

**A  
NEFIS  
WEBINAR**

**Report on**

**Challenges and Opportunities in Fisheries and Aquaculture in  
Covid-19 Era in Nepal**



**Prepared and Presented by  
Nepal Fisheries Society (NEFIS)**

**Kathmandu, Nepal**

**June 20, 2020**

## **Foreword**

In Nepal, the Covid-19 period began from the month of February 2020. The corona virus the causative agent of the Covid-19 is likely to be a disaster for national and global economy. Although many governments have brought many trajectories to overcome or minimize the loss of the human life and economic order, however, still ‘the light at the end of the tunnel’ is not likely to appear so soon. The Covid-19 has also been disastrous to the agricultural sector, thus to fisheries and aquaculture. Visualizing offering some consolation to worrying farmers, vendors, sellers, consumers, hatchery operators, feed manufacturer, the Nepal Fisheries Society (NEFIS) has organized a webinar on ‘Challenges and Opportunities in Fisheries and Aquaculture in Covid-19 Era in Nepal’. During the webinar there were 5 presentations by academia, officials, researchers, policy makers and farmers. One of the attractions of this webinar was that mostly all stakeholders they accumulated and attempted to find out the solutions to escape this difficult time imposed by the Corona virus.

At present all participants opined that for sustainability of the fisheries and aquaculture sector, the government should declare the fisheries sector as one of the ‘essential services’, there should be provision of ‘fisheries ambulance’ services to facilitate the transportation services during the covid-19 period. The farmers expressed problems on fish harvesting from their ponds and accessing the market. To resolve this issue the participants agreed that the farmers first should cooperate with the local government agencies. To sustain the fisheries and aquaculture in the Covid-19 era, more support on ‘live fish market’, ‘packed fish’, and ‘home delivery services’ and ‘on line fish marketing approach’ to farmers and concerning agencies were recommended.

**Dr. Tek Bahadur Gurung**

**President**

**Nepal Fisheries Society**

**Kathmandu, Nepal**

**NEFIS EXECUTIVE TEAM MEMBERS, 2020 (supported to organize the webinar)**

<b>President</b>	<b>Dr. Tek Bahadur Gurung</b>
<b>Vice-President</b>	<b>Mr. Yugal Kishore Tiwari</b>
<b>General Secretary</b>	<b>Mr. Baikuntha Adhikari</b>
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## Challenges and Opportunities in Fisheries and Aquaculture in Covid-19 Era in Nepal

A webinar on

### “Challenges and Opportunities in Fisheries and Aquaculture in Covid-19 Era”

The global crisis of COVID-19 pandemic has created crisis in all sectors including aquaculture enterprises and capture fisheries. Many of the agricultural sectors have already planned to recover the loss incurred during the crisis. Nepal Fisheries Society (NEFIS) being one of the leading non-governmental, non-profit making organization has proposed a webinar to recommend some of the action plans to cope the COVID-19 for sustainable aquaculture and fishery. The webinar program are as follows:

**Target audience:** All NEFIS members and other stakeholders including fisheries entrepreneurs, academicians, scientists, extension officials, students and others. Journalists of national media.

**Language:** Nepali/ English

**Media:** Zoom App

#### Program

S.N.	Topic	Approximate time	Presenter	Chairperson
1.	Status of aquaculture and fisheries in Nepal and Effects of COVID-19 on Fisheries Sector	20 min	YK Tiwari, RL Sharma & R Jaiswal	Dr. DB Swar
2.	Impact of COVID-19 on Fisheries Research, Education and Extension	15 min	Prof. S Rai, Dr. A Prasad & N Pradhan	Prof. DK Jha
3.	Potential means and ways to combat COVID-19 in fisheries focusing on transport of fish product to market	15 min	P Rijal, B Adhikari & S Laudari	RN Mishra
	Break (Playing video or slide show about NEFIS)- 5 min			
4.	Measure to combat COVID-19 in aquaculture: A global scenario	20 min	Dr. RC Bhujel	Dr. J Panta
5.	COVID-19: Can this crisis could be an opportunity in fisheries?	15 min	Dr. TB Gurung, R Ranjan, RR Dhital	Prof. MK Shrestha
6.	Comments & Discussion,	20 min		MB Panta

## Challenges and Opportunities in Fisheries and Aquaculture in Covid-19 Era in Nepal

7	General recommendations (Draft), Conclusion	5 min		Tek B Gurung
	Total time	125 min		

Program Convener: Baikuntha Adhikari,

E-Facilitator & Rapporteur: Rahul Ranjan

## **Potential Means and Ways to Combat COVID-19 in Fisheries Focusing on Transport of Fish Product to Market**

B. Adhikari<sup>1</sup>, P. K. Rijal<sup>2</sup>, S. Laudari<sup>2</sup>

<sup>1</sup>Ministry of Agriculture and Livestock Development, <sup>2</sup>Central Fisheries Promotion and Conservation Center

### **Abstract**

Fish breeding, seed production, distribution, feed management, production, area expansion, marketing and supply and are the major areas that has been affected by COVID-19. Supply chain of input such as feed and fish marketing are the most disturbed of fisheries due to the restriction in travel, closed boarder and social distancing. Due to these problems it is estimated about 10,500 Mt of ready to harvest fish has been stuck in farmer's pond. This is hindering the stocking of fish seed for production in next cycle. Since th fish and fish products are perishable commodity, therefore to ensure the future production according to the market demand fisheries sector should also be categorized as one of the 'essential services' of the state. COVID-19 has huge impact on different component of aquaculture. We speculated that in next season fish production will be reduced by around 35%. Only 10-15 % of fresh fish shop and live fish shop are in operation with minimal supply of fish product.

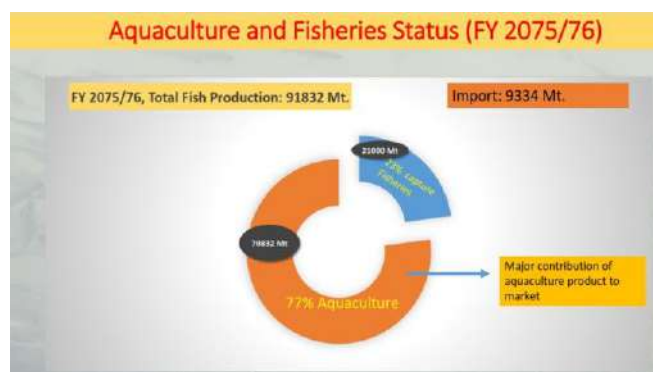
*Key Words: Fish Market, COVID-19 impact on Fish Market, Fish Supply chain, Market opportunities, Vulnerability in fisheries sector.*

# Challenges and Opportunities in Fisheries and Aquaculture in Covid-19 Era in Nepal

## Presentation Slides

**Potential Means and Ways to Combat COVID-19 in Fisheries Focusing on Transport of Fish Product to Market**

**Presenter:**  
 Mr. Baikuntha Adhikari, Joint-Secretary, MoALD  
 Mr. Pramod Kumar Rijal, Joint-Secretary, CFPCC  
 Mrs. Sumitra Laudari, Senior Fisheries Dev. Officer, CFPCC



**Aquaculture Market Governing Factors and Issues in Nepal**

**1. Aquaculture inputs**

- Seed- Hatcheries and nurseries are not evenly distributed at each provinces across country
- Feed and Raw materials depend mainly upon India and other countries
- Chemicals and drugs for fish health and water quality management – less availability and not used properly
- Hormones– depending upon other countries
- Machines and equipment–depending upon other countries

**2. Technical Support**

- Less number of expert in comparison of sector expansion

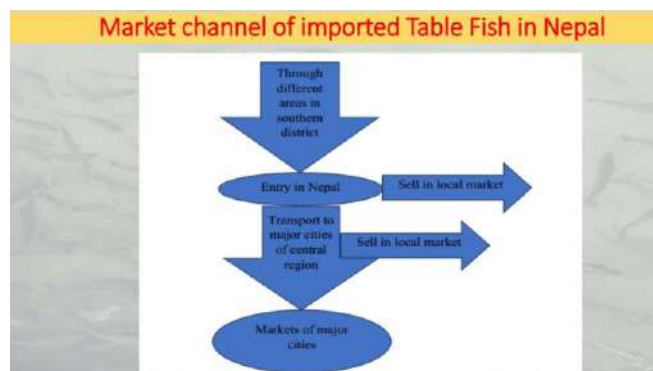
**Aquaculture Market Governing Factors and Issues in Nepal**

**3. Market issues**

- Perishable commodity needs more attention- still not focused for market development
- No proper practice of post harvest
- Consumers variation with region and provinces
- No well established fish market and mart
- More than 80% fish products are from carp species but still not fixed with standard size and price
- Rainbow trout and Pangas have selective consumers
- Yet to brand the indigenous/carp species in market

**4. Regulations:**

- Limited regulations, standard, protocol
- Aquaculture products are depending upon various of uncontrolled factors



**Major Component of Aquaculture Affected by COVID-19**

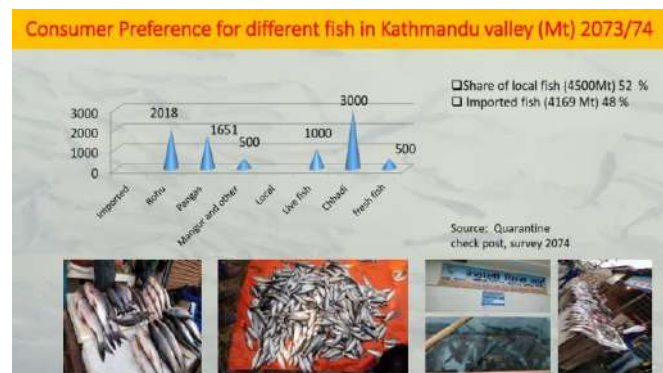
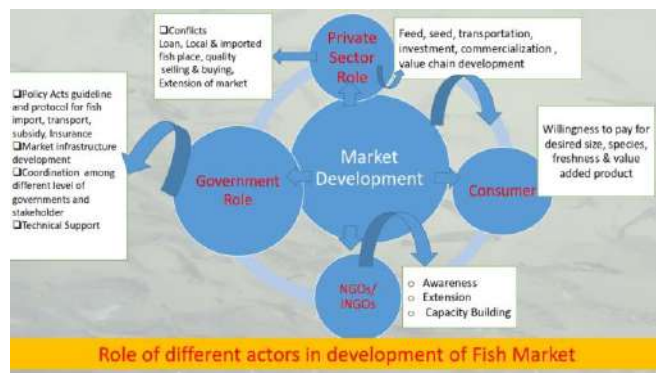
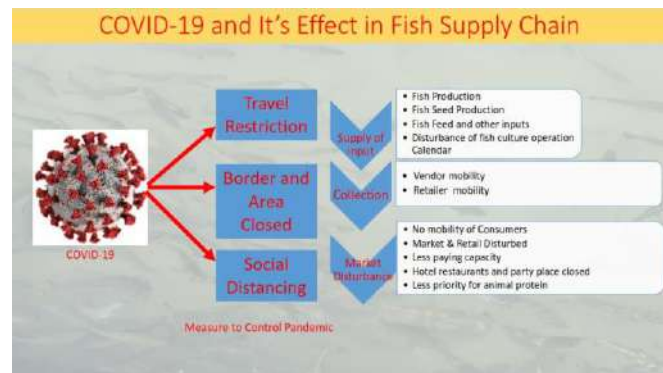
S.N	Affected Component	Remarks
1.	Fish Breeding, Seed Production and Distribution	<ul style="list-style-type: none"> <li>Breeding of Chinese carp is fully affected</li> <li>Less number of seed production</li> <li>Less coordination between producers and small farmers</li> </ul>
2.	Fish Feed Management	<ul style="list-style-type: none"> <li>In a verse of scarcity i.e. unavailability of raw and finished product</li> </ul>
3.	Fish production and Management	<ul style="list-style-type: none"> <li>Less human resource (Labor)</li> <li>Reduction in next year production</li> </ul>
4.	Fish Health	<ul style="list-style-type: none"> <li>Less water quality management</li> <li>Risk of changing weather</li> <li>Availability of Drugs and chemicals</li> </ul>

**Major Component of Aquaculture Affected by COVID-19**

S.N	Affected Component	Remarks
5.	Area expansion and extension program	<ul style="list-style-type: none"> <li>Technical support on site supervision (New pond construction and renovation)</li> <li>Government targeted programs affected</li> </ul>
6.	Market and market channel	<ul style="list-style-type: none"> <li>Around 10,500 Mt of fish is still not possible to harvest and still remains in farmer's pond which hinder stocking of fish seed for future production</li> <li>Supply chain disturbed</li> <li>Chances to shifting of job</li> <li>Hotel restaurants and party place closed (Around 30%)</li> </ul>



# Challenges and Opportunities in Fisheries and Aquaculture in Covid-19 Era in Nepal



- ### Market Vulnerability
- Fresh Fish shops
  - Live fish Shops
  - Live fish suppliers
  - Harvesting manpower (Malah)
  - Consumers health

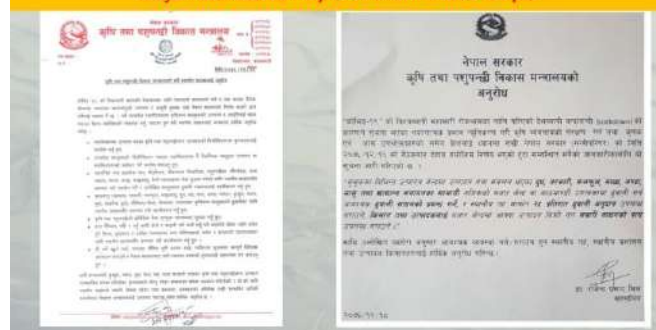
- ### Market Vulnerability
- More than 230 fish shop and more than 72 Live fish shop in all province were directly affected by COVID-19 which causes fish market disruption with high risk of collapse.
  - Only 10-15 % of fresh fish shop and Live fish shop are in operation with minimal supply of fish product.
  - Negative impact on consumer's perception about consumption of fish and fish product.

- ### Is COVID-19, an opportunity to strengthen market ?
- It disclose the necessity of alternative pattern of fish production and marketing
  - Evoke the necessity of fish processing and storage plan for future use of fish product.
  - Urge for establishment of fish Collection Center and Fish Mart
  - Necessity of Diversity of fish product in market
  - Necessity of local and legal framework for fish and fish product marketing
  - It gives the idea of necessity of fish seed nursery and hatchery within district.

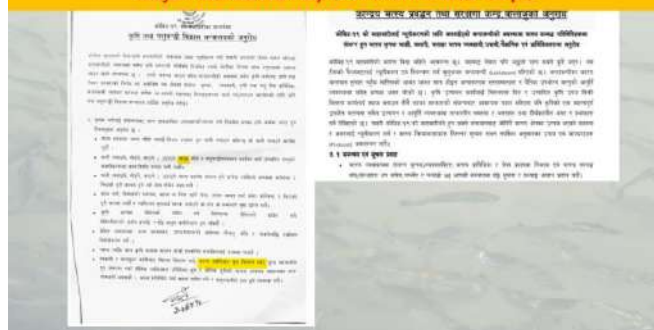


# Challenges and Opportunities in Fisheries and Aquaculture in Covid-19 Era in Nepal

## Major facilitation by Government of Nepal



## Major facilitation by Government of Nepal



## Major facilitation by Government of Nepal



### Means to Combat COVID-19 Effect

- Final Harvesting of fish should be done strictly following WHO protocol against COVID-19 and responsibility of marketing should be taken in provincial level authority for availability in local level.
- Maintain the short supply chain of fish product which make fish readily available such as home delivery system.
- Provision of Pass for transporting means for fresh and live fish marketing.

### Means to Combat COVID-19 Effect

- Reduce unnecessary regulatory burden that are preventing access to fish product.
- District wise at least a “task force” should be formed responsible for fish marketing. (Active participation of “Jilla Matshy Byabsayi sangh”).
- Provision for fresh fish shop and live fish shop operation in lockdown period by maintaining social distancing and WHO protocol against COVID-19
- Subsidy and incentive should be given to transporter and marketer of fish product.

## Means to Combat COVID-19 Effect

- Involvement of fisheries cooperatives and society for fish product marketing.
- Develop online marketing portal and facilitate home delivery system.
- Health checkup of marketers and transporter of fish product for COVID-19 should be done to ensure safety measures.
- Easy pass and authentication should be granted in each check post and haultage station for transporter.
- Strengthen local market and develop the package for increase in consumption of fish production in local level.

## Conclusion

- Aquaculture has the major contribution in the fish market
- Major inputs of aquaculture like seed and feed are most concerning component that has to be focus and make availability at every potential area
- Technical support act as keystone for the development of aquaculture sector
- Fisheries Sector is highly vulnerable
- Fish and by products as perishable commodity should have to addressed as like milk and vegetable for better market
- COVID-19 has huge impact on different component of aquaculture due to which next year estimated production will be reduced by around 35%.

## Recommendations

- Potential area of aquaculture and fisheries are to be identified and should be listed by local government to be responsible in front line.
- Fish Supply value chain should be identified and should be carried out as emergency service
- In current situation, coordination between different government is most crucial for development of fisheries sector
- Fish Market Infrastructure should be developed
- Post harvest practice should be developed and promoted by different government
- Producer and market demand should be synchronized
- Market supply and production base incentive should be promoted in future for better result.



## **Measures to Combat Covid-19 in Aquaculture/Fisheries: A Global Scenario**

Ram C. Bhujel<sup>1</sup>

Director, Aqua-Centre, Research Associate Professor, SERD, AIT, Thailand

### **Abstract**

COVID19 has become pandemic which has infected about 8 million people globally causing death of over 0.43 million as of June 14<sup>th</sup>, 2020. The pandemic is still growing. It has affected almost everyone's livelihoods on the earth one way another. Fish or seafood is perishable item, its production; processing, transport, trade and consumption have been critically affected. Overall 45% of the total seafood consumed is live, fresh or chilled which are highly perishable and 38% seafood produced are traded across the countries which indicates that seafood industry has been more affected than most animal production sectors. Seafood is the highest trading food product from developing countries to developed countries and it was almost doubling every decade. As result of cancellation of all international flights and closure of country borders, many developing countries are losing their incomes and their people have lost jobs. To some extent, farming of fish or seafood is relatively more resilient as majority fish are still produced from green water pond systems utilizing natural food in many countries.

However, due to some misconceptions and misunderstandings, wrong measures have been implemented due to fear of new pandemic. All the sectors including fisheries have been affected badly in many ways. Firstly, people had a wrong perception about seafood when the news was spreading that COVID19 started in seafood market in Wuhan, China and it had to shut down. Many people got an impression that seafood is dangerous to consume and stopped buying seafood especially from wet markets. Most markets were shut down as a result fisherman could not sell their fish and farmers could not harvest from their culture system. Shut down on group activities, restaurants, hotels, catering services and implementation of social distancing resulted in closure of fish harvest, processing, markets and shut down of markets affected directly the seafood supply and availability. As a result, prices of food have gone a lot higher than the normal prices. Supply together with price hikes have made the seafood access limited. At the same time, limited availability and accessibility affected the nutrient deficiency and deterioration of health of the people causing stresses and even have caused many deaths. However, there are no data available yet.

A number of measures were and have been implemented in various countries. In most countries, complete closure or indiscriminate lockdown of social or group activities. Some countries applied more practical measures instead of indiscriminate lockdowns. Agriculture or food production, and its value chains were still running as usual. In most countries, where complete shutdown was implemented, many people are encountering life-threatening problems. A number of ways have been tried to minimize the impacts or recover the seafood production and supply chain as many countries depend on trade. Among the measures most popular ones are subsidies or financial supports, use of GIS maps, fixing maximum prices of fish seed, giving special permission for the transport of perishable goods including seafood and other basic needs items. Several countries are allocating a huge sum of rescue packages for fishing and farming companies e.g. US\$19 billion by USA, US\$0.5 billion by EU, US\$264million by India and many others for this sector as a part of development and measures to combat against COVID19.

## Challenges and Opportunities in Fisheries and Aquaculture in Covid-19 Era in Nepal

More recently when virus was detected in raw Salmon products in Beijing, the countries which are importing it e.g. Singapore are having strict regulations. Various guidelines, rules and regulations are being developed by FAO, World Fish, etc. being implemented by some regional bodies and national governments. This paper attempts to compile and present them with a view to helping develop a set of practical guidelines for Nepal.



## Presentation Slides

### Global measures to combat COVID19



**Ram C. Bhujel, PhD**

Director, Aqua-Centre  
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Asian Institute of Technology (AIT), Thailand

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&  
Advisor, Seafood Watch Program, USA

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June 20

### Outline

1. COVID19 impacts / problems
2. Measures in fisheries / aquaculture sector
3. Country specific measures
4. Conclusions and recommendations

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### Tiny virus (COVID19) is very powerful



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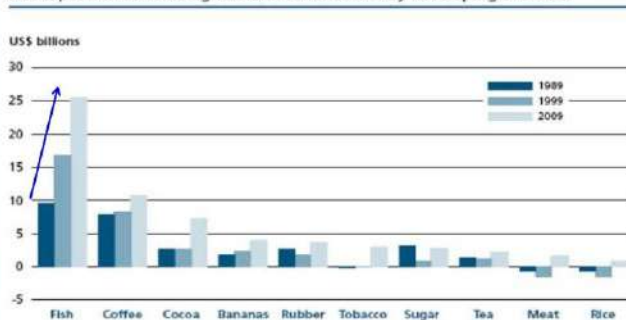
### Background: Global Seafood industry

- 3 billion people - staple food
- 60 million people are engaged (85% in Asia)
- 15% of the animal protein comes from seafood
- 45% are highly perishable (live, fresh and chilled – highly vulnerable)
- 38% of the global production is traded (\$164 B.)
- 70% are women especially in processing and markets

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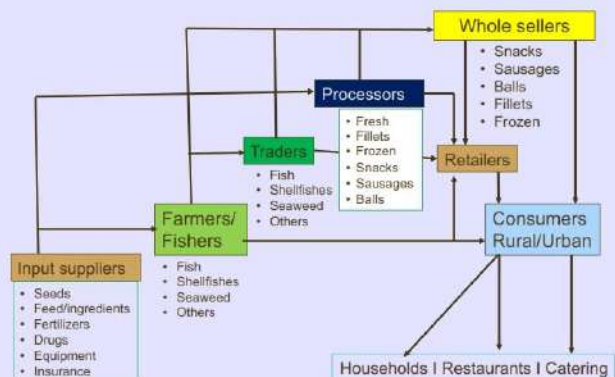
Fish is the #1 export agricultural item of developing countries by value and it is increasing by decade

Net exports of selected agricultural commodities by developing countries



June 20

### COVID19 disrupted whole value chain



June 20

# Challenges and Opportunities in Fisheries and Aquaculture in Covid-19 Era in Nepal

## Regional fisheries advisory bodies – FAO survey

### 3.1 Fisheries management and aquaculture production/management

Is the impact of COVID-19 having, or expected to have, negative consequences on the management of fish stocks or on the production and management of aquaculture?

A) Capture fisheries



B) Aquaculture production



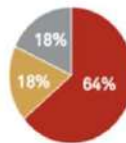
3 Asia-Pacific Fishery Commission (APFIC); Ministerial Conference on Fisheries Cooperation among African States Bordering the Atlantic (AFIAPCO); Bay of Bengal Programme – Intergovernmental Organisation (BOBP-IGO); Fishery Committee for the Eastern Central Atlantic (CECAF); Committee for Inland Fisheries and Aquaculture of Africa (CIFA); Commission for Small-Scale and Artisanal Fisheries and Aquaculture of Latin America and the Caribbean (COPESCAL); Fishery Committee for the West Central Gulf of Guinea (FCWG); North Atlantic Marine Mammal Commission (NAMMCO); Organization for the Fishing and Aquaculture Sector of the Central American Isthmus (OSPESCA); Southeast Asian Fisheries Development Center (SEAFDEC); Secretariat of the Pacific Community (SPC); Western Central Atlantic Fishery Commission (WECAFC).

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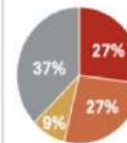
### 3.4.1 Employment

Owing to the impact of COVID-19 have levels and conditions of employment suffered?

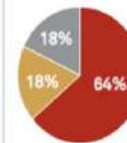
A) Capture fisheries



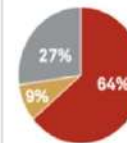
B) Capture fisheries Post harvest



C) Aquaculture



D) Aquaculture Post harvest



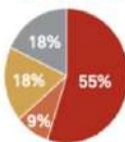
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June 20

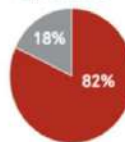
### 3.4.2 Demand for fisheries products

Owing to the impact of COVID-19 has demand for fish harvested in your region been affected?

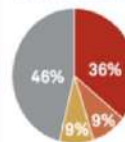
A) Capture fisheries Domestic market



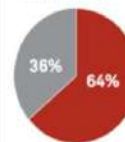
B) Capture fisheries Export market



C) Aquaculture Domestic market



D) Aquaculture Export market



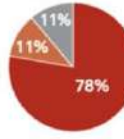
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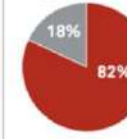
### 3.4.4 Supply

Owing to the impact of COVID-19 how has the supply of fish to the domestic markets changed from the following supply markets?

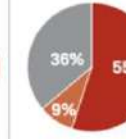
A) Capture fisheries Domestic



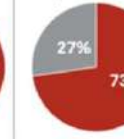
B) Capture fisheries Imports



C) Aquaculture Domestic



D) Aquaculture Imports



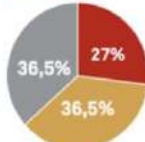
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June 20

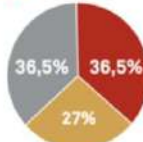
### 3.4.3 Price for fisheries products

Owing to the impact of COVID-19 has the price paid for fish been affected?

A) Capture fisheries



B) Aquaculture



● Decreased ● Increased ● Don't know

June 20

## Effects on Aquaculture

- Farmers are holding for long, instead of harvesting
- Species grown for export and airline industry – are severely affected e.g. Sea bass in Thailand
- live-fish market or high-end food services (i.e. restaurants, tourism and hotels) -dramatically impacted
- Seasonal breeding – stopped? => no fry/fingerlings
- Inputs supply disruptions
- Cash-flow problem cost of labour and others can't pay

June 20





### Processors, traders & markets

- Processing plants - workers infected
- Low demand – longer time storage, more losses
- Adverse effects as hotels, restaurants and catering closed
- Direct sales – delivery and online sales
- Sales of longer shelf life increased e.g. frozen, sun-dried, smoked, canned, marinated products
- Cancellations of most seafood conferences, fairs, exhibitions and events for marketing / promotion

June 20

Wet seafood market was open  
but very few buyers were there



June 20

In Manila – seafood market was still open



June 20

### Impact: Losses

- **US** seafood distributors forecasting more than \$100 million in losses this year
- Survey of 15 leading distributors details the financial pain resulting from the coronavirus pandemic.
- **Vietnam's** seafood export value down by 15%
- **Salmon** farming companies take \$1.4 billion hit as China media reports coronavirus link (Oslo Stock Exchange)

June 20

### Salmon

- **June 12**, the **Beijing** Municipal Center for Disease Control found that in the investigation of the city's farmers' markets and large supermarkets: 40 foods were found in the new market from the collection of 5,424 samples of seafood, meat and other foods and smears in the external environment.
- Many supermarket and supermarket enterprises in **Beijing** have removed salmon products.
- Stopped ordering salmon from Europe

June 20



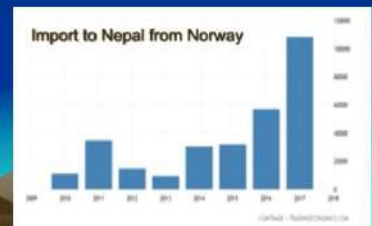
## China's CDC

- **June 16** - No proof of virus from contaminated salmon – now cleared the issue
- Land-based salmon farming: Explosive growth through COVID-19 and beyond

June 20

## Salmon import

- Highly developed
- Large circular cages – automatic feeding
- Land-based systems under-developed
- China is trying to produce



June 20

## Egypt

- Local media - reported eating fesikh – a type of fermented and salted fish widely consumed during Easter and the spring holiday Sham el-Nessim – could weaken the immune system and enhance susceptibility to COVID-19.
- Sales of fesikh declined to 30% to 40%
- prices of fish including tilapia, mullet, crab and shrimp were reported to have increased by 10% following a reported rise in demand prior to the Ramadan holiday which started April 24<sup>th</sup>
- Solution - ???

June 20

## Nigeria

- In Cross River state markets, fish and crayfish were reported to be sold twice their regular price
- COVID-19 crisis may act as a catalyst to spur aquaculture investments in Sub-Saharan African countries such as Nigeria, enabling them to reduce dependence on fish imports
- Measures: Food delivery to 0.2 million residents of Lagos, and Govt provided \$25 million
- Private donors/wealthy – donated millions of \$

June 20

## Mitigations & Adaptations Measures

June 20

## How countries can mitigate risks of #COVID19 on food and nutrition



- ✓ Keep the **global food trade** going.
- ✓ **Support smallholders** to increase food production.
- ✓ Meet **immediate food needs** of vulnerable populations.
- ✓ Keep the **food supply chain** alive.
- ✓ Ensure this is done while **protecting everyone's health**.



June 20

# Challenges and Opportunities in Fisheries and Aquaculture in Covid-19 Era in Nepal

## Mitigation measures

1. Virtual / online meetings
2. Increased production of training materials
3. Formalizing intelligence networks
4. Contingency plans
5. Safe products and promotion of consumption
6. Home delivery – private business or aid by govt
7. New products developed/processed e.g. powder
8. Online permits and export procedures

June 20

## ONLINE AUCTION / BIDDING

[www.todayonline.com](http://www.todayonline.com) > live-streaming-bargains-online-marketplace...

**Live-streaming bargains: Online marketplace is the new wet ...**  
Sep 7, 2019 - Ms Joyce Leong live-streams a seafood auction six mornings a week, with hundreds of potential buyers online. Photo: Nuria Ling/TODAY.

[www.youtube.com](http://www.youtube.com) > watch

**Bid for fresh seafood online | The Straits Times - YouTube**

Jul 22, 2019 - Uploaded by The Straits Times

Live auctions on Facebook are gaining popularity in Malaysia, as fishermen turn to the Internet to sell their ...

[www.seafoodsource.com](http://www.seafoodsource.com) > news > supply-trade > online-seafood-auct...

**Online seafood auction expands - SeafoodSource**

Three years after opening up shop in Boston, the Whaling City Seafood Display Auction will open its third location Wednesday in Gloucester, Mass. the firm ...

[www.facebook.com](http://www.facebook.com) > Places > Singapore > Grocery Store

**FirstMarketOnlineBidding - Home | Facebook**

★★★★★ Rating: 4.7 - 30 votes

Seafood Boy. Fish Market. Freshcatch seafoodbidding. Business Service. OceanStar Seafood. Fish Market. Xing Hong Fresh Fruits. Fruit & Vegetable Store.

## Online sales mushrooming

<https://www.foodpanda.co.th/>



## Online advertisement / booking and live, fresh and frozen fish sales – home delivery

Thailand – shrimp, mud-crabs etc.  
Philippines – tilapia



## GRAB Delivery and every Superstore – Home delivery



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## Promote fish processing and storage

1. Sun dried
2. Smoking
3. Skin snacks
4. Pickle
5. Paste
6. Power
7. Can
8. Frozen





## Challenges and Opportunities in Fisheries and Aquaculture in Covid-19 Era in Nepal



### Fish powders:

Stored long  
Easy  
Eat anytime

With different tests for  
kids and adults



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### Promote fish processing and storage

Scale up these to  
supply mass scale similar  
to Chhadi fish



### Home-made Feed Alternative feed ingredients:

#### Insect meals:

Field cricket  
Maggots

Instead of fishmeal  
For fish and  
Animal feed



### Other applications

- Web applications, online services
- **Brazil** – research group - COVID19 observatory
- West Africa, regional small-scale fisheries producer organizations have teamed up to launch an electronic survey on COVID-19 impacts on small-scale fisheries.

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### India: Kerala

- Mechanised boats – banned
- But small-scale beach landing crafts are allowed to ensure fishers' sustenance and food security needs of the society –
- Subject to maintain physical distancing at sea and fish landing centres

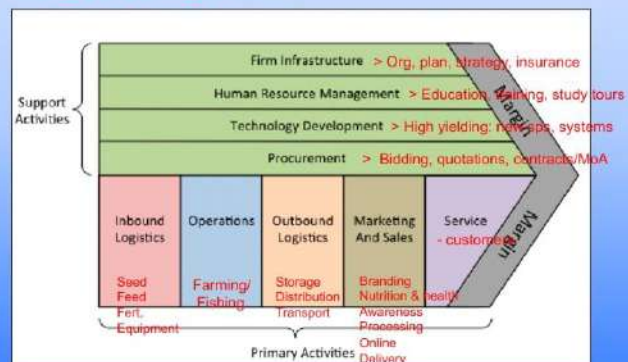
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## India –US\$264 million

- help fill in critical gaps in fish value chains
- develop sustainable marine and inland fisheries, as well as infrastructure such as cold chains and markets.
- provide future employment opportunities
- increase exports.

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Michael Porter's value chain model



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## Suggestions to consumers / staff

- Avoid direct contact with raw fish / meat
- Avoid eating raw fish (sushi & Sashimi)
- Wear gloves when buying, to avoid contact with vegetables, fruits or other cooked foods in the shopping basket. After returning home, dispose of them in a timely manner, regardless of the chopping board, kitchen knife, container, raw and cooked.

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## More suggestions

- Wash hands after touching any raw fish and seafood, including raw egg shells thoroughly before touching other foods and utensils. Otherwise, there is a great risk of cross-contamination.
- Raw fish food can be processed in time, do more at a time, and after cooking, divide it into several portions and store it in refrigerator or frozen.

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## Recommendations

1. Emergency response / task force
2. Assess and analyze the problems
3. Strategies and frameworks
4. Investment support (financial/technical)
5. Identify good practices and promote
6. Locally made commercial feed
7. Locally available species & locally produced seed
8. Raise awareness / training / promotion
9. Support operations of farms factory & fishing (3F)
10. Facilitate transportation, markets & marketing

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## Support to Aquaculture/Fisheries or Seafood industry

### USA:

- US\$19 billion bill relief to aquaculture sector
- US\$300 million fisheries aid

1. **EU** - EUR 500 million
2. **India** – US\$264 million (part of COVID-19 pandemic relief)
3. **EU to Portugal**: 20 million Euro credit for Corona crisis
4. **Ireland**: EUR 3.5 million (USD 3.9 million)
5. **Indonesia**: USD 69 million for fisheries, aquaculture
6. **Ecuador Govt.:** will invest US\$26 m to improve competitiveness of aquaculture and fisheries

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## Opportunities in the sector

In creating jobs, food & nutrition security and income generation in:

1. Farming
2. Marketing
3. Processing
4. Education
5. Research
6. Training

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## 4 species to focus

1. **Trout** – continue for cold water
2. **Tilapia** – suitable for Biofloc & aquaponics
3. **Pangasius** – large scale high density
4. **Catfish** – high density – live
5. **Carps** – continue for warm water

Formula: 2T-P-2C

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musicians are busy making a noise about government's lockdown relief grant for artists, a Limpopo musician found business in fresh fish



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Simple green water pond: 100 ton fish/year  
10 million NRs/year revenue



Promote backyard Biofloc / RAS  
(Tunnel Fish Farming – round the year)



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Promote Aquaponics as home garden for food and nutrition security (with Mushroom?)



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## Challenges and Opportunities in Fisheries and Aquaculture in Covid-19 Era in Nepal



### Technical supports to seed production nursing and transportation

1. Pangasius
2. Tilapia
3. Catfish
4. Trout
5. Carps

Nursing of hatchlings  
& fry in hapas  
Chhadi fish?

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### Pangasius Breeding – need to make a possible in country

- 3 staff were trained from Nepal
- NARC, Govt and private
- Broods were also sent to them



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### Catfish breeding should be done:

1. 300 females injection/day
2. Up to 40 kg eggs / day
3. Sales of >5 million hatchlings in a day



### Hybrid catfish in Thailand

Male African Catfish (*Clarias fariatus*)  
X  
Female Asian (*Clarias macrocephalus*)



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### Social distancing



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## Challenges and Opportunities in Fisheries and Aquaculture in Covid-19 Era in Nepal

### Promote low cost farming for poor pfarmers

- Chicken manure (+Goat / pig)
- Urea & TSP – 4 kg N & 2 kg P
- Home-made feed
  - Rice bran + oil cake
  - Insect meal (instead of fishmeal)

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### High density culture for commercial farming

- Pangasius
- Catfish
- Tilapia



### Maximize cage productivity: Increase density (Tilapia / Pangasius in cages)



Polar Circle HDPE cage (20m Ø),  
Production capacity 50 m.t./cage/cycle



### Largest Tilapia cages in Africa – Lake Harvest, Zimbabwe

Cage size = 19 m diameter  
Production = 35 ton / cage



Cage size = 24 m diameter  
Production = 65 ton / cage  
Total production = 12,000 ton/year

### Establish & organize fish markets in every municipality



### Street foods markets



## Challenges and Opportunities in Fisheries and Aquaculture in Covid-19 Era in Nepal



### Conclusions

1. Large scale **program** development
2. Subsidies to farmers / traders
3. Intensify current systems i.e. pond and cages
4. Series of **training programs** for unemployed youths and others interested
5. Processing and **new product** development
6. **Markets** and cold storages
7. Push for small-scale backyard gardening all over Terai and mid-hills
8. Food & nutrition security - rice-fish, veg+fish
9. Integrated with pig/poultry, goat, cow etc.

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### Achieving goals

- Keeping virus infection and death rates low
- Restart and promote fisheries and aquaculture food supply chains (production, processing, markets, storage and consumption) to:
  - Ensure food and nutrition security
  - Ensure minimum job losses or even attract in this sector the people who have lost their jobs
  - Increase income of all engaged in this sector
  - Special focus on the most vulnerable groups and communities

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### In Nepal

Terai, Inner Terai and mid-hills



**Thank you!**

**For more info:**  
[www.aqua-centre.org](http://www.aqua-centre.org)  
Email: [bhujel@ait.asia](mailto:bhujel@ait.asia)

**Any questions!**

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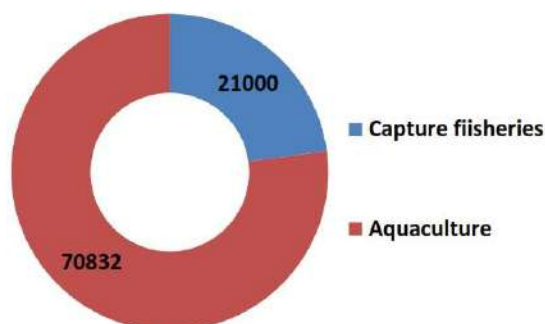
## **Aquaculture and Fisheries in Nepal and Impacts of Covid-19 on Fisheries Sector**

Yugal Kishor Tiwari, Ravilal Sharma, Ramesh Jaiswal

### **Abstract**

## Presentation Slides

**National Production in 2075/76 (mt)**



- Now approximately 3 % of total population are involved to fishing and aquaculture productions (FAO, 2012),
- At present, contributes to about 1.32 % of total GDP and about 4.22 % of AGDP (DoFD, 2016)
- 54,237 farmers family fully dependent on fisheries sector.
- All together 4,21,354 people maintain their livelihood by catch fishing from Natural water bodies.
- Fisheries sector created directly employment for the 1,43,241 people in Nepal.

**Natural waterways and Pond culture**

S.N.	Water Resources	Estimated area (ha)	Coverage (%)	Number	Remarks
1	Rivers and streams	395000	47.77	6000	45000 km length
2	Lakes	5000	0.60	5358	
3	Reservoirs	1500	0.18		Future Potential 78000 ha
4	Ponds	12749	1.54	45678	
5	Marginal swamps	12500	1.51		
6	Low land Irrigated Paddy Field	398000	48.14		Total Paddy area 1551000 ha
7	Irrigation Canal	3160	0.38		Irrigation Canal length 7900 KM (Assuming 4 m av. Width of canal)
8	Highway side ditches	262	0.03		Approximate Road length in Terai area 3500 KM (Assuming 15% of highway having the side ditches with av. Width 2 m)
		828171	100.00		

## Current scenario of fisheries and aquaculture in Nepal

- Having landlocked in nature, Nepal depends only on inland aquaculture with finfish farming,
- Nepalese aquaculture practices is quiet new trend and it was started in early 1950s,
- Fisheries and aquaculture provide nutritious food for 20 millions of people in Nepal.
- The fastest growing agricultural subsectors in the last 3 decades with an annual rate of growth of nearly 11.6 % in Nepal (Wagle *et al.*, 2011),

## Aquaculture and Fisheries in Nepal and Impacts of Covid-19 on Fisheries Sector



TEAM

**Yugal Kishor Tiwari\***

**Ravilal Sharma & Ramesh Jaiswal**

## Impacts of COVID-19 on Fisheries Sector



## Challenges and Opportunities in Fisheries and Aquaculture in Covid-19 Era in Nepal

- Reduction in highway hotel fish demand and pangas for urban fish demand (like, Kathmandu valley, Pokhara valley, different celebration party's venue and star hotel demand)
- Reduction in rainbow trout production (lack of feed and disruption of backward linkage supply chain)
- Disturbance in Aqua-tourism related to rainbow trout farm (due to less mobility)

### • Pangas, Rainbow trout and chhadi fish production

- Dependent upon 100% feed based with the monoculture system of aquaculture
- High risk of economic loss
- Reduction in commercial fish production:- The feed supply and formulation system is interrupted due lack of labor, raw materials and feed ingredients.
- International supply of such feed raw materials i.e. corn, soybean, mustard cake and other micro nutrients will remain interrupted for some time.
- Domestic supply of such materials is very less.

### – Reduction in carp fish production is due to:-

- less production of seed,
- poor management and poor feeding of brood, delayed production of seed,
- lack of seed production inputs (hormones and other chemicals for brood management and breeding performance), lack of labor(malaah).
- Interrupted feed supply chain

- Reduction in fish seed production and distribution due to less mobility and human resources(Labor) availability,

- Reduction of production of Chinese carps Fry and Fingerling fish seed due to less breeding activities in Government and private hatcheries both,

- Reduction in production of Hatchlings of IMCs (Rohu, Naini & Catla) due to poor management and low quality feed,

- Unavailability of quality feed for broods results in the bad performance of Chinese carps as well as IMCs as well

## Impact on Aquaculture Production

### □ Carp Fish production

- Carp polyculture plays major role (>90% contribution in total fish production) in fish production in aquaculture,
- Among Carps Chinese Carps (Common Carp, Grass Carp, Silver carp and Bighead carp) covers 60 % of total fish and rest of 40 % by IMCs (Rahu, Naini & Catla),
- As the breeding season (March to July) has just started and will severely affected by lockdown.

## COVID-19 ????

- A group of RNA viruses that cause a variety of respiratory, gastrointestinal, and neurological diseases in humans and other animals is corona virus and disease caused by corona virus is COVID-19.
- A global pandemic emergence in December 2019 from Wuhan province of China.
- Till now 8274 people are directly suffered by Corona virus with 22 deaths in Nepal.
- Though COVID-19 does not affect fish



## Challenges and Opportunities in Fisheries and Aquaculture in Covid-19 Era in Nepal



### Conclusion

- All aspects of **fish supply chains** are strongly affected by the COVID-19 pandemic, with jobs, incomes and food security at risk.



### Summary

The full range of activities required to deliver [fish and fish products](#) from production to the final consumer is subject to indirect impacts of the pandemic through new sanitary measures, changing [consumer demands](#), market access, or logistical problems related to [transportation](#) and border restrictions. This has a damaging effect on fishers and fish farmers' livelihoods as well as on food security and nutrition for populations that rely heavily on fish for animal protein and essential micronutrients.

### Ultimately

- Reduced food supply in the market and increased food price.
- food insecurity.
- increase unemployment.
- Decline in per capita income.
- Increased labor supply in market (foreign employment returnee and stoppage) can reduce wage rate in labor market.
- Decline in purchasing power.

### • Fisheries Capacity enhancement

- Adversely affect on trainings and skill development programs on fish farmers & technicians

### • Infrastructure development

- Hatcheries, fish markets & sheds, fish ponds, irrigation structures and facilities has been adversely affected.

## Challenges and Opportunities in Fisheries and Aquaculture in Covid-19 Era in Nepal

- **Natural water fisheries stock:**

- Ranching of indigenous species on natural water will be affected due to disruption of breeding of major carps as well as Sahar fish production.
- Livelihood of fisher community affected adversely.

- **Expansion of Aquaculture area:**

- The peak period of feasibility study as well as pond construction has been affected by lockdown
- Harvesting has been disturbed which has also affected the proper management of ponds for better production of next year

- **Aquarium Fish and others:**

- Import of aquarium fish stopped, international supply of such aquarium fish breakage due to long term effect of COVID -19 in other countries
- Loss of aquarium fish due to no management during lockdown due to no mobility lack of availability of individual pass.
- Brood management of aquarium fish and breeding will have disrupted due to lockdown.



## Impact of COVID-19 on Fisheries Research, Education and Extension in Nepal

Prof. Sunila Rai<sup>1</sup>, Dr. Archana Prasad<sup>2</sup>, Neeta Pradhan<sup>3</sup>

<sup>1</sup>Fisheries Program, Agriculture and Forestry University, Rampur, Chitwan, <sup>2</sup>Fisheries Department, Tribhuvan University, Kirtipur, Kathmandu, <sup>3</sup>Fisheries Research Division, Nepal Agriculture Research Council, Godawari, Lalitpur

### Abstract

Covid-19 pandemic and nationwide lockdown has profound effects on fisheries education, research and extension in Nepal. Academic and research institutions were closed for more than two months and activities required to conduct education, research and extension services have been suspended due to lockdown. Closure of universities has impacted career of fisheries students and teachers, and socio-economic costs of families while lockdown disrupted research programs, technology transfer and technical backstopping to farmers in research stations.

Agriculture and Forestry University and Tribhuvan University provide fisheries education. Lockdown has interrupted teaching, internal assessments, exams, research, and graduation of students in both universities. Academic calendar is disrupted badly, academic semester has extended and exams are postponed. Graduation of B.Sc. Fisheries, M.Sc. Fisheries and Doctoral students is delayed giving them psychological stress. Students are likely to lose opportunities in higher education abroad, scholarships, and jobs that may create gap in fisheries development. Immediate effect is much higher to last semester students because B.Sc. Fisheries last semester students could not begin their Learning for Entrepreneurial Experience (LEE) this year while M.Sc. Fisheries students' thesis research is interrupted. Covid-19 has positive effect also because teaching is gradually shifting to online system might develop technical capacity of faculty and students, and infrastructure though there are challenges due to unequal access to internet. Researchers got more time to review literature, publication in journals and write proposals for funding during lockdown.


Although COVID-19 does not affect fish but the full range of activities required to deliver pellet feed from production to the government and private farms is subjected to indirect impacts of the pandemic through new sanitary measures, market access, or logistical problems related to transportation and border restrictions. The most affected fish species with shortage of pellet feed are Rainbow trout and Pangas. Most of the businessmen of raw materials for fish feed are Indian who import the feed ingredients from India. This has a damaging effect on fisher and fish farmer's livelihoods as well as on food security and nutrition for populations that rely heavily on fish for animal protein and essential micronutrients. Disruption in supply of research equipment and chemicals severely affected the breeding program of fish (LRH-A for carp, 17 $\alpha$ methyltestosterone for tilapia). The trout fry produced from late breeding was still stocked in the government and private hatcheries. Mortality of trout fry occurred due to high stocking density in government as well as in private hatcheries such as at RTFRS, Dhunche (25000) and Sole, Rasuwa (300000). Agro-vet and pharmacy were closed in Dolakha, Arghakhanchi and Rasuwa during lockdown which hindered treatment of bacterial disease of trout. The research depended on field visits such as biodiversity, migration of sahar, game change program; participatory research trial

## Challenges and Opportunities in Fisheries and Aquaculture in Covid-19 Era in Nepal

and feasibility study for trout culture in Manang, Rukum and Mustang and carp culture were severely affected due to mobility restriction. Distribution of pure line brood of common carp from FRS, Pokhara to private hatcheries could not complete. Training programs to scientists, technical officer and farmers were unable to conduct. Budget for capital items, pond construction, repair and maintenance was freeze due to all of sudden announce of lockdown. Due to fear of COVID-19 to the staffs and daily workers, and Government rules and regulation, full time works was affected.

## Presentation Slides


A  
F  
U




### Impact of COVID-19 on Fisheries Research, Education and Extension in Nepal

Team

Prof. Sunila Rai, Neeta Pradhan and Dr. Archana Prasad

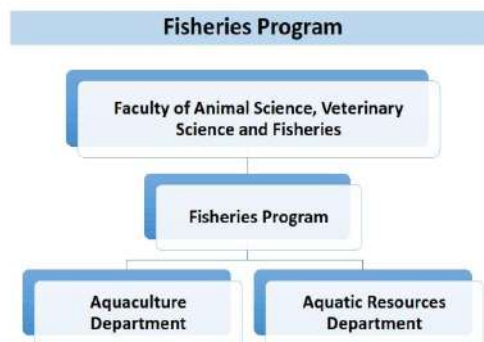



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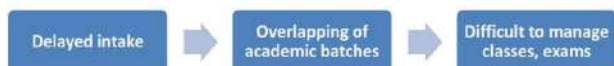


### Impact of COVID-19 on Fisheries Education, Research and Extension in AFU and TU

Prof. Sunila Rai, PhD  
Fisheries Program  
Agriculture and Forestry University



B.Sc. Fisheries			
	1 <sup>st</sup> Batch	2 <sup>nd</sup> Batch	3 <sup>rd</sup> Batch
LEE	2074 Magh	2075 Falgun	Field work not began
B.Sc. Graduation	2075 Shrawan 22	2076 Bhadra 19	?
B.Sc. Intake (New)	5 <sup>th</sup> batch	6 <sup>th</sup> Batch	7 <sup>th</sup> Batch
B.Sc. Intake (New)	2074 Magh 24	2076 Jeth 28	?



- LEE on breeding and seed production technology
- Abandoned breeding topics due to uncertainty



# Challenges and Opportunities in Fisheries and Aquaculture in Covid-19 Era in Nepal



LEE (20 Credits)

## Effects on Education

### Teaching

LEE in B.Sc. Fisheries  
Thesis research of PG

Internal assessment and final examination

Admission of new students in B.Sc. Fisheries

## M.Sc. and Ph.D.

### M. Sc.

- Theses research interrupted particularly field survey
- Delayed graduation
- 3 ongoing batches (2074, 2075, 2076) both in AFU and TU

### Ph.D.

- Delayed final defence and graduation

## If lockdown prolongs.....?

### Possible solutions.....

- Go for adaptive technology and modifying existing assessment system
- **Online teaching ?**
- Technical university, curriculum includes 40-50% practical classes, LEE (20 credits)
  - Theory classes (TU already started)
  - Practical classes ? After lifting lockdown maintaining physical distance ?
  - Train faculty (TU already did and AFU just started) to use apps
- Internal assessment
  - Online viva or written assignments
- Examination/Evaluation
  - Online theses defence/evaluation and awarding degree

## Positive Impacts

### Research projects

- Proposal write up for funding
- Report write up

### Publication

- Publication of research works - pending

### Networking

- Networking with national and international organization

## Challenges and Opportunities in Fisheries and Aquaculture in Covid-19 Era in Nepal

Positive Impacts		Negative Impacts	
Education system is shifting to online	<ul style="list-style-type: none"> <li>Capacity building of student and faculty, e-learning experience, new skill developed</li> <li>Learning from home, so cost for travel is reduced</li> </ul>	Disruption of academic calendar	<ul style="list-style-type: none"> <li>Extension of semester and overall academic program</li> <li>Cannot match with global academic calendar</li> </ul>
Infrastructure	<ul style="list-style-type: none"> <li>Technology friendly classroom may be developed</li> </ul>	Delayed graduation	<ul style="list-style-type: none"> <li>Affects students career as likely to lose jobs, higher education abroad, scholarships</li> <li>Either delays recruitment of technical manpower in government offices, NARC or universities to affect overall fisheries and aquaculture development in the country</li> <li>Extra financial burden to parents</li> </ul>
Theses Research	<ul style="list-style-type: none"> <li>Enough time for literature review</li> </ul>		

Effects on Research		TU Experience	
On-station trials	<ul style="list-style-type: none"> <li>Lack of materials/chemicals/equipment</li> <li>Lack of manpower</li> </ul>	<ul style="list-style-type: none"> <li>T.U. has taken the initiative to deliver trainings to teachers on use of different Apps- <ul style="list-style-type: none"> <li>Microsoft Teams</li> <li>Google Classroom</li> </ul> </li> <li>Assignment's are given online.</li> <li>Sharing of knowledge of the optimum benefit through online as travelling time is saved.</li> <li>Challenges due to unequal access to internet, interruption in power supply and it prevents equal online education opportunities for students all over the country.</li> </ul>	
Field trials/survey	<ul style="list-style-type: none"> <li>Field visit restricted due to lack of transportation</li> <li>There is some relaxation in lockdown and researchers are heading towards their work</li> </ul>		

Conclusion
<ul style="list-style-type: none"> <li>Covid-19 pandemic and nationwide lockdown has profound effects on fisheries education, research and extension worldwide including Nepal.</li> <li>New experience.</li> <li>University should make efforts to maintain overall academic calendar and minimize effect to students' career.</li> <li>University should make efforts to capacitate and facilitate distance learning classes that does not need physical distancing.</li> <li>Let's develop technology friendly environment and work together for fisheries development in Nepal.</li> </ul>



## **COVID-19 Impacts on aquaculture research and extension**

### **Abstract**

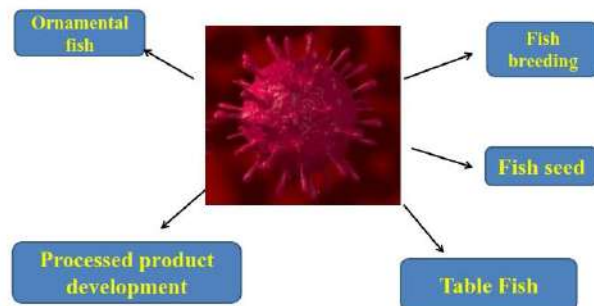
## Presentation Slides

### COVID-19 impacts on aquaculture research and extension

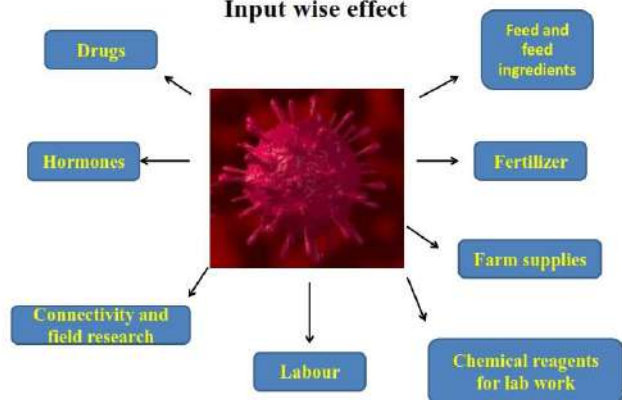
- Although COVID-19 does not affect fish, the full range of activities required to deliver pellet feed from production to the government and private farms is subjected to indirect impacts of the pandemic through new sanitary measures, market access, or logistical problems related to transportation and border restrictions.
- The most affected fish species with shortage of pellet feed were trout and pangas.



#### Commodity wise effect



#### Input wise effect



#### Trout fry mortality

- Due to lockdown could not transport trout fry to Rukum, Taplejung, Gulmi, Ramechhap, Lamjung, Rasuwa, Achham, Sindhupalchowk.
- Problems in trout fry procurement by farmers due to national lockdown and closed bank.
- Mortality of trout fry due to high stocking density in government as well as in private hatcheries such as at RTFRS, Dhunche (25000 trout fry), 3 lakh at Sole, Rasuwa.



#### Bacterial disease

Unable to cure bacterial disease of trout due to lockdown and closed medicinal shops in Dolkha, Arghakhanchi and Rasuwa.



*Vibrio* spp.

*Pseudomonas* spp



# Challenges and Opportunities in Fisheries and Aquaculture in Covid-19 Era in Nepal

## Field related research

- The research depended on field visits eg.,
  - Biodiversity,
  - Migration of sahar,
  - Game change program



## Affects on Game change program

**Ram Poudel (Pradesh no. -1)**  
R and R Agro Private fish farm

- 70,00000 Common carp produced.
- 30,00000 distributed
- 40,00000 still on the stock



**CAARP (Pradesh no.- 3)**  
Pro. Dr. Madhav K. Shrestha

- Tilapia fry : sold 17,800
- Ready to sale 20,000
- Hormone feeding stage 25,000
- Tilapia farmer: Nandan thapa was unable to produce all male tilapia due to lack of hormone (17  $\alpha$  methyltesteron hormone).
- But produced mix sex tilapia fry (40,000-50000).



## (Pradesh no. -1)

### Common carp

- Hari chaudhari common carp fry 20,00000 distributed and 8,00000-10,00000 still stocked.
- Udaypur due to lockdown > 1,0000 common carp fry dead
- 40,000-50,000 still in the stock.

### (Pradesh no. -5)

- Amrish patel and Rajesh Sahani produced about 2,00000 pangas fry and could not distributed due to lockdown.

## Bishal Rai for pangas (Pradesh no. -1)

- Due to heavy rain 2 sets of pangas brood dead
- But 186,000 pangas fry distributed
- 6,00000 fry still the in stock.
- Had to paid 1500/vial of hormone instead of 500/vial due to shortage of hormone because of lockdown.
- Due to lack of hormone (ovaprim, ovulin) could not continue to breed for 2<sup>nd</sup> lot



- Participatory research trial at selected outreach reach sites is affected due to delay in the fish seed stocking and growth check-up and monitoring.
- Feasibility study for site selection for trout (Manang, Rukum, Mustang) and carp culture was severely affected e.g.,
- Distribution of pure line brood (common and silver carp) from FRS, Pokhara to private hatcheries is incomplete. Two hatcheries still remained to support among 4.

# Challenges and Opportunities in Fisheries and Aquaculture in Covid-19 Era in Nepal

## • Effect of COVID-19 on fisheries

- Due to clean water during lockdown.....

भारतको घाँघरा नदी हुँदै आएका  
Gangetic Dolphins कैलौलीको मोहना,  
पथरैया र काँडा नदीमा देखा परेका

- Migratory fish observed in natural water eg Bagarius (in Nepal), *Tor ramadevi* (40-50 kg, in India) for breeding

- But poaching problem increasing.

COVID-19 and biodiversity: The paradox of cleaner rivers and elevated extinction risk to iconic fish species

Alister C. Pooley<sup>1,2</sup> | Rajen Raju<sup>1,2,3</sup> | J. J. Robertson<sup>1,2</sup> | Steven J. Cooke<sup>1,2</sup>



- Due to fear of COVID- 19 to the staffs and daily workers, and Government rules and regulation, full time works was affected.
- Training programs to scientists, technical officer and farmers were unable to conduct.
- Budget for capital items was freeze due to all of sudden announce of lockdown.

Construction and repair and maintenance of pond were affected.



Pond No. 1 (incomplete)



Pond No. 2 (incomplete)



Pond No. 25 (delayed but will be complete)



Painting the roof (delay but will be completed)

**Dried fish products from Chhapiya Fish Village**



Dried fish products from common, silver and bighead carp.



Thank you

## **COVID-19 Crisis: Is there any opportunity for sustainable fisheries?**

Rahul Ranjan<sup>1</sup>, Resham Raj Dhital<sup>2</sup>, Tek Bahadur Gurung<sup>3</sup>

### **Abstract**

Corona virus disease (COVID-19) is also named as SARS-CoV-2. This disease was first identified in December 2019 in Wuhan, China and spread as pandemic all over the world. This disease is hitting the modern world economy s enormously. This disease has changed the lifestyle of people all over the world. Nepal implemented the lockdown in the country from 24<sup>th</sup> March 2020 to 14<sup>th</sup> June 2020 spanning for 83 days. The lock down has affected the fisheries and aquaculture sector enormously in Nepal.

The economy as well as agricultural activities in many countries came to an abrupt halt due to the lock down imposed by governments. There are presumptions that prolonged effect of COVID-19 may force the agro-powerhouse like USA, China and India to impose ban of food exports. Thus, the condition may worsen further. There are speculations that the returning Nepalese youths might escalate the food demand.

There are also questions except the negative aspects, does this pandemic has any positive attributes towards the fisheries and aquaculture? In other sector, the sanitizer and mask companies, medical suppliers and canned food producing companies benefitted substantially in the covid-19 era. Similarly, the wild life are known to be benefitted with the covid-19 as the wild animals were least disturbed by the human activities. So we would discuss the positive areas in fisheries and aquaculture that could take the advantages of the Covid-19 era for sustainability of this sector.

For the sustainability of fisheries and aquaculture probably the experts and policy makers should work out on the formulation and getting approval on fisheries regulations related to fish seed, table fish, ornamental fish, licensing for culture and hatcheries etc. Similarly, certification of fish hatcheries, fish markets as well as licensing for cultivation of specific fish species could be done. There is no concrete data on fish seed import, table fish import, ornamental fish import as well as the fish farmers and fish hatcheries so these information should be collected along with the development of the mechanism to obtain such information regularly and systematically.

The quarantine rules over ornamental fish will enhance the scope of indigenous fish as ornamental species. Similarly, such a regulation will also help us to certify the hatcheries with the quality of seed produced.

Large numbers of youth are returning home from abroad due to the COVID-19 lock down. This will necessarily escalate the demand of food but will also provide the necessary human resources to increase the production. The returnees can be involved in fish farming. Development of locally-suitable technology to enhance fish production could also one of the areas for cooperation. This will result in the intensification of fish farming in Nepal as shown by some previous foreign returnees.

The fish market and marketing is one of the important areas where enormous innovations have to be invited. A number of incoming youth may also involve in fish market business, carrier development in ornamental or commercial fish hatcheries.

## Challenges and Opportunities in Fisheries and Aquaculture in Covid-19 Era in Nepal

There are also enormous opportunities lying to establish E-commerce and trade in fisheries sector. Many entrepreneurs might involve them on high quality fish preservation business to produce certified processed fish products in country that could be sold in supermarkets and other market arenas. The COVID-19 has opened opportunities to develop more innovations such as Bio flocculation, Aquaponics, Recirculating Aquaculture System (RAS) etc. Engagement of farmers from production to market and consumers would be highly desirable actions to avoid the economic loss due to the COVID-19. It is recommended that to overcome the Covid-19 challenges the fisheries sector should be declared as ‘special sector’ for marketing and transporting the products from farm to consumers. The fisheries sector should invite abroad returnees to engage in production and value chain, initiate the trainings and other motivational programs to take the advantages of the COVID-19 era.



## Presentation Slides

### COVID -19 CRISIS: IS THERE ANY OPPORTUNITY FOR SUSTAINABLE FISHERIES ?

Rahul Ranjan, Resham Dhital,  
TB Gurung

Presented at Webinar "Sustainable fisheries and aquaculture in Covid-19 era"

Dated : 6<sup>th</sup> Asar 2077 (20<sup>th</sup> July 2020 ) organized by Nepal Fisheries Society (NEFIS)

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### COVID -19

- Also known as **SARS-CoV-2**.
- First identified in December 2019 in Wuhan, China.
- Resulted in pandemic very soon.
- First case traced on 17<sup>th</sup> November 2019.
- Virus thought to be natural and has an **animal origin**.
- Locking down came up as an instant solution to stop the spread.
- Many countries faced official as well as unofficial lock downs.

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### COVID 19

- Nepal implemented lock down of whole country from 24<sup>th</sup> March 2020 (11<sup>th</sup> Chaitra 2076).
- Continued till 14<sup>th</sup> June 2020 (32<sup>nd</sup> Jestha 2077) in different phases.
- Total:- 83 days (almost 3 months)
- Affected many sectors in **fisheries and aquaculture in Nepal**
  - Fisheries production and marketing
  - Fisheries education and research
  - National economy
  - Remittance (impact on investment)

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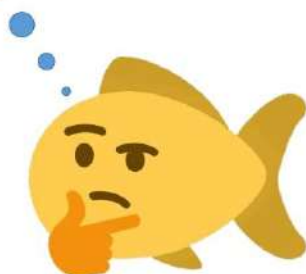
### GLOBAL IMPACTS

- Economy as well as agricultural activities- come to an abrupt halt.
- Farmers facing problem due to locked down: transportation, market and consumers.
- Prolonged effect may force agri-powerhouse like USA, China and India to impose ban of food exports.
- Millions of Nepalese may return to country from abroad- further escalate the food demand.

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Opportunity in  
Pandemic for  
sustainable fisheries !!



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### THE BENEFICIARIES OF COVID-19!!

- Sanitizer products
- Mask Companies
- Medical suppliers
- Canned food products including fish products
- Nature itself, environment and wild-life etc.

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Yes, there are  
some...

## Policy level opportunities

Strengthening aquaculture entrepreneurship by

- Information Technology
- Education, research & extension services
- Unification of stakeholders

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## POLICY LEVEL OPPORTUNITIES

- Formulation and recognition of some fisheries regulations such as
  - Fish seed regulation
  - Table fish/Shellfish products quarantine
  - Ornamental fish
  - Improving better international linkages
- Certification
  - Hatchery
  - Fish market
  - Licensing for cultivation of specific fish species

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## DATA ON IMPORT

- Strengthening data collection measures on fish seed imported- lacking to a greater extent
  - Importing seed of species like *Clarias*, *Rupchandra* etc.
  - Importing unhealthy seed
- Data on ornamental fish import
  - Unaware of the spent cost for import

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## PANGAS VS WALKING CATFISH



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## IN TRANSPORT



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## OPPORTUNITY ON IMPORT CERTIFICATION

- Establishment of strong quarantine on import points
  - Able to lower the import of banned and uncertified seeds
    - Certified by fish seed specialist
- Import only healthy fish seed
  - Certified by fish disease specialist
- Certify the table fish
  - A veterinarian and a food technologist certification
- Certify ornamental fish
  - Locally available species- banned to import

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## PROMOTION OF LOCAL ORNAMENTAL FISH

More than 40 indigenous species have ornamental attributes.



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## OPPORTUNITIES....

- Hatcheries
  - Collect actual data on fish hatcheries and their product
  - Certify according to their product (quality of seed)
  - Also help to recognize the needy hatchery for any sort of support
- Fish farmers
  - Collect more precise data on fish farmers from all provinces on production system and production etc
  - Collect information on farmer's demand (need).

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## OPPORTUNITIES AQUA-ENTREPRENEURSHIP !

- Youths returning from abroad
  - Not only escalate the demand
  - Also increase the availability of human resources as well as entrepreneurs
- Develop technology to enhance the production suitable to local context.
- Intensification of fish farming.

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## AQUA-ENTREPRENEURSHIP

- Youths can also choose to market fish.
- A proper marketing channel can be established with the involvement of youth in this sector.
- A number of youth can also involve themselves in the sector of ornamental fishes.
  - Establishment of ornamental fish hatcheries.
  - Aquarium fabrication and service provision.

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## AQUA-ENTREPRENEURSHIP

- Fish feed
  - Pandemic may result into hike in the price of raw materials for fish feed production
  - Increase the price of fish feed
  - So there will be opportunity to use local materials for fish feed production.

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## AQUA-ENTREPRENEURSHIP

- Opportunity to connect the farmers through E-commerce: A new way to market
  - Farmers are social media literate.**
- E-commerce of fish and fish products.
- Fish food preservation opportunity
  - Upgrading the local processing technologies and marketing the locally processed fish enhances social distancing thus should be helpful even in Covid-19 era.
- Locally processed fish can also find way in supermarkets.

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## A BRUTAL STEP

- Ornamental fish and packaged fish products are luxurious items.
- An increment of taxes in these products may result in:
  - Decrease in import
  - Increase in revenue

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## EDUCATION, RESEARCH, EXTENSION SERVICES

- Opportunity to develop online education options
- Research on utilization of locally available materials as fish feed.
- Development of technologies suitable at local context.
- Research on new technologies like Biofloc and aquaponics and ornamental fisheries.

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## Conclusion

- In this Covid-19 era every walk of life has been hit hard. So it is difficult to say “yes” to the posed question of the ‘opportunity’.
- To survive the fisheries sector, engagement of farmers to production and there link to market and consumers would be highly desirable to avoid economic loss. Therefore, the fisheries must be privileged by declaring as ‘Special sector’ for marketing and transport to reach the farm products to consumers.
- Fisheries sector should invite those returnees from abroad to be engaged for production and other value chains. We urge to initiate training and other motivational programs in all concerned agencies to make this Covid-19 era as the opportunity.

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# THANK YOU

## Any suggestions and queries are welcome

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