



# Declining Population Of Phabou Nga (*Puntius Sophe*), A Staple Dietary Fish In Manipur: Ensuing Concerns

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## ABSTRACT

In the Manipuri society, it is becoming a necessary and important hour to study the relation of Manipuri food habits and ‘ngari’ (form of fermented fish). From time immemorable, ‘ngari’ plays an important role in the dietary of the Manipuri people. ‘Ngari’ can be of any fish but generally it is considered to the one produced from PhabouNga, a variety of small fish which is found abundantly in Manipur and the neighboring areas. The research intended to conduct a descriptive survey on the importance of this fermented fish, ‘ngari’ in the context of Manipuri cuisines and its market and industrial issues. It also aims to provide a descriptive study on the context of availability and the declining habitat of this species in the Loktak lake. Data was collected using questionnaire and interviews from an incidental sample of 81 participants, around 20 each from consumers, sellers, producers and locals in and around the Loktak lake. Rise in demand of ‘ngari’ led to over catching of this species, price rise of this product and moreover creates a chance of chemical adulteration in the fermentation process. Some of the human activities like pollution in and around Loktaklake, unchecked removal of Phumdis and dam construction seem to disrupt the natural habitat of this species in Loktak lake.

Keywords: Ngari, Phabounga, Loktak Lake, Phumdis, Environmental pollution.

## INTRODUCTION

Manipur is one of the North-East Indian state covering landmass of 22,347 sq. km at 23°80'N-25°68'N latitude and a longitude of 93°03'E-94°78'E. It is a place of diverse culture and environment, a home for many habitats and landscapes-consisting of lush green ranges of hills to mesmerizing valley to beautiful lakes. Enormous flora and fauna of the state reflects the richness of biodiversity in this land. The region also falls

under the Indo Burma Hotspot region of the 34 recognized global “Biodiversity hotspots<sup>1</sup>” (1).

Lakes and swamps in the valley play a vital role in the geography of the state and the socio-economic and cultural life of the people as they are very important from ecological view and economic security of the region. Loktak lake in the southern part of the valley is the largest fresh water lakes in the entire North Eastern region (7). Other freshwater lakes in the valley include Kharungpat, Ikoppat, Pumlenpat, Lousipat, Yaroupat, Lamphelpat, Yaralpat.

As the people of the state have a taste of diverse food habits, fish plays an important role in the dietary of Manipuri food. People have the culture of cooking curries with fishes varied from fresh to dry to fermented kinds. Some of the indigenous fishes used in every household are Ngasang, MukaNga, Ngapemma, Ngamu, Ukabi, Ngmhai, Ngahou, Ngasep, Ngachik, Ngakra, Ngahou and Phabounga. Out of many fishes found in the region, PhabouNga, a small variety of fish plays an important, inseparable part to the dietary of the people. It is mainly consumed by the people in its fermented form which is popularly known as ‘ngari’<sup>2</sup>

*Puntius sophore*, commonly known as Pool barb, and ‘PhabouNga’ in Manipuri is a fresh water cyprinid fish widely distributed in Asia and more prevalently in South East Asia. The fish inhabits rivers, streams and ponds of plains and submontane regions. Size of adult fish varies from 7 to 8 cm in length (3). Studies on fish consumption and nutritional values of small fishes indicated that *P. sophore* is an important food resource and a crucial source of micronutrients essential in preventing malnutrition and vitamin and mineral deficiencies in rural communities (2). It is reported that the population of the species is declining rapidly to high fishing from the Indian waters, and now PhabouNga is in the category of threatened species (3).

‘Ngari’, the fermented form of ‘PhabouNga’ is one of the most important ingredient of Manipuri cuisines. The staple food of Manipur includes rice, vegetables, fish, chicken and meat. The vegetable curries like Kangsoi, Kangsu, Iromba, Ametpa, Singju are prepared using this fermented fish as an important ingredient. It is reported that besides its flavour, ‘ngari’ is considered to possess some medicinal values.

The research focuses on the description of the importance of ‘ngari’ and ‘PhabouNga’ among the Manipuri people in the light of the staple foods of Manipur and the issues related to the fish habitats especially in the Loktak lake and demand for its fermented form in the market.

Popularity, medical values and alternatives of ‘ngari’, price fluctuation, adulteration, scope and factors affecting ‘ngari’ business, reason for specificity of raw material, possibility of raw material substitution and source of raw material of ‘ngari’ production, availability and quality of fish in the field, prevalence of diseases and environmental impact on PhabouNga are the aspect of the study.

## METHODOLOGY

### *Survey in four levels viz.*

#### a. Consumers

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<sup>1</sup>Areas that support natural ecosystem where indigenous species are well represented. Also region with high diversity of endemic species

<sup>2</sup>Fermented form of fishes. Generally considered the fermented PhabouNga

- b. Market
- c. Field
- d. Ngari Producers

**Data Collection through Survey**

- a. **Questionnaire method:** The information from the locals were collected through a qualitative questionnaires from four levels i.e. consumers, market, field and ‘ngari’ producers. A total of 81 people were interacted
- b. **Semi-structured Interview:** The interview questions are related to the questionnaire but are more in number and meant for those with a deeper knowledge on the topic like a fisherman in the Loktak Lake, or a producer in the industry etc. More questions (even if not framed before) were asked by the researcher according to need and convenience to gain deeper knowledge into the information provided by the participant.
- c. **Photography:** Photographs of participants, scenes and objects concerned to the research topic were taken where allowed and necessary.



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**Images:** (1) Dry Phabounga, raw material of ‘ngari’ production, (2) Selling of ‘ngari’ in Ima market (interaction of students with ‘ngari’ sellers), (3) Phumdis in Loktak Lake, (4) Water pollution in Loktak lake.

d. **Videography:** Video recording of interaction with people was taken.

### **Sampling**

Incidental sampling methods were used to collect feedback of participants. It is a type of non-probabilistic sampling where researcher picks up data from anyone who falls into hands at the time of research till the completion of the sample size.

The sample consists of 81 individuals, around 20 individuals in each level.

### **Rapport Formation**

After introducing the researcher, the participant is provided full information about the purpose of the study and requested to help in the research if he or she is willing to provide information. The participant is made comfortable to share information with a little informal conversation.

### **Informed Consent**

Before administration of questionnaire or interview, the research participant is informed that the research is not harmful to him/her physically or psychologically. He or she has full right to decide to withdraw from providing information whenever

he/she feels so at any point of time during the data collection procedure. It is also informed that the data is confidential and will be used only for research purpose. He or she is helping the Delhi University in its research studies and he or she is not getting paid for that in any form.

**Administration**

After rapport formation and informed consent, the participant(s) is asked questions from the questionnaire and/or the interview questions according to convenience. Videography, Photography or Audio recording is done only with the permission of the participant.

**Statistical Analysis**

Data is analyzed qualitatively in a descriptive form and are presented in tabulated form wherever necessary. Similar responses are grouped and percentage is calculated which is also shown in the tabulated form. If all responses are similar, it is given as a statement.

**RESULTS**

**Field (Loktak Lake):**

The fish is available throughout the year. Prevalence of diseases regardless of seasons were reported (Table 3). Their supply cannot meet the raw material demand for ngari production (Table 4). Most of the locals don't have any idea about quality fluctuation of taste while some claimed to be degrading comparing to some years back, some probable reasons reported are pollution and dirty water and construction of dam (Table 1 & 2). Population of the fish is claimed to be declining by locals. Some probable reasons observed by locals are pollution, over-catching of fish, unchecked removal of Phumdis<sup>3</sup> and dam construction (Ethai barrage) which disturbs the natural flow of Phumdis and upstream migration of fishes (Table 5). No particular initiatives are taken up by the government to enhance population or productivity of Phabou, specifically. But occasional dropping of about 2,00,000 (two lakhs) small fishes (mix varieties) were reported (Table 6).

**Table 1:** Trend of quality of fish in Loktaklakecomparing to previous years.

<b>Answer</b>	<b>Number of reply</b>	<b>Percentage</b>	<b>Comment</b>
<b>Decrease</b>	5	33.33 %	Taste of PhabouNga are declining and found some new disease.
<b>No idea</b>	10	66.67 %	

<sup>3</sup>heterogenous mass of vegetation, soil and organic matter at various stages of decomposition

Table 2: Possible reason for the decrease of quality and quantity of the fish.

<b>Answer</b>	<b>Number of person</b>	<b>Percentage</b>
<b>Pollution and dirty water</b>	5	50%
<b>Construction of Dam</b>	5	50%
<b>Other reason</b>	0	0%

Table 3: Prevalence of disease in Phabou fish.

<b>Answer</b>	<b>Number of person</b>	<b>Percentage</b>	<b>Comment</b>
<b>Yes</b>	8	57.14 %	No particular season
<b>No</b>	4	28.57 %	
<b>No idea</b>	2	14.29 %	

Table 4: Supply of PhabouNga from Loktaklake to ‘ngari’ producers.

<b>Answer</b>	<b>Number of reply</b>	<b>Percentage</b>
<b>Yes</b>	1	9.09 %
<b>No</b>	8	72.73 %
<b>We don't supply</b>	2	18.18 %

Table 5: Reasons reported for declining of fish population.

<b>Answer</b>	<b>Number of reply</b>	<b>Percentage</b>	<b>Comments</b>
<b>True</b>	10	90.9 %	Dirty water, over harvest of the fish, removal of Phumdi and Dam construction were major response.
<b>No idea</b>	1	9.09%	

Table 6: Responses on initiatives taken by government for conservation of Phabounga.

Answer	Number of reply	Percentage	Comment
Yes	2	16.67 %	From time to time, Government departments drop in about 2,00,000 small fishes (mix species) in the lake in a year.
No	10	83.33 %	

### Ngari Producers:

The increasing demand of 'ngari' was informed. Increasing consumer and increasing consumption by non-locals are some of the reasons reported (Table 7). The specificity of raw material of 'ngari' is claimed to be because of its taste, economically available and tradition (Table 8). Some producers described that a specific oil in Phabou makes fermentation feasible. It is reported that they cannot meet enough raw material (Phabou) for 'ngari' production in Manipur. Bokdaya, Jagiroad and Lakhimpur of Assam, Andhra Pradesh, West Bengal and Odisha are some major exporter of the fish and sometimes Bangladesh. Some reported that they fully rely on imports only (Table 8). Time fluctuation of fermentation process is from 5 months to 15 months. Over catching of Phabou fish and water pollution are believed to be the leading factors for declination of Phabou population/availability. So far there is no alternative raw material to substitute Phabou fish for 'ngari' production. But some fishes like Ngamu, Ngaton, small Common Carp and Yelong can be processed for fermentation. No government initiatives reported in industrial/production level (Table 9)

Table 7: Response on demand for ngari by customers over the recent years.

Answer	Reason	Number of reply	Percentage
Increase	Increase in population	3	27.27 %
	Non-locals start consuming	2	18.18 %
	Export	1	9.09 %
	No idea	5	45.45 %

Table 8: Response on whether the demand supply is fulfilled in Manipur only.

Answer	Number of reply	Percentage	Comments
Yes	0	0 %	
No	10	100 %	Most of the raw material are imported. Assam is the major part and other states like Andhra Pradesh, Odisha and West Bengal. Sometimes Bangladesh.

Table 9: Initiatives taken up by the government to enhance 'ngari' production.

Answer	Number of reply	Percentage
Yes	0	0 %
No	4	100%

#### 'Ngari' seller:

Increasing demand of 'ngari' is being claimed by sellers. Rise in human population, export and increasing consumption by non-locals are some of the reasons reported (Table 10). Rising price for 'ngari' is observed. Some reasons reported for price rise are economic blockade in national highways, increasing taxation, rising price of other goods. Possibility of 'ngari' adulteration in industrial and market level were reported. Adding urea and mixing of sub-standard products were being claimed (Table 11). It was suggested that the 'ngari' business has a fair scope for future as it is a perennial business since the Manipuri people will never stop consuming ngari. Some reported problems affecting 'ngari' business are economic blockades, bandhs, general strikes and high transport charges.

Table 10: Demand trend of Ngari by consumers and probable reasons.

Answer	Reason	Number of reply	Percentage
			27.27 %
	Increase in population	3	18.18 %
Increase	Non-locals start consuming	2	9.09 %
	Export	1	45.45 %
	No idea	5	



Table 11: Response on the chance of adulteration in industry and market level.

<b>Answer</b>	<b>Number of person</b>	<b>Percentage</b>	<b>Comments</b>
<b>Yes</b>	4	33.3 %	Possible of adding Urea.&mixing of sub standardNgari
<b>No</b>	6	50 %	
<b>May be/ No idea</b>	2	16.67 %	

**Consumers:**

‘Phaboungari’ is an important diet of Manipuris (Table 12). Almost all people in Manipur consume ‘ngari’. Popular Manipuri curries that are prepared with ‘ngari’ as an ingredient are Kangsoi, Iromba, Singju, Kangsu, Ametpa etc. Curries that have ngari in its recipe do not require oil. The specific use of Phabou fish in ‘ngari’ production is reported to be because of taste, customary/tradition, availability, size of the fish, economical price and capacity to store for longer time (Table 13). ‘Ngari’ is claimed to have some medicinal properties like relieving stomach pain, ulcer and also good for liver. It is also claimed to prevent plague (Table 14). Price rise of ‘ngari’ were reported. Some reasons reported are economic blockade in national highways, increasing taxation, rising price of other goods (Table 16). Response on the reason for the declining in the availability of Phabou fish by consumers are over catching, pollution (dirty water, pesticides, insecticide), dam construction, removal of phumdis, lowering of water level (Table 15). Some alternatives of ‘ngari’ as suggested by locals are ‘Thoidingasuba’ (crushed sesame seeds) and ‘Hentak’ (crushed dry fish).

Table 12: Response on the type of fish use for ‘ngari’.

<b>Answer</b>	<b>Number of person</b>	<b>Percentage</b>
PhabouNga	22	100 %
Other	0	0 %

Table 13: Reason for the specificity of raw material.

<b>Answer</b>	<b>Number of reply</b>	<b>Percentage</b>
Taste	12	41.379 %
Customary/ tradition	6	20.689 %
No idea	3	10.345 %
Other (Availabilty, size, prize, storage)	8	27.586 %

Table 14: Response on the medicinal benefits of ‘ngari’.

<b>Answer</b>	<b>Number of reply</b>	<b>Percentage</b>
<b>Relief stomach pain</b>	15	51.724 %
<b>Relief Ulcer</b>	2	6.897 %
<b>Good for liver</b>	4	13.793 %
<b>Prevent plaque</b>	4	13.793 %
<b>Other</b>	2	6.896 %
<b>No idea</b>	2	6.897 %

Table 15: Reason for the declining in the availability of Phabou fish.

<b>Answer</b>	<b>Number of reply</b>	<b>Percentage</b>
<b>Over catching</b>	9	25 %
<b>Pollution (dirty water, pesticides, insecticide)</b>	10	27.78 %
<b>Dam construction</b>	4	11.11 %
<b>Removal of phumdis</b>	10	27.78 %
<b>No idea</b>	2	5.56 %
<b>Lowering of water level</b>	1	2.78 %

Table 16: Possible reason for the increase in price of ‘ngari’.

<b>Answer</b>	<b>Number of reply</b>	<b>Percentage</b>
<b>Economic blockade</b>	5	45.45 %
<b>Price rise of raw material</b>	3	27.27 %
<b>Price rise of other goods</b>	1	9.09 %
<b>Rise of tax</b>	2	18.18 %

## DISCUSSION

The data from the Consumer survey shows that there is an indispensable need of ‘ngari’ in Manipuri society where cuisines are concerned. The consumers have expressed their idea on how difficult it would be without ‘ngari’ even though some alternatives such as ‘ThoidingAsuba<sup>4</sup>’ and ‘Hentak<sup>5</sup>’ can be used. “‘ngari’” is also reported to have many medicinal properties including prevention of plague and stomach ulcer. Curries that have ‘ngari’ in its recipe do not require oil. It is yet to be studied if ‘ngari’ has not only preventive values but also curative nature. The rise of price is also a concern that needs to be checked.

As reported by the ‘ngari’ sellers, there has been an increase in demand due to rise in population of consumers which is related to the chemical adulteration in the ‘ngari’ producing industries in their pursuit to meet the high demands in very short time. The producers use Urea to speed up fermentation process which generally needs at least 6 months to complete. The adulterated ‘ngari’ are substandard in quality which the producers mix with the standard or good quality ‘ngari’ to earn more profit.

<sup>4</sup> Crushed sesame seed

<sup>5</sup> Crushed dry fish especially small fishes

Other than rise in demand, the market and consumers have also reported various causes of price hike of 'ngari' including rise of taxes in the imported raw material, rise in the price of raw material itself, and frequent Bandhs and blockades in the National highway 39. The major supplier are Assam (Bokadaya, Jagi road, Lakhimpur), Andhra Pradesh, Odhisa, West Bengal and sometimes Bangladesh. Even if some fishes like Ngamu, Ngaton, small Common Carp and Yelong can be processed for fermentation, they cannot be so far used as a substitute of Phabounga for mass production of 'ngari' for many reasons like taste, availability and tradition. It was reported that Phabounga also possess a specific kind of oil that makes the fermentation more feasible. The producers informed the research team that there has been minimal supply of raw material from the local Manipuri suppliers. This statement is supported by the information received from the survey in Loktaklake. The locals of Sendra (an islet in Loktaklake) and Thanga reported that they cannot supply sufficient amount of Phabounga even though it is available throughout the year in the lake. The main reasons for decreasing population of fish in Loktak lake includes increase in population of catchers around the lake, no appropriate policy of government towards the conservation of this fish, and removal of Phumdis which are the suitable habitat for the fishes in winter. Locals reported that the construction of Ethai barrage on Khodak canal which connect Loktak lake with Manipur river<sup>6</sup> is disturbed and the normal/natural cycling of Phumdis in the lake are hampered. The Ethai barrage also blocks the upstream and downstream migration of many fishes. Some diseases like inflammation in body, fins and tail were reported to be prevalent in Phabounga regardless of season. It is quite possible that water pollution and use of insecticides and pesticides are the leading factors for destructing the Phabounga habitat. The importance of Phabounga as an integral part of Manipuri staple diet is clearly seen from the project. Threats to natural habitats of fish (Phabounga) are reported, which seems to affect the population of fish. Some possible reasons which need attention are water pollution, unchecked removal of Phumdis<sup>7</sup>, dam construction<sup>8</sup> and overharvesting of fish. Initiatives<sup>9</sup> taken up by the government is informed to be non-satisfactory by the locals. So far, no initiative has reported to be taken up by government specifically to enhance Phabou breeding and productivity of 'ngari'. Shortage of raw material in Manipur for producing 'ngari' is vivid from the collected data. Possibility of chemical adulteration to shorten the fermentation process is also visible from the collected information as there is an increasing demand of 'ngari' and low supply of raw material.

## • CONCLUSION

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- Owing to nutritional, medicinal and traditional values of Phabounga, newer line of researches focussing on its conservation are required.
- Impacts assessment studies of pollutants on Phabounga habitat destruction can also be undertaken
- Further study can be done on the medicinal properties of 'ngari'.
- Commercial researches can be done to promote 'ngari' production on other states of India as it can substitute oily ingredients in diet.

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<sup>6</sup> It is a name of a river derived from the name of state itself

<sup>7</sup> heterogeneous mass of vegetation, soil and organic matter at various stages of decomposition

<sup>8</sup> Construction of Ethai barrage, which disturbs the upstream migration of fishes from Chindwin river of Myanmar

<sup>9</sup> Occasional dropping of 200000 small fishes of mix variety in Loktak Lake

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