Annals of Tropical Research 44 (2):119-149(2022)
https://doi.org/10.32945/atr4428.2022

Social impacts of a coconet enterprise on smallholder coconut farming families: The case of Panaon Island Farmers Federation Inc in the Philippines

Henry Y. Goltiano[2*] and Feliciano G. Sinon[1]

ABSTRACT

Received: 16 November 2021 | Accepted: 22 June 2022

This study looked into the social impacts of the cocotwine-coconet-making enterprise of the Panaon Island Farmers Federation, Inc. The study followed the constructivist research approach. Results showed that the enterprise had positive and negative impacts on PIFFI members, their families, PIFFI as an organization, their communities and their environment. Most impacts were positive, including acquisition of new knowledge and skills, improved economic productivity and income, changed values, built courage and confidence to take investment risk, molded financial discipline, strengthened family bond, reinforced community cohesion and improved the environment, among others. As a farmers' organization, PIFFI demonstrated interest, capability and willingness to sacrifice to make its livelihood enterprise succeed. Smallholder coconut farmers organizations, like PIFFI, that demonstrate such characteristics deserve government assistance to enable them to optimize positive impacts of the livelihood enterprises that they are engaged in.

Keywords: social impact assessment, constructivist approach, conversational interview, family cohesion, rural out-migration, community cohesion

INTRODUCTION

Coconut *(Cocos nucifera* L.*)* is considered as the "tree of life", "tree of heaven" or "tree of abundance" by Asians for many reasons (Ahuja et al 2014, Fujii 2005, van Dam 2002). First, the coconut industry is the source of livelihood for millions of

[1] Visayas State University, Baybay City, Leyte, Philippines

*Corresponding Author. Address: Visayas State University, Baybay City, Leyte, Philippines; Email: henrygoltiano@vsu.edu.ph

farmers in Indonesia, Philippines, India, Sri Lanka, Vietnam, Thailand and Malaysia (Aragon 2000, Batugal and Oliver 2005, Kumar et al 2008, Purba and Saleh 2018, Shaffer 2013). Second, coconut is a durable crop being able to withstand conditions that are harsh for other crops (Rajendra and Sumariati 2018, Somma 2021). Third, the coconut tree, from fronds to roots, has many uses from food to feed, fiber to fuel, floor to furniture, and as a health supplement and even as festival adornment, among others (Abuya 2013, Tacio 2019). The list is very long.

Despite the problems that beset the coconut industry, coconut remains a top export commodity of Asian countries. Indonesia, Philippines, India, Sri Lanka, Vietnam, Thailand and Malaysia account for 52.08 metric tons or 83.38% of the world's 62.46 metric tons of coconut production in 2019. Indonesia (17.13 million metric tons), Philippines (14.77) and India (14.68) are the global leaders in coconut production (FAO 2019). Indonesia and the Philippines alone contribute about 67% of global crude coconut oil exports (Alouw and Wulandari 2020).

Behind these macro statistics though are the millions of coconut farmers and their families who are at the bottom of the production chain earning low incomes (Alouw and Wulandari 2020, Ani and Aquino 2016, Batugal 2005, Gunetillele and Senanayake 2004, Reddy and Sang-Arun 2011, Sukphisit 2012). Most Asian coconut farmers are resource-poor smallholders and sharecroppers, including those of the world's top three coconut producers: 98% of Indonesia's 6.6 million coconut farmers and India's 5 million and 75% of the Philippines' 3.5 million (Arancon 1997, Hengky et al 1998, Ratnambal and Nair 1998). Their poverty is worsened by fluctuations in demand and the price of traditional coconut export products that have to compete with other vegetable oils (APFC 2008, Castillo and Ani 2019, Gurbuz and Manaros 2019). Coconut farmers therefore need to find alternatives to replace the diminished or lost income from traditional export products.

The solution may not be in planting more trees or producing more nuts, but in finding greater value in traditionally undervalued parts of the tree of life. Among these are the husks from where cococoir (husk fibers) are extracted and made into cocotwines and coconets. Coconets, also called cocomats, are geotextiles used by civil work contractors for slope blankets and riverbank erosion control. The increasing preference for coconets is due to their being biodegradable and made from a renewable part of the coconut tree making production less environmentally costly. Due to growing environmental concerns, environmentally-friendly products have huge market potential.

Cocotwine-coconet-making has become a commercially viable alternative livelihood for Indonesian, Indian, Sri Lankan, Filipino, Thai and Vietnamese coconut farmers. Just like any social intervention, the cocotwine-coconet enterprise as an alternative livelihood, has consequences, the ultimate level of which are called social impacts (van Schooten et al 2003). Social impact refers to consequences on the life of individuals and how they relate with one another and their communities (Ahmad 2009, Burdge 2012). On the surface, cocotwine-coconet-making may appear good, especially from the economic aspect. However, as a social intervention, it carried with it a host of other impacts including social and environmental, which are inextricably connected with the economic (Burge 2003, Vanclay 2003). These other impacts can be positive or negative. According to Herr et al (2019), no project is without risk of negatively impacting a community. Blundo-Canto et al (2018) found that improvement in one livelihood dimension paralleled deterioration in another. Renzaho et al (2020), in their study of UPLIFT (Urban

Program on Livelihoods and Income Fortification and Sociocivic Transformation) in Kampala, Uganda, found that while UPLIFT had positive impacts on the quality of life, psychological well-being and the neighborhood environment, it had a negative impact on beneficiaries' personal independence, which was eroded by their reliance on UPLIFT financial assistance.

This paper, therefore, presents the social impacts of the cocotwine-coconet enterprise of a group of smallholder coconut farmers aside from the economic aspect that is usually observed. This paper hopes to address the dearth of information on the psychological, social and environmental impacts that are often overlooked, but deserve attention since, more than the economic impact, they have broader consequences beyond the personal.

The study was done with just one group of coconut farmers whose circumstances may not be completely reflective of the experiences of others. However, being engaged in the same crop, affected by similar trade shifts and subjected to comparable socio-economic and political structures that keep small coconut farmers on the peripheries of society, applicable lessons can be found, not just for farmers, but also for governments on how to better support such farmers struggling to attain their livelihood objectives.

METHODOLOGY

Subject of the Study

The study was conducted with the Panaon Island Farmers Federation, Inc. (PIFFI), a federation of agrarian reform beneficiaries' organizations (ARBOs) in Panaon Island, Southern Leyte, Philippines. PIFFI was formed in 2006 through the Agribusiness Entrepreneurship Development Program-Sustainable Integrated Coconut Area Development (AREDP-SICAD) of the Department of Agrarian Reform (DAR), the agency in charge of the implementation of the Philippines Comprehensive Agrarian Reform (CARP) Program. PIFFI served as a vehicle for the collective effort to revive the cocotwine-coconet enterprise that was started through PLAN International's assistance to the survivors of the December 19, 2003 landslides in Barangay Punta, San Francisco, Panaon Island, Southern Leyte (reliefweb 2004) to recover from the trauma and start life anew.

Research Approach: Social Constructivism

Social impacts are changes in one or more of the following: people's way of life, their culture, their community, their political systems, their environment, their health and well-being, their personal and property rights, their fears and aspirations. Either real or perceived, they must be felt or experienced by an individual, family or community (Vanclay 1999). They may be positive or negative, primary or secondary, direct or indirect, and intended or unintended (OECD 2014).

The overarching framework that embodies the evaluation of impacts on humans and on all the ways in which they and their communities interact with their sociocultural, economic and biophysical surroundings is called Social Impact Assessment (Vanclay 2003). It is also called social assessment (Burdge 2002, Kvam 2018). While SIA's basic purpose is to forecast social change that may result from a development project or policy action (Becker et al 2004, Abu Bakar et al 2015), it can also be done ex post (Li et al 2014, OECD 2014, Schmid et al 2016,

Walker et al 2008). Ex post assessments not only provide information about a particular intervention, they also contribute to learning whether particular kinds of projects are worthwhile (Boardman et al 2001).

Social assessments are divided into two methodological paradigms: technocratic or technical and constructivists or participatory (Becker et al 2004, Tur and Gomez 2006,). Technocrats proceed with the hypothetical deductive approach that employs a set of prelisted indicators developed by experts that are 'objectively' and quantitatively measured (Arce-Gomez et al 2015, Becker et al 2004, Rossouw and Malan 2007). The constructivists, on the other hand, follow the inductive approach that avoids making presumptions because they believe that social change is dependent on numerous contextual elements that configure change into diverse patterns (Aledo et al 2015, Tur and Gomez 2006). Van Schooten (2003), who noted that social impact variables are inadequate and contradictory, said that most social specialists find it impossible to detail all dimensions of social impact because social change has a way of creating other changes and, therefore, cannot be listed and predicted in advance. Juslen (1995), who made an analysis of the social impacts identified in several studies, concluded that a universal list of social impacts that would suit every case was not possible.

Constructivists argue that social impacts are “actually experienced by humans (at individual and higher aggregation levels) in either a corporeal (physical) or cognitive (perceptual) sense” (van Schooten et al 2003), and that therefore, they are socially constructed. Thus Stolp (2003) contended that the use of methods that take into account stakeholders' varying values, perceptions and attitudes is inescapable.

There are three major types of the constructivist approach: cognitive constructivism, radical constructivism and social constructivism (Bodner and Klobuchar 2001). Doolittle and Hicks (2003) distinguished the three. Cognitive constructivism embraces the notion that reality, or truth, exists independently from the individual, but can be objectively known, and that there can be harmony between reality and the individual's cognition of it. Radical constructivism, on the other hand, believes that while reality may exist independently of the individual, the true nature of reality is unknowable because it is contingent to the subjective construction of the individual, which may not reflect the true nature of external reality. Radical constructivism highlights individual cognition and downplays social interaction. Social constructivism, for its part, stresses the social nature of reality as it emerges from the social interaction among people collectively searching for truth. Unlike radical constructivism, social constructivism emphasizes social interaction as the source of knowledge. This study subscribed to social constructivism as the researchers believe that PIFFI members possessed a shared appreciation of their cocotwine-coconet enterprise experiences so that commonalities and patterns can be found in their narratives.

Focus Group Discussions. PIFFI is a federation of nine ARBOs found in the four towns that comprise Panaon Island, namely Liloan, San Francisco, Pintuyan and San Ricardo. The researchers conducted two FGDs, each attended by PIFFI members from two adjacent towns. One FGD was in PIFFI's cococoir processing plant in Habay, San Francisco, attended by nine officers and members from San Francisco and adjacent Liloan. The other was at the municipal hall of San Ricardo attended by 13 members from San Ricardo and adjacent Pintuyan. San Ricardo was chosen as the site for the second FGD because it is a more commercially active town, thus providing an added incentive for PIFFI members to attend because they

could also do other things in San Ricardo such as buying household or farm needs. Also San Ricardo is a gateway to Mindanao with more public transport vehicles available, ensuring that the farmers had transportation to return home. Information gathered during the FGDs were validated through interviews with available members. The researchers also visited PIFFI's worksite in Burauen, Leyte.

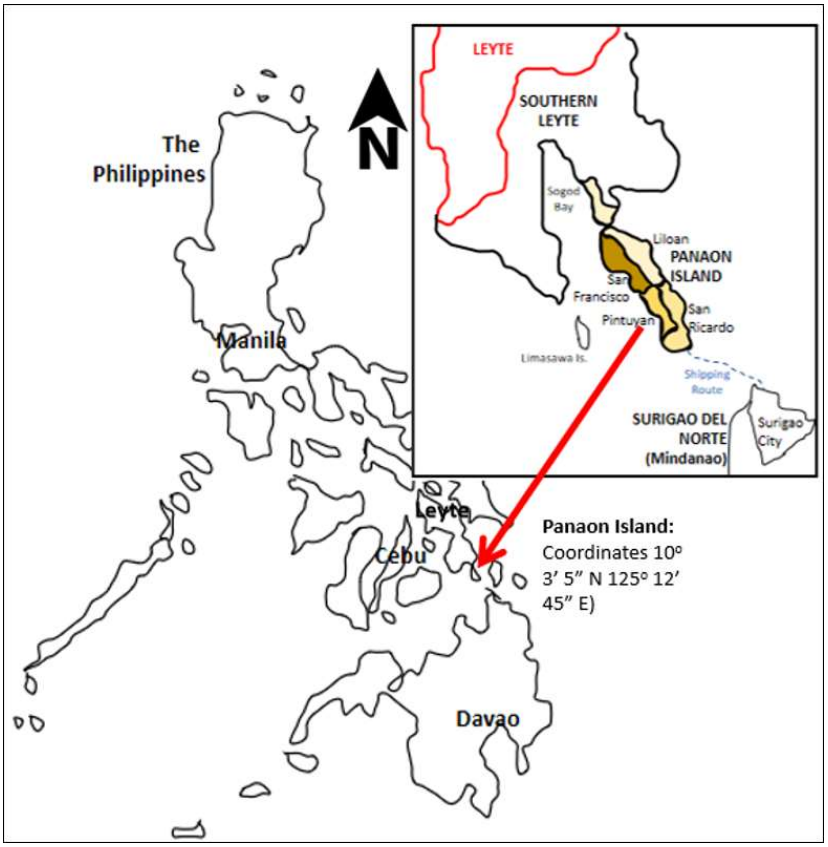

Figure 1. Map of the Philippines showing Panaon Island in Southern Leyte

Unstructured Conversational Process

Information for this paper was gathered through FGDs, face-to-face interviews and site visits. Consistent with the constructivist paradigm, the FGDs and interviews were done in the most open-ended manner employing the unstructured conversational method where questions were asked only casually and derived from the immediate context. Conversational interviews offer maximum flexibility to seek relevant information in whatever setting (Fontana and Frey 2000, Patton 2002). The strength of conversational interviews is its flexibility, spontaneity and responsiveness (Gall et al 2003, McNamara 2008, Turner 2010) that deepen communication (Patton 2002). Information gathered from informal conversations were put together with one building upon another with new information amplifying and illuminating that which was previously picked up. The conversational approach

allowed participants to express and define the enterprise's impact in their own terms with the researchers weaving the pieces of information gleaned into a succinct and holistic description of impacts. Impacts extracted from the testimonies were categorized into personal qualities, family welfare, organizational well-being, community well-being and environmental condition.

During the FGDs the researchers only asked a few prompt questions that consisted of main questions and subsidiary questions (Table 1) that were knitted into the sharing of stories by the participants. Subsidiary questions were only asked when the information desired was not provided by the participants. Clarifying questions were raised every now and then to avoid misinterpretation or ambiguity, or to gather essential supplementary information. The researchers wanted the atmosphere during the FGDs to be as relaxed and friendly as possible. They wanted to establish an atmosphere of trust and rapport with the participants. They took some notes, but did not use a voice recorder that may cause discomfort and restrain participants from fully sharing their stories.

Table 1. Prompt questions asked during the FGDs

Main Questions	Subsidiary Questions
1. Can you share with us the history of PIFFI and its cocotwine-coconet enterprise?	1. How come that of all the possible alternative livelihoods, you decided to go into cocotwine-coconet-making? 2. How did you know how to make twines and nets? 3. How did you link to buyers of your twines and nets? 4. Aside from the twines and nets, what other cocohusk-based processed products do you earn income from? 5. What challenges have you encountered along the way? 6. Who provided you with assistance? What assistance?
2. What benefits have you derived from the enterprise?	1. How much are you paid for your twines and nets? 2. Aside from the economic benefits, are there other benefits to the family, your organization, the community and the environment? 3. With all these benefits, have you now focused on cocotwine-coconet making and spent less time in your farming and other livelihoods?
3. Where there unintended negative effects of the enterprise?	1. Where there unintended negative effects on individuals, family, your organization, the community and the environment? In what way has the enterprise negatively affected individuals, family, your organization, your community and the environment? 2. What did you do about the negative effects? 3. Has the enterprise not diverted you from your other livelihoods? 4. If your children help you in twining, has it not affected their school performance?
4. How is your enterprise now?	1. Compared to five years ago, is your enterprise growing or declining? Why do you say so? 2. Are there prospects for further growth? Why do you say so? 3. What do you think is in store for your enterprise in the future? 4. Is PIFFI capable to meet the challenges of growth? Why do you say so?
5. What assistance does PIFFI need and who should provide them?	1. Have you made representations with these offices? 2. What has so far been the response?

The same day after each FGD the researchers immediately transcribed and organized the responses from the participants while they were still fresh in the memory. The researchers worked through each main question and its subsidiaries. Responses were either a single narrative from one participant or a composite narrative that blended several responses, each supplementing or expanding on another. A composite narrative could also come from one principal participant, with others providing bits and pieces of additional information. Vague or incomplete information in the draft transcripts were followed up through individual interviews with available members who participated in the FGD. After the second FGD, the researchers came up with a unified transcript that put together commonalities in the narratives of participants from the first and second FGDs. From the unified transcript the researchers then identified preliminary themes that pointed to the social impacts of the enterprise. The draft transcript was then presented to the officers and members of PIFFI for verification and correction.

RESULTS

Social Context

Panaon Island has a total land area of 9,409ha. It is subdivided into four municipalities: Liloan with a total land area of 3,746ha; San Francisco, 1,597ha; Pintuyan, 1,556ha and San Ricardo, 2,510ha. Liloan has a total coconut production area of 576ha; San Francisco, 750ha; Pintuyan, 257ha and San Ricardo, 2,119ha.

Occupying 3,702ha or 39% of Panaon's total land area, coconut is Panaon's main crop. Panaon's coconut farmers have an average farm area of about 1.5ha. Cocotwine/coconet-making as an alternative livelihood was introduced to Panaon by PLAN International. In 2004 PLAN facilitated the formation of the Punta Survivors Cooperative (PUSCO) to help those who survived the December 19, 2003 landslides in Barangay Punta, San Francisco, Panaon Island, Southern Leyte to recover from the trauma and start life anew. Successive landslides also occurred in Liloan and San Ricardo. The landslides, that led to the death of 154 persons, 37 injured and hundreds homeless, were caused by 15 days of unremitting rain, which resulted in a flood that carried debris and mud downstream sweeping everything in its path including rows of houses on the slopes and along the riverbanks (reliefweb 2004). Most victims were coconut farmers.

The Bicol-based Cocotech (Coco Technologies Corporation) trained PUSCO members how to make cocotwines and weave them into coconets. PLAN provided PUSCO with a decorticator (decorticating machine), a truck, manual twining machines and weaving looms. The target market for the coconets that PUSCO members produced were civil work contractors who use coconets for slope protection and riverbank erosion control. The initial coconets produced were used to rehabilitate the landslide areas in Panaon. After this PUSCO failed to get adequate buyers for their coconets to sustain the enterprise. Coupled with internal bickering, PUSCO split into two groups, the PULCO (Punta Livelihood Cooperative) and PEARBA (Punta Extension Agrarian Reform Beneficiaries Association). Neither were able to sustain a viable coconet enterprise.

In 2006, PIFFI (Panaon Island Farmers Federation Incorporated) was formed through the AREDP-SICAD Program. PIFFI unified nine ARBOs (agrarian reform beneficiaries' organizations) in Panaon island including PULCO and PEARBA. The

formation of PIFFI conformed with the DAR's objective to expand the reach and strengthen the enterprise capability of ARBOs by unifying them to benefit from economies of scale, bulk purchases, efficient processing and collective marketing (DAR 2006, 2006a, 2009). PIFFI served as the channel for the ARBOs' efforts to collectively produce and market coconets.

PIFFI's Cocohusk Byproduct Enterprise

Cocotwines woven into coconets were PIFFI's principal products. Twines are made from coir, the fibers extracted from husks. PIFFI bought the twines produced at PHP2.50 each. The twines are used to make coconets, ropes, rags, fish cages, etc.

Aside from slope stabilization and erosion blankets, coconets have a variety of other uses such as for riverbank erosion control (Ali 2010, Beena 2013), road construction, reinforcing soil tensile strength and roadbed rapid de-watering layer systems (Beena 2013, Ravindranath 2016,), and as railway soil stabilizers (Beena 2013, Fuggini et al 2016, Wu et al 2020).

In addition to cocotwines and coconets, PIFFI also supplied cocopeat, vetiver grass (*Chrysopogon zizanioides*), kakawate (*Gliricidia sepium*) planting materials and bamboo sticks, which are essential components in the installation of coconets as erosion control and slope protection. Cocopeat or coirpith is the brown dust from the husk of the coconut fruit when dehusked or when fibers are removed. Decorticating produces 30% coir and 70% peat (van Dam 2002). Cocopeat is used as an organic fertilizer and soil conditioner. (Khan et al 2019, Krishnapillai et al 2020). PIFFI does not only supply coconets, it also installs them with attendant paraphernalia at added cost to the customer.

Workforce

Former PUSCO members trained by Cocotech on cocotwine-coconet-making comprise the core of PIFFI's workforce. However, PIFFI had conducted training for others in the community interested in making twines regardless of whether they were PIFFI members or not. The Department of Social Welfare and Development (DSWD) also sponsored a training for the beneficiaries of its 4Ps (P*antawid Pamilyang Pilipino*) Program, a social assistance measure that provides conditional cash grants to the poorest of the poor. At least 300 individuals were involved in the cocotwine-coconet production either as laborers in coir decortication, hauling, retting, or twining and weaving. At the time of the study, some 600 individuals, either members or non-members of ARBOs, had completed trainings on twine-net production. This indicated a positive interest to be involved and benefit from the enterprise. Experienced PIFFI twiners and weavers served as resource persons in the trainings that PIFFI conducted with assistance from government agencies including DAR and DSWD. The PIFFI-affiliated ARBOs fabricated twining machines for use by those who completed the trainings.

Production Capacity

PIFFI used an old decorticator driven by a diesel engine to extract coir or fiber from husks, while twine production was done manually using locally made twining

machines made from bicycle rims. The decorticator operator was paid daily. The plant assistant who gathered, bundled and distributed the twines to twiners as well the driver were paid daily.

PIFFI bought husks per kilo. Husks are mostly produced in the uplands and there was difficulty in bringing them down to the processing plant. PIFFI's capacity to produce twines and nets was dependent upon the availability of husks. This made the operation irregular. PIFFI operated only between 12 and 15 days in a month.

The coir fibers extracted from husks vary in length from 15 to 35cm. Twining is done by individual households. Because of the inadequacy in the number of twining machines (TM), households share TMs. Twining requires three persons, two of whom twine the coir and one who operates the TM. Two husks (about 110g) are needed to produce one 16m-long twine. Ten husks (a little over 1kg) produce five pieces of twines. A highly-skilled three-person twining team can produce about 250 pieces of twines a day. The team requires about 50kg of coir from about 500 husks a day. With a coir production of 1,000kg a day, 20 three-person teams can produce a total of 5,000 pieces a day. Twenty teams mean 60 persons. PIFFI and its affiliate ARBOs have about 300 twiners.

The 16m-long twines are used to weave coconets. To produce one 1mx50m coconet requires about 250 pieces of 16m-long twines. There are two kinds of 1mx50m coconets. One is 40 warp x 40 weft (40x40), which requires about 300 cocotwines. The other is 30 warp x 26 weft (30x26) that requires about 220 twines. Warps are the longitudinal twines held stationary in tension on a loom, while wefts are the twines slipped crosswise over and under the warp and pressed home. Two highly-skilled persons working together in PIFFI's weaving looms can produce one 1mx50m coconet in 0.67 days on the average. In two days, three rolls of 40x40 coconets and five rolls of 30x26 could be produced by two workers. PIFFI paid weavers per roll. PIFFI can produce a maximum of 20 rolls of coconet in a day of full operation.

PIFFI's 90Hp decorticator is an old and, therefore, slow model. PIFFI processed 30,000 husks per week and produced 1,000kg of fiber a day or 6,000kg in a six-day week. PIFFI processed ten thousand husks in 2.5 days. The decorticator consumed 60 liters of diesel fuel to process ten thousand husks. Decorticating required at least two passes. One pass was not enough to disintegrate the husk to produce the fiber quality required for twine production. After two or three passes, the decorticator's fiber output still required carding or cleaning to separate short fiber (locally called *nagnag*), which is additional work for the twiners, consuming about 30 to 50% of their time. Cleaning also includes separation of the lumped fibers and improperly disintegrated portions of the husk.

A new and more efficient decorticator was deemed necessary for the growth of the enterprise. PIFFI, however, did not have the resources to buy one. The affiliate ARBOs and their members did not seem to be willing, or did not have the capacity, to contribute to PIFFI's capital build-up that would enable it to buy a new decorticating machine.

Aside from the decorticator, PIFFI had 12 weaving looms, six of which are in the Habay-Tinaan Irrigators Association MPC (HTIAMPC) facility, with the other six distributed among the affiliate ARBOs. HTIAMPC is an ARBO in the town of San Francisco affiliated with PIFFI. With increasing interest in the enterprise, the 12 looms have become inadequate. PIFFI also had 100 sets of twining machines distributed among ARBO members across Panaon.

Market

Huge market potential. Coconet, PIFFI's principal product, has a huge market potential considering its various uses. On September 2, 2002, then Philippine President Gloria Arroyo issued Memorandum Circular 25 mandating the use of cocofiber products in all government infrastructure projects. In line with this, the Philippine Department of Public Works and Highways (DPWH) issued a series of department orders that required the use of coconets and cocopeat for slope stabilization, erosion control, soil restoration and vegetative regeneration in all areas disturbed by DPWH's infrastructure and public works projects (DPWH 2008, 2009, 2010). PIFFI was sub-contracted for the installation of coconets and the planting of kakawate, vetiver grass and cover crops in the Albuera-Burauen road that was being constructed under the DPWH. In addition PIFFI had a sub-contract to produce 1,200 rolls of coconets per month for mining companies in Surigao, Butuan and Claveria in Mindanao. PIFFI, however, was struggling to meet the demand. They could provide the company only 120 rolls per month. There are other coconet producers in Eastern Visayas, but PIFFI is closest to the market because most mines in the country are in Mindanao, which is just about two hours by boat to Lipata, Surigao City from Liloan and one hour from the Benet Port in San Ricardo. Surigao del Norte alone is home to the Boyongan-Bayugo mine, one of the largest copper-gold reserves in the world (Oliveros 2011). With more roads and mines to be opened, according to PIFFI officers, the market for PIFFI's products was assured for at least five to ten years.

Indirect market link. PIFFI's engagement with the coconet market was as a sub-contractor. It did not have a direct link to the market. It was the DAR Development Facilitator (DF) who looked for buyers for PIFFI products and services. The DAR DF,however, did not have a direct link to buyers. He also worked through brokers. Direct link to the market was identified by PIFFI officers as a critical factor in the success of the enterprise.

Other products. Not all coir can be used to produce twines. Shorter fibers (2-5cm) were sold to AFFIRE (Agribusiness Federation of Financial Intermediaries for Rural Empowerment), an exporter of short coir that is made into mattress fibers, fiber board and tufted mats, among others. AFFIRE has an office in Southern Leyte.

PIFFI also sold cocopeat by sack locally. Cocopeat, however, has huge market potential abroad. At the time of the study, PIFFI was being contacted by Coco Products, a California-based company that distributes all-natural and eco-friendly products made from the coconut husk. Coco Products manufactures CocoAbsorb, a cococoir/peat-based oil absorbent that is used for industrial, automotive and oil spill clean-up. The company also produces CocoDry, a natural paint hardener for all types of acrylic, oil-based and water-based paints. As a leading American brand, CocoAbsorb was *Popular Mechanics Editor's Choice Awardee for New Product Design and Innovation* in 2013.

Social Impacts

As mentioned earlier, impact is what an individual perceived, felt or experienced. It can be positive or negative and direct or indirect. Negative impacts were unexpected and unintended. Tables 2a, 2b and 2c present the narratives built from the responses obtained during the FGDs and follow-up interviews. A narrative

may carry accounts from more than one respondent. Short and related responses were put together as one narrative. For each narrative, the impact or impacts conveyed are indicated at the column next to the narrative. The specific part of the narrative indicated is underscored. A part that indicates direct positive impact has double underscore and one that indicates indirect positive impact receives a single underscore. Those that indicate negative impacts have broken underscoring.

Figure 2. PIFFI members installing coconets on the scraped slopes along the newly-constructed road in Barangay Matin-ao, Burauen, Leyte

Narratives from women were separated from those of men. Men and women were observed to have different types of participation in both household and livelihood responsibilities. For example, most of the twiners were women because twining could just be done in the house or near the house where women could still attend to household chores or care for children. Men worked either in PIFFI's processing facility like hauling of husks or going out to the farm and doing other livelihood options like carpentry or *habal-habal* (motorcycle taxi) driving. Even in the coconut farm, they performed different roles. Men tended the trees and harvested the nuts, women helped dehusk, split and dry the nuts. The gender-based difference in the roles played might have affected the participants' perception on the impacts of the enterprise. Studies of Ikkatai et al 2020, Bai et al 2015, Byrne and Willis 2005, Harvey et al 2018 showed that gender and livelihood project experiences affect perception. Thus the narratives of men and women are treated separately, as were the narratives of officers.

From the narratives in Tables 2a-2c it can be seen that the most dominant direct impact felt was economic. It came with such statements as: *"Now we spend our free time productively making twines from where we earn additional income," "It's helping us financially," "The coconet enterprise is helping families financially," "Now we earn not only from the meat of the coconut, but also from the husk," and "What we earn from coco-twining and coco-netting helps us meet our daily needs."*

Table 2a. Women participants' narratives and the impacts conveyed

Narrative	Impact Conveyed			
	Positive		Negative	
	Direct	Indirect	Direct	Indirect
Coconut-farming is mainly a man's job, but I and my two daughters help dehusk nuts, split them into halves and dry them in kiln (locally-called tapahan) or sun dry them on the road, scrape off dried meat from the shell, chop and sack the copra, among other things. Of course, there are many household chores to do, but when these are done, I and some other wives spend our free time mostly in trivial conversations or playing tong-its (rummy-type card game). Now we spend our free time productively making twines from where we earn additional income. Something worthwhile. We are thankful to PLAN International and to CocoTech for helping us, especially in training us how to make cocotwines and coconets from coco fibers. The knowledge and skills we obtained are so valuable. In fact, I should say these are the most valuable because these are never lost, but instead grow with use. When we first started making twines and nets, we were so clumsy. Now, we are skillful. We don't have properties to bequeath our children, but the knowledge and skills we acquired can be passed to our children. Actually, our children are helping us make twines during weekends when not in school. Our additional earning helps in their schooling. The beauty with twining is you are in control of your time and you just work at home or near your home.	Became economically productively & obtained increased income Acquired new knowledge and skills Children provided avenue to contribute to family income	Changed values and behavior Valued knowledge and skills as important assets that can be passed to children Sense of control over work time and place Additional earning keeps children in school		

Table 2a continued

Narrative	Impact Conveyed			
	Positive		Negative	
	Direct	Indirect	Direct	Indirect
We decided to make twines because we were encouraged by our friends who said that it's helping them financially. It's true. Aside from providing us with additional income source, twining strengthens the bond in the family. Me, my husband and our son work together making twines. We take turns twining and turning the machine. Twining requires at least three persons. We didn't have a twining machine before, but realizing that we can earn from twining, we saved money so that we could have our own twining machine made. It was an investment. We already have recouped our investment. Apart from making the family more cohesive, twining raised my sense of significance at being able to contribute more to meet family needs. With coir stacked in the house, my husband and son who used to smoke had since quit smoking because they could not take the risk of burning the coir and our house. Our son too who seldom could be found in the house but spent most of his time with his barkadas (circle of friends) would now rather be home making twines.	Helped family financially Strengthened family bond	Molded financial discipline (saving money for investment) Built courage and confidence to take risk to invest on twining machine Raised sense of contribution to meeting family needs Changed attitude and behavior		

Table 2a continued

Narrative	Impact Conveyed			
	Positive		Negative	
	Direct	Indirect	Direct	Indirect
The coconet enterprise is helping families financially. Because of increased financial capacity, sari-sari (neighborhood convenience) stores have become more willing to give us goods on credit. The problem is that at times PIFFI is not able to pay twiners immediately, because also of delayed payments from buyers or those who contract us, especially the government. Payment from government institutions really takes long to come making us uneasy, especially if we see the sari-sari store owner.	Improved economic status of families	Raised credit rating		Uneasiness caused by delayed payment for finished twines/nets
Twining is done in open space of about 38 square meters. Because it's done in the open, we can't work when it rains. It would have been better if we can have a twining machine that will allow us to do the twining inside the house. The other problem is when ones twining partners are from other families and they are not available, we can't twine. And if we look for another partner, your previous partner would be disappointed. It creates friction.			Created friction between twining partners.	
The coconet enterprise is helping us financially, but not so much because it's not all the time that we have fibers to twine. There are several of us who can twine, but fibers are available only in about two weeks every month. And because there are many who wish to make twines, fiber allocation is rotated among twiners. So you get to twine now, not next time. While there is economic benefit from the enterprise, irregularity of the twining diminished the benefits to insignificance.	Financially helped			Discontentment resulted from irregularity of husks supply Felt economic benefits to be insignificant

Table 2b. Male participants' narratives and the impacts conveyed

Narrative	Impact Conveyed			
	Positive		Negative	
	Direct	Indirect	Direct	Indirect
As coconut farmers, we basically survived by producing copra, which is not also year-round. Copra harvest is just for a little over a week and comes only at intervals of about one-and-a-half months. In-between copra seasons, we practically earn very little. Well, we earn from our other crops –rootcrops, vegetables, some fruits. Some have backyard hogs and poultry. Others also till small rice farms. But income from each of these is meager. We also work as laborers in other farms planted to other crops. Or as carpenters and/or habal-habal drivers (motorcycle taxi). Depending on one's skills. We engaged in various livelihoods as income from one is not enough. The cocotwine-coconet enterprise is just one additional alternative, which does not also give us regular income. It is however a blessing that came thru a tragedy. The tragedy of the landslide that victimized us introduced us to the cocotwine and coconet enterprise at the goodwill of PLAN international. Now we earn not only from the meat of the coconut, but also from the husk. It may not be much, especially that PIFFI operates only in only about two weeks a month, but what we earn from coco-twining and coco-netting helps us meet our daily needs. The additional earning may not be much, but it's better than when one is far from his family. I used to work in Cebu far from my family. While we don't earn much from twin- and net-making, at least our family is intact because the enterprise supplements income from other livelihoods.	Increased earning Improved capacity to meet family needs	Saw blessing disguised through tragedy Grateful for the little Kept family intact		

Table 2b continued

Narrative	Impact Conveyed			
	Positive		Negative	
	Direct	Indirect	Direct	Indirect
It's a privilege to be a member of an ARBO affiliated with PIFFI. You get prioritized in the livelihood projects. I and my family make twines. My wife also weaves coconets with another female ARBO member. I myself works as decorticator operator. The coconet enterprise is really helping us, except that operation is not regular. But it helps, especially that if several in the family are involved. My only concern as operator are the dusts belched out of the machine. They cause some allergic reactions. Long exposure to coir dusts caused me to sneeze frequently and have running nose. Of course, I cover myself. I put on mask, cover my head and wear long sleeves, but still very tiny dusts penetrate my covering. This is also the reason why I couldn't work long as decorticator operator.	Improved family's earning		Health adversely affected	
My involvement in the coconet enterprise is a source of pride. I'm just an ordinary farmer, but being a part of the team that is installing coconets as slope protection in Barangay Matin-ao in Burauen, Leyte makes me feel being a part of something bigger than myself and my community. Before I was very insular. I never have gone outside of Southern Leyte. I never imagined to reach Burauen and even stay there for weeks installing coconets and planting kakawate and vetiver on roadside slopes. I never expected to live among people who speak another language. What we are doing in Burauen is not for us, but for the safety of motorists who will pass by.	Pride at being a part of a bigger effort	Broadened outlook Enhanced sense of being able to contribute to greater good		

Table 2c. Officers' narratives and the impacts conveyed

Narrative	Impact Conveyed			
	Positive		Negative	
	Direct	Indirect	Direct	Indirect
It's a privilege to be elected as chairman of PIFFI. It's a privilege that I and my fellow officers share. We are grateful for the opportunity to do something to help uplift the socioeconomic condition of our fellow coconut farmers. The opportunity helps us grow as individuals. The trainings we were fortunate to participate, the exposure to meet and work with government officials and businessmen with stakes in the coconut enterprise, the challenges that stretch our mettle make us better persons. But with the opportunity come huge responsibilities that result to so much stress and anxiety, especially that the members expects so much from us. They even call us the "revival officers". Many expect much from us. We need to make the coconet enterprise successful.	Pride at being elected officers Sense at being able to contribute to improving community welfare Increased leadership competence through training and exposure			Overwhelmed by responsibilities

Table 2c continued

Narrative	Impact Conveyed			
	Positive		Negative	
	Direct	Indirect	Direct	Indirect
We are happy that demand for our products is increasing. There is so much opportunity for growth. Problem is that we don't have the capacity to meet the demand. We can train people to make twines and weave nets, but of what use if we can't provide them the raw materials because we can't produce enough coir for them. We don't have adequate supply of husks and our decorticator is old and inefficient. Honestly, we earn more making twines and nets than producing copra. Copra traders have become rich, while copra producers have remained poor. With twine- and net-making, we earn more in half the effort producing copra - if only our twine and net production is regular and sustained. We are requesting for assistance from government so that we can have new decorticator, but we don't know if our request will be granted. The reality is while the cocotwine-coconet enterprise has good prospects, we risk creating the impression that we can't provide the needs of the market, making prospective buyers to go somewhere else, especially that we don't have direct link to the market. We are linked to the market only through the DAR.	Expanded network	Realized the economic advantage of twine-mat-making over copra production Made request for assistance from government		Caused stress and anxiety
There are three critical factors we see for the success of our enterprise: adequate and regular husk supply, sufficient and efficient machines, and direct link to the market.				

Table 2c continued

Narrative	Impact Conveyed			
	Positive		Negative	
	Direct	Indirect	Direct	Indirect
The coconet enterprise serves as a unifying force. If it were not for the coconet enterprise, our ARBOs would be operating disjointly relying on each ARBO's limited resources. The enterprise glued us together, causing us to work for a common objective of making the coconet enterprise successful. While each of us remains affiliated with our mother ARBO, we are also members of PIFFI. Me, I'm an officer of Habay (Habay-Tinaan Farmers Irrigators Association), my principal ARBO. Habay owns the building where PIFFI's decorticator, weaving looms and other equipment and facilities are housed, but we don't consider these as belonging to Habay, but to all ARBOs affiliated with PIFFI.	Unified the ARBOs Engendered sense of commonality of purpose			
I am the president of our PERBA (Punta Extension Agrarian Reform Beneficiaries Association). The core of PIFFI's workforce come from PEARBA. PEARBA's twiners and weavers comprise PIFFI's training team, but when they introduce themselves, they introduce themselves as PIFFIs trainers. We are not PEARBA. We are not Habay. We are not... But we are PIFFI and collectively this enterprise is our own.	Generated a sense of solidarity Developed a sense of ownership			

Table 2c continued

Narrative	Impact Conveyed			
	Positive		Negative	
	Direct	Indirect	Direct	Indirect
The project has benefited not only PIFFI members, but the rest of our communities. The project helped our communities in three ways. First, it made our communities cleaner. Where before piles of discarded coconut husks and shells just become breeding ground for mosquitoes, now they are sources of income. Second, because twining requires at least three persons, there are cases when members of at least two families twine together, improving relationship between neighbors. Third, because of the families improved economic capacity, neighborhood sari-sari (convenience) stores have graduated from sira-sira stores (stores that often close because of lack of stocks or customers).	Improved environment Strengthened community cohesion	Stimulated community economy		

It was also alluded to by comments like: *"Aside from providing us with additional income source, twining strengthens the bond in the family," "Our children are helping us make twines during weekends when not in school. Our additional earning helps in their schooling," "We didn't have a twining machine before, but realizing that we can earn from twining, we saved money so that we could have our own twining machine made. It was an investment. We already have recouped our investment," "It raised my sense of significance at being able to contribute more to meet family needs," "Because of increased financial capacity, sari-sari stores have become more willing to give us goods on credit," and "While there is economic benefit from the enterprise, irregularity of the twining diminished the benefits to insignificance."*

Table 2a shows us that although the cocotwine-coconet enterprise was a viable alternative livelihood, it was considered only an additional livelihood option that did not dislodge other livelihoods of PIFFI members. The enterprise did not provide them year-round income as it was not regular, thus PIFFI members continued farming (coconut and other crops and livestock and poultry raising) and engaging in other livelihood options as income from each option was not enough to meet the family's needs.

Economic benefits, however, would not have come without the training provided so that PIFFI members would gain the knowledge and skills to make twines and nets. Two narratives mentioned the training received that improved knowledge and skills and leadership competence.

Table 3 summarizes and classifies the impacts conveyed by the narratives in Tables 2a-2c into five impact areas: personal qualities, family welfare, organizational well-being, community well-being and environmental condition.

Table 3 shows both positive and negative impacts. Most impacts are positive. Impacts can be direct or indirect. Among the indirect impacts on personal qualities worth noting, because they can be linked to the economic benefits from the enterprise, are the value attached to knowledge and skills acquired through training, the courage and confidence to take risk and invest, financial discipline molded and the change in values, attitudes and behavior. Other important indirect impacts are the strengthening of family cohesion and keeping the family intact.

DISCUSSION

The cocotwine-coconet enterprise proved to have positively affected PIFFI members. Impacts were mostly positive. The knowledge and skills initially sown by PLAN International to help the landslide survivors of Barangay Punta, San Francisco, Panaon Island have been shared and benefited others as well, including those in the towns of Liloan, Pintuyan and San Ricardo. Economic benefit was the dominant theme in the participants' narratives. It was the principal reason for the spread of interest in cocotwine-coconet making. Economic gain, in many cases, is the principal driver to participation in development initiatives (Baker-Medard et al 2021, Davis 2003, Sanou et al 2017). This is more so in times of economic uncertainties (Montana and Petit 2008).

The other impacts of the enterprise worth mentioning were:

On Personal Qualities:

1. Knowledge and skills valued as important assets. While the narratives of the

participants overwhelmingly highlighted the economic impact of the enterprise, this however came only after new knowledge and skills on making twines and nets were obtained. This suggests that development of essential abilities is a prerequisite to economically benefit from a livelihood opportunity. Participants valued knowledge and skills as important assets that could not be lost but grow with use and could even be passed on to children. McGraft (2002) describes knowledge and skills as the motor of economic development.

2. Built courage and confidence to take the risk to invest in twining machines. The researchers consider this as an indirect impact that unambiguously points to the economic benefits of the enterprise that helped some PIFFI members meet their basic needs. According to Paranita and Agustinus (2020) investment is carried out by someone only when his/her basic needs are met. The economic gain derived from the enterprise emboldened some PIFFI members to invest in their own twining machines. Investment is driven by the desire to make profit and more profit in the future (Paranita and Agustinus 2020, World Bank 2005).

3. Molded financial discipline as shown by saving money for investment to have their own twining machine. Saving is essential for the achievement of long-term goals, which is an element of financial resilience (OECD/NIFE 2016). Paranita and Agustinus (2020) describes saving for investment as a commitment to sacrifice present consumption in order to increase future consumption.

4. Changed values and behavior displayed through dropping worthless habits like idle talk and playing *tong-its* (3-player rummy card game), smoking and spending lots of time with *barkadas* (friends). While this is categorized under personal qualities this resulted from experiencing the economic benefits of the enterprise. This finding supports several studies that suggest that economic considerations play an important role in changing values, attitudes and behavior either in the adoption of sustainable innovation (Yoon and Tello 2009) or shifting from swidden to intensive agriculture (van Vliet et al 2012), whether to go for specialized or diversified land use (van Vliet et al 2015) and even in the rise of anti-establishment sentiments (Guriev 2018).

Without the need to mention all, the enterprise had a host of positive impacts on personal qualities. The UK Department for International Development (1999) refers to personal qualities as human assets that are the means of achieving livelihood outcomes and the weaknesses in human assets are core dimensions of poverty.

On Family Welfare:

1. Strengthens family cohesion. Another important impact was the enterprise's capacity to reinforce family cohesion as it brought family members to work together. Strong family cohesion raises work performance (Neziri and Kamberi 2016), enhances business success (EYGM Limited 2017), reduces substance abuse among youth (Ramsey 2008), moderates psychological distress (Rivera et al 2008), among others.

2. Kept the family intact. By providing families with a viable additional livelihood, the enterprise prevented PIFFI family members from migrating out to look for work. With very few livelihood opportunities in rural areas, out-migration often becomes

the most attractive option to provide for family needs (Garcia-Barrios et al 2009, Parkins 2010, Siddiqui 2003). The enterprise, therefore, is not only be a tool to reinforce family cohesion, but it can also mitigate out-migration, which can have many unwanted consequences both for the migrant and the family left behind. Out-migration by any member of the family affects the well-being of the family either positively or adversely, but mostly, adversely, especially if the one who out-migrated is a spouse. The left-behind spouse will be compelled to perform double roles, which now must include those usually performed by the migrant spouse, which can either lead to empowerment or dis-empowerment (Saha et al 2018). When the remittance from the migrant spouse is meager and sporadic, the left-behind family can fall into more social vulnerability and insecurity (Mergo 2016, Sabates-Wheeler and Waite 2003). The separation can also undermine the marital bond resulting to marital infidelity (Schulden et al 2014). These are just a few of the many unpleasant outcomes of out-migration.

On Organizational Well-being:

The enterprise served as a rallying point that unified the agrarian reform beneficiaries' organizations and engendered a sense of commonality of purpose with the cocotwine-coconet enterprise as rallying point. It developed a sense of ownership of an enterprise causing their officers to do their best to make the enterprise work, especially since the members had pinned so much hope on them, even calling them “revival officers”.

On Community Well-being:

The enterprise strengthened community cohesion because twining requires at least three persons, thus there are cases when members of at least two families twine together, improving relationships between neighbors. It also stimulated community economy through the improved economic capacity of families that helped to make business in the neighborhood *sari-sari* (convenience) stores brisk.

On the Environment:

The enterprise got rid of heaps of discarded coconut husks and shells that were a breeding ground for mosquitoes.

Factors that Eroded Positive Impacts:

While the impact of the enterprise in various areas is encouraging, these were being whittled down by PIFFI's operational shortcomings. First, PIFFI could not gather enough husks for sustained coir production. Second, even if they had sufficient husks, PIFFI did not have adequate and appropriate machines to process them. Third, even if they were able to produce enough twines and nets, they did not have direct access to the market. PIFFI's link to the market is through brokers. PIFFI officers, referred to as “revival officers,” have so much on their shoulders trying to satisfy the expectations of PIFFI members who hoped to uplift their socioeconomic status through cocotwine-coconet making.

CONCLUSION

Evidently, the cocotwine-coconet enterprise had more positive impacts than negative. The most forthright and discernible ones were the new knowledge and skills acquired and additional income obtained. There are indirect impacts that further demonstratde the efficacy of the enterprise. More than the direct impacts, these indirect impacts, like investing to have one's own twining machine and staying put instead of moving somewhere else to look for work, testified to the confidence that respondents had on the viability of the enterprise to help meet their basic needs. However, PIFFI twiners-netters could not make-the-most of the potentials of the enterprise because of PIFFI's operational weaknesses, which included the inability to procure enough husks for sustained coir production, an old and inefficient decorticator and the lack of direct access to market.

The case of PIFFI members is illustrative of other smallholder farmers who have the interest, capability and willingness to sacrifice, even to invest out of their hard-earned financial resources, to make an alternative livelihood work. Similar cases may not be so many. It is, therefore, recommended that governments assist farmers' groups like PIFFI. Governments cannot assist all. Its resources are limited and thus must deal with the vital question of whom should get livelihood assistance. Smallholder farmers' groups similar to PIFFI have the essential characteristics to successfully carry out livelihood assistance. It is unto such groups that the government can commit assistance because these organizations do not need cajoling and arduous tutoring. They only need strengthening, technology and equipment upgrading and vigorous product promotion and marketing assistance. With coconut being an essential part of the social, economic and cultural life of their countries' social, economic and cultural life, smallholder coconut farmers deserve more from their government. After all, they are the ones that give life to the “tree of life”.

ACKNOWLEDGMENT

The authors are thankful to the Philippine Department of Agrarian Reform thru the Agrarian Reform Agribusiness Entrepreneurship Development Program (ARAEDP) for funding and the Office of the Director of Extension of the Visayas State University, Baybay, Leyte for the support that enabled the researchers to conduct the study.

REFERENCES

Abu Bakar A & Osman MM. 2015. Social Impact Assessment: How do the public help and why do they matter? *Procedia-Social and Behavioral Sciences* 170:70-77. DOI:10.1016/j.sbspro.2015.01.016

Ahmad A. 2009. Social impact assessment in Malaysia. Malaysian Association of Social Impact Assessment, Shah Alam, Malaysia

Aledo A, Garcia-Andreu & Pinese J. 2015. Using causal maps to support ex-post assessment of social impacts of dams. *Environmental Impact Assessment Review* 55:84-97. https://www.sciencedirect.com/science/article/abs/pii/S0195925515000633

Alouw JC and Wulandari S. 2020. Present status and outlook of coconut development in Indonesia. IOP Conference Series: Earth and Environmental Science. DOI:10.1088/1755-1315/418/1/012035

Ani PA and Aquino A. 2016. The long climb towards achieving the promises of the Tree of Life: A review of the Philippine coconut levy fund policies. FFTC Agricultural Policy Articles 2016-01-28. http://ap.fftc.agnet.org/ap_db.php?id=577&print=1

Aragon C. 2000. Coconut program area research planning and prioritization, Philippine Institute for Development Studies Discussion Paper Series No. 2000-31, Makati City, Philippines. https://dirp4.pids.gov.ph/ris/dps/pidsdps0031.pdf

Arancon RN Jr. 1997. Asia-Pacific forestry sector outlook: Focus on coconut wood. Working Paper No. APFSOS/WP/23 in *Working Paper Series on Asia-Pacific Forestry Sector Outlook Study*, Food and Agriculture Organization, Rome

Arce-Gomez A, Donovan JD & Bedggood RE. 2015. Social impact assessments: Developing a consolidated conceptual framework. *Environmental Impact Assessment Review*, 50:85-94. https://www.academia.edu/10253414/Social_impact_assessments_Developing_a_consolidated_conceptual_framework

Asia-Pacific Forestry Commission (APFC). 2008. Forestry in a changing world: The outlook for the Asia-Pacific Forest Sector, Proceedings of the 22nd Session of the Asia-Pacific Forestry Commission, 21-25 April 2008, Hanoi, Vietnam. https://www.fao.org/publications/card/en/c/8868dd9a-3709-5121-b4d6-22d6312e0868

Bai Y, Leib AY, Puri AM, Whitney D, Peng K. 2015. Gender differences in crowd perception. *Frontiers in Psychology* 6,1300:1-12. https://doi.org/10.3389/fpsyg.2015.01300

Baker-Medard M, Gantt C & White ER. 2021. Classed conservation: Socio-economic drivers of participation in marine resource management. *Environmental Science and Policy* 124:156-162. https://quantmarineecolab.github.io/pdfs/2021_BakerMedard_etal_EnvSciPol.pdf

Batugal P. 2005. Introduction. In Batugal P and Oliver J (eds) *Poverty reduction in coconut growing communities, Volume III, Project Achievements and Impact* (p. vi). International Plant Genetic Resources Institute-Regional Office for Asia, the Pacific and Oceania, Serdang, Selangor Danil Ehsan, Malaysia. http://cogentnetwork.org/oldsite/images/publications/PRCGC_Vol3_part1.pdf

Becker DR, Harris CC, Nielsen EA & McLaughlin WJ. 2004. A comparison of a technical and a participatory application of social impact assessment. *Impact Assessment and Project Appraisal,* 22(3):177-189. DOI:10.3152/147154604781765932

Boardman AE, Greenberg DH, Vining AR & Weimer DL. 2001. Cost-benefit analysis: Concepts and practice. Upper Saddle River, Prentice Hall: New Jersey, USA

Burdge RJ. 2002. Why is social impact assessment the orphan of the assessment process? *Impact Assessment and Project Appraisal* 20(1):3-9. DOI:10.3152/147154602781766799

Burdge RJ. 2012.The practice of social impact assessment background. *Impact Assessment and Project Appraisal* 21(2):84-88. DOI:10.3152/147154603781766356

Byrne M and Willis P. 2005. Irish secondary students' perceptions of the work of an accountant and the accounting profession. *Accounting Education* 14(4):367-381. https://doi.org/10.1080/06939280500346003

Carranza DT. 2015. *Agrarian reform and the difficult road to peace in the Philippine countryside*. Report for the Norwegian Peacebuilding Resource Centre (NOREF) , December 2015. Available at https://reliefweb.int/sites/reliefweb.int/files/resources/Carranza_NOREF_Agrarian%20reform%20and%20the%20difficult%20road%20to%20peace%20in%20the%20Philippine%20countryside_Dec2015_FINAL.pdf

Castillo MB & Ani PAB. 2010. *The Philippine coconut industry*: *Status, policies and strategic directions for development*. Food and Fertilizer Technology Center for the Asian and Pacific Region. Available at https://ap.fftc.org.tw/article/1382

Davis JR. 2003. The rural non-farm economy, livelihoods and their diversification: Issues and options (Natural Resources Institute Report No. 2753 on Rural Non-Farm Economy). UK Department for International Development's (DFID) Rural Livelihoods Department. Available at https://core.ac.uk/download/pdf/42389803.pdf

Department of Agrarian Reform of the Philippines (DAR). 2006, September 05. Memorandum Circular No. 03, Series of 2006: Intensified rural development through agrarian reform communities (ARCs) Connectivity. Available at https://media.dar.gov.ph/source/2019/07/11/2006-mc-3-intensified-rural-development-through-agrarian-reform-communities-arcs-connectivity.pdf

Department of Agrarian Reform of the Philippines (DAR). 2006a, October 25. Memorandum Circular 06, Series of 2006: Revised implementing policies and guidelines on the "ARB Agribusiness Entrepreneurship Development Program (AREDP)." Available at https://media.dar.gov.ph/source/2019/07/31/mc06-06-revised-implementing-policies-and-guidelines-on-the-arb-agribusiness-entrepreneurship-development-program-aredp.pdf

Department of Agrarian Reform of the Philippines (DAR). 2009, January 30. Memorandum Circular 02, Series of 2009: Addendum to Memorandum Circular No. 9 Series of 2007 "Harmonizing the Implementation of Agribusiness Development Prorams and Initiatives in the Department". Available at https://media.dar.gov.ph/source/2019/05/27/mc2-09-addendum-to-memorandum-circular-no-9-series-of-2009-harmonizing-the-implementation-of-agribusiness-development-programs-and-initiatives-in-the-department.pdf

Department of Public Works and Highways of the Philippines (DPWH). 2008, May 16, 2008. Department Order No. 28: DPWH Standard Specifications for BY Bio-Engineering Products and Solutions, Item 519. Available at https://www.dpwh.gov.ph/dpwh/sites/default/files/issuances/DO_041_S2010.pdf

Department of Public Works and Highways of the Philippines (DPWH). 2009, December 14. Department Order No. 62: Reiterating D. O. Nos. 28 and 29, both Series of 2008, re: DPWH Standard Specifications for BY Bio-Engineering Products and Solutions (Item 519) and Coconut Bio-Engineering Solutions (Item 518), respectively. https://www.dpwh.gov.ph/dpwh/sites/default/files/issuances/DO_041_S2010.pdf

Department of Public Works and Highways of the Philippines (DPWH). 2010, August 31. Department Order No. 41: Prescribing the Use of Coconut Bio-Engineering Technology Solutions in DPWH Projects. https://www.dpwh.gov.ph/dpwh/sites/default/files/issuances/DO_041_S2010.pdf

Department for International Development of UK (DFID). 1999. *Sustainable livelihoods guidance sheets.* https://www.livelihoodscentre.org/documents/

114097690/114438878/Sustainable+livelihoods+guidance+sheets.pdf/594e5ea6-99a9-2a4e-f288-cbb4ae4bea8b?t=1569512091877

Doolittle PE and Hicks D. 2003. Constructivism as a theoretical foundation for the use of technology in social studies. Theory and Research in Social Education 31(1):72-104

EYGM Limited. 2017. In harmony: family cohesion and business profitability. Ernst & Young Global Limited UK and Cox Family Enterprise Center, Coles College of Business, Kennesaw State University, Georgia, USA. https://coles.kennesaw.edu/familybusiness/docs/ey-family-business-cohesion-profitability.pdf

Fontana A & Frey JH. 2000. The interview from structured questions to negotiated text in Denzin NK & Lincoln YS (eds), *Handbook of Qualitative Research* (2nd edn), pp 645-72. Sage, Thousand Oaks, CA

Food and Agriculture Organization (FAO). 2019. Production of Coconuts: Top 10 Producers. Available at http://www.fao.org/faostat/en/#data/QC/visualized

Fuggini C, Zangani D, Wosniok A, Krebber K, Franitza P, Gabino L & Weigand F. 2016. Innovative approach in the use of geotextiles for failures prevention in railway embankments. Transportation Research Procedia 14:1875-1883. https//doi.org/10.1016/j.trpro.2016.05.154

Fujii M. 2005. Livelihood change in a Philippine coconut farming village: A case study in Laguna Province. African Study Monographs 29:115-124. https://doi.org/10.14989/68439

Gall MD, Gall JP & Borg WR. 2003. Educational research: An introduction (7th ed.). A & B Publications, Boston, MA

Garcia-Barrios L, Galvan-Miyoshi YM, Valdiviso-Perez IA, Masera OR, Bocco G & Vandermeer J. 2009. Neotropical forest conservation, agricultural intensification and rural out-migration: The Mexican experience. *BioScience* 59:863-873. DOI:10.1525/bio.2009.59.10.8

Gunetilleke N & Kenanayake D. 2004. Monetary poverty estimates in Sri Lanka: Selected Issues. Economics and Research Department, Asian Development Bank Working Paper No. 58. Available at https://www.adb.org/sites/default/files/publication/28189/wp058.pdf

Gurbuz, IB & Manaros M. 2019. Impact of coconut production on the environment and the problems faced by coconut producers in Lanao Del Norte Province, Philippines. *Scientific Papers Series on Management, Economics and Engineering in Agriculture and Rural Development* 19(3):235-246

Guriev S. 2018. Economic drivers of populism. *American Economic Association Papers and Proceedings* 108:200-203. https://doi.org/10.1257/pandp.20181123

Hengky N, Rompas T & Darwis SN. 1998. Coconut breeding programme in Indonesia. In Batugal PA and Rao VR (eds.) *Coconut breeding: Papers presented at the workshop on standardization of coconut breeding research techniques*, 20-24 June 1994, Port Bouet, Cote d'Ivoire. https://www.bioversityinternational.org/fileadmin/bioversity/publications/Web_version/362/ch3.htm#bm1-Coconut%20breeding%20programme%20m%20Indonesia

Herr D, Blum J, Himes-Cornell A & Sutton-Grier A. 2019. An analysis of the potential positive and negative livelihood impacts of coastal carbon offset projects. *J Environ Manage* 1(235):463-479. https://doi.org/10.1016/j.envman.2019.01.067

Ikkatai Y, Minamizaki A, Kano K, Inoue A, McKay E & Yokoyama HM. 2020. Gender-biased public perception of STEM fields, focusing on the influence of egalitarian attitudes toward gender roles. *Journal of Science Communication* 19(01):A08. https://doi.org/10.22323/2.19010208

Juslen J. 1995. Social impact assessment: A look at Finnish experiences. *Project Appraisal* 10(3):163-170. DOI: 10.1080/02688867.1995.9726990

Khan MZ, Era MD, Islam MA, Khatun R, Begum A & Billah SM. 2019. Effect of coconut peat on the growth and yield response of *Ipomoea aquatica*. *American Journal of Plant Sciences* 10:369-381. https://doi.org/10.4236/ajps.2019.103027

Krishnapillai MV, Young-Uhk S, Friday JB & Haase DL. 2020. Locally produced cocopeat growing media for container plant production. *Tree Planters' Notes* 63(1):29-38. https://rngr.net/publications/tpn/63-1/locally-produced-cocopeat-growing-media-for-container-plant-production/at_download/file

Kumar SN, Bai KVK, Rajagopal V & Aggarwal PK. 2009. Simulating coconut growth, development and yield with InfoCrop-coconut model. Tree Physiology 29(5): 751. https://doi.org/10.1093/treephys/tpp026

Kvam R. Social impact assessment: Integrating social issues in development projects. Inter-American Development Bank, Washington DC. Available at https://publications.iadb.org/en/social-impact-assessment-integrating-social-issues-development-projects

Li D, Chen H, Hui ECM, Yang H & Li Q. 2014. A methodology for ex-post assessment of social impacts of an affordable housing project. *Habitat International* 43:32-40. Available at https://www.infona.pl/resource/bwmeta1.element.elsevier-b1eadba6-8091-34d0-bb35-2fdebfaf3d84

McGrath S. 2002. Skills for development: a new approach to international cooperation in skills development? *Journal of Vocational Education and Training* 54(3):413-430. DO1: 10.1080/13636820200200207

McNamara C. 1999. General guidelines for conducting interviews. Available at https://managementhelp.org/businessresearch/interviews.htm#anchor1404957

Mergo T. 2016. The effects of international migration on migrant-source households: Evidence from Ethiopian diversity-visa lottery migrants. *World Development* 84:69-81. Available at https://econpapers.repec.org/RePEc:eee:wdevel:v:84:y:2016:i:c:p:69-81

Montana PJ & Petit F. 2008. Motivating and managing Generation X and Y on the job while preparing for Z: A market-oriented approach. *Journal of Business and Economics Research* 6(8):35-39. Available at http://www.theibfr2.com/RePEc/ibf/gjbres/gjbr-v2n2-2008/GJBR-V2N2-2008-11.pdf

Neziri I and Kamberi I. 2016. Family cohesion and the efficacy of employees in the working environment. *Mediterranean Journal of Social Sciences* 7(2):427-434. https://doi.org/10.5901/mjss.2016.v7n2p427

Oliveros NC. 2011. *T*echnical report on the Boyongan-Bayugo deposit in Surigao Del Norte, Mindanao, Philippines. Philex Mining Corportion. Available at http://www.philexmining.com.ph/wp-content/uploads/2017/05/Technical-Report-on-the-Boyongan-Bayugo-Deposit-.pdf

Organisation for Economic Co-operation and Development (OECD). 2002. What is impact assessment. Available at https://www.oecd.org/sti/inno/What-is-impact-assessment-OECDImpact.pdf

Organisation for Economic Co-operation and Development/International Network on Financial Education (OECD/INFE). 2016. International survey of adult financial literacy competencies. OECD, Paris. https://www.oecd.org/finance/oecd-infe-survey-adult-financial-literacy-competencies.htm

Paranita ES and Agustinus M. 2020. The influence of investment motivation and financial literacy on interest in investing during the COVID-19 pandemic. *Advances in Economics, Business and Management Research* 169:299-303. https://repository.usahid.ac.id/649/1/21.%20The%20Influence%20of%20Investment.pdf

Parkins N. 2010. Push and pull factors of migration. *American Review of Political Economy* 8(2):6-24. Available at https://sites.bemidjistate.edu/arpejournal/wp-content/uploads/sites/2/2015/11/v8n2-parkins.pdf

Patton MQ. 2002. Qualitative research and evaluation methods. Sage, Thousand Oaks, CA

Purba YZW and Saleh W. 2018. An analysis of the feasibility of the copra business in the village of Pendowo Harjo, sub-district of Sungsang, Banyuasin Regency. *Earth and Environmental Science* 102. https://doi.org/10.1088/1755-1315/102/1/012068

Rajendra IGNA and Sumariati DAR. 2018. The role of coconut plants in relations to disaster management in the tropical coastal regions. *MATEC Web of Conferences* 229,01012. https://doi.org/10.1051/matecconf/201822901012

Ramsey L. 2008. Perceptions of family cohesion and achievement orientation among runaway adolescents: Understanding school performance (Senior honors thesis). Ohio State University. https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.572.1547&rep=rep1&type=pdf

Ratnambal MJ & Nair MK. 1998. National coconut breeding programme in India. In Batugal PA and Rao VR (eds.), *Coconut breeding: Papers presented at the workshop on standardization of coconut breeding research techniques,* 20-24 June 1994, Port Bouet, Cote d'Ivoire. https:www.bioversityinternational.org/fileadmin/bioversity/publications/Web_version/362/ch2.htm#South%20Asia

Ravindranath DA. 2016. Potentials of coir as technical textile fibre. In Compilation of Seminar Papers, India International Coir Fair (IICF-2016), 15-18 July 2016, Coimbatore, Tamil Nadu, India. Ministry of Micro, Small and Medium Enterprises and the Coir Board, Government of India. http://coirboard.gov.in/wp-content/uploads/2016/07/papers.p

Reddy V and Sang-Arun J. 2011. Promoting coconut-based agro-ecosystem and efficient product utilization for augmenting on-farm income, improving quality of environment and conserving natural resources [Occasional paper]. Institute for Global Environmental Strategies, Kanagawa, Japan. https://www.iges.or.jp/en/publication_documents/pub/workingpaper/en/2228/fullreport-kerala_coconut_corrected.pdf

ReliefWeb. 2004 January 12. Report on the effects of landslide and flooding incidents in Visayas and Mindanao. https://reliefweb.int/report/philippines/report-effect-landslide-and-flooding-incidents-visayas-and-mindanao

Renzaho AMN, Doh D, Mahumud RA, Galukande M & Kamara JK. 2020. Impact of the livelihoods and income fortification and socio-civic transformation project on the quality of life, wellbeing, self-esteem, and quality of neighbourhood social environment among the youth in slum areas of in Kampala, Uganda. BMC Public Health 20 (1872):1-18. https://doi.org/10.1186/s12889-020-09868-y

Rivera FI, Guamaccia PJ, Mulvaney-Day N, Lin JY, Torres M & Alegria M. 2008. Family cohesion and its relationship to psychological distress among Latino groups. *Hispanic J of Behavioral Sciences* 30(3):357-378. https://doi.org/10.1177/0739986308318713

Rossouw N and Malan S. 2007. The importance of theory in shaping social impact monitoring: Lessons from the Berg River Dam, South Africa. *Impact Assessment Project Appraisal* 25(4): 291-9. https://doi.org/10.3152/146155107X246305

Sabates-Wheeler R and Waite M. 2003. Migration and social protection [Concept paper]. Sussex: Institute of Development Studies. https://assets.publishing.service.gov.uk/media/57a08d2140f0b6497400167c/WP-T2.pdf

Saha S, Goswami R & Paul SK. 2018. Recursive male out-migration and the consequences at source: A systematic review with special reference to the left-behind women. *Space and Culture* 5(3):30-53. https://doi.org/10.20896/saci.v5I3.289

Sanou L, Savadogo P, Ezebilo EE & Thiombiano A. 2017. Drivers of farmers' decisions to adopt agroforestry: Evidence from the Sudanian savanna zone, Burkina Faso. *Renewable Agriculture and Food Systems* 34(2):1-18. https://doi.org/10.1017/S1742170517000369

Schmid O, Quiédeville S, Sterly S, Barjolle D & Midmore P. 2016. Research Impact Pathways: Comparative case study analysis [Synthesis report]. The Impact of Research on EU Agriculture (IMPRESA). https://orgprints.org/30965/1/IMPRESA_WP3_Research_Brief_-_Impact_Pathways.pdf

Schulden JD, Painter TM, Song B, Valverde E, Borman MA, Monroe-Spencer K, Bautista G, Saleheen H, Voetsch AC & Heffelfinger JD. 2014. HIV testing histories and risk factors among migrants and recent immigrants who received rapid HIV testing from three community-based organizations. *Journal of Immigrant Minority Health* 16(5):798-810. https://doi.org/ 10.1007/s10903-013-9811-y

Shaffer L. 2013 November 5. Asia's other aging population problem: coconuts. *CNBC*. https://www.cnbc.com/2013/11/05/asias-other-aging-population-problem-coconuts.html

Siddiqui T. 2003 June 22-24. Migration as a livelihood strategy for the poor: the Bangladesh case [Paper presentation]. Regional Conference on Migration Development Pro-Poor Policy Choices in Asia, Dhaka, Bangladesh. https://assets.publishing.service.gov.uk/media/57a08d16ed915d3cfd0017e2/WP-C1.pdf

Somma M. 2021 September 30. Adaptations of the coconut tree. https://sciencing.com/trees-that-grow-in-saltwater-13429031.html

Stolp A. 2003. Citizen values assessment. In Becker HA & Vanclay F (Eds), *The international handbook of social impact assessment*, 231-257. Edward Elgar Publishing, Cheltenham, UK. https://doi.org/10.4337/9781843768616.00027

Sukphisit S. 2012, September 23. The ugly truth about coconuts. *Bangkok Post*. https://www.bangkokpost.com/life/social-and-lifestyle/313603/the-ugly-truth-about-coconuts

Tacio HD. 2019 July 18. Coconut: major export crop of Filipino farmers. https://pca.gov.ph/index.php/10-news/234-coconut-major-export-crop-of-filipino-farmers

Tadem EC. 2015 June 5-6. Land grabbing, conflict and agrarian-environmental transformation: perspectives from East and Southeast Asia. Discussion Note No. 2, International Academic Conference, Chiang Mai University. http://www.iss.nL/fileadmin/ASSETS/iss/Research_and_projects/Research_networks/LDPI/CMCP_D2-Tadem.pdf

Tur AA and Gomez JAD. 2016. Social Impact Assessment from a multidimensional paradigmatic perspective: Challenges and opportunities (pre-print version). *Journal of Environmental Management*. https://doi.org/10.1016/j.jenvman.2016.10.060

Turner DW. 2010. Qualitative interview design: A practical guide to novice investigators. *The Qualitative Report* 15(3):754-760. http://nsuworks.nova.edu/tqr/vol15/iss3/19

Vanclay F. 1999. Social Impact Assessment. Contributing Paper for the Thematic Review for the Environmental and Social Assessment for Large Dams. World Commission on Dams, Cape Town, South Africa. https://www.researchgate.net/publication/320196961_Social_Impact_Assessment_Contributing_Paper_Prepared_for_Thematic_Review_V2_Environmental_and_Social_Assessment_for_large_dams

Vanclay F. 2003. International principles for social impact assessment. *Impact Assessment and Project Appraisal* 21(1):5-12. https://doi.org.10.3152/147154603781766491

van Dam EG. 2002. Coir processing technologies: Improvement of drying, softening, bleaching and dyeing coir fibre/yarn and printing coir floor coverings. Technical Paper No. 6, Food and Agriculture Organization-UN Rome Italy and the Common Fund for Commodities, the Netherlands. https://www.fao.org/3/y3612e/y3612e00.htm#contents

van Schooten M, Vanclay F & Slootweg R. 2003. Conceptualizing social change processes and social impacts. In Becker and Vanclay (eds) *The international handbook on social impact assessment: Conceptual and methodological advances*, Chapter 6:74:91. Edward Elgar, Cheltenham, England

van Vliet J, de Groot LF, Rietveld P & Verburg PH. 2015. Manifestations and underlying drivers of agricultural land use change in Europe. *Landscape and Urban Planning* 133:24-36. https://doi.org/10.1016/j.landurbplan.2014.09.001

Walker T, Maredia M, Kelley T, La Rovere R, Templeton, Thiele G & Douthwaite B. 2008. Strategic guidance for ex post impact assessment of agricultural research. Report prepared for the Standing Panel on Impact Assessment, CGIAR Science Council. Science Council Secretariat, Rome, Italy

World Bank. 2005. The investment climate, growth and poverty. In World Bank, World Development Report 2005: A better Investment Climate for Everyone, World Bank. https://doi.org/10.1596/0821356828_Chapter1

Wu H, Yao C, Li C, Miao M, Zhong Y, Lu Y & Liu T. 2020. Review of application and innovation of geotextiles in geotechncial engineering. *Materials* 13(1774). https://doi.org/10.3390/ma13071774

Yoon E and Tello S. 2009. Drivers of sustainable innovation: Exploratory views and corporate strategies. *Seoul Journal of Business* 15(2):85-115. https://doi.org/10.35152/snusjb.2009.15.2.004