Milkfish *(Chanos chanos)* Fry Concession System in Bolinao, Pangasinan: Implications to Coastal Resources Management

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ABSTRACT

The ecological and socioeconomic implications of the concession system on milkfish (*Chanos chanos* Forssk.) fry in Bolinao, Pangasinan were evaluated from 1996 to 1999. Monitoring of landed catch from 1996 to 1998 showed that the seasonal trend and annual volume of catch varied widely during the three-year period. The fry season in 1996 and 1997 lasted seven months, starting from the second week of April to the second week of October. However, during the 1998 season, fry were available for eight months starting in the second week of March and ending in November. The peak period also varied considerably during the three-year period. In 1996, peak abundance of fry was observed in the last week of July while in 1997 and 1998, the peak was during the second week of May. The volume of total catch for the entire season also varied widely, from as low as ~400,000 fry (1997) to as high as 2,400,000 fry (1996). The concessionaire "postor" has the sole right to buy all fry caught within the municipal waters. Thus, s/he dictates the buying price. Moreover, the existing concession system has no mechanism to regulate harvest of milkfish fry gathering. This arrangement allows the concessionaire to enjoy huge economic benefits while the fry gatherers only get a minimal share in the income. To promote sustainable and equitable harvest of milkfish fry, a new access arrangement through a permit system was proposed by the fry gatherers. The proposed permit system will promote a sustainable harvest of milkfish fry through the implementation of a closed period during the fry season. Compared to the present concession system, the permit system is believed to be more equitable because of the abolition of the 1/3 cut levied by the concessionaire on the landed catch. The permit system also facilitates a mechanism that provides for transparency on the selling/buying price. More importantly, fry gatherers will have the opportunity to sell to buyers offering a relatively higher buying price. In addition, fry gatherers may also opt to grow out milkfish fry to fingerlings which may potentially give them higher economic returns for their catch.

Keywords: milkfish fry, concession system, economic benefits, sustainable/equitable resource use, permit system

INTRODUCTION

Milkfish (bangus) is an important domestic foodfish and aquaculture commodity in the Philippines. Among the foodfish, milkfish ranks third in demand among local consumers after roundscad and tuna. Several economic activities are related to the milkfish culture which include: fry gathering, hatchery, and nursery operations, processing, marketing, and other services, such as ice making and fish transport (Guerrero 1981). Although

commercial production of milkfish was introduced more than a century ago, significant growth of the industry was realized only in the last four decades. However, the industry is now declining, mainly as a result of the dwindling supply of milkfish fry. Contributory to this decline is the destruction of natural habitats brought about by the extensive conversion of mangrove areas to fishponds, destructive fishing methods, and environmental quality degradation (e.g., high pesticide load), among others (Villacorta 1994). While imported and local commercially produced milkfish fry are available, growers generally prefer wild fry over hatched fry (Garcia 1997). Thus, sustainable harvest of wild fry remains a critical issue in ensuring the sustainable development of the milkfish industry.

In Bolinao, Pangasinan, the major milkfish fry gathering area is along the coastline of Barangay Balingasay (Fig. 1). Five other neighboring barangays and some parts of Santiago Island are also benefiting from the milkfish fry gathering industry. Compared to other barangays, gatherers from Balingasay are more dependent on the milkfish fry resource. Almost 60% of the barangay is economically dependent on the fry gathering activity, especially during the peak season from April to July. The abundance of milkfish fry in the area may be attributed to the presence of an ecologically rich estuarine ecosystem that provides adequate riverine nutrient-rich inputs and relatively calm entrainment features that protect the fry ground from strong wave actions and current flushing (Bagarinao 1984). As a traditional fishing industry, the municipal government managed the milkfish fry through: (1) the delineation of a milkfish fry reservation area (Municipal Ordinance #1, s1988); and (2) the implementation of reforms in the concession system. Unfortunately, the designated milkfish fry reservation is not strategic because the area is not within the primary milkfish fry gathering area (Fig. 1). Effectively, the only real management scheme employed by the municipal government is the concession system.

Under this concession system, the concessionaire always aims to attain maximum harvest, thus, resource extraction is intensified with less regard for harvest controls. More importantly, the present system is perceived to be inequitable as the concessionaire always has the "lion's share" in terms of economic returns. Because of this situation, an alternative management scheme was proposed by the milkfish fry gatherers in order to promote sustainable harvest and equitable sharing of benefits from milkfish fry activity.

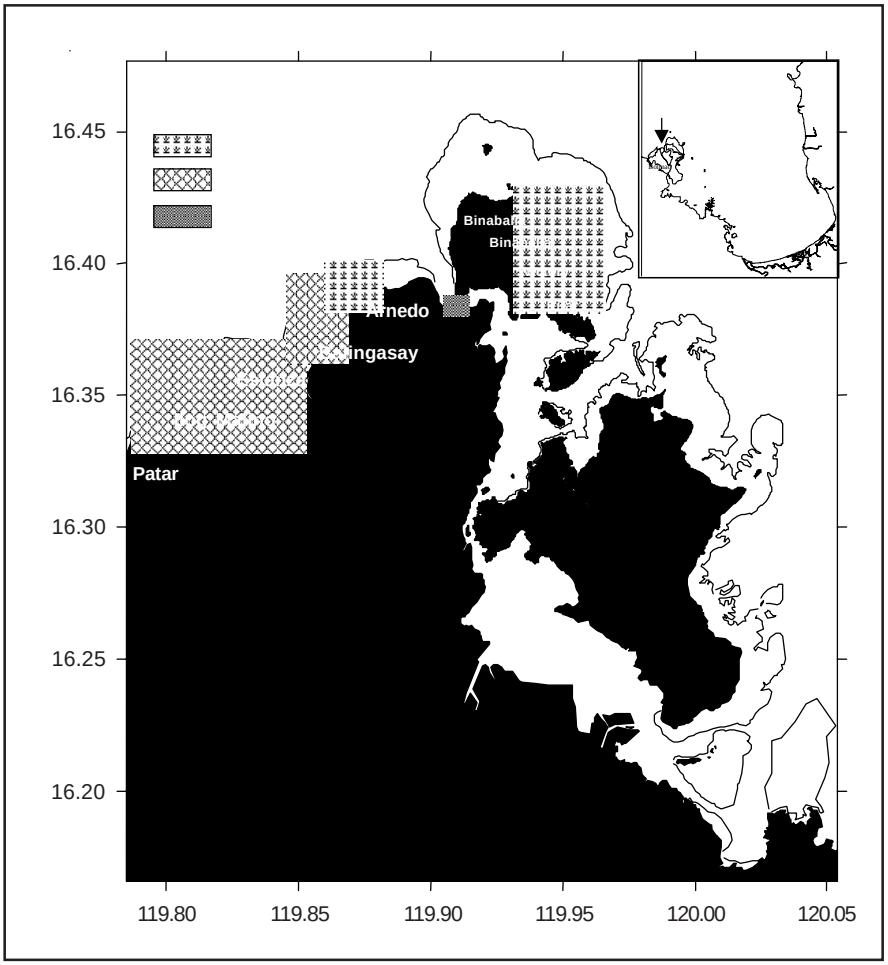

Fig. 1. Map of Bolinao showing the milkfish fry ground and the milkfish fry reservation area (Inset: Map of Lingayen Gulf

The objectives of this study are: (1) to evaluate the ecological and socioeconomic implications of the milkfish fry concession system in Bolinao; and (2) to evaluate the proposed alternative management scheme in terms of how it promotes sustainable utilization and equitable sharing of the milkfish fry harvest.

METHODOLOGY

The study was conducted over a four-year period (1996-1999) in Brgy. Balingasay, the most significant source of milkfish fry in Bolinao. Parameters analyzed in this case study were evaluated based on sustainability, equitability, and legal-institutional considerations of the milkfish fry concession system. For sustainability, data on total landed catch were gathered from the concessionaires during the respective periods, e.g., SAMMABAL (Samahan ng mga Mangingisda at Mamamayan ng Balingasay, Inc.), as co-concessionaire in 1996, and BABFGA (Balingasay Bangus Fry Gatherers Association) in 1997 and 1998. For equitability, data on the number of milkfish fry gatherers and beneficiaries, and buying and selling prices were derived from the records of the concessionaires. Pertinent socioeconomic parameters (e.g., average catch, fishing gear use) were gathered through interviews and personal records in Brgy. Balingasay where the number of fry gatherers was highest. Meanwhile, legal-institutional analyses were conducted by reviewing existing municipal policies/ordinances and relevant national laws. The evaluation of the proposed alternative management scheme was based on the minutes of the consultation meeting. Comparative evaluation based on potential impact on sustainability of the resource and equitability of returns using projected income analysis was undertaken.

RESULTS AND DISCUSSION

Legal-institutional considerations

There is no historical record as to when the milkfish fry concession system started in the municipality of Bolinao or the entire province of Pangasinan. However, according to some officials of the Department of Agriculture-Bureau of Fisheries and Aquatic Resources (DA-BFAR) in Region I, significant harvesting of milkfish fry in the Ilocos Region was initiated in the 1920s.

In the Philippines, there were reports that milkfish culture started in the late 1920s (Herre and Mendoza, 1929) and intensified in the early 1930s (Adams and others 1932). Meanwhile, there were local anecdotal reports that massive conversion of mangrove forest into fishpond (primarily for milkfish culture) started in the 1960s. The national government's attempts to manage milkfish fry are reflected in national laws and policies passed (Smith and Panayotou, 1984). The first national law on fisheries was R.A. 4003 or the Fisheries Decree of 1932 which provided for the allocation and designation of specific areas for exclusive uses (i.e., erecting fish corrals and oyster beds, operating fish ponds, catching of milkfish fry, etc.). This was later reinforced by the enactment of P.D. 704 or the Fisheries Code of 1975 which delineated the extent of municipal waters (i.e., 10 km. from the shoreline) and gave the municipality the power to award fishery privileges in the form of grants or leases.

In 1991, R.A. 7160 or the Local Government Code was enacted. This code devolved certain functions to coastal municipalities and legally empowered them to regulate resource-use activities, such as milkfish fry gathering within the municipal waters (Pimentel 1993). The law provided that fry grounds be subjected to a fishery privilege to an individual or a group, i.e., the right of first purchase of all gathered fry. The difference between P.D. 704 and R.A. 7160 is that the latter specified that coastal municipalities may give preferential rights to marginal fisher's groups in the granting of fishery privileges. Recently, the passage of R.A. 8550 or the Philippine Fisheries Code of 1998 further strengthened R.A. 7160 by granting the municipal government the power to delineates zone of specific uses. It also recognized the direct role of marginal fisher's groups in fishery privileges.

The process of granting the concession system In Bolinao is interesting. Legally, the municipal council (Sangguniang Bayan), as the legislative branch, should have the authority to grant the concession (Sec. 149b, R.A. 7160). The Sangguniang Bayan mandated a committee to take charge of the granting of

concessions. The committee was composed of a representative of the Mayor, three members from the Sangguniang Bayan, and the Municipal Treasurer.

The process of granting the concession would start with the posting of a notice on the bulletin board of the Municipal Hall and/or in other strategic places for a period of two weeks, usually during the third week of October. The notice would indicate the date and time when the bids could be filed with the Municipal Treasurer. At the time and place designated, the committee would open all bids (usually during the first week of November). Usually, all bidders would present their cash upon stating their bid. The committee would then award the lease to the highest bidder. Upon being granted the rights to the concession, the winning bidder would pay the total amount of the bid, which represented a one-year rent, from January 1 to December 31 (Rodriguez 1997). It has been a policy that the starting bidding price should at least be the same as the winning bid of the previous year. With this system, fry gatherers observed that only the influential and the elite in the municipality could acquire the concession. The highest bidding price was recorded in 1995 at P400,000.00.

Without amending the municipal policies, the usual process of granting the concession system (e.g., bidding) was not followed since 1996 and was replaced by the granting of a negotiated contract. In a negotiated contract, the municipal government may directly award the concession to an individual or an organization. In the past three years, the municipal government opted to award the concession to people's organizations. It was perceived that such development was made because of the decrease in the number of participants in the bidding, which was attributed to the annually increasing concession fee. It is also believed that the intervention was made in consonance with the preferential right of fisher's organizations as provided for by Sec. 149b, R.A. 7160. Since then, the awarding of the concession system was based on the discretion of the municipal government. However, it was observed that only those organizations closely connected to the municipal government had access to the concession. For instance, SAMMABAL and BABFGA who were known to have close connections to the municipal government acquired the concession, i.e., SAMMABAL as co-concessionaire in 1996 and BABFGA as concessionaire in 1997 and 1998. Meanwhile, except for the granting process, other procedures traditionally imposed by the concessionaire were maintained, such as the 1/3 cut on catch.

Sustainability

The total landed catch of milkfish fry is presented in Fig. 2. There were wide intra- and inter-annual variation in landed catch in the area during the fry gathering season. Fry gathering usually lasted for seven months, from the second week of April until the second week of October (1996 and 1997 seasons). However, in 1998, fry gathering lasted for eight months, from the third week of March until the second week of November. Volume of the total landed catch varied from ~400,000 fry in 1997 to 2.6 and 2.2 million fry in the 1996 and 1998 seasons, respectively. Peak period also varied annually during the three seasons, from the second week of May in 1997 and 1998 to the last week of July in 1996. The seasonality of milkfish fry was believed to be influenced by the following: ebb period or tidal advection, freshwater inputs from adjacent riverine systems, onset of the rainy season, and direction of water current (Bagarinao 1984). A plot of the tidal range and total landed catch during the 1996 season (Fig. 3) suggests that the period of highest tidal advection generally coincids with the period of highest recorded landed catch of milkfish fry. While there were still amounts of fry caught in the latter part of the season, these did not contribute as much to the income of the fry gatherers becuase of the low buying price imposed by the concessionaire.

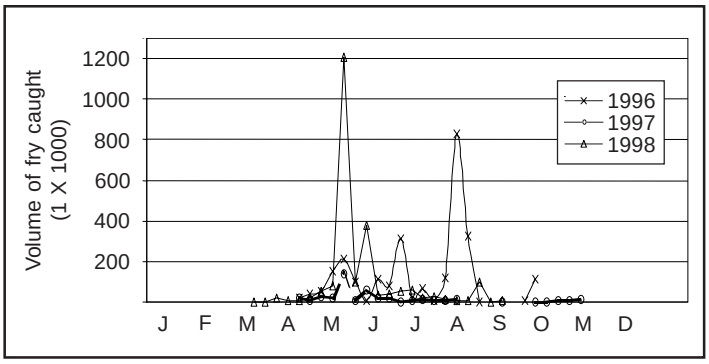

Fig. 2. Total landed catch of milkfish fry (1996-1998) in Balingasay, Bolinao, Pangasinan

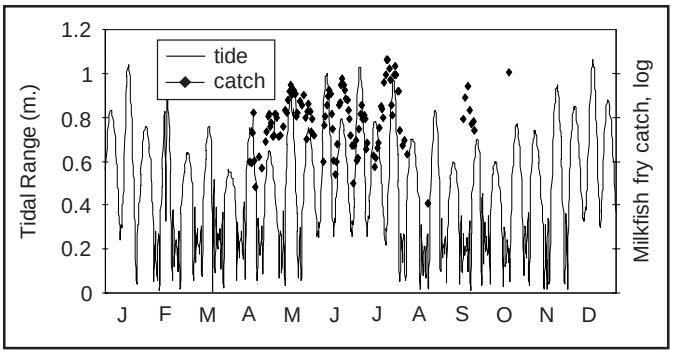

Fig. 3. Relationship of tidal range and total landed catch (log) during the 1996 season in Balingasay, Bolinao, Pangasinan

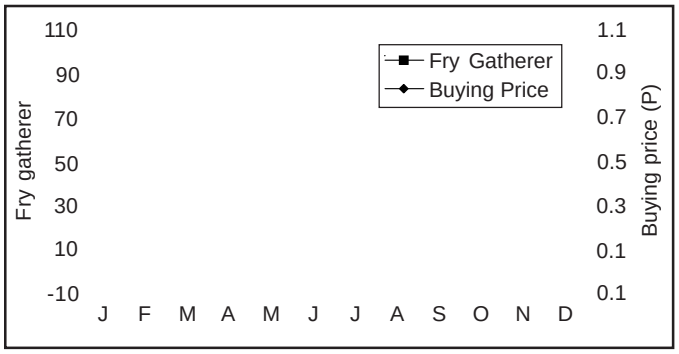

Fig. 4. The number of fry gatherers and buying price during the 1996 fry gathering season

Institutional arrangements and equitability considerations

The concessionaire took full control of the operation and management of the concession. Neither the fry gatherers nor the municipal government had the right to oppose any regulation imposed by the concessionaire. The concessionaire allowed the fry gatherers to use the fry ground on the condition that all catches were sold to the concessionaire. The concessionaire also had control over the price of the fry. Catches were presented to the concessionaire who issued payments for the catch. The sharing arrangement imposed was that, from the total catch, 1/3 would be deducted as a concessionaire's fee. An additional deduction of 5% of the total catch was imposed as mortality rate charge. The concessionaire then paid the fry gatherer the value of the net catch. The concessionaire, on the other hand, sold the milkfish fry to buyers outside Bolinao at a relatively higher price. This system primarily benefited the concessionaire who got the "lion's share" and who aimed for higher economic profits. Furthermore, the system did not have a provision on management measures and since the concessionaire would always want to increase income, resource extraction was further intensified.

The milkfish fry gatherers engaged in fry gathering and its relationship with the buying price during the 1996 season is presented in Fig. 4. Fry gatherers were abundant during the start of fry gathering period even if supply of milkfish fry was still low and progressively decreased towards the end of the season. Conversely, fry gatherers were fewer even when the supply of milkfish fry was high, e.g., third week of July. Such inverse relationship was affected by the buying price imposed by the concessionaire. Buying price was usually set at P1.00/fry at the start of the season and decreased to P0.70 and P0.50/fry during the middle of the season until it stabilized at P0.40/fry towards the end of the season. According to the concessionaire, the selling price was usually P0.20/fry higher than the imposed buying price. However, in reality, the selling price of the concessionaire reached P0.50/fry (i.e., P1500.00/ 1000 fry), which is much higher than the buying price especially during March up to the second week of May. The source of income for the fry gatherers was derived only from daily landed catch paid for by the concessionaire while the concessionaire derived his/ her income from the mark up price (selling price minus buying price), the imposed 1/3 cut on landed catch, and 5% mortality rate. Thus for every thousand fry, the fry gatherer received P633.00 while the concessionaire earned P1,741.00, broken down as P1,425.00 (derived from the selling price) and P316.00 (from the 1/3 cut on landed catch).

The proposed alternative management scheme – permit system

For a long time, fry gatherers have been clamoring for the elimination of the concession system of the municipal government. Unfortunately, the request has not been granted because the municipal government has needed to generate income from the bangus fry resource derived from the concession fee paid in December of each year. The concession fee was used by the municipal government as payment for Christmas bonuses of

municipal employees. Cognizant of the financial needs of the municipal government, the fry gatherers, through SAMMABAL, proposed a scheme that would generate revenue equal to at least the concession fee. The proposed permit system (Fig. 5) is an alternative management scheme based on individual permits intended to eliminate the concession system and promote sustainable harvest of milkfish fry.

The proposed permit system involves the milkfish fry gatherers, accredited buyers, respective barangay councils, and the municipal government. The permit system differs from the present system in that only the concessionaire has the main role in the concession system (Table 1). The income of the municipal government will be derived from the licenses and taxes paid for by the fry gatherers and buyers amounting to P330,000.00 (Table 2). In the present system, the municipal government derives its income from the concession fee paid by the concessionaire. The barangay council, which does not have a role in the present system, will have its share through the fishing permits paid by the fry gatherers (P35-50/gear/year). The barangay council will serve as the monitoring body that will oversee the implementation of open/closed season and check the authenticity of recorded catch. Although the municipal government may get a slightly lower income in the proposed system, if the income derived by the barangay councils (P50,000.00) will be considered as part of the municipal government's income, then the total income that will be generated by the proposed permit system is higher than the current

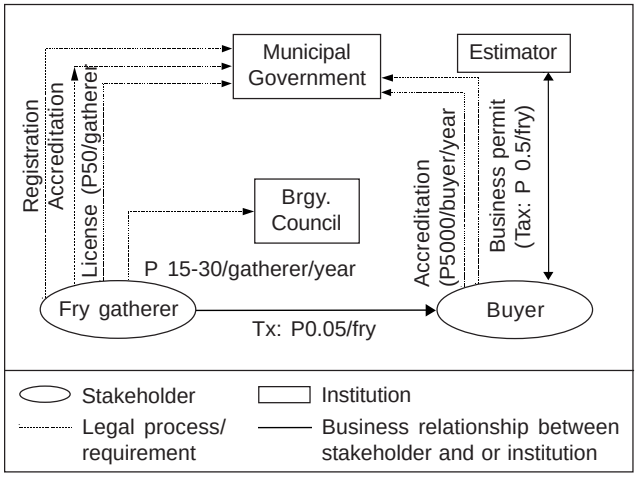

Fig. 5. The proposed permit system

Table 1. Comparative analysis of benefits in the concession system and the proposed system

Sector	Present System (Concession)	Proposed System (Permit)
• Municipal Government	• P300,000	• P345,000
• Brgy. Council	• None	• P80,000
• Concessionaire	• P1.7 Million	• None
• Buyer	• P300,000 average net income	• P300,000 • average net income
• Fry Gatherer	• P1,5000 average net income	• P2292 • average net income

Direct Benefit	Indirect Benefit
• role of concessionaire - eliminated • buying price - not monopolize	• equitable and sustainable harvest of milkfish fry

Options
• fry gatherer may look for buyers offering relatively higher price • milkfish fry grow-out as added value

income derived from the present system. More importantly, the monopolistic system of the concessionaire will be diminished in the proposed permit system. Authorized buyers will come from accredited fishers' organizations who will manage small-scale buying stations where catch can be brought and sold. Capitalization of a number of smaller buying stations will be more affordable to the local community. Estimated aggregate gross income of the buyers was P1,815,274.93. Among its expenses were accreditation, business permit, and taxes, thus, the estimated net income was computed at P371,667.26. Meanwhile, the fry gatherers who were traditionally just involved in selling their catch to the concessionaire may have the opportunity to monitor the buying/selling price and look for buyers offering relatively higher buying prices. Fry gatherers, even with the added expenses for licenses and permits, may have an increase in aggregate average income from P1,500.00 to P2,292.22 (range: P1,000-P12,000.00) due to the abolition of the 1/3 cut on submitted catch (Table 1). Meanwhile, in order to help ensure the sustainable harvest of milkfish fry, the proposed system will include a provision on the closed season (October - April 15).

Table 2. Projected comparative income analysis between the concession system and the permit system

		Income/Expenses (P)
a.	Municipal Government	
	Buyer's Permit=P5000/buyer * 5 buyers	25,000.00
	Tax (p0.15/fry * 1.6 million fry	240,000.00
	License for fry gatherers (500 gatherers * P50/gatherer)	25,000.00
	Permit to transport for buyers (P0.15/fry * at least 50% of 1.6 million fry)	40,000.00
	Gross income	330,000.00
	Expenses, i.e. estimator (0.5% of total catch)	8,000.00
b.	Brgy. Councils	
	Permit to gather (P15/year * 500 gatherers)	7,500.00
	Expenses: none	
c.	Buyers (Assumptions: no 1/3 cut on submitted catch and selling price is P0.4/fry higher than the buying price during the first month (March-May), P0.3/fry higher during the middle period (June-July) and constant at P0.1/fry higher towards the end of the season, e.g. September-October (Selling Price – Buying Price)	1,815,274.93
	Gross	**1,815,274.93**
	Expenses	
	Business Permits (P5000/year * 5 buying stations)	25,000.00
	Tax (P0.15/fry * 1.6 million fry)	240,000.00
	Price paid for the fry gatherers	1,178,607.66
	Total Expenses	**1,443,607.66**
	Net Income (Gross Income – Total Expenses)	**371,667.26**
d.	Fry Gatherers	
	Paid buying price/Gross	**1,178,607.66**
	Expenses	
	Licenses (P35-50/year * 500 gatherers)	25,000.00
	Permit to gather for Brgy. Council (P15/year * 500 gatherers)	7,500.00
	Total Expenses	**32,500.00**
	Net Income	**1,146,107.66**
	Average Income per Fry Gatherer (Net Income for 500 Fry Gatherer)	**2,292.22**

SUMMARY AND CONCLUSION

The milkfish fry concession system in Bolinao, Pangasinan has been implemented by the municipal government for a long time. An evaluation of the concession system showed that it threatens the sustainability of the milkfish fry supply.

The concessionaire tends to exploit the resource to achieve high profits because of his concern that he might not be able to win the concession the following year. Furthermore, the municipal government, after acquiring the concession fee from the concessionaire, does not exercise any control over the fry gathering operation and administration. Thus, the present system lacks the assurance of fair buying price for the fry gatherers. In addition, the fry gatherers are always on the losing end due to the monopolistic pricing system and the sharing scheme imposed by the concessionaire.

The proposed permit system promotes sustainable harvest and equitable sharing of milkfish fry. A closed season, from October to April 15, is included in the proposal to help ensure the successful return of a substantial number of milkfish fry in the ocean. This increases the probability of a greater number of fry becoming breeders (sabalo). Equitable allocation of economic benefits among resource-users will also be realized with the abolition of the 1/3 cut on catch and assurance of the transparency of selling and buying prices. Furthermore, the proposed system will also enjoin active participation of the concerned stakeholders (e.g., fry gatherers, barangay council) in implementing the closed season and validating the recorded catch.

REFERENCES

Adams W, Montalban HR, Martin C. 1932. Cultivation of bangos in the Philippines. Philipp J Sci 47(1): 1-38.

Bagarinao TU. 1984. The natural life history of milkfish. SEAFDEC Asian Aquaculture Publication. South-East Asian Fisheries Development Center. Tigbauan, Ilo-Ilo. 8(3): 3-6.

Garcia GVH. 1997. Morphological abnormalities in hatchery-bred milkfish *(Chanos chanos* Forsskaal) fry and juveniles. Aquaculture 152: 155-166.

Guerrero RD. 1981. Introduction to fish culture in the Philippines. Philippines: Philippine Education Co. Inc. 70 p.

Herre AW, Mendoza J. 1929. Bangus culture in the Philippine Islands. Philipp J Sci 38: 451-509.
Pimentel AQ. 1993. The local government code of 1991 –the key to national development. Mandaluyong City: Cacho Publishing House, Inc.

R.A. 8550. The Philippine Fisheries Code of 1998.

Rodriguez S. 1997. Concession system in Bolinao: Implications to coastal management [dissertation]. Quezon City, Philippines: University of the Philippines.

Smith IR, Panayotou T. 1984. Territorial use rights and economic efficiency: The case of Philippine fishing concessions. Rome: FAO.

Villacorta LG. 1984. Milkfish industry profile and action research and development program. PCAMRD-DOST Primer No. 22.