

RESEARCH PAPER

Traditional fishing gears and fishing methods of Ilocos Norte, Philippines

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Index Terms

Traditional Fishing
Artisanal Fishermen
Fishing Gears
Methods

Received: 6 November 2014

Accepted: 28 August 2015

Published: 15 October 2015

Abstract—This study documents the traditional fishing gears and fishing methods of the rural Ilocano fishermen of which this has not been done comprehensively. It records, identifies, and describes their characteristics that include their designs, mode of operation, fishing grounds and species of fish caught, among others. Artisanal fishermen using the fishing gears and fishing methods from the inland and coastal municipalities of the province were the sources of information. Results of the study revealed that there are 48 fishing gears and fishing methods used which are classified into four (4) categories based on the classification of fishing gears in the Philippines. There are eight of the hand instruments (six coastal, two inland and three common); ten of the traps (three coastal, seven inland and one common); 14 of the lines (11 coastal, two inland and one common); and 16 of the nets (10 coastal, six inland and four common). Fifteen miscellaneous fishing accessories or paraphernalia which are not in the classification were also documented. A variety of marine and freshwater fish species comprising the catch of the fishing gears and fishing methods were identified and recorded in their Ilokano and English or common names. These include 44 species of marine fishes, six (6) species of marine invertebrates, seven (7) species of freshwater fishes, and three (3) species of freshwater invertebrates. A documentation of these traditional implements is valuable material to preserve the fishing culture and traditions of the Ilocanos. Researchers and other interested persons may find this study as an important material for further studies.

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I. INTRODUCTION

Traditional fishing gears and fishing methods have been developed through time to adapt to local fishing conditions including the types of fishing areas and the desired and targeted species and size of fish [1]. Accordingly, the most successful methods at a given locality are those that have stood the test of time.

Some of these methods have evolved and improved to technical level appropriate to local conditions. The

municipal fishermen in Ilocos Norte adopted traditional gears and fishing methods in their fishing activities which were used by their forefathers since time immemorial. These had served as important small-scale economic activity and as a source of their daily sustenance [2]. With the passage of time, some of these traditional implements were improved, thus, increasing the income and improving the health and nutrition of the people in the rural communities.

Ilocos Norte has one of the most extensive coastal and marine waters in Northern Luzon which are endowed with some of the richest coastal and marine fishery and aquatic

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resources. The province has 155.37 km of coastline [3], a total of about 23,918 hectares of fishing grounds with vast area for deep sea fishing, and about 873 hectares of coral reef areas which serve as sources of fish, invertebrates, seaweeds and other aquatic products. Furthermore, these serve as primary mode of transportation, major area of human settlements and eco-tourism, breeding ground and habitat for wildlife, and as a permanent feature of the province's natural beauty along the coast.

The province has eight coastal municipalities and one coastal city with about 2,343.15 km² of municipal waters, 35 hectares salt bed, 260 hectares for mari-culture and 3,500 hectares of fish sanctuaries and marine reserves [4]. Hence, almost 14 percent of the total provincial population is found along the coast. With such geographic location, Ilocano fishermen developed fishing gears and methods which were appropriate to the environment and suited to their needs. Fishing, now and before, is one of the major sources of livelihood in the province.

The fishing industry is predominantly small-scale and is concentrated along the coastal waters where fishing bancas and other fishing crafts with less than three (3) gross tons are operating [5]. According to [3], there are a total of 1,298 motorized fishing boats, 60 non-motorized boats, 69 flatboats and 538 rafts operated by a total of 4,556 fishermen with an annual production of 6,423.45 MT of fish.

Apart from the coastal areas, the province has a total of 1,233.83 hectares of communal inland waters that include the small water impounding projects (SWIPs), diversion dikes (DDs), rivers, creeks and lakes in all the 21 municipalities and two (2) cities. Inland fishing also contributes to municipal fisheries in the province. There are a total of 1,259 fishermen operating in these areas with a total annual production of 167.9 metric tons of fish [3]. According to the Provincial Agriculture Office, the overall fish sufficiency level of the province as of 2012 is 55.87% [3].

The fishing gears and fishing methods used by the fishermen are mainly small-scale classified as wounding gears, barriers and traps, lines, and nets [5].

The fishing industry lacks modern fishing methods to exploit the vast area for deep sea fishing. Illegal fishing practices such as the use of explosives, poisonous substances, and compressor fishing are undeniably being used by some fishermen and these pose threats to the fishing industry particularly to the fisheries and living aquatic resources.

Municipal fishing with the traditional gears and fishing methods is not merely a familiar economic activity and an important food contributor, but something that embodies a deep cultural and historical significance of the Ilocanos. With these traditional activities, the Ilocano fishermen set out to adopt and utilize technologies which are appropriated in the local milieu and substantiated by the

present day technologies.

The aim of this study is to shed light on the fishing gears and fishing methods employed by the municipal or artisanal fishermen in the province. Work on this has not been carried out comprehensively. This may also serve as benchmark information for researchers and other interested groups. This will also encourage the fishermen to employ appropriate and non-destructive fishing techniques for the rational utilization of the marine fishery resources.

II. METHODOLOGY

Artisanal fishermen using the fishing gears and fishing methods from the inland and coastal municipalities of the province were the key sources of information. Data and information gathered were mainly on the designs, mode of operation, fishing grounds, and species of fish caught, among others.

Photo-documentations were done for the various fishing gears and fishing methods. The improvised accessories used by the fishermen were also documented. The municipalities/cities which were surveyed were those which comparably had the most number of fishermen, both inland and coastal, such as Bacarra, City of Batac, Burgos, Currimao, Laoag City, Pagudpud, Paoay, Pasuquin and Vintar. Table I shows the number of fishermen in the province.

III. RESULTS AND DISCUSSION

The fishing gears and fishing methods documented in the survey are classified under four (4) categories as follows: a) hand instruments, b) traps, c) lines, and d) nets (Table II). All these fishing gears and methods are described below based on Umali's classification of fishing gears in the Philippines [6]. Further, the fishing accessories or paraphernalia used by the fishermen were also documented.

A. Hand Instruments

These are movable instruments operated by a single individual. There are at least eight (8) instruments documented under this category as presented and described below (Table III and Fig. 1). Out of these fishing gears and methods, six (6) are used in coastal areas (Panudok, Kawit, Pisga, Pana, Karwas and Wisiwis), two (2) in inland areas (Asad and Karadikad) and three (3) in both fishing grounds (Pisga, Pana, Karwas).

Miscellaneous hand instruments like the ones consisting of a handle or shaft bearing a barbed or barbless, pointed or blunt metal blade at the curved tip, such as gafts, forks,

hoes, picks, scrapes, spades, hooks, tongs, and grabs were also documented. These include the following: a) Panudok

or Pang-dugal or Pantugkit (Fig. 1a): A fishing gear made of a handle with an attached iron which is flattened and sharpened at the end.

TABLE 1
NUMBER OF FISHERMEN BY MUNICIPALITY/CITY (Source: PAO, 2011)

Municipality/City	Number of Fishermen		Total
	Inland	Coastal	
Adams	15	-	15
Bacarra	110	336	446
Badoc	35	225	260
Bangui	8	85	93
Banna	20	-	20
Batac City	116	-	116
Burgos	100	150	250
Carasi	5	-	5
Currimao	55	840	895
Dingras	25	-	25
Dumalneg	25	-	25
Laoag City	175	1,100	1,275
Marcos	86	-	86
Nueva Era	16	-	16
Pagudpud	15	920	935
Paoay	75	200	275
Pasuquin	10	700	710
Piddig	15	-	15
Pinili	105	-	105
San Nicolas	60	-	60
Sarrat	25	-	25
Solsona	55	-	55
Vintar	108	-	108
Total	1,259	4,556	5,815

TABLE 2
THE FISHING GEARS AND METHODS UNDER THE FOUR CATEGORIES WITH THEIR ILOCANO NAMES

		Category		
		Hand Instruments	Traps	Lines
Ilocano Names				Nets
	Panudok, Pang-dugal	Tallakeb	Waniswis	Bukatot
	Kawit or Ganso	Nasa	Patukod	Dus-dus
	Pisga	Kub-kub or Screen	Para-pating	Pang-kusimay
	Pana	Barek-bek	Toga-toga	Bat-bateng
	Karwas	Udag	Bantak or Ban-niit	Sayup or Dus-dus
	Wisiwis with Karwas	Balingato	Lawin or Parisris	Tabukol
	Asad or As-asad	Bubo	Pangurita or	Palned
	Karadikad	Litro	Kampakampa	Patapao
		Saltok	Paguyod	Pangtamban
		Tarik or Kubong	Saba-saba	Pamukto
			Rapala	SigayPangkarayan
			Kitang	SigayPangkarpa
			KitangPangkarayan	Panglaki
				Dolyar
				Daklis
				Kammang

TABLE 3
HAND INSTRUMENTS IN THEIR ILOCANO AND ENGLISH OR COMMON NAMES

Ilocano Name	English or Common Name
Panudok, Pang-dugal or Pantugkit	Scrape
Kawit or Ganso	Pick
Pisga	Fork
Pana	Spear gun
Karwas	Scoop or Dip net
Wisiwis with Karwas	Squid Luring Device
Asad or As-asad	Cover pot
Karadikad	Tray

It is operated along the seashore at a depth of about 100 cm. The fisherman scratches the gear into the sand where the eel (locally known as dugal), is found. Upon seeing the eel, the fisherman grasps the eel using his bare hands. The gear is operated by one individual. A creel (alat) is used for holding the eel caught.

b) Kawit or Ganso (Fig. 1b): A hand instrument which consists of a handle that bears a pointed curved metal tip. The device is used to pick fish in holes and crevices or as an accessory in picking big-sized fish caught by other fishing gears;

c) Pisga (Fig. 1c): A simple device made of bamboo or wooden stick with 3–4 pointed metals or iron at the end designed for catching eels and other fish species. The gear is operated in areas several fathoms deep using a raft. The fisherman searches for the eels that are usually covered with sand with their head hidden or uncovered. Upon sighting the eel, the fisherman then pierces it using the gear. The gear is operated during dry season when the sea is calm and the water is clear.

d) Spear: Instruments provided with pointed, barbed or barbless blades at the straight tip which are not detachable from the handle or shaft, and generally thrown by hand or discharged from a gun. An example is the spear gun which is locally known as pana (Fig. 1d). Fishes caught include those found in reef areas such as parrotfish (molmol), terapon (baraungan), siganids (malaga), jacks (talakitok), octopus (kurita), surgeon fish (sungayan), squid (laki), emperor fish (babayo), trigger fish (papakol) and others.

e) Scoop: Lifted instruments made of non-textile webs with an opening uppermost in which the capture of fish is done either by brailing, entrapping or dipping action. An example is the karwas. Presently, the non-textile webs are

already replaced with a netting (textile) material. a). Karwas (Fig. 1e): A dip net vigorously shaped and framed small bagnet operated entirely by hand or partially by mechanical power, in which fish is captured by scooping motion. It is operated during daytime or nighttime either in freshwater or coastal waters;

b) Wisiwis with Karwas (Fig. 1f): The dip or scoop net is aided with the squid luring device that consists of a combination of wood-iron bar 0.6–0.8m long with 0.4 – 0.5m long nylon monofilament (0.2–0.5 mm diameter) where the squid lure that resembles an octopus or fish covered with pink, red or silver material is attached at the end [7]. The scoop net is used in catching the squids. The luring device is operated by rotating motion with one hand at the surface of the water using light during the night (7–11pm) in deep sea areas of about 20 miles away from the coast. According to the fishermen they can catch 40 to 200 kilos of squid per fishing operation.

f) Cover pot: This is a device devoid of a non-return valve with the lowermost opening used to cover and entrap the fish. This gear is locally known as asad or as-asad (Fig. 1g). Catches include tilapia, mudfish (dalag), catfish (paltat) and others.

g) Tray (Karadikad) (Fig. 1h): A hand instrument made of webbed bamboo splits with a circular frame similar to a tray. The bamboo splits are webbed in regular intervals so that sand or soil is pushed when screening by shaking so that the freshwater shellfishes (locally known as unnok or tukmem), the main catch, are left inside the device. This fishing device does not fall under the different categories of hand instruments as described by Umali [6]. By the nature of its fishing operation however, it may be classified under hand instruments.



Fig. 1. Hand instruments used for fishing in Ilocos Norte.

Traps: All types of gears, exclusive of those made of textile, are either temporarily or permanently fixed to the bottom. The fish are caught in an area where they entered after having been enticed or attracted into it. There are 10 types of traps documented under this category. These are presented and described below (Table IV and Fig. 2). Out

of these fishing gears and methods, three (3) are used in coastal areas (Tallakeb, Nasa and Saltok), seven (7) in inland areas (Kub-kub, Barekbek, Udag, Balingato, Bubo, Litro and Tarik), and one (1) in both fishing grounds (Tallakeb).

TABLE 4
TRAPS IN THEIR ILOCANO AND ENGLISH OR COMMON NAMES

Ilocano Name	English or Common Name
<i>Tallakeb</i>	Fish pot
<i>Nasa</i>	Fish pot
<i>Kubkubor Screen</i>	Fish pot
<i>Barekbek</i>	Fish pot
<i>Udag</i>	Fish pot
<i>Balingato</i>	Fish pot
<i>Bubo</i>	Fish pot
<i>Litro</i>	Improvised fish pot
<i>Saltok</i>	Set fish trap
<i>Tarik or Kubong</i>	Set fish trap

Fish pots: Usually baited enticing devices made of bamboo, rattan or chicken wire in the form of regular receptacles with a non-return valve which provides easy entrance but difficult exit.

a) *Tallakeb*(Fig. 2a): A trap or pot designed and constructed to catch crabs in ponds, rivers and lakes 3 – 5 meters deep during the night. It is provided with a buoy set to determine its place when it is hauled. This gear is hexagonal or round in shape and flattened from top to bottom with a non-return valve. Ten to twenty units of “*tallakeb*” are operated by one or two men aboard a bamboo raft or banca. Catches include mudcrabs (*rasa* or *kappi*), blue swimming crabs (*dariway*), squids and other fishes that happen to be trapped inside the device;

b) *Nasa*(Fig. 2b): A fish pot made of bamboo splits that is rectangular in shape and provided with a non-return valve. It is operated in seawater with a depth of seven (7) fathoms or more during the dry season or when the sea is calm. The setting lasts from 5–7 days before the gear is hauled. Ten to twenty units of the device are operated by one to two men aboard a bamboo raft or a motorized banca. A nylon rope (10 mm in diameter) is attached from one fish pot to another that are 15 to 25 meters apart to avoid loss of the gear. A buoy which serves as a marker is usually placed to determine the setting place of the device. Sometimes, a buoy is not used but plotting the setting place to landmarks like mountains, towers or big trees is done. This is for other fishermen not to find the set gears and treacherously haul these for their catch. Hauling is

done by hooking and lifting the nylon rope attached to each pot. The species of fish caught are squids (*laki*), crabs (*kappi*), snappers (*maya-maya*), and goat fishes (*balaki*);

c) *Kubkubor Screen* (Fig. 2c): An improvement of the *nasa* in which the bamboo materials used in its construction are replaced with a chicken wire or a plastic netting (Amazon net). The gear is operated in freshwater areas like in lakes and rivers for catching tilapia, mudfish (*dalag*), catfish (*catfish*), climbing perch (*ar-aro*), and other relatively bigger species of fish;

d) *Balingato*(Fig. 2d): A conical fish pot made of webbed bamboo splits provided with two non-return valves at the side and center portions. This trap is set in rivers, lakes, ponds, and ditches three (3) meters deep or more during nighttime. It is baited with a mixture of rice bran and porridge (*lugaw*) in solid form. Hauling is done in the morning. The catch comprises of freshwater species of fish such as goby (*bukto*) in Paoay Lake. A smaller size of this gear is used to catch freshwater shrimps (*lagdaw*) at the Sarnap Lake;

e) *Udag*(Fig. 2e): This is another version of the *barekbek*, however with only one non-return valve. *Udagis* is a term used by the fishermen from Vintar which they particularly operate in catching eels (*kiwetor igat*) at the Laoag River;

f) *Bubo* (Fig. 2f): A larger version of *balingato* is used by the fishermen of Sarnap Lake, City of Batangas, for catching bigger species of fish like tilapia, mudfish (*dalag*), catfish (*paltat*) and others.

g) *Barekbek*(Fig. 2g): A baited fish pot made of webbed bamboo splits that is cylindrical in shape and provided with two (2) series of non-return valves. This is designed to catch freshwater eels (*igat* or *kiwet*), shrimps (*lagdaw*), crabs (*kippî*), and goby (*bukto*, *palileng*). It is operated in rivers 1.5 meters deep and tied to roots of trees to prevent loss during overnight operation. The main purpose of having two (2) series of non-return valves is to separate the eels from the shrimps caught preventing the latter from being eaten by the eels.

h) *Litro*(Fig. 2h): An improvised fish pot made of 1.5 L softdrink bottles as shown in the figure. The gear is used by the fishermen of Vintar in catching freshwater shrimps (*lagdaw*) in LaoagRiver. *Miscellaneous Set Traps*. Other set traps of enticing devices are regular receptacles, exclusive of those made of nets, which prevent the escape of fish by

means of trap doors or devices other than non-return valves.

a) *Saltok*(Fig. 2i): A mechanical device made of bamboo, designed and constructed for catching goose crabs, locally known as *dakumo*, that hide in holes. It is provided with a trap door which automatically closes through a mechanism like that of a bow when the crab enters the trap. This is operated by setting or placing it at the mouth or opening of crab holes.

b) *Tarik* or *Kubong* (Fig. 2j): A set fish trap made up of bamboo splits in which a fence (locally called *tarik*) is constructed to lead fish into a compartment with an easy entrance but difficult exit (locally called *kubong*) where the trapped fishes are scooped. The gear is used by fishermen in Paoay Lake in catching tilapia, mudfish (*dalag*), catfish (*paltat*), climbing perch (*ar-aro*), and other relatively bigger species of fish.

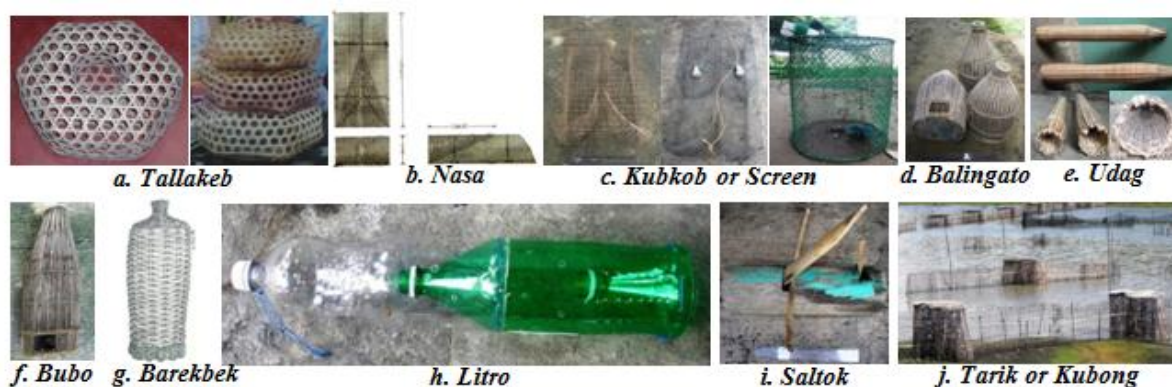


Fig. 2. Fishing traps used in Ilocos Norte.



Fig. 3. Lines used for fishing in Ilocos Norte.

TABLE 5
NETS IN THEIR ILOCANO AND ENGLISH OR COMMON NAMES

Local Name	English or Common Name
<i>Bukatot</i>	Hoop net
<i>Dus-dus</i>	Push net
<i>Pang-kusimay</i>	Push net
<i>Bat-bateng</i>	Skimming net
<i>Sayupor Dus-dus</i>	Skimming net
<i>Tabukol</i>	Cast net
<i>Palned</i>	Bottom set gill net
<i>Patapao</i>	Drift gill net
<i>Pangtamban</i>	Gill net for sardines
<i>Pamukto</i>	Gill net for goby
<i>SigayPangkarayan</i>	Gill net for rivers
<i>SigayPangkarp</i>	Gill net for carp
<i>Panglaki</i>	Gill net for squid
<i>Dolyar</i>	Tuna drift gill net
<i>Daklis</i>	Beach seine
<i>Kammang</i>	River Seine

All fishing gears are principally made of woven or knitted fabrics with openings or meshes of uniform, or almost uniform, sizes, at least in the individual parts of the net. There are 16 fishing gears being used by fishermen documented under this category and they are presented and described below (Table VI and Fig. 4). Out of these fishing gears and methods 10 are used in coastal areas (*Dus-dus*, *Pangkusimay*, *Tabukol*, *Palned*, *Patapao*, *Pangtamban*, *Panglaki*, *Dolyar*, *Daklis* and *Kammang*), six (6) in inland areas (*Bukatot*, *Bat-bateng*, *Sayup*, *Pamukto*, *SigayPanhkarayan*, and *SigayPangkarp*) and four (4) in both fishing grounds (*Dus-dus*, *Tabukol*, *Bat-bateng* and *Sayup*).

Hoop net (Fig. 4a): Funnel-like bag nets constructed over circular hoops, having non-return valve with no wings. This fishing gear is operated in estuarine areas and in rivers. The catch includes tilapia, goby (*bukto*, *palileng*), climbing perch (*ar-aro*), mudfish (*dalag*), freshwater shrimps (*lagdaw*), and crabs (*kipp*), among others. In Laoag River, particularly the Vintar fishermen, this is locally known as *bukatot* (Fig. 4a).

Push net (Figs. 4b-c): This is a triangularly-framed collapsible netting operated by one individual. The capture of fish is done by a forward and lifting motion from the bottom to the surface in wading depths of water. There are some variations or types used by the fishermen in the survey area and these variations depend on the kind of fish caught. The types used are: *dus-dus* (Fig. 4b, gear from Sarnap Lake which is bigger than the *dus-dus* under

skimming nets below), *pang-kusimay* (Fig. 4c, gear from Pasuquin), *pang-pasayan*, *sagap*, *pangipon*, *pang-karayan*, and *pamurak*. The type of fishing gear is usually named after the species of fish caught such as *kusimay* (mole crabs), *pasayan* (shrimps), and goby fry (*ipon*). Sometimes they are named after the place of operation such as *karayan* (river) or purpose such as *pamurak* which means that the gear is used to harvest the fish in fish shelters.

Skimming net: A lifted push net operated in waters beyond wading depths using a small water craft, raft or boat with a skimming motion while drifting with the motion. Examples are the *bat-bateng* (Fig. 4d), gear from Pagudpud) and the *sayupor dus-dus* (Fig. 4e, gear from Vintar). These are used in catching goby (*bukto*, *palileng*).

Cast net: A conical net usually operated by one man (except when used in deeper water from a boat) by throwing it to cover the school of fish. It is heavily weighed around the base with lead sinkers and is provided with a retrieving line attached to the apical portion of the net for handling. It is operated during daytime where fish is available. This is locally known as *tabukol* (Fig. 4f). Species of fish caught include siganids (*malaga*), mullets (*purong*), cardinal fish (*bagsang*), mojarra (*ikuran*), jacks (*pompano*), threadfin (*kugaw*), sillago (*uso-os*), terapon (*baraungan*) and other fish species in shallow coastal, estuarine and riverine areas.

Gill net: This fishing gear is generally known locally as “*sigay*”. It is curtain-like netting in which the capture of fish is affected by gilling of the actual meshes of the net.

Variations exist depending on the kind of fish caught, the part of water column where these are set or whether the gear is drifting or anchored.

a) *Pal-ned* (Fig. 4g): A gill net designed in catching demersal species of fish such as sardines (*tamban*, *munamon*), threadfin bream (*saramulyete*), big-eyed scad (*mataan*), cavalla (*kabalyas*), *ronguan*, barracuda (*babayo*) and others. It is made of monofilament plastic nettings with rubbers and leads as floats and sinkers, respectively. Anchored ones are known as set gill nets while those not anchored are drift nets. Several units are joined to form one setting. The gear is operated in coastal waters at depth of 1 – 6 fathoms during the dark phase of the moon.

b) *Patapao* (Fig. 4h): A surface gill net designed and constructed in catching pelagic species of fish such as flying fish (*borador*, *bulador*), needle fish (*layalay*), half beak (*barasot*) and others. It is made of monofilament plastic nettings with rubbers and leads as floats and sinkers, respectively. When it is anchored, it is known as set gill net, if not, it is a drift gill net that goes with the direction of the current. This is attached to a boat or any watercraft which the fishermen use to prevent its loss. One setting is composed of several units of nets to ensure more catch. This gear is operated by 2 – 3 fishermen in coastal waters during the dark phase of the moon.

c) *Pamukto* (Fig. 4i): A gill net used in rivers specifically for catching goby (*bukto*). This is used by fishermen in Vintar.

d) *SigayPangkarayan* (Fig. 4j): A gill net is used in freshwater bodies of water such as lakes and rivers. This gear has rings, instead of lead, as sinkers. The mesh size is number seven with a little variation in size in some gears used. The gear is used in catching tilapia, mudfish, catfish, and other relatively bigger size fish species. This is used by fishermen in Sarnap Lake.

e) *SigayPangkarpa* (Fig. 4k): A gill net with big meshes mainly used for catching carps in Paoay Lake.

f) *Pangtamban* (Fig. 4l): A gill net about 50 meters long and four (4) meters deep with mesh size 12 to 14 (two to three cm stretched mesh) operated during the day specifically used to catch sardines (*tamban*, *munamon*), however other species of fish may also be caught.

g) *Panglaki* (Fig. 4m): A gill net used mainly in catching squids (locally known as *laki*) in coastal areas during daytime particularly in the morning. This is used by fishermen in Currimao.

h) *Dolyar* (Fig. 4n): Tuna drift gill net with big mesh sizes of 3 – 5 inches, four (4) meters deep and 100 meters long with about 0.5 m long wooden floaters placed at regular intervals. There are no sinkers. One fishing operation entails several units (10 to 15 units) set along the migration path (about 20 miles from the shoreline) of tuna and tuna-like species including blue marlins (*susay*), mackerel (*tanguigui*), sharks (*yo*) and others which comprise the catch. The units are set fixed to the boat and are free to move with the wind, current or tide. Fishing operation is usually during night time and when the weather condition is calm.

Seine Nets (Beach/Drag Seine): This is a seine net in which the capture of fish is done by a horizontal pulling or dragging motion of the gear. It consists of a bag or bunt, flanked on each side by quarters and wings. The apparatus is short in such a position as to close a definite body of water containing a shoal or school of fish, thereby affecting the localization of the latter and then hauled towards the shore. It is operated by 50 or more persons. This is locally known as *daklis* (Fig. 4o). Fishes caught include jacks (*talakitok*), sardines (*munamon*), anchovies (*dilis*), slipmouth (*sap-sap*), squid (*laki*), big-eyed scad (*mataan*), cavalla (*kabalyas*), crabs (*kappi*), emperor fish (*timmakong*) and others.



Fig. 4: Nets used for fishing in Ilocos Norte.

Kammang (Fig. 4p): This is a smaller version of the *daklis* which is operated in the mouth of rivers and estuarine areas for catching brackishwater species of fish such as cardinal fish (*bagsang*), grouper (*angrat*), *sidingan*, mudcrabs (*rasa*), eels (*igat*), siganids (*Malaga*), jacks (*pompano*), jacks (*talakitok*), slipmouths (*sap-sap*), mojarra (*ikuran*), terapon (*baraungan*) and others. The gear is operated by a relatively fewer number of fishermen (4 – 6 persons) compared to the *daklis*. It can also be used in harvesting earthen fishponds.

Miscellaneous Fishing Accessories or Paraphernalia

The miscellaneous instruments documented in this study include the goggles locally made of wood with rubber straps locally known as *antiparra* (Fig. 5a), improvised fins using plastic and other materials available

(locally known as *palik-pik*, Fig. 5b), line holders locally known as *pudunan* (Fig. 5c) and *sikuan* (Fig. 5d), fish creel or container locally known as *alat* (Fig. 5e and f) which was formerly made of bamboo webbings but has been improvised using available materials such as plastic containers with netting such as the *paggupukan* (Fig. 5g), basket made of bamboo for storing fish catch and shellfish locally known as *laga* (Fig. 5h), bamboo and wooden rafts locally known as *rakit* (Fig. 5i and j), hand paddles locally known as *gaud*, *bugsay* or *timon* (Fig. 5k) and *lapad-lapad* (Fig. 5l), an improvised water resistant ordinary flashlight covered with an interior of a motorcycle wheel such that water will not enter inside locally known as *lente* (Fig. 5m), lantern for light fishing locally known as *hasag* (Fig. 5n), and fishing boat or banca locally known as *bilog* (Fig. 5o).



Fig. 5. Miscellaneous fishing accessories or paraphernalia.

IV. CONCLUSION AND RECOMMENDATIONS

This study documented the traditional fishing gears and fishing methods in the province. It records, identifies, and describes their characteristics that include their structures, designs, mode of operation, fishing grounds and species of fish caught, among others.

Results of the study revealed that there are 48 fishing gears and fishing methods used which are classified into four (4) categories based on the classification of fishing gears in the Philippines by Umali [6]. There are eight (8) of the hand instruments (six coastal, two inland and three common); ten (10) of the traps (three coastal, seven inland and one common); 14 of the lines (eleven coastal, two inland and one common); and 16 of the nets (10 coastal, six inland and four common). Fifteen (15) miscellaneous fishing accessories or paraphernalia which are not in the classification were also documented.

Further, a variety of marine and freshwater fish species comprising the catch of the fishing gears and methods are

identified and recorded as to their Ilokano and English or common names. These include 44 species of marine fishes, six (6) species of marine invertebrates, seven (7) species of freshwater fishes, and three (3) species of freshwater invertebrates.

The collection and documentation of these fishing gears and fishing methods are valuable materials in the preservation and appreciation of the fishing culture and traditions of the Ilocanos for the present and future generations. These are also important references for researchers and other interested persons to validate and to diffuse because these are useful for the local communities. The following are recommended for further study: a) a follow-up study on the relative popularity, catch per unit of effort, profitability, and seasonality of the fishing gears and fishing methods; b) improvement of catching efficiencies; and c) development of more sustainable fishing gears based on the existing fishing gears, local conditions and available fishery and aquatic resources in the area.

ACKNOWLEDGEMENT

The authors acknowledge the support provided by the Mariano Marcos State University; the help of the different local government units of Ilocos Norte in allowing the researchers to conduct the study; the assistance of the key informants and the several fishermen in the municipalities and cities of the province by generously giving the necessary information and data for the study; and the selfless help given by some of the faculty and staff of MMSU College of Aquatic Sciences and Applied Technology in the preparation and finalization of this manuscript.

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— This article does not have any appendix. —