

A microscopic image of plant cells, showing a network of thin, light-colored cell walls and some darker, more complex structures. The background is a soft, out-of-focus blue-grey.

# SILLIMAN JOURNAL

VOLUME 57 NUMBER 4 | OCTOBER TO DECEMBER 2016

A JOURNAL DEVOTED TO DISCUSSION  
AND INVESTIGATION IN THE HUMANITIES AND SCIENCES

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All articles must be accompanied by an abstract of 200 words and keywords of not more than ten words, and must use gender-fair language.

SILLIMAN JOURNAL likewise welcomes submissions of “Notes,” which generally are briefer and more tentative than full-length articles. Reports on work-in-progress, queries, updates, reports of impressions rather than research, responses to the works of others, even reminiscences are appropriate here.

SILLIMAN JOURNAL also accepts for publication book reviews and review articles.

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## Editorial Notes

*“Our environment, the world  
in which we live and work,  
is a mirror of our attitudes  
and expectations.”*

**- Earl Nightingale**

*“We won’t have a society if  
we destroy the environment.”*

**- Margaret Mead**

Welcome to the final issue of 2016 when the Silliman Journal was published quarterly. Most of the articles in this issue are research outputs from the natural sciences. But first, faculty at the College of Nursing investigate “Integrated Management of Childhood Illness (IMCI) Training through the Lens of the Participants”. The study of Rowena Turtal and colleagues was intended to evaluate a training program from the perspective of those trained. Because of experienced logistical difficulties and challenges of the trained health workers, the authors recommend ways by which the problems could be addressed, including proposals for continuing education.

The second paper is by engineering adjunct professor Benjamin Tobias on the “Design and Development of Abaca Fiber Sand Cement Frogged Brick Composites.” An attempt was made to fabricate at room condition short abaca fiber sand cement composite material using the conventional mixing method. The product was found to lend application in the building industry.

Third, Lani Lou Lopez and colleagues investigated “Molecular Identification and Characterization of Two Trichoderma species Isolated from Carabao Manure and Evaluation of Shelf Life Using Locally Available Substrates”. Beneficial microorganisms such as Trichoderma play an

important role in nature farming and organic agriculture as they have the ability to improve the quality of soil, increase yield of crops and serve as bio-control agent and microbial activator. Researchers try to isolate and identify the usefulness of microorganisms in nature in order to determine the biology of the species and its mode of action.

Then, engineering faculty compare fuel economy of a vehicle with standard power train and another with power train modified into a hybrid with cylinder deactivation, stating at the outset that rising gas prices and concern over global warming have resulted in the development of hybrid vehicles and vehicles with cylinder deactivation in order to improve automotive fuel efficiency. These vehicles currently make up less than 1% of vehicles worldwide. Success of this technology shows how some of the remaining 99% of vehicles may be made more fuel efficient.

In the fifth full-length article, Maribeth Jadina and colleagues from the University of the Philippines-Los Baños theorize land ownership in land titling. After three decades of agrarian reform, the authors sought to identify and discuss the concept of land and land ownership through land titling and to determine its connotations. Data gathered through in-depth interviews were interpreted within the context of constructivism and three major paradigms emerged in the process: land ownership through titling is viewed as security, pride, and propaganda.

Next, Annie Paz-Alberto and others assess animal diversity in the Forest Ecosystems of Baler Forest Reserve and Dibut River Watershed. Some 40 animal species were observed in the area under 30 families, where Families Alcedenidae, Pteropodidae, Muridae, and Ranidae are the most represented. The mammalian species Greater Musky Fruit Bat (*Ptenochirus jagori*) is the most common and the most dominant animal species surveyed in the forest ecosystem. Baler Forest Reserve and Dibut River Watershed exhibited low to very low diversity among animals. As has repeatedly been found in similar diversity studies, human activities (e.g., timber poaching, kaingin farming, and so on) have posed major impact on environmental degradation.

The final full length article is also by colleagues from the University of the Philippines in Los Baños who look into climate change adaptation and resiliency of coastal communities in the Red River Delta Biological Reserve in Vietnam. The relationship between climate change adaptation and resiliency variables was found to be weak although it was positive

linear; the ecosystem in the area has worsened due to environmental pollution and lack of awareness in environmental protection, but the mangrove forest resources have the capability to combat climate change.

## NOTES SECTION

There are three diverse contributions to the notes section; one by religious studies teacher Lily Apura who discusses parenting the Old Testament way, the second is by retired sociology professor Salvador Vista who reflects on Jose Rizal's poem "My Last Farewell," and in the third contribution, Beryl Andrea Delicana reflects on "powerful women in and out of Romance novels." Beryl concludes her essay by saying that "happily ever afters" (HEAs) "should be seen as an open possibility that a woman can want it all and that she has the ability to have it all."

## ACKNOWLEDGMENTS

I would like to thank all contributors to this issue, including the reviewers of each paper. Though varied in expertise and wisdom, all papers have something to say about the fragility of living and the interconnection between health and environment. As Barbara Ward reminds us, "We have forgotten how to be good guests, how to walk lightly on the earth as its other creatures do." Indeed, everything is somehow connected. We must remember to walk lightly.



Margaret Helen F. Udarbe  
*Editor*





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# **Integrated Management of Childhood Illness (IMCI) Training Through the Lens of the Participants**

**Rowena M. Turtal, Shem S. Baguio,  
Rochie C. Cagara, Lourdes L. Oliva,  
Geraldine G. Anque, Renee Felisa O. Teh,  
and Florenda F. Cabatit**

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This qualitative study, which made use of a focus group discussion for data collection, aimed to describe the outcomes of the IMCI service providers training in terms of the knowledge, skills, and attitude gained by the participants. Furthermore, it also aimed to describe the services rendered and the challenges they encountered in their one year of utilizing the IMCI strategy in their respective health centers. The participants consisted of six midwives of the nine who completed the training which was organized by the Revitalizing Primary Health Care (RPHC) Project of the College of Nursing of Silliman University, Dumaguete City, which is funded by the Commission on Higher Education (CHED) of the Philippines. The study made use of content analysis to interpret the collected data.

The results of the study show that the participants appreciated the training because it is useful, helpful, and empowering. More so, it makes the health services accessible and affordable to the community. The knowledge and skills learned by the participants, as well as the services rendered, are related to the four steps of the IMCI process which are assessing, classifying the illness, treating the child, and health education/counselling. The two steps of the process which are not mentioned as learned and performed are identifying the treatment and giving of follow-up care. The study also yields some challenges and problems experienced by the IMCI-trained participants, which are related to logistics, the attitude and expectations of some mothers about how their sick children should be managed, self-doubt when the classifications identified do not match with the doctors' diagnoses, and time constraints when implementing such a long but important strategy. The recognition of the importance of applying the newly acquired knowledge and skills and the enhancement of caring behavior manifested through a deeper concern for the children and prompt attendance to their needs help the trainees perform these IMCI-related services.

In view of the results of this study, it is recommended that more midwives and nurses will be trained in IMCI strategy. Furthermore, the challenges and difficulties shall be looked into by the authorities concerned, and regular continuing education and update sessions for the participants should be conducted. It would also be beneficial if another study can be conducted to look into the performance of IMCI-trained personnel in the city health offices and rural health units to gain a deeper understanding of the issues.

**Keywords:** Primary Health Care, Integrated Management of Childhood Illness (IMCI) Strategy, Training, Health Education, Domains of Learning, Skills, Knowledge, Attitude

## INTRODUCTION

Primary Health Care (PHC) is an international framework of delivering health services close to the people. It was launched during the First International Conference on Primary Health Care, which was held in Alma Ata, USSR way back in September 1978 and was sponsored by the World Health Organization (WHO) and United Nations Children's International Emergency Fund (UNICEF). In the Philippines, it has been adapted since October 19, 1979 by virtue of Letter of Instruction (LOI) 949 (Cuevas, 2007, p.30).

PHC is a strategy through which "essential health care that is based on practical, scientifically sound, and socially acceptable methods and technology is made universally accessible to individuals and families in the community by means acceptable to them, through their full participation and a cost that the community and country can afford" (Estrada-Castro, 2012, p.9). Its concept is characterized by partnership and empowerment of the people that is envisioned to eventually make them self-reliant.

The College of Nursing of Silliman University strongly believes in the capacity of Primary Health Care to transform the society particularly in the health aspect. It is on this note that the Revitalizing Primary Health Care Project, which is funded by the Commission on Higher Education (CHED) of the Philippines, is undertaken by the college with the aim of strengthening the implementation of PHC in the seven barangays (villages) of Dumaguete City, Negros Oriental.

Along with the concept of empowerment is capability building. With this in mind, the RPHC project team organized/conducted education and training sessions, one of which is the Service Providers Training on Integrated Management of Childhood Illness (IMCI). IMCI is a strategy of managing

common illnesses among the under five children. It was launched by the WHO and the UNICEF in the mid-1990's, with the goal of reducing the morbidity and mortality rates of common illnesses such as pneumonia, diarrhea, measles, malaria, dengue hemorrhagic fever, and malnutrition, among the population of children under five years of age. Aside from reducing the morbidity and mortality rates, it also seeks ways to improve the growth and development of the under five children through the use of an integrated manner by combining the separate guidelines for Control of Diarrheal Diseases (CDD), Care of Acute Respiratory Infection (CARI), Malaria Control Program, Prevention and Control of Dengue Hemorrhagic Fever. Management of other illnesses which are common among children was also added into the IMCI guidelines (IMCI Resource Manual and Workbook, 2011).

Though IMCI strategy was internationally launched in the mid 1990's, its implementation here in the Philippines started only in 1997 in few regions and eventually, it was expanded to all regions in the country (IMCI Resource Manual and Workbook, 2011). Selected health workers, which included municipal/city health officers, public health nurses, and rural health midwives, were trained. Furthermore, with the intention of sustaining competent health workers in health care facilities, teaching of IMCI in nursing, midwifery, and medical schools is seen as a potential opportunity to broaden health system coverage. This resulted to the inclusion of faculty of selected schools of nursing, midwifery, and medicine in the IMCI trainings.

The training of health workers involved in the implementation of IMCI strategy has always been of prime importance to create a pool of competent workforce. According to the study of Arifeen et al. (2009), the strategy was associated with positive changes such as improved health-worker skills, health system support, and family and community practices including increased pure breastfeeding in Matlab which is a sub district of Bangladesh. It has also decreased stunting in that place. The study of Nguyen, Leung, McIntyre, Ghali, & Sauve (2013) also found out that the IMCI training improves health worker performance.

A number of studies have found positive results of IMCI strategy. However, the cost-effectiveness issue of the training has been identified as one of the challenges to be surmounted in the expansion phase of IMCI (Lambrechts, Bryce, & Orinda, 1999). With this thought, and alongside the goal of PHC, the RPHC Project responded to the request of the City Health Office of Dumaguete City, Negros Oriental, Philippines to facilitate an

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IMCI Service Providers Training for the midwives of the partner barangays (villages). In collaboration with the Integrated Provincial Health Office of Negros Oriental and the City Health Office of Dumaguete City, the RPHC Project facilitated an intensive training for seven midwives and two faculty of the College of Nursing of Silliman University, which lasted for thirteen days in November 2013. The training observed the standard training protocol for the IMCI strategy, implementing its two components which are the classroom and supervised clinical practice. The classroom component of the training used videos, readings, reviews of photographs, demonstrations, and a variety of other interactive methods (Lambrechts et al., 1999). On the other hand, the supervised clinical practice was spent in various health centers of the city, where trainees practiced their skills and received feedback from the trained facilitators.

With the IMCI training conducted, it is deemed important that the outcomes of the trainings be studied, as this can bring about improvement and provide direction to future trainings that will be conducted. The aim of this study then is to describe the outcomes of the IMCI training conducted by the RPHC Project in terms of the knowledge, skills, and attitude gained by the participants. Furthermore, it also aims to describe the services rendered and the challenges and difficulties they encounter along the way.

## **METHODS**

This is a qualitative research, which made use of focus group discussion (FGD) as the method of data collection and content analysis for interpretation. The FGD was attended by six midwives from the RPHC project partner barangays. During the training, the participants had been informed that they would also participate in the evaluation study sometime after the training. The FGD was conducted by three researchers who were each assigned to facilitate the discussion, to record, and to serve as secretariat. The guide questions were the following: a) What impressions were generated by the participants for the training?; b) What knowledge and skills were learned from the training?; c) What changes in attitude and behavior were developed or enhanced because of the training?; d) What health services have been rendered as a result of the training?; and e) What difficulties and challenges were encountered while providing the health services?

Before the actual conduct of the FGD, an orientation and a practice session

were done for the facilitators. The actual FGD was held at the Mary Marquis-Smith Hall Room 103. Consent from the participants was obtained. It was also emphasized to them that they could opt not to answer questions which they were not comfortable answering. Furthermore, a demographic form was used to obtain some characteristics for the profiling of the participants.

During the conduct of the FGD, one of the researchers facilitated the discussion based on the research questions, another researcher wrote the responses on a manila paper posted on the board or wall, while another one wrote the responses in a recording notebook. A digital recorder was used to record the discussion proceedings after a consent was given by the participants. Final validation of the responses was made before the facilitator summarized and concluded the session. The FGD lasted for one hour and twenty minutes.

In the analysis of the data, transcribing was done both from the digital recorder and from the written entries. The responses were read more than once, clustered, and then coded into themes by two researchers. The two researchers then met to concur on the clustering of data into themes. Impressions, challenges/difficulties were read and reread at the same time analyzed alongside the derived themes.

## **RESULTS**

### **Profile of the Participants**

The participants of the study included six female midwives who completed the IMCI Service Providers Training. Their ages ranged from 39 years to 53 years old. As to their marital status, three are married, two are single, and one is a widower. Those who are married and the widower have two children each while those who are single do not have children. They are assigned in the seven partner barangays of RPHC Project except for one who is assigned in another barangay but was made to participate because of the request of the city health officer who believed that having a midwife who is trained in IMCI was a felt need of that particular barangay.

### **Participants' Impressions on the IMCI Training**

There were three themes that emerged related to the participants' impressions of the IMCI Training. These themes are: a) useful; b) accessible and affordable

health care; and c) empowering, which are all appreciations for the training because of its positive qualities. As a participant expressed, “we feel lucky and blessed that we were able to attend the training.”

The participants believe that what they learned in IMCI training is helpful and useful. The treatment of the common illnesses and the counselling of the care givers (mothers) on how to care for their children turned easier because of the training. As a number of participants verbalized, “We learn whether to treat the condition or refer. Also, we can educate the mother on what to do if the child has fast breathing.”

One of the principles of PHC is to make health services close to the people. The IMCI training is seen by participants of the study as a strategy that is aligned with this principle. The participants expressed that because of the IMCI training, the health services are within reach of the people in terms of proximity and cost. This is concurred when a participant said that it is “very helpful especially that there are those who can’t afford the fare (in going to the doctor).”

According to Conger & Kanugo (1991, p. 474, as cited by Costello-Nickitas, 1997) “empowerment is a process of enhancing feelings of self-efficacy among organizational members through the identification of conditions that foster powerlessness and through their removal by both formal organizational practices and informal techniques of providing efficacy information.” This is manifested in the statement of the participants: “We feel like we are doctors... we are able to prescribe antibiotics.” This is also supported by another participant who said, “It enhances our knowledge and skills as midwives. We feel empowered.”

## **Knowledge and Skills Learned**

Learning can take place in three domains according to Benjamin Bloom (1956, as cited by Berman & Snyder, 2012). These are knowledge (cognitive), skills (psychomotor), and attitude (affective). The cognitive domain is also referred to as the thinking domain. This covers the levels of thinking which starts with simple recall, then progressing to comprehension, analysis, synthesis, and evaluation. Furthermore, the psychomotor domain includes learning of fine and gross motor abilities while the affective domain, which is also known as the “feeling” domain refers to learning of desirable emotions and attitudes.

The knowledge and skills learned by the participants of the IMCI training

can be categorized into the following themes: a) assessing the sick child; b) classifying the child's condition; c) treating the sick child; and d) educating/teaching the mother/care giver. These themes are focused on the steps of the IMCI process.

The first step of the health care process is assessment, which entails taking of the necessary information for the purpose of gaining a deeper understanding of the client's situation. According to Berman & Snyder (2012), the process involves collecting, organizing, validating, and recording data about a client's health status. However, in IMCI, it specifically means taking the health history of the sick child and performing a physical examination. In relation to assessment, the participants expressed that the training enable them to thoroughly assess the sick children. This is affirmed by a participant who stated that "Now, we are able to do thorough examination of the child...we ask them (mother/caretakers) questions following the IMCI guideline."

The second theme is centered on the second step of the IMCI strategy, which is identifying the child's condition. In the IMCI parlance, identifying the child's condition means classifying the child's illness which means taking a decision on the severity of the illness (IMCI Resource Manual and Workbook, 2011, p. 3). A sick child may have one or more classifications which are action-oriented (not medical diagnoses). In concordance to this theme, a participant expressed that she learned "...classifying whether the child has no pneumonia, pneumonia, or severe pneumonia... I am able to identify if the child has pneumonia or no pneumonia."

The third theme, which is on treating the child's condition is affirmed by a participant who said, "I learned how to treat minor illnesses (covered by IMCI)." This is the fourth step of the IMCI process which covers the implementation of the identified treatments for the classifications identified. The treatments are based on the guidelines established by the IMCI protocol, which may cover giving of appropriate medications, giving missed vaccines, and others.

Lastly, a very important theme on educating/teaching the mothers/caregivers came out and is supported by this participant's claim that "It (the training) enhances our knowledge which led to a more substantive health education among mothers." Health education is any combination of learning experiences designed to facilitate voluntary adaptation of behaviors conducive to health (Green & Ottoson, 1999). It is a vital tool for facilitating the primary, secondary, and tertiary levels of prevention.



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## Attitude Developed or Enhanced

Affective learning involves gaining the desirable attitudes and emotions. It is an important domain which often times interspersed with the other domains because without the right attitude, cognitive and psychomotor learning would be hampered.

There are only two themes that emerged related to development/enhancement of desirable attitude among the participants. These themes are: a) recognition of the importance of applying the newly acquired knowledge and skills; and b) enhancement of caring attitude and behavior

According to Hubley (2004, p.70), whether a training is taken seriously and put into practice will usually depend on one's attitudes. Primarily, the trainees must feel that the topic is important and should be put into practice. It is then rewarding to note that the participants recognize that it is important to apply what they learned in the IMCI training. As one participant said, "Before (we had the IMCI training), if there is a patient who would come to ask for medication, we tell them that 'there is no medication' because there is no doctor. We tell them to go to a doctor." Another participant also said that, "Now (that we have gone through the training), we assess the patient based on the IMCI assessment guide." This is so because the protocol of the IMCI strategy gives the trained health workers the bases for their actions giving them certain degree of autonomy. Furthermore, this implies that a doctor is not a requisite for the implementation of IMCI strategy.

The second theme that emerged is enhancement of caring attitudes and behavior. There are a lot of theories about caring. Central to these theories is the idea that caring is vital to all helping professions and enables people to create meanings in their lives (Berman & Snyder, 2012, p. 449). It is an essential attribute that health workers must possess, and it is manifested as a theme when majority of the participants chorused that "(We)...learn to love our patients...love...patience...care. We are now more patient in dealing with our clients. We are able to give more attention to them." Furthermore, this is affirmed by this statement of a participant, "(I am) ...inspired to attend to clients immediately and refer to the hospital right away as necessary to prevent complications."

## Health Services Rendered

The IMCI-related services rendered by the participants are closely related to the items learned by them. The themes are also categorized into: a) assessing; b) classifying the illness; c) treating the condition; and d) health education/teaching.

Understandably, the themes for the services rendered by the participants are in consonance with the knowledge and skills that they learned. These themes, which are a) assessing; b) classifying the illness; c) treating the child; and d) educating/counselling, are also important steps of the IMCI process.

The first three themes, which are the assessing, classifying the illness, and treating the child, are supported when a participant verbalized, “Now we thoroughly assess them with the use of IMCI guide questions.” Furthermore, a participant said, “We assess whether the child is underweight and also check on immunization status.” The theme on classifying the illness is affirmed when a participant expressed that she does “...formulation of different classifications for the child’s condition,” while the third theme, which is on treating the child, the participants mentioned several treatments that they implemented: “We treat conditions which are not severe like diarrhea, ear problem and pneumonia,” Give Vitamin A if the child is already 6 months,” and “... administering needed vaccines.”

Another theme that came out under services rendered is health education/counselling. This is affirmed by the participants’ claim that “(they) give advice, counsel on feeding, schedule for return check up, immunization.” Another participant verbalized that “(they) perform counselling and health education about topics covered by IMCI including hygiene, and family planning.”

According to the WHO (as cited by Estrada-Castro, 2011, p. 19), health education comprises consciously constructed opportunities for learning involving some form of communication designed to improve health literacy, including improving knowledge and developing the life skills which are conducive to individual and community health. It is considered an indispensable tool for health promotion. On the other hand, counselling is a process of helping a client to recognize and cope with stressful psychological or social problems, to develop improved interpersonal relationships, and to promote personal growth (Berman & Snyder, 2012, p. 17). In IMCI, health education/counselling means assessing how the child is fed and telling the

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mother about the foods and fluids to give the child, and when to bring the child back to the health center (IMCI Resource Manual, 2011, p.3).

## Challenges and Difficulties Encountered

Encountering challenges and difficulties is but natural in every undertaking. As far as the IMCI training participants are concerned the following themes emerged under this category: a) lengthy IMCI process, b) lack of some supplies, c) difficulty in evaluating the outcome, d) inconsistency of formulated IMCI classification with the doctor's diagnosis, and e) mothers' preference for medication.

The participants feel that the length of the IMCI process poses a challenge to them. It is affirmed by a number of participants' responses. One intimated, "The process is too long. It covers giving of treatment, making the mother do the return demonstration, counselling...more so if I will include feeding advises which is very long. In consideration to this, I always tell them ahead that this process really takes long." Another participant said, "... (even) the taking of the respiratory rate also takes long...it has to be counted when the child is calm... couldn't be taken when the child is asleep, breastfed, and when not relaxed or crying. Sometimes we cannot even finish filling up the back page of the form because of lack of time".

Marquis and Huston (2009) emphasized that supplies are the second most significant component in a budget for a hospital and for any health institution for that matter. It is necessary to provide health services. The lack of it can hamper the delivery of important services including health services under IMCI strategy. As to the theme on lack of some supplies, a number of the participants said, "We are not provided with forms...we need to have them photocopied." Another participant also claimed that "the medicine for ear infection is expensive and not available at the City Health Office. Other medicines such as antibiotic, iron, paracetamol, Vitamin A and others are available."

Monitoring and evaluation of the outcome of the treatment is important. Without them, the health provider will not have a chance of modifying the care and treatment given to the child if it is necessary. However, the third theme under challenges and difficulties encountered is the difficulty of monitoring and evaluating the child's condition. This is supported by a participant's statement: "We have difficulty in monitoring patients' condition

when their mothers do not bring them back for follow up as instructed.”

The fourth theme is doubt on the IMCI classifications formulated. In relation to the theme, Webster’s New Encyclopedic Dictionary (1995, p. 302) defines doubt as a state of affairs that causes uncertainty or suspense. It implies uncertainty about the truth or reality of something and an inability to make a decision.. As a participant expressed, “Our classification is different from the doctor’s diagnosis. They usually come up with URTI as diagnosis while our classification is pneumonia. We cannot also refute because they are doctors.” Another participant affirmed the previous statement when she said, “That is right...”

The last theme is on some mothers’ and caretakers’ preference for medications. Drugs and medications are considered important in the management of many illnesses. However, not all health problems need medications. Despite this fact, the study result shows that a number of mothers would like that their sick children be given such. According to a participant, “Mothers would just directly ask for medicines without bringing the child to the center. I told them that I need to see the child.” This is also affirmed by a participant’s verbalization that “some mothers would prefer that their child be given medication even if it is not necessary for the condition of the child...and [they would] feel upset when they are not given drugs for their child’s condition.”

## **DISCUSSION**

### **Impressions on IMCI Training**

The Integrated Management of Childhood Illness (IMCI), which is a strategy of managing common childhood illnesses among children under five years of age, is anticipated to lessen the vulnerability of this population group. It aims to reduce the morbidity and mortality and at the same time takes into consideration the ways of improving the growth and development of the under five children through the use of an integrated manner by combining the separate guidelines for Control of Diarrheal Diseases (CDD), Care of Acute Respiratory Infection (CARI), Malaria Control Program, Prevention and Control of Dengue Hemorrhagic Fever (IMCI Resource Manual, 2011).

The first component of IMCI includes health worker training and the reinforcement of the correct performance. The training is based on a set of

adapted algorithms that guide health workers through a process of assessing signs and symptoms, classifying the illness according to treatment needs, and providing appropriate treatment, counselling/education to the child's caregiver, and follow-up care (Gove, 1997; IMCI Resource Manual, 2011).

The result of this study shows that the participants have good impressions about the IMCI training that was organized by the Revitalizing Primary Health Care Project. The training is well appreciated because it is helpful and useful to them as they dispense their duties. As midwives, the participants are considered front liners in the delivery of health services in the Philippine Health Care Delivery System, and the IMCI training is seen to have empowered them as their knowledge and skills have been augmented. These impressions are aligned with the systematic review and meta-analysis study result of Nguyen et al. (2013) which sought to determine whether IMCI training improves the skills of health workers. The study revealed that the IMCI training improves health worker performance. Several studies have also shown that health workers trained in IMCI do perform better than those who have not been trained. Health facility surveys carried out in Tanzania (Schellenber et al., 2003), Brazil and Uganda (Amaral, Gouws et al., 2004), show that IMCI training substantially improves health worker performance in assessing and managing sick children, and in counseling their caretakers.

It is also worthy to note that the empowerment of midwives resulting from the enhancement of their knowledge and skills has made the health services close to the people in terms of proximity and economics. This helps in meeting one of the objectives of PHC which is to make basic health care services universally accessible.

### **Knowledge, Skills, and Attitude Learned and IMCI Services Rendered**

According to John Hubley (2004, p. 66), training is another word for teaching, which is often applied to the process of introducing fieldworkers to new ideas, information, and skills as part of their continuing education. Just like any kind of teaching, it is expected to result in positive changes in cognition, skills, and attitude that are relatively permanent.

This study shows that the knowledge and skills learned by the participants of the IMCI training as well as the IMCI services they rendered are related to the steps of the IMCI process. These are a) assessing the sick

child; b) classifying the child's condition; c) treating the sick child; and d) counselling/educating the mother/care giver. The findings of the systematic review of Nguyen et al. (2013), which found out that IMCI-trained workers were more likely to correctly classify illnesses, showed greater improvements in prescribing medications, vaccinating children, and counseling families on adequate nutrition and administering oral therapies, support the findings of this study.

It is interesting to note that out of the six steps of the IMCI strategy only four emerged in the study. The remaining steps, which are identification of treatment and giving of follow-up care, did not come out. This could be explained in the next three paragraphs.

Assessment is an important step of the health care process. This is a continuous and systematic process of collection, organization, validation, and documentation of data (Berman & Snyder, 2012, p.180). In regard to IMCI, assessing the sick child is carried out using an algorithm jointly formulated by the WHO, UNICEF, and the Department of Health of the Philippines, which is found in the IMCI Chart Booklet. As the first step, assessment is of prime importance as it yields to full appreciation of the condition of the client. It is only through an accurate assessment of the child that the health worker can identify correct IMCI classifications of the illness and implement relevant and safe treatments based on the IMCI protocol.

On health education and counselling, it must be reiterated that these two are vital responsibilities of health workers which have been emphasized in the academic curriculum of health disciplines like midwifery. It is a vital tool for health promotion, prevention of illness, and even to facilitate healing and rehabilitation of clients. With the over emphasis of the importance of health education and counselling in the curriculum and the work place, it is easily internalized, remembered, and performed by any health worker. Furthermore, in the study by Turtal et al., (2013), even clients in the community have clamored for health education on topics which they perceive as vital for health and development. With this great demand for health education, the health workers are all the more motivated to include it in their services.

Although the participants of the study did not specifically mention about the identification of treatment as one of the things they learned, it must be considered that the giving of appropriate treatment is never carried out without the proper identification of such. It could then be construed that this step is part and parcel of treating the child which the training participants

must have learned. Furthermore, the giving of follow-up care which did not also come out in the study could be due to the fact that the step is executed after a number of days specified in the protocol depending on the illness classifications identified. When asked about the challenges and difficulties encountered while using the IMCI process, it was expressed that many mothers/caretakers do not bring their kids back to the health center for return check-up. This may have diminished the opportunity of the participants to give follow-up care and learn along the way.

Though attitude is harder to measure than knowledge and skills, authorities consider it an important learning domain. The acquisition of the right kind of attitude is an integral part even in reference to the learning of knowledge and skills. It is often times equated with positive feelings, emotions, affect, and even values.

As far as the study is concerned, there are only two themes that emerged related to the development/ enhancement of desirable attitude among the participants. These themes are recognition of the importance of applying the newly acquired knowledge and skills and enhancement of caring attitude. According to Hubley (2004, p. 70), whether a training is taken seriously and put into practice will usually depend on one's attitudes, some of which are a) feeling that the topic is important and should be put into practice; b) realizing the importance of making follow-up visits; c) being prepared to work among disadvantaged and poor people; d) being patient and prepared to listen to and respect the community, and e) taking care to prepare one's health education properly. It is then worthy to note that despite having only two themes, these are well aligned to Hubley's (2004) thought about the importance of learning positive attitude.

## **Difficulties and Challenges Encountered**

Challenges and difficulties are natural in the work arena and elsewhere. The participants of the study have been using the IMCI guidelines for a little more than a year since they have completed the training. They have identified the following challenges and difficulties: a) lengthy IMCI process; b) inadequate logistics; c) difficulty in monitoring and evaluating the outcome; d) inconsistency of formulated IMCI classifications with the doctor's diagnosis; and e) mothers' preference for medication.

The study of Tandingan et al. (2005) assessed the implementation of

IMCI strategy in the Philippines. This study presented in a conference in 2005 showed some challenges and difficulties: some essential drugs and supplies are not purchased because the end-users are not involved in the purchase, varied recording systems were followed making consolidation of information difficult, and inadequate monitoring and supervisory visits making technical support from local supervisors not available most of the time. The length of the IMCI process mentioned by the participants of the study has not been identified as one of the challenges in the study of Tandingan et al. (2005). However, during the researchers' casual conversation with midwives and nurses in the Rural Health Units of neighboring towns of the setting of the study, a number of them expressed the same concern. As expressed, the process takes about thirty minutes to one hour to complete depending on the child's condition. With the number of clients that they need to attend to, following the guidelines strictly would mean not being able to attend to some of the clients who would come to the center.

Marquis and Huston (2009), emphasized that supplies are the second most significant component in a budget for a hospital and for any health institution. It is important to provide health services. The lack of it can affect the delivery of important services including health services under IMCI strategy. This important limitation has also been observed in Bangladesh, Cambodia, Nigeria, and Uganda, where there is low use of public sector health care for a variety of reasons like accessibility, official or under-the-table user fees, perceived poor quality, lack of drugs, and so on (Arifeen et al., 2009). Furthermore, in the article by Lambrechts et al. (1999), drug availability had been cited as one of the areas to be improved under the IMCI strategy.

Monitoring and evaluation of the outcome of the treatment is important. Without it, the health provider will not have a chance of modifying the care and treatment given to the child if it is necessary. In IMCI, the giving of follow-up care is the last step of the process which enables the health worker to monitor the child's condition and evaluate the outcome of care. However, the study shows that the step is often times omitted as mothers and other care takers seem not to value the importance of such; more so, when the child's condition has been noted to have improved. To address this challenge, two of the participants said that they find time to make follow-up visits. However, a participant said that "when mothers don't bring their children back to the health center for follow-up check, I take it as an indication that the children have already been healed of their illness," which may not actually be the case.

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There is therefore a need to put in extra effort to emphasize and impress to the mothers the importance of the follow-up check. This is necessary to see if the children are improving with the treatment prescribed, to check for signs of worsening like in the case of diarrhea, cough and cold, fever, eye and ear infection, and to make sure that those with feeding problems are fed correctly and are gaining weight (IMCI Resource Manual, 2011, p. 163).

The Webster's New Encyclopedic Dictionary (1995, p. 302) defines doubt as a state of affairs that causes uncertainty or suspense. It implies uncertainty about the truth or reality of something and may result to an inability to make a decision. When IMCI front line workers doubt the illness classifications that they identified as not consistent with the doctor's diagnosis, this can erode their trust of their ability and trust in the strategy. If the so called "inconsistency" will cascade to the mothers and other caretakers, the mistrust may even be felt down to their level. It is important then to explain to all concerned that the IMCI classifications are action oriented which are meant to guide the actions of the health workers in managing the illness, and therefore are not necessarily medical diagnoses.

The last challenge/difficulty identified is on some mothers' and caretakers' preference for medications. Drugs and medications are considered important in the management of many illnesses. However, not all health problems need medications. Despite this fact, the study result shows that a number of mothers would like that their sick children be given such. This may be related to deeply rooted practice of taking the sick children to doctors who are often associated to attractively package medications (Basaleem & Amin, 2009). Also, people perceive drugs especially antibiotics and other pharmaceutically prepared drugs to work better when it comes to healing of illnesses. This somehow might have increased the practice of self-medicating which in turn have influenced the mothers to prefer for medications to be prescribed whenever their children get sick. Considering the fact that not all illnesses need medications, a drive for deeper awareness of such must be initiated by the health workers. The consumers of health must realize that drugs, when taken inappropriately and unnecessarily, can even result to adverse reactions and side effects which may worsen the client's condition.

## **CONCLUSION AND RECOMMENDATIONS**

The study concludes that the participants, who are midwives of selected

barangays of Dumaguete City, have positive impressions of the IMCI training, which was organized and conducted through the RPHC Project. The positive impressions emanate from the usefulness and alignment of the strategy with the principles of Primary Health Care. They are able to acquire knowledge and skills that are vital for front liners of IMCI implementation that are parallel with the steps of the IMCI strategy, and because of such, they are able to render IMCI-related services reflective of the majority of the steps of the strategy which are: a) assessing the sick child; b) classifying the child's condition; c) treating the sick child; and d) educating/teaching the mother/care giver. The recognition of the importance of applying the newly acquired knowledge and skills and the enhancement of caring attitudes and behaviors manifested through a deeper concern for the children and prompt attendance to their needs help the trainees perform these IMCI-related services with a greater satisfaction.

In the course of performing their duties and responsibilities as IMCI trained health workers, the participants of the study encountered difficulties and challenges which are related to logistics, the attitude and expectations of some mothers about how their sick children should be managed, self-doubt when the classifications identified do not match with the doctors' diagnoses, and time constraints when implementing such a long but important strategy.

In view of the difficulties and challenges expressed by the participants, the study recommends that these problems shall be looked into by the authorities concerned. The RPHC Project staff need to disseminate the results of this study to proper authorities to initiate interventions for such. Furthermore, the need for regular continuing education and update sessions for the participants is necessary. These sessions will allow filling-in of the gap in knowledge and skills whenever necessary, correct participants' misconceptions about the strategy, and let them air out their concerns. Regular monitoring sessions and supervisory visits by the IMCI trainers would also be very helpful.

It would also be beneficial if another study can be conducted to look into the performance of IMCI-trained personnel in the health centers including those who were not trained under RPHC Project. It would give a deeper understanding of the issues related to the strategy and how the performance of these health personnel is affected by these issues.

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# Design and Development of Abaca Fiber Sand Cement Frogged Brick Composites

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An attempt is made to fabricate at room condition short abaca fiber sand cement composite material using the conventional mixing method. Frogged bricks have been designed and developed as a novel material built upon the foundation of concurrent engineering practice. Through this process, the brick molder and the fabricating rig are conceived. Abaca fibers are natural fibers which are classified as leaf fibers among the plant fibers. These fibers are impregnated with a mixture of sand and cement water ratio which cures at room temperature by hydration process. The fabrication, constituent proportion, and compressive strength of fabricated frogged brick composites are described. The fabricating facility is designed to accommodate fabrication of four bricks in one setting. Accordingly, for a given fiber length, the compressive strength increases as the volume fraction increases to a limiting value of 10% fiber volume fraction. The product lends its application in the building industry.

**Keywords:** Abaca Fibers, frogged bricks, sand cement water ratio, fabricating rig, composite material

## INTRODUCTION

**B**rick is an artificial stone made by forming clay into rectangular blocks, which are hardened either by burning in a kiln or by sun-drying. Bricks may be made from clay, shale, soft slate, calcium silicate, concrete, or shaped from quarried stone. Modern clay bricks have been developed in one of three processes - soft mud, dry press, or wire cut. Bricks are used for building and

pavement. The brick in this study is made of sand in a water cement matrix with unprocessed abaca fibers. The consolidation of constituent anticipates in enhancing the mechanical properties of frogged bricks (Tobias, 1990). The addition of abaca fibers in the composite material renders less cement proportion which could make the product affordable for the construction industry. A proper ratio formulation is the key to the success in developing a quality frogged brick.

## **BACKGROUND**

In most cases wherein concrete is subjected to heat, it degrades some of its important properties. Concrete will have a decrease in its toughness and strength when subjected with extreme conditions thus becoming brittle in the process (Boyd, 2002). Commonly used also for walls and partitions in construction is the hollow blocks technology. For this reason, concrete and other related products must have the strength and toughness to withstand load bearing conditions. Frogged bricks, in essence, are to be characterized in terms of their mechanical properties, specifically, toughness and compressive strength.

## **CONSTITUENTS**

The constituent proper proportions of abaca fiber, sand, and water-cement ratio need to be optimized. Abaca fiber is one of the strongest of the hard fibers, commercially known as Manila hemp. It is obtained from the leafstalks of a member of the banana family, *Musa textilis* (Abaca, n.d.). Sand is a substance that consists of fine loose grains of rock or minerals, found on beaches, in the desert, and in soil. Portland cement is a common type of cement generally used as a basic ingredient of concrete and mortar. Moreover, the water cement ratio influences the constituents to be molded into sound frogged bricks product.

### **Cement**

This material consists of a mixture of oxides of calcium, silicon and aluminum. Portland cement and similar materials are made by heating limestone (as source of calcium) with clay or sand (as source of silicon) and grinding the product (clinker), with a source of sulfate (most commonly gypsum). The resulting

powder, when mixed with water, will become a hydrated solid over time. The cement was first manufactured in Britain in the early part of the 19th century, and its name is derived from its similarity to Portland Stone, a type of building stone that was quarried on the Isle of Portland in Dorset, England. The patent for Portland cement was issued to Joseph Aspdin, a British bricklayer, in 1824 (Portland Cement, n.d.).

## **Sand**

Sand is often a principal component of the aggregate used in the preparation of concrete. Sand manufactured at rock crusher plants for use as an aggregate is called man sand. Graded sand is used as an abrasive in sandblasting and is also used in media filters for filtering water (Matthews, 2006).

## **Abaca fiber**

The plant resembles the fruiting banana, but is a bit shorter in stature, bears small inedible fruits, and has leaves that stand more erect than those of the banana, and that are slightly narrower, more pointed, and 5–7 ft (1.5–2 m) long. The plant was domesticated long ago in the southern Philippines. Abaca prefers a warm climate with year-round rainfall, high humidity, and absence of strong winds. Soils must always be moist, but the plant does not tolerate water logging. Abaca grows best on alluvial soils in the southern Philippines and northern Borneo below 1500 ft (450 m) elevation. The plant is best propagated by rootstalk suckers. There are about 75 varieties grown in the Philippines, grouped into seven categories, each of which varies slightly in height, length, quality, and yield of fiber. The fiber ranges 6–14 ft (1.8–4.2 m) in strand length, is lustrous, and varies from white to dull yellow. As one of the longest and strongest plant fibers, resistant to fresh and salt water, abaca is favored for marine hawsers and other high-strength ropes. Abaca is also used in sackings, matting, strong papers, and handicraft art goods (Fibers of Abaca, n.d.).

## **THEORETICAL FRAMEWORK**

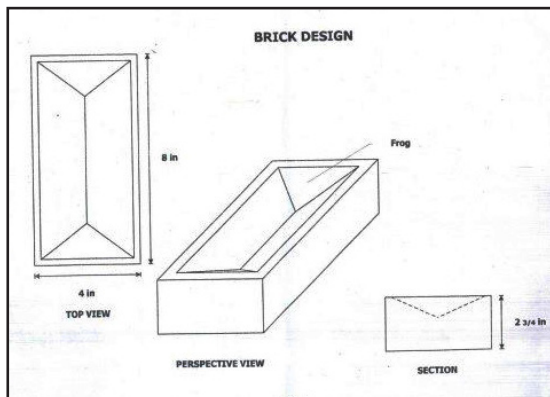
Rule of mixture is primarily the design of composites materials which emphasizes volume fractions of the constituents (Tobias, 1990). Mixing proportions considered in this study were 9:1 ratio (90% sand and 10%



abaca fiber), 8:2 ratio (80% sand and 20% abaca fiber), and 7:3 ratio (70% sand and 30% abaca fiber) with constant water-cement ratio. Frogged brick composites stipulate a major constituent of a particulate type. In this case, micro-mechanics analysis was used to stipulate the theoretical aspect of the development of the material. In retrospect, the sand-cement composite falls under concrete technology in particular mortar/grout mixture. In such case, only consolidation of the mixture becomes a paramount consideration for practical consideration.

## METHODOLOGY

Both basic and applied types of research were undertaken in this study. The development of this type of bricks integrated the optimized proportions that have been achieved through experimental fabrication. It is based on the theoretical framework that uses the rule of mixture associated with fiber and matrix densities and their volume fractions (Tobias, Remoto, & Flores, 2010). Figure 1 represents the frogged brick specification, which dictates the type and size of the brick molder. This has gone to a process of concurrent engineering practice (Mott, 2004) undergoing conceptualization, technical interpretation, and fabrication (Figure 2).



**Figure 1.** Frogged brick specification



**Figure 2:** Frogged



**Figure 3.** Frogged fabricating rig bricks with & without abaca fibers

Using the fabricating rig, frogged bricks (Figure 3) were produced as the desired outcome in this study, following the design and development of composite materials. Experimental analysis is paramount to the variation of the constituent proportion. Four bricks were produced using the brick molding machine shown in Figure 2.

In line with consistency of frogged brick fabrication, it is essential to follow its general procedure as follows: Sift the sand to separate the big particles from the small/fine ones. Cut the abaca fiber into small parts preferably 1 or 2 cm in length. Fill in the wooden box with the desired amount of sand. Also use the wooden box to fill the desired amount of cement. Mix the sand and cement properly by using a flat trowel or shovel. Sprinkle the desired amount of abaca fiber. Pour the desired amount of water. By using a shovel or flat trowel, mix the sand, cement, abaca fiber and water thoroughly. Place a small piece of plywood on the molder. The plywood will serve as a support for the brick. Pour the composite material to the molder. Turn on the machine. Press the Steel plates and lock the knot. Remove the bricks from the machine and let it dry for hours. After an hour or two, slowly remove the plywood from the base of the brick. Do a compression test after four days using a Universal Testing Machine (UTM).

## RESULTS AND DISCUSSION

After four days, the 202mm x 100mm x 70mm brick samples have been developed under atmospheric condition. Table 1 shows experimental results under varying constituents proportions. In the first three samples, the water and cement content were the same; only the sand and abaca fiber were variable components. Meanwhile, the 4th and 5th samples vary with the first three experiments; instead of three cups of water, four cups were added. Also, the 5th sample has longer abaca fiber.

**Table 1** Constituents proportions

Materials	No. 1	No. 2	No. 3	No. 4	No. 5*
Cement	1½	1½	1½	1½	1½
Sand	90%	80%	70%	90%	90%
Abaca Fiber	10% 3inch	20 % 3inch	30% 3inch	10% 4inch	10% 5inch
Water	3 cups	3 cups	3 cups	4 cups	4 cups

The fabricated bricks with length 202mm, width of 100mm, and thickness of 70mm were tested in compression using the UTM. Table 2 shows that among the three samples of the same cement and water composition this product had the highest strength with 3.61 MPa, followed by 1.72 MPa (3rd sample) with the ratio of 1½ cement, 90% sand, and 30% abaca fiber

with three cups of water and the last is 1.65 (2nd sample) with ratio of 1½ cement, 90% sand, and 20% abaca fiber with three cups of water.

The second set of the experiment was with the ratio of 1½ cement, 90% sand, and 10% abaca fiber with four cups of water but with different abaca fiber length. The fourth sample is stronger than the fifth sample with the strength of 6.44MPa compared to the fifth sample with strength of 4.42MPa. Both experiment had the same ratio of cement, sand, and water except the length of abaca fiber. Experiment 5 had longer fiber but exhibited lower strength. Basing on the test results, the fourth sample exhibited better quality than the fifth sample. The fourth sample was more compact compared to the fifth. It has also been observed that the longer the fiber length, the more difficult it is to fabricate the material. Among the five experiments, sample 4 exhibits the highest strength while sustaining a maximum load of 129.988kN. Furthermore, the water-cement ratio made a difference in the quality.

**Table 2** Compression test results

Sample No.	Maximum Load (kN)	Strength (MPa)
1	72.85	3.61
2	33.294	1.65
3	34.711	1.72
4	129.99	6.44
5	89.256	4.42

As observed, the fabrication of short abaca fiber consolidated friggred brick composites encountered some problem. It was a labor intensive exercise. Moreover, during the mixing process, balling of fibers was inevitable, when done at longer period.

However, frogged bricks have been successfully used as walls and partitions (Figure 4).



**Figure 4.** Frogged bricks showcased in building industry as external walls

## CONCLUSIONS

Among the five samples of bricks that was fabricated, sample 4 possesses the best property among other experiments. The brick's formulated ratio was 1½ parts cement, 90% sand, 10% abaca fiber, and four cups of water. Based on compression test, the brick can sustain a maximum load of 129.998 kN and strength 6.435 MPa. Hence, the proportion identical to 90% sand, 10% abaca in appropriate water-cement ratio was found to be most reasonable for the frogged bricks. Problems in fiber preparation and mixing of constituent can be overcome at a given time.

## ACKNOWLEDGEMENT

The author wishes to acknowledge the Philippine Higher Education Research Network, Silliman University, which this study is a derivative of a study (05) on natural fibers. Special thanks to those who have been involved in one way or another for making this research possible and providing significant input in answering the needs to have this project documented.

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# Molecular Identification and Characterization of Two *Trichoderma* species Isolated from Carabao Manure and Evaluation of Shelf Life Using Locally Available Substrates

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This study aimed to identify and characterize at molecular level, the two species of *Trichoderma* isolated from carabao manure. This study also evaluated the shelf life performance and suitable substrate for the mass production of the two species of *Trichoderma*.

The two *Trichoderma* isolates were identified as *Trichoderma longibrachiatum* and *Trichoderma asperellum*. Substrates from locally available agricultural wastes such as rice bran + soil and rice bran + sawdust can be suitably used in the mass production of the two *Trichoderma* species since they produce very thick and cottony mycelial density at nine days of incubation. It also increased the production of spore during 40 days of incubation at  $128 \times 10^7$  cfu/g for *T. longibrachiatum* and  $55 \times 10^7$  cfu/g of *T. asperellum*. Shelf-life performance of rice bran + soil as substrates for the two *Trichoderma* species were observed to last for six months of incubation with spore production of  $129 \times 10^7$  cfu/g to  $80 \times 10^7$  cfu/g for *T. longibrachiatum* and  $17 \times 10^7$  cfu/g to  $71 \times 10^7$  cfu/g for *T. asperellum*.

**Keywords:** *T. longibrachiatum*, *T. asperellum*, molecular identification, mycelia density



## INTRODUCTION

Beneficial microorganisms like *Trichoderma* play an important role in nature farming and organic agriculture since they have the ability to improve the quality of soil, increase yield of crops, and serve as bio-control agent and microbial activator. Microorganisms require certain nutrients for their growth and reproduction. Given the right conditions such as temperature, food, and other environmental factors, they will grow and multiply.

Several researchers try to isolate and identify the usefulness of microorganisms in nature. Identification and characterization of the isolate is important to determine the biology of the species and its mode of action. Previous methods employed to identify the isolate is through the conventional method which relies on the phenotypic identification of the microorganism through cultural and biochemical methods. However, these methods of identification are not consistent since there are microorganisms that can only be cultivated in-vitro. There are also some species or strains of microorganism that exhibit unique biochemical characteristics that do not fit into the pattern that have been used as a characteristic of any known genus and species. Another way of identification is through the molecular level, which allows for the identification of any living microorganisms by using a single cell. Molecular identification determines the genetic feature of the microorganism to provide valuable data on variation at DNA level.

The Central Luzon State University through the Ramon Magsaysay Center for Agricultural Resources and Environment Studies (RM-CARES) was able to isolate two species of *Trichoderma* from carabao manure which is very useful in organic fertilizer and vegetable production. Initial results from the previous study of Lopez, Aganon, and Juico (2014) indicate the potentials of the two *Trichoderma* as compost activator and bio-control agent against soil borne diseases. However, fungal identification of the two species of *Trichoderma* was not yet determined. This study aimed to identify and characterize the two *Trichoderma* species using the molecular method since accurate and reliable fungal identification is essential to assess the genetic diversity of the two species and their association with the other species. This study also aimed to further evaluate the suitable locally available substrates in an effort to economically mass produce the two species of *Trichoderma*.

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## MATERIALS AND METHODS

Pure culture of the previously isolated *Trichoderma* species from three-week old carabao manure was submitted to the Institute of Biotechnology, University of the Philippines Los Baños, Laguna for identification and characterization.

### DNA Analysis

Templates for Polymerase Chain Reaction (PCR) were prepared by taking 3-4 loopfuls of the mycelial growth and placing them in 60 microliters of 1x TE buffer. The mixture was placed in boiling water for five minutes and frozen at -80 C for five minutes. This freezing and thawing process was done two more times. The mixture was centrifuged for one min at 5000-6000 rpm. The supernatant was used as PCR template.

The molds were sequenced using the primers ITS1 (5'TCCGTAGGTGAACCTGCGG3') and ITS 4 (5'TCCTCCGCTTATTGATATGC3'). These were chosen because the region amplified is recommended for barcoding of fungal species.

The 5.8S-ITS region of the yeast ribosomal gene was amplified in 25 microliter reactions with 1U Taq polymerase (iNtRON Biotechnology), 1x PCR buffer, 1.5 mM MgCl, 10 micromolar DNTPs (iNtRON Biotechnology), 2.5 microliter template DNA and 0.5 micromolar of each of the primers (ITS1 and ITS4). The PCR (Techne thermocycler TC-512) conditions are as follows: 95C at five mins, 35 cycles of 94C one min, 55.5C two min, 72C for two min with final extension at 72C 10 min. Presence of PCR products was detected by electrophoresis using 1.2% agarose (Pronadisa) on 0.5x TAE buffer (using Cosmobio AR 201 gel electrophoresis unit) set at 100 mV. Gel was stained with gel red and viewed under UV (Vilber Lourmat Gel Documentation system). The PCR products were purified with Megaquick spin Total Fragment DNA purification kit by iNtRON Biotechnology.

Resulting purified PCR product was sent to Macrogen Korea for sequencing analysis. A number of sequences from the two isolates were compared to biological sequence information for the resemblance of query sequence using Basic Local Alignment Search Tool (BLAST).

Colony characterization of the two isolates was done using different media such as Potato Dextrose Agar, Malt Extract Agar, and Czapek-Dok Agar.

### **Testing of Locally Available Substrates for *Trichoderma* Production**

The following treatments were used in the evaluation of best substrates for *Trichoderma* production:

- T1 - rice bran alone
- T2 - 1 part rice bran + 1 part soil
- T3 - 1 part rice bran + 1 part sawdust
- T4 - rice hull alone
- T5 - 1 part rice hull + 1 part soil
- T6 - 1 part rice hull + 1 part sawdust
- T7 - sawdust alone
- T8 - 1 part sawdust + 1 part soil

Growth preference on each of the substrate was evaluated using rice bran, rice hull, saw dust, soil, or in combination of the treatments and partially added with water to attain 35% moisture content of the carrier.

Substrates either alone or combination was placed in glass bottle with equal volume then covered with polypropylene bags and tightened with rubber band. The prepared substrates were sterilized for 45 minutes at 15 psi or 120°C. Prior to inoculation, each substrate was placed in a clean area under room temperature to cool, and once cooled, the substrates were separately inoculated with 10 mm mycelia disc from the 7-day old pure culture of *Trichoderma* sp. 1 and *Trichoderma* sp. 2. This was incubated at room temperature to allow mycelia ramification.

Fungal growth was determined and propagule density was estimated on Potato Dextrose Agar. Colony forming units was counted after 10, 20, 30, and 40 days of incubation.

### **Determination of Shelf-life of *Trichoderma* Inoculated at Best Substrate**

Shelf-life performance of the two species of *Trichoderma* using the best

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substrate from the previous study was determined. Number of spore count after six months of incubation period was considered.

## RESULTS AND DISCUSSION

### Molecular Identification and Characterization of *Trichoderma* species from Carabao Manure

The DNA analysis of the two isolates *Trichoderma* sp.1 and *Trichoderma* sp.2 isolated from carabao manure were identified as *Trichoderma longibrachiatum* strain CEN506 and *Trichoderma asperellum* strain TR044, having 100% and 99% maximum identity with the accession number of KC576708.1 and KC993074.1, respectively. The two isolates were tested using primer ITS1 and ITS4 for barcoding and blast analysis of the two fungal isolates. A total of 472 bp was sequenced and used for the identification of *T. longibrachiatum* while 506 bp was used for the identification of *T. asperellum*. The two isolates were also characterized based on their colony and cellular characteristics. Figures 1 and 2 show the pure culture and cellular structure of *T. longibrachiatum* and *T. asperellum* after five days of incubation at 30°C. The growth and sporulation of the two isolates varied between the two species.

**Table 1** Identities of the fungi based on ITS region using ITS1 forward and ITS4 reverse primers and confirmed using BLAST analysis

Source	Isolate	Base Pair (bp)	Maximum Identity	Query	Genbank Accession Number	Species
Carabao Manure	<i>Trichoderma</i> sp. 1	472	100%	100%	KP671487	<i>Trichoderma longibrachiatum</i>
	<i>Trichoderma</i> sp. 2	506	100%	99%	JQ013144.1	<i>Trichoderma asperellum</i>

### Morphological characteristics of *T. longibrachiatum* at different medium

At different medium, *T. longibrachiatum* is characterized as follows:

**Potato Dextrose Agar:** Rapid growing grayish green powdery colony; conidia forming in distinct concentric rings with conidia at the outer rings just beginning to form; moderately well conidial production with small loose

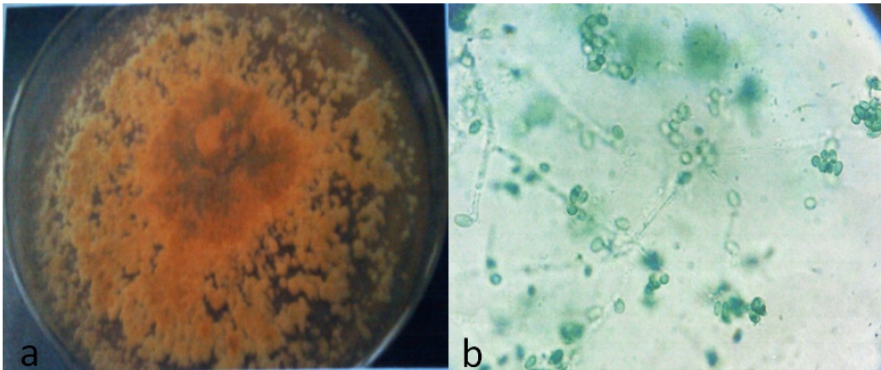
pustules or tuft; smooth yellow green reverse; yellow green soluble pigments produced/ no exudates produced; > 80 mm colony diameter.

**Malt Extract Agar:** Rapid growing greenish yellow powdery colony; conidia forming in a dense central disk with confluent pustules of conidia at the outer ring just beginning to form; moderately well conidial production; smooth yellow reverse; light yellow soluble pigment produced/ no exudates produced; > 80 mm colony diameter.

**Czapek-Dok Agar:** Rapid growing green colony; restricted central conidial with 12 mm diameter area, conidial production scanty and no consistent pattern, green pustules or tufts of conidia dispersed throughout the plate; smooth colorless reverse; no soluble pigments produced/ no exudates produced.

### Cellular characteristics of *T. longibrachiatum*

The cellular characteristics of *T. longibrachiatum* is conidial green, oblong to narrowly ellipsoidal, clustered, 3.0 -4.0  $\mu\text{m}$  L x 2.0 – 2.5  $\mu\text{m}$ ; conidiophores 2.5 – 3.5  $\mu\text{m}$  wide; phialides mainly arising singly, cylindrical, only slightly enlarged in the middle; chlamyospores not observed.



**Figure 1.** Pure culture of *T. longibrachiatum* after five days of incubation at 30°C (a). Cellular characteristics observed at 1000x magnification (b).

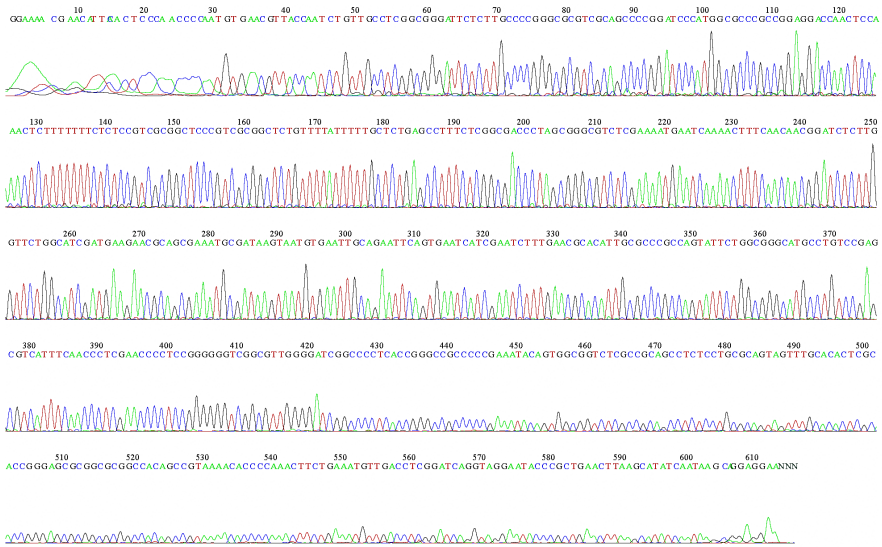


Figure 2. DNA sequence used in the identification of *T. longibrachiatum*

## Morphological characteristics of *T. asperellum* at different medium

Similarly, the morphological characteristics of *T. asperellum* in different medium are as follows:

**Potato Dextrose Agar:** Rapid growing light yellow powdery colony; conidiation effuse covering the entire surface of the plate; conidia dense, forming in three distinct concentric rings, deeply scalloped yellow green margin; smooth brownish yellow reverse; brownish yellow soluble pigments produced/ colorless exudates produced; > 80 mm colony diameter.

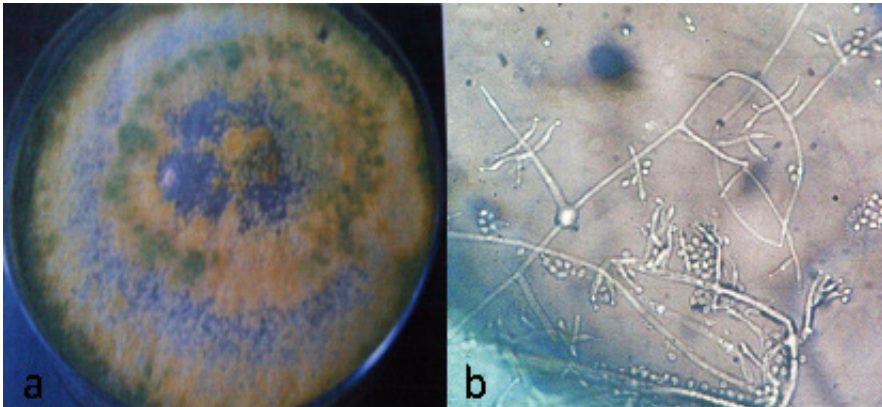
**Malt Extract Agar:** Rapid growing white to light yellow powdery colony; conidiation effuse covering the entire surface of the plate; conidia dense forming in two distinct concentric rings, less dense almost sterile central disk, deeply scalloped green margin; smooth yellow reverse; yellow soluble pigments produced/ no exudates produced; 80 mm colony diameter.

**Czapek-Dok Agar:** Rapid growing green to grayish green powdery colony; conidia toward the center dark green while conidia at the outer margin just

beginning to form; uniformly dispensed dense pustules that have a radial arrangement; smooth colorless reverse; no soluble pigments produced/ no exudates produced; 600 mm colony diameter.

### Cellular characteristics of *T. asperellum*

The cellular characteristics of *T. asperellum* point to being conidia pale green, globose to subglobose, 2.5 – 3.5  $\mu\text{m}$  L x 2.0 – 2.5  $\mu\text{m}$  W; conidiospores typically with pair branches, 2.0 – 3.0  $\mu\text{m}$  wide; phialides pulliform often with a bulbous base and a long, cylindrical neck; chlamydospores abundant, terminal or infrequently intercalary, subglobose to globose, pale green 7.0-9.0  $\mu\text{m}$ .



**Figure 3.** Pure culture of the *T. asperellum* on malt extract agar after 5 days of incubation period at 30°C (a). Microscopic features of the isolates at 1000x magnification (b).

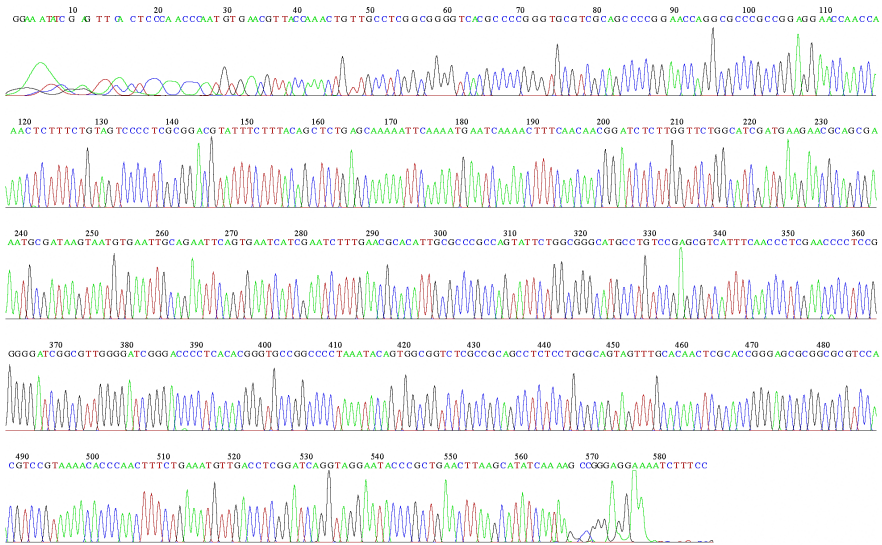


Figure 4. DNA sequence used in the identification of *T. asperellum*.

## Suitability of Substrates for *Trichoderma* Production

Suitable substrates for the two species of *Trichoderma* were evaluated using agricultural wastes (Table 2). *T. longibrachiatum* grown on substrates such as rice hull alone, rice hull + soil; rice hull + sawdust; sawdust alone and sawdust + soil were noted with shorter incubation period of five days. *T. longibrachiatum* grown on rice bran alone, rice bran + soil and rice bran + sawdust produced the longer incubation period of nine days.

*T. asperellum* grown on substrates, such as rice hull alone, rice hull + soil, rice hull + sawdust, sawdust alone, and sawdust + soil, produced the shorter incubation period of six days, followed by the substrate rice bran + soil and rice bran + sawdust with incubation period of nine days. Longer period of incubation was recorded on rice bran alone with incubation period of 13 days.

Results show that the two species of *Trichoderma* when grown in rice hull alone or in combination, have the shorter period of incubation which is similar to the study of Mangili et al. (2003) which found that rice hull can be used as alternative substrate for the mass production of *T. koningii* but the maximum spores can be obtained only on shorter period of 10 days after inoculation. This only indicates that this substrate cannot be stored for



longer period of time since they have only limited nutrients that support the growth of *Trichoderma*. However, rice bran, either alone or in combination, was observed to have longer incubation period than rice hull. It can be observed from Fig. 5 the luxuriant mycelial density of the *Trichoderma* grown in this substrate. According to Sukaryana et al. (2010), rice bran consists of high level of starch that can be used by *Trichoderma* as source of energy for their growth and development. The growth of *Trichoderma* may produce significant amount of enzymes that can be used to reorganize and reduce course fiber of the substrate, and increase the support to mycelia growth and prolong its growth.

**Table 2.** Influence of different locally available substrate on the incubation period and mycelial density of *T. longibrachiatum* and *T. asperellum*

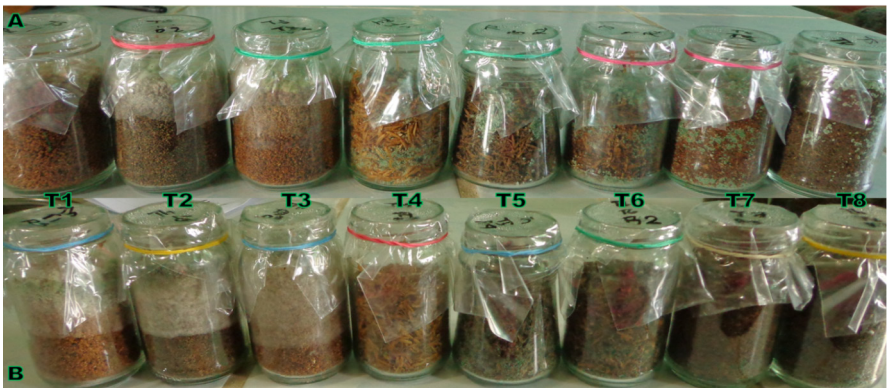
Different Substrate	Incubation Period		Mycelial Density	
	<i>T. longibrachiatum</i>	<i>T. asperellum</i>	<i>T. longibrachiatum</i>	<i>T. asperellum</i>
T <sub>1</sub> - rice bran alone	9a	13a	***	***
T <sub>2</sub> - 1 part rice bran + 1 part soil	9a	9b	***	***
T <sub>3</sub> - 1 part rice bran + 1 part sawdust	9a	9b	***	***
T <sub>4</sub> - 1 part rice hull alone	5b	7c	*	*
T <sub>5</sub> - 1 part rice hull + 1 part soil	5b	6c	**	**
T <sub>6</sub> - 1 part rice hull + 1 part sawdust	5b	6c	*	*
T <sub>7</sub> - sawdust alone	5b	6c	*	*
T <sub>8</sub> - 1 part sawdust + 1 part soil	5b	6c	*	*

Means having the same letter script within a row (a,b,c) are not significantly different at the 5% level of significance. Note: \*\*\* Thick and cottony, \*\* thin, \* very thin.

## Mycelial Density

The mycelial density of the two *Trichoderma* species on the substrate such as rice bran alone, rice bran + soil and rice bran + sawdust produced a thick and cottony mycelia growth. Mycelial density on the growth of microorganism as influenced by the substrates can be a factor in selecting a good media for the growth of the two species of *Trichoderma*. According to Juliano (1993), rice bran is rich particularly in dietary fiber and omegas and contains significant

quantities of starch, protein, vitamins, and dietary minerals which signify that rice bran is a good source of energy for the growth and survival of *Trichoderma* (Kuarya et al., 2010). The addition of soil in combination with the other medium is used to regulate the amount of nutrients on each substrates especially the rice bran. Soil component consists of mineral, organic, water and air that stimulate the growth of *Trichoderma*. However, substrate like rice hull alone or in combination with the other substrates shows thin mycelial density. As explained by Yadav (2012), rice hull substrate used for the growth of *Trichoderma* production exhibited restricted mycelial growth as well as low sporulation because of the limited nutrient content of the said substrates. Traditionally, rice hull has been used in ruminant and poultry feeds, but there is the problem of low nutrient digestibility, high silica content, and abrasive characteristics which are limiting factors in its utilization (Aderulo, 2007). Other substrates, such as rice hull alone, rice hull + sawdust, sawdust alone, and sawdust + soil, noted a very thin mycelial density due to the small amount of nutrient content on the substrates. Essentially sawdust consists of cellulose, hemicellulose, lignin, and extractives that can be directly absorbed and digested by the *Trichoderma* which allow the fungi to consume the content of the substrate in a short period of time.



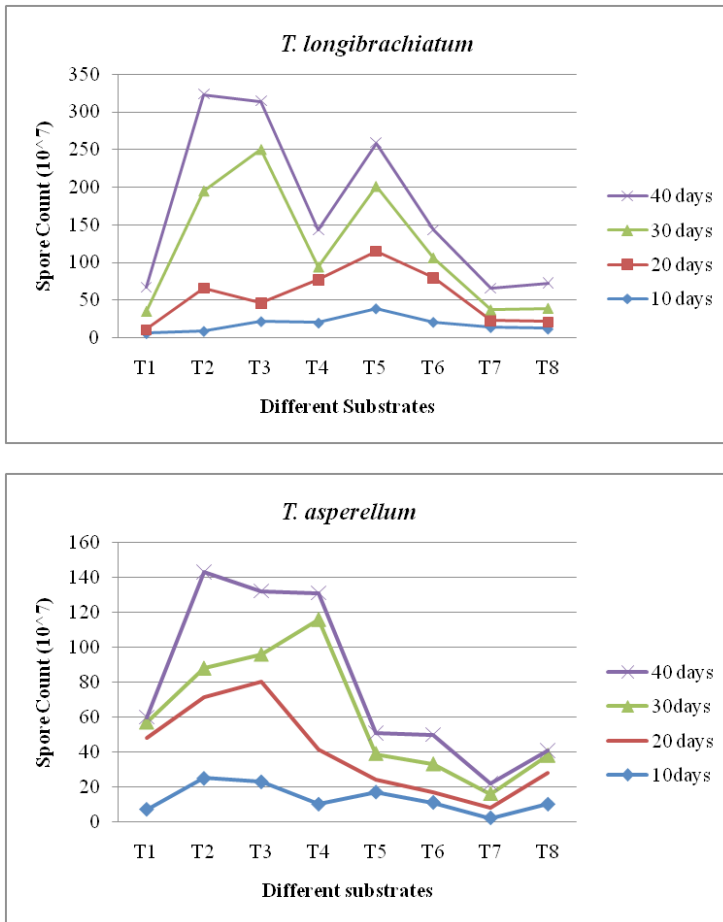
**Figure 5.** Mycelial colonization of *T. longibrachiatum* (A) and *T. asperellum* (B) on different locally available substrates according to treatments applied.

## Spore Count

The maximum spore count production of *T. longibrachiatum* was observed during 40 days of incubation on the substrate rice bran + soil ( $128 \times 10^7$  cfu/g).

As described by Cavalcante et al. (2008), wheat bran as substrate strongly enhanced the spore production of *T. harzianum* and *T. viride*. Lowest maximum spore count of *T. longibrachiatum* was observed on the substrate sawdust alone and sawdust + soil ( $14 \times 10^7$ cfu/g and  $12 \times 10^7$ cfu/g, respectively) at 10 days of incubation.

Similar observation was noticed at 40 days of incubation period of *T. asperellum* wherein, the highest maximum spore count of *T. asperellum* grown on rice bran + soil produced  $55 \times 10^7$ cfu/g. Lowest spore count of *T. asperellum* was noted during 10 days of incubation period on the substrate sawdust + soil, although it was one of the earliest to colonize the substrate at six days of incubation period, but obtained a lower spore count of  $3 \times 10^7$ cfu/g.

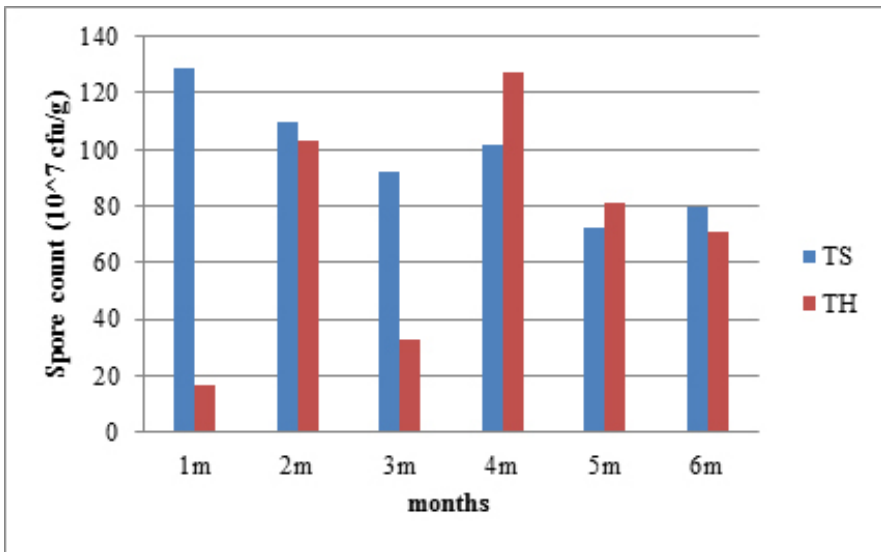


**Figure 6.** Maximum spore count of (A) *T. longibrachiatum* and (B) *T. asperellum* at different days of incubation period.

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**Shelf-life Performance of Rice Bran + Soil Medium used in Mass Production of *T. longibrachiatum* and *T. asperellum***

Shelf-life evaluation using rice bran + soil inoculated separately with *T. longibrachiatum* and *T. asperellum* was determined monthly by counting the spores of each media using haemocytometer. Fig.7 shows that the highest spore count ( $129 \times 10^7$  cfu/g) of *T. longibrachiatum* was noted during the first month of incubation period which suddenly dropped during 2nd month and 3rd month of incubation period with spore count of  $110 \times 10^7$  cfu/g and  $92 \times 10^7$  cfu/g, respectively. This indicates that spore production of *T. longibrachiatum* during the first month was very active given the right condition and environment, which allowed the same species to proliferate and sporulate. After four months of incubation the spore count increased with  $102 \times 10^7$  cfu/g then suddenly decreased during the 5th and 6th month with  $72 \times 10^7$  cfu/g and  $80 \times 10^7$  cfu/g, respectively which indicate that the spore production of *T. longibrachiatum* can be limited due to the limited source of nutrient from the substrates. However, *T. asperellum* was noted to have the lowest spore count during the 1st month of incubation period ( $17 \times 10^7$  cfu/g), probably the response of fungi was highly variable which allowed the said species to grow vegetative and unable to sporulate under high nutrient condition. However, its spore count increased during the 2nd month at  $103 \times 10^7$  cfu/g but suddenly dropped to  $33 \times 10^7$  cfu/g at three months of incubation. Highest peak of spore was noted during the 4th month of incubation period with  $127 \times 10^7$  cfu/g, but suddenly decreased during the 5th to 6th months with  $81 \times 10^7$  cfu/g and  $71 \times 10^7$  cfu/g, respectively. This is due to the limiting food nutrient of the substrates which were already used by the fungi for the period of incubation.



**Figure 7.** Shelf-life evaluation of *T. longibrachiatum* and *T. asperellum* after 6 months of incubation period.

## CONCLUSION

The two *Trichoderma* species isolated from carabao manure was identified and characterized through DNA analysis as *T. longibrachiatum* and *T. asperellum*. Rice bran + soil and rice bran + sawdust can be suitable substrates for the two species of *Trichoderma* due to the very thick and cottony mycelial density at nine days of incubation period as well as increased production of spore during incubation period. Shelf-life performance of rice bran + soil as substrates for the mass production of the two *Trichoderma* species were observed to last until six months of incubation with spore count of 129x10<sup>7</sup>cfu/g to 80x10<sup>7</sup> cfu/g for *T. longibrachiatum* and 17x10<sup>7</sup> cfu/g to 71x10<sup>7</sup> cfu/g for *T. asperellum*.

## RECOMMENDATIONS

Other potential uses of the two *Trichoderma* species must be evaluated since different species with the same genus possess different mode of action. Synergism effect of the two isolates must be evaluated to find out its compatibility with other microorganisms. Different substrates and formulations must also be determined to improve and enhance the shelf life

performance of the two isolates. Mass production of the two *Trichoderma* species should also be done into new form like talc and liquid formulation.

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# Fuel Economy Comparison between a Vehicle Having a Standard Power Train and a Vehicle Having Its Power Train Modified into a Hybrid with Cylinder Deactivation

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Due in part to rising gas prices and concern over global warming, hybrid vehicles and vehicles with cylinder deactivation have been developed in order to improve automotive fuel efficiency. This study was an attempt at comparing the fuel economy of a vehicle with standard power train and another vehicle modified into a hybrid with cylinder deactivation. These vehicles currently make up less than 1% of vehicles worldwide. Success of this technology shows how some of the remaining 99% of vehicles may be made more fuel efficient.

**Keywords:** hybrid vehicle, fuel efficiency, global warming, cylinder deactivation, hybrid drive trains

## BACKGROUND

**I**ncreased global demand for vehicular fuel has resulted in rising gas prices and the development of vehicles with improved fuel economy. One such type of vehicle is the hybrid electric vehicle, which uses an internal combustion engine and an electric motor adapted to provide alternative and additional power to improve fuel economy. Rechargeable storage batteries on the vehicle energize the electric motor. Current hybrid electric

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vehicles are complicated and are expensive to manufacture, largely because of the high cost of the lithium or nickel metal hydride batteries and the need for especially designed hybrid drive trains. Furthermore, it has not been possible to use this technology to convert standard nonhybrid vehicles into hybrid vehicles.

Another fuel-saving approach is based on the observation that a vehicle usually needs much less power for cruising than it does for acceleration, for passing, or for climbing a grade. This gave rise to the idea of cylinder deactivation. This involves means for deactivating some cylinders in a regular internal combustion engine for economical operation when less power is needed, such when cruising on a level highway, and reactivating them when more power is needed, such as when accelerating or climbing a grade. Fuel savings through this solution, however, have been severely limited, mainly because of power losses associated with the continuing reciprocating motion of the components (pistons, con rods, etc.) within the deactivated cylinders.

Recently, new technology has been developed to combine these two fuel-saving approaches, aimed at maximizing their effectiveness and overcoming their disadvantages. Power losses associated with the continuing reciprocating motion of the pistons, con rods, etc. in the deactivated cylinders are eliminated by simply removing these moving parts altogether. An electric motor is coupled to the engine to supply additional power when needed. Sufficient cylinders are left fully functional, so that it becomes possible to limit use of the electric motor to short periods of acceleration, passing, or climbing a grade. Minimizing electric motor duty cycle permits use of inexpensive lead-acid batteries instead of costly lithium or nickel batteries. Expenses associated with the use of an especially designed hybrid drive train are avoided by simply using the standard drive train already present in the vehicle. These changes make it possible to convert a regular vehicle into a hybrid vehicle and to do so quite inexpensively. The authors tested a prototype to determine the validity of this concept.

## **METHODS**

A 1967 model Volkswagen Sedan ("Beetle") having a four-cylinder engine with a piston displacement of 1600 cc. was used as the prototype. Prior to conversion, its fuel economy was tested to be 12.5 kilometers per liter of

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regular gasoline, equivalent to 30.10 miles per gallon (US).

The piston displacement of the existing engine was reduced from 1600 cc. to 800 cc. by permanently deactivating a balanced pair of cylinders through removal of the pistons, con rods, and other moving parts therein. Air and fuel intake to these cylinders was shut off by removing their corresponding valve rocker arms, thus leaving the intake and exhaust ports shut permanently through the action of the valve springs. Lubricating openings (“spit holes”) in the crankshaft serving these cylinders were securely plugged. Ignition wires to the spark plugs in these cylinders were removed. The engine has now undergone permanent deactivation of half of its cylinders.

The engine was converted into an electric hybrid by installing an electric motor of suitable power capacity in parallel position alongside it and coupling its output shaft to the front end of the engine crankshaft via a V-belt, pulleys, and an electromagnetic clutch. Driver-operated means were provided for turning the electric motor on and for engaging it to the crankshaft whenever more power was needed, such as when starting off, passing, or when climbing a grade. This included means for disengaging and turning off the electric motor whenever added power was no longer needed, such as when simply maintaining cruising speed, which was well within the power capacity of the modified engine itself.

For the purpose of conducting the road fuel economy tests, an especially designed calibrated fuel tank was placed in an elevated position in the passenger compartment of the vehicle and connected by special tubing to feed a premeasured amount of gasoline to the engine carburetor by gravity. At the start of each test run, this tank was filled with 1000 cc. of regular gasoline. The car was then started, and the test run was begun. The end point was when the vehicle stopped as the fuel was consumed. The distance traveled was measured via the trip meter of an accompanying pace car, which was switched to “zero” at the start of the test run and then read for the distance traveled at the end point of the test run. The prototype was road tested by a team of six engineers, all of whom are listed as coauthors of this report. A majority of the members of the group attended each test.

## RESULTS

The group did a series of ten test runs between March 30, 2011 and July 7, 2012. Each test run measured the distance, in kilometers, covered by the

test vehicle on one liter (1000 cc) of regular gasoline, as indicated by the trip meter of the accompanying pace car. The first two tests were on the highway north of Dumaguete City towards the city of Tanjay. This is a concrete road, on generally level ground. The rest of the tests were on the highway southwest of Dumaguete towards the town of Zamboanguita where there was less traffic. This is an asphalt road with some gentle dips and rises. All tests were conducted in generally fair weather without rain or strong winds. The results are tabulated below.

Date	Fuel Consumed		Distance Traveled		Fuel Economy	
	Liters	US Gallon	Km	Miles	Km/L	MPG
Mar. 30, 2011	1.000	0.2581	24.1	14.98	24.1	58.04
Mar. 30, 2011	1.000	0.2581	25.0	15.54	25.0	60.21
Apr. 09, 2011	1.000	0.2581	26.7	16.59	26.7	64.28
Apr. 09, 2011	1.000	0.2581	24.5	15.23	24.5	59.00
May 25, 2012	1.000	0.2581	24.4	15.16	24.4	58.74
May 28, 2012	1.000	0.2581	25.0	15.54	25.0	60.21
June 11, 2012	1.000	0.2581	27.5	17.09	27.5	66.21
June 11, 2012	1.000	0.2581	25.9	16.10	25.9	62.38
July 05, 2012	1.000	0.2581	27.0	16.78	27.0	65.02
July 07, 2012	1.000	0.2581	24.1	14.98	24.1	58.04
Average	1.000	0.2581	25.4	15.80	25.4	61.21

## DISCUSSION

The test vehicle had fuel economy of 12.5 km per liter, equivalent to 30.10 miles per gallon of regular gasoline before it was modified into a hybrid with deactivation of half of its cylinders. After modification, its fuel economy averaged 25.42 km per liter or 61.21 miles per gallon, showing that the modification made it possible for the vehicle to travel twice as far on a given amount of fuel.

These tests suggest that similar improvement in fuel economy may also be gained by using similar modifications on other vehicles. This remains to be seen until such tests are made.

These tests were made at speeds ranging from about 50 to 75 km per hour, equivalent to about 30 to 45 miles per hour, matching the average speed of traffic in the test highways. It remains to be seen if similar

improvement in fuel economy can be gained at higher speeds, such as those in the highways of Europe and the United States.

No acceleration tests were made during these road tests. It had been observed, however, that the test vehicle had no problem in keeping up with traffic, going up grades, or passing some slower vehicles. Acceleration tests to assess performance of the electric motor, combined with the down-sized engine, would yield more useful information.

These tests demonstrate that it is possible to convert an existing vehicle into a fuel-efficient vehicle by combining hybrid technology with cylinder deactivation technology. The fact that this was done without need for expensive lithium or nickel-based batteries and without the need to replace the existing drive train of the vehicle shows that this conversion can be done simply and inexpensively, suggesting that this conversion process may be commercially viable.

These test results also suggest that this type of hybrid technology which uses a standard nonhybrid drive train and uses regular (off-the-shelf) electric motors may be successfully employed in the manufacture of a new, inexpensive type of hybrid vehicle — one simply having a smaller engine.

Seen in the context of rapidly increasing demand for fossil fuel worldwide, escalating cost of automotive fuel, and threats of global warming and climate change, any possible means to improve the fuel economy of the remaining nonhybrid 99% of motor vehicles worldwide would be desirable and worthy of further investigation.

## **CONCLUSION**

A 1967 model Volkswagen Sedan having a four-cylinder gasoline engine with piston displacement of 1600 cc. was modified by deactivating two cylinders through removal of the pistons and associated moving parts therein and sealing said cylinders from ingress of air, fuel, and lubricating fluid. It was further modified into a hybrid vehicle by installing a battery-powered electric motor alongside the engine and coupling its output shaft to the front end of the engine crankshaft via a V-belt, pulleys, and a releasable electromagnetic clutch thereby making it possible for the operator to add power from the electric motor to the engine output whenever more power was needed. Highway tests on the modified vehicle at speeds between 30 MPH to 45 MPH showed that the vehicle traveled twice as far on a given

amount of regular gasoline, in comparison with the distance it traveled before modification.

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# Theorizing Land Ownership in Land Titling

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The Philippine contemporary land ownership and titling system underwent severe reforms through several decades. In 1988, the Comprehensive and Agrarian Reform Law (CARL) was crafted aimed to distribute the country's land base. After two decades, the government launched the land administration and management project (LAMP) to secure land tenure as well as reduce the country's poverty rate. From 1988 to the current date, land reform programs created and disseminated a vast amount of knowledge from implementers that trickles down to the community. This paper aimed to identify and discuss the concept of land and land ownership through land titling and to determine its connotations after three decades of agrarian reform. Data was gathered through in-depth interviews and was analyzed using the Atlas.ti. The results were interpreted within the context of constructivism. Three major paradigms emerged in the process. Land ownership through titling is viewed as security, pride, and propaganda.

**Keywords:** Land titling, Land ownership, LAM Project, knowledge construction

*Just like heaven. Everybody wants a little piece of land, but nobody ever gets to heaven, and nobody gets no land. They have all the time talking about it, but it's just in their head.*

[Steinbeck, 1937]



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## INTRODUCTION

Land ownership symbolizes power. It is thought to create an emancipatory force towards poverty and other forms of oppression, because of the concept that land is seen as wealth (Kuhnen, 1989). Power in the context of land governance is wealth and, vice versa, is often associated with domination, tyranny, and oppression.

Land-related problems have taunted the country for generations. Issues vary from landlessness to land transfer and grabbing, duplication to fake titles, multiple laws and taxes, weak land administration and management, and unfair governance (Dealca, 2009), each one related to land access and tenure security.

The Government responded to these issues through crafting different agrarian reform policies. One of which is the Comprehensive Agrarian Reform Law of 1988 (CARL). This law was crafted to protect the rights of agricultural workers in the country (Comprehensive Agrarian Reform Law, 1988). The Comprehensive Agrarian Reform Program (CARP) was then established to distribute the country's land base. This was followed by the Land Administration Reform Act of 2011 (LARA) so as to support CARP. The law mandate reforms on land administration system in the country. This law gears towards sustainable administration of resources and records, standardization of the titling process, fully decentralized service through One-Stop Shops, and development of increased transparency and accountability across the whole administration process and assures land tenure security to agrarian reform beneficiaries and other clients (Williamson, Enemark, Wallace, & Rajabifard, 2010).

The LARA was developed after the implementation of the Land Administration and Management Project or LAMP. The LAMP is the Governments' first step towards the 15–20-year goal to alleviate poverty and enhance economic growth (Hunter & Hoogsteden, 2010) through tenure security. The project has two phases. Phase 1 aimed to test alternative approaches on land protection, policy, and regulation. Subsequently, Phase 2 has five components: (1) policy development, (2) institutional development and capacity building, (3) tenure security, (4) property valuation and taxation, and (5) project management (Dealca, 2009). Of the five components, component 3 on tenure security focused on the communication and information dissemination of the project. It aims to promote community

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participation and awareness on land rights, responsibilities, and the benefits of land titling and improved tenure. It streamlined titling procedures through reforms in surveying, mapping, and adjudication services in partnership with LGUs and other agencies. This component also focused on providing efficient services in land registration and record management through a One-Stop Shop (OSS), an online land database.

More than a decade after its implementation, it would be interesting to know the effects of land tenure security in terms of knowledge development. This paper aimed to explore and discuss the concepts surrounding land ownership through land titling.

## **THEORETICAL FRAMEWORK**

The knowledge we have today has been passed on through generations and has survived the rigid selection of reality. This is the dominant knowledge created by culture and society. In this notion, reality is filtered, manufactured, and modified by the dominant echelon silencing and marginalizing dissimilar perspectives producing domination over knowledge.

This study follows the concept of social construction of knowledge. Constructivism claims that the knowledge we have and reality we believe guide us in our everyday life. Berger and Luckmann (1966) supposed that everyday life presents itself as a reality interpreted by men and is subjectively meaningful to them as a coherent world. Social construction of knowledge originated as an attempt to come to terms with the nature of reality (Andrews, 2012).

Allen (2007) defined social construction as a school of thought which contends that humans create reality through interaction. This reality involved naming of things and concepts and beliefs which basically creates culture within an individual or a community. Meanings in this concept arise from social systems and that we derive knowledge from dominant discourses, which is more often, based on dominant value systems (Philp, Guy, & Lowe, 2007). The idea according to Pearce (2009) is that our social world is fabricated, and we are the beneficiaries or victims of the things we and others have constructed. In this paradigm, epistemology (what do we know?) is thoroughly penetrated by ethics (what we should know?). Hence, the processes of constructing social identity “depend heavily on social, political, and historical factors, as humans rely on current ideologies to

create social identity categories and their meanings” (Allen, 2007).

Social construction is then a viable approach to theorizing land ownership. This paradigm also guides us to delve into the idea that everyone is assigned to an artificial construct and taught how to enact it (Grimes, 2002), as well as how to perceive things and symbols around them. In addition, social construction acknowledges relationships between contexts; hence, it provides means for how rights to land give authority and power to certain individuals. This perspective according to Allen (2007) “encourages us to question taken-for-granted knowledge about the world and, therefore, about ourselves.”

## **METHODOLOGY**

### **Research design**

The study employed a qualitative research design method. Qualitative researches are tools used in understanding and describing the world of human experience (Myers, 2000). Generally, the study sought to answer the following questions: what are the different concepts surrounding land ownership in land titling; and how do landowners construct or create knowledge on land ownership and its related concepts. An in-depth interview involves a comprehensive inquiry and detailed conversation on the participant’s history of land acquisition, the process of ownership, and experiences.

### **The participants**

The participants are LAMP clients, who acquired or are in the process of acquiring their land titles through the project. A total of 21 LAMP participants were interviewed in the study. All of whom are locals of Leyte, Philippines, one of the project’s pilot site. The participants consisted of 13 females and 8 males. They were composed of 11 senior citizens (60 years and above) and middle aged individuals (40–59).

Their lands were registered as (20) agricultural and (3) residential which they mostly inherited (17) from their parents and relatives. Basically, the participants use their land as coconut farms because of the mountainous landscape in the area. Selling “copra” is a major source of livelihood and

income. Other crops planted were sweet potato, banana, fruit trees, upland rice variety, bamboo, mahogany, and other types of hard wood.

### **Sampling procedure**

An exponential nondiscriminative snowball sampling of LAMP participants from the municipality was employed. This type of sampling is usually used for small groups of stakeholders. This case, on the other hand, is different. The LAMP OSS has thousands of clients over the three municipalities in Leyte. Since the study is qualitative and will follow a case study research design, a smaller sample is needed. This type of sampling procedure will allow respondents to recommend or refer other LAMP participants near the area. Once saturation is reached, data collection stops.

### **The Analysis**

The study followed the coding process developed by Corbin and Strauss (1990). The following procedures were employed: open coding, axial coding, selective coding, and the theoretical model. The recorded interviews were transcribed using ExpressScribe which directly stores the texts to Microsoft Notepad.

Analysis or the coding process was done using a Computer Assisted Qualitative Data Analysis Software (CAQDAS) program Atlas.ti. The program was specifically built to support grounded theorizing (Silver, 2006). Atlas.ti enables one to collect large bodies of data, including interview transcriptions, PDFs, Microsoft Word documents, html, pictures, and even audio and video recordings, and conveniently manages the codes from analysis to output (Mungal, 2009). Text and categories were then translated from Filipino-Cebuano to English after the analysis.

## **RESULTS**

### **Security and land titles**

Security features mutual trust, mutual benefit, equality, and coordination (Jinping, 2014). Security of tenure was basically the core concept of the LAM Project. Hence, subjects regard land titles as something that will secure

and assure their rights over the land they own or registered. This concept is apparent in the phrases “kasigurado-an na imu na jud ang yuta” (assurance that the land is yours), “wa nay la-ing mu-ilog og mu-angkon” (no one will try to own), and “ikaw na ang mubarog” (you will be the owner). The participants added that titles have also lessened the threat of land grabbing and ease complicated bank transactions.

**[P1]** *With a (land) title, you have that security that the land is yours. People will also hesitate to take advantage if there is a title. I have this land, a timberland, but was planted with abaca which was cultivated by someone else. Then, there was an officer from the Department of Environment and Natural Resources (DENR) who told him that the land is his because he was the one tilling it. Now, the farmer tried to take the land — that is the problem when you don't have a title.*

**[P15]** *The only difference in having a title is the assurance that the land is yours. For those who have money, it's easy for them to take other's land especially if the land doesn't have a title.*

Land markets basically exist when and wherever there is exchange to rights of land for agreed amounts of money or services rendered (Mahoney, Dale, & McLaren, 2007). The construct that land titles improved land market can be explained by the following subthemes: (1) easy transactions in selling land, (2) access to bank loans and collaterals, and (3) clarification of boundary disputes.

**[P1]** *It helped a lot in my children's education. If you do not have other source of money, the bank is available if you have a title, you can use it as collateral.*

**[P2]** *A title gives you ownership. There are some siblings that are crazy and will question why you are managing part of your parents land. So, I decided to have it titled, after that no one tried to get involved with our land anymore.*

**[Client P5]** *It's more trustworthy when you sell land with a land title compared to not having one; the buyer will tell you “there are still a lot of things to process.” We have a lot of problems before when we still don't have a title for our land. If we sell it, they will ask us if we have titles, if there's none, they would back out.*

An investment is basically anything, usually a property purchased specifically to generate income (Investing in Property, 2013). One of the participants specifically described land as an investment.

[P21] *Land is investment; it is not currently clear but apparently its value will increase. If you will just take care of the land, especially a coconut farm, every 3 months you can harvest the copra. It really helped in our livelihood. The education we have is from the yield of our coconut farm.*

Though the concept of secured ownership through titles is clear, scripts revealed that the idea or knowledge was unnaturally constructed. There is a disconnection between knowledge and the individual or the participant saying it. This concept is evident in the words “ingon sa/nila” (they said), “matud pa” (according to), “kuno” (it is said), and “pasabot sa” (said by/ according to).

[P6] I don't really know the use of a title but according to LAMP, the land will be ours.

[P9] They said that if you have a title, your land will not be easily or merely taken, there is evidence.

[P10] It is said that the purpose of the title is for the land to be ours, that we will surely be the owner of the land.

[P11] It's good to have a title, that's what I heard. So, I also thought it may be good, that's why I tried to have a title. We never tried having a title before; we just followed others who had acquired land titles.

[P14] The title, according to them, that from the program, the land will surely be yours, no one will take it.

[P20] The title, according to LAMP, makes you the total owner of the land. If you don't have title, you are just like declaring to the government. If you have a title, you are surely the owner and you can use it as collateral/loan it to the bank. A declaration only allows you to loan it to other people but not to the bank.

## **Pride and Legacy**

Land owners see land titles as a source of pride. This conception of pride that comes from land titles is lucid in the word “garbo” or “kapisigarbo” (pride

or something to be proud of). The following quotations further explain this notion:

*[P4] When you have a land title, you have this pride that the land is really yours, no one can take it. I have something to be proud of to my children, a place where they can live. It's good to have a title because you have something to show, not just words.*

*[Client P5] There is a huge change when you have a title; there is pride when your land has title.*

*[P10] We got interested in land title because the name of our father will be transferred to our name.*

*[P21] You have a land but there is no title. You can boast if you have a title.*

Inheritance is defined as a “property that one receives from someone when they die.” Land and a land title are perceived as a legacy and source of pride to some of the respondents. This concept is salient in the word “kabilin” or legacy.

*[Client P15] You cannot call me a professional; I'm just a high school graduate. I just thought that it is better if you have a land and land titles because you can give a legacy to your children. That is the most important, to give a legacy.*

*[P17] Land is important because it is a legacy from our forefathers and a legacy for the person who will inherit it and to the children. We have a small land. The story is, the portion of our mother's land was sold because she got sick. There is nothing else to sell; there is nothing else in mind except that land. It was sold to our relative in my mother's side. The land we (our family) have now is an inheritance from one of her siblings. That is where my siblings live now.*

## **Government Propaganda**

Section 2, Article XII of the 1987 Regalian Doctrine and the Constitution of Land Ownership in the Philippines provides that “all lands of the public domain, waters, minerals, coal, petroleum and other mineral oils, all forces of potential energy, fisheries, forests, wildlife, flora and fauna, and other

natural resources are owned by the State.”

The concept of government propaganda in land titling and ownership also emerged in the collated data. This perception is couched in the phrases “ila propaganda way bayad” (their propaganda was free titling), “dili ato ang yuta, sa gobierno” (the land is not ours, it is the governments’). Land titles in this aspect do not mean total ownership; this means that clients only buy or claim the rights to the land but not the land itself (physical ownership), because it still belongs to the State. Furthermore, a communication gap, which resulted to doubt, was created in the delivery of information from implementers to the community. The doubt came from paying taxes. Apparently, tax is symbolized as rent. This means that paying taxes means paying rent to the government. It would appear this way, because the Philippine Regalian Doctrine on the ownership by the State implies that any person claiming ownership of a portion of the public domain must be able to show title from the state according to any of the recognized modes of acquisition of title. A land title provides an individual security of tenure to freely manage and dispose the land during his lifetime. Though a title provides legal rights, all lands still belong to the State. The term “ila” (theirs) which pertains to the government and “dili ato” (not ours) proved that there is limitation to ownership even with land titles.

Another issue encountered is the process of mainstreaming the procedures in the acquisition of land titles. The concept of (land ownership through) land titling as government “propaganda” came from the “free titling” campaign. Several participants paid a hefty amount of money to process their land titles.

*[P1] They said there's no fee but during the surveying, I gave P 7, 000 to measure the land and to have a title on one of our lands, but until now there's no result. They only gave us a drawing on a bond paper. They said that would include the title but there is none.*

*[P6] The person who recruited us said that the land will be ours if it has a title. That's why my question, if there is a title and the land will be ours, will we still be paying tax? And they said that we will be paying tax instead. So, this means that the land is not ours; it is not certainly ours because we are paying taxes, and we are renting it. But the rights will not be taken. Even if there is a title, it is not ours. The land still belongs to the government.*



*[P12] They said that everything is free, but then again, we spent. We paid taxes now because we never paid taxes for a number of years. We are now slowly paying taxes, it is higher now that the land has a title.*

*[Client P16] It is said that it is free, but it's not, I paid P 6, 000, it's a hefty amount. That is their propaganda, no payment. They said that there are no fees because it's a program by the government, doing the poor a favor. I don't know what the problem is because we still spend paying for taxes. Land title is important for the government for taxes. Now that there are land titles, taxes are also clear.*

## DISCUSSION

In vivo coding through Atlas.ti shows that the words “ato/amo” (ours) and “imo” (yours) were used as reference to ownership. The lack of term like “ako” (mine) showed that land ownership in this sense is collective and not individualized. This means that not just a single individual owns the property or the land but the family or group as a whole, even if only a single person is registered as the owner.

Furthermore, as campaigned by the LAMP, ownership through land titles assures and secures an individual's legal rights to the land he tills and owns. Consequently, the concept of legal ownership through titles emerged from the collated data, but further scrutiny revealed another category. The construct of land ownership through land titling is then associated with these two major categories:

- **Legal ownership** — how landowners perceived the outcome of having land titles; and
- **Political ownership** — how landowners indicate and identify power relations to the land they own.

The concept of ownership is broad. Lars Bergström (1999) provided questions concerned with this notion: (1) What is the basis of ownership and (2) under what conditions does someone owns something? In this case, the basis of formal ownership is the acquisition of land titles. A predetermined concept was created by the program; but how did landowners perceive land ownership and titles? What kind of information did they receive and how did they process this information?

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## THE CONCEPTUALIZED THEORY

### Legal Ownership

This category requires justification or validation from the law. Our legal rights according to Garrett (2004) are, roughly, what the law says they are. He added that legal rights gain their force through legislation or decree by a legally authorized institution. Hence, in this category, participants:

1. should be able put into words the rights an individual has over a property or the land he/she owns;
2. they should be able to determine changes in management and disposition of the land he/she owns after having a land title; and
3. be able to verbalize perceived concepts and processes in acquiring legal ownership.

This type of ownership is determined through the availability of titles. Moreover, their knowledge of the law should also be evident. This concept on the other hand showed clients' vulnerability. Though there is personal claim, their knowledge over land ownership through titling is insufficient and needs to be compensated. It has been observed that there is an emphasis of uncertainty. This observation was taken from the terms "ingon sa/nila" (they said), "matud pa" (according to), "kuno" (is said), and "pasabot sa" (said by). Participants were not able to clearly explain the processes and policies related to land ownership or confidently verbalize their claim over the land. Uncertainty contradicts the concept of security.

The acquisition of titles should provide participants adequate knowledge about the policies and processes, the pros and cons, but as observed, the process of communication done by the project is linear. Participants do not have a clear idea of the whole titling procedure or full knowledge of their rights as legal owners of the land. Hence, the concept of legal ownership falls short in only providing titles.

### Political Ownership

This category entails an individual to determine power over an owned property. Political ownership (Kline, 2009) is determined through discourses

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and verbalization of power relations as perceived by participants. In this category then, participants should be able to:

1. identify and describe dominant roles and prevailing practices in land administration and management;
2. show discourse through verbalization of concepts, perceptions and viewpoints; they should verbalize their claim over the land they own based on experiences and what those experiences mean to them.

Of the 21 participants, only one [P6] was able to scrutinize the process of land titling, identify power relations over the land he owns and made sense of the experiences he encountered in the process of acquisition. He was able to question the kind of ownership he has through the payment of taxes:

*That's why my question, if there is a title and the land will be ours, we will not be paying tax anymore? And they said that we will be paying tax instead. So, this means that the land is not ours; it is not certainly ours because we are paying taxes, and we are renting it. But the rights will not be taken. Even if there is a title, it is not ours. The land still belongs to the government.*

## **CONCLUSION AND RECOMMENDATIONS**

The study identified three concepts (security, pride, and propaganda) in land ownership through land titling. This was further categorized into two: legal and political ownership. Though the number of respondents is very small or limited, the study gave a partial view (of) and highlighted landowners' experiences and problems encountered in the process of land and land title acquisition. Hence, the study stands as a baseline for future land administration programs in the area. Especially now, that the government is improving its land administration programs after Typhoon Haiyan, where land records are destroyed, making small land owners vulnerable to land grabbing.

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# Assessment of the Diversity of Animals in the Forest Ecosystems of Baler Forest Reserve and Dibut River Watershed

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The diversity of animals in the forested area of Baler Forest Reserve and Dibut River Watershed was assessed. The four major groups of animals such as birds, mammals, reptiles, and amphibians were observed, described, identified, and classified. Birds and volant mammals were observed through standard mist netting and either sight or sounds. On the other hand, nonvolant mammals were observed or caught by traps and searched along their possible habitat. Amphibians were caught by hands, and the reptiles were observed through sightings.

A total of 40 animal species were observed in the area under 30 Families, where Families Alcedenidae, Pteropodidae, Muridae, and Ranidae are the most represented. Of the observed animals, 40 species were identified up to genus and species level.

A mammalian species Greater Musky Fruit Bat (*Ptenochirus jagori*) got the highest importance value index of 62.67% and biodiversity indicator value of 88%. It is also the most common and the most dominant animal species surveyed in the forest ecosystem. Baler Forest Reserve and Dibut River Watershed exhibited low to very low diversity among animals.

One species was listed as vulnerable and five species as near threatened by the IUCN Red List of Threatened Species. There were 24 native species recorded. Furthermore, there were no introduced species recorded in Baler Forest Reserve and Dibut River Watershed.

Human activities such as timber poaching posed major impact on environmental degradation. Soil erosion, kaingin farming, mining, charcoal making, fires, and hunting posed small to moderate impacts on the area.

**Keywords:** Birds, Mammals, Reptiles, Amphibians, Biodiversity, Forest Ecosystem, Baler Forest Reserve and Dibut River Watershed, IUCN Red List of Threatened Species

## INTRODUCTION

The Philippines is one of the few nations that are, in its entirety, both a hotspot and a megadiversity country, placing it among the top priority hotspots for global conservation. Most of the islands are covered in rain forest. The bulk of the country is blanketed by lowland rainforests dominated by towering Dipterocarps, beautiful and straight hardwood. At higher elevations, the lowland forests are replaced by montane and mossy forests that consist mostly of smaller trees and vegetation.

The patchwork of isolated islands, the tropical location of the country, and the once extensive areas of rainforest have resulted in high species diversity in some groups of organisms and a very high level of endemism. There are over 530 bird species found in the Philippine hotspot; about 185 of these are endemic (35%) and over 60 are threatened. At least 165 mammal species are found in the Philippines, and over 100 of these are endemic (61%). Reptiles are represented by about 235 species, some 160 of which are endemic (68%). There are nearly 90 amphibian species in the hotspot, almost 85% of which are endemic. These continue to increase, with the continuing discovery and description of new species (McGinley, 2013).

This project aimed to determine the exploitation and conservation status of forest biodiversity in Central Luzon. Specifically, it aimed to conduct assessment of the diversity of animals in the selected forest ecosystems of Central Luzon, to identify indicators of biological diversity in the forest ecosystems of Central Luzon, to determine sources of all levels of impacts of environmental problems/degradation of forest ecosystems in Central Luzon, to identify alien/introduced species in the forest ecosystems and their impact to biodiversity, and to determine the ecological/economic role/functions of animals in the forest ecosystems of Central Luzon.

## METHOD

### Study Area

The Baler Forest Reserve in Brgy. Zabali, Baler, Aurora covers 310 hectares

of mountainous forest while Dibut River Watershed in Brgy. Dibut, San Luis, Aurora has a total land area of 1,341.24, 93% of which is used for timberland. The two watersheds were divided into ten (10) stations. Of these, two stations were selected in Dibut River Watershed and eight stations in Baler Forest Reserve. In each station, ten (10) quadrats were chosen and designated as study areas and were delineated and digitally mapped. The delineated study area was divided into grid with a scale dimension of 10 m × 12 m. The numbers of grids were determined, and a simple lottery method was used to represent the random sampling technique.

### **Data Gathering and Documentation**

The four major groups of animals such as birds, reptiles, amphibians, and mammals were surveyed, monitored, and recorded in each quadrat. The animals were recorded by monitoring the number of sightings. The following information was gathered: common name, habitat, locality, altitude, province, morphological description of the animal, and ethnobiological information (benefits/uses, values, associated beliefs and practices, etc.). Ethnobiological/ethnopharmaceutical/ethnomedicinal information of the recorded and observed animals was gathered through interview with the local people living in the protected area who are knowledgeable about local wildlife and resource use.

Collection and observation of the representative animals that were not known or not identified were conducted through the use of mist nets and binoculars for flying mammals and birds, improvised traps for reptiles and birds, cast nets of small mesh size for small animals, and hand-picking for other animals. All animals were photographed and released thereafter.

Pertinent information regarding their habitat, sex, behavior, and economic and ecological importance were also noted. All observed animals were identified and classified based on available Taxonomic Keys, and authentication was done by an expert in Taxonomy of Animals at the National Museum, Manila.

Quantitative descriptions of animals were gathered to compute for the various ecological parameters such as frequency, relative frequency, density, relative density and dominance, and importance value index. Species diversity was computed and determined using Shannon's Diversity Index (Smith & Smith, 1998). Furthermore, biodiversity indicator was also



determined using the formula,  $IndVal_{ij} = A_{ij} \times B_{ij} \times 100$ , adapted from Dufrene and Legendre (1997).

Rare, endangered, depleted, endemic, and economically important species of animals were identified. Indicators of biological diversity as well as introduced species were also identified, and their impact to biodiversity was also determined.

## RESULTS AND DISCUSSION

### Assessment of the Diversity of Animals

A total of 40 animals were observed in the Baler Forest Reserve and Dibut River Watershed. Of these, 17 are birds, 10 are mammals, seven are reptiles and six are amphibians (Table 1). All of them were identified up to species level.

#### Birds

Birds were the most numerous group of vertebrates in the area. Based on the identified species of birds, Order Passeriformes is well represented with nine species. Birds of the Order Coraciiformes are represented with four species while Order Caprimulgiformes are represented with two species. Birds of the Orders Falciformes and Apodiformes are represented with one species each.

#### Mammals

The captured mammals are grouped under four Orders. Orders Chiroptera, Rodentia, Primata, and Carnivora. The ten species of mammals belonging to five Families include four volant mammals from the Family Pteropodidae and one species from the Family Hipposideridae, three rodents (Muridae), one macaque (Cercopithecidae), and one civet cat (Viverridae).

**Table 1.** Computed ecological parameters of the surveyed animals in Baler Forest Reserve, Baler, Aurora and Dibut River Watershed, San Luis, Aurora.

Local Name/Scientific Name	No. of Individuals	F	RF (%)	D	RD (%)	Do	R Do (%)	IVI (%)
<b>Birds</b>								
<i>Penelopides manillae</i>	20	0.8	5.55555556	0.001667	4.694835681	0.002098868	1.878584141	12.128975
<i>Pycnonotus urostictus</i>	12	0.7	4.861111111	0.001	2.816901408	0.00072908	0.652560807	8.3305733
<i>Lanius cristatus</i>	11	0.7	4.861111111	0.000917	2.582159624	0.000607567	0.543800672	7.9870714
<i>Dicaeum austral</i>	9	0.5	3.472222222	0.00075	2.112676056	0.00039768	0.355942258	5.9408405
<i>Haliastur indus</i>	6	0.6	4.166666667	0.0005	1.408450704	0.0001657	0.148309274	5.7234266
<i>Copsychus luzoniensis</i>	6	0.4	2.777777778	0.0005	1.408450704	0.0001657	0.148309274	4.3345378
<i>Terpsiphone cinnamomea</i>	4	0.4	2.777777778	0.000333	0.938967136	6.628E-05	0.05932371	3.7760686
<i>Aerodramus inquietus</i>	4	0.3	2.083333333	0.000333	0.938967136	6.628E-05	0.05932371	3.0816242
<i>Motacilla cinerea</i>	3	0.3	2.083333333	0.00025	0.704225352	3.314E-05	0.029661855	2.8172205
<i>Stachyris demissouri</i>	4	0.2	1.388888889	0.000333	0.938967136	6.628E-05	0.05932371	2.3871797
<i>Rhipidura cyaniceps</i>	2	0.2	1.388888889	0.000167	0.469483568	1.10467E-05	0.009887285	1.8682597
<i>Alcedo atthis</i>	2	0.2	1.388888889	0.000167	0.469483568	1.10467E-05	0.009887285	1.8682597
<i>Actenoides lindsayi</i>	2	0.2	1.388888889	0.000167	0.469483568	1.10467E-05	0.009887285	1.8682597
<i>Alcedo mentinting</i>	2	0.2	1.388888889	0.000167	0.469483568	1.10467E-05	0.009887285	1.8682597
<i>Hypsipetes philippinus</i>	2	0.2	1.388888889	0.000167	0.469483568	1.10467E-05	0.009887285	1.8682597
<i>Caprimulgus jotaka</i>	1	0.1	0.694444444	8.33E-05	0.234741784	0	0	0.9291862
<i>Batrachostomus septimus</i>	1	0.1	0.694444444	8.33E-05	0.234741784	0	0	0.9291862
<b>Mammals</b>								
<i>Ptenochirus jagori</i>	88	0.6	4.166666667	0.007333	20.657277	0.042286661	37.84852679	62.67247
<i>Cynopterus brachyotis</i>	84	1	6.944444444	0.007	19.71830986	0.038508699	34.46707534	61.12983

<i>Rattus everetti</i>	21	0.8	5.555555556	0.00175	4.929577465	0.002319801	2.07632984	12.561463
<i>Macrolossus minimus</i>	14	0.7	4.861111111	0.001167	3.286384977	0.001005247	0.899742931	9.047239
<i>Macaca fascicularis philippinensis</i>	6	0.6	4.166666667	0.0005	1.408450704	0.0001657	0.148309274	5.7234266
<i>Bullimus luzonicus</i>	7	0.5	3.472222222	0.000583	1.643192488	0.00023198	0.207632984	5.3230477
<i>Haplonycteris fischeri</i>	4	0.4	2.777777778	0.000333	0.938967136	6.628E-05	0.05932371	3.7760686
<i>Paradoxurus hermaphroditus</i>	3	0.3	2.083333333	0.00025	0.704225352	3.314E-05	0.029661855	2.8172205
<i>Coelops hirsutus</i>	3	0.2	1.388888889	0.00025	0.704225352	3.314E-05	0.029661855	2.1227761
<i>Apomys datae</i>	1	0.1	0.694444444	8.33E-05	0.234741784	0	0	0.9291862
<b>Reptiles</b>								
<i>Varanus marmoratus</i>	3	0.3	2.083333333	0.00025	0.704225352	3.314E-05	0.029661855	2.8172205
<i>Draco spilopterus</i>	2	0.2	1.388888889	0.000167	0.469483568	1.10467E-05	0.009887285	1.8682597
<i>Python reticulatus</i>	2	0.2	1.388888889	0.000167	0.469483568	1.10467E-05	0.009887285	1.8682597
<i>Gonocephalus sophiae</i>	1	0.1	0.694444444	8.33E-05	0.234741784	0	0	0.9291862
<i>Denalephhis pictus</i>	1	0.1	0.694444444	8.33E-05	0.234741784	0	0	0.9291862
<i>Boiga cymodon</i>	1	0.1	0.694444444	8.33E-05	0.234741784	0	0	0.9291862
<i>Trimeresurus flavomaculatus</i>	1	0.1	0.694444444	8.33E-05	0.234741784	0	0	0.9291862
<b>Amphibians</b>								
<i>Hylarana similis</i>	61	0.7	4.861111111	0.005083	14.31924883	0.02021541	18.09373146	37.274091
<i>Limnonectes macrocephalus</i>	20	0.2	1.388888889	0.001667	4.694835681	0.002098868	1.878584141	7.9623087
<i>Fejervarya vittigera</i>	7	0.7	4.861111111	0.000583	1.643192488	0.00023198	0.207632984	6.7119366
<i>Platymanthis cornutus</i>	2	0.2	1.388888889	0.000167	0.469483568	1.10467E-05	0.009887285	1.8682597
<i>Polypedates sp.</i>	2	0.1	0.694444444	0.000167	0.469483568	1.10467E-05	0.009887285	1.1738153
<i>Rana luzonensis</i>	1	0.1	0.694444444	8.33E-05	0.234741784	0	0	0.9291862
TOTAL	426		100		100		100	300

(*Herpetofauna*) **Reptiles and Amphibians**

Herpetofaunal assessment was also conducted in Baler Forest Reserve and Dibut River Watershed. A total of 13 species of reptiles and amphibians were recorded and identified. Seven species of reptiles belonging to five Families were identified; two Colubridae and two Agamidae. One species each from Pythonidae, Varanidae, and Viperidae was also identified. A total of six species of amphibians were also recorded. The six species were identified up to genus and species level belonging to three Families, four species from Ranidae Family and one species each for Families Ceratobatrachidae and Rhacoporidae.

### Importance Value Index (IVI) of Animals Surveyed

Table 2 presents the animals with the highest importance value index (IVI) for each class.

**Table 2.** Animals with the highest number of importance value index (IVI) present in Baler Forest Reserve and Dibut River Watershed.

Class	Species Name	Importance Value Index (IVI)
Birds	<i>Penelopides manillae</i>	12.13
Mammals	<i>Ptenochirus jagori</i>	62.67
Reptiles	<i>Varanus marmoratus</i>	2.81
Amphibians	<i>Hylarana similis</i>	37.27

Results revealed that *Ptenochirus jagori* obtained the highest importance value index of 62.67%. The Greater Musky Fruit Bat (*P. jagori*) is endemic in the Philippines. This frugivorous tree and cave roosting species, which occurs from sea level to at least 1,950 m, is abundant in primary forest and common in secondary forest (Ong et al., 2008). This is followed by an amphibian *Hylarana similis*, with 37.27% IVI. The True Frog (*H. similis*) inhabits in undisturbed and disturbed streams and rivers in lower montane and lowland forests. It breeds and lays its eggs in clean streams and rivers, and the larvae develop in quiet side pools. This species is native in the Philippines and listed as near threatened because its extent of occurrence and quality of its habitat are probably declining, thus making the species close to qualifying for vulnerable status (Diesmos et al., 2004).

On the other hand, *Penelopides manillae* got 12.13% IVI while *Varanus marmoratus* obtained 2.81% IVI. *P. manillae* is also native in the Philippines, found commonly in moist lowland forest and wetlands of permanent rivers, streams, and creeks. The population of this species is suspected to be in decline locally because of habitat destruction and hunting for food and trade (Birdlife International, 2012). Furthermore, *V. marmoratus* is widely distributed in Luzon island occurring in protected areas and is having a large population. This species is tolerant of habitat degradation and is regularly recorded from secondary forest, disturbed forest, and agricultural areas. The major threats to *V. marmoratus* are heavy trading of the species for food and pet purposes and the capture of their hatchlings and juveniles (Gaulke et al., 2009).

### Species Diversity

Table 3 shows the various diversity indices of vertebrates in Baler Forest Reserve and Dibut River Watershed. Shannon's Diversity Index shows that the ten (10) stations observed in the watersheds have low avian diversity, with a value of 2.48. Shannon's Index of Diversity also shows that mammals, reptiles, and amphibians have very low diversity, with values of 1.53, 1.84, and 1.01, respectively. Still, these values imply low diversity with regard to the three groups of vertebrates. This is because of the low number in species observed and low number of individuals recorded. Many of the vertebrates observed had only one to two individuals in all of the 10 stations observed in Baler Forest Reserve and Dibut River Watershed. The low diversity of the animals in the forest ecosystem of Baler Forest Reserve and Dibut River Watershed may also be the result of human activities such as wildlife hunting and habitat destruction caused by timber poaching, mining, and kaingin farming system.

**Table 3.** Diversity indices of four groups of animals in Baler Forest Reserve and Dibut River Watershed.

Group	# of Species	# of Individuals	Diversity Index	Interpretation
Birds	17	91	2.48	Low
Mammals	10	231	1.53	Very Low
Reptiles	7	11	1.84	Very Low
Amphibians	6	93	1.01	Very Low

## Biodiversity Indicators

Greater Musky Fruit Bat (*Ptenochirus jagori*) obtained the highest biodiversity indicator value of 88% followed by Philippine Tailless Leaf-nosed Bat (*Coelops hirsutus*) with 8.82% and True Frog (*Hylarana similis*) with 61% biodiversity indicator values (Table 4). The findings could be because of the high number of individuals of the species observed and their wide spread distribution. The other groups of animals (mammals, reptiles, and amphibians) showed very few numbers of individuals and were less distributed (Table 4).

Mammals and birds had high biodiversity indicator value with more than 80% indicator value. Biodiversity indicators are quantitative data to measure aspects of biodiversity, ecosystem condition, ecosystem services, and drivers of change. They help explain how biodiversity is changed over time and space (UNEP, 2013). These are species whose presence or absence affects the biodiversity of a particular area. They can serve as important sources of food for the other species, and they can serve as indicators of habitat/ecosystem conditions. Species with more than 80% biodiversity indicator values are considered as biodiversity indicator species.

The presence of these species is important in determining the habitat/ecosystem condition and the disturbances experienced in the area. The absence of these species may mean that the area is disturbed or is not in good condition anymore. Hence, biodiversity indicator may form as an essential part of monitoring and assessment to give the status of biodiversity in the area.

**Table 4.** Animals in Baler Forest Reserve and Dibut River Watershed with high biodiversity indicator values.

Species	Indicator value (%)
<i>Ptenochirus jagori</i>	88
<i>Coelops hirsutus</i>	84
<i>Hylarana similis</i>	61
<i>Rattus everetti</i>	21
<i>Limnonectes macrocephalus</i>	20
<i>Penelopides manillae</i>	20

## Ecological Status of Animal Species in the Forest Ecosystem of Baler Forest Reserve and Dibut River Watershed

Table 5 presents the ecological status of animal species in the forest ecosystem of Baler Forest Reserve and Dibut River Watershed. Based on the latest IUCN Red List (2014.2), one species of amphibian was evaluated as vulnerable species. These species also have decreasing population trend; thus, they are very much threatened by habitat loss and other ecological disturbances. There was also one near threatened species of bird, one near threatened species of mammal, and three near threatened species of amphibians. Two (2) species had not yet been evaluated, and four species were data deficient. There were also 15 bird species, eight mammalian species, three reptiles, and two amphibians which were observed in Baler Forest Reserve and Dibut River Watershed and were listed as least concern. Some of these species have stable and unknown trend population. However, 11 species were evaluated with decreasing population. In the future, these animals may therefore become threatened and vulnerable because of the threats in their habitat. Furthermore, based on the DAO 2004-15 lists of threatened species, brahminy kite (*Haliastur indus*), a bird, was evaluated as endangered species. Moreover, *Macaca fascicularis philippinensis* and *Python reticulatus* were also listed as other threatened species.

**Table 5.** Ecological status of animal species observed in Carranglan Watershed, Carranglan.

Fauna	Scientific Name	Conservation Status and Population Trend	
		IUCN 2013.1	DAO 2004-15
<b>Birds</b>		IUCN 2013.1	DAO 2004-15
Golden-crowned Babbler	<i>Stachyris dennistouni</i>	Near-threatened (D)	—
Red Keeled Flower pecker	<i>Dicaeum australe</i>	Least Concern (S)	—
Yellow-wattled Bulbul	<i>Pycnonotus urostictus</i>	Least Concern (S)	—
Grey Nightjar	<i>Caprimulgus jotaka/ indicus</i>	Least Concern (S)	—
Rufous Paradise Flycatcher	<i>Terpsiphone cinnamonea</i>	Least Concern (S)	—
Grey Wagtail	<i>Motacilla cinerea</i>	Least Concern (S)	—
Philippine Bulbul	<i>Hypsipetis philippinus</i>	Least Concern (S)	—

Blue-headed Fantail	<i>Rhipidura cyaniceps</i>	Least Concern (S)	—
Brown Shrike	<i>Lanius cristatus</i>	Least Concern (D)	—
Blue-eared Kingfisher	<i>Alcedo meninting</i>	Least Concern (D)	—
White-browed shama	<i>Copsychus luzoniensis</i>	Least Concern (D)	—
Brahminy kite	<i>Haliastur indus</i>	Least Concern (D)	Endangered
Philippine Frogmouth	<i>Batrachostomus septimus</i>	Least Concern (D)	—
Luzon Tarictic Hornbill	<i>Penelopides manillae</i>	Least Concern (D)	—
Common Kingfisher	<i>Alcedo atthis</i>	Least Concern (U)	—
Spotted Kingfisher	<i>Actenoides lindsayi</i>	Least Concern (U)	—
Island Swiftlet	<i>Aerodramus inquietus</i>	Not Evaluated (U)	—
<b>Mammals</b>			
Philippine Long-tailed Macaque	<i>Macaca fascicularis philippinensis</i>	Near-threatened (D)	Other Threatened Species
Phil. Pygmy Fruit Bat	<i>Haplonycteris fischeri</i>	Least Concern (S)	—
Long-tongued Nectar Bat	<i>Macroglossus minimus</i>	Least Concern (S)	—
Greater Musky Fruit Bat	<i>Ptenochirus jagori</i>	Least Concern (S)	—
Philippine Forest Rat	<i>Rattus everetti</i>	Least Concern (S)	—
Common Palm Civet	<i>Paradoxurus hermaphroditus</i>	Least Concern (S)	—
Lesser short-nosed fruit bat	<i>Cynopterus brachyotis</i>	Least Concern (U)	—
Large Luzon Forest Rat	<i>Bullimus luzonicus</i>	Least Concern (U)	—
Luzon Montane Forest Mouse	<i>Apomys datae</i>	Least Concern (U)	—
Philippine Tailless Leaf-nosed Bat	<i>Coelops hirsutus</i>	Data Deficient (U)	—
<b>Reptiles</b>			
Dog-toothed cat snake	<i>Boiga cynodon</i>	Least Concern (S)	—
Philippine Pit Viper	<i>Trimeresurus flavomaculatus</i>	Least Concern (S)	—



Philippine Flying Dragon	<i>Draco spilopterus</i>	Data Deficient (U)	—
<b>Reptiles</b>			
Negros Forest Dragon	<i>Gonocephalus sophiae</i>	Data Deficient (U)	—
Marbled Water Monitor	<i>Varanus marmoratus</i>	Data Deficient (U)	—
Reticulated Python	<i>Python reticulatus</i>	Not Evaluated (U)	Other Threatened Species
Painted Bronzeback	<i>Dendrelaphispictus pictus</i>	Least Concern (U)	—
<b>Amphibians</b>			
Horned Forest Frog	<i>Platymantiscornutus</i>	Vulnerable (U)	—
True Frog	<i>Hylaranasimilis</i>	Near Threatened (D)	—
Luzon Fanged Frog	<i>Limnonectes macrocephalus</i>	Near Threatened (D)	—
Everett's Frog			
Rana luzonensis	<i>Near Threatened (D)</i>	—	
Luzon Wart frog	<i>Fejevaria vittigera</i>	Least Concern (S)	—
Common Tree Frog	<i>Polypedates sp.</i>	Least Concern (S)	—

## Major Sources of Environmental Degradation

Illegal logging or timber poaching posed a major impact on environmental degradation in Baler Forest Reserve and Dibut River Watershed. Mining, kaingin, soil erosion/silt runoff, and charcoal making got moderate impacts on the degradation of the watershed. Fires and wildlife hunting done by the local people posed small impacts on the Baler Forest Reserve and Dibut River Watershed (Table 6).

These threats and problems present in the forest ecosystem had great impacts on the biodiversity of the forest ecosystems especially to those species which had been listed in the IUCN Red List and DAO 2004-15. If the area loses valuable floral diversity, the fauna will also be threatened. The loss of biodiversity thus threatens the balance of the ecosystem and the available resources for all the living things associated with the forest ecosystem. Furthermore, a disruption of this biodiversity will also disrupt the normal cycle of nutrients, organic substances, and water and energy flow in the forest ecosystem.

**Table 6.** Sources of environmental degradation in the three forest ecosystem of Baler Forest Reserve and Dibut River Watershed.

Sources of Environmental Degradation	Computed Value	Interpretation
Illegal logging/timber poaching	3.26	Major impact
Mining	3.25	Moderate impact
Kaingin	2.97	Moderate impact
Soil erosion/silt runoff	2.69	Moderate impact
Charcoal making	2.63	Moderate impact
Fires	2.39	Small impact
Hunting	2.18	Small impact

## CONCLUSION

There were only a few species of animals recorded in Baler Forest Reserve and Dibut River Watershed. The status of the diversity of fauna in the forest ecosystem of Baler Forest Reserve and Dibut River Watershed ranges from low to very low. This could be because of the environmental threats which posed major, moderate, and small impacts on the forest ecosystems and the disturbances made by the people living near and inside the forest ecosystems such as illegal logging/timber poaching, soil erosion, kaingin farming, mining, wildlife hunting, and quarrying. These major sources of environmental degradation present in the forest ecosystem had great impacts on the biodiversity of the forest ecosystems.

## RECOMMENDATIONS

Based on the results of the study, the following are being recommended:

1. Biodiversity assessment studies should be undertaken in other forest ecosystems in Central Luzon which have not been studied yet in order to complete the Biodiversity Information System (BIS) in the area.
2. Local ordinances pertaining to "Biodiversity Conservation" should be done by the local community to preserve and conserve wildlife and those plants that are now critically endangered, endangered, threatened, and vulnerable.
3. Biodiversity monitoring should be regularly conducted specifically

to monitor the status of biodiversity and the status of the identified biodiversity indicators in this study.

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# Climate Change Adaptation and Resiliency of Coastal Communities in the Red River Delta Biological Reserve, Vietnam

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This case study assessed the climate change adaptation and resiliency of coastal communities in Giao Thien and Giao Xuan in Giao Thuy District, Vietnam. Methods used include survey, key informant interview, and review of documents of which 194 households served as the sample size. A pretested interview schedule was used to gather data. Descriptive statistics was done to describe the data. Inferential statistics was employed in determining the relationship between climate change adaptation and resiliency. Result revealed that majority prepared materials to shield their houses, prepared food, and monitored weather bulletin. The communities received help from various organizations and have talent and skills to adjust to climate change. Majority observed that the ecosystem has worsened because of environmental pollution and lack of awareness in environmental protection. Communities perceived that the mangrove forests have the full ability to protect the environment. Coastal communities have limited knowledge on climate change adaptation. The most common plan in preparation for climate change is on house renovation. Infrastructure in the communities is not enough to cope with climate change. Natural resources have decreased because of mining, destructive fishing, and pollution which also contribute to climate change. The mangrove forest resources have the capability to combat climate change. The relationships among the climate change adaptation and resiliency variables have positive linear association, but all are found to have weak association.

**Keywords:** climate change adaptation, resiliency, knowledge



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## INTRODUCTION

Vietnam is one of the most vulnerable countries to climate change impacts (Dasgupta et al., 2007). It has 28 provinces, which consist of numerous small fishing communities (Han, 2007). The provinces are bordered by the sea which makes it vulnerable to typhoons, tornados, and flooding (Dasgupta et al., 2007). Recent research reveals that, by 2050, sea level will rise up to 33 centimeters more and, by 2100, it will rise up to one meter. This scenario may lead to a reduction in the country's Gross Domestic Product (GDP) by about 10% (Dasgupta, 2007). This implies that the livelihood of the coastal communities will be highly affected by climate change. Thus, it is imperative to conduct an in-depth study in the Red River Delta, particularly on climate change adaptation and resiliency due to the environmental, economic, and social importance of the area.

Adaptation to climate change and resiliency are development issues that should be taken into account. Resiliency refers to the patterns of positive adaptation reflecting to the process of adaptation, capacity to adapt, or the outcome of successful adaptation despite the presence of challenging or threatening circumstances (Masten, Best, & Garmezzy, 1990, as cited in Yates & Masten, 2004). On the other hand, climate change adaptation pertains to the ability of ecological, social, or economic systems to adjust to climate change including climate variability and extremes (Easterling et al., 2007).

According to OECD (2010), there is a need to identify how coastal communities adapt to climate change to determine the productivity and sustainability of the systems in place and for framework purposes. Lagos and Wirth (2009) indicated that many Least Developed Countries (LDCs) and small islands have a limited capacity to respond to the challenge of adaptation. In this regard, it is timely to document the resiliency of the coastal communities to adapt to climate change to serve as models for countries that have limited capacity to adapt to climate change.

One of the adaptation strategies to climate change is the strengthening of community capacity. In the context of climate change, community capacity is the ability of the communities to adapt to real and potential impacts. The common goal is to reduce the vulnerability of the community while increasing its resiliency to the effects of climate change. Communities can increase their resilience to the adverse impacts, as well as take advantage of opportunities that may result from climate change by preparing for the

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future in a locally meaningful and policy-relevant way (Sharmalene, Mills, & Yantz, 2003).

Because of the vulnerability of the coastal communities to the effects of climate change, community development is highly needed. Community development, according to the Budapest Declaration (2004), is a way of strengthening civil society by prioritizing communities' actions and their perspectives in developing social, economic, and environmental policies. It seeks to empower the local communities, communities of interest or identity, and communities organizing specific themes or policy initiatives. It also strengthens the capacity of people as active citizens through their community groups, organizations, and networks. Even the institutions and agencies are being capacitated to work in dialogue with citizens to shape and determine changes in their communities. Thus, community development plays a vital role in supporting active democratic life by promoting the autonomous voice of disadvantaged and vulnerable communities.

In this light, it is worth knowing the resiliency of the coastal communities to adapt to climate change. This can serve as baseline information for the Vietnam government in conducting environmental planning, specifically in identifying appropriate projects/programs, formulating policies, and recommending strategies to make coastal communities resilient to climate change.

## **MATERIALS AND METHODS**

The study utilized a case study approach using various methods such as survey among households in coastal communities, key informant interview, and review of documents. The study was conducted in the biological reserve of Red River Delta, particularly in Giao Thuy District under Nam Dinh province located in the easternmost province of Nam Dinh adjacent to South and East China Sea.

Giao Thien and Giao Xuan communes in Giao Thuy District were chosen as study sites because they are the most adjacent to the sea and bear all the direct effects of climate change. Their sources of income are agriculture and fishing. It can be implied that these communities are the ones who will be highly affected by climate change.

The sample population was computed using Slovin's formula at 10% margin of error. Out of the 5,721 households, 194 households served as

the sample size. Simple random sampling was used in selecting household heads that would serve as respondents of the study. To ensure validity and reliability of the research instrument, it was pretested to households in other communes in the biological reserve. The information was categorized into preparation activities and preventive measures to adapt to climate change. Descriptive statistics such as frequency distribution, percentages, means, and standard deviations was done to describe the data. Inferential statistics was employed in determining the relationship between climate change adaptation and resiliency of coastal communities.

## RESULTS AND DISCUSSION

### Climate Change Adaptation

**Knowledge on climate change adaptation.** By studying the effects of both inherent and gained knowledge of the people in a community and relating it to the ability of a community to adapt to climate change, results revealed that majority (63.4%) of the respondents considered themselves knowledgeable on how to adjust to climate change. They acquired information through trainings and workshops (61.8%); media (19.5%) such as television, radio, and newspaper; and self-learning and diffusion of folk experience (14.6%). The knowledge obtained from trainings/workshops included methods and techniques on how to cultivate plants, raise livestock with strong resistance against diseases, and ways to treat the diseases (27.6%). Information gathered also included raising awareness on environmental protection through the use of organic matter and planting more trees (26.3%). Knowledge can be heightened by sharing and exchanging information on adopted adaptation strategies. The “Sister-Commune” relationships could be established to enable the commune to exchange information to strengthen local adaptation practices such as those found in Ky Ninh and Vinh Hien communes (MONRE & UNDP, 2009).

**Adaptation planning.** Adaptation planning involves responding to the impacts of climate change, both proactively and reactively. It includes preventive measures to slow down the progression of climate change and also mitigation measures to reduce its effects. It is not a domain of a specific department or agency but requires cooperation and interrelationship among concerned institutions. The commendation of climate change adaptation

plan will find its way into other communities' planning documents such as emergency measures plan, energy strategy, transportation plan, strategic plan, community land use plan, economic development strategy, public work plan, and other significant community planning endeavors (Bowron & Garry, 2011).

Because of their high level of awareness on climate change, majority (84%) of the respondents had personal plans on how to adapt to climate change. The plans of the respondents vary; however, most (20.2%) of them plan to acquire equipment for mobilization and build solid and firm infrastructures and/or facilities. Relevant to this is the study on vulnerability of households by Shen et al. (2011) which revealed that it is necessary to build houses that are strong enough to withstand typhoons. Policies of Vietnam government focused on the assessments of all sectors and on hard adaptation measures such as building of sea dikes, reinforced infrastructure, and durable buildings (World Bank, 2010).

Among the 194 respondents, only 155 have plans to coordinate with various agencies in preparing for disaster-related incident due to climate change. Most of the respondents also plan to coordinate with Women's Union and Youth Union (22.7%) and with different organizations and local government for storm prevention (20.6%). Meanwhile, other respondents have no plans at all regarding this matter (20.1%).

**Preparedness.** In a case study conducted by Predo (2010) in Ormoc and Cabalian, Philippines, natural disasters affected the households' welfare and the natural resources where they obtain their livelihood. This implies that it is important to identify the impacts of climate change on the livelihood of the households particularly those who belong to the low socioeconomic status.

In the study site, majority (73.2%) of the respondents have no plans of learning alternative livelihood aside from the one which they are currently engaged in. Only 26.8% have plans on preparing for climate change. Opening a small-scale business was the most cited answer (11.3%) while other respondents will still look for other sources of livelihood (10.3%).

Aside from having alternative sources of income, most of the respondents had plans to build infrastructures that can withstand the effects of climate change such as stronger typhoons. Majority have plans to use steel to reinforce their houses (42.3%), solidify and repair their respective houses (27.8%), and build two-storey houses that cannot be reached by flood (10.3%).

The respondents had also experienced typhoons for several times. The activity of the majority (62.4%) prior to the occurrence of typhoon included preparing materials such as bamboo, wooden pillars, and sandbags that can be used to shield their houses while others built concrete houses (12.4%). In the study of Predo (2010), the most cited adaptation strategies by most households include the transfer to evacuation area temporarily, restructuring of housing unit, and permanently moving to a safe place. Many (75.7%) of them also cited that they prepare food, particularly rice, dried fish, noodles, and water in anticipation of the possible effects of a strong typhoon. The data obtained show that the highest priority of the respondents during a typhoon is to ensure that there will be available food since they are not certain of how long a typhoon will last and a flood will subside. By reserving food at home, they are assured that they will not get hungry even if they cannot go out of their respective houses to purchase food. There are also some (11.9%) who store water in containers and place it in a high area in the house.

There are also respondents (19.6%) who prepare batteries, kerosene, and candle whenever they learn that a typhoon is coming. Thirty-seven respondents (19.1%) prepare batteries for lighting and listening to radio for news.

In a study conducted by Peñalba et al. (2008), households generally prepare alternative lighting materials and cooking fuel at the onset of the rainy season because power loss is common during that time. The common adaptation strategies done by households include preparing candles, lamps with rechargeable batteries, and kerosene lamps as well as charcoal-fueled stove. This adaptation strategy is further emphasized by the Buenos Aires program on the need for preventive measures, planning, preparedness, and management of disasters relating to climate change, as well as for contingency planning, particularly for droughts and floods and extreme weather events (UNFCCC, 2005).

**Community practices.** Whenever a storm threatens to hit the study sites, a number of respondents (24.7%) evacuate the elderly and children first and then collaborate with concerned organizations for assistance. Another 16.5% cited that, before the typhoon, they prepare necessary materials, solidify sea dikes, and mobilize people and organizations involved in typhoon responses. Few (12.9%) pertain to the activities of the Board of Administration such as meetings, information dissemination to all villages, preparation of foods, and evacuation of people. In Vietnam, the goal of the

natural disaster risk management is to enhance the resilience concerning the impacts brought by natural hazards. The recent economic and human toll of natural disaster events in Vietnam served as an avenue to prioritize investment on this aspect when factoring in climate change (UNDP, 2010).

In the study of Peñalba (2008), households employed temporary adaptive measures such as placing their appliances and furniture on the second floor of their houses or on stilts when anticipating the occurrence of flood.

In a related study conducted by Shen et al. (2011) in Zhejiang province of China, 52% of the households move to a safer place whenever a typhoon will come. On the other hand, 28% evacuate as recommended by their government. Majority of the respondents (67%) of the households find these measures as effective.

Also, in the same study, 77 % of the households purchased and stored food, drinking water, and other basic necessities. Most of the households opted to resort to this practice since it was a common practice in the community. On the other hand, 9% adhered to the habit because it was a routine taught by their ancestors or elders. Majority (70%) of the households found this option as effective.

**Information needs.** Among the 194 respondents, most of them answered the need to collect information concerning flood and typhoon (30.9%) and monitor weather information through television (13.4%). Based on the study conducted by Ligasan (2011), information and technology are used during disasters. Broadcast media such as radio and television ranked second and bulletin information ranked third as sources of information on the adverse effects of disasters. Data showed that the respondents are concerned with the occurrence of flood and drought which can affect their primary source of income which is agricultural production.

To get information about typhoon, most of the respondents monitor the weather through the daily weather bulletin (50.5%), listen to the FM radio for daily typhoon updates (18%), and get information on typhoon via radio and TV and from commune officers (17.5%). In the locality of the Red River Delta, most communes have loudspeakers. This radio system managed by the commune People's Committee emphasizes the role of information and communication on the social and cultural as well as local production activities such as weather information, seasonal calendar, plant pest information, and others.

## Coastal Communities' Resilience to Climate Change

**Social capital.** Schneider (2002) pertains to social capital as social relationships and patterns of trust, which enable people to gain social networks. It is good to note that almost all of the respondents (94.3%) join meetings/consultation with the local government. The level of participation was high since majority (66.1%) attended the meetings very often. Their participation ensures that the people are informed, that discussions are being done, and that the activities of the Government of Vietnam are being monitored relative to democracy.

Majority of the respondents (70.1%) received help from the local government and other organizations. This reflects a positive situation for most of the respondents since only 29.9% revealed that they have not received any help at all. The kinds of help extended include food (46.4%), agricultural training (30.9%), cash aid (16.5%), and health security (10.8%). This only implies that a strong social network may allow greater access to resources and reduce the psychological stress caused by climatic disturbances, hence, may strengthen adaptive capacity (Ospena & Heeks, 2010). In terms of networks, almost all the respondents (95.4%) are members of organization/s. Among the 185 respondents, 63.9% of them are members of a farmers' association. With regard to the nature of their respective organizations, most of them (29.8%) help each other by providing technical support and inputs in agricultural production.

Building and maintaining resilience requires different actors with complementary capacities and skills. Through partnerships and drawing on diverse networks, communities, civil society, academic research institution, government, and the private sector can strengthen the ability of vulnerable populations to improve people's well-being and capacity to adapt to change (Frankenberger et al., 2012).

Many of the respondents (70.6%) also received help from other various organizations. Among the 137 respondents who answered yes, most (19.7%) of them cited that they received assistance in the form of disaster prevention, fortification of house structure, and helping in evacuating and evading the strong typhoon. Few (18.2%) received assistance in mangrove reforestation and environmental protection.

It is evident in this study that social capital can ameliorate resiliency. Ritchie and Gil (2010) also stressed that social capital enhances

a community's ability to work toward collective goals, which is necessary for disaster recovery. It contributes to resilient recovery by enhancing sense of belonging and by strengthening bonds between individuals and groups. Bridging social capital affords connections needed to solicit and leverage external support. Social capital also facilitates access to other forms of capital essential to recovery such as human, financial, political, and cultural capital. However, World Bank reported (2010) that the Vietnam government does not give much attention to soft adaptation measures such as social capital and the role of collective action in building resilience.

**Economic capital.** Data gathered through the survey revealed that majority (71.6%) experienced an increase in their annual income since 2005. For some (17.5%), there was no change in the level of income. Vietnamese farmers in general and the farmers in the Red River Delta prioritize rice production to ensure consumer demand and the sustainability of food for the family. Although they are living in coastal areas, their main income-generating activity was rice production even if other activities (i.e., aquaculture, fishing) could bring higher income than agricultural production.

Agriculture will be highly affected by climate change. Thus, the respondents should imitate the farmers in Trieu Van commune by applying different drought-tolerant crop varieties and local breeds; applying integrated production model, intercropping bean and sweet potato, rotational cultivation, and diversifying crops; adjusting seasonal calendar; and applying soil management measures and adjusting farm inputs including fertilizers and pesticides as adaptation measures (Phuong, 2011). It is good to note that most of the respondents (53.6%) have savings which could be accessed in time of disasters. These savings were kept in homes (34.6%), the Mutual Loan Club (31.7%), and the bank/commune fund or in the form of gold reserves (25.0%).

The Mutual Loan Club ("Hui") is a convenient scheme for raising capital and saving money. In the past, when the Vietnamese banking system was still new and underdeveloped, the Mutual Loan Club was popular among the common people. Even after the development of banking, where the banks usually had many loan requirements and borrowing procedures were difficult, the Vietnamese people specifically the farmers continued to patronize the Mutual Loan Club. Other businessmen and wage-earners also subscribed to the Mutual Loan Club.

From the capital-raising mechanism of the Mutual Loan Club, many



people had new business ventures while others were able to address their financial problems immediately. Thus, the Vietnam government agreed to the existence of this scheme which later became Civil Code 2006.

In a study conducted by the Intergovernmental Panel on Climate Change (2011) regarding the social impacts of storm, results revealed that taking odd jobs, consumption reduction, and acquiring multiple loans are the commonly adopted coping strategies. The findings of the IPC corroborate with this study particularly in borrowing money through loans in case their respective houses would be affected by disasters.

**Human capital.** Human capital is one of the factors affecting the resiliency of a community to adapt to climate change. It could be further dissected into health of the people, skills, and knowledge that the people in a community have. This is consistent with the sectors and variables used in the Vulnerability-Resilience Indicators Model (VRIM) (Brenkert & Malone, 2005).

In the study sites, it is good to note that many (62.4%) of the respondents are healthy. This is because the overall health quality in Vietnam is regarded as good based on the 77 years life expectancy estimates done in 2010 (Huong et al., 2007).

In terms of skills that enabled the respondents to adapt to climate change, 44.8% of the respondents referred to swimming skills as the most important skill that can help them adapt to climate change. Other skills include the ability to make weather observations to predict storm as cited by 19.6% of the respondents. Of this, 71.1% stated that the skills have been taught by their folks.

In terms of having access to information, findings showed that almost all of the respondents (91.2%) had access to information pertaining to climate change adaptation strategies. The information came from television (82.5%), national radio stations (43.8%), and local radio stations (25.3%). The main information gathered from television and national radio stations was the weather forecasts while local radio stations feature storm preparation awareness.

For trainings as source of information, majority of the respondents (61.3%) did not have any training associated to climate change. Only 38.7% had the opportunity to attend trainings; hence, they are relatively knowledgeable on climate change.

With regard to livelihood training for the respondents in the study

sites, only few have attended such training. Among the 194 respondents, 2.6% had no opportunity to attend the training while 97.4% were able to attend trainings on straw mushroom planting, knitting, and bee keeping conducted in 2008 by the Women's Association.

**Physical capital.** Results of the survey revealed that many (70.1%) of the respondents have concrete houses and 22.2% have houses made of concrete materials and wood. For the house type, most (50.5%) of the respondents' houses are tiled; 42.3% are one-storey while 7.2% are two-storey.

Facilities are also available in the study sites. Majority (66.5%) of the respondents answered that there were available facilities where people could evacuate in the event of disasters caused by climate change. The kinds of facilities include school of communes (89), Office of the People's Committees of Commune (63), and church (52). Others cited the presence of high buildings, used trucks, temple, and Office of the Bank of Commune. With this, majority (70.6%) believed that there are enough facilities to accommodate the affected households.

**Natural capital.** Most of the residential lands of the respondents (20.1%) ranged from 1.6–2.0 sao. Most of the gardens (30.4%) ranged from 0.6–1.0 sao while 17% measured 0.1–0.5 sao. A small percentage of the respondents (14.9%) do not have a home garden at all.

The lack of gardens and ponds was because of the limited land area of the households. Majority (52.1%) do not have ponds; only two (1%) have about 6.0 sao pond. In scrutinizing the land area used for agriculture, most (25.8%) used 4.1–5.0 sao, 17% respondents cited 2.1–3.0 sao, and 15.5% adhered to 3.1–4.0 sao. Results of key informant interview revealed that a vast number of people did not experience changes in the use of agricultural lands since 2005.

Furthermore, most of the respondents agreed that there were many available coastal resources in their area. All respondents mentioned the presence of mangroves. Literature shows that, in the context of climate change, mangroves have played a vital role in preventing coastal erosion and in protecting inland areas (Chi et al., 2015). Other resources included seafood and fishes as indicated by 145 respondents (71.6%) and sea grasses (62.4%). Other coastal resources include corals, clams, crabs, and prawns. Valuing natural assets such as fisheries, coastal wetlands, and terrestrial forests and integrating these values into economic decision-making can strengthen resilience (World Bank, 2011).

A close examination of the water resources reveals that almost half of the respondents believed that there was an abundant supply (43.85%). There are only 18% who observed a decrease in the amount of water resources provided for domestic use. Meanwhile, there are also some (38.1%) who claim that the supply remained unchanged.

Ritchie and Gil (2010) indicated that natural capital is vital to human survival and fundamental to society. In the aftermath of a disaster, natural capital represents basic necessities that support human life, ranging from uncontaminated air to potable water to renewable resources. A community's relationship with its natural environment also influences ways in which it responds to disaster-related environmental degradation.

### Relationship Between Resilience to Climate Change and Capacity to Adapt

Findings revealed that the coastal communities have high knowledge on climate change adaptation based on the obtained mean of 8.47. However, the obtained value on standard deviation is 1.686 only, which implies low deviation. The knowledge of the communities pertains to occurrence of more storms, floods, sea level rise, and drought which they derived from television programs.

**Table 1.** Summary score for climate change adaptation.

PARTICULARS		CLIMATE CHANGE ADAPTATION		
		Knowledge (K)	Plan (P)	Practice (P)
Giao Xuan	Mean	8.40	8.61	4.03
	Standard deviation	1.753	1.418	1.112
Giao Thien	Mean	8.55	8.62	4.35
	Standard deviation	1.620	1.220	0.646
Total	Mean	8.47	8.61	4.19
	Standard deviation	1.686	1.319	0.922

Meanwhile, the plan of coastal communities in terms of climate change adaptation has an obtained mean of 8.61, which is attributed to their knowledge. The standard deviation on planning, which is 1.319, implies low deviation.

With regard to applying what they know about climate change, the mean is low which is 4.19, but the standard deviation is high (0.922). The obtained mean implies that, generally, the coastal communities are not practicing what they are learning about climate change. Also, there is commonality in terms of practices of the coastal communities based on the obtained standard deviation.

**Table 2.** Summary score for resilience.

PARTICULARS		RESILIENCE				
		Social Capital (SC)	Economic Capital (EC)	Human Capital (HC)	Physical Capital (PC)	Natural Capital (NC)
Giao	Mean	4.60	3.29	3.69	1.81	2.17
Xuan	Standard deviation	0.954	1.282	1.211	1.285	0.8293
Giao	Mean	4.46	3.02	3.58	1.74	1.88
Thien	Standard deviation	1.031	1.683	1.306	1.129	0.819
Total	Mean	4.53	3.15	3.63	1.78	2.02
	Standard deviation	0.993	1.498	1.257	1.208	0.836

On the sources of capital, the coastal communities have low social, economic, human, physical, and natural capital based on the obtained mean for each source of capital. Findings also revealed that, among the five capitals, social capital had the highest mean (4.53). As reflected in the table of statistical analysis, there was only a very slight difference on the mean of Giao Xuan (4.60) and Giao Thien (4.46). On the other hand, physical capital obtained the lowest mean (1.78).

The physical capital refers to the presence of dikes, evacuation center, and the structure of houses in the communities. Majority of the respondents have one-storey houses only; hence, it is their utmost desire to build two-storey houses to protect their belongings and their lives. In the case of the study conducted in Iloilo City, Philippines, the physical dimension likewise obtaining low score pertained to water supply, early warning, and evacuation system which may threaten the enhancement of resilience of communities. Similar result was obtained in Danang City wherein the physical dimension of resilience is threatened by the fragile warning systems (Shaw et al., 2009).

Based on the respondents' perception, there is a need to build more infrastructures particularly dikes to protect the coastal communities from

the adverse effects of climate change. The existing dikes according to the respondents are no longer adequate and do not ensure safety of the coastal communities particularly when there is a strong typhoon which may lead to sea level rise.

There is also a perceived need to build evacuation centers because using schools as evacuation centers affects the students because of the noise of the evacuees. Hence, it is deemed necessary for the government to build structures that will serve as evacuation centers when disasters due to climate change happen.

The social capital which obtained the highest mean refers to the linkages to various institutions and membership of the respondents to the different organizations. Almost all of the respondents, aside from being members of the Farmer's Organization, are also members of other organizations depending on their interest.

Among the five capitals, economic capital showed low deviation based on the value obtained which is 1.498. The deviation is lower in Giao Thien (1.683) compared with that in Giao Xuan (1.282). Likewise, low values were obtained in Iloilo City, Philippines wherein the economic capital referring to budget and subsidy and savings and insurance signified the fragility of this capital (Shaw et al., 2009).

Natural capital obtained high deviation at 0.836. There is only a very slight difference on the obtained standard deviation from the two sites. One of the natural capitals being referred to is the presence of mangrove forest, which helps mitigate climate change and avoid its adverse effects. With the almost similar value obtained on standard deviation, this implies that both sites are fully aware on the value of the mangrove forests. Mangroves are known for protecting coasts during storm and tsunami events through frictional reduction of wave energy and by promoting sedimentary resilience to erosion through the root mat (Hirashi, 2008; Dahdouh-Guebas et al., 2005).

The communities have limited savings, and their livelihood was regularly affected whenever there is typhoon because majority of them are into agricultural production. Since their livelihood is affected during typhoon, sources of income are disrupted. They opt to use their savings to buy their basic necessities. However, their savings are limited. This means that there is no guarantee that the savings will be enough depending on how long a typhoon will last. Experience in other countries showed that the

ability to cope with increasing climatic hazards relies mostly on the ability to diversify income sources. Hence, access to credit, insurance, and other financial services including noncash loans is highly imperative. Building financial incentive systems into loans can lead to reduction in environmental impacts (MONRE & UNDP, 2009).

**Table 3.** Relationship between climate change adaptation and resilience.

RESILIENCE	CLIMATE CHANGE ADAPTATION								
	Giao Xuan			Giao Thien			Total		
	K	P	P	K	P	P	K	P	P
Social Capital	.127	.316**	.097	-.133	.213**	-.322*	-.006	.260*	-.162**
Economic Capital	-.100	.024	-.055	-.024	-.035	.183	-.068	-.004	.057
Human Capital	.140	.172	.190	.103	.244**	.100	.119	.208*	.119
Physical Capital	-.200	.170	.039	.072	.103	-.047	-.231*	.131	-.022
Natural Capital	.326**	.025	-.153	-.042	.148	-.119	.124	.089	-.154**

**Note:**

\*\* significant at 0.05 level

\* significant at 0.01 level

**Legend:**

K — Knowledge

P/A — Plans

P — Practice

Table 3 shows the relationship between climate change adaptation and resilience. Results revealed that a correlation exists between social capital and planning of households at Giao Xuan commune ( $r = .316$ ) at  $p = 0.05$  level of significance. On the other hand, at Giao Thien commune, results showed that a correlation exists between social capital and planning of household ( $r = .213$ ) at  $p = 0.05$  level of significance. However, even though there is a positive relationship between the two variables, the relationship is weak, which indicates that social capital is based on the planning on climate change adaptation of the households. For Giao Thien commune, the result of the correlation between social capital and practice ( $r = .322$ ) at the  $p = 0.01$  level of significance is weak, but it shows that the people in Giao Thien are practicing the knowledge that they derive about climate change adaptation.

In general, there is a positive but weak linear association on social ( $r = 0.260$ ) and planning based on the obtained values at  $p = 0.01$  level of significance. Otherwise, result of the correlation between social capital and practice of household ( $r = -0.162$ ) at  $p = 0.05$  level of significance is found to

be weak, but this shows that social capital of the community was anchored on the proper planning and practice of knowledge on climate change adaptation. The climate change adaptation practices of the coastal communities were based on their obtained knowledge and acquired skills. Their practices also came from their membership to organizations, linkages with various institutions, and passing of traditional knowledge from grandparents and based on experiences.

Result of the correlation between human capital and planning of household at Giao Thien commune is found to be weak ( $r = .244$ ) at  $p = 0.05$  level of significance. Even the relationship is found to be weak. It is also entirely consistent with the results of the survey which showed that people have a positive attitude. This reflects the application of knowledge and skills in their plans to adapt to climate change in Giao Thien. Overall, the result of the study indicates the correlation between human capital and planning ( $r = .208$ ) at  $p = 0.01$  level of significance. This indicates that there is a linear relationship between human capital and planning of household in adapting to climate change. The human capital refers to the knowledge and skills of the respondents. The weak association between human capital and practice is attributed to the limited knowledge and skills of the coastal communities on climate change adaptation.

Result of the correlation revealed that there is a positive linear association on physical capital and knowledge ( $-0.231$ ) at 0.01 level of significance. However, even if there is a positive relationship between the two variables, the relationship is found to be weak. This implies that the coastal communities are aware of the importance of building infrastructures particularly raising the dikes considering that they live near the coastline which makes them more vulnerable to sea level rise because of climate change.

Findings revealed that social and natural capital and practice on climate change adaptation also have positive linear association based on the obtained value at  $p = 0.05$  level of significance. The practices of the coastal communities on how to adapt to climate change are based on their networks and membership and norms of reciprocity. For natural capital, the coastal communities are aware on the importance of mangrove forest in mitigating the effects of climate change; hence, they protect and conserve it and join mangrove planting activities.

The statistical analysis apparently shows that there is no relationship

between economic capital and knowledge and plans and practice of climate change adaptation. This indicates that the economy of the household does not currently meet sustainability even when natural disasters occur.

## **CONCLUSIONS**

Coastal communities have limited knowledge on climate change adaptation. Their knowledge basically comes from television programs and limited trainings. Climate change will have a significant impact on agricultural production because of frequent storms, sea level rise, salt water intrusion, and floods. To prepare for climate change, the most common plan of the households focused on house renovation which is not enough. It is also imperative and very important to have a sustainable means of livelihood.

The communities have limited capacities to adapt to climate change because of limited knowledge, skills, trainings, meager income, and few investments. Their traditional knowledge is limited to determining the occurrence of storm. Infrastructure in the communities is also not enough to cope with climate change. Natural resources have decreased because of mining, destructive fishing, and pollution, which can further aggravates climate change. The mangrove forest resources have the capability to combat climate change, avoid saltwater intrusion, and limit the damage caused by natural disasters.

The relationship among the variables on climate change adaptation and resiliency has positive linear association, but all are found to have weak association. This implies that climate change adaptation is not highly related with the social, natural, physical, economic, and human capitals.

## **RECOMMENDATIONS**

Coastal communities should be united to mitigate the effects of climate change through solid waste management, planting and protection of mangroves, and prohibition of destructive fishing activities.

It is imperative to promote a close link among the farmers, scientists, enterprises, and the government to create favorable conditions through research results endorsing new plant varieties and animal breeds that are resistant to climate change. Consequently, this will lead to sustainable livelihood; hence, it will result in resiliency among the respondents to the effects of climate change.



The government should invest in putting up early warning system in coastal communities to protect properties and human life. Budget allocation for infrastructure facilities like evacuation centers during typhoon and flood should also be prioritized. Food and clean water must be provided to the evacuees in these centers. To ensure health and safety, infrastructure for the water system should be available in the community. Decentralization in the management of mangrove resources and ecosystems is also needed to define the distinct functions of Xuan Thuy National Park and local authorities. This will prevent the overlap in the policies on conservation and management of the environment.

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NOTES SECTION

# Wise Parenting, the Old Testament Way

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## ABSTRACT

An essay on biblical and contemporary parenting, this article explores the ever-challenging role of parenting. It examines biblical parenting and its function in the perpetuation of social and religious values in ancient Israelite communities. It summarizes the parenting counsel of the wise in Proverbs, and compares it with Filipino and current parenting principles. The article addresses the issue of employing corporal discipline traditionally understood to be biblical.

## INTRODUCTION

A book published in 2011 caused a stir worldwide, as the author of Chinese descent recounted her strict parenting practice. Her disciplinary measures included physical deprivations and verbal lashings, which incidentally the book of Proverbs supports. The controversy came about as the book touched an important concern among parents — child discipline.

Biblical wisdom has probed the intricacies of human relationships including parent–child relationships. It is interested in guiding the younger generation to the right way of living that would bring utmost satisfaction and meaning. This paper is an attempt not only to understand the sages’

perspective on discipline particularly corporal punishment, but also to understand the traditional Filipino and contemporary wisdom on parental discipline.

## THE LIFE SETTING OF THE BOOK OF PROVERBS

The book of Proverbs presents a high ethical standard that supports a good, peaceful, and satisfying life for the individual the community (Prov. 3:7–10, 21–24). Honesty and integrity in personal and business matters as well as justice and compassion are exhorted in the book (Prov. 1:3–4; 2:7–8; ad passim). The family pictured in Proverbs is monogamous where faithfulness to one's spouse is the ideal ethical norm and both parents are involved in the upbringing and discipline of children. Children were expected to obey and respect them (Prov. 2:17; 4:3–4; 6:2–21). The same thoughtful consideration is also extended in relationship to other people (Prov. 11:12; 18:24).<sup>[1]</sup>

Children according to according to E. W. Wheaton in his book *Everyday Life in the Old Testament* was “(T)he desire of every married couple...,”<sup>[2]</sup> particularly sons. They were considered blessings from God, the future of the family rests on them.

In the early times (as it is still today), a child's earliest teacher was the mother who took care of the child. She was the one who taught the child his/her first words and nurtured the child with love and care. Such attachment was especially true since the child was breastfed until weaning at the age of two to three years.<sup>[3]</sup> The child later would join other children in the neighborhood playing, still within the watchful eyes of the mother who would naturally teach them the rudiments of relating to other children, their elders, and the people in the neighborhood. Excavations pertaining to the biblical period have unearthed children's toys such as “whistles, rattles, miniature cooking utensils, and pottery models of furniture and animals”<sup>[4]</sup> attesting that parents then make effort to provide toys for their children's delight.

As is still true in many traditional societies today, children would grow up with and in the presence of extended families, who may share in the livelihood and the cultivation of the family's common lot. Examples of such families were those of Noah and Jacob.

1 Rowland Dean Van Es, “The Hebrew Sage As A Model for Theological Leadership in the Philippines” A Doctoral Dissertation presented to SEAGST, June 14, 1982, p. 151–153.

2 E. W. Wheaton, *Everyday Life in the Old Testament* (London: B. T. Batsford LTD, 1961), p. 77.

3 Roland de Vaux, *Ancient Israel Vol. 1 Social Institutions*. (New York: MacGraw Hill Company, 1965), p. 39.

4 Wheaton, p. 80.

The patriarch, as the family head, made important decisions and presided in family gatherings. Opinions of the elders would have been solicited regarding family concerns. Religious instructions would be done in the many occasions when the family was gathered. Shared work would have served as venues for sharing practical knowledge and insights for living. These were the venues for the inculcation of approved manners and of community values.

Each family may have been composed of several nuclear families called “beth av.” Several “beth’avs” would compose a clan “mishpahah”<sup>[5]</sup> who would meet regularly for common concerns. As opinions were exchanged, eventually the wise ones would be recognized. The one who demonstrated wisdom and skill in teaching and counsel would formally or informally take the responsibility of educating the young people of the community. Over time, the function and work of the sages had been formally recognized in the community.<sup>[6]</sup> The close relationship within the community because of kinship and close alliances was the context of the sages’ address to young people as “my son.” Parental discipline, therefore, could not be isolated from the community context, as the sage teacher would usually be an elder considering the children as their sons, especially in the context of the egalitarian communal structure of old Testament communities.

Growing up, sons were taught the occupation of their fathers, while girls before marriage would assist their mothers in their tasks, which in agricultural society were many: “she looked after the flocks, worked in the fields, cooked the food, did the spinning.”<sup>[7]</sup> The prominence of the women in the patriarchal stories may be a hint that women were more empowered in the early days of Israel’s history, particularly before monarchy. Sarah made important decisions, i.e., Hagar and Ishmael ; and Miriam was a community leader. Rebecca, Rachel, and Leah were strong women who did not accept conventions and played active roles in managing their households. The book of Samuel tells of the stories of wise women in II Samuel 14:1–20 and II Samuel 20:16–22 whose wisdom was recognized in the community.

Edgar Jones in his commentary to the book of Proverbs states that “the family is the most formative context for the early development of character.”<sup>[8]</sup> The mother played a significant part in the children’s discipline. Jones notes that recognition of the mother’s influence in this book of Proverbs citing the

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5 Ibid., p. 20; De Vaux, *ibid.*, p. 19ff.

6 Ibid., pp. 115–16.

7 Ibid.

8 Edgar Jones, *Proverbs and Ecclesiastes Introduction and Commentary* (London: SCM Press, 1961), p. 59

following passages as proof: Prov. 6:20; 10:1; 15:20; 19:26:20:20; 23:22, 25; 30:17 also Lev 19:3. Proverbs 31 is in fact understood by Jones as a “tribute to...the dignity and status of women in the Jewish home at its best.”<sup>[9]</sup> He takes this as a reference to a woman’s place in the home “leading part in the upbringing of the children and earns respect and obedience...”<sup>[10]</sup> He quotes a comment on the role of a woman in ancient Judaism, “No religion in the ancient world gave a higher place to women. In her home the Jewish wife and mother was a priestess with privileges no one could share.”<sup>[11]</sup>

With Israel’s survival dependent on passing the values of freedom and equality, literacy and education would have been valued. Because of the centrality of law for the life of Israel, its study, formally and informally would have been valued if not required, particularly for future family heads. Feasts and community gatherings served as educational venues for the whole community, but the family being the smallest unit of society was the primary institution of teaching.<sup>[12]</sup> That wisdom was primarily passed on in the context of family and tribe is affirmed by Gottwald, even when the familial and tribal influence was reduced at the time of monarchy.<sup>[13]</sup>

A primary obligation of parents particularly fathers enshrined in the “shema”<sup>[14]</sup> was to instill love of God to their children (Duet 6: 4–9). One can imagine all Israel attending in compulsory feasts hearing the proclamation of the law. The strength of Israel as a people was dependent on their faithfulness to the values of Yahwistic faith; no wonder apostasy was punishable by death (Duet. 13: 6–10). The parents were to nurture and discipline their children in way of the Lord. To this end verbal and physical correction might have been employed.<sup>[15]</sup>

The relationship of a father to his children is described as characterized by compassion (Ps 103: 13) in face of transgression. It is notable that the fathers mentioned in the patriarchal stories — Abraham, Isaac, Jacob — were by today’s standards benevolent fathers. The Bible does not mention actual incidents of severe disciplinary measures resorted to by fathers in the Old Testament. Abraham loved Isaac (Gen 22:1); the very reason why the sacrifice of Isaac was the ultimate test of Abraham’s faith. Isaac’s relationship

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9 Ibid., p. 247.

10 Ibid.

11 Ibid., pp. 247–48.

12 Ibid., p. 49.

13 Norman K. Gottwald, *The Hebrew Bible — A Socioliterary Introduction*. Philadelphia: Fortress Press, 1985), p. 568

14 Jewish declaration of faith.

15 Ibid.

with Esau his son is characterized by a shared affection. The same relationship was shared by Rebecca and Jacob. Jacob is pictured as a loving father to his children particularly to Joseph and Benjamin. In the book of Judges, Samson was allowed by his parents to marry the wife he preferred even if it was against their wishes. Hannah and Elkanah demonstrated love for Samuel. Eli died upon hearing the death of his own sons. Saul and David were so affected by the death of their ;evensons; even in the case of David it was a son who instigated a revolt against his own father the king.

## PROVERBS ON PARENTING

The following are the verses in Proverbs that talk about parenting:<sup>[16]</sup>

Prov. 3:12, 13	The discipline of the Lord, my son, disdain not; for whom the Lord loves he reproves, and he chastises the son he favors.
Proverbs 6:20	Observe my son, your fathers bidding, and reject not your mother's teaching.
Proverbs 13:24	He who spares the rod hates his son, but he who loves him takes care to chastise him.
Proverbs 15:5	The fool spurns his father's admonition, but prudent is he who heeds reproof
Proverbs 19:18	Chastise your son, for in this there is hope; but do not desire his death.
Proverbs 19:27	If a son ceases to hear instruction, he wanders from the words of knowledge.
Proverbs 22:6	Train up a boy in the way he should go; and even when he is old, he will not depart from it.
Proverbs 22:15	Folly is close to the heart of a child, but the rod of discipline will drive it far from him.
Proverbs 23:13	Withhold not chastisement from a boy; if you beat him with a rod, he will not die.
Proverbs 23:14	Beat him with the rod, and you will save him from the netherworld
Proverbs 29:15	The rod of correction gives wisdom but a boy left to his whims disgraces his mother.

16 New American Bible,(Thomas Nelson Publishers: Nashville, 1987).



Proverbs 29:17     Correct your son and he will bring you comfort  
and give delight to your soul.

With the security and stability of the clan at stake, parents particularly fathers expected obedience from their children. This respect “extends beyond childhood to later years,” when age affects the parent capacities. “Children honor their parents by heeding advice—that is, through listening to instruction and putting it into practice in their daily conduct.”<sup>[17]</sup> This would ensure that the way of life and principles for living of the clan is perpetuated, and the values that ensure the survival of the clan are adopted. It also ensures the stability of the family structure. The patriarch knowing the threats to the life of the clan would instill the wisdom accumulated over the years as well as those passed on by generations before, to make sure the next family head takes his responsibilities seriously.

The seriousness of the responsibilities attached to family heads as well as the members of the clan demand purposive parenting. To this end “(C) orporeal punishment reinforced obedience to parents.”<sup>[18]</sup> Yet while attesting to the efficacy of corporal punishments, the sages also acknowledged that there are fools upon whom bodily punishments will make no difference. However, the awareness that harsh punishments can be incompatible with love has also been considered. Hence, the justification that likens discipline to God’s dealings with God’s own people. Just as people respect Yahweh’s authority and submit to His discipline, parents and the sages also rationalized discipline which may include beatings by its disciplinary value because God’s discipline is always seen as a beneficent expression of his love.<sup>[19]</sup>

It must be noted, however, that the Hebrew word *musar* (discipline) means more than simple thrashings or verbal rebuke. It also carries with it training for life and survival with the purpose of securing the well-being of a person; thus, the importance and urgency of the parental discipline.

The book of Proverbs as a whole can be considered a practical guide for living clarifying choices, pointing to the wise way through which the youth will have good life. The wise live “with prudence, deep respect and awe for the basic moral order of the universe, and go about their ways with humility and fear of God.” A wise person gives “much value to the basic

17 James L. Crenshaw, *Old Testament Wisdom an Introduction* (Kentucky: Westminster John Knox Press, 1998), p. 68–69.

18 *Ibid.*, 78.

19 William McKane, *Proverbs A New Approach* (Philadelphia: The Westminster Press: 1970), p. 294.

virtues needed for life to be fulfilling such as integrity, honesty, friendship, moral righteousness...”<sup>[20]</sup> Parenting is “an example primarily of the practical strand found in the meaning of Wisdom. The book seeks to perform the urgent task of laying the foundation for living the good life and is directed towards young people.”<sup>[21]</sup>

Aside from practical aspects of living and relating to people coming from different cultures and social class, Proverbs give stress to the values that sustain community life. Gottwald asserts the social perspective of the sages in that while the proverbs about wealth and poverty in the book of Proverbs support the dogma that the rich and poor deserve their lot, the “socioeconomic appraisals” in the book “attribute existing wealth and poverty to the oppression and dishonesty by which riches are in effect stolen from the poor.” He notes that it was done through “exorbitant interests on loans, moving of boundary markers of fields, judicial perjury and bribery, violent confiscations and killing of rightful owners, and the permissiveness and complicity of the king in this planned impoverishment of the populace.”<sup>[22]</sup> Hence Gottwald contends that even as the sages endorsed the status quo, they noticed that it violates the “cosmic order,” prompting them to preach about “amelioration and reformation of such disorder = folly = injustice = sin against Yahweh.”<sup>[23]</sup> He postulates that the sages were caught in class contradictions in the great debates among leaders making decisions about policies the postexilic community should adopt.

This proposition is supported by Ceresko, who noted that a “significant majority of the texts concerning poverty and riches exhibit a concern for a just social order.”<sup>[24]</sup> Indeed with much of Proverbs coming from popular sources, passed on in the context of the family and clan, the values upheld by the ordinary people must have been reflected in the collection. The final collectors and editors coming from the upper classes, though at this time have experienced disenfranchisement from Israel’s colonial masters cannot help but affirm the social contradictions present in the reconstituted Jewish community in Judah. The youth were made aware of the situation and were given guidelines in living with such contradictions.

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20 Noriel C. Capulong, *Reading and Hearing the Old Testament in Philippine Context* (Quezon City, Philippines: New Publishers, 2010), p. 243.

21 Crawford H. Troy, *The Critical and Exegetical Commentary to the book of Proverbs* (New York: Charles and Scribner’s Sons, 1916), p. 31.

22 Gottwald, p. 573–74. Gottwald contends that one third of evaluative Proverbs and admonitions about wealth and poverty support this teaching.

23 *Ibid.*, p. 574.

24 Anthony Ceresko, *Introduction to the Old Testament* (Quezon City: Claretian Publications, 1994), p. 284.

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The verses in Proverbs identified above stress the importance of parental discipline and to this end counsel the use of corporal punishment. McKane reads Prov. 13:24 thus, “(V)erse 24 insists that corporal punishment is an element of parental discipline and an expression of parental love, and that to be soft with a child is to do him a profound disservice...”<sup>[25]</sup> Given the choice of condoning a wrongful act, parents in this verse are exhorted to choose being tough. When the child is in the wrong, chastisement is considered part of parental responsibility, which may be in the form of verbal reprimand and/or bodily punishment.

McKane’s translation of Prov. 19:18 significantly differs from the familiar ones: “Correct your son, for there is hope, and do not bring about his death” rather than “Correct your son, for there is hope, but do not bring about his death.” The Hebrew can be translated both ways. McKane, however, supports his translation: “The rather quaint motive clause, which is attached to the imperative (‘for there is hope’), is apparently intended to reassure a father that parental discipline, if it is sustained, will take effect, and that a son, is not so incorrigible or intractable as he may appear. If the father keeps it up, he will eventually be knocked into shape.”<sup>[26]</sup>

Crawford H. Troy in the *Critical and Exegetical Commentary to the book of Proverbs* also takes the sense of the verse as chastising a child in impressionable years, and not giving in to weakness of mistaken kindness so as to allow the child to go astray as the consequence of wrongdoing.<sup>[27]</sup> The second phrase of the verse should not be understood as a warning against excessive punishment; he asserts, “(I)n the family life contemplated by Pr. (proverbs) it is highly improbable that a father would ever think of carrying chastisement to the point of killing his son.”<sup>[28]</sup> He notes the mention of being too kindhearted to chastise as not permitting such an extreme measure.

Prov. 22:6. The importance of education for the young while malleable is stressed. The seriousness of the task of enabling the youth to face the demands of life and set them on way of God’s law entails disciplining their habits, attitudes, and inclinations. For the parents in the biblical times, there is a particular direction: “the way he ought to go — there is a recognized right way<sup>[29]</sup> — the way of the Lord”.

25 William McKane, *Proverbs A New Approach* (Philadelphia: The Westminster Press: 1970), p. 457.

26 *Ibid.* p. 524.

27 Crawford, *ibid.*, p. 376.

28 *Ibid.*

29 McKane, *ibid.*, p. 564.

Proverbs 22:15. The New Interpreter's Bible proposes that this statement should not be taken as a statement of general depravity of the youth that calls for beating but should be understood as a condition which calls for the "rod of discipline."<sup>[30]</sup> The child is not naturally inclined to be disciplined and self controlled; this must be modeled and taught.

Proverbs 23:13–14. This proverb is a reminder for too softhearted parents who would withhold chastisement from a child who needed it. The necessary discipline will save the child from the sure consequences of wickedness.

The Rod of discipline mentioned in Prov. 10:13; 13:24; 22:15; 23:13–13; 26: 3; 29:15 can be understood as the popular understanding of necessary discipline, verbal exhortation, rebuke, and even punishment of wrongdoing towards the education and training of children.<sup>[31]</sup> As is still true today, some parents may use it excessively; others sparingly, as there are also varying situations of belligerence faced by parents. But parents in the Old Testament not only employed punishments; the blessings of a good and satisfying life was held as an enticement for those who follow the steps and advice of the wise and orient one's values to the way that enhances life for one's family, community, and the observed order of reality. Further, the above proverbs on parenting must also be understood in the context of wisdom, where passion and anger are subordinated to reason, and of possession of self-mastery and self-control.<sup>[32]</sup>

Hence, the virtues of self-control especially in speech (16:32; 19:11; 21:23); truthfulness particularly among court witnesses (12:22; 14:25; 19:28). Humility is encouraged as opposed to pride (11:2; 16:5, 18; 21:4). Industry, hard work, and prudence in making decisions are strongly urged (10:5, 26; 19:24; 20:4; 13:4); as well as the practice of justice and compassion (14:31; 19:17; 21:13).<sup>[33]</sup> The possession of wealth is not criticized and is even taken as an evidence of being wise, but it is the gift of wisdom that is extolled.<sup>[34]</sup>

Undesirable behavior like folly, hypocrisy, dishonesty, deceit, adultery and sexual impropriety, laziness, humor mongering were made clear (Prov. 2:16; 7:5–23; 10:5; 14:25; 19:24; 20:4, 13; 22:13; 25:9; 26:20–22).

30 Raymond C. Van Leewen, "Proverbs" The New Interpreter's Bible Vol. V (Nashville: Abingdon Press, 1997), p. 199.

31 G. Johannes Botterweck and Helmer Ringgren, eds., Theological Dictionary of the Old Testament Vol. 14 (Grand Rapids, Michigan/Cambridge U.K.: William B. Eerdmans Publishing Company, 2004), p. 304.

32 Crenshaw, *ibid.*, p. 70.

33 Crawford, *ibid.*, p. 49.

34 *Ibid.*, p. 49.

## THE SAGES AND PARENTING TODAY

In 2011 the publication of a book entitled, “The Battle Hymn of a Tiger Mom” written by a Yale professor of Chinese descent created a stir as the author seems to advocate traditional, strict parenting. In one anecdote the author shares how she did not allow her daughter to eat, have bathroom visits, drink water among others until she learned particular piano piece. She also described how triumphant the child was upon mastering the piece. The book was not a book on parenting however, but a mother’s memoirs, and Amy Chua later admitted that “(M)uch of the book is about my decision to retreat from the strict ‘Chinese’ approach, after my younger daughter rebelled at thirteen.”<sup>[35]</sup>

Diana Baumrind, a highly respected developmental psychologist describes four parenting types thus:<sup>[36]</sup>

1. The **permissive** parent who is nonpunitive, accepting, and affirming towards her/his child’s attitudes and actions. S/he makes few demands on her/his children and does not attempt to control the children’s behavior and future, giving their children the most freedom to find their own way of doing things and build their own future. The children virtually have it their way.
2. The **authoritarian** parent seeks to shape and control his/her children’s behavior and attitudes with an identified standard of conduct, usually religiously motivated. The parent compels obedience and punishes undesirable behavior to redirect the child’s will to do what the parent wanted. S/he believes that the child must be kept in his/her place. S/he regards the preservation traditional values and structures as important.
3. The **authoritative** parent attempts to direct the child’s inclinations towards values and habits that are desirable. S/he gives love freely and attempts to be fair and rational in his/her expectations. The parent is mindful of the uniqueness of the child and does not impose his/her own and seeks to cultivate the child’s unique

35 [Battle Hymn of the Tiger Mother — Wikipedia, the free ...](https://en.wikipedia.org/wiki/Battle_Hymn_of_the_Tiger_Mother) en.wikipedia.org/wiki/Battle\_Hymn\_of\_the\_Tiger\_Mother.

36 Diana Baumrind, Effects of Authoritative Parental Control on Child Behavior, *Child Development*, 37(4)(1966), 887-907.

abilities and potentials. But expectations and boundaries are also made clear.

4. The **neglectful** parents show little attention and love to their children. Their children learn to fend for themselves to survive.

It is clear that parents have responsibilities and duties. They need to give their children guidance and love. The purpose of guidance according to Darla Ferris Miller, author of the book *Positive Child Guidance*, is to teach children (assertively and respectfully) to behave appropriately.<sup>[37]</sup> She asserts, “(D)iscipline is a part of positive guidance; punishment is not.” She elaborates that punishment “is used to bully or coerce children into behaving the way we want them to behave.” But forcing children to behave the way we want them to, even if the goal is good, does not guarantee that they will do so on their own. Aside from the questionable method, it has adverse effects on a child whose feelings and needs are continually ignored. Miller details some of the ways adults “bully” children:<sup>[38]</sup>

- *spanking, slapping, arm-yanking, and shaking.*
- *biting, hair-pulling, or pinching (so he will know how it feels).*
- *withdrawing affection, ignoring, avoiding eye contact, and not speaking.*
- *humiliating the child, putting him in a position to be ridiculed*
- *endlessly lecturing, nagging, or harping on problems that are past history (they are done, the child cannot undo them).*
- *forcing the child to sit or stay somewhere for a set period, regardless of whether the child is sincerely remorseful and ready to make amends.*
- *arbitrarily taking away privileges and forbidding activities that the child particularly enjoys (especially privileges that are totally unrelated to the child’s offense).*

Ting Pantoja-Manalac, a Filipino pioneer in parenting education, mentions in her book *The Parent University’s Pinoy Parent* that “many

37 Darla Ferris Miller, *Positive Child Guidance* Fifth Edition (U.S.A.: Thompson Delmar Learning, 2007), p. 341.

38 Ibid.

traditional Asian cultures (including Filipinos) still think that discipline through hardship build character and prepares the child to bear the sufferings that life inevitably brings.”<sup>[39]</sup> Filipino cultural influences in parenting are reflected in popular Filipino proverbs. One that readily comes to mind easily states, “Anak na di patatangisin, ina ang paluluhain” (A child who would not be made to shed tears will cause mothers’ tears to fall. See Prov. 29:17 in comparison). Below are some proverbs relevant to parenting from a collection by Rey Esto and their equivalent in Proverbs:<sup>[40]</sup>

*“Kung ano ang pagkabataan, ay siya ring pagkakatandaan.”*

— Prov. 22:6

*“Ang aral na walang timyas, walang malugod lumasap.”*

— Prov. 15:4

*“Ang laki sa layaw karaniway hubad sa bait, Sa muni’t hatol ay salat.”* — Prov. 13:19

*“Masaklap na bunga ng maling paglingap habag ng magulang sa irog ng anak.”* — Proverbs 29:15

*“Anak ay malunod man ay di sagipin ng magulang, naawa’t nasasaktan sa labis na pagmamahal.”*

*“Inahing mapamupog, ang anak ay sumasabog.”*

It is notable that no Filipino parenting proverb mentions beating as an important component of discipline.<sup>[41]</sup> Filipino parenting wisdom does stress parental responsibility of raising children, so that they can be productive members of the society. The sampling of parenting proverbs quoted show the parents’ long suffering love even for children who have strayed from the right way. It critiques cruelty and violence. Through these proverbs, the Filipino parenting wisdom can be discerned: gleaned from nature and experience are distilled by intellect and thought with the help of language into seeds of

39 Ting Pantoja-Manalac, Parent University’s The Pinoy Parent (Pasig City, Philippines: Anvil Publishing Inc., 2000), p. 97. Bracketed words added.

40 Rey Esto, Mga Kasabihan at Salawikaing Filipino (Bulacan, Philippines: FAR Publications, 1996), p. 47ff.

41 I went through three salawikain collections. A number of salawikain cited above are those which have to do with parenting.

goodness and nobility as well as that heroism and cultural refinement — “ang mataos na pagkilala ng likha ng kalikasan, at tinig ng mahabang karanasan sa buhay” na inalagaan “ng talino ng pag-isip at sa tulong ng kayamanan ng wika ay nagiging matimyas sa binhi ng kabaitan at karangalan, gayon din ng kabayanihan at kabihasan ng mga tao at bayan.”<sup>[42]</sup> In this respect Filipino wisdom on parenting dwells less on corporal punishment. Yet it cannot be denied that many Filipino parents today still favor the use of force in compelling compliance from their children.

Rather than improving behavior, however, corporal and hurting disciplinary measures adversely affect children. Research on corporal punishment came out with the following negative effects on children:<sup>[43]</sup>

- *direct physical harm*
- *negative impacts on mental and physical health*
- *poor moral internalization*
- *increased aggression in children*
- *increased perpetration and experience of violence in adults*
- *increased antisocial behavior*
- *poor cognitive development*
- *damaged family relationships*

In addition, corporal punishment violates children’s right to be free from all forms of violence particularly in the home and from the people they love. Punishments build resentment and create negative feelings.

A website for religious tolerance notes that parents who favor spanking do so based on the biblical injunction particularly on the book of Proverbs. As the website on religious tolerance states, “(A)ll of the ‘pro-spanking’ sites on the Internet that we have been able to find are written from a Christian Fundamentalist or other Evangelical perspective.”<sup>[44]</sup> Affirming the infallible authority of the Bible, these Christian groups believe that the book of Proverbs advocate corporal punishments. The sages believed in the efficacy of the rod of discipline, but it is not a central doctrine nor teaching rather than a practice reflective of the time of the sages, who have even confessed the limitations of its efficacy. The counsels of the wise in book of Proverbs

42 Lope K. Santos, *And Diwa ng Salawikain* (Metro Manila, Philippines: Bookmark Inc., 1993), pp. 68–9.

43 Research on the effects of corporal punishment: [www.endcorporalpunishment.org/pages/research/effects.html](http://www.endcorporalpunishment.org/pages/research/effects.html).

44 Religious Tolerance.org. Ontario consultants for religious tolerance available at [www.religioustolerance.org](http://www.religioustolerance.org).



must be received not as an infallible rule for all but as a counsel that must be received wisely to help one arrive at the most informed action based on one's situation.<sup>[45]</sup>

Yet even those who favor corporal punishment has recognized the negative effects of unmindful use of affliction on a child physically and emotionally as a punishment. They also counsel the most thoughtful consideration of the situation and employ physical punishment only in extreme cases — a central theme of wisdom in the book of Proverbs within which the exhortations for the use of the “rod” should be read.

Building desirable character calls parents to thoughtfully raise children so that they embrace desirable values and good behavior, and make wise decisions themselves. To do this, parents must be proactive and set examples and clear boundaries, spelling out the consequences in consideration of the situation at hand. Hence, avoiding punitive action and hurting words that comes from anger, confusion, and frustration.

## CONCLUSION

Wisdom is based on knowledge and observation. Reality is not static. The sages themselves counseled prudence and extolled the embrace of wisdom above all. Continuing search for wisdom today with the advancement of knowledge propelled by research has debunked the traditional wisdom that corporal punishment is advantageous to the education of children. Yet even for the sages, it was not punishment that was the end goal; the sages were clear that discipline for children is important, and in their time the rod was only an instrument. The sages today, by observation through scientific research, make wise choices available for those who care to listen to positively guide their children.

The wise then counseled parents to take their parental duties to their children with utmost seriousness — to be wise. Resorting to the “rod of discipline” can be a choice. Parents have the responsibility to love and discipline children. Yet the sages themselves were the first to confess that what they know is limited; they never failed to counsel prudence. Gauged by their legacy, the Jewish parents did well.

Thus the continuing search to know and live wisely rest on our

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45 Carol a. Newsom and Charon H. Ringe eds. *The Women's Bible Commentary* (Louisville, Kentucky: Westminster/John Knox Press), 1992. Crenshaw states that the sages counsel the discernment even in the employment of beatings as there are cases where it does not work, Crenshaw, p. 69.

generation. Our success as parents today will be gauged by the quality of life of our communities and the larger world. Parents must empower their children to preserve and pass on those values and practices that need to be perpetuated and empower them to discern aberrations from what is good. By extolling wisdom above all, the sages did not exclude criticizing oneself and considering wisely the situation at hand.

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NOTES SECTION

## Reflection on Rizal's Poem "My Last Farewell"

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One wonders, did the genius in Dr. Jose P. Rizal conceptualize, in its entirety, the poem "My Last Farewell," within the last few hours of his life on the eve of that fateful day, December 30, 1896? Or, did it gestate in his whole being while he was in Dapitan, living in Exile? How did it morph?

The whole piece consists of fourteen magnetic stanzas. Could it be that he had devised it in consonance with the 14 stations of the via Dolorosa — the ecclesiastical ceremony practiced annually by the Roman Catholic believers during the commemoration of Holy Week or Semana Santa.

Another curious thing about "Mi Ultimo Adios" is the question whether Rizal wrote a title to the poem. Some scholars contend that the original copy did not have a title to it. If so, perhaps it is safe to say that he composed the poem only while he was in his prison cell in Fort Santiago, in Manila. Historians tell us that Narcisa, sister of Pepe (Jose Rizal), received from him minutes before his martyrdom, a lamparilla (kerosene lamp empty of the liquid) where the written poem in a folded piece of paper was hidden inside the lamp.

Looking deeper into the poem, it may be interesting to note that the rise and fall, cadence if you will, of the poetic lines from beginning to end, rendered in the exquisite lengua Española, simply delights the attentive ear.

And if one familiar with the musical piece "Bolero", by Maurice Ravel, may find it suitably blend or accompany, if you like, the poem when recited.

Let me now attempt to spell out my own translation in English the immortal  
 "Mi Ultimo Adios" of Jose Protacio Rizal.

## I

Goodbye, dear Country, beloved by the sun;  
 Pearl of the Orient Seas, our lost Paradise.  
 I give you with gladness, this life so filled with sadness.  
 Even though it may not be so bright or fresh as a scented flower;  
 Yet, for you, I give it. Yes, for your sake,  
 I offer it.

## II

In fields of battle, there are those who in delirium  
 give their lives, not having a doubt, nor counting the cost.  
 The setting (locale) does not matter. There may be  
 cypress trees, laurels or lilies;  
 By scaffold or open field;  
 In combat or cruel martyrdom;  
 All the same, if it need be;  
 For your sake, I'll lay it down, my life,  
 I would Lay it down.

## III

I die, while I am seeing some color gleaming  
 upon your skies.  
 And if it declares at last a new day dawning;  
 While behind it a gloomy past be gone.  
 If it be needed, so to keep the color of dawn;  
 Take my blood on that very hour, that it  
 might bring out more hue and bright glow.

## IV

In my dreams while in my youthful years;  
 In my dreams, when I, full of vigor and strength —  
 That I'll see you one day (gem of the Orient Seas)  
 with bright eyes and face lifted up, without frown  
 nor false pride; without stain or unsightly marks.

## V

In my life's dreams, it had been my burning desire, All hail!  
says a soul who is about to depart. All hail! How wonderful to  
give a life in an open sky. To die, dying for you, to  
die beneath your skies.  
And in your enchanted ground, to sleep eternally.

## VI

If around my grave there sprout one day, an herb,  
a flower, so tiny and humble;  
Come near it, and with your lips, kiss, kiss my soul;  
(that flower is my soul). And I'll feel on my brow  
down below the cold earth, the touch of your  
tenderness, the warmth of your breath.

## VII

Let the moon beam over me, soft and serene;  
Let the dawn shed over me, its radiant rays;  
Let the wind with its sad lament sweep over me.  
And if ever on my cross a bird may alight;  
let it sing forth a song of peace.

## VIII

Let the sun draw the vapor skyward;  
And up to the heavens with my tardy protest,  
Let a kind soul give a sigh over my untimely fate;  
And at eventide, Let others also pray for me;  
That my soul may rest in God.

## IX

Pray for those who have haplessly died;  
For those kinsfolk who had suffered unmeasured pain.  
For mothers who had suffered so much sadness and pain;  
for orphans, widows, prisoners.  
And for you as well, that you might finally find  
Your final redemption.

## X

And when the dark night covers my graveyard,  
With only those who rest in peace lie there;  
Disturb not their respite, disturb not the mystery.  
And perchance, you may hear a sad hymn resound.  
It's for you, O my Country; it's I, singing a song for you!

## XI

And when my grave is remembered no more;  
Without even a cross or a stone-marker be seen.  
Let the plow sweep through it, the spade turn it over,  
That may carpet your earthly floor,  
Until then, into nothingness, at last they are blown

## XII

Then will oblivion bring to me no care,  
As over your valleys and planes it would sweep;  
Throbbing and with a clear sound for you to hear,  
Sweet aroma, bright color, sad melody and a song;  
Continuously repeating the faith that I keep.

## XIII

My dear country, beloved and adored,  
The pain and sadness that I feel for you;  
Beloved Filipinas, goodbye, forever goodbye.  
I give You my all; I leave you all: parents,  
and kindred and friends.  
I go to a place where no slaves before  
oppressors bend, where faith does not die,  
where only God reigns

## XIV

Farewell my parents, my kins, protectors of my soul.  
Friends of my childhood; in deep sadness I leave you.  
Thank you, Let me take a rest on this toilsome day.  
Farewell, sweet stranger, my friend/wife, my joy.  
Farewell, beloved all; to die is to rest.

## **Damsel in Distress No More: Studying Powerful Women In and Out of Romance Novels, and Why It Matters**

Beryl Andrea P. Delicana

**P**orn for women, smut novels—these are only a few of the choice descriptions that are given to Romance novels. Often dismissed as trivial and worthless, they receive little to no respect from critics. The oldest tale of romance novels was that they were dismissed because they were written by women, they were about women, and appealed to women exclusively. This argument can be traced back since the birth of the English novel itself, stemming from the belief that women’s writings were inferior to that of men’s because vast preserves of masculine life—schools, universities, clubs, sports, and the like were generally unavailable to women during those times (Ryan, 2010). Although this argument still exists today as to why women’s writings are still dismissed, derided, or considered inferior, many authors like Sarah McLean (2016) think that this argument is dated and need not be honored. As time has progressed, however, many other problems have risen concerning the writings of the female gender. In an article published in the *Writer’s Digest*, Leigh Michaels (2008) discusses how critics of Romance novels dismiss these books because they are

...simplistic and childish, and that they contain no big words and very little plot—just a lot of sex scenes separated by filler and fluff.

A common view of romance is that there’s really only one story;



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all the authors do is change the characters' names and hair color and crank out another book.

Critics also accuse these novels, and their authors by extension, that they present unrealistic views on love and relationships to its readers—telling them that there is a Prince Charming who will come to sweep them off their feet and that they often come with chiseled abs and a lot of money. The books are accused of portraying women as helpless, as damsels in distress in need of a perfect hero to come to their rescue.

Romance novels are also very often chastised for being 'formulaic,' meaning that the stories follow a certain pattern—courtship, the obstacles, overcoming these obstacles, then the betrothal, and the happily ever after. They are short novels, focused on upbeat stories and a happy ending; they do not discuss on the evils of modern society. They are also easy to comprehend for readers, making it seem like they are easy to write.

These problems, however, can be a gross overgeneralization of the genre. Alex Townsend (2015) talks about how no other genre is directly associated to bad books faster than romance. She does concede that there really are bad romance novels that illustrate gender roles and some that may carry misogynistic undertones and undermine the role of females in society. But there are still romance novels that do not follow the tropes of gender roles often associated with them. Sarah Mclean (2016), a well-known author of Historical Romance novels, shares the same opinion as Townsend and even furthers her argument by stating that romance, and their authors, are generally dismissed because of its contents saying,

In the years since I began writing, I've come to realize that the judgment that romance readers and writers receive for the genre they love is not about the writing. There are great romances and terrible ones, just as there are great works of literary fiction and terrible ones. I used to think it was about the fact that the genre was by and about women—and certainly that is a part of it. But let's be honest, romance gets the literary stink-eye because of the sex bits.

The lack of academic study on the romance genre may be cited as one of the main reasons as to why romance novels are still being overgeneralized as antifeminist and filled with useless fluff and still considered to be inferior compared with other genres, despite its forbearers such as Jane Austen's and Charlotte Brontë's novels as being considered some of the great literary

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works of their time. This paper hopes to give reason as to why the study of the romance novel as an important literary text is important by disputing some of the many gross overgeneralizations that the genre has been treated to, using Mina Esguerra's *Never Just Friends*, *What You Wanted*, and *The Harder We Fall* as examples as to why this is so.

In an article published by the *Yale Herald*, the lack of a single definition that encompasses the meaning of Romance novels, and what makes them such, may be part of the reason for the silent treatment from academes. Dr. Pamela Regis, author of the *A Natural History of the Romance Novel*, defines the genre as "prose fiction that tells the story of the courtship and betrothal of one or more protagonists." The *Romance Writers of America* describes the romance genre as smart, fresh, and diverse, which is comprised of two basic elements—a central love story and an emotionally satisfying and optimistic ending. These definitions can be the big umbrella that covers the genre, as it covers a very wide scope of topics considering all subgenres associated with it. A happily ever after (HEA) is necessary, because this is what basically appeals to the readers of the genre—that a woman can want it all and have it all. But the HEA does not always mean marriage; it could mean the beginnings of a relationship or the end of one in exchange for something better for the heroine,

...the happy ending becomes very different in different novels. Sometimes, it's sort of an equivocal happiness—not perfect, just the happiest possible ending for these two people. And that can be equally satisfying (Lauren Willig as cited from *The Yale Herald*, 2010).

A HEA in romance novels, however, does not mean that the novels are filled with sunshine and happiness. Andrea DaRiff (2010) explains that, despite an emotionally satisfying ending, the novels still portray the doubt and emotional turmoil and the darker sides of emotional relationships.

Mina Esguerra's *Never Just Friends* is an example of a Romance novel that, although provides an emotionally satisfying ending where the heroine, Lindsay, ultimately ends up with her long time best friend Jake, still, it portrays the difficulty of transitioning from a friendly relationship to a romantic one. Lindsay knew Jake all too well, and she knew all of his casual relationships and how dysfunctional his lifestyle was. Throughout the novel, she struggles

to understand why Jake suddenly takes a break from his stardom to become a spokesperson for the company she works in and put in actual work as an environmentalist, something he dropped in exchange of being a star back when they were in college. Jake also made it clear that he wanted Lindsay. And despite knowing that she also wanted him, Lindsay constantly questions and doubts herself, and Jake, and his sincerity and motives.

Circumstances surrounding Jake and Lindsay may not be applicable to many people, with the environmental researcher and the successful TV star finding love doing the things they actually set out to do, the reality of how they were navigating through the issues they each were facing, and how they find themselves in a relationship in the end being very relatable to many readers. The struggles that they both face, with Lindsay always choosing to prioritize her career over Jake for fear that he only wanted her because she felt he needed someone he could constantly depend on and Jake being on defensive and refusing to let Lindsay in for fear of coming out as weak and needy, are issues men and women in or getting into relationships face. The issues that the story dealt with were real, and not merely 'fluff and a whole lot of sex,' and how it was resolved is what ultimately gave the readers a very satisfying ending. The doubts and the insecurities were key tools in order to make the ending as satisfying as it was, when Jake and Lindsay finally put their pride aside and allowed themselves to be vulnerable to each other in order to be together in the end.

This shows that the formula, the need for an obstacle or a problem for the characters to overcome obstacles is a key factor in order to leave the reader feeling satisfied in the end. The lack of a relatable and effective struggle cannot lead to an emotionally satisfying ending. But that type of formula is not exclusive to Romance novels. The need for obstacles and problems as such is a common device, especially in genre novels, in order for the plot to move, and that is not a bad thing. Michaels (2008) sums it all up in an article for *The Writer's Digest* saying,

What romance novels have in common is this: A romance novel is the story of a man and a woman who, while they're solving a problem that threatens to keep them apart, discover that the love they feel for each other is the sort that comes along only once in a lifetime; this discovery leads to a permanent commitment and a happy ending.

She also adds that, even when Romance novels have certain characteristics in common, the same can be said of Crime novels where there

is a crime, a perpetrator, an investigator, and an ending in which the crime is logically and clearly solved. But mysteries are not all alike, and neither are romances. Even then, that does not mean that either genre presents one story where authors just change the characters and the setting, which is what critics often say about Romance novels. There are also exceptions to this 'formula', as there are gay romances and others that do not have a permanent commitment as part of their endings. The three novels, for example, have that treatment.

Esguerra's novels do not end in a proposal or even marriage. The *Harder We Fall* ends with Daria and Nicholas finding themselves in a place where they could have an actual future together and not be pulled apart by the careers they have chosen, which was one of the main contentions of their story. Lindsay and Jake from *Never Just Friends* are only starting a new life where they were much more involved in each other's and no longer the one where they play hide and seek with their feelings and see each other only once or twice a year then live separate lives for the rest of it. *What You Wanted's* Damon and Andrea finally admit their feelings for each other, more so Andrea than Damon. All three stories end with the characters starting lives where they can balance their work with their new relationships and not the common misconception of HEAs where all are dropped for a marriage to happen or a family to start.

This then, easily breaks the 'easy and formulaic' and 'just fluff and a lot of sex' descriptions of many critics about the genre. The formulaic nature, according to many critics of Romance novels, stems from the fact that they are easy and childish and simplistic with no big words. But Esguerra's books are prime example of how there are authors who break the formula, who go for different formats of the expected HEAs, and still find that their books still appeal to a large audience. Sarah Maclean talked about how she found that many readers today of Romance novels especially love the ones that break the rules—never the HEA though, because that is the one thing that assures avid Romance readers that they will feel satisfied with their choices in books. It is the small rule that people tend to associate with the genre like how the hero needs to do the saving or how the heroine should be a virgin, in her case, as she is a writer of Historical Romance (*Happily Ever After*, 2016). The special thing that enchants readers according to Maclean is that this type of books establishes itself in a genre that is defined by rules and then twists those rules, the tropes, and makes it work still. She adds

Don't misunderstand me. Romance (and romance readers) love [sic] a good trope. We curl up on the couch with secret babies and virgin widows and our alpha billionaires, and our wallflowers and rakes, and we cannot get enough of them. But when a book comes along that tosses out all those rules we adore and somehow, successfully convinces us that we don't care, that's when magic happens.

Maclean and Esguerra are perfect examples of authors who create magic by breaking the rules, and the amount of readership for both authors is a testament that they create magic with their works still. This effectively proves that the easy formulaic nature according to the critics is not a bad thing. A closer look and study of the genre will prove that 'formulaic nature' of it does not prove that the genre is not worth looking into, that there is no easy fix in writing a Romance novel, and that there is something to be said about the formula, and how many authors of contemporary Romance novels are breaking them, and yet still are established well in the genre, and its followers.

The oldest story in book when talking about Romance is that it presents gender stereotypes and it casts women as weak and dependent on men. The discussion on Romance being antifeminist texts is a tale as old as time, and despite the progress the genre has made, there seems to be no appeasing this monster. Many authors also encounter the comments on them writing smut fiction and porn for women. MacLean, in an article she wrote for Bustle, has spoken about how these comments used to put her on the defensive but how now she chooses to ignore these comments, saying even that these are a form of slut shaming women.

How do Romance novels present gender stereotypes, and how are they antifeminist? Townsend (2015) listed some of the gender stereotypes that are presented by many bad Romance novels. Underscore on the bad. Like any other genre, Romance has its fair share of badly written novels which seem to be the focal point of many critics, instead of those that were written better. These novels, according to both MacLean and Townsend, do present dangerous gender stereotypes, like how men are stupid with emotions but women are stupid about everything else or how the women have spunk, while men have all the power. Many Romance novels, especially older ones, always has that alpha-male who comes swooping in to save the female from the problems she had been facing all her life in just a week since she had known him. He is the solution, the end game, and all she has to do is to wait

for him to come and save the day. There may be some Romance novels that share that certain story, but a lot of authors have moved past this dated plot and have written about powerful heroines who want it all and gets it all.

Esguerra's three novels are prime examples of such a story line. She has written of three powerful career-driven women in Daria, Andrea, and Lindsay. These women have established themselves well in the field they all have chosen. Daria has made a name for herself as one of the best documentary film makers in her graduating batch at Addison Hill, without using the influence of her father's company. Relentlessly going after the scholarship she had been working toward since her freshman year, Daria did not need Nicholas in order for her to figure out the things she really wanted in life. The same goes for Andrea, she indulged in a one night stand with the best man at her sister's wedding. She had a headstrong personality, an established career, and never lets anything get in the way of her happiness. Damon may have been an emotional crutch for her after Thad rejected her, but never did Andrea let Damon just sweep her off her feet and be her man in shining armor. She chose to engage in a casual relationship with him, where they used each other to get what they wanted. Lindsay, as well had established herself well as an environmentalist in the foundation she worked in and openly admitted that she had been in love with Jake since they were in college. But that fact never deterred her from becoming successful, and she made no move to drop everything she had the moment Jake told her he wanted her. These three women are strong and successful on their own, and they did not need alpha-males to come swooping in to save them. These women in Romance novels, however, seem to escape the eyes of critics. They want it all and get it all. They get their careers and their man, and they may have compromised at some point, but it was for their happiness and not for the happiness of the hero.

Sarah MacLean wrote how calling Romance novels as smut novels and porn for women and limiting them to merely the sex scenes in the novels is a form of slut-shaming women, as well. She had often felt the need to defend the genre when encountered with comments and questions about her still writing sex-books,

These questions and their myriad brethren used to put me right on the defensive. I'd feel required to pontificate on the value of the genre, of its long history (Pride and Prejudice was a romance, didn't you know?), of the value of books as entertainment, of the way romance builds literacy

and community among readers, and the idea that the books are powerful feminist texts—written by, for, and about women. In romance, after all, the heroine plays the role of the hero. And she wins. Always.

In her article for *Bustle*, MacLean talks about how she no longer feels the need to defend the genre and has found that the problems that many critics have about the genre no longer stem from how it was written. There was a moment in time when women's writing was seen as inferior to men as men had more opportunities compared with women. But MacLean says that the time has passed, and it is no longer the point of contention in criticizing women's fiction, specifically Romance novels today. The main problem, it seems, is sex. Romance novels are known for, and often seen only for the graphic sex scenes in its pages. Many critics have made it to seem that this is the focal point of the novels and the reason why many women read and patronize them.

The description of it being porn for women, which automatically labels it as an unimportant literary text, simply says that sexually active women are not to be taken seriously. MacLean writes about how society sees women who indulge in sex saying,

...society tells us that decent women shouldn't be thinking about sex, let alone reading about it. Real ladies should be ashamed of desire. Of sexual identity. Of sexual pleasure. And, by extension, we should be ashamed of anything that supports female sex positivity.

MacLean talks about how there is a stigma to women who own their sexuality, who know what they want and take it, and who prioritize their sexual satisfaction. Victoria Dahl, another famous Romance author, mentions the 'unrealistic expectations' that critics say Romance novels portray to women saying that this seems to point toward women fantasizing sexual encounters that are enjoyable to women. MacLean quotes her to saying,

The 'unrealistic expectation' seems to be a man who makes sure his female partner has an orgasm. Maybe even more than one. Maybe even before he has one.

This notion, according to Dahl, is apparently a dangerous idea to present to women as she may expect for this to apply in real life and allows her to own her sexuality and impose it on her partner.

Power is central to women in Romance novels, and it shows her as succeeding and owning her sexual identity without being shamed for it. The novels normalize and celebrate female sexuality, and that is something almost unheard of in today's society (Rai as quoted in MacLean, 2016).

Romance novels depict a society where women are allowed to explore and enjoy their sexuality, and they are not shamed for doing so. This is true in Esguerra's *What You Wanted*, where Andrea, the main character, indulges in a one night stand during her wedding. Throughout the novel, Andrea engages in a sexual relationship with Damon, she often talks about how she enjoys sex, she explores what gives her pleasure and indulges in it, and throughout the novel, she is not put in a light where she feels ashamed for indulging in her desires. The same can be said for the treatment of Lindsay and Daria, who also enjoy the pleasures of their sexual relationships with the heroes in their stories. There is no shaming them for being too forward with their desires, and there is no worries about them being seen as a slut.

Such a notion is almost unheard of in a mainly Catholic population like the Philippines, which could be one of the reasons as to why, even until to this day, Romance novels are still almost never talked about in the literary scene. Sex is all but taboo, even more so women enjoying sex outside the confines of marriage.

There exists until today a double standard between men and women and how they relate to sex and their sexuality. Men wanting and enjoying sex is normal, but women owning their sexuality are improper, too brash, and slutty. This is proven time and again when women post pictures of themselves showing off their bodies and celebrating it, or when phones are hacked and nude pictures that were shared in private are put into the spotlight. Hackers are never shamed for violating a person's privacy in such 'scandals,' it is always the women who are shouted down at for having those pictures in the first place. And this scenario is not exclusive to the likes of celebrities but to all women who have experienced the same thing. In short, women are vilified by the society for enjoying and owning their sexuality.

Romance novels, however, provide a space for women to explore sex and desire and pleasure and satisfaction and fulfillment. And with that space, it delivers the keen knowledge that women are the heroines of their story and that they can triumph in all ways (MacLean, 2016).

This then obliterates the notion that Romance novels are antifeminist texts, and that they depict and strengthen gender stereotypes. Instead, a



closer study of many Romance novels may be polarizing in providing more female-empowered literature. There is to be said about some badly written Romance novels, but those should not be the ones to define the genre as a whole.

Romance novels need to be studied not only for why they are so popular to the masses and what about them appeals to its audience. It needs to be studied for how it contributes to the literary scene, especially in regard to how it depicts women and society. The central story to it may be a man and a woman's relationship, but in its way, it provides as well a graphic image of how society treats women. The wide latitude of the Romance genre carries with it a story for every woman and has the reach to show that women are powerful and that they should own who they are and not be shamed for it. Romance is also a venue to start discussions on women's sexuality, and how they fit in society, and can open doors to the destruction of the double standards about women and sex.

Romance novels, therefore, are not merely fluff and all sex. They should no longer be dismissed as simplistic pornographic material for women but should be seen as literary texts that could be polarizing to the discussion of the roles of women in the society. Its inherent quality of having happily ever afters should not be seen as a weak quality that makes it uninteresting. Instead, HEAs should be seen as an open possibility that a woman can want it all and that she has the ability to have it all.

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