



SUSTAINING OUR FORESTS,
OUR RICE LANDS, OUR CULTURE

PERSPECTIVES
OF THE
PIDLISAN PEOPLE

Sustaining our Forests, our Rice Lands, our Culture: Perspectives of the Pidlisan People

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CONTENTS

Introduction	2
Indigenous Knowledge and Innovations in Rice Cultivation	5
Pidlisan Territory/Ancestral Domain	5
The People	11
Rice Farming up to end of 20 th Century	12
Other Associated Indigenous Knowledge in Rice Lands Management	24
Indigenous forest conservation and management to ensure water supply	24
Lampisa system	25
Knowledge on biodiversity and ecology	27
Present Challenges and Adaptation Measures	30
Reviving and Strengthening Indigenous Knowledge and Practices, Testing Innovations	33
Unifying people’s views, committing to restoration	33
Reviving and strengthening IKSP in rice production	34
Testing innovations in rice farming	35
Results of Innovations and Revival of Inung-unga	42
Showing the way	47
Summary and Conclusion	50

Glossary¹

Agabat - manner of cleaning stonewalls, paddy dikes and immediate surrounding of rice fields done during land preparation and after the palay heads begin to form

Agamang - rice granary; place where dried palay grains are stored

Aklo - curved piece of wood about 5 feet long used in place of a plow by men and women to turn up soil in rice fields. With improvements in technology, the current aklo is made of a curved metal with a wooden handle

Alado - wooden plow with only one handle and a pointed blade of iron or steel pulled by a carabao

Assiw - piece of wood used by men on their shoulders for carrying agricultural products

Baneng - paddy dikes to hold the water in the rice field and used as pathway

Ba-oy - obaya for 5 days; a ritual performed in the mountains to help prevent the fields from rat and bird infestation.

Basi - sugarcane wine produced during sugar milling time

Begnas - ritual performed before or after a community activity or event, e.g., after the season of house repairs and construction, also before or after major activities within the rice production cycle

Bewew - act of driving away ricebirds by loud clapping of hands and beating of cans

Bika - a species of bamboo plant made into strips to tie the newly harvested rice grains still attached to their pannicles in bundles

Buknag - community people can go to work (working day)

Chiyot - very sticky cooked sugarcane juice which needs to be consumed while still hot or else it hardens

Chang-as - collective work of pumangbon in exchange for animals (chicken, pig) donated by a member of the chap-ay

Chap-ay - traditional center of governance

Chetchet - the act of compacting soil in the irrigation canal or paddy dikes to prevent water seepage

Gabyon - hoe

Galatis - service rendered freely; the umili contributes free labor to perform tasks during general community mobilization requiring each household to render free labor as community service such as in clearing irrigation or

landslide along paths, or roads; clearing creek blockage; and cleaning pathways

Gaman - bolo

Gibo - collective work for immediate repair of irrigation

Gimata - twin baskets joined by a wooden handle carried by men on their shoulders to transport agricultural crops, palay, etc.

Kumpay - sickle

Kupi-it - improvised stick that mimics the sound of the bird, maya

Luwa - woven basket used by women to carry agricultural products

Lakem - hand ripper used for harvesting palay

Lalat - manner of uprooting rice seedlings ready for transplanting

Lampisa - volunteer or appointed person in charge of equally distributing water in rice fields after planting season. He ensures fair distribution of water to all rice fields within the area. Also, he ensures that water supply reaches the end part of the canal. Compensation is given to the lampisa.

Latab - the time when rice grains ripen between the months of Kiyang and Panaba (approximately May to June)

Lebek - sugarcane milling

Lengyat - to clean the paddy dike

Obaya - traditional holiday when people in the community are not allowed to go to the fields, forests, and rivers. People going out or into the village have to pass through a designated path, not the usual pathway used during ordinary days.

Palay - general term for rice before it is threshed or pounded

Panagkames - weeding rice fields at the same time; stunted and dead seedlings are replaced

Pachugan - where palay seeds are sown

Pakde - ritual done in community's sacred area where the old men bring a pot from the dap-ay and butcher a small pig for abundancy and fertility

Panagpapabaey - time for wedding or ceremonies when married couples vow to have their own house (baey) and separate from their parents

Patpatayan - sacred area in the community where a sacred tree stands. It is here where men perform rituals during begnas before they go to their own chap-ay.

Panagsasaad - time of housebuilding

Pinanyuwan - courtship dance using handkerchief

Pospos - tree with sticky sap used by farmers to catch birds

Puchong - piece of stick - stem of cane grass - with knotted leaves placed at entrance of pathways in the community to serve as warning to prevent people from entering the area. It may also be placed near any material to prevent it from being touched and taken.

Puket - very sticky glue from pospos used to trap maya

Sagad - kind of harrow made of several pieces of wood or metal fastened together and pulled by a carabao, used to smoothen the soil after the field is plowed

Salapsap - weeding tool or material with flat, wide, thin iron attached to a wooden handle used to remove or clear weeds

Sanggap - used for weeding and cleaning rice fields; this tool has a wooden handle and flat narrow metal blade on one end which is sharpened for digging

Suwan - tool used for digging soil

Tad-og - lime soil to neutralize acidity of the soil

Senga - common rituals performed by the family during wedding rites, death rites, building houses and thanksgiving ceremonies; includes butchering a number of pigs and chickens and is usually observed for three days when family members, relatives, and neighbors go to eat in the house of the "ninsenga"

Sukyab - time for repair of cogon roof

Tagna - form of payment in kind (pig) for land owned by the chap-ay where a person has built his house. Land that is "natagnaan" means it is permanently owned.

Lawes in chap-ay ownership - tax in kind in the form of chicken to be given during begnas

Tanbo - voluntary donation in kind during begnas

Takik - courtship dance

Tallibeng/Ballangbang - community dance

Ub-ubbo - reciprocal labor exchange by a group that agree to take turns in providing labor for a number of days to each member. With this practice, work that a person could generally do in a number of days can be accomplished faster. This is usually practiced during peak farming periods.

RICE CULTURE OF THE PIDLISAN PEOPLE

*“Our rice landscape is a symbol of our unity
and our values of helping one another.*

*It is a living reminder of our elders’
and ancestors’ aspiration for us
to have abundant food.*

*It sustains our spirituality and our beliefs
that there are unseen beings in our territories
that can help us if we continue
to respect their dwelling sites.”*

(Pidlisan Tribe Organization, 2019)

INTRODUCTION

The *mapayew* or rice landscape is of crucial importance to the food system of the Pidlisan tribe in the northern Philippines. Up to the end of the 20th century, the rice lands provided a diversity of food. The rice production cycle sets the tempo of all activities of the community and embedded in it are cultural values and indigenous spirituality. The interplay of various factors, however, such as the mainstream educational system, government programs, exposure to other cultures, increasing need for cash and subsequent emergence of cash-based occupations (i.e., small scale mining, tourism, farming for the market), and the climate crisis have brought negative changes to the rice lands and rice culture of the people.



This was one of the reasons why some of the women of Pidlisan requested Tebtebba in 2009 to assist their community in assessing their situation to come up with a common view on the issues and concerns of the *ili* (community). In response, Tebtebba partnered with the Pidlisan communities in 2011 and the continuing collaboration has included community action research and documentation of the various indigenous knowledge systems, practices and innovations of the Pidlisan people. One focus of the research and documentation is the rice culture including the development of the rice lands and contemporary challenges.

As intended, the process of documenting and validating indigenous knowledge systems and practices (IKSP) in rice land management and other related knowledge systems increased the appreciation of the leaders and members of the Pidlisan tribe of the underlying principles and wisdom of the IKSP passed on to them by their forebears. A series of workshops* in 2011 and 2016, jointly organized by the Pidlisan Tribe Organization (PITO) and Tebtebba to collectively study the Pidlisan rice culture, enabled members of the Pidlisan communities to recognize some important elements of their community identity rooted in rice production that need to be revitalized and to serve as foundations for innovation and development.

The results of the 2011 workshop on the status and trends of rice land management showed significant erosion of IKSP and the factors that led to the deterioration of the whole rice landscape. In its 2015 planning session, PITO thus resolved to realize the following objectives:

1. Revitalize the indigenous knowledge systems and practices in resource management of the forests and rice lands (e.g., strengthen indigenous conservation and sustainable use of resources);
2. Improve systems and technologies used during rice production as well as post-harvest season to develop the rice culture and contribute to increasing food security;
3. Rehabilitate the communal irrigation system and campaign for the revival of the lampisa (irrigation management) system to hasten restoration of the rice lands not only as production site but also as part of biodiversity habitat building.

To realize these objectives, the PITO developed two project proposals: (1) *Promotion, enhancement and transmission of indigenous knowledge and practices of the Pidlisan Tribe, mid-2015-2016* and (2) *Sustaining our forests, our rice lands, our culture, 2020-2021*. Both were funded by the Pawanka Fund (formerly known as [fund for] Indigenous Ways of Learning and Knowing [IWKL]).

The first project fostered a partnership of the Pidlisan community and schools,[†] specifically the teachers, elders and knowledge holders, and the youth for the development of educational materials to advance the implementation of the school system's Indigenous Peoples' Education within the Pidlisan ancestral domain. This was in the form of workshops and direct transmission of indigenous knowledge on Pidlisan rice culture from the elders or knowledge holders to the teachers and from the latter to students in the secondary and elementary level. In all the workshops convened, the elders' resounding call was for the young people to reconnect with the land.

* In June 2011 around 20 elders participated in a workshop on the status and trends of the different land uses of the Pidlisan Tribe. In February 2016, training workshops were conducted among farmers on sustainable agriculture and innovations in rice production and in August among students, teachers and elders on video production of the Pidlisan rice culture.

† Bangaan National High School and Bangaan Elementary School in Barangay Bangaan, Fidelisan Primary School in Barangay Fidelisan, and Aguid Elementary School in Barangay Aguid



Another part of this project supported (1) awareness raising on the need to revive IKSP and (2) promoting the methodology of “learning by doing” through training in enhancing composting and production of foliar sprays to propagate the use of organic farm inputs. This started collective action by the Guesang Farmers’ Organization Inc. (GFOI) to produce organic agricultural inputs and to test these in their rice lands in Barangay Bangaan.

The second project focused on three action points. One was systematizing the documentation of IKSP in rice land management, which is presented in the first part of this paper. Second was to make a feasibility study on the rehabilitation of the Oliwek-Mabileng Communal Irrigation System which, then, enabled the community to enhance their capacity, doing their own feasibility study and using community processes to lobby concerned government agencies for funding and support for their self-determined project. Third were the activities to start rice land restoration.

This paper highlights the IKSP associated with irrigated rice farming and actions taken to address various challenges through time. It includes the results of recent innovations undertaken from 2014 to 2020 to revitalize the vibrancy of the rice lands and recommendations for future actions. It also includes notes and documentation by various individuals who were tasked or volunteered to document in the process of community research, meetings, workshops and trainings during the projects.

This paper aims to increase appreciation for the Pidlisan tribe’s indigenous knowledge systems, practices and innovations on rice land ecosystems as habitat and production site; serve as reference in advancing Indigenous peoples’ education; and contribute to advocacy work for the promotion, revival and strengthening of indigenous knowledge and innovations within the holistic perspective of Indigenous peoples.



INDIGENOUS KNOWLEDGE AND INNOVATIONS IN RICE CULTIVATION

Pidlisan Territory/Ancestral Domain

The Pidlisan ili—ancestral domain or territory—dominates the northern part of the municipality of Sagada, Mountain Province in the Cordillera Region. Located within the coordinates 17°08'N, 120°54'E, the territory of the Pidlisan tribe is bounded in the south by Barangay Tanulong of Sagada Municipality, in the north by Tubo Municipality of Abra Province, and in the east and west by Bontoc and Besao municipalities; respectively, of Mountain Province.

Pursuant to Republic Act 3590 or Barrio Charter, the territory was divided into four barangays: Fidelisan (the original settlement), Aguid, Bangaan and Pide. The first three were created in 1968 while Pide was created the following year.²

In 2014, a community mapping was done by the Pidlisan elders and knowledge holders in two workshops facilitated by Tebtebba. The main informants were elders who hold the knowledge of their ancestors as well as hunters and fishers of the rivers who frequently monitor their forests. Making use of Google Earth, the participants delineated their territorial boundaries and demarcated the different land uses within their ancestral domain. The result of the mapping showed that the Pidlisan territory has a total land area of 3,902.48 divided into nine (9) distinct land uses. The forest land is the biggest with 3,248.30 hectares or more than 80% of the total land area, of which 74.90% are mainly primary forests and conserved areas.³

The 2014 community mapping delineated the Pidlisan ancestral domain as one whole territory and not according to barangay. All the participants held the view that the domain should be seen as a whole and not to be fragmented as barangays. The community map is considered a work in progress as the communities of adjacent territories have yet to be consulted, and this is planned to be done in collaboration with the office of the National Commission on Indigenous Peoples.

In 2013, a Cadastral Survey was conducted by the Department of Environment and Natural Resources in the four barangays of the Pidlisan tribe. The survey recorded a total land area of 4,434.63 hectares,⁴ which is bigger by 532.15 hectares than that recorded by the 2014 community mapping. According to informants, the Cadastral Survey went beyond boundaries and encroached into the three adjacent municipalities of Bontoc, Besao and Tubo.

Figure 1: Land Use Map of Pidlisian Territory derived from Community Elders with the aid of Google Earth

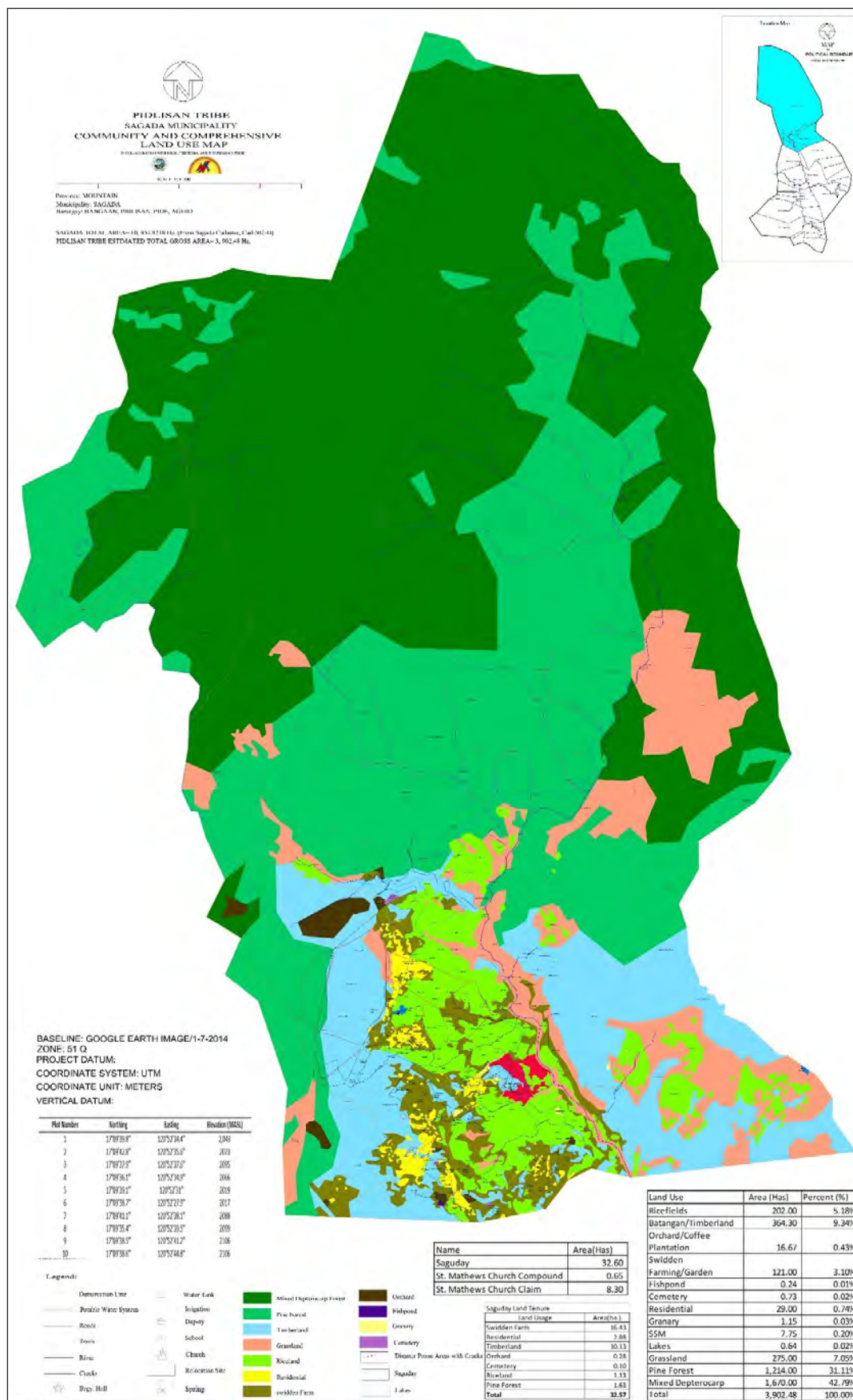
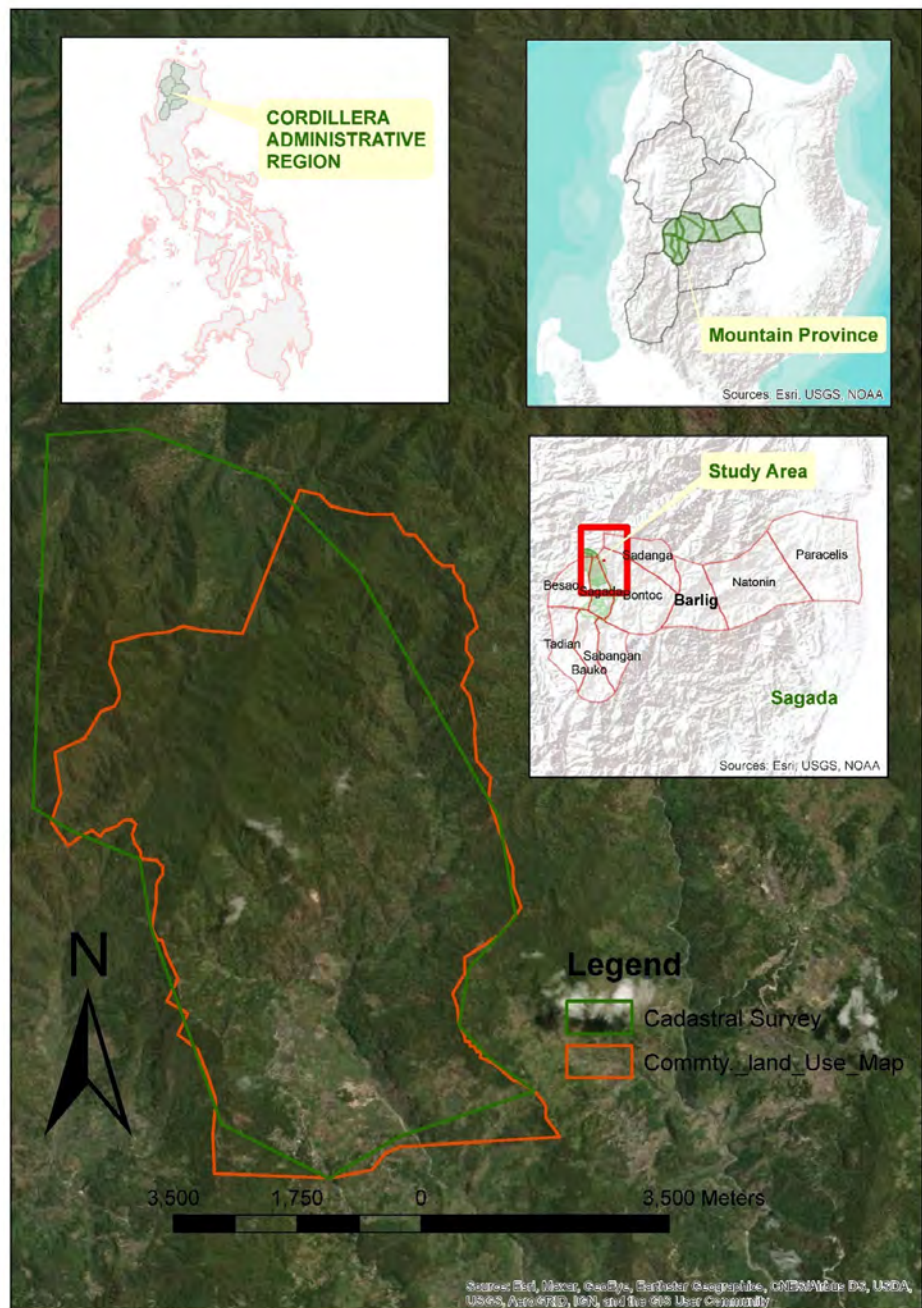


Figure 2: Results of Community Land Use Mapping and Cadastral Survey



Pidlisan is recognized by the Sagada municipal local government as host to the largest forest frontiers in the said municipality and maintains the largest watershed of pine and mossy forests in the north that stretches deep into the Maeng domain in Tubo, Abra.⁵ Waters flowing northwest go into the Maeng territories and proceed to the Abra River and in the west to the ancestral domain of the Agawa people and then to the Ilocos Region. Under the common customary law, the natural flow of the water grants the Maeng and Agawa peoples the right of prior use to these waters even if these come into the territory of Pidlisan. The Pidlisan claim the water right to the creeks and rivers that flow in the southeast into the Pidlisan forests, farmlands and homesites. These waters proceed into the Amlusong River to join the Chico River that irrigates the rice lands of Tabuk, the rice bowl of the Cordillera Region, then flow to Cagayan Valley and Isabela.

Customary land tenural arrangement⁶

As per tenural arrangement, the bulk of the Pidlisan territory is *saguchay chi umili* (Table 1). *Saguchay* denotes collective ownership or stewardship, and *saguchay chi umili* means that all members of the tribe have the right to access and use the resources therein. These include *pagpag* or forests where water comes from and which are sources of food, medicine and wild game. Every member of the tribe has the right to use the water coming from it, to hunt and to gather fruits, like berries and other food. In return, all people have the obligation to protect the forest from fires.

The use of the land within the watershed is limited to the making of *bitu*. These are holes dug in the ground to trap animals. The recognized “owner” is the one who constructs and maintains the *bitu*, performs the required ritual and protects the area from forest fires. If he abandons it, one can clean and maintain these for his use and also perform the ritual for good luck.

Other *saguchay chi umili* are pasturelands and timberlands. The latter is the area where the community can cut trees. Cutting of trees is regulated. Use of wood cut is limited to building a house within the ancestral land and for fuel during wedding and death ceremonies. Regulated cutting of trees and *uma* (swidden) cultivation can be done in all these forest lands. In exchange, all the people are obliged to protect the forest from fires and it is their collective responsibility to put out forest fires. The elders know very well that these edicts must be respected and not violated so as to maintain the functionality of the watershed as the supplier of life-giving water.



The Pidlisan tribe has two other kinds of saguchay, the *saguchay chi sinpangbon*^{*}/*chap-ay*[†] and the *saguchay chi singpangapo*. The first is owned by members of a certain chap-ay and the second is owned by a clan, that has been awarded for a heroic deed done by a clan member. These saguchay include uma, orchard, grassland and timberland. Within these areas, any member of the chap-ay or of the clan, on a first come, first serve basis, can cultivate and plant crops, take care of and manage a piece of land. S/he owns the fruits of his/her labor at the time s/he is caring for that portion of land but not the land itself, so that when she/he no longer needs it, other members can utilize the land for their families.

However, if one plans for longterm improvements, such as constructing a house or terracing and stonewalling a farm, the person must first seek permission from the chap-ay. If permission is granted, s/he will give the chap-ay a pig (for lands with irrigation) or a chicken (for unirrigated lands) during *begnas* (performance of community rituals) for the *tagna*, the announcement of a request to be the longterm steward of a defined portion of land. The chumap-ay shall, then, identify the appropriate area to award to the person.

Table 1. Land areas of Pidlisan according to land use and tenural arrangement

Land Use	Area (in hectares)	Percentage	Tenural Arrangement
Rice field	202.00	5.18%	Family-owned
Batangan/Timberland	364.30	9.34%	Saguchay chi ili or saguchay chi sinpangbun
Orchard/Coffee Plantation	16.67	0.43%	Saguchay chi ili and family owned
Uma/Garden	121.00	3.10%	Saguchay
Fishpond	0.24	0.01%	Family-owned
Cemetery	0.73	0.02%	Saguchay chi ili
Residential	29.00	0.74%	Clan/family owned
Granary	1.15	0.03%	Family owned granaries in saguday chi ili
Small Scale Mining (SSM)	7.75	0.20%	Saguchay chi ili
Lake	0.64	0.02%	Saguchay chi ili; family-owned
Grassland	275.00	7.05%	Saguchay chi ili
Pagpag - Pine Forest	1,214.00	31.11%	Saguchay chi ili, saguchay chi sinpangbon
Pagpag (Mossy Forest)	1,670.00	42.79%	Saguchay chi ili
Total	3,902.48	100.00%	

Result of community mapping generated using Google Earth (January 2014) and elders' workshops

Lands that were awarded with *tagna* (natagnaan) are considered privately owned. Right to “ownership” is made possible by investing labor to make permanent improvements to the land and having been granted such right by the chap-ay. Ownership gives the owner the right to bequeath these properties to a person of her/his choice, usually her/his children.

* Sinpangbon means members of a chap-ay.

† Chap-ay is a multipurpose institution in the Pidlisan community. It is the seat of customary governance where important decisions on tribal matters are discussed, community rituals are performed and men gather for discourse for sharing or knowledge transmission. In the time of headhunting, it served as a venue for military planning and launching of wars, and at the time when houses were a one-room affair, as sleeping quarters for the male population of the community.



Those tilling or using *natagnaan* lands must give an appropriate tax (*lawes*) in the form of a chicken and some wine during the begnas. Any person can also give their *tanbo* (voluntary donations in kind) to the chap-ay during begnas.

Rivers and lakes within the ancestral domain are also considered owned by the tribe. These bodies of water are sustained through protection by customary laws such as the prohibition of chemicals and electricity or battery use in fishing and through indigenous practices of forest protection and conservation.

Natural lakes are saguchay chi ili. However, there are lakes which have become privatized. These include some parts of Lenneng Lake and the whole of Bellang Lake. Lenneng has some shallow parts, which were taken by owners of adjacent rice lands to widen their farms and eventually became family-owned. Bellang was once a cluster of rice fields up to the late 1970s but the fields gradually sank until the area became a lake in the 1990s. The owner, when he could no longer plant rice, abandoned it but the community still recognize his ownership over the lake. At present, the lake is used as a fishpond; the user had to ask permission from the owner who consented on the condition that the user does not remove the stones which mark the boundaries of the lake.

The People

The people call themselves i-Pidlisan, meaning “people of Pidlisan.” They speak Pidlisan-Kankanaey. Kankanaey is one of seven major languages spoken in the Cordillera Administrative Region, and various peoples who speak it have their own particularities, with Pidlisan-Kankanaey being distinct to the i-Pidlisan.

Members of the Pidlisan tribe are those whose parents or one of them are i-Pidlisan (by blood) and those who married an i-Pidlisan (by affinity). The location of residence does not affect membership in the tribe. Whether or not they live within the ancestral domain, for as long as they consider themselves i-Pidlisan, they are regarded as members of the Pidlisan tribe.

The May 2020 Philippine Census placed the population of Pidlisan at 2,429.⁷ At the end of the same year, the Barangay Health Workers (BHW) recorded 2,593 as its total population. Of this total, Bangaan had the biggest number with 1011, followed by Aguid with 632, Pide 496, and Fidelisan 454.⁸



Rice Farming up to end of 20th Century

Development of rice lands

The research was not able to determine where the people of Pidlisan came from. According to informants aged 65 and above, the knowledge and art of terrace building and stonewalling was possessed by their great grandparents. The people also have no memory of nomadic life which they say may indicate that they came from a settled community/ies. Taro (*bakkag*) and other root crops were their first staple food and were replaced by rice in the mid-20th century.

Up to the 1930s, terracing and constructing paddy fields were limited to areas near springs and creeks. The use of lands for these purposes is requested from the *chumap-ay* or council of elders. If granted, the person donates a pig to be used for the ritual where the council of elders would announce to the community that such land has been granted to the donor of the ritual animal.

The lack of water in the summer has been experienced since time immemorial. People recall that even when rice fields were few, these would light up with pith wood torches appearing like fireflies in summertime when people checked them even at night to ensure the said fields had adequate irrigation water.

*San umili id kasin,
ubi san kinkinanda
Bina-og insibsibo cha,
ay maid pestisidyo na*

*No abes san pagbalasaan
Enda inan-anusan
Ay inmey ed Tamboan
Siyay enda nakilagbuwan*

*No abes isaada
Pagey ay inlagbo da
Malatlitan nan poke cha
Mabengasan nan chapam cha*

*No abes san panag-obra
Kulang da is laminta
Kaiw san inusal cha
Mangkabla is sanikua*

*Amam-a ninemnem cha
Mabileng ay irigasyon
Mangdanum as taltalon
Kagapuan chi taraon*

*Enda ginangsagangsaan
Amin ay kadepeppasan
Sada pay abu-abutan
Sada pay es bongbongon*

(Composed by women of Pidlisan)

The few rice fields could only provide for some families for about three months of the year, thus the people depended more on root crops as staple but these too were not enough. To augment their sustenance, people went to nearby villages to work for others and in exchange for their labor, they were given *bin-nge*, bundles of rice panicles laden with grain to be pounded.

When able-bodied members of the household went out of the community, the women and children had to bear the tasks of fetching water, fuel gathering, and ensuring irrigation supply of the rice fields for the growing rice, among others. Noting the difficulty during the seasonal outmigration for work, the elders in the *chap-ay* decided to construct a communal irrigation system (CIS) in the place called Mabileng-Oliwek.

The construction of the communal irrigation canal started in the 1930s.*

* This information emerged during a Senior Citizens' meeting in November 2019 convened in Barangay Banaan and affirmed by PITO Officers on August 17, 2021 in a meeting called to validate this paper.

*Long time ago
People ate sweet potatoes
with bina-og, free of
pesticides
To augment their food
They go to Tamboan with
lots of patience to earn
In carrying the earned rice,
their shoulders are skinned
and their feet get chaffed
In their work, they lack
tools
They used wooden tools to
terrace their farms
The Elders thought of
harnessing
Mabileng for irrigation, for
their source of food
They played the gongs
And bore holes and flat-
tened the slopes*

(English translation)

Before the work started, rituals were performed to ask permission from the unseen, whose habitat may be disturbed, for the safety of whoever would work the land, and for the land to give bountiful harvests.

Through the *galatis*, *gibo* and *chang-as*, i.e. collective work for the common good, the people worked on the construction of the canal through rotation according to *pangbun*, the basic unit of the *chapa*, their indigenous political system. With wooden and stone tools and some metal implements, they carved the mountain slopes. In the 1990s, it was recorded as the longest communal irrigation system in the whole municipality of Sagada, having a length of 9.24 kilometers and a width of 3 meters.⁹ To this day, people wonder how their elders and ancestors were able to construct the canals on the rocky mountain walls with more than 85% in slope.

The completion of the Mabileng-Oliwek Communal Irrigation System in 1952 called for a celebration that was well attended by all members of the tribe. More significantly, its completion solved the problem of water shortage and stopped the seasonal outmigration of men to work outside their community. From then on, the people worked the grassy slopes to build rice terraces through an *ub-ubbo* or labor exchange network where two or more people pool their labor power together with other members of their families to do terrace and rice field construction. Each day of work is reciprocated equally by members of the *ub-ubbo* group.



Part of the Mabileng-Oliwek Irrigation system

Rice lands as production site and as habitat

Having stabilized their irrigation source and having constructed their rice fields, the people developed their rice farming system which reached its maximum level in the 1970s. The rice lands were not only a production site for rice but also a habitat for different non-aquatic and aquatic crops. Contemporary women elders describe the rice fields in their younger days as follows:

We do not only plant rice in the rice lands. After transplanting the rice seedlings, we surround these with taro. We also plant sweet potatoes in the paddy bund, legumes such as rice beans, pigeon peas, cow peas and other vegetables in the outer bund. If there are other spaces, these are planted with bananas, corn, beans, other non-aquatic crops.

During each land preparation, we harvest the sweet potatoes, and taro; we can harvest some vegetables while maintaining the paddy fields. We can gather fish, snails, frogs and mole crickets during land preparation and edible weeds during weeding time.

With such diversity, the rice lands contributed significantly to the protein, mineral and vitamin needs of the community.

Indigenous calendar and rice production cycle: holistic perspective on interconnection for optimum productivity

The people developed their rice cropping calendar which was not only favorable for rice growth but also for labor allocation, soil fertility maintenance, pest control and land productivity.

Every stage of work in the rice production cycle has to be opened by a community ritual in which piglets are butchered in the *patpatayan* (sacred site) and chicken in the chap-ay. The performance of ritual goes with the declaration of *obaya*. Obaya is the holiday of farmers, hunters, and fishers when nobody is allowed to go to the forests, rivers and farms outside of the home site. Also, people going out of or into the village cannot use the main pathways and instead have to pass by a designated path. This practice persists to this time to include people who are engaged in small scale mining and tourism. According to informants, the obaya gives time for the nature spirits to be free from human interventions.

People participate in the ritual which includes hours of prayers, and major rituals like this one involve playing of the gongs and dancing the *takik*, *tallibeng/ballangbang* and *pinanyuwan*. It is during this time that children learn how to dance and play the gongs. The obaya ranges from one to three or five days.



Photo by Robert Pangod

Most rituals mark the start or end of an activity but a specific ritual called *chakchaka* is done as needed. The performance of the *chakchaka* has no definite time and is decided by the *chumapay*. This ritual prays for *labeg*, *kedse* or *ebat* and *gawgaw* from Kabunyan, the Supreme Being. *Labeg* is for *labey* and *chaeg*, for continuous bountiful harvests in crop production and for healthy and prolific livestock. In recent times, this has also been performed for people to have regular employment with good income. *Kedse* means bravery and courageousness, *ebat* is the avoidance of accidents and illnesses in the community, and *gawgaw* is to drive away bad luck and cleanse the community from negative energies (Bowaken, 2021).



New year and start of rice production cycle

The opening of the rice production cycle ushers in the new year of the tribe with the *Pakden di Lakat*, a ritual to start the new cycle of rice production in the month of August. After the *obaya*, the people do *agabat*, i.e., clearing the vegetation on stonewalls and surrounding areas. This is closely followed by or simultaneously done with the *panagpela* or plowing of the soil using *aklo*, the plow drawn by a carabao. The cleared weeds and rice straw are incorporated into the soil to decompose.

The land preparation includes the *pulak chi baneng*, which is done by putting more mud in the paddy dike using the *aklo*, and molding it with bare hands to serve as a pathway and to strengthen the dike so it can hold water. This can be simultaneously done with *agabat*, depending on the labor force and size of the rice field. As farmers strengthen the paddy dike, they collect the mole crickets that make holes in the dikes the cause water to seep out of the rice field. These crickets are included in the family diet.

Tools introduced after the *aklo* were the *pala* or shovel and *gabyon* or grab hoe and later on the micro-tiller.

Seedbed preparation

Prior to plowing, *pachugan* or seedbeds are selected and these are prioritized over the other rice fields. After the tilling, men and women gather green leaves, weeds, and rice husk. They mix these with decomposed or dried manure for fertilizer. In 2000, people started using synthetic fertilizers in seedbeds for the robust growth of rice seedlings.

Farmers select one of their rice fields as a seedbed depending on the distance from the other fields, kind of soil, and area of the rice field. They plow and harrow the seedbed well, then divide it into plots according to the number of rice varieties to be sown. This is done in the month of September.

Sowing the seeds

The sowing of the seeds (*panagpachog*) comes in the late part of October or November. This is preceded by five days of obaya when people stay in the home site and going to the fields, rivers and forests is prohibited. During this time, the women do their seed inventory and carefully inspect their stored rice seeds, segregating different varieties and removing undesirable panicles (those with many empty grains). They also do seed exchange with other women.

For improved germination and further screening of seed stocks, the women soak selected seeds for three days. Empty and undersized grains would then float and these get removed. The three days in water will initiate the germination process, after which the seeds are sown evenly in the prepared seedbed, each variety in its designated plots. This is done in the month of November.

After a week, when the palay seedlings are about 1 inch tall, water is controlled so as not to flood the young plants. When the seedlings are about two inches tall, farmers neutralize the acidity of the soil by using *tad-og*, a whitish soil found in very specific areas.

Maintenance and management of communal irrigation system

Towards the last quarter of the year, the community work to clear the weeds and repair any damage in the communal irrigation canal. This is to facilitate the flow of water which is needed to make land preparation much easier.

Work in the irrigation canal requires the attendance of all households. Even those who do not own rice fields are obliged to participate but will join only one work group. Households with rice fields in different areas, however, have to join every group designated to maintain the irrigation canal that irrigates their rice farms. A farmer can be a member of all groups of land tillers or owners called *pumayas* if his rice fields are scattered and fall under the service areas of all irrigation systems. Usually, a rice field owner renders three to five days of service for the rehabilitation of each irrigation system per year per rice field cluster.

The work is organized by assigning a specific pumayas group to take charge of designated areas. This kind of arrangement was decided on by the chap-ay in 1954 but was modified after the irrigation canal was cemented in the 1990s. The groupings were made per barangay, including barangays Tanulong, Madongo and Bangaan which was further subdivided into three sitios. Each group has to maintain their area of assignment at the onset of farming until the rainy season starts which could be in the month of April or May.

Annual clearing and repair of irrigation canals start when farmers from barangay Fidelisan, whose paddy fields are located on the lower portion, initiate the clearing of the canal section starting from the water source in Bumayeng. The other barangays and sitios then proceed to clean their assigned section, one after the other, until the water reaches the end of the irrigation system. Those who fail to participate are *ma-aptangan* or fined an amount equivalent to the daily rate of labor in the community. All collected *aptang* (fines) are centralized and used to buy food for the participating pumayas. This is still being followed up to the present.



Chetchet

Table 2. Area of responsibility for irrigation maintenance according to barangay or sitio

Barangay or Sitio	Area of responsibility
Barangay Fidelisan	Bumayeng (water source) to Aatey
Sitio Codocod of Bangaan	Aatey to Malawa
Barangay Bangaan	Malawa to Kaka-ongi
Barangay Tanulong	Kaka-ongi to Kiwas
Barangay Madongo	Kiwas to Malobolbo
Sitio Guesang of Bangaan	Malobolbo to Domeg
Barangay Aguid	Domeg to Naidayos
Barangay Pide	Naidayos to Liyang (tailend)

By the month of November or December, the rain comes in sparingly and the fields have to rely mainly on the irrigation water. During this time, the elders go to the source of the irrigation water to do the ritual locally called *Apoy* “to seek divine intercessions from the Kabunyan and unseen dwellers for a continuous water supply. A white chicken, symbolizing water, is butchered as an offering. On their way back home, they make an ocular inspection of the entire irrigation system, identify eroded portions and seepages, and estimate the number of days and persons needed for rehabilitation work.”¹⁰

After the ritual, the elders and barangay officials convene a meeting of all the rice field owners to inform them of the needed repairs on the irrigation system. Usually at this time, the main task is to do *chetchet*, which involves compacting the soil to plug in holes to block water seepage.

Final land preparation and soil fertility maintenance

When the paddy dikes are dried and strong enough, farmers work the rice field again using the plow, hoe and shovel, with or without the aid of a carabao. Then, they gather the weeds they cleaned, get sunflower leaves around their farm and trample these into the soil in the paddy fields for easier decomposition.

After a week, harrowing is done to break down the plowed soil. Then, with the use of a piece of circular wood (*chalolos*) about three feet in diameter and an inch thick or a rectangular wood plank eight inches wide and six feet long, the soil is leveled for the equal distribution of water. Again, the farmers get more green grasses or sunflower stalks and leaves and trample them into the soil to add as fertilizer.

The final phase of land preparation is a second harrowing and the removal of golden *kuhol* (snail) and azolla. This starts in November up to the end of transplanting, as some do this just before planting the rice seedlings.

Chinamey or planting season

Planting season or *chinamey* begins after the Obayan chi Wange in December, and transplanting ends in the latter part of January.

Before farmers plant rice, they select and uproot the good palay seedlings from their seedbed and transport them to the rice field where these will be planted. Called *lalat*, men, women and children can participate in this work. Palay seedlings are transplanted one by one, about three to five inches apart, in rows.

Rice planting should be done in silence. The person who starts planting (*menkayto*) should be quiet and is not allowed to stretch her back until she finishes planting one bundle. According to the old folks, this will make work easier and faster.

Ub-ubbo is practiced during this time to facilitate rice transplanting. Any group can form their own ub-ubbo group such as a group of nursing mothers, of unmarried individuals or of students (who can only work during weekends and holidays), or of older women.

Transplanting starts in Bene (Aguid), then to Bas-angna, to Gowab, to Wangá - from higher elevation to lower elevation or from a cooler to a warmer place.

After a day of planting rice, each household butchers a chicken as nourishment for the body. They pray for the rice plants to grow well and have bountiful yield. After the household does this ritual, the members can attend cultural activities like *senga* or the butchering of pig/s for wedding, construction of a house and death rituals.

After all rice farms are planted, *pakden chi inana* is performed where the *say-at* is done. Part of this occasion is the cooking of *binaod* by the women. Binaod is salted pig intestine mixed with ground rice placed in the center of freshly ground rice and molded into round shapes about four to five inches in diameter, wrapped in sayote or banana leaves, and boiled.

Begnas chi inana marks the end of the planting season. The elders gather in their respective chap-ay to perform the required ritual. Like in many of the rituals, the male population gather in the chap-ay, some staying for the whole day/s sharing stories and experiences. After the *begnas chi inana*, anybody from the community can construct a house or celebrate a wedding.

With the introduction of high-yielding rice varieties (HYVs) in the 1980s, people started to plant their seedlings after the month of December. At present, some do their transplanting as late as April. The traditional rice varieties take about six months to mature while HYVs mature in four to five months.



Uprooting young seedlings for transplanting

Panagkakames or weeding



Panagkakames or weeding

In March, the rice has grown above the knee and weeds have also grown, so the *panagkakames* is initiated. *Menkakames* is the act of cultivating the soil around the rice plants with bare hands in the process of removing the weeds and dead seedlings. Also, stunted sickly seedlings are replaced with healthy seedlings from crowded hills. To do these, women have to walk carefully in between rice plants that are narrowly spaced.

It is also during this time that the soil, *tad-og*, is added in areas where the field is infertile. Signs of infertile soil include stunted (*matiltit*) plants and a significant number of seedlings dying (*matetey*). Nowadays, farmers use inorganic fertilizers. *Tad-og* is very scarce and it cannot supply all the farms. *Tad-og* needs further research.

Before or after the grain formation (*menlito*), *agabat* and *lengyat* (cleaning of stonewalls and of paddy dikes, respectively) are done as needed if the weeds have already grown. The weeds removed from the stonewalls are inserted into the holes and rat tunnels in the stonewalls (*mensuwat is tekaw*) and surroundings of the rice field. If not enough, stems and leaves of pine trees, used plastic bags and unusable clothes are gathered and used.



*Panagbewew or
guarding the rice fields*

*Panagbewew: plastics
on tops of poles to drive
away the rice birds*



Photo by Robert Panged

Panagbewew or guarding the rice fields

By the months of April and May, the grains start to mature. *Tilin* or rice birds increase and go to the rice fields to eat immature grains. The farmers put up scarecrows in the fields and sometimes stay there the whole day to chase the birds away (*bewew*). Others make use of the sticky sap of the *pospos*, a kind of tree, to catch the birds. Farmers build a hut near the rice field and make a *kupi-it*. An improvised stick which makes a sound resembling that of the maya, the kupi-it draws other mayas to land on the sticky sap, making them unable to fly.

While waiting for the grains to mature, men of the tribe go to the mountain to gather *bika*, a plant belonging to the family of bamboo that is used to bundle the rice harvest in the months of May to July.

Panag-ani or harvest time

The month of June marks the start of harvesting of rice or *panag-ani*. Prior to this activity, the i-Pidlisan celebrate the *Begnas di Latab or saan di pagey*, or bringing the rice home. On the third day of the celebration, the chumap-ay performs the *pakde* and obaya is observed for the entire duration of the ritual.



Present day harvest season Scene

The tool for harvesting and cutting the rice plants panicle by panicle (one to four panicles) was the *lakem* (small knife held between the index and middle finger). But due to the introduction of new varieties such as the tillering varieties which produce more than three tillers, the people now use a sickle in reaping. Threshing is done with the use of a pestle but this has given way to the wooden thresher and other equipment for threshing. The threshed grains are winnowed to remove the chaff and put in sacks. At the end of the day, the threshed grains are brought home and are further winnowed using an electric fan or the winnower called *ligao*.

After the harvest season, old men butcher a chicken in the chap-ay, then every household follows. Called *panagsasay-at** or *aaw* as referred to at the household level, every household performs the ritual by butchering a chicken which they may share with their neighbors or relatives in a nearby barangay. During this *samyang* or *say-at*, a prayer of thanksgiving is made by an elder once the chicken is butchered. The people believe that in doing the samyang or say-at their harvest will be enough for them (*sumika*) until the next harvest. After the samyang, the dried *palay* are stored in a rice granary or *agamang*. *Bin-e* or the selected seed stocks intended for the next planting season are separated from the rest of the harvest and piled in one corner.

After a family is done with their harvest, they butcher a chicken (*a-aw*); the family members can now attend any cultural activity being held in the community such as wedding, senga, wake and others.

When most of the people have finished harvesting, the community celebrates the *Obayan chi Kesep*. The chumap-ay-in-charge performs its rituals by butchering a piglet in the Papakdean in Annew, then a three-day obaya is observed. The Begnas chi Kesep has been merged with Begnas chi Lakat since 2005 (Diosan).

In summary, the calendar followed in rice production enables the decomposition of the green manure which becomes ready to be absorbed by the time the young rice plants are planted. This makes possible the flowering of the rice to coincide when daytime lengthens and before the onset of the rainy season. These are important considerations as longer days favor the formation of grains and rains, especially as heavy rains cause pollen to fall resulting in empty grains.

Every major activity in the production of rice has to start with a community ritual (Table 3). This results in synchronized activities all throughout the rice lands which also serve as natural pest control. Pests attack and can have their share of food but the damage is insignificant as they spread themselves all over the rice fields. When vegetation is turned over into the soil and come harvest time, pests are deprived of food and hosts which may render them incapable of reproducing. Finally, the synchronized activities are favorable to the community system of *ub-ubbo* (same work at certain times).

* Say-at is a ritual performed by the chap-ay for the community; on the household level the ritual is called *aaw*.

Table 3. Time of activities and corresponding rituals in rice production cycle

Month*	Ritual	Activity	Significance of activity and reasons for ritual
<i>Kosikos</i> August	Pakchen chi Lakat/ Pangpangon chi Obaya Begnas Chi Lakat	New year; start of the rice cropping cycle signaling the start of land preparation; Clearing the surroundings of fields and turning over cleared vegetation into the soil	Time for the community to pray for a successful year of farming
September		Panagpabaey (traditional wedding), panagsasaad (house construction, sukyab (repair of roof) menbalasa (to earn cash)	Time to prepare for sowing of seeds Performance of community rituals for successful sowing and growing of seedlings
<i>Adogna</i> October	<i>Pakchen chi Pangat</i> <i>Begnas chi Yabyab/</i> <i>Kalub chi Pangat</i> when rice seeds sprout	Plowing and polak or strengthening the paddy dikes by adding more mud Removal of remaining weeds in stonewalls, harrowing	To pray that seeds grow well and will not be eaten by birds, insects and rodents
<i>Kiling</i> November		Sowing of rice seeds	Time for women to inventory their seeds and for seed exchange with others
<i>Lipuned</i> December	<i>Wange, Sungba</i> (first day of buk nag)	Start of transplanting rice seedlings starting in higher elevation	Opening of planting season For abundance of seedlings for planting For protection and growth of seedlings/plants
<i>Kilalaw</i> January		Continue rice planting in lower elevation rice fields	
<i>Bakakew</i> February	<i>Pakchen chi inana and begnas chi inana</i>	Performance of say-at Start of house construction or repairs in the community	Inana means rest. The rituals provide time for people to rest (<i>mangilleng</i>) and for elders to discuss other community concerns
<i>Opok</i> March		Irrigation water decreases and has to be distributed equally Booting period of rice plant starts	Work of lampisa becomes very significant during this time
<i>Kitkiti</i> April	Ba-oy	Weeding of rice plants which started in March continues. Weeds around fields are cleared and used to fill in rat holes in stonewalls	Prevention of pests, diseases and invasion of rodents on rice plants
<i>Kiyang</i> May	<i>Saa'n Chi Pagey</i> (three days obaya) <i>Begnas chi Latab</i> (five days obaya)	Time for house repairs and construction and panagpabaey Start of harvest season	Rituals seek for abundance of rice harvest (<i>sika</i> †) and prosperity (<i>gabay</i>)
<i>Panaba</i> June	Begnas chi Latab, saa'n di pagey	Harvest season	For abundance of harvest
<i>Bandawey</i> July	Pakche/Pasika (three days obaya)	Harvest season about to finish	Thanksgiving for the harvest, abundance of harvest, and care and protection of the grains from rodents

Note: *Chakchaka* is performed as needed.

* The column on months first mentions the name of the month in the Pidlisian language, then as it is referred to in the Lunar calendar.

† Sika pertains to abundance and, if used in rice harvests, it usually means that consumption of the rice will take a much longer time. In a workshop of elders and teachers convened to document the Pidlisian rice culture, all five participating elders attested that one cavan of rice grown in their ricelands is consumed much longer than one cavan of rice that they buy from the market.

OTHER ASSOCIATED INDIGENOUS KNOWLEDGE IN RICE LANDS MANAGEMENT

Indigenous forest conservation and management to ensure water supply

Of the i-Pidlisan's nine land uses, four - pagpag, timberland, orchard and swidden farms - are considered forest lands. Communally owned and managed by the i-Pidlisan, these forest lands are interconnected with the rice lands.

Watersheds are delineated. In these areas, cutting of trees and farming are strictly prohibited, and there is a time for hunting and for gathering herbs, food and berries. There are sacred sites that are off limits to humans. The *batangan* or timberland, where people can get wood for their fuel and construction needs, is also defined. The *amam-a* or male elders have managed the collective protection and utilization of these forests, and it is through the chap-ay and community gatherings that customary laws, practices and beliefs in forest protection are imposed and taught. The table below lists the mountain ranges that are communally owned.

Table 4. Communally-owned watersheds (Kagapowan chi chanum), location and type of forest

Forest and Watershed Resources	Location	Forest Type
1. Pusong	Between Tanulong and Pidlisan	
2. Wawalitan, Pinudo	Located above Bomod-ok Falls above Pinucho	Pine forest
3. Babawian – sacred sites	Located below Pinudo pagkakaweyan	Pine forest
4. Palikong	Bomod-ok Falls above Magaet-get Beside Pinucho, left side	Mossy or Pine forest
5. Magaet-getan	Below Palikong	Pine forest
6. Anopo	Beside Magaet-getan Ridge	Pine forest
7. Pinmawpaw	Located above Data, Bandong Hill, Magaetget	Mossy and Pine forest
8. Kakaadingan	Ridge boundary with Mainit, Bontoc	Mossy and Pine forest
9. Bato Ridge	Boundary above Los-ok, left side	Mossy and Pine forest
10. Gusod Abikian, Lanas Banate, Matabako, Ginge, Kakaongi	Sisipitan/Ay-ayagan Mountain	Mossy forest
11. Kaman-engel	Boundary	Mossy forest
12. Mengmeng	Kaman-engel/ boundary with Agawa	Mossy forest
13. Boasaw-Banaao	Boundary with Agawa, Besao; above irrigation of Boasao-Masini	Mossy forest and grassland
14. Masini	Boundary Besao-Sagada	Mossy and Pine forest
15. Miging/Polis	Ridge	Pine forest, kapean
16. Katokbowan	Ridge	Mossy forest, kapean
17. Langsayan	Ridge Sagada-Besao boundary	Pine forest, kapean

A recent challenge has been the multiple use of the batangan. Nowadays, more and more people use the timberland to cultivate and grow coffee, fruit-bearing trees, and under these trees root crops, legumes, and other short-term crops. The community has yet to address these questions: To what extent can people cultivate in the timberland? Will cultivated areas become privatized as perennial crops are considered permanent improvement? Will these be privatized without the permission of the chap-ay?

Respect and customary protection of water sources from pollution

Aside from conserving and protecting the forests through customary laws, certain norms and beliefs also protect and safeguard the water sources. First, springs are believed to be inhabited and guarded by spirits. These spirits can cause an increase in the water flow if they are pleased but can also make them dry if they are displeased. In relation to this belief, the people show their respect toward the springs by observing certain taboos. They do not bring detergent, bath soap or sanitary napkins near springs since the spring spirits find these implements unclean and objectionable. Spirits live in springs as guardian and are believed to be averse to animal waste, hence grazing and tethering animals like cattle and carabao near springs is strictly not allowed. Furthermore, people coming from a wake or who are *men ngilin* or in mourning avoid passing by these water sources because the spirit dwellers are repulsed by death.

It is believed that these taboos if not followed will decrease the volume of water flowing out or it may totally disappear.

Moreover, the deep respect for water sources is manifested through rituals, like the earlier cited apoy chi balaan. This ritual is done by elders in certain water sources of the community where a white chicken is butchered and cooked with salted meat. They should follow the taboos, otherwise the ritual would come to naught. For example, the elder who performed the ritual should not go to the house of a dead person or any senga or butchering of pig for a ritual being performed in the community. He will just stay in his house for a given period of time until the moon changes in size (*mensukat nan taon*). In some areas such as in main irrigation systems, it is the lampisa or elders who perform the apoy chi balaan.

Lampisa system

For irrigation management, one essential component is the lampisa. The lampisa is a system of irrigation care and maintenance and egalitarian water distribution and also refers to the person who performs these tasks. According to key informants, the lampisa system started about the time when they constructed the earthen Mabileng-Oliwek Communal Irrigation System. It ended conflicts among individuals and ensured water access to all users including rice field owners. In 1979, Pidlisan had a total of 14 lampisa that by 2005 had decreased to only six, servicing Mabileng (3), Balikwey (2) and Lakchag (1). (MRDC, 2005)

The lampisa or water managers are appointed by the chumap-ay and everyone is expected to entrust the water distribution to them throughout the duration of the rice cropping period, especially after

transplanting to make sure the planted seedlings have enough water. They are tasked with the following:

- to ensure that all rice fields receive a fair share of water at all times;
- to conduct regular inspection of the entire irrigation system to make certain that water flow is maintained; and
- to do minor repairs.

If the irrigation system needs major repairs that require gibo or collective work, they report these to the chumap-ay who will then mobilize the people to do the irrigation repair.

Excerpts from “Lampisa: water distribution system among the Pidlisan”¹¹

The selection of lampisa is vital to the success of the system. Since the lampisas are tasked to take absolute control over water regulation, a set of stringent requirements are imposed both by the dap-ay elders and the barangay officials. According to the requirements, a lampisa, preferably male, must be industrious, patient, dedicated, just, respectably brave and does not bow to political kinship pressures.

Voss documented past events to justify such a tough selection process as shared by the lampisas:

Case 1. Sometimes I am afraid to enforce a penalty on a guilty person, especially if the offender is some prestigious personality. But this is checked with the help of the other lampisa who gave me moral backing; or if necessary, with the help of the elders and the barrio officials. We lampisa are always being reminded that our duties are in the interest of the whole village as against the interests of one man - no matter who he is.”

Case 2. One of the lampisas reported that he was forced to fine a nephew and a cousin during the past year because they took water out of turn. When he levied the fines both called him dirty names; but when he challenged them to take the cases to the dap-ay, they backed down because they knew they were wrong.

The greatest challenge to this system comes from relatives of the lampisa, or from powerful influential people demanding more than their due on the basis of ties of kinship or patronage. However, the lampisa was able to maintain his fairness through the help of the old guards of the system - the elders of the dap-ay, who used past similar experiences to override such pressures. They cited that the lampisa system had failed in Tetep-an where it originated, when the lampisa had shown favoritism and the people refused to pay their dues.

Given the complexity of their work, the elders advised all lampisa to implement the system based on the guiding principle of equal rights of all farmers to communal water resource. Likewise, the following set of rules and penalties were drafted:

1. All lampisas are given absolute control over water regulation. Anyone who interferes with the duties of a lampisa, or swears at him without due cause will be fined and reprimanded.
2. A lampisa who is found guilty of negligence shall pay a fine to the rice field owner commensurate to the damage. A rice field owner has the right to sue a lampisa for negligence and collect damages. However, he must present strong evidences lest he will be fined in return if the lampisa is found not guilty.
3. A lampisa who is found guilty of favoritism shall be penalized. He shall pay a dear price given his delicate position. He shall also be reprimanded and undergo re-orientation.

For the performance of his tasks, the chumap-ay set the policy that a lampisa shall receive five percent of the total harvest of each farmer beneficiary as payment for his services. Aside from being crucial in rice production, the presence of the lampisa makes it possible for the men to engage in other occupations without worrying that their fields will dry up. This is highly significant today as people have to earn more cash to pay for educational expenses of their children and other basic household needs.

Knowledge on biodiversity and ecology

The years of rice growing has taught the people the need to acquire and maintain different rice varieties. Up to the 1980's, people had been increasing their traditional rice varieties (TRV's) which reached more than 50. Changes have taken place and the documented rice varieties in 2012 consisted of 32 varieties (15 TRVs, eight HYVs and another nine TRVs from intermarriages involving neighboring communities).

Like in other communities of the region, the women of Pidlisán know that for every eco-niche of their territory, there is a certain variety suited to it. In addition, they rotate the rice varieties to be planted. As one of the women remarked, "One of the teachings of my mother, that she is emphatic about, is that the payew will forgive you if you plant one variety of rice in two consecutive croppings but she will not forgive you if you plant one variety in three successive croppings." (Angela Yocogan, 2019)

Loss of knowledge on the characteristics of traditional rice varieties and the disappearance of some of these varieties have been observed.

Table 5. Observations on rice varieties

Traditional Varieties that Disappeared	1960s	Teptepep
	1970s	Ginolot varieties - Boltikey, Kiwisan, Saluya
	1980s	Kiwisan, Inegnas, Linag
	1990s	Chinol-os, Boltikey
	2000s	Ingtan, Banyos, lastog
Becoming less	Since mid-80s	Saba, Palnit, Bolik, Magumbal Balatinaw (purple in color), Pastilyas
Rare		Linibayan, Apolog, Saliket ay gagapasen, Waray, Inagindang, 160, Pastilyas
In demand	1990s	Lampakan, Bordagol
Others		
From high demand to rare	2000	Pokpoklo (2018), High Noon (2000)
Abundant due to marketability		Balatinaw ay menmansa, Red rice
Adopted HYVs		Taiwan, Senyora (minimal at present) Bordagol , Dash-1, C-1, C-18, 160, High Noon, Masipag, California, Double Diamond, Darat



The payew does not only provide rice. Through time, aquatic and nonaquatic flora and fauna made their habitats in the rice lands. Some of these are collected as food and contribute to the community's diet. A method of seasonal harvesting has ensured the regeneration of these resources.

Table 6. Naturally occurring edible plants and animals in rice lands

Local term	English term/Description	Time of Harvest
Bayyek/Tukak	Frog	Any time of the year but during new moon
Aggong, Lescheg (Lawasan, Kutitiyan) Ket-an	Five species of snail	After rice harvest up to planting season
Kaka [two species]	Mole cricket	During land preparation
Saksaknong	Edible aquatic weeds	During panagkames or weeding
Sungan	Edible grasshopper	During panagkames or weeding
Kaling	Japanese mudfish	During land preparation

Note: Mudfish and snails were abundant up to the 80s and were marketed locally in the town center.

Aside from the naturally occurring plants and aquatic animals, the rice plants are intercropped with taro [*Colocasia esculenta*] planted at the edges of the rice plants within the paddy fields. Outside the irrigated part, rice beans, pigeon peas, cow peas, other legumes, camote, and onion leeks are planted in the outer paddy bunds and if other spaces are available, also bananas.

Finally, the community practice of rotating camote, corn, beans, and other vegetables with rice by raising up plots above the water level, but retaining water in the small canals that separate the plots, has helped aquatic plants and animals to survive. Thus, paddy fields are optimized as a production site.

Ecosystem balance exemplified in rice land management

From 1972 to 1977, the practice of *uma* or rotational farming in Pidlisian drastically expanded due to the push of cash economy and population increase. Rotational farming are patches of farms within the forest lands where different crops are rotated and if soil fertility is depleted, these are left to rest. Seeds from plants from surrounding forests will eventually and naturally regrow into a forest.

Pushed to produce more income, people cleared much wider spaces and opened up more forest lands for rotational farming. The peak of *uma* was in 1983 when almost every household in Aguid, Pide and Fidelisan cultivated *uma* lands. The once forest lands of Abikiyan, Los-ok and Data were converted into squash plantations. It was during this time that the people experienced rat infestation on a yearly basis, and rat damage went as high as 50% of expected rice yield.



The elders analyzed the situation and came up with the view that in converting the forests to farm lands, the people were destroying the habitats of rats which had to look for alternative areas, thus invading the rice lands. Thus, in 1985, the chumap-ays declared parts of Datakan and Sisipitan as off limits to uma cultivation to solve the problem of rat infestation. This is one of the profound discernments of the elders on the interconnectedness of ecosystems within the territories. As a respected elder of Pidlisan said, “To restore the productivity of our rice lands, we had to restore the habitats of the rats in the forests.” (Somebang, 1991)

Rice production sustains culture, spirituality and indigenous values

As seen in the rice production cycle, rice farming plays an important role in the transmission and development of values and culture. During the community ritual and five-day obaya that open each of the rice production’s four major activities, the men gather in the chap-ay to participate while the women congregate in the *ubub-unan* (open space paved with flat stone with bigger stones on the edges to serve as seats designated for women) to observe the solemnity of the ritual on the first day. In the remaining four days, the men and women also usually gather in these same places to share knowledge, ideas, discoveries, and experiences.

Given the short period for rice transplanting and harvesting, people normally form their ub-ubbo groups to cope with the monotony and to speed up the work, thus maintaining the spirit of cooperativism.

Also, relatives of a family, where the mother has just given birth, are obliged to plant that family’s rice fields or to harvest the rice of a bereaved family when death occurs during harvest time.

Present Challenges and Adaptation Measures

Up to the 70s the development of the rice culture of the Pidlisan tribe occurred with minimal external intervention. The tribe was able to develop their knowledge to optimize yet conserve and protect the land, water and resources. However, various changes and factors have since affected their rice cultivation, negatively impacting the whole rice lands ecosystem.

Table 7. Summary of major changes that impacted rice lands

Timeline	Changes/Description of rice lands
2020 to present	Start of increase of restoration of abandoned rice fields, um-a, and also expansion of agricultural lands into forest lands with about four hectares planted with coffee
2011- 2019	Additional cash-based occupation, particularly tourism activities, resulted in more abandonment of rice fields, and their corresponding degradation due to non-cultivation
2010	Widespread use of synthetic fertilizers especially in rice seedbeds and vegetables grown for the market
2005	Beginning of non-cultivation and abandonment of some rice fields as people focused more on small scale mining (SSM). SSM started in the 70s.
2004	Start of saktoto infestation, still a major pest at present

1990	Start of use of inorganic fertilizers mainly by those who started growing temperate climate vegetable for the market Presence of saktoto observed
1986-1990	Introduction of high-yielding varieties
1986	Introduction of first invasive species - the golden apple snail

First was the entry of invasive species like the golden kuhol or apple snail introduced by the Department of Agriculture in the early 1980's, followed by the *saktoto* (worm of unknown origin) which appeared in the mid-90's. The golden snail caused the extinction of four out of seven species of snails, leaving only the *lescheg*, *ket-an* and *cob-i* and significantly decreased the population of mudfish.

Aside from eradicating some species, the golden kuhol was a very serious pest in the rice farms, feeding on the young rice seedlings which if not successfully replaced, led to marked decrease in yield. After some years of observation and failing to get rid of the golden snail, the people lengthened the number of days of rice seedlings from one and one and a half months before planting them so that they would be hard and strong enough to evade damage. This reduced the damage of seedlings by the golden kuhol. Also, people adapted to the taste of the kuhol and it became part of their food. The golden snail is now acceptable as they also observed that once the seedlings reach a certain age, they are no longer bothered by the snails and can grow to maturity. The snail now depends on the vegetation that grows in the paddy fields, effectively doing the weeding. This saves the women labor in weeding the rice plants (*kames*). However, they cannot bring back the snails that have disappeared.

Still a major pest, the saktoto are threadlike worms that number in the millions boring holes into paddy fields causing water seepage and burying young, newly transplanted rice seedlings if they happen to turn the soil over.

Second is the lack of labor force. More and more people prefer to work for cash and, given the option, they will choose a cash-based occupation over subsistence livelihoods such as rice growing. This is common not only among the young people of today but also among the middle-aged population as seen in the tourism industry.

The lack of labor force caused the weakening of soil fertility maintenance and field sanitation. Land preparation now usually starts in November, and soon after transplanting. The



farmers have to throw away cleared vegetation as it will not be favorable for planting young seedlings, thus weakening fertility maintenance. Another reason is their use synthetic fertilizers. Also, aside from growing rice, each family has to find ways and means to earn cash. This made it difficult to synchronize the activity of the ubbo group as each had his/her own schedule to follow.

The net effect of invasive species and weakened practice of soil fertility maintenance significantly reduced yields by about 50% in some fields.

The gathering of people during traditional holidays has also greatly diminished, negatively affecting the transmission of knowledge from elders—the holders of indigenous knowledge—to the young people.

Third is the change in climate, i.e., typhoons occurring at the end of the year, warming of temperature, confusing onset of the rainy season with early heavy rains sometimes occurring when the rice plants are flowering, and strong typhoons happening during harvest time. These are disasters that also significantly damaged or reduced rice yield.

All of these discouraged some farmers to continue cultivating their rice lands, hence the abandonment of some fields.

With the yield decrease and field neglect, the farmers could no longer produce the fair remuneration of the lampisa. No lampisa has been appointed in Pide, Aguid and Bangaan since 2007, and in Fidelisan since 2014. The absence of lampisas aggravated the situation as the community faces the problem of lack of irrigation, and more people are not cultivating their fields. In the search for solutions, people adopted the readily available technology of agrochemical inputs which has become widespread since 2010.

By 2014, the rice land ecosystem had reached its worst degradation which led the PITO to plan their restoration in 2015. From then on, the community under PITO's leadership has taken actions through continued collective learning to recover the vibrancy of their rice lands and to revitalize the associated indigenous knowledge systems and practices.



Abandoned payew converted to um-a/garden during the pandemic.

REVIVING AND STRENGTHENING INDIGENOUS KNOWLEDGE AND PRACTICES, TESTING INNOVATIONS

Unifying people's views, committing to restoration

The PITO's campaign to revive knowledge systems and practices in resource management with rice lands and forest lands as priority areas initially drew little interest among the people. Its officers began with an active campaign to revive soil fertility in farms after procuring two shredders* to help communities in composting. But only the GFOI, through collective action and a few individuals, heeded the call.

Thus, the PITO project, "Promotion, enhancement and transmission of indigenous knowledge and practices of the Pidlisan Tribe," meant mainly for advancing Indigenous Peoples' Education in the school, included the rice farmers. This project continued the documentation of IKSP in rice production which gave opportunities for continuing discussions on the rice lands.

Workshops convened for elders to transmit their knowledge to students, facilitated exchange of views among the Pidlisan elders and youth. In one such workshop, the young people declared the importance of sustaining the rice terraces as they are the beauty of their ili, giving them the opportunity to engage in the tourism industry. To the elders, however, while they agreed with the youth's perspective, the rice terraces go beyond the aesthetic value—they contribute greatly to the community's food security. They recalled that during the rice hoarding and rationing the country experienced in the early 70's, the i-Pidlisan were not affected as they had rice in their granaries. To them the rice lands are a living symbol of their ancestors' ingenuity, patience, perseverance and cooperation in upholding the common good and unity of the community.

The discussions generated interest and differing views among the various sectors of Pidlisan. To some people, the community can do away with rice growing, citing the cold climate, availability of cash-based occupations like tourism and mining, various problems such as the intensive labor it requires and its vulnerability to climate change. When tourism peaked in 2018-2019 especially in the months from February to May and in September, people could earn in three to four days the equivalent of one sack of rice.

Despite differing views, however, most of the people arrived at a unified common ground that the risk from climate crisis, while significant, should not discourage the community from working on and sustaining their rice lands. Allowing the continuing abandonment of rice fields, the elders declared, would impact heavily on their food security. In August 2021, PITO formalized their resolution to restore the rice lands in a Declaration of Commitment. (Annex 1)

* The shredders were purchased with funding support from Tebtebba. One is managed by the Guesang Farmers' Organization, Inc. (GFOI) and the other by the Fidelisan Farmers Association (FIFA).

Reviving and strengthening IKSP in rice production

PITO implemented the revival of some indigenous practices in rice farming simultaneously with experimentation in some farm innovations. This entailed a two-pronged approach of awareness raising and of actual farm demonstrations. Twenty-one farmers volunteered to be cooperators* in the experiment to revive some cultural practices and test innovations in their rice farms including monitoring the performance of their rice plants. They would also allow their fields to be learning or observation sites for other members of the community.

The IKSP revival focused on three important cultural practices: (1) traditional calendar of the rice production cycle; (2) *inung-unga* or early transplanting of seedlings; and (3) *ubbo*.

Strengthening observance of the traditional calendar, however, was not possible as the project started only in February. The compromise was to have three criteria of cooperator selection. First was to choose farmers who had not yet planted and whose seedlings were still considered *inung-unga* or young (not more than 25 days). Second was willingness to synchronize their activities. Third was a commitment to record the results of their monitoring activities.

For the practice of *inung-unga*, the cooperators transplanted their seedlings 25-30 days after sowing compared to the usual practice of transplanting seedlings when they were around 45 days old.

Strengthening the *ub-ubbo* or labor exchange networks, however, faced some problems. While favorable to smaller households with limited family labor force, this is no longer practiced as people would rather be paid with money. Reinforcing the *ubbo* also did not materialize partly due to the COVID-19 community quarantine restrictions and how to do it during the pandemic was not discussed. What was continued was the collective action of the Guesang women in producing organic fertilizers, compost and foliar fertilizers, which were applied by each family in their individual farms.

Testing innovations in rice farming¹²

Before the turn of the century, green manuring (placing cut vegetation around fields at the start and final stage of land preparation) was extensively practiced, giving sufficient green food to the soil and time (five months) for decomposition. At present, people do land preparation and plant young rice seedlings in a month's time, throwing away green manure which, if undecomposed, is inconvenient for them to use. What is, thus, needed are fertilizers that can readily be absorbed by the plant, hence the need for innovations.

In 2015, PITO implemented trainings in making organic farm inputs after being supported with two shredders by Tebtebba to revitalize and innovate traditional farming systems both in rice lands and unirrigated farms. The shredder would lessen the labor in making biofertilizers by mechanizing the cutting of vegetation and reinforce the use of natural vegetation as source of farm inputs. One shredder was given to the GFOI which constructed housing for the machine that served as a Biofertilizer Center. GFOI organized a work group that maximized its use, and its members learned how to make foliar

* Cooperator in this document refers to a farmer-volunteer who performs the needed tasks in the experiment to study the effects of reviving some indigenous practices, some features of the system of rice intensification and innovations for soil fertility enhancement.

sprays, fortifying them with fermented plant juices (FPJ) and fermented fruit juices (FFJ) which they similarly produced. They were also successful in enhancing the decomposition process through the use of indigenous microorganisms (IMO).^{*} The Biofertilizer Center was further maximized to introduce innovations in the rice lands drawn from some features of the System of Rice Intensification (SRI)[†] through learning by doing.



Production of biofertilizers.

^{*} The use of microorganisms from the forests is traditional knowledge of the Kalanguya of Tinoc, Ifugao and the Butbut of Kalinga.

[†] <http://sri.cals.cornell.edu/aboutsri/methods/index.html>

Rice Plants seedlings are transplanted:

- **very young** at the two-leaf stage, usually between eight and 12 days old
- **carefully and quickly**, protecting the seedlings' roots and minimizing the transplanting shock
- **singly**, one plant per hill instead of three to four together to avoid root competition
- **widely spaced**, to encourage greater root and canopy growth
- **in a square grid pattern**, 25 by 25 centimeters or wider in good quality soil

Rice fields soils should be kept moist rather than continuously saturated, minimizing anaerobic conditions as this improves root growth and supports the growth and diversity of aerobic soil organisms. Rice plants should be planted singly and widely spaced to permit root and canopy growth to keep all leaves photosynthetically active. Rice seedlings should be transported when young, less than 15 days old with just two leaves quickly, shallowly and carefully, to avoid trauma to roots and minimize transplant shock.

Source: <http://sri.cals.cornell.edu/aboutsri/methods/index.html>

Farm experiments and innovations

In 2020, PITO renewed the campaign for soil fertility restoration for sustainable agriculture. They conducted further training* on processing of organic fertilizers, with farmer practitioners and two Municipal Agriculture staff as facilitators and resource persons. Twenty-one farmer cooperators, coming mainly from the barangays of Bangaan and Fidelisan, were trained to culture indigenous microorganisms, make biofertilizers and apply the system of rice intensification. They also agreed to test some farming innovations in their rice fields. These innovations include:

- Inung-unga;
- Application of processed organic farm inputs: foliar fertilizers, fermented plant juices, fermented fruit juices and Oriental Health Nutrition (OHN) decoction; and
- Widening distance of rice seedlings or hills, a feature of SRI.

Seven rice varieties were used for the innovation tests. Of the seven, three are traditional rice varieties - the Mam-is, Pokpoklo and Saliket. The others, Double Diamond, Milagrosa, Bordagol and Taiwan, are high yielding varieties introduced decades ago as part of the government's Green Revolution program.

The experimental fields had elevations of 1270 to 1461 meters above sea level (MASL) (Table 1).

* With support from the Pawanka Fund



Orientation on Sustainable Agriculture in Guesang Bangaan.

Table 8. Elevation, estimated land area, location of field using innovations, and rice variety tested

Farm Location	Elevation (masl)	Estimated land area (m2)	Rice variety
Matange	1270	120	Taiwan
Maatong	1307	210	Bordagol
Pal-id	1313	190	Taiwan
Gosadan	1318	70	Bordagol
Nataeg	1321	450	Taiwan
Nataeg	1321	140	Saliket
Nataeg	1321	210	Bordagol
Dapin-ay	1329	70	Bordagol
Dapin-ay	1329	127	Taiwan
Dapin-ay	1329	127	Saliket
Otog	1330	200	Pokpoklo
Otog	1330	210	Pokpoklo
Tiktikipan	1342	70	Bordagol
Guwab	1343	90	Bordagol
Bua-at	1364	210	Taiwan
Esset	1461	107	Bordagol

Most of the cooperators succeeded in making their own fertilizers and were able to teach others who were willing to learn. The use of these organic fertilizers was not limited to the experimental areas but extended to other rice lands and home gardens. Their utilization started at seed sowing. The seeds were first soaked in one liter of water mixed with two tablespoons of the microorganisms which were beneficial to the seeds' growth and development. During the vegetative stage, the rice plants were sprayed with fermented plant juices for growth and development and decoctions of Oriental herb nutrient which protect plants from insects and fungus. Fermented fruit juices were applied during the fruiting stage.

The cooperators tested widening the distance of rice seedlings from the conventional distance ranging from 7x9 to 15x10. The distance 20cm x 20cm with 20 hills/m² was applied in 11 fields; 25cm x 25cm distance with 16 hills/m² in 8 fields; 15cm x 15cm distance with 26 hills/m² in 2 fields.

Insights from biofertilizer training

"In collecting raw materials needed for the fermentation, the materials are best gathered in the morning before sunrise."

"Plants found near toilets and dirty canals are not advisable for fermentation."

"Oriental herbal nutrient decoction could also be used in plants and animals such as pigs and chickens to boost immunity from diseases."

Table 9. Distance per hill in fields with innovations and control fields

Field Location	Rice Variety	Field with Innovations		Control Field	
		Planting Distance (cm)	# of Hills/m ²	Planting Distance (cm)	# of Hills/m ²
Nataeg	Mam-is	15 x 15	26	10 x 8	44
Nataeg	Mam-is	20 x 20	20	10 x 8	44
Otog	Mam-is	25 x 25	16	15 x 10	33
Otog	Mam-is	20 x 20	20	15 x 10	33
Dapin-ay	Mam-is	20 x 20	20	7 x 9	50
Dapin-ay	Mam-is	20 x 20	20	7 x 9	50
Dapin-ay	Mam-is	20 x 20	20	7 x 9	50
Nataeg	Double D	20 x 20	20	10 x 8	44
Pal-id	Double D	20 x 20	20	10 x 8	44
Maatong	Double D	15 x 15	26	15 x 10	26
Gosadan	Bordagol	25 x 25	16	10 x 8	44
Guwab	Bordagol	20 x 20	20	7 x 9	50
Esset	Bordagol	20 x 20	20	10 x 8	44
Matange	Taiwan	20 x 20	20	10 x 8	44
Balin-eng	Taiwan	25 x 25	16	10 x 10	40
Leneng	Taiwan	25 x 25	16	10 x 8	44
Leneng	Taiwan	25 x 25	16	10 x 10	40
Banaaw	Saliket	25 x 25	16	10 x 10	40
Tiktikipan	Saliket	25 x 25	16	10 x 8	44
Papang-an	Saliket	25 x 25	16	10 x 10	40
Average seedlings planted in 1 square meter			19		42

The net effect of widening the distance is seed saving, 19 against 42 seedlings or more than 100% which could be greatly significant if applied in all the 202 hectares of rice lands in Pidlisan.

Procedures in producing Biosprays

1. Oriental herbal nutrient

Materials needed:

- 2 kilos peeled and chopped ginger, garlic, turmeric and bulb onions
- 2 kilos muscovado
- 10 liters of red horse/gin
- Plastic container

Procedure:

1. Mix peeled and chopped ginger, garlic and bulb onions and put in a plastic container. Add 2 kilograms muscovado and 10 liters of red horse/gin.
2. Cover and seal the plastic container. Label the cover with name, date prepared and date of harvest (extraction). Ferment for 7-10 days.
3. After 7-10 days, extract liquid and place it in a separate container. This can be used for humans, plants and animals. For plant use, you can add fresh and dry chili, *makabuhay* and marigold to make it more potent or effective.

2. Fermented fruit Juice (FFJ)

Materials needed:

- 1 kilo of ripe fruit (such as papaya, banana, squash, 1 kilo muscovado

Procedure:

1. Prepare 1 kilo of ripe fruits and 1 kilo muscovado.
2. Peel the fruits and remove seeds if any. Finely slice or mash the fruits and place in a container at a ratio 1 kilo of fruit to 1 kilo of muscovado, then mix thoroughly. It is best to prepare in the evening to prevent flying insects.
3. Cover with a clean sheet of paper. Tie with a string and label, indicating the date it was prepared. Ferment for 7-10 days in a cool shaded place.

3. Fermented Plant Juice (FPI)

Materials needed:

- 1 kilo of vegetable shoots such as camote, squash, alugbati, young banana stem
- 1 kilo muscovado

Procedure:

1. Use any vegetable shoots.
2. Finely chop 1 kilo from the plants gathered.

3. Place these in a container and mix in 1 kilo of muscovado.
4. Cover with a clean sheet of paper, label with its name, date prepared and date of harvest. Ferment for 7-10 days in a cool dark place (Avoid direct sunlight).
5. After 7-10 days, strain and transfer the solution to a clean container. Always leave about 1/3 of the bottle empty to enable microorganisms to breathe.

4. Kuhol Amino Acid (KAA)

Materials needed:

- 1 kilo golden apple snail or the kuhol
- 1 kilo muscovado

Procedure:

1. Wash 1 kilo of kuhol.
2. Add 1 kilo of muscovado.
3. Cover and keep in a cool place or shaded area. Label the cover with its name, date prepared and date of harvest.
4. Extract liquid after 10-15 days and transfer it into clean bottles. Wait until tiny bubbles disappear before sealing the cover and storing. Always leave about 1/3 of bottle empty so microorganisms can breathe.

5. Indigenous Microorganisms (IMOs)

Materials needed:

- 1 kilo cooked rice preferably local rice which is free from chemical sprays
- 1 kilo muscovado

Procedure:

1. Put 1 kilo of rice in a plastic container, bamboo pole, tupil, woven bamboo rice container similar to a lunch box.
2. Cover the container with a clean sheet of paper and tie with a string. Label the box indicating when it was prepared and day it will be harvested.
3. Cover and wrap with plastic to protect it from rainwater, wild rats or small rodents that may interfere or destroy its contents.
4. Bring box to a forest floor/bamboo plantation/rice paddy/banana plantation.
5. Retrieve box after 3-5 days. Expect to see white, pink, yellow molds and black molds; collect the white, yellow and pink molds and discard the black molds.
6. Place the moldy rice in a container and mix with 1 kilo of muscovado. Cover the jar with clean sheet of paper and tie with a string. Place in a cool and shaded place. After 7 days, this will yield a mud-like juice.

Source: Office of the Municipal (Sagada) Agriculture (OMAG)¹³



Trainings on the production of organic farm inputs such as foliar fertilizers at Guesang, Bangaan.



Barangay Aguid



Barangay Pide

Results of Innovations and Revival of Inung-unga

As the following results show, the rice farming innovations generally led to better plant performance and, thus, bigger yields for the farmer cooperators.

Effects on number of panicles

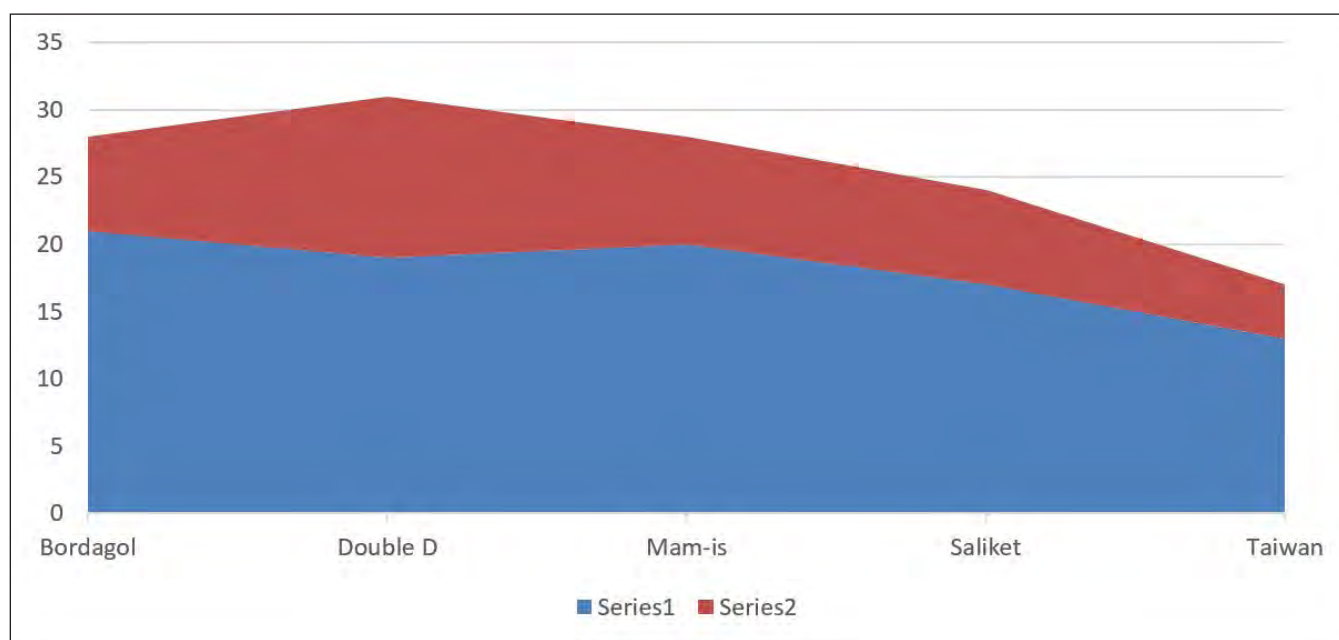
The panicles per hill increased significantly. Plants in the fields which adopted the innovations averaged 18 panicles compared to 7 panicles for those planted in the conventional way.

Table 10. Number of panicles per plant

Number of Panicles per Hill			
Field Location	Rice Variety	Field with Innovations	Control Field
Otog	Mam-is	28	7
Gosadan	Bordagol	26	6
Otog	Mam-is	25	7
Tiktikipan	Saliket	22	8
Esset	Bordagol	21	7
Nataeg	Double diamond	20	10
Dapin-ay	Mam-is	17	8
Dapin-ay	Mam-is	16	8
Nataeg	Mam-is	15	10
Maatong	Double diamond	15	14
Guwab	Bordagol	15	7
Matange	Taiwan	15	4
Banaaw	Saliket	15	6
Balin-eng	Taiwan	13	3
Leneng	Taiwan	13	5
Leneng	Taiwan	12	5
Average number of panicles/plant		18	7

Much difficulty however was encountered in controlling the golden kuhol because of the scarcity of water and the pandemic which imposed restrictions on movement especially at the start when even going to the fields was discouraged.

Figure 3: Average number of panicles in control fields (blue) and fields the innovations were applied (red) according to variety



Effects on plant maturity (harvestable grains)

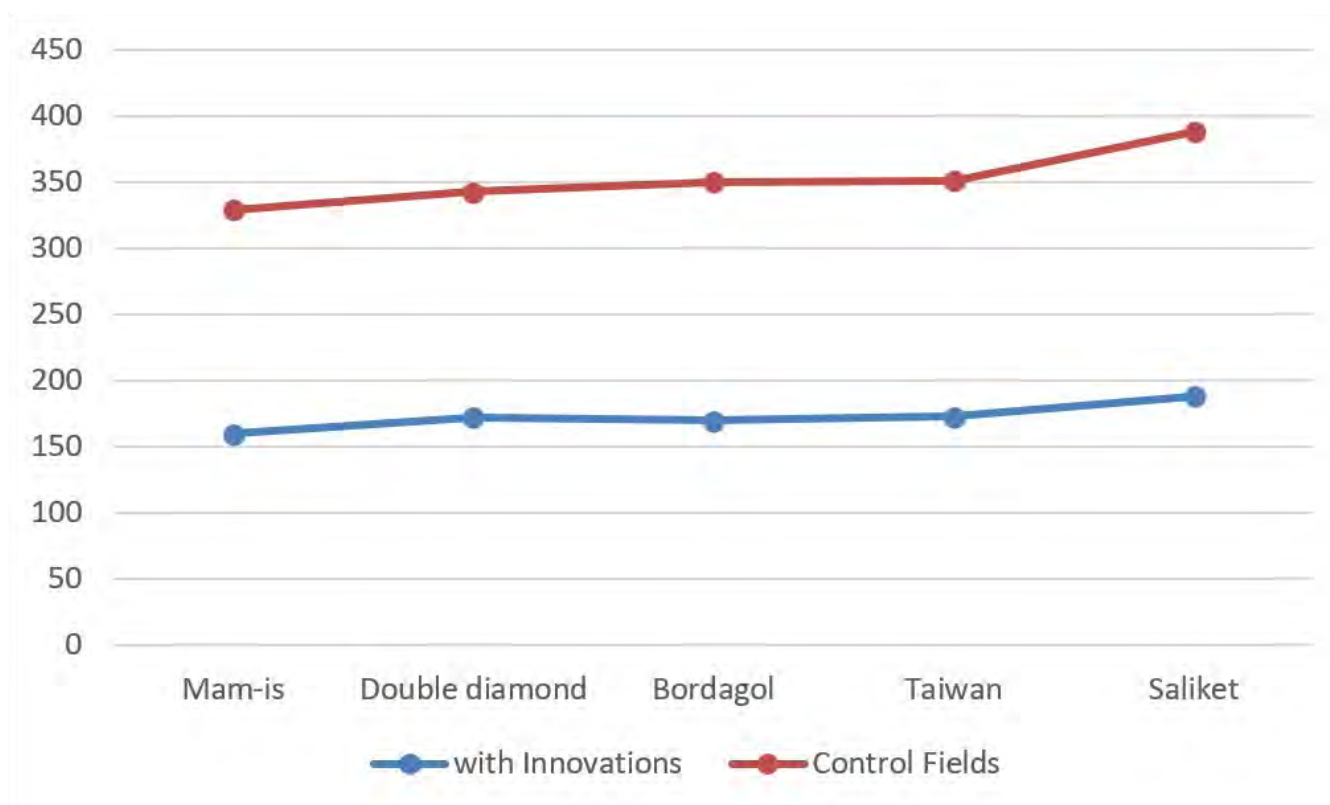
Further, the time from the sowing of seeds to the harvest of the ripened grains was shorter in the fields where the innovations were applied.

Table 11. Number of days from sowing of seed to maturity

Field Location	Elevation (masl)	Estimated Land Area (m ²)	Rice Variety	Number of Days from Seed Sowing to Harvesting	
				Field with Innovations	Control Field
Dapin-ay	1329	127	Mam-is	140	172
Dapin-ay	1329	127	Mam-is	150	172
Nataeg	1321	140	Mam-is	155	167
Matange	1270	120	Taiwan	161	173
Guwab	1343	90	Bordagol	162	170
Bua-at	1364	210	Milagrosa	163	180
Dapin-ay	1329	70	Mam-is	166	172
Maatong	1307	210	Double diamond	166	174
Nataeg	1321	450	Mam-is	167	167
Otog	1330	210	Mam-is	169	169

Gosadan	1318	70	Bordagol	171	183
Otog	1330	200	Mam-is	172	169
Tiktikipan	1343	70	Saliket	174	193
Esset	1461	107	Bordagol	178	188
Balin-eng	1499	400	Taiwan	178	180
Nataeg	1321	210	Double diamond	179	167
Leneng	1503	380	Taiwan	180	182
Banaaw	1468	360	Saliket	203	207

Figure 4: Average number of days to maturity from sowing to harvesting in fields with innovations (blue) and control fields (red) according to rice variety



As the chart illustrates, the rice plants in the fields with innovations generally matured earlier than those in the control fields. The earliest was in a field with innovations of the variety Mam-is which matured on its 140th day while the earliest in the control fields matured nearly 30 days after or on the 169th day. The last to mature was the Saliket, a traditional variety, in both the innovation and control fields, at 203 days and 207 days respectively, only a three-day difference.

Effects on yield

Fields with innovations had greater production with an average palay yield of 0.74kg/m² compared to 0.65kg/m² in control fields.

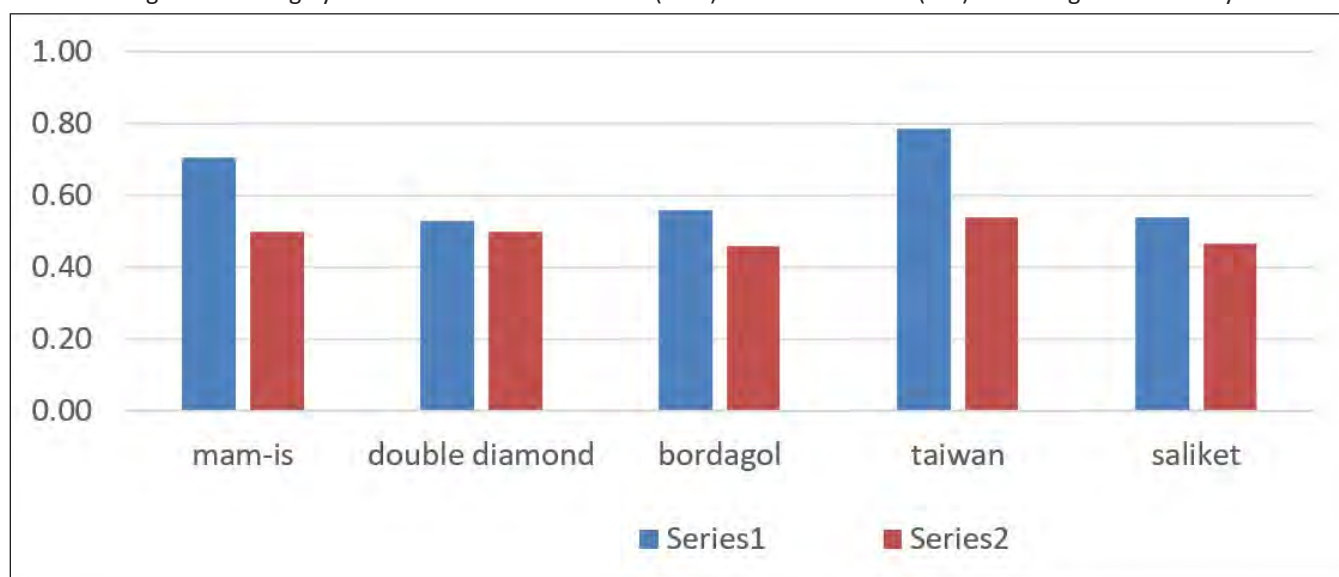
The table also shows that the yield of farmer home-saved seeds in northern Sagada produced an average of 6.2 MT/ha. This is higher than the national yield of 3.95 tons/hectare through 2014 to 2018.¹⁴

The fields with innovations produced an even higher average yield of 7.4 tons per hectare. Taiwan and Mam-is varieties had the highest yield at 8.9 tons hectare. The cooperators, however, said the variety was not the determining factor in yield performance but other factors such as soil, health of the plant, incidence of pests and weather.

Table 12. Yield in unmilled rice (kg/sqm)

Average Yield Unmilled Rice (kg/sqm)					
Field Location	Rice Variety	Field with Innovations		Control Field	
		Estimated land area (m ²)	Unmilled yield per sqm	Estimated land area (m ²)	Unmilled rice yield / sqm
Nataeg	Mam-is	450	0.89	200	0.67
Nataeg	Mam-is	140	0.87	200	0.67
Otog	Mam-is	210	1.09	70	0.7
Otog	Mam-is	200	1.15	70	0.7
Dapin-ay	Mam-is	70	0.57	300	0.5
Dapin-ay	Mam-is	127	0.6	300	0.5
Dapin-ay	Mam-is	127	0.4	300	0.5
Nataeg	Double D	210	0.7	250	0.67
Maatong	Double D	210	0.52	150	0.48
Gosadan	Bordagol	70	0.71	250	0.6
Guwab	Bordagol	90	0.55	110	0.46
Esset	Bordagol	107	0.7	90	0.55
Matange	Taiwan	120	0.83	90	0.75
Balin-eng	Taiwan	400	0.89	100	0.82
Leneng	Taiwan	170	0.79	90	0.77
Leneng	Taiwan	380	0.86	90	0.84
Banaaw	Saliket	380	0.69	70	0.6
Tiktikipan	Saliket	70	0.53	60	0.42
Average yield - unmilled rice per square meter			0.74kgs	0.62 kgs	
Average yield – unmilled rice per hectare			7,400kgs	6,200 kgs	
Average yield – unmilled rice per hectare			148 cavans	124 cavans	

Figure 5: Average yield in fields with innovations (blue) and control fields (red) according to rice variety



Lower yields in both innovation and control fields are said to have been caused by golden kuhol and saktoto infestation and lack of water.

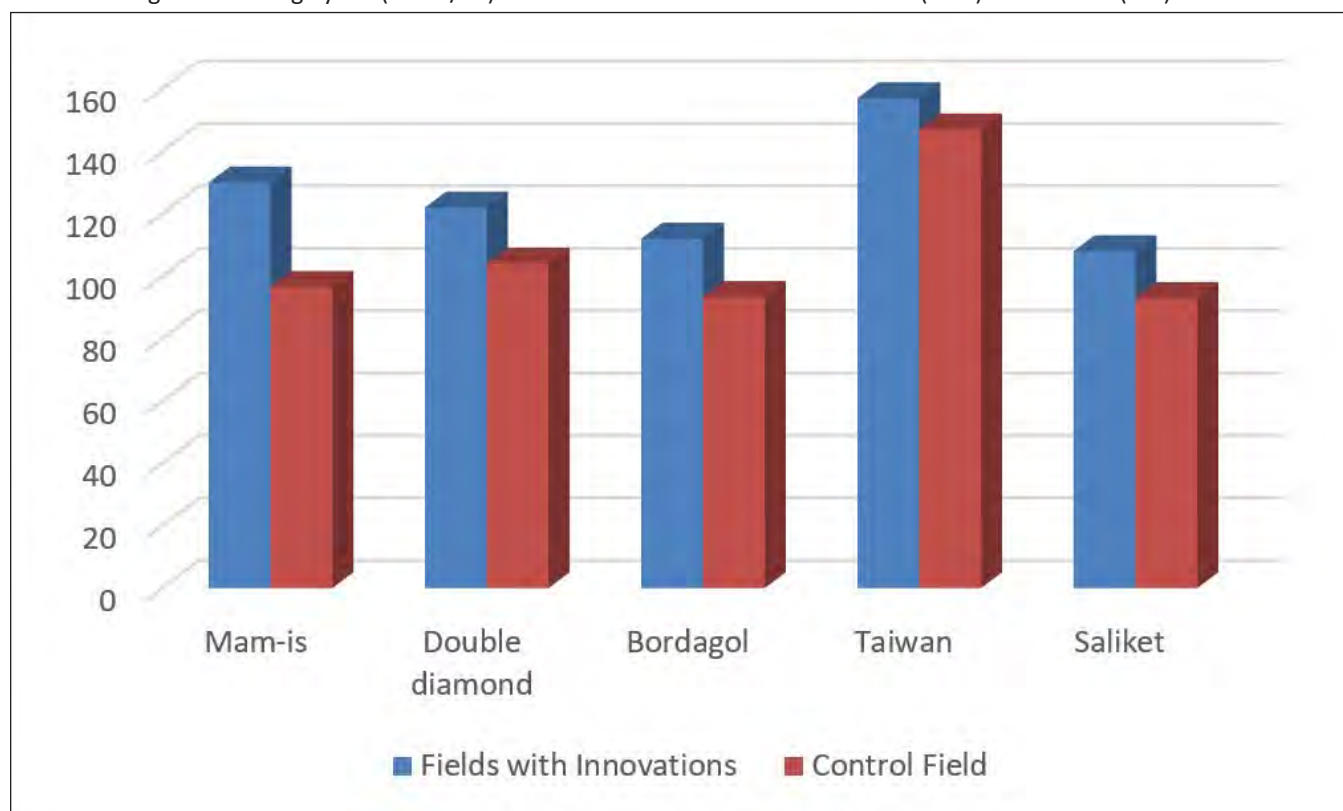
Yield in milled rice

The yield per square meter was also recorded after the rice grains were milled. As the following table and chart show, the fields with innovations had significantly higher yields than the control fields.

Table 13: Average yield of milled rice in cavan/hectare according to rice variety

Average Yield, cavan/hectare		
Variety	Field with Innovations (cavan/hectare)	Control Field (cavan/hectare)
Mam-is	130	97
Double Diamond	122	104
Bordagol	112	93
Taiwan	157	147
Saliket	108	93

Figure 6: Average yield (cavan/ha) of different rice varieties in innovation (blue) and control (red) fields



Showing the way

The results of the revival of these indigenous knowledge, practices and innovations in rice farming were shared during PITO meetings. Pide and Aguid farmers subsequently requested to be trained in biofertilizer production and the SRI features, which were the innovations adopted by the farmer cooperators in their rice fields. Their lead trainer was an adopter of the rice farming innovations, now considered an expert, who led other adopters in conducting the training. Some of the cooperators also interacted with other farmers, eventually convincing two women farmers of Tanulong, a neighbor tribe, to also adopt the innovations and to revive their indigenous rice culture. More and more people are now interested to use organic fertilizers, increasing the demand for them.

Problems, however, were encountered in the implementation of the project. First was the difficult situation brought about by the COVID-19 pandemic. The suddenness of the radical changes caused by lockdowns and mobility restrictions caught the project and people off guard in the first three months at a very critical period of the tests for the innovations. These greatly disrupted monitoring of the test crops.¹⁵ The situation was aggravated by the intensified red tagging of PITO as an organization and some of its leaders and members. While it took some time for PITO to respond collectively, they were able to defend their legitimacy and assert their rights and values.

Water management was one of the most challenging tasks. Water was low due to the damaged irrigation system and as some cooperators noted, the prescribed water management was not followed resulting in golden snail infestation.

Rehabilitating communal irrigation system and reviving lampisa system

PITO also undertook three significant actions on irrigation management to hasten the restoration of the rice lands. First was the revival of the lampisa as identified in 2015. While PITO did not do further planning on how to implement the resolution for this, a representative of Aguid brought up the issue with the Aguid Barangay Council which, in 2016, passed a resolution allocating funds for a lampisa. This was realized in 2018 when a budget of PhP10,000.00 per year was allotted for this purpose. All interested individuals were required to file an application with the Aguid Barangay Local Government Unit (BLGU) which is responsible for selecting the lampisa. The Aguid BLGU selected two lampisas to serve as long as they were willing to do the job and would be changed if they resigned; they would also equally share the P10,000 incentive. The lampisas' area of responsibility are the rice lands within the Aguid territory. To date, no lampisa has been chosen for barangays Pide and Bangaan because they have not allotted funds for this position, while in Fidelisan, which has made an allocation, no one yet has applied.

In the course of the rice land restoration campaign, it was seen that reviving the lampisa would not be enough. The years of neglect of the irrigation canal have caused major damage that needs to be rehabilitated, and it may take some time for the community to strengthen the culture of service to inspire members of the community to willingly serve as lampisa.

Mabileng Irrigation (Google Imagery)

Implementing Unit: Pidlisan Tribe Organization (PITO)

Project Site: Fidelisan Sagada Mountain Province

PAWANKA PROJECT



The second major activity was the rehabilitation of strategic parts of the Mabilieng–Oliwek communal irrigation canal. Three sites were worked on: Malyok to Dem-ang (190 meters), 10 meters in Saew, Aguid which was ripped to prevent further damage, and Dem-ang to Malangaya portion (247 meters) which was cemented and reinforced to be more stable and sturdy. In all, improvement work was done on 447 meters of the total 9.2 kilometers of the Mabileng-Oliwek CIS at a total cost of P761,866.00 with support from the Pawanka Fund and Swedbio. With this amount, PITO was able to repair more meters of irrigation canal than is normally accomplished in similar government projects at the same cost, and this was achieved because of community unity, *gibo* or collective work for the common good and funding support.

For the whole stretch of the rehabilitated irrigation canal, the people did *gibo* and *galatis* for the weeding, clearing and gravelling work. *Gibo* and *galatis* is collective action, and for the irrigation work the people pooled their labor and tools to perform a task not reciprocated by money or human labor but by nature providing its service, i.e., water to irrigate the rice fields for food. *Gibo* or *galatis* is also done on a yearly basis by the *pumayas*/landowners/tillers for the maintenance of the irrigation canal done at the onset of the land preparation cycle and of the summer days.

The rehabilitation of Malyok to Dem-ang to Malangaya facilitated the smooth flow of water and prevented leakage, thus increasing water for the farms and tilapia fishponds that benefit 150 farmer and fisherfolk families. Also, during the COVID-19 pandemic that has caused much economic dislocation, the project was of great help to the community. It provided food for work and contributed significantly to enabling the people to reclaim abandoned paddy fields.

The project also fortuitously drew out the capacity and collective action of PITO to conduct a feasibility study for the repair of the Mabileng-Oliwek Communal Irrigation System, a requirement for project requests from the government. Both PITO and Tebtebba hold the view that government resources should be accessed and to be used where they are needed. While there are government offices and duty bearers mandated to facilitate communities' access to government services, communities encounter difficulty in complying with the many requirements for project requests. To meet one such requirement, PITO agreed on collective action to make and submit a preliminary feasibility study for fund support for the Mabileng-Oliwek CIS rehabilitation.

The need for this support was presented at the Dialogue on Indigenous Agriculture and Food Sovereignty, a Tebtebba-organized series of dialogues participated in by government agencies including the Department of Agriculture, National Irrigation Authority (NIA), Department of Agrarian Reform and National Commission on Indigenous Peoples as well as Tebtebba partner communities, among them PITO. The NIA followed up on PITO, which subsequently submitted their feasibility study to the agency for funding.

SUMMARY AND CONCLUSION

To restore the entire rice lands, the Pidlisan communities addressed most of the concerns that led to their deterioration. The actions included (1) a campaign on environmental protection, being against the use of synthetic fertilizers and pesticides, and rice land restoration to increase food sufficiency; (2) awareness raising and trainings to equip farmer cooperators from barangays Bangaan and Fidelisan, enabling them to conduct experiments in rice farm innovations; (3) the attempt to fully revive the lampisa system in irrigation management; (4) a rehabilitation of the Malyok to Dem-ang to Malangaya portions of the Mabileng-Oliwek Communal Irrigation System; and (5) making a feasibility study to rehabilitate the Mabileng-Oliwek Communal Irrigation System.

The successful implementation of these actions resulted in (1) the Pidlisan Tribal Declaration of Commitment to restore their rice landscape and revive associated values and culture; (2) reviving certain practices and adopting innovations on rice culture that have increased rice yields up to 8.9 tons/hectare (unmilled rice) with significant savings on seeds; (3) significant increase in the number of people interested to be part of the organic/sustainable/regenerative movement which extended the training on biofarm inputs production to barangays Pide and Aguid; (4) reclamation of abandoned paddy fields especially in areas irrigated by the rehabilitated portions of Mabileng-Oliwek CIS; and (5) completion of the Preliminary Feasibility Study for Rehabilitation of the Mabileng-Oliwek CIS and lobbying for support with the National Irrigation Authority.

The Pidlisan women underscored the importance of reviving indigenous knowledge and practices and innovations. The women members of Guesang Farmers Organization observed that transplanting was best when seedlings were 25-30 days old because of the weather in Pidlisan and when plant distance was 15-20 cm because of the presence of golden snails that like to eat the seedlings. Another cooperator from Fidelisan pointed out that kames or the process of removing small weeds in paddies served at the same time as a form of cultivation that helped seedlings to absorb nutrients from the soil. In a cooperators meeting, the participants highlighted the impact of the farm innovations: the food produced was healthy and nutritious and the production process was environmentally friendly that they proudly said, “No gawis nan igtom isnan mula ay kanena, gawis nan ipakana ken sik-a. Pabalinen ay agas nan makan ya nan makan et agas (If you feed your crops with good food, it will also feed you with good food. [Hence], make your food your medicine, and your medicine your food).”

PITO has to continue to popularize these rice farming innovations among the people, as the majority of the more than 560 families in Pidlisan have yet to be convinced to adopt them.

The process of documenting indigenous knowledge and practices in rice land management has brought to light valuable wisdom and culture in the rice production cycle. The documentation looked into the present challenges and highlighted the interconnected drivers of paddy field abandonment, and an entry of invasive species, resulting in decreased yields that pushed people to utilize agrochemicals which further aggravated the situation, discouraging people to cultivate rice. Discussing the research and documentation results brought out differing views but, in the end, the Pidlisan people agreed to stop the growing trend of abandoning paddy fields, agreeing instead to reclaim uncultivated lands as well as to revive, strengthen and innovate on their indigenous knowledge systems in rice production. The results of their collective actions have opened pathways that can lead to full restoration of the rice lands and in sustaining their ancestors' legacy.

While the project aimed to strengthen the connection of forests to rice lands to reinforce forest protection and conservation, it did more than that. The research reminded the people that the watershed found within their territories is a source of water for other communities, giving a higher motivation to sustain their forest management which upholds primacy of the health of the forest.

The Declaration of Commitment, if made a living document by the i-Pidlisan, can go a long way not only to sustain the health of the forests and the rice lands but also of the people. They will be enabled to “walk to the future in the footsteps of their ancestors.”

Endnotes

- ¹ Naty Camareg and Theresa Salao, (2017) Glossary of Terms – Rice Farming Cycle of Pidlisan Tribe, unpublished.
- ² Profile of Barangay Bangaan, 2020, unpublished.
- ³ Pidlisan Community Mapping with aid of Google Earth Map, Jan 1, 2014.
- ⁴ Sagada Ancestral Domain Sustainable Development and Protection Plan, 2019 Second Edition, unpublished by Municipality of Sagada, Mountain Province.
- ⁵ Cadastral Survey, 2013, Department of Environment and Natural Resources.
- ⁶ Cadastral Survey, 2013, Department of Environment and Natural Resources.
- ⁷ PSA Census, May 2020.
- ⁸ Record of Barangay Health Workers, Barangays Fidlisan, Pide, Aguid, Bangaan, 2020 (Unpublished).
- ⁹ Allasiw D.I et al. Costly Barriers to Sustainable Institutions: Empirical Evidence from State-Reinforced Management of a Communal Irrigation System in the Philippines Graduate Program in Graduate Program in Sustainability Science-Global Leadership Initiative (GPSS-GLI), Graduate School of Frontier Sciences, the University of Tokyo, Environmental Studies Building, 5-1-5 Kashiwanoha, Kashiwa City, Chiba 277-8563, Japan; ttanaka@k.u-tokyo.ac.jp (T.T.); mino@mw.k.u-tokyo.ac.jp (T.M.) published May 5, 2017, page 10.
- ¹⁰ Montanosa Research and Development Center, 2005, “Lampisa: water distribution system among the Pidlisan” <https://www.nordis.net>.
- ¹¹ Ibid.
- ¹² Brenda Basali, “Some results of testing systems rice intensification in Pidlisan”, 2020 (unpublished)
- ¹³ Manual on Organic Farming of the Department of Agriculture, 2020.
- ¹⁴ Global Yield Gap Atlas Rice Production in the five Southeast Asian countries, Vietnam, Thailand, Myanmar, Philippines, and Cambodia, seen October 11, 2021.
- ¹⁵ System of Rice Intensification Assessment and Meeting held on May 22, 2021.

Annex 1

Declaration of the Pidlisan Tribe on their Commitment to Restore the Vibrancy of the Rice Land and its Environment

August 14, 2021

This Declaration is a result of a series of collective learnings and dialogues among the umili di Pidlisan or members of the Pidlisan tribe from 2015 to 2016 and is now put in writing this 14th day of August 2021.

We express our heartfelt thanks to our elders and leaders who persist to advocate for the revitalization of indigenous knowledge, culture and values within our ancestral domain. We thank the Fund for Indigenous Ways of Learning and Knowing who provided the resources for our series of gathering and reflection sessions. We also thank Tebtebba, Indigenous Peoples' International Centre for Policy Research and Education, which helped in facilitating community research to surface out information that validate and elaborate the profound teachings and knowledge of our elders and our ancestors.

Our gathering and series of collective learnings have reminded us that we as a tribe have collective responsibility to our ancestral domain that hosts watersheds that supply waters not only to our territories but to other peoples as far as the Province of Kalinga, Province of Isabela and Cagayan Valley. Up to the present times, we continue to protect and conserve this life-giving gift from our Creator and continue to strive to maintain the balance of the different parts of our territories.

The effects of climate change and external pressure like the lack of education that carries our world views, the weakening of our systems of knowledge transmission, other various factors that resulted to erosion of culture and values have negative impacts on our indigenous food systems.

We express concern on the increasing pests and diseases in our farmlands that have driven some of us to embrace agrochemical inputs as solutions; on abandonment of the farm lands due to changing perspectives and the subsequent weakening of our connection to our lands.

We come together as a tribe to express our collective commitment to work together:

1. To revitalize indigenous knowledge systems and practices (IKSP) of resource management of the forests and rice lands; e.g. strengthen the indigenous conservation and sustainable use of resources, revive the vibrancy of the whole rice landscape including re-cultivation of the abandoned paddy fields through the promotion of new appropriate technologies, strengthen the traditional ub-ubbo or labor exchange network, revive the lampisa system among others;
2. To improve systems and technologies of rice production to post harvest technology to develop the rice culture and contribute to increasing food security;
3. To rehabilitate the communal irrigation system and campaign for the revival of the lampisa

system to hasten the restoration of the rice lands not only as production site but also as part of biodiversity habitat;

4. To advocate for government support for the provision of labor-saving appropriate tools and support the initiatives of the people in traditional knowledge innovations and skills training, e.g. production of biosprays and biofertilizers, adoption of some features of the system of rice intensification;
5. To re-educate whole villages to change the mindset of the people that manual labor and land-based occupations are NOT “low class” towards revival of peoples’ connection to the land;
6. To mobilize human resource to study the newly emerging pests and continue to discuss emerging challenges;
7. To reduce carbon emissions in the territories through organic farming and enhanced land/soil fertility and strengthening customary forest protection;
8. In doing self-determined development, we experienced persistent vilification. Some of us felt harassed, fear, confusion and we had to come together to draw strength and courage from one another. We resolved to stand together to protect our rights, our lives, our dignity and resources against all forces. We stand and unite together for the protection of our territory from development aggression.

Finally, we commit to reconnect to our lands and strengthen our relationships as peoples and our relationship to nature and the unseen beings in our territories.

14 Aug 2021 PITO

