.11 Maximum Number of Conductors or Fixture Wires in Rigid PVC Conduit, Schedule 40 and HDPE Conduit. The discussed references are summarized in Table 1.

Table 1. Summary of Reference Table from PEC 2017 Edition for Sizing of Conductors and Protective Device

Branch Circuit	**Branch Circuit Load, Ampere**	**Conductor Size, mm^2 (THHN Cu)**	**Protection Device, AT**	**Ground, mm^2 (TW Cu)**	**Conduit (PVC)**
Number/ Type	Equation 1 For motor branch circuit, use equation 5	Table 3.10.2.6 (B) (6)	Table 2.40.1.5 (A)	Table 2.50.6.13	Table C.11

2.3.1.1 Lighting Branch Circuit

According to the Section 2.10.2.5 (A), 15- and20-ampere branch circuits shall be permitted to supply lighting units or other utilization equipment, or combination of both. In addition, from Section 2.20.2.3 Lighting Load for Specified Occupancies, the computation of the lighting load is based from the type of occupancy. From Table 2.20.2.3 General Lighting Loads by Occupancy, for every type of occupancy, there is an equivalent unit load volt- ampere per square meter applicable. Where total lighting load is:

$$Total\ lighting\ load = Floor\ area \times lighting\ load\ constants$$

Equation 4. Total Lighting Load by Occupancy

The floor area should be in square meters while the lighting load constants will be based from Table 2.20.2.3.

Also, the use of the actual wattage rating of the lighting equipment may apply. Using equation 1 to compute for the load of the branch, the sizing of conductors and protective device for this branch will be based from Table 1.

2.3.1.2 Small-Appliance Branch Circuit (Convenience Outlet Branch Circuit)

In addition to the number of branch circuits required, according from Section 2.10.1.11 (c) (1) Small Appliance Branch Circuit, two or more additional 20-ampere small appliance branch circuits shall be provided for all receptacles. Receptacle outlets shall be calculated at not less than 180 volt-amperes for each single or for multiple receptacle in one yoke. For four or more receptacle shall be calculated not less than 90 volt- ampere per receptacle, Section 2.20.2.5 (i) Receptacle Outlets. The computation for sizing of conductor and protective device will be based also from Table 1.

2.3.1.3 Motor Branch Circuit

The protective device for motor branch-circuit and ground fault protective device shall be capable of carrying the starting current of the motor and in accordance with Table 4.30.4.2 Maximum Rating or Setting of Motor Branch-Circuit Short-Circuit and Ground- Fault Protective Devices, a protective device that has a range or setting not exceeding the value calculated according to the given values in the table shall be used.

Therefore, the formula of the reference load of the individual motor circuit that will determine the protective device is:

$$I_m = I \times Percentage\ of\ full\ load\ current$$

Equation 5. Computation of Load of the Individual Motor Circuit

Where I is the current of the branch circuit or the motor using equation 1 while the multiplier will be based from Table 4.30.4.2. Afterwards, sizing of conductor and protective devices will be in accordance from Table 1.

2.4 Service Entrance

Based from the computed value of the current of the protective device from equation 3, choose a main circuit breaker in Table 2.40.1.5 (A). The rating of the protective device should not be greater than the ampacity of the conductors.

The size of the wire for service entrance will be based from the computed value on equation 2. Select a wire in Table 3.10.2.6 (B) (6) having an ampacity equal or greater than the rating of the circuit breaker or the protective device. Specify a size of RCS conduit from Table C.9based from the service entrance size of wire in AWG. Also, the grounding of the system in TW Cu will be based from the selected size of wire in mm2 in Table 2.50.3.17 Grounding Electrode Conductor for Alternating –Current Systems.

3. Implementation of the Developed Algorithm in the Estimation of the Electrical System Design of an MSME in Tarlac

A calamansi beverage manufacturer in Tarlac was used to demonstrate the methodology developed in electrical system design analysis.

The University Extension Services Office (UESO) assisted the said MSME in the layout of its production facility compliant to the requirements of Good Manufacturing Practices. It also acquired new equipment through the Small Enterprises Technology-Upgrading Program (SET-UP) of Department of Science and Technology (DOST) for the improvement of their production process to ensure their compliance with food safety requirements. And to safeguard its facility and the occupants, the calamansi juice manufacturer became one of the clients of the department on technical consultancy in the preparation of electrical layout compliant to safety standards under the Index program of the UESO.

3.1 Preparation of the MSME load schedule

Based from the on-site survey and interview with the beneficiaries, the electric service is 230V, single phase, two-wire, grounded and 60Hz. The loads of the MSME are lighting and food processor equipment which are as follows:

Table 2. The Load Requirement of the MSME

Quantity	Load Description
14	Lighting outlet, Exhaust Fan
16	Lighting outlet
20	Convenience outlet
1	3 Hp Extractor
1	1 Hp Slicer
1	1 Hp Pump
1	1 Hp Washing Conveyor
1	0.5 Mixer
1	0.5 Pasteurizer

The ratings of the motor loads were in Horsepower (Hp). These ratings were converted to Volt Ampere (VA) as shown in Table 3 using Table 4.30.14.2 of PEC that indicates the full load current of an Hp-rated motor at 230 volts. The motor loads were numbered individually as branch circuits while the convenience outlets were grouped into two branches- 9 convenience outlet and 11 convenience outlets. The other branch circuits were 14- lighting outlet with exhaust fan and 16- lighting outlet. These were the input data for the load schedule. The circuit numbers are as shown in Table 3.

Table 3. The MSME Load Schedule Input Data

Circuit No.	Load Description	Quantity	VA Rating
1	Lighting outlet, Exhaust Fan	14	1400
2	Lighting outlet	16	1600
3	Convenience outlet	9	900
4	Convenience outlet	11	1100
5	3 Hp Extractor	1	3910
6	1 Hp Slicer	1	1840
7	1 Hp Pump	1	1840
8	1 Hp Washing Conveyor	1	1840
9	0.5 Mixer	1	1127
10	0.5 Pasteurizer	1	1127

3.2 Design Analysis

3.2.1 Branch Circuit

Each branch circuit load in Ampere were computed using equation 1. For circuit numbers 1 through 4, the size of conductor based from the current value is 2-3.5mm2 THHN Cu as seen from Table 3.10.2.6 (B) (6). A 3.5mm2 THHN Cu has an ampacity of 30, therefore protection device rating is 20 AT as stated in Table 2.40.1.5 (A) and Section 2.10.2.3. The size of grounding conductor for a 20 AT circuit breaker is 2-3.5 TW Cu from Table 2.506.13. And the specification of the PVC Conduit for a 3.5mm2 or 12 AWG from Appendix C is 15 mm in diameter in accordance with Table C.11.

For the individual branch circuit of motor load, the basis for the size of the conductor on each branch was equation 5, where the current of the branch was multiplied by the motor percentage of full load current. The motor loads are single-phase motors and the percentage of full load current is from Table 4.30.4.2 is 250. The analysis resulted to a 20 AT circuit breaker as enough to protect branch circuit numbers 6 through 10. However, branch circuit 5- a 3 Hp extractor has a 42.5-Ampere load. A 2-8.0THHN Cu mm2 was required and a 50 AT circuit breaker for the said branch circuit. The size of the PVC conduit for the specified size of conductor is 15 mm in diameter and the identified grounding for a 50 AT circuit breaker was 2-5.5 mm2 TW Cu.

The result of the analysis is presented in the Table 4.

Table 4. Schedule of Loads of the MSME

Circuit No.	Description	Qty.	VA	Amperes	Circuit Breaker, Ampere Trip	Conductor (THHN Cu) mm^2	Ground (TW Cu) mm^2	Conduit (PVC) mmΦ
1	Lighting Outlet, Exhaust Fan	14	1400	8.090	20	2-3.5	3.5	15
2	Lighting Outlet	16	1600	6.960	20	2-3.5	3.5	15
3	Convenience Outlet	9	900	3.910	20	2-3.5	3.5	15
4	Convenience Outlet	11	1100	4.780	20	2-3.5	3.5	15
5	Extractor 3 Hp	1	3910	17.000	50	2-8.0	5.5	15
6	Slicer 1Hp	1	1840	8.000	20	2-3.5	3.5	15
7	Pump 1Hp	1	1840	8.000	20	2-3.5	3.5	15
8	Washing Conveyor 1Hp	1	1840	8.000	20	2-3.5	3.5	15
9	Mixer 0.5 Hp	1	1127	4.900	20	2-3.5	3.5	15
10	Pasteurizer 0.5 Hp	1	1127	4.900	20	2-3.5	3.5	15
11	Spare							
12	Spare							

3.2.2 Service Entrance

The computed current of the system- Iw, using equation 2 with the application of the 125 percent of the full-load current rating of the highest rated motor was 74.54 Ampere. While the calculated load of the circuit breaker for service entrance-Icb with the application of the percentage of full load current of 250 for single-phase motor was 84.54 Ampere.

The rating of the circuit breaker for an Icb of 84.54 Ampere is 100 AT. The size of wire selected for the service entrance was that of having an ampacity equal or greater than the rating of the circuit breaker was 2-30mm2 THHN Cu. The grounding conductor was 1-8.0 mm2TW Cu for 2-30 mm2 THHN Cu. The identified RSC conduit for the system of 2 AWG wire (2-30 mm2 THHN Cu) was35mm2.

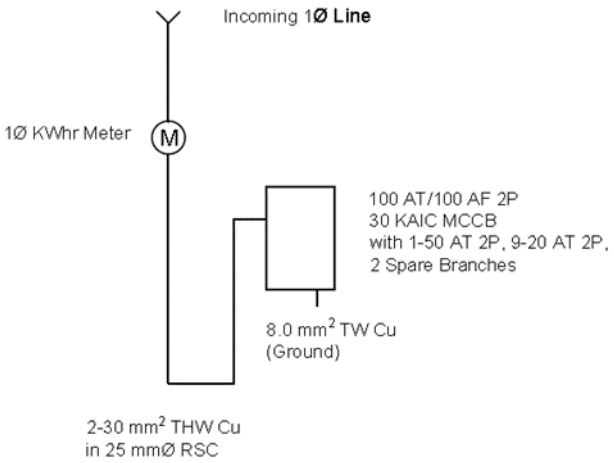

Figure 3. Single Line Diagram of the Service Entrance

Figure 3 summarizes the results of the computation for the sizing of conductor and protective device for the facility of the MSME.

CONCLUSION

The utilization of the algorithm or methodology developed in designing an electrical system for a MSME simplifies the analysis in load calculation and sizing of conductor and protective devices since using PEC without a process is time consuming and prone to errors. With the flowchart and direct cross-referencing with the safety standard of the code, the experts have design with ease an electrical layout for the MSME in Tarlac.

The algorithm was also implemented in designing the electrical system layout of the other MSMEs client of the program.

RECOMMENDATION

To upgrade the developed algorithm, the experts suggested the implementation of the methodology into a software to produce faster and accurate results. Also, since the algorithm focuses only to MSMEs with single phase service, it is suggested to consider other types of occupancies.

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MULTI-MODEL EXTENSION CAPACITY BUILDING APPROACH FOR THE AGRARIAN REFORM BENEFICIARIES IN HACIENDA LUISITA, TARLAC

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University Extension Services Office

Abstract

This paper presents the approaches of Tarlac State University (TSU) as a Professional Service Provider (PSP) in the implementation of Agrarian Reform Communities Connectivity and Economic Support Services (ARCCESS) Project implemented to the Agrarian Reform Beneficiaries Organizations (ARBOs) in Hacienda Luisita in the province of Tarlac. The use of a MMECB Approach was designed and developed to suit the condition of the ARBs in Hacienda Luisita. It integrates the various approaches towards an empowered and capacitated farmer. The implementation of MMECB Approach resulted to the delivery of targeted plans and activities, encouraged active participation of the ARBs in organizational and management of common service facilities, and increased in technical know-how in various agri-technology and crop production of farmers. Indeed, it has been validated that the approach used is effective considering the slow shift of ARBs' perspective towards agri-business management. However, ambivalent/indifferent attitude among some ARBO leaders is seen to hinder the success of the project and the approach developed. In the end, the purpose of this paper is to share the approach established and the issues and challenges encountered to better assist other farmers and communities in attaining sustainable development.

Keywords: *Agrarian Reform Beneficiaries Organization, Multi-Model Extension Capacity Building Approach*

INTRODUCTION

> *Success of extension depends on what type of extension approach being used or implemented to assist the partner beneficiaries. Therefore, the use of innovative approaches and strategies is indeed imperative to attain the overall goal of extension services. VJDS, 2018*

There are various forms of agricultural extension services exist throughout the world. It plays a pivotal role in addressing challenges that farmers are facing. It ensures that the farmers have access to improved and proven technologies and that their concerns and needs are properly addressed by relevant service providers. It contributes to improving the welfare of farmers and other people living in rural areas as extension advisory services and programs forges to strengthen the farmer's capacity to innovate by providing access to knowledge and information and facilitate learning and extend new knowledge and technologies in non-formal educational settings to improve agricultural productivity and increase farmers' incomes. (USAID, 2002; Suvedi and Kaplowitz, 2016)

It is said that the success of extension depends on what type of extension approach being used or implemented to assist the partner beneficiaries (farmers). The use of innovative approaches and strategies is indeed imperative to attain the overall goal of agriculture extension services.

Several agri-extension services such as farming systems development approach which maintain close ties with research are required and technology for local needs is developed locally through an iterative process involving local people; training and visit approach which is based on a rigorously planned schedule of visits to farmers and training of agents and subject matter specialists and maintained closed links between research and extension; and agricultural extension participatory approach which intends to center on the expressed needs of farmers' groups and its goal is increased production and an improved quality of rural life (Kromah, 2016) are used by many countries to enhance and support the livelihood of the farmers. These approaches goes to one direction, "to improve the living conditions of the people particularly in the marginalized and depressed communities".

In the Philippines, aside from the approaches previously mentioned, the use of traditional cooperation mechanism like "bayanihan", "alayon" or "dagyaw" in demonstrating technologies in the farms of interested adopters; involves farmers in knowledge development through the conduct of on-farm experimentation; undergo capacity building, this is often called as Farmer-Based Extension (FBE) or Farmer-Led Extension (FLE) (Trainer's Manual on Agricultural Extension And Land Management).

As one of the agencies which promotes platforms for continuous innovation of approaches and strategies, along with the fulfillment of its vision "to be a premier university in the Asia-pacific region", the Tarlac State University partnered with the Department of Agrarian (DAR) as a Professional Service Provider (PSP) to implement the Agrarian Reform Communities Connectivity and Economic Support Services (ARCCESS) Project to the Agrarian Reform Beneficiaries Organizations (ARBOs) in Hacienda Luisita, province of Tarlac. The engagement was timely since, the provision of support intervention immediately followed after the lands has been awarded in Hacienda Luisita in 2013. This is in pursuant under the Republic Act 9700, otherwise known as Comprehensive Agrarian Reform Program Extension with Reforms (CARPER) Law. It can be noted that these ARBs are farm workers from the sugarcane plantation in Hacienda Luisita Inc. and these farm workers have a little, less or no experience from planting other crops aside from sugarcane (Samson, 2017).

Considering a unique condition in Hacienda Luisita, it is a challenge therefore for the University to develop strategies and approaches which can easily be grasped by the ARBs. This led to the development of a Multi-Model Extension Capacity Building (MMECB) Approach. It intends to integrate the above-mentioned approaches and other extension strategies towards a capacitated and empowered farmer. Continuous validation of the approaches during implementation was done by the PSP and at the end of the project implementation in 2017 and considered adding appropriate methods and approaches as part of its opportunities for improvement.

This paper includes the discussion on the accomplishment as a result of the implementation of the approach used and challenges and opportunities that could possibly be undertaken to improve the existing delivery of extension services in ARBs and rural communities.

OBJECTIVES

Generally, this paper aims to present the Multi-Model Extension Capacity Building (MMECB) Approach used in the implementation of the ARCCESS project to the ARBs in HL. Specifically, it aims to:

1. Describe and discuss the process and implementations of the MMECB Approach by TSU to the ARBs in Hacienda Luisita;

2. Explain the outcomes from the application of MMECB Approach; and

3. Share challenges and opportunities to improve the existing delivery of MMECB Approach for the farmers and communities.

METHODOLOGY

The Multi-Model Extension Capacity Building (MMECB) Approach was implemented to ARBs in HL. It covered the five (5) ARBOs assisted by the TSU, namely: Asturias Farmers Beneficiaries Assoc. Inc.; Bantog Magsikap Farmers Assoc. Inc.; Mabilog Kaunlaran Farmers Assoc. Inc.; Coral Pando Pag Asa ng Magsasaka Assoc. Inc.; and Motrico Farmers Beneficiaries Inc. The following methods were employed during the implementation, to wit:

1. Organization and Enterprise Needs Analysis and Design Assessment (OE-NADA)

To achieve this, TSU conducted series of data gathering procedures and analysis such as focus group discussions (FGD), environmental scanning, documentary review such as socio-economic profile and root cause analysis to identify problems, needs and challenges being faced by the ARBOs and communities. It also made use of Strengths, Weaknesses, Opportunities and Threats (SWOT) in the analysis of data collected and development of strategies. In the end, it provided relevant information in development and actions to be undertaken to address the problems and challenges.

2. Formal Training/Lakbay-Aral

On some occasions, the project team implemented formal trainings, with emphasis on demonstration and hands-on learning so that the ARBO members can have better understanding of the concepts being taught.

3. Informal/Unconventional Methods of Transferring Knowledge and Skills

To promote a more relaxed and free-flowing environment among ARBO members, some activities had been delivered using informal or unconventional methods like open discussions in informal gatherings, techno-clinics, and practicum.

4. Coaching and Mentoring Sessions

To discuss specific issues within subprojects, coaching and mentoring sessions had often been conducted with ARBO members. These specialized advisory sessions provided a more personalized approach to learning in order to give members a better understanding of specific issues.

5. Interviews

Focus group discussions and other similar methods were utilized to gather additional information from the ARBO that may be used as bases for planning further interventions.

6. Recording/Data Collection and Analysis

Other significant information which had been used as inputs for monitoring, evaluation and other interventions had been obtained using observation, site visit, and other methods.

7. Reporting

Reporting was done to inform any person or party about the progress of the project. Reports were accomplished on a regular basis. The team prepared inception report, progress/midterm report and terminal report as a part of updates and accomplishments of the project.

RESULTS AND DISCUSSIONS

A. INNOVATIONS

MMECB Approach is an Innovative approach used by the UESO in implementing extension services in the partner beneficiaries. It is an integrated knowledge transfer strategies and modalities towards a holistic empowerment of partner beneficiaries. It incorporates various approaches (participatory, holistic, sustainable, multi-teaching, and continuous problem identification through M&E). It is flexible, and it can be replicated to the other partner beneficiaries/ communities.

Figure 1 presents the Multi-Model Extension Capacity Building Approach implemented by the TSU to the ARBs in Hacienda Luisita. The following approaches are briefly discussed below. Lastly, as means to validate the approach, this paper presented immediate outcome/impacts and the challenges or issues encountered in the implementation of the said approach and project.

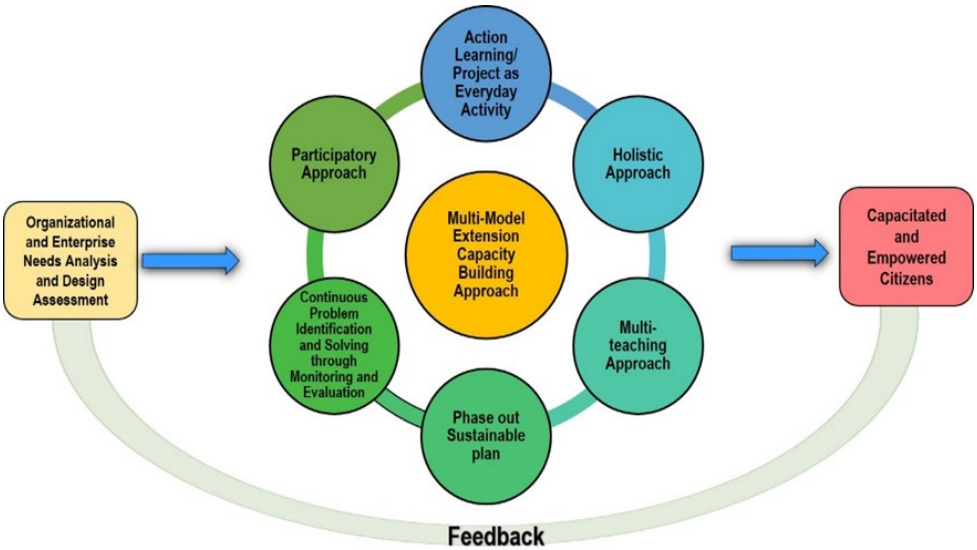

Figure 1. Multi-Model Extension Capacity Building Approach by Tarlac State University implemented to the ARBs in Hacienda Luisita

1. Holistic Approach

The activities conducted focused not only on the development of knowledge and skills among ARBO members but also on the development of their attitudes, values, and outlook. The project team believed that technical knowhow is useless if not coupled with proper attitudes and values as well as a positive outlook. The said approach also included the participation of women as part of the organization and also as ARBs.

2. Participatory Approach

Planning of activities employed a participatory approach, since the ARBO members themselves would benefit from the intervention provided to them. This approach evoked a sense of ownership on the part of the ARBO members as they were given the privilege to get involved and voice out their ideas including the women, since this approach also empower the participation of the ARB women. Another is to treat the farmers as partner-beneficiaries as this will create synergy between the TSU, ARBOs, DAR and other government/non-government agencies. Consultation meetings had been conducted with the stakeholders to solicit ideas or opinions that significantly mattered to them and incorporated these in the interventions delivered. In addition, since UESO alone cannot fulfil its planned activities without the assistance of the other Colleges and institutions, it tapped its faculty experts and students from different Colleges and continuous partnership and linkages to other government and non-government interventions for the fulfilment of the planned extension intervention to the community.

In the problem identification, OE-NADA was used, this also involves different stakeholders (including ARBs, DARPO-Tarlac, and other government agencies) to clearly identify the problems, needs and challenges to be coupled with appropriate interventions to address such.

3. Action Learning/ Project as Everyday Activity

Learning shall be well-structured yet highly adaptable, experiential and field-based to ensure retention of skills and competencies among ARBO members. In addition, the ARBO members were encouraged to treat all project activities as an integral part of their daily lives. The project terminates upon completion, but its target outcomes must become the beneficiaries' way of life.

4. Multi-Teaching Approach

The use of formal trainings/seminar/ facilitated workshop, lakbay-aral/emersions, consultation, coaching, mentoring (CCM) sessions, hands on experience and farmer-farmer interaction as means of providing appropriate technical knowhow in agri-business and organizational capacity of the ARBs. In addition, creation of manuals and techno-guides in a popularized manner such as translation of such into Filipino language is imperative to make it user-friendly. Illustrations and figures had been integrated to ensure that the manuals and techno-guides are easy to understand.

5. Continuous Problem Identification and Solving through Monitoring and Evaluation

The project team made use of the information obtained from its monitoring and evaluation activities to identify new problems that may have surfaced or solutions that may be applied to other problems.

6. Phase out and sustainability approach

Project phase out and sustainability approach closes to the interventions provided by the TSU to the ARBs in Hacienda Luisita. Before the project ends, the project team gathered the ARBOs through its participatory approach to report accomplished targets and explain the phase out and the sustainability of the project. Through the TSU's phase out and sustainability recommendations and plans to the ARBOs and to the facilitating agency (DAR), this will further continual development to all aspects of the organization.

The identified problems and needs based on OE-NADA served as an input for the project implementation. As stated, TSU integrated and developed approaches and created plans and activities based on the results of the OE-NADA. The said needs analysis also included participatory approach.

The team used MMECB Approach as a process which integrates holistic, participatory, use of multi teaching, problem solving, active learning and phase out and sustainability approaches make it as new extension approach compared to other approaches used before by various extension services workers. Each approach is inter-linked with one another. Each activity can use combination of approaches or all approaches as may be necessary.

The output of the said approach is geared towards capacitating and empowering the farmers/partner beneficiaries. Giving them necessary technical-know how in terms of managing the ARBO and making use of their lands efficiently and effectively. This also constitutes the role of values and leadership that are deemed needed to make the programs/projects sustainable to uplift their living conditions.

The approached also imperatively considered the role of feedback mechanism through the facilitation of customer satisfaction evaluation, post-activity report and field monitoring which includes farmer-extension worker interaction. These were also processed as part of needs assessment and analysis and the MMECB approach will further be improved through the feedback from the farmers/partner beneficiaries. Re-planning of activities was done considerably to adjust to the changing needs of the ARBO.

B. Immediate Output of the MMECB Approach in the implementation of ARCCESS Project in Hacienda Luisita:

Following were the notable outputs of the MMECB Approach based on the accomplishments of the project:

1. Farmers graduated into Farmer Technicians

The farmer technicians graduated were identified to have currently maintained farming operation records, attended relevant trainings, and are practicing experts.

As mentioned through Multi teaching approach which involved the conduct of trainings, seminars, lakbay aral, coaching and mentoring sessions, the ARBs per ARBOs were capacitated in the technical know-how in terms of agricultural production and business operations.

Table 1 presents the number of farmer technicians graduated in the ARCCESS project from the 1st phase (2015-2016) and 2nd phase (2016-2017) of engagement.

Table 1. Number of Farmer Technicians Graduated from the 1st and 2nd Phase of ARCCESS Project

Name of ARB	1st Phase 2015-2016			2nd Phase 2016-2017		
	M	F	Total	M	F	Total
Asturias Farmers Association, Inc.	6	1	7	5	2	7
Bantog Magsikap Farmers Association, Inc.	7	1	8	9	1	10
Mabilog sa Kaunlaran Farmers Asso-	2	3	5	4	3	7
Motrico Farmer Beneficiaries Associ-	9	1	10	8	1	9
Coral Pando Pag-Asa ng Magsasaka	11	0	11	8	2	10
Total	**35**	**6**	**41**	**34**	**9**	**43**

During the 1st phase of the project, a total of forty-one (41) farmer technicians graduated, thirty-five (35) of which are male and six (6) are female. Meanwhile, during the 2nd phase of the project, an increased in two (2) ARBs with a total of forty-three (43) graduated as farmer technicians. This included to an increased in participation of women with a total of nine (4) ARBs compared to six (6) in the 1st phase. Meanwhile, there is a decreased in participation of male ARBs with a total of thirty-four (34), compared to thirty-five (35) ARBs in the 1st Phase. Nevertheless, the participation of rural women as ARBs and as farmer technicians increased, since the inclusion of a gender-responsive activities has been conducted in the program.

2. All ARBOs were assisted and converted into cooperatives.

This was one of the other assistances provided by the TSU project team during the 2nd phase of he ARCCESS implementation. The need to convert the ARBOs assisted from association to cooperative was identified for them to have a legal entity to operate a business. The project team assisted the ARBOs in the required documents and submitted them to Cooperative Development Authority (CDA).

3. Synergy among DAR, ARBOs, TSU and other agencies were maintained and sustained; and

All activities implemented under the ARCCESS project were coordinated and supported by the DAR and ARBOs.

4. Encouraged active participation of community and the members of the ARBOs.

Through the course of implementation of the project, the team had encouraged the participation of ARBs, including women.

C. Issues and Challenges Encountered

The immediate impact or outcome of the MMECB approach will not be done without the issues and challenges encountered of the team in implementation the said approach. This was also considered in this paper since, this will create opportunities for the improvement.

1. The presence of an external/private entity to the community, most specially the chairman himself is an official, hinders the introduction of interventions and the execution of initiatives by the organization;

2. A significant number of ARBO leaders and members remained indifferent and unresponsive to the initiatives undertaken by the Project team;

3. Some farmers still do not maintain farming operation records, thus, they cannot comply with the minimum requirement to be considered as farmer technicians;

4. The team often reschedules the target training dates to match the farmers' availability; and

5. Money remains to be a primary motivation of members to actively participate in the organization.

CONCLUSION

The following conclusions are based on the result of this research:

1. MMECB Approach introduced flexibility from the linear research-extension model and it can be replicated to the other partner beneficiaries/ communities;

2. MMECB Approach can be used towards capacitating and empowering the community (partner-beneficiaries);

3. MMECB approach helped transform the slow shift of ARBs' perspective towards agricultural production, since there has been a direct and high level of application on the learnings from AES-BDS trainings; and

4. The team accomplished all of its proposed interventions from 1st and 2nd Phase of ARCCESS Project for a specified period.

RECOMMENDATIONS

The following are the recommendations based on the foregoing discussions:

1. There are total of ten (10) ARBOs in HL, however, this paper only focused on the approaches implemented by TSU to the five (5) ARBOs. This means that the approach used can also be applied to other five (5) ARBOs which was not formerly handled by TSU;

2. The coordination and synchronization between DAR and the TSU Project Team should be strengthened to avoid overlapping of activities, likewise, this will also solve issues anent to the timeliness on the delivery of services to prevent rescheduling of planned activities;

3. Presence and guidance of the assigned field facilitators and Facilitating Agency (DAR) in the conduct of training or other activities of the ARBOs are deemed important so that the initiatives will be sustained;

4. Plans, programs and activities to be prepared shall always be based on the identified needs of the ARBOs so that it can be addressed effectively; and

5. Sustainability of the documented approaches which can be replicated or shared not only to the ARBs but also to other communities that further needs assistance for sustainable community development. In the end, the purpose of this paper is to share the approach developed to better assist other farmers and communities in attaining sustainable development.

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EXTENSION WORK ON IDENTIFYING NEEDS OF MICRO, SMALL AND MEDIUM ENTERPRISES USING STRATEGIC NEEDS ASSESSMENT TOOLS

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Abstract

Most experts agree that performance improvement initiatives should begin with a needs assessment that examines relevant system-related problems and performance improvement opportunities. However, most MSMEs asked for assistance from different agencies to improve their performance without conducting needs assessment and considering the existing capability of the MSME, thereby resulting to mismatch performance improvement targets, unattainable goals and impractical plans. This extension work explored the use of Strategic Needs Assessment (SNA) Tools to examine performance improvement needs, undertake long-term performance improvement and identify the processes that do not add value to the MSME. Strategic needs assessment tools such as business issue worksheet, performance measure matrix, suppliers, input, process, outputs, customers SIPOC Diagram and Process Map were used to document or map the current performance and to show the deficiencies & discrepancies of the system. Fishbone Diagram, and Gap Analysis Worksheet were used to show all causes of problems which were arranged in category and level of importance. Thus, with the use of SNA Tools, realistic performance improvement plans and achievable long-term solutions to existing performance problems will be developed.

Keywords: *MSME, productivity, productivity measure, Strategic Needs Assessment (SNA)*

INTRODUCTION

The selected micro-cottage enterprise located at Brgy. San Roque, Lapaz, Tarlac is one of the thriving business in the Province. It manufactures Rice Hull "IPA" Stove and its products are being sold in the Visayas and Mindanao Region. Products are manufactured on a made to order basis. With the quality of products and its economic benefit, sudden increases in quantity are ordered which makes it hard for the enterprise to deal, with the given existing capability of the enterprise. The enterprise would like to venture on performance improvement of its processes to meet the increasing demand of its products, however they don't know when and how to start because its existing manpower has very limited capabilities in identifying, planning and implementing performance improvement strategies/ techniques. Hence, the purpose of this extension work is to use the strategic needs assessment in identifying the performance improvement needs of the enterprise. [2] Strategic Needs Assessment is a systematic approach in examining the internal and external factors that affect performance within the context of an organization's business strategy and identified gaps between the current and desired conditions. The breakthrough of the approach used by the Extension Service Provider (ESP) is that the SNA Tools were utilized in a more simpler form that is easy to understand by the enterprise in order obtain substantial information on production problems/ performance improvement needs that would lead to realistic and achievable improvement plans.

Note: This extension work is the pilot project of the ESP using SNA Tools.

OBJECTIVES

The primary objective of this extension work is to use SNA Tools to help the enterprise determine its performance improvement needs in the production of Rice Hull "IPA" Stove. Specifically, it aims to:

1. Document and map the current performance of the enterprise by using the Business Issue Worksheet, Performance Measure Matrix, Suppliers, Input, Process, Outputs, Customers (SIPOC) Diagram and Process Map; and

2. Use Fishbone Diagram and Gap Analysis Worksheet to show all causes of problems of the enterprise in the production of Rice Hull "IPA" Stove.

METHODOLOGY

The used of Strategic Needs Assessment Tools comprise of five (5) steps. See figure 1 for the Methodology used the Extension Service Provider.

Step 1 – Gather Preliminary Information

The purpose of this step is to develop a better understanding of the current situation of the enterprise as well as future performance need. In this step, it is not necessary to obtain information from all the personnel of the enterprise. Series of discussions with the enterprise' key people will provide ample information and data to establish preliminary process scope and a definition of the enterprise performance problem or opportunity for improvement.

Step 2 – Examine External Environment

This step is deemed needed by the ESP in order to identify and isolate external factors affecting a performance need and to determine the implications of these external factors.

Step 3 – Examine Internal Environment

This step focused on documenting or mapping how the enterprises' exact performance occurs. In documenting or mapping the enterprise' production process, all elements and their relationships that show obvious evidences of the bottlenecks and non-value adding activities will be highlighted.

Aside from the initial interviews conducted in the step 1. Widening the horizon of the information gathered thru interview was done in this step. All eighteen (18) personnel of the enterprise were subjected to interview. There are fourteen (14) production workers/ welders, two (2) administrative staff and one (1) manager/owner.

Documentary review was conducted by the ESP to verify information gathered during the interview. Some of the records that were asked are subjected to documentary review which includes the following: production and sales history, manpower and material utilization, utilities expense, material expense, equipment expense, wage expense, capitalization and other overhead expenses.

Data gathered in the series of interview and documentary review were carefully evaluated and verified thru series of actual observation. This part of the extension work was the check and balance part between the initial findings gathered from the interviews and documentary reviews.

Step 4 – Identify Causes of Performance Gaps

In identifying the cause of performance gaps, the ESP used the Fishbone Diagram (FD) and Gap Analysis Worksheet (GAW) to uncover the real causes of the problems which is very vital in producing long-term performance improvement.

Step 5 – Develop Performance Improvement Plan

After documenting and mapping all the performance improvement needs and uncovering of all cause of the problems, the next step that must be considered is to assess its readiness of the enterprise and its people to implement performance improvement plan. Based from the results of the SNA Tools that were used in this extension project, the enterprise must also select interventions that will effectively support the implementation of performance-improvement plan.

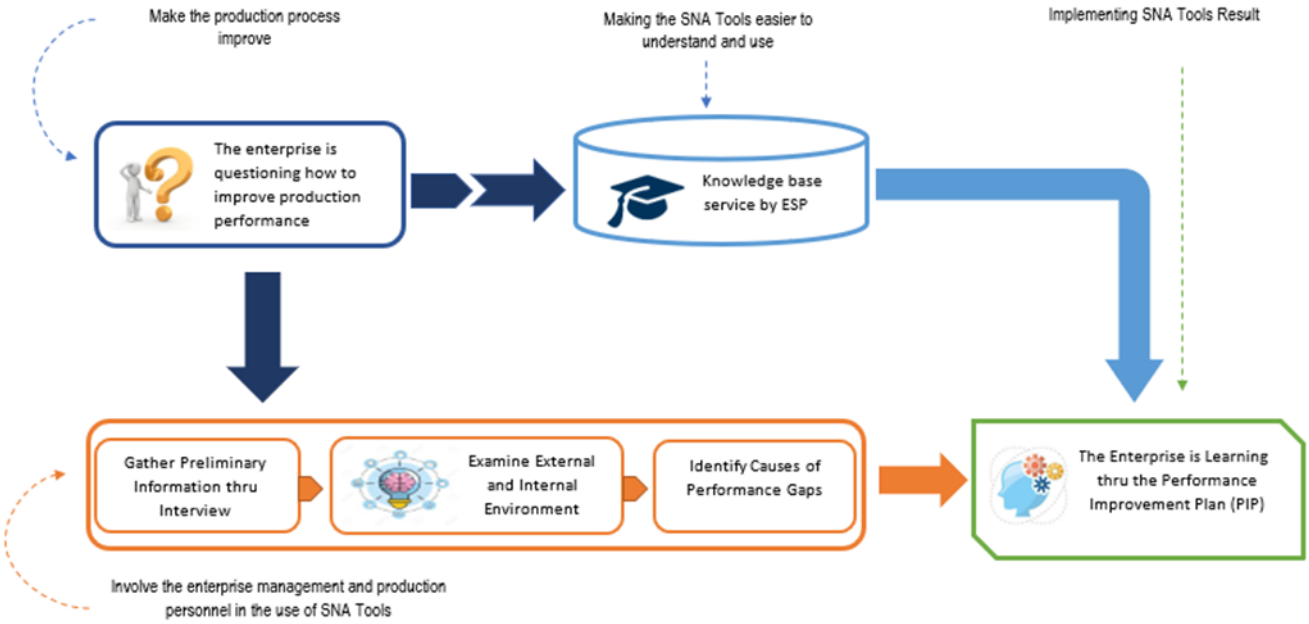

Figure 1. A Model on Identifying Needs of Micro, Small and Medium Enterprise (MSMEs) Using Strategic Needs Assessment Tools

DISCUSSION/INNOVATIONS

Step 1 – Gather Preliminary Information

Upon receiving of the Notice to Proceed (NTP) and Special Order (SO) of the Extension Service Provider (ESP), the enterprise preliminary visit was conducted. The scope of extension project and Service/ Commitment Contract was discussed and agreed by both parties. Series of firm visit from the month of January – June 2018 were conducted.

Initially, the ESP conducted series of interviews with senior key personnel of the enterprise (Manager/ Owner, Production/ QA Supervisor, senior production welders) involved in the production of the Rice Hull "IPA" Stove. Later, the span of inquiry was widened and included the administrative staff and marketing staff and other production welders/workers. Secondary information were also initially gathered in this step thru the review of order slip, production history and delivery receipts. The Business Issue Worksheet is the tool used by the ESP in summarizing the result of the interviews.

Table 1. Business Issue Worksheet (BIW)

Enterprise: Rice Hull" IPA" Stove Manufacturer Location: San Roque, Lapaz, Tarlac	
Questions	***Answers***
What are the key business issues that must be addressed?	a. Cannot accommodate or produce all the quantity required by customers;
	b. Unmet deadlines in the delivery of finished products. Two weeks or more lead time on the delivery of finished IPA Stove products to customers;
	c. Increased overtime costs and other operating cost.
What are the consequences of not acting?	a. Loss of customers.
	b. Long waiting/lead time may lead to cancelled orders.
	c. Due to long waiting time, customers may opt to buy substitute products or buy to other suppliers (competitors) of same product.
	d. No increase in profit.
Which business process are currently affect-ed?	a. Delivery & Sales
	b. Production & Quality Assurance
	c. Material Utilization & Management
What are the performance improvement goals?	a. Increase production of IPA Stove by 10%.
	b. Reduce order delivery time by 50%.
	c. Reduce number of rejects (currently 10%) by 5%.
	d. Reduce production costs by 10%
What prevents the achievement of business goals?	a. Lack of technical expertise on productivity measure/ assessment, monitoring and improvement;
	b. Lack of production forecasting to be used in the preparation of production schedule;
	c. Unavailability of benchmark data as basis for increasing production capacity (e.g. equipment and machine efficiency, material utilization);
	d. Unestablished time and workmanship standards in the production of IPA Stove;
	e. Lack of monitoring and testing of quality control parameters of IPA Stove;
	f. Poor production layout;
	g. Lack of knowledge on workplace ergonomics and occupational health safety; and
	h. Lack of established procedure and guideline in Product Development and Innovation.

Step 2 – Examine External Environment

The ESP used the five forces model by Michael E. Porter (1980) in examining the external environment of the enterprise. Show hereunder is the External Environment Figure of the enterprise using the five forces models.

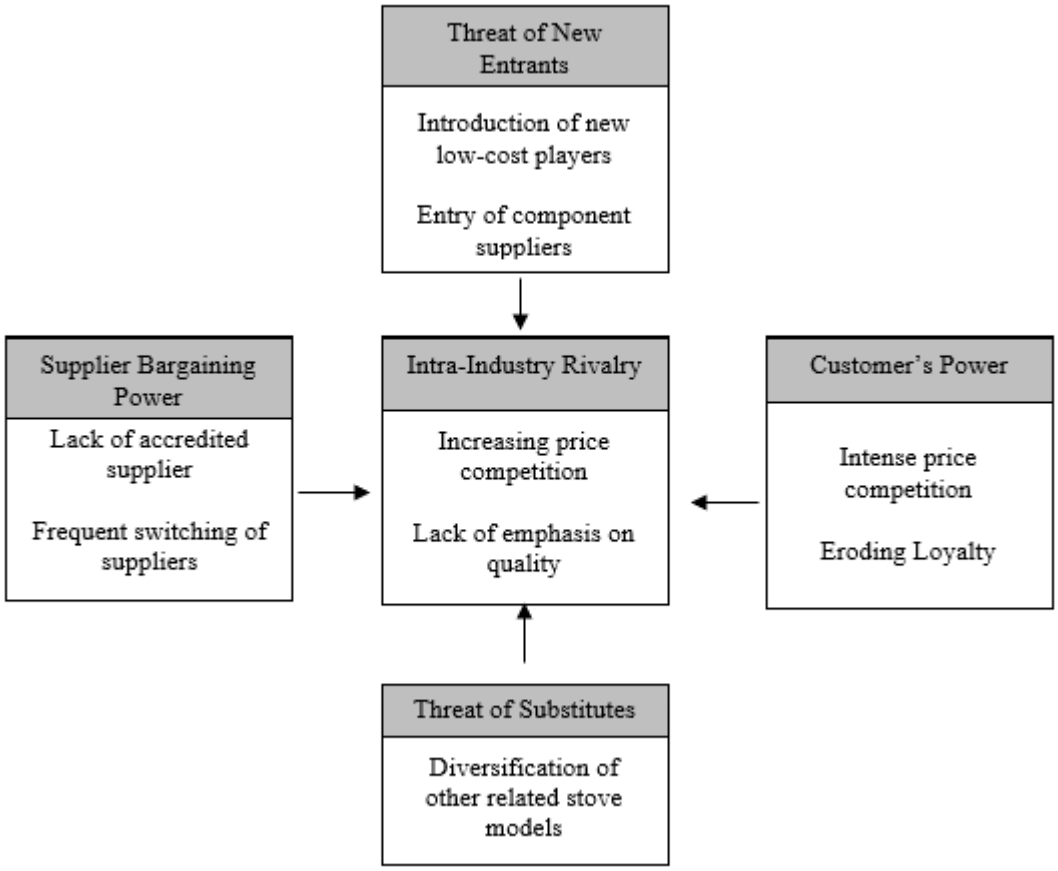

Figure 2. Five Forces Model: Production of "IPA" Stove

Step 3 – Examine Internal Environment

The tools that were used by the ESP in this step are Performance Measure Matrix, Suppliers, Input, Process, Outputs, Customers (SIPOC) Diagram, and Process Map. It can be noticed that the enterprise is categorized as micro cottage industry, however, its production process involves hundreds of elemental activities, and therefore mapping performance is not a simple undertaking.

Table 2. Business Issue Worksheet (BIW)

Process	**Cost**	**Quality**	**Customer Time**	**Satisfaction**
Production & Quality Assurance	Average cost per unit	Number of defects produced per order/ delivery batch	Amount of orders shipped/ delivered on time	Number of returns per hundred units sold
	Direct Material Cost – Php 610.78 Direct Labor – Php 252.50	(10%) of total production per delivery batch	Average number of units delivered every delivery period (every two weeks) 68 units every two weeks (136 units per month)	No returns but common defects or problems in the use of the product and are communicated to the enterprise by the distributor; Rework/ replacement of defective parts are being addressed by the customers
Material Acquisition, Utilization & Management	**Percentage Scrap**	**Material Yield Per-centage**	**Cost**	**Income/ Loss**
	29%	71%	Php 26,068 per month	(Php 312,808.50 per year)
Production Equipment & Layout	**Man-Machine Ratio**	**Travelled dis-tance-NPT**	**Travel Time-NPT**	**Effect of Accumulated NPT**
	4:1	168 meters per operator per unit	10.186 minutes/ op-erator/ unit	Unmet production cycle time

The ESP uses the PMM in order for the senior key personnel of the enterprise to see performance bottlenecks which are often invisible to them.

Table 3. Supplier, Input, Process, Output, Customer (SIPOC) Diagram

Supplier	Input	Process	Output	Customer
Enterprise	Manpower (Administrative Staff)	Customer placed order	Order slip	User of IPA Stove Distributor
Enterprise	Manpower Transportation Travelling Expense	Canvassing & Acquisition of Raw Materials	Delivered raw materials Delivery receipt	Enterprise
Hardware	Empty Freon Tank GI Sheet 1.0 GI Sheet 1.5 GI Sheet 1.3 GI Pipe 4s20 GI Pipe ¾ Skytube GI Pipe ½ Skytube Round Bar 3/8 Angle Bar 1/4x1 Round Bar 1/4 Welding Rod	Production	List of number of IPA Stove to be produced	Marking & Tracing Process/Personnel
		Marking/ Tracing → Cutting	Marked and Cut Work in process	Drilling and Bending Process/Personnel
		Drilling ⟷ Bending	Drilled and Bended WIP	Welding Process/ Personnel
Enterprise	Equipment Machinery	Welding/ Assembly	Welded WIP	Finishing, Painting, Drying & Storing Process/ Personnel
Hardware	High Heat Paint Ordinary Silver Paint Blower Adaptor	Finishing → Painting → Drying → Storing	Finished Product Rice Hull IPA Stove	Shipping Process/ Personnel
Enterprise	Manpower Equipment Machinery			
Enterprise	Finished IPA Stove	Shipping		Distributors Walk in clients Other clients

The Supplier, Input, Process, Output, Customer (SIPOC) Diagram is used by the ESP to reflect the system view of the enterprise and to find out and document at a high level the inputs, outputs, and workflows in the production of Rice Hull "IPA" Stove.

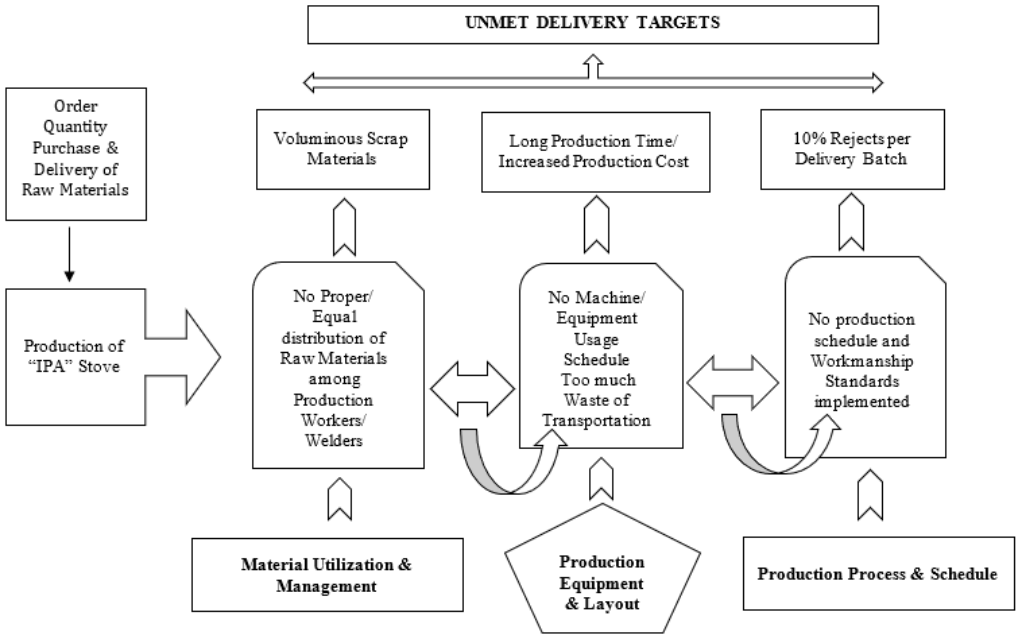

Figure 3 Production of Rice Hull" IPA" Stove Process Map

The PM was used by the ESP to document the performance gaps or activities that do not contribute to business or customer needs. Such tool is useful for non-value-added activities will be documented and understood so that gaps in the performance can be minimized.

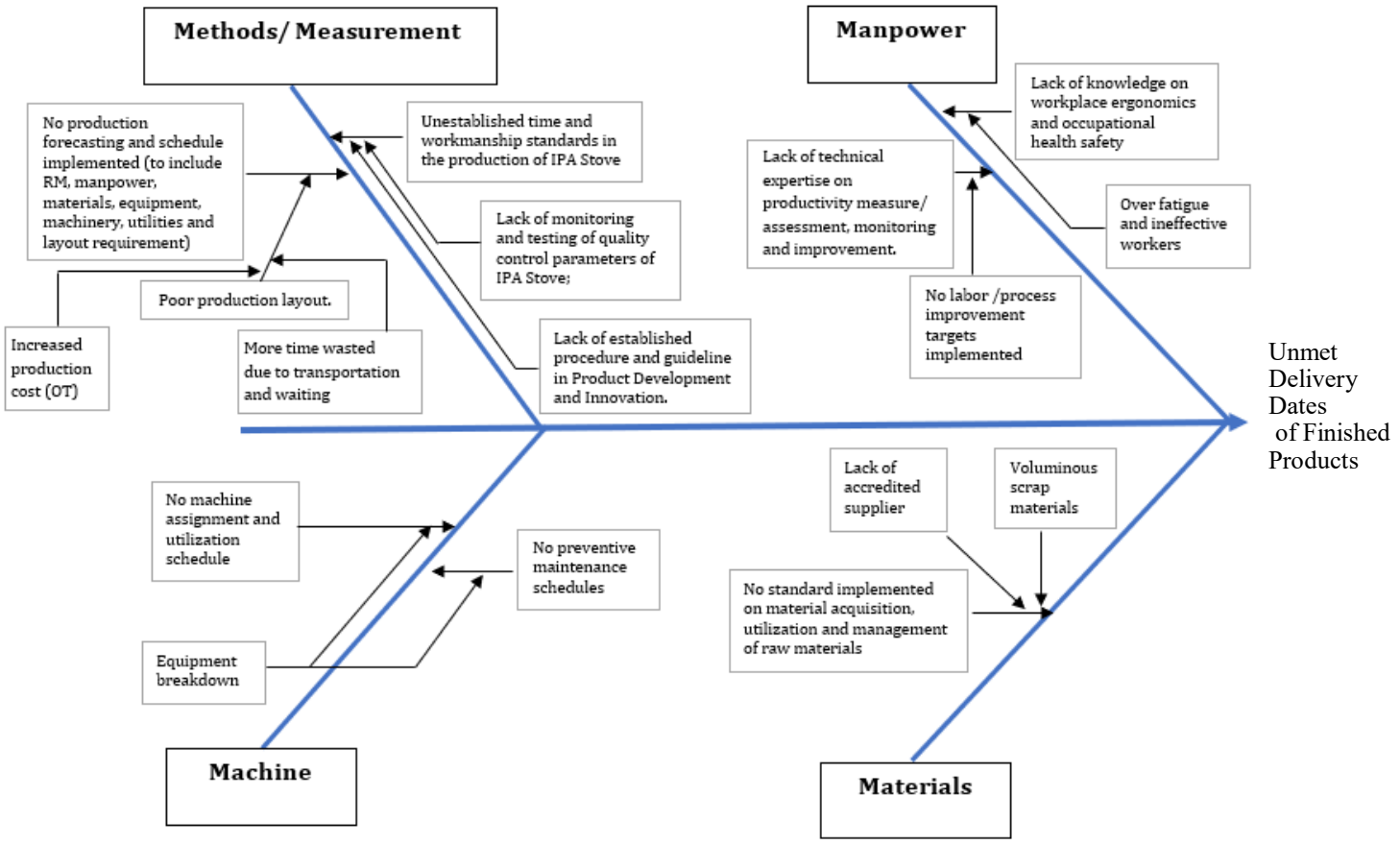

Figure 4. Fishbone Diagram (FD)

The ESP used Fishbone diagram to uncover the root cause of the performance gaps or problems of the enterprise thus leading to the development of solutions to address its long-term performance improvement needs. As seen in the figure, the result showed the relationships among identified and potential causes of the problem on unmet delivery dates of finished products.

Table 4. Gap Analysis Worksheet (GAW)

Firm/ Enterprise: Rice Hull "IPA" Stove Manufacturer		***Location: Barangay San Roque, Lapaz Tarlac***	
Process	**Current Performance Indicators**	**Performance Gap**	**Effect**
Order Taking & Processing	3 workings days	Customers expect quote within 2 days	Lost business; dissatisfied customers
Canvassing/ Acquisition of Raw Materials	5 working days	Not all materials are acquired within 5 working days due to lack of accredited suppliers	Inconsistent quality of raw materials
Material Utilization & Management	N/A	Upon delivery of raw materials, no standard implemented on proper dis-patching/distribution of raw materials to production	All production workers are cramming to get all the materials/ Run out of raw materials Voluminous scrap materials

Table 4 (continued)

Firm/ Enterprise: Rice Hull "IPA" Stove Manufacturer		*Location: Barangay San Roque, Lapaz Tarlac*	
Process	**Current Performance Indicators**	**Performance Gap**	**Effect**
Quality Assurance	Visual inspection conducted by the production supervisor	Not all produced products are inspected No report of rejects inspected, and no report of rework conducted No visual inspection report generated	Reject product parts delivered to customers
Shipping/ Delivery	5 working days	Customers expect the shipping/ delivery of products within 14 days after ordering	Unmet delivery targets (initial delivery)
Report and Record Keeping	3 working days after each delivery	Owner/ Manager expect reports 1 day after the scheduled weekly delivery	Sales and expenses reports are not prepared on time No analysis of sales and expenses reports conducted (to serve as basis for performance improvement) No production and quality assurance monitoring reports generated (only number of outputs produced and delivered)

The last SNA Tool used in this extension work is the Gap Analysis Worksheet (GAW). The ESP used GAW to transform mapped information from previous SNA Tools into performance improvement plan. The enterprise may use the data in GAW to select what interventions should be done that will most effectively support the enterprise long -term performance improvement targets.

Step 5 – Develop Performance Improvement Plan

In developing the performance improvement plan (PIP), the ESP essentially transforms the information that was mapped in the previous steps. The PIP documents all the performance-improvement projects that must be undertaken to improve the overall performance efficiency of the enterprise. This involves two important elements: assess readiness for change and select interventions.

The enterprise shall assess its readiness first to assess if the enterprise and its people are ready to implement performance improvement plan. Having constant communication with its people, maintaining a working environment, and involving them in the discussions of their issue and concerns relative to the performance improvement plan is essential. Having a team leader for each area of the enterprise can also help in building strategy in launching change initiative.

The second important element for this step is to select what interventions best fit and effectively support the enterprise operations based from the crafted performance improvement plan. See Annex 1 – Performance Improvement Plan for the Enterprise.

CONCLUSIONS

1. The following SNA Tools were used by the ESP in documenting and mapping the current performance of the enterprise: The Business Issue Worksheet (BIW), Performance Measure Matrix (PMM), Suppliers, Input, Process, Outputs, Customers (SIPOC) Diagram and Process Map (PM).

In the BIW it was mapped that lack of technical expertise on productivity measurement or assessment prevents the enterprise to see how productive are the production personnel, how materials are being utilized and managed and by how much the enterprise is losing due to unestablished time and workmanship standards in the production of IPA stove, lack of monitoring and testing of quality control parameters of IPA stove, poor production layout, lack of knowledge on workplace ergonomics and occupational safety & health and lack of established procedure/ guideline in Product Development and Innovation. Without baseline data or information on these concerns, it will be hard for the enterprise to target increase in production capacity and reduce delivery time of finished products.

In the PMM, the performance bottlenecks in the production of IPA stove in the areas of production & quality assurance, material acquisition, utilization and management, and production equipment & layout were uncovered for the senior key personnel of the enterprise to consider issues which are often invisible to them. Without sufficient information about how and why poor performance is occurring, it is impossible for them to implement corrective actions and propose performance improvement targets. Also, problems relative to these areas will always recur if were not addressed properly which will eventually add up to the operating cost of the enterprise.

The SIPOC Diagram showed a high-level view of what process the project is focused on. Without diving in and getting a deeper, more granular view of the project, the customers for a process, what outputs they received, the primary inputs for the process and who supplies them, the performance improvement work will not be directed at one or all the elements involved. Hence, does not provide achievable and realistic improvement plans for actions.

In the Process Map, non-value-added activities were documented and mapped for the enterprise to have a clear vision of the different production wastes being generated in the existing production process. Non-value adding activities like travel time, voluminous waste materials from inaccuracies in cutting of raw materials, idle time and unnecessary activities by the production personnel directly affect the efficiency of all factors involved in the production, thereby affecting the productivity of the enterprise. Without noticing and minimizing the non-value-added activities, increase in production capacity, reduction of overtime cost and operating cost and reduction in delivery time of finished products, appropriate corrective actions and development of measurable performance improvement plan will be hard for the enterprise to establish.

2. The SNA tools that were used by the ESP in identifying cause of the performance gaps are Fishbone Diagram (FD) and Gap Analysis Worksheet (GAW).

The fishbone diagram was used to uncover the root cause of the performance gaps. Inability to identify the root cause of problems is a serious issue for the problem will still recur and cost associated on actions taken will not be recovered. Aside from problems are not addressed appropriately, non-recognition of root cause of problems disables the enterprise from developing realistic and achievable long-term performance improvement.

Finally, the ESP used the Gap Analysis Worksheet to identify the current performance of each process involved in the production of IPA Stove, the performance gaps and possible effects of these performance gaps. Comparing actual performance with potential or desired performance is very vital for the enterprise to check if business requirements are being met and, if not, what steps should be taken to ensure they are met successfully. By using gap analysis worksheet, it will aid the enterprise to check if its operations/ systems do not make the best use of its current resources. Without analyzing and measuring these gaps, it will be very hard for the enterprise to see areas that can be improved which often lead to customer dissatisfaction. Also, the basis for a sound decision making in targeting performance improvement was being sacrificed. The enterprise shall fill all the identified gaps to sustain its operations and grow. Most of the micro cottage industries located in the province do not employ the use of SNA Tools in conducting needs assessment and

achievable long-term solutions. SNA Tools are not sophisticated to use. Using these tools may be time consuming but it will uncover and identify real causes of problems which most of the time are not visible for MSME's key business players.

RECOMMENDATIONS

Based from the result of the Strategic Needs Assessment Tools, the following strategies are recommended:

1. Thru this pilot project, the UESO may consider using SNA Tools and Approaches in identifying the performance improvement needs of other MSME's in the province;

2. The UESO may offer training for PEC's on how to use the SNA Tools to be used as one of the major tools in identifying the needs and problems of extension clients/ beneficiaries;

3. The SNA tools can also be used by other ESP with varied clients. SNA Tools can be most useful for the MSME's in the province if they are translated and used in a simpler manner;

4. The enterprise may consider enhancing its capability in terms of understanding and using results of SNA Tools thru capabality building trainings or seminar-workshop;
The enterprise may consider gathering all pertinent data that affects core business strategy by using SNA Tools covering all of its activities and processes for a much longer period of time to capture varying data for different seasons of production for a more sound and holistic result;

5. The enterprise may consider using the findings of this SNA Tools Report to develop techniques and/ or strategies to address its long term performance improvement needs. The enterprise may also seek assistance of government and non-government agencies offering consultancy or practicing line of expertise being recommended in the SNA Tools Report.

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NEEDS ASSESSMENT TOOL AND APPROACHES FOR EXTENSION PROGRAM DEVELOPMENT

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Abstract

Effective survey of community needs will enable the development of vital and viable intervention programs in order to attain community development. Likewise, survey tools to identify needs must be carefully selected and developed to extract or elicit accurate needs of the community. The present study aimed to describe the needs assessment tools and approaches for extension program development in an adopted community. A qualitative study design was used in gathering and analyzing the data to come with solutions to the problems raised. Data of the study were gathered via observation and interview with key participants in the extension program development and implementation. The key participants were three experts, school head and teachers (8) and one of the community program proponents. Findings revealed that generally, the survey questionnaire or interview guide tools to gather data to establish community demographics was evaluated to be appropriate and in order. The physical and laboratory examination tools to determine health conditions, particularly the skin, hair, scalp (physical) and fecalysis (laboratory) were based on standard operating procedures. The focus group discussion (FGD) was likewise effective. Moreover, the needs assessment tools were found to have extracted adequate data necessary in identifying the pressing needs of the community. The survey of community needs, in effect, had enabled the development of extension programs. The community program proponents were able to design an extension plan which aimed to address the needs of the community along health, environment, livelihood needs and potential skills of the women, teacher improvement needs and community leadership needs. However, in the process of implementing extension projects and activities, the proponents observed that there were some variables in the community demographics survey which were not included but are vital information in developing extension programs. The study then recommends the enhancement of tools and approaches to include more variables. By doing so, the community needs assessment tools will be more accurate in extracting vital community information.

Keywords: *community needs, community program proponents, extension program development, focus group discussion, interview guide, laboratory Examination, Needs Assessment Tools, survey questionnaire, physical examination*

INTRODUCTION

Successful community development efforts begin with determining the factors that hinder growth and improvement among the community residents or identifying the needs of the community. If community programs do not address the community's pressing needs, efforts and resources will be wasted. Programs may be successfully carried out but the community may remain unimproved because their needs were not met.

To ensure that the needs of the community are accurately identified, tools in data gathering must be effective. It must extract the basic needs vital in attaining development. In developing needs assessment survey tools, the first step according to the Kiwanis International (2018) is to determine the scope- the group of people to develop and to decide whether the needs assessment will be done solely by the party to provide extension or if the needs assessment survey is to be carried out together with the target beneficiaries.

In addition, community needs assessment survey tools must enable establishing relationship with the target community. The Rotary association in USA (2016), suggested six ways to identify community needs and at the same time, establish relationship with eh target beneficiaries. These are community meeting, survey, interview, focus group, asset inventory and community mapping. Through a community meeting, needs are identified through large group of people and ideas are followed up or built on one member to another. On the other hand, surveys are effective in knowing candid response from anonymous community members who fear being exposed. Survey is also a less costly way of knowing the needs of the community. Interviews are also helpful, especially if community members are illiterate. Focus group technique is an effective way to get deeper information about community issues. Asset inventory shows actual community resources which can be useful in developing the community.

Asset inventory may be followed up by community mapping. This would provide better insights on how community resources are being utilized.

Moreover, the Child Welfare Information Gateway (2018) recommended that community needs survey tools must identify the strengths and resources available in the community to meet the needs of the community members across all age groups. Accordingly, the assessment maybe limited to documentation of community demographics and informal feedbacks from community partners but the survey may expanded into using interviews and focus group discussions, interviews with stakeholders, and telephone or mailed surveys.

Findings of the community needs survey should be the bases of a community extension program. According to the Community Tool Box (2018), it is necessary to obtain and keep a record of baseline measures with which to measure success of interventions implemented. If there are no changes in baseline measures, it means that the interventions were ineffective. However, accordingly, assessment of outcomes of intervention may take a longer time in some cases. The evaluators may wait a while to measure the effects.

The researchers, being also the key leaders in community extension, also developed tools to identify the needs of the community. The present study described and analyzed the tools used and the approaches developed and implemented to address the community needs identified.

LITERATURE REVIEW

One of the features of community needs assessment survey is health information of the community members. The three most important health information to be obtained are population with unmet needs, health issues and concerns, and gaps in programs and services. In conducting community assessment survey, it is suggested that a steering committee be formed. The committee will be involved in designing and evaluating the tools; deciding how the data will be gathered and approving the reports. Then the next step is to define the community- how is the community described. Is it a community with emerging health needs? Or is it a community with depressed socio-economic status? The third step is to identify the objectives- the community demographics; health problems; priority populations; community resources; the things that the group conducting community extension can address; and what trainings must be attended by health care providers to take care of the health needs. The next step is to identify principles. The principles are the ethical considerations- how the identity and confidentiality are to be protected; how the community will be oriented about the research being conducted; and how the information gathered through research will be shared and disseminated. The development of the plan follows after. The last step is to decide what information will be gathered during the evaluation (Community Organizational Health, 2017).

In addition, the Center for Disease Control (CDC, 2013) also suggested components of community needs survey. These are policy change, systems change and environmental change. Policy change includes laws, regulations, rules, protocols and procedures like taxes on tobacco products; environmental laws; curfew hours; and others. Systems change are changes in social norms; how public health services are conducted; how seniors are to be treated; and others. The environmental change which relates to the physical, social or economic factors designed to influence people's practices and behaviors. The physical aspects are the structural changes or the presence of programs and services such as food services, public school services, and public health services. The social aspects include favorable attitudes of the community. The economic aspects include changes in how incentives or disincentives affect the behavior of people.

Moreover, according to Smathers and Lobb (2014), a community assessment involves an evaluation of the current situation in the community; a judgment of what the preferred or desired situation in that community should be; and a comparison of the actual and desired situation of the purpose of prioritizing concerns. It is equally important to keep in mind the principles of community assessment- residents are the best experts in the community they live in; all residents have skills, abilities and talents that they can contribute to the community; and a strong community is built upon the talents and resources of its members.

Based on the above principles and concepts on how community needs assessment should be conducted, community extensionists must also be mindful about the indicators of community development. In the study of Schutte and Dphil (2015), which analyzed community development program in Lebanon vis-à-vis the basic needs theory, the success of community development programs is seen on how the quality of life of the people has improved. In the study, the authors captured the argument of the basic needs theory that underdeveloped

underdeveloped communities are often caught in the culture of underdevelopment where people have difficulty in extricating themselves out. Accordingly, there are varied and complex causes of this underdeveloped culture that leads to a feeling of hopelessness among the people to break free from this vicious cycle of poor quality of life. The authors of the study cited unsatisfied basic needs as one of the culprits in attaining quality of life. Community assessment of needs, according to the researchers, must then ask the people about their unmet basic needs.

If the Maslow's hierarchy of needs is to be the basis of human needs, McLeod (2018) pointed that the deficiency or basic needs are physiological (food, water, warmth and rest), safety and security, belongingness and love, and self-esteem needs. If the physiologic needs are unmet, the human body cannot function and all other needs in the hierarchy will also be unmet. With the deficiency needs in mind, community development programs must assist the community in meeting the needs.

Moreover, the study of Latopa and Saidu (2015), analyzing the values and principles of community development in Nigeria, there were six principles of community development extracted. These include holistic approach to community needs; community development should be an approach; it should be empowering; it should consider environmental issues; it should be sustainable; and it should partner with stakeholders. Latopa and Saidu discussed about two approaches of community development- the bottom-up and the top-bottom approaches. The fundamental principles and values of the bottom-up approach rely on people participation, mobilization, empowerment, networking, social justice, and general well-being of the population. The bottom-up approach considers the interests and needs of the people rather than the imposition of the development projects and programs. On the other hand, the top-bottom approach hinged on what the government or the group wanting to assist in community development prescribes necessary for the community. The authors concluded that both approaches are important and maybe applied depending upon prevailing and acceptable structure of the community being developed. Furthermore, the authors concluded that community capacity building is an important aspect of community development and vital to attaining general well-being of people and the adequate involvement of the indigenous people in monitoring and evaluation of the programs and projects. Networking is essential as it supports sustainability, partnership, collaboration, knowledge -sharing and harmonious -peaceful co-existence.

The principles of community development approaches offered by the cited authors were affirmed by the Center for Community and Economic Development (CCED, 2018). According to CCED, the essential principles in responding to a distressed community are promoting active participation of the community; engaging community members in the diagnosis of their problems so that there is adequate understanding of their situation; helping the community members understand the economic, social, environmental and psychological impact associated with alternative solutions to the problems; assisting community members in designing and implementing a plan to solve the problems by emphasizing share leadership and active community participation; seeking alternative solutions to any effort that may likely adverse the situation of other sub-groups in the community; and actively work to increase leadership capacity, skills, confidence, and aspirations in the community development process.

The cited literature and studies above were the bases of the researchers and community extensionists in designing and implementing community development program and projects in an adopted community.

OBJECTIVES

General Objective. The study aimed to describe and assess the tools and approaches used in surveying the needs of the community and the approaches used in developing extension programs.

Specific Objectives. The following are the specific objectives of the study.

1. Describe how the tools for needs assessment was developed.

2. Assess the effectiveness of the tools in determining the needs of the community.

3. Describe how the extension approaches were used in community development.

4. Discuss the opportunities for improvement of the tool to be used in community extension.

METHODOLOGY

Research Design. This study employed the qualitative design in describing and analyzing the tools and approaches that were used in the assessment of community needs and conception of programs extended to an adopted community to assist in its development.

Locale. The tools for needs assessment and approaches in the development of extension programs were used in one of the adopted communities of College of Education of Tarlac State University. The community is one of the underprivileged towns in Tarlac City. Most extension programs are held in the elementary school and in the barangay hall. Parents, teachers and pupils usually gather in the school for the extension programs and activities.

Participants and Sampling. The participants in the analysis and description of tools and approaches utilized in the community were three experts, school head and teachers (8) and one of the community program proponents. The participants were chosen via purposive sampling- they were the ones directly tapped in gathering community needs.

Research Tools. The tools used in the study were observation guide and semi-structured interview schedule. The observation and interview guides were provided to the study participants, who also happened to be the ones who volunteered to gather data for the needs survey.

Data Gathering Procedure. In describing and analyzing the tools and approaches utilized in the community extension, the participants conducted interviews to parents, teachers and pupils. The participants took notes of their observations and the researchers carefully analyzed the data. The study participants first observed 15 parents. The parents were not included in the final survey of the community needs.

On the other hand, for the questionnaires used in knowing the teachers' needs, three education experts were asked to evaluate the content. The experts were school heads from the Department of Education in Tarlac City Division.

As to the questionnaire or interview guide for parents and pupils to know their knowledge of emerging and endemic diseases, 15 parents and 15 pupils were taken as pilot respondents. The questions used in asking the pupils about the tools and approaches, including that of the parents were translated in Tagalog and explained in Kapampangan by one of the researchers.
The data gathered were analyzed qualitatively.

RESULTS AND DISCUSSIONS

1. Development of the Needs Assessment Tool

Prior to the development of extension program for an adopted community, a needs assessment tool was developed.

1.1 Survey-Questionnaire/Interview Guide

The researchers deemed it necessary to document the profile of the community or the community demographics. The community profile formed part of other baseline information used in analyzing community needs. The variables included in the community profile were number of children in a household, work of parents, monthly income of family, educational attainment, health history, knowledge about emerging diseases, health intervention practices, and environmental protection practices. The researchers based their selection of profile variables included in the survey tool from review of related studies on community needs assessment. According to the authors, the profile variables reveal vital information about the socio-economic needs of the community.

The survey- questionnaire also served as the interview guide for parents and pupils who were unable to provide data through writing. The survey-questionnaire was translated to Tagalog so that the respondents will understand and answer appropriately.

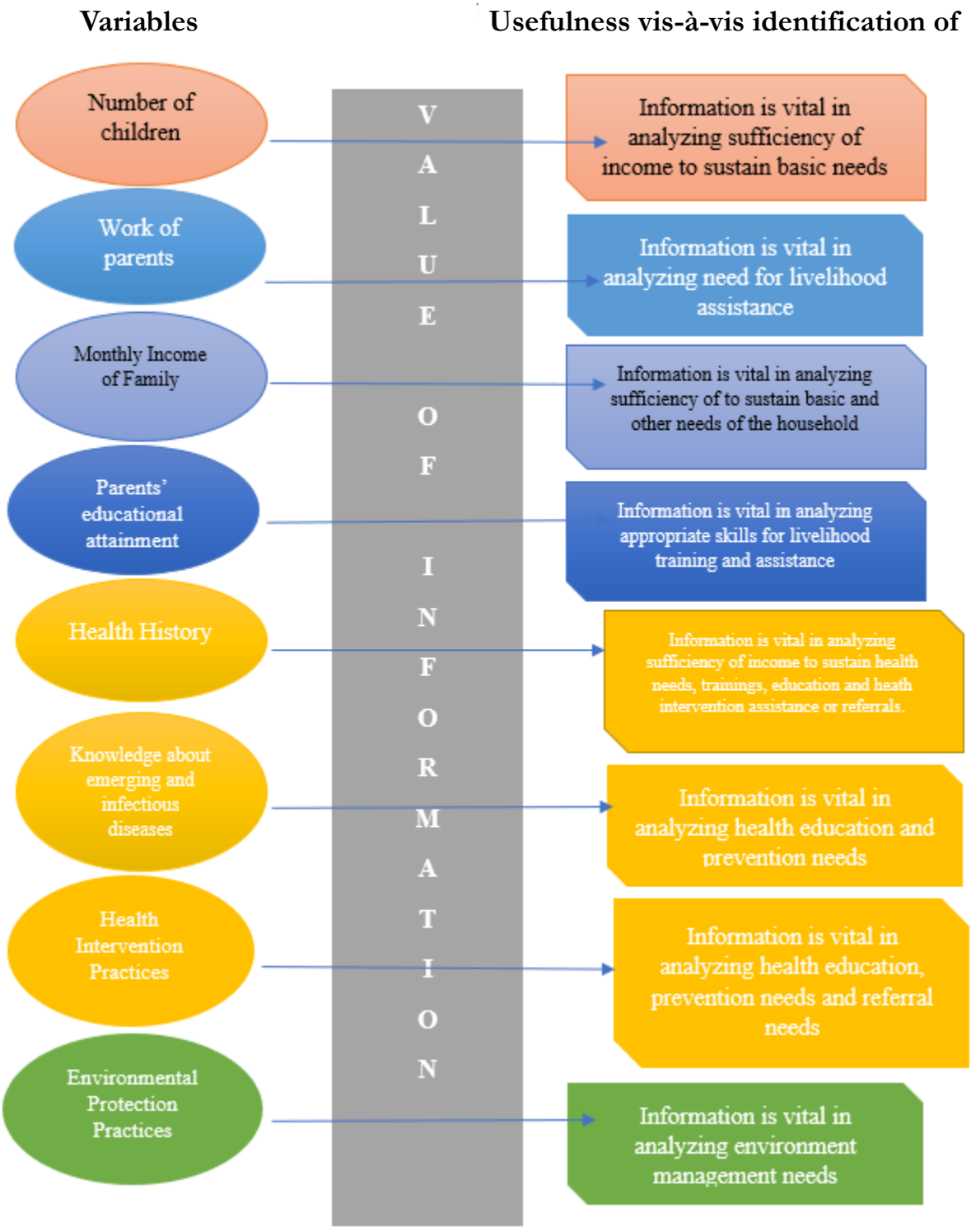

Figure 1. The Variables Included in Community Profile and the Value of the Information vis-à-vis Identification of Needs

The variables included in the survey-questionnaire are shown in Figure 1. The Since the general objective in conducting community extension is to assist in attaining community development, the project leaders deemed it necessary to obtain a base-line of the demographics. The selection of the variables was based on the root causes of poverty in the Philippines as reported by the Asian Development Bank (2009). According to ADB, there is low to moderate growth in economy; low growth elasticity of poverty; weakness in employment generation; failure to develop the agriculture sector; high inflation; high levels of population growth; high and persistent level of inequality; and exposures to risks such as economic crisis, conflicts, and environmental poverty. The information needed as seen in Figure 1, will help the proponents analyze the socio-economic situation of the community households.

In addition, Hueftle (2014) also included the income and work variables in conducting the needs assessment in a community. Although, there were important variables in the study of Hueftle which should have been included in the survey of the project leaders in the present study, which included the age classification of the community residents, the number of years that the residents had lived there, the distance of the residents to the center of business establishments; and community establishments or services that cater to child and senior welfare.

Moreover, the health information of the community households was deemed important by the project proponents since they believed that health is vital in the functioning of individuals and if not properly managed, health abnormalities will drain the resources of the families. Health information was also a part of the needs assessment survey conducted by Ahari et. al (2012) in a community in Iran where there was obvious socio-economic deprivation. Knowledge about emerging and chronic diseases was also deemed vital in the health information from the residents because of the fast-increasing cases of HIV/AIDS in the town where the target community belongs (Corpuz, Sunga, Pulmano, Lazatin, 2016); uncontrolled dengue cases; parasitic infections; and meningitis (Department of Health, 2017). These diseases are communicable and pose risks among the community residents.

In the past, community needs assessment survey of the College of Education and other Colleges in Tarlac State University did not include the use of laboratory tests and physical examination as component of the needs survey tool for health. In the present tool developed, fecalysis was conducted and examination of the hair, scalp, nails and skin of the pupils. These are deemed necessary since health is a crucial factor in development. According to Grosse and Harkavy (2016), “basic needs strategy of development is directed toward helping poor nations meet requirements for adequate food, shelter, sanitation, health, and education; thus, health becomes an objective of development”.

In including the environmental protection practices of the community, the project proponents believed that empowering the community with sound and relevant environmental information and basic management will help mitigate the climate change and its devastating effects, especially that the location of the community is prone and risky to natural calamities of strong rains and flooding. The importance of community empowerment in environmental preservation and protection are elucidated in the study if Dan Ayaa and Waswa (2012) on the role of indigenous knowledge system in the conservation of bio-physical environment in Kenya. The authors strongly recommended rekindling, recording and preservation of indigenous environmental best practices among local communities and be a part of sustainable natural resources management plans.

The questionnaire -survey was also used in interviewing some respondents who had difficulty in answering through writing. The project proponents translated the questionnaire/interview guide in Tagalog for easier comprehension on the part of the respondents.

Evaluation of the survey-questionnaire to gather community demographics.

A. Dry -run

To validate the survey-questionnaire to gather community demographics, a dry-run was conducted among 15 community residents. The objective of the dry-run was to observe whether parents easily understood the questions asked or data being extracted from the respondents. The School head, community program proponent, three practice teachers were tasked to write the observations.

Table 1. Observations During the Dry-run

Source of Observation or Informant	Informant's Narration	Formulated Meanings	Formulated Themes
IF 1	*"May mga magulang na hirap sagutan ang mga tanog"* (Some parents had a hard time filling out questionnaire.)	Some parents did want to answer the questions through writing.	Difficulty of some to write in the questionnaire.
F2	*"Kailangan ipaliwananag sa mga ibang magulang ang mga uri ng sakit na inilagay na pag-pipilian nila."* There is a need to explain the disease terminologies in the options	Disease terminologies in the options must be described to parents so they can answer correctly.	Respondents were not familiar with some disease terminologies.
F3	*"May mga hirap mag tantya kung magkano ang kinikita ng mga magulang sa isang bu-wan."* There are those who were hard up in estimating monthly in-come of parents.	Some respondents could not estimate the average monthly income of family.	Monthly income of family is difficult to estimate.
F4	*"May mga ibang parents na nagmamadali kaya hindi sinagutan ang mga iba."* There were some parents who were in a hurry and did not want to finish answering the questionnaire.	Some parents did not complete answering the questionnaire because they have other things to do.	Some parents cannot complete answering questionnaires due to lack of time.
F5	*May mga ilang parents na hindi masyadong marunong magbasa."* There were some parents who were not so good in reading.	Some parents had poor reading and comprehension abilities.	Some parents are not competent in reading and comprehension.

Adjustments done in the final survey -questionnaire.

To provide remedy to the observed difficulties of the respondents, the following adjustments were done:

1. Respondents unable to write legibly or who had difficulty in reading were interviewed using the questionnaire itself. The interviewers just wrote the answers of the respondents.

2. The terminologies in the disease options were explained by the interviewers. They had to spend longer time in completing the interview.

3. Parents who had no time to answer questionnaires or finish interview were not included as respondents.

4. To improve the readability of the questionnaire, fonts and spaces were adjusted.

B. Experts Evaluation

The three experts unanimously approve the survey-questionnaire but indicated few suggestions such as writing the "others " in the options so that the respondents can write answers not found in the options.

1.2 Physical and Laboratory Examinations

To provide a more significant health information of the community, aside from directly asking them about their health problems. The project proponents also employed physical and laboratory examinations among the children who are enrolled in the school. The project proponents tied up with the Philippine Association of Medical Technologists (PAMET), Tarlac chapter in conducting the examinations. One of the project proponents, being a member of PAMET, made a courtesy call to the municipal health officer to conduct gross physical examination of the skin and scalp and conduct fecalysis. The information obtained were bases of providing health intervention for the children.

Figure 2 shows a glimpse of the physical and laboratory examination conducted in the target community. The health information was used in providing health intervention for the children.

Figure 2. PAMET, Tarlac Chapter in Action

Another information obtained was the Body Mass Indices (BMI) of the Pupils to determine their nutritional status.

The BMI revealed 7 severely wasted and 33 wasted pupils. The school head asked the community extension program proponents to include an intervention for the undernourished children in cooperation with the feeding program of the Department of Education.

Figure 3. BMI Taking

1.3 Focus Group Discussion

Another tool used by the community program leaders was the focus group discussion. The project leader, Dr. Cynthia G. Quiambao coordinated with the school head in setting the FGD. A representative from the University Extension Office, representative from the parents and barangay leaders were asked to meet with the project leader. They discussed the needs of the school and the barangay.

1.3.1 Community Leadership Needs

For the parent and barangay and leaders, they were asked to indicate what leadership training they needed in order to enhance their leadership skills. Community leaders, headed by the barangay captain, expressed about leadership training needs. The school head agreed with the suggestion of the barangay captain and thus, leadership seminar was a part of the extension program.

1.3.2 Teacher Needs

A meeting was also arranged with the school head and teachers to talk about the needs of teachers to improve their teaching competence. The areas of teaching were based on the areas measured in the performance indicators. The community proponent took notes on the result of the FGD with school staff and included the needs in the extension program developed.

1.4 Questionnaires

1.4.1 Knowledge of the parents and pupils about Emerging and Endemic Diseases

A separate set of questionnaires, translated in Tagalog was developed by the project proponents to know the knowledge of parents and pupils on emerging and endemic diseases. The questions revolved on the cause of the disease, possible source of infection, signs and symptoms and prevention. Parents and pupils' answers were the bases of the project proponents in providing health education to them. The questions were just answerable by yes or no because the community program proponents decided to phrase simple questions and provide simple answer options so that the respondents will not get tired in answering. The School head, community program proponent, three practice teachers and eight teachers were tasked to write their observations.

Table. 2. Summary of Observations in the Dry -run of Questionnaire

Observations from Parent Respondents	Observations from Pupil Respondents
The parents had an easy time choosing from yes or no option.	1. Pupils were more enthusiastic in answering the questionnaire.
The disease being mentioned in the questionnaire was not known to some of the parents.	2. Pupils were free to ask the teachers administering the questionnaire in some words they did not understand.
Some parents found the font used too small.	

Adjustments Done to remedy the observations

1. Questions had to be explained by the person administering the questionnaire.

2. There are cases when the person administering the questionnaire had to write answers for the respondents.

3. The font of the letters was adjusted so that parents could read them well.

2. How the Tool was Used in Community Development

The varied tools used in the community needs assessment were able to provide base line information on the community demographics, health, environment, livelihood needs and potential skills of the women, teacher improvement needs and community leadership needs.

Table 3. Community Needs

Health Needs	Basis	Means of Verification
Health Education Trainings and Seminars	1.Few respondents have knowledge of the causes, prevention and basic management of health ailments. -Meningitis -Dengue -Parasitism -HIV/AIDS 2. Only few parents use herbal medicines for common ailments	Attendance to seminars Assessment of knowledge of health acquisition Anecdotes of parents' experience in using herbal medicines
Health Intervention Measures Delousing Deworming Treatment of wounds on skin and scalp Feeding Program	 Most pupils have human lice Some pupils are positive for intestinal parasites Some pupils have visible wounds on scalp and skin Some pupils are severely wasted and wasted	 Elimination of head louse through visual inspection Healing of skin wounds Comparison of BMI before and after feeding
Environment Development Solid waste management program seminar Cleaning and Regreening Program Putting up of herbarium and planting of ornamental plants and vegetable Gardening	 Some respondents have no knowledge on proper waste segregation and disposal Some respondents do not clean their surroundings regularly and only 2 indicated to have participated in tree planting Herbarium will not only help the community's health needs but will also support biodiversity. Vegetable gardens will teach the community to produce their own food.	 Solid waste are managed Presence of trash bins Clean surrounding Trees growing Herbarium is visible Vegetables are grown in the school and house environments
Teachers' Needs Seminar and workshop on: Teaching strategies Action research Professionalism towards work Assessment	All teachers indicated they needed seminar workshop on the five areas of their work responsibilities through a survey questionnaire. Top five of the teachers' needs.	Attendance to seminars Certificates in the seminars
Livelihood Skills training Sewing Cooking commercial food Recycling	Most mothers are plain housewives	Mothers have acquired skills or have put up small retail business
Community Leadership seminars	Barangay leaders interviewed indicated their desire of expanding their knowledge and awareness of strategies to motivate the community to participate in barangay programs.	Attendance to seminars
Other needs: Gender and Development	Seminars of GAD and human rights needs	

Table 3 shows the needs identified in column 1. Column II were the bases of the program proponents in identifying the needs. Column III indicated the tools used to gather the data needed to identify the needs.

3. Assessment of the Effectiveness of the Tools

The tools used in determining the effectiveness of the tools used in community assessment were validation of the tools before using and evaluating the outcome of program implementation.

Validation of Tools Before Use

The questionnaire/interview guide on demographics underwent face validation and dry-run. For face validation, three experts examined the questionnaire and it was found to be unanimously sufficient and appropriate to gather the data that the project proponents wanted to extract from the respondents.

Another validation used was conducting dry run on the questionnaire which asked for the knowledge of parents and pupils about emerging and endemic diseases. Fifteen parents and fifteen pupils were taken as respondents for the dry-run. Since the options are either yes or no, the project proponents no longer subjected the data to a test for reliability. They only wanted to know if parents could easily understand the questions asked. The project proponents observed that the questions were very simple and easily understood by the respondents.

Evaluation of the tools During and After Implementation of a Specific Project

Another way of determining if the tools used in determining the needs of the community were effective, is in evaluating whether the target beneficiaries had attained a level of improvement after the project implementation. For example, in using the physical and laboratory examination for the pupils' health needs and in using the BMI measurements, the outcomes were encouraging since the health interventions were generally effective.

4. Opportunities for Improvement

Generally, the tools used by the project proponents were effective in identifying the needs of the community as far as health education, health intervention measures, environment development, livelihood skills training, community leadership and teaching improvement are concerned. However, while the proponents were implementing the extension programs and projects they observed that ocular inspection of the entire community to look into possible resources to be utilized and those having potential in developing for future use was lacking.

In addition, the community demographic information was not extensive as it failed to include pertinent community information such as the age classification of the community and the socio-economic profile. The information could have been valuable in developing more programs to cater to the vulnerable age groups. The community program proponents observed that there were seniors who attended health teachings and some mothers tagged along with them babies, whom the extension leaders could have also considered in planning projects for them such as physical exercise programs for seniors and physical or health monitoring assistance for the babies.

IMPLICATIONS OF THE STUDY

Efforts to develop the community should be dynamic and evidence-based. Community development programs must be based on thorough needs assessment survey in order to address the root causes of underdevelopment. In this case, a valid and reliable needs assessment tool must be employed in gathering data. The tool developed in this study could extract the needs of a community across economic, health, social and political aspects. Groups with similar community development goals may adopt the tool or use it as baseline in developing their own tools to diagnose the needs of their target beneficiaries.

CONCLUSIONS

The tools developed in assessing the community needs were basically questionnaire-checklist or interview guide, physical and laboratory examination, BMI measurement and focus group discussion. The questions asked were based from literature and studies reviewed by the program proponents.

The tools developed were validated by experts based on examination whether the contents were appropriate and sufficient in extracting data desired to describe the situation of the community. A dry -run was also conducted and the school head, three practice teachers and one of the community program proponents observed the respondents while they were answering and took down notes on the difficulties of the dry run respondents. The findings in the observation were considered in modifying or enhancing the final survey-questionnaire sets.

The tools used was generally effective on the areas of health improvement, teacher development and environment development. The community program has been extended for two more years in order to implement more projects and activities to meet other needs not implemented in the first phase of implementation.

However, the tools failed to provide other pertinent data on community demographics such as the age classification of the community members. information on the resources in the community which could have been potential in supporting other programs such as in developing programs for livelihood, other than those already included in the plan.

RECOMMENDATIONS

The community program proponents strongly suggest that the tools be enhanced to include other pertinent variables in establishing community demographics such as the age classification of the community; types of houses; number of years that the residents resided in the community; the types of family -whether extended or nuclear; and the skills of the community members and the socio-economic profile of the community.

Another tool that was not explored by the community program proponents was conducting thorough ocular inspection of the community. What was inspected was only the school premises. There must be an effort to conduct a thorough inventory of the resources and potential resources available in the community which will help in supporting community development projects.

The tool developed maybe used in other communities in order to diagnose the holistic needs of the community. The tool may be modified to suit the needs of a community being diagnosed.

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The University Extension In-House Review of Completed Extension Projects is an annual event of the Tarlac State University-Extension Services Office that provides a two-pronged venue to recognize the efforts of Extension Service Providers (ESPs), individually or collectively through paper presentation and publication.

It is hoped that ESPs would be encouraged and motivated to involve themselves more towards attaining concrete progress on the major function of the university and contribute to sustainable development and client empowerment. In addition, it specifically aims to:

1. Share and present the significant accomplishments of ESPs;

2. Hone the skills of ESPs in organizing and presenting their accomplishments in a technical forum;

3. Heighten the extension service consciousness and culture of the university;

4. Recognize and reward programs or projects that created significant impact to communities, sectors, institutions, organizations and other clients; and

5. Document and publish significant accomplishments.

Original and unpublished articles may be submitted in the following categories:

1**) Community Development** integrates all the necessary factors to development affiliated on economics, social-cultural, physical, technological and environmental condition of the subject community. It is a planned effort to build assets, matching it with the capabilities of the university which empower the community and increase the capacity to improve their quality of life;

2) **Industry Development** focuses on the expansion of micro-cottage, small and medium enterprises (MSMEs) through technical advises and consultancy services either leading to productivity enhancement compliance to statutory regulation process improvement;

3) **Human Resource Development** incorporates the use of skills training, knowledge transfers and professional training by which individuals, organizations and communities are empowered; and

4) **Extension Tools and Approaches** identifies and describes specific developed tools and unique approaches such as methods, models and instruments or tools used in extension that can be disseminated, improved and adapted by the university.

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