
DRIED FISH MATTERS – SRI LANKA (DFMSL)

KEY ZONE IDENTIFICATION

A study to identify the key dry fish producing zones in Sri Lanka

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INTRODUCTION

Fish processing, especially the process of drying fish, has been an important component of the fish value chain, dominating all fish processing activities undertaken by the people of Sri Lanka. Dried fish making (both dried fish and *maldive*¹ fish) has been traditionally undertaken by women, providing fishing families with an important source of supplementary income. Its contribution towards food security, nutrition, sustainable livelihoods and poverty alleviation has been considerable. Moreover, fish processing has also provided women fisher folk with avenues of employment and empowerment. As mentioned above, the major fish processing activities carried out in Sri Lanka, are making *maldive* fish (*umbalakada* as called locally) and dried fish. A major portion of the fresh fish used for processing comes from low quality and damaged fish landed by crafts. Although the target is to catch fish for export, Sri Lanka's multiday boats land a fair quantity of poor quality fish; those which are found at the bottom of the stack of trays in the cold room of the boats (fish caught earlier in the fishing trip). Part of such low quality fish may not even be sold locally as fresh fish and, they find their way to dried fish processing. The rest of the supplies comes from the coastal fishery, when huge surpluses are found (when landings are heavy). Even though the industry has advanced significantly, the processors (often women in fishing families), still use the age-old, conventional processing techniques, which have not changed throughout the history of fish processing in the country. The exact technique employed depends on the type of product being processed. For the traditional drying style, this involves a meticulous routine of cleaning, gutting, boiling, salting, and laying out the fish to dry. For the Maldivian style, the fish are also smoked.

It is well known that fish stored in the ice compartment of the multi-day crafts, especially those at the bottom trays of the cold room, are of poor quality. This quality deterioration of the fish at the bottom trays is higher, the higher the duration of the fishing trip. Often the first-caught fish are dried on the deck of the craft during the voyage and such dried fish is called "Boat-Dry Fish" (*boattu karawala*). There is belief that *boattu karawala* are clean, contain less moisture and are of better quality and, thus command a higher demand than other dry fish types. They fetch higher prices compared to fish dried on land. Yet, the volumes available are limited.

Once the catches are landed by the multiday crafts, the fish stored in top trays of the cold room go for export while those at the bottom are sold for fish drying. Fish stored in the middle go to the local market. It is generally known that, fish that go for dry fish production are inferior in quality, although not decomposed.

¹ *Maldive* fish is a certain type of dried fish, which follows a path of processing different from that of dry fish. During the very early days, this product was imported from Maldives, which explains why this fish product is called *maldive* fish.

Dried Fish making

Poor quality fish landed by multiday crafts and used for dry fish making often consist of large pelagic species such as Tuna or *Kelawalla* (*Thunnus albacares*), skipjack or *Balaya* (*Kastuwoun pelagis*), *Kattawa* (*Chrinemus sp*), *Wannawa* (*Caryphaens hippurus*), *Para*, (*Caranx sp*) etc. Generally, purchasing of fish is done by males in the family. The drying process involves, cleaning, washing, cutting, salting, which are done by the women fisher folk. Traditionally this existed for centuries as a household activity. Women say that this activity is profitable because only lower quality (and thus cheap) fish is used for fish drying.

Smaller pelagic fish species such as sprats, *salaya* (*Sardinella melanura*), *linna* (*Decapterus sp.*), *kumbala* (*Rastrelliger Kanagurta*), *hurulla* (*Amybligaster sp*), etc. are also used for dried fish making, for which supplies come from both small and large scale boats. No selective buying is practiced and prices are quoted for whole mounds.

Prices of dried fish depend to a great extent, on the inputs that go into the process. Sun drying is most common method, where cleaned and salted fish are sun-dried on coir mats lying on beaches or on specially prepared drying racks kept above the ground.

Maldives fish making

In general, large pelagic fish species are used as raw material for maldives fish, which is prepared through a steamed and dried process. This process is quite popular among small-scale fish processors, mainly females, settled along the coastal belt of Matara and Hambantota. However, the type of processing technique used by them is said to be quite inefficient leading to high wastage and poor quality product

Both dry fish and maldives fish processors confront difficulties of waste disposal. The usual method of throwing into the sea or burning have already reached alarming levels and public protests have threatened the industry's existence, if such practices are continued. There are of course good practices (which are being practiced in certain areas to a lesser extent) such as producing fish meal, poultry feed (as ingredient), slurry for pigs and bio-fertilizer. By product user are facing difficulties in drying the raw material and storing the semi-finish products at village level.

Spatial distribution of dried fish processing zones

Processing of fish into dried fish and maldive fish is not evenly distributed in the country, in terms of quantities produced, scale of production, involvement of men and women, organization of production, etc. Commercial scale processing is often found in the western and northern parts of the country and household production is generally practiced in the southern regions, especially in Buddhist communities. Due to this diversity, and the dearth of information on dried fish and maldive fish, it was decided to carry out a Key Zone identification study, which forms the objective of the current study.

METHODOLOGY EMPLOYED IN THE STUDY

Identification of Key Zones was done with the assistance of Assistant Directors (ADs) of Fisheries, who are the representatives of the Department of Fisheries and Aquatic Resources Development for each Fisheries district of the country (There are fifteen Fisheries districts in Sri Lanka: Colombo, Kalutara, Galle, Matara, Tangalle, Kalmunai, Batticaloa, Trincomalee, Mullaithivu, Kilinochchi, Jaffna, Mannar, Puttalam, Chilaw and Negombo). Each Assistant Director has a group of Fisheries Inspectors serving all fishing villages (FI divisions). Thus the Assistant Directors has first-hand knowledge of the area, and in the present context, they form the best sources of information on the following, for each coastal district

A structured questionnaire was prepared, which included questions on the following

- *Major fish production areas*
- *Major dried fish producing sites*
- *Volume of Production of dry fish by type*
- *Number of households involved in dried fish production*
- *Distribution of employment in dried fish production (disaggregated by gender and work category)*
- *Fish marketing channels and the type and number of traders serving each location*
- *Location and number of wholesale centers*
- *Type and number of state and non-state institutions (civil society organisations, community organisations, women's organisations) engaged in the sector*
- *Key issues faced by the dried fish producers of the district*
- *Changes over the last 10 years, in respect of volumes of production, locations, technology, marketing, etc.*

The questionnaire, which was prepared in English, was translated to local languages; Sinhala and Tamil (see annexes 1, 2 & 3).

The ADs were asked to give data for the year 2018.

A payment of Rs.5000 was made to each Assistant Director for responding to the questionnaire.

All Assistant Directors of Fisheries are co-opted members of the Sri Lanka Forum for Small Scale Fisheries and thus they had already been sensitized on the DFM project and its objectives, when they attended a meeting on the 28th of September at the National Science Foundation, Colombo, where a State Actor Sensitizing workshop on "Implementing FAO Voluntary Guidelines" was held. All of them expressed their willingness to assist the DFM project.

Data collection:

Mail Questionnaire method was used to reach all Assistant Directors of Fisheries). Some of the questionnaire were posted while others were sent by email.

THE IMPACT OF COVID PANDEMIC ON THE STUDY

However, the study had serious negative consequences due to the Covid 19 pandemic, after the first Covid case was found on the 11th of March 2020. All Assistant Directors were involved in helping the fishing communities in selling their catches, making arrangements for transport, issuing curfew passes, transport arrangements for sending catches to remote areas under area lock-down conditions etc. The project activities came to a standstill during the months of March, April, May and June. Although fishing commenced fully by July 2020, project work continued at a slow pace because the Ads were too busy with the recovery process of the fisheries sector. However, most of the questionnaire were received from Ads in August and September. The last questionnaire (from Mullativu District was received in November, due to the absence of the AD who had met with an accident.

Type of information furnished by Assistant Directors of Fisheries

While information furnished by Ads included production of dried fish and maldivian fish by location, quantity, and employment (with gender disaggregated data), information on community institutions, wholesale and retail trade, etc. were absent. However, information that were received were sufficient enough to attain the objectives of the study.

Information on maldive fish production are scanty. It is not known whether data is not available for a particular district or whether there is no maldive fish production. Therefore, no attempt was made in this paper to analyse the available data on maldive fish production.

RESULTS AND DISCUSSION

Due to the diversity in population characteristics, such as density, religion, ethnicity, etc. results will be discussed by province and district, while aggregate data will be used whenever necessary.

1. Dried fish and Maldive fish production

1.1 Southern Province

Annual fish production and dry fish production, including maldive fish in the three districts of the Southern Province are given in tables 1, while the same data, by FI Division (Fisheries Inspector Division; the lowest fisheries administrative area) is presented in table 2.

Table 1. Production of fresh fish and dried fish in the Southern Province, by coastal District.

| Southern Province | | | | | |
|-------------------|---------------------|---------------------------|-----------------------------|-----------------------------------|-------------------------------------|
| District | No. of FI divisions | No. of fishing households | Annual fish production (kg) | Annual dried fish production (kg) | Annual maldive fish production (Kg) |
| Galle | 09 | 3452 | 49,976,205 | 77,685 | 3,659 |
| Hambantota | 12 | 8291 | 74,799,760 | 385,000 | 356,000 |
| Matara | 09 | 9109 | 25,465,027 | 1,572,914 | 139,850 |

District with the highest dried fish and maldive fish production

As revealed by the results, Matara has recorded the highest quantity of annual dried fish production (1,573 MT of fish), while Hambantota has recorded the highest maldive fish production (356 MT).

Tables 2, 3 and 4 give dried fish and maldive fish production in the 3 districts of the Southern Province, by FI Division

Table 2. Dried fish and *maldive* fish production in the Galle District, by FI Division

| Galle | | |
|------------------|-----------------------------------|-------------------------------------|
| FI Division | Annual Dried fish production (kg) | Annual maldive fish production (kg) |
| Ambalangoda | 7,050 | 610 |
| Hikkaduwa- North | 6,135 | 2,850 |
| Hikkaduwa- South | 32,550 | DNA |
| Dodanduwa | 4,300 | DNA |
| Galle | 27,650 | 199 |

* DNA : *Data Not Available*. Shaded in orange colour are the FI Divisions with highest dried fish and *maldive* fish production

Table 3. Dried fish and *maldive* fish production in the Hambantota District, by FI Division

| Hambantota | | |
|----------------|-----------------------------------|-------------------------------------|
| FI Division | Annual Dried fish production (kg) | Annual maldive fish production (kg) |
| Kudawella | 110,000 | 120,000 |
| Mawanalla | 20,000 | 25,000 |
| Unakuruwa | 10,000 | 15,000 |
| Tangalle | 25,000 | 40,000 |
| Hambantota | 40,000 | 20,000 |
| Kirinda | 80,000 | 40,000 |
| Rekawa | 5,000 | 23,000 |
| Kahandhamodara | 5,000 | 9,000 |
| Kalamatiya | 10,000 | 3,000 |
| Welipatanyila | DNA | 21,000 |
| Sisilasagama | DNA | DNA |
| Pallewalala | 80,000 | 40,000 |

Shaded in orange colour are the FI Divisions with highest dried fish and *maldive* fish production

Table 4. Dried fish and maldive fish production in the Matara District, by FI Division

| FI Division | Annual Dried fish production (kg) | Annual maldive fish production (kg) |
|--------------|-----------------------------------|-------------------------------------|
| Gandara | 27,443 | |
| Weligama | 72,000 | 11,000 |
| Kapparathota | 19,383 | 9,800 |
| Dikwella | 13,833 | 5,000 |
| Gandara west | 24,000 | 6,000 |
| Dondra | 1,110,600 | 105,050 |
| Matara | 655 | |
| Mirissa | 305,000 | 3,000 |
| Kottekoda | | |

Shaded in orange colour are the FI Divisions with highest dried fish and maldive fish production

Evidently, the highest dried fish producing FI Divisions of the Southern province are, Dondra (1,110 MT) and Mirissa (305 MT) in the Matara District, Kudawella (110 MT), Kirinda (80 MT) & Pallewalala (80 MT) in the Hambantota District. In respect of maldive fish production, the highest production is recorded in Dondra (105 MT) in the Matara District and Kudawella (120 MT), Kirinda (40 MT), Tangalle (40 MT) and Pallewalala (40 MT) in the Hambantota District. The total annual maldive fish production in the Matara District is 140 MT. Both in respect of dried fish and maldive fish the annual production in the above FI divisions are as follows (from high to low).

| | |
|-------------|----------|
| Dondra | 1,215 MT |
| Mirissa | 308 MT |
| Kudawella | 230 MT |
| Pallewalala | 120 MT |
| Kirinda | 120 MT |

1.2 Northern Province

Tale 5 gives the annual dried fish production in the Northern Province. No data is available for maldive fish production in the Northern Province.

Table 5. Annual dried fish production in the Northern Province

| Northern Province | | | | | |
|-------------------|---------------------|---------------------------|-----------------------------|-----------------------------------|--|
| District | No. of FI divisions | No. of fishing households | Annual fish production (kg) | Annual dried fish production (kg) | Annual <i>maldive</i> fish production (Kg) |
| Kilinochchi | 04 | 3877 | 6,676,550 | 582,760 | DNA |
| Mannar | 06 | 9759 | 23,048,762 | 819,280 | DNA |
| Jaffna | 14 | 21593 | 48,835,012 | 2,996,009 | DNA |
| Mullaitivu | 04 | 3410 | 12,500,000 | 3,350,000 | DNA |
| All | 28 | 38639 | 91,060,324 | 7,748,049 | DNA |

Among the four districts of the Northern Province, the highest annual dried fish production is found in the Mullativu District, which is 3,350 MT, followed by Jaffna, with a production of 2,996 MT. The other two districts have recorded very small quantity of dried fish production. The district total of dried fish production amounts to 7,748 MT annually.

Tables 6 - 9 show the breakdown of the district-wise production into respective Fisheries Inspector Divisions of then Jaffna, Kilinochchi, Mannar and Mullativu Districts.

Table 6. Annual dried fish production in the Jaffna District, by FI Division

| Jaffna | | |
|---------------------|-----------------------------------|--|
| FI Division | Annual Dried fish production (kg) | Annual <i>maldive</i> fish production (kg) |
| Jaffna West | 776,030 | DNA |
| Aliyawalai | 391,220 | DNA |
| Thalaiyady | 33,680 | DNA |
| Point Pedro East | 341,950 | DNA |
| Kankasanthurei East | 155,850 | DNA |
| Kankasanthurei West | 213,250 | DNA |
| Sandilipay | 90,700 | DNA |
| Chulipuram | 2,350 | DNA |
| Kayts | 00 | DNA |
| Velanai | 250,700 | DNA |
| Delff | 50,160 | DNA |
| Jaffna East | 152,250 | DNA |
| Chavakachcheri | 00 | DNA |

| | | |
|------------------|---------|-----|
| Point Pedro West | 537,869 | DNA |
|------------------|---------|-----|

The highest annual dried fish production in the Jaffna district are, Jaffna West (776 MT), Point Pedro West (538 MT), Alliyawalai (391 MT), Point Pedro East (342 MT), Velanai (251 MT) and Kankasanthurai West 213 MT).

Table 7. Annual dried fish production in the Mannar District, by FI Division

| Mannar | | |
|----------------|-----------------------------------|-------------------------------------|
| FI Division | Annual Dried fish production (kg) | Annual maldive fish production (kg) |
| Pesalei | 202,698 | DNA |
| Erikkalampiddi | 107,321 | DNA |
| Mannar Town | 181,339 | DNA |
| Nanattaan | 116,230 | DNA |
| Silawathurei | 132,928 | DNA |
| Widaththaltheu | 78,764 | DNA |

Only two FI divisions in Mannar have recorded annual dried fish production above 150 MT; Pesalai with 203 MT and Mannar Town with 181 MT), while lesser amounts are produced in Silawathurei (133 MT) and Nanattaan (116 MT).

Table 8. Annual dried fish production in the Kilinochchi District, by FI Division

| Kilinochchi | | |
|-------------|-----------------------------------|-------------------------------------|
| FI Division | Annual Dried fish production (kg) | Annual maldive fish production (kg) |
| Nachchikuda | 546,000 | DNA |
| Poonagary | 36,000 | DNA |
| Kandavadani | DNA | DNA |
| Palai | 760,000 | DNA |

Two FI Divisions in the Kilinochchi District have recorded considerably high annual dried fish production; Palai (760 MT) and Nachchikuda (546 MT).

Table 9. Annual dried fish production in the Jaffna District, by FI Division

| Mullaitivu ++ | | |
|----------------------|-----------------------------------|-------------------------------------|
| FI Division | Annual Dried fish production (kg) | Annual maldive fish production (kg) |
| Mullai North | 395,000 | DNA |
| Mullai Town | 490,000 | DNA |
| Naayaaru | 715,000 | DNA |
| Kokkilai | 1,950,000 | DNA |

The Mullativu District, which has produced the highest quantity of dried fish, has two FI divisions annually producing dried fish in excess of 700 MT; Kokkilai (1,950 MT) and Naayaaru (715 MT). Lesser amounts are recorded by the other two FI divisions: Mullai Town (490 MT) and Mullai North (395 MT). Evidently, all FI Divisions in the Mullativu district are good dried fish producing areas, producing more than 395 MT per year.

1.3 Western Province

There are only two coastal districts in the Western Province; Kalutara and Negombo. The total annual dried fish production in the district is 2,000 MT, the two districts reporting quite similar quantities of production; Kalutara 1,023 and Negombo 977 MT. Information on maldive fish production is only available for Kaulatara, which is 25 MT annually.

Table 10. Production of fresh fish and dried fish in the Western Province, by coastal District

| Western Province | | | | | |
|-------------------------|---------------------|---------------------------|-----------------------------|-----------------------------------|-------------------------------------|
| District | No. of FI divisions | No. of fishing households | Annual fish production (kg) | Annual dried fish production (kg) | Annual maldive fish production (Kg) |
| Kalutara | 09 | 79 | 2,740,200 | 1,023,200 | 25,100 |
| Negombo | 13 | 7490 | 33,909,527 | 976,520 | DNA |
| All | 22 | 7569 | 36,649,727 | 1,999,720 | DNA |

Tables 11 and 12 gives the annual dried fish production in Kalutara and Negombo districts, by FI Division

Table 11. Annual dried fish production in the Kalutara District, by FI Division

| Kalutara | | |
|-----------------|-----------------------------------|-------------------------------------|
| FI Division | Annual Dried fish production (kg) | Annual maldive fish production (kg) |
| Aluthgama | 50,000 | DNA |
| Beruwala south | 100,000 | DNA |
| Beruwala north | 36,200 | 22,400 |
| Maggona | 568,000 | 1,200 |
| Payagala | 120,000 | DNA |
| Kalutara south | 22,000 | DNA |
| Kalutara north | 122,000 | DNA |
| Wadduwa | 5,000 | 1,500 |
| Panadura | DNA | DNA |

A sizeable amount of dried fish is only produced in the Maggona FI division (568 MT), followed by Kalutara North (122 MT) and Beruwala South (100 MT). Beruwala North has also recorded a production of 22.4 MT of maldive fish annually.

Table 12. Annual dried fish production in the Negombo District, by FI Division

| Negombo | | |
|----------------|-----------------------------------|-------------------------------------|
| FI Division | Annual Dried fish production (kg) | Annual maldive fish production (kg) |
| Kammalkuraya | DNA | DNA |
| Ethukala | 25,000 | DNA |
| Kudapaduwa | 513,600 | DNA |
| Town 1 | 141,500 | DNA |
| Town 2 | 8,020 | DNA |
| Town 3 | 37,700 | DNA |
| Duuwa | 21,500 | DNA |
| Pitipana | 24,200 | DNA |
| Aluthkuruwa | 137,000 | DNA |
| Kapungoda | DNA | DNA |
| Ja Ela | DNA | DNA |
| Uswatakeiyawa | DNA | DNA |
| Wattala | 68,000 | DNA |

In the Negombo coastal district, only three FI Divisions have recorded an annual production of dried fish in excess of 100 MT; Kudapaduwa (513 MT), Town 1 (142 MT) and Aluthkuruwa (137 MT). No information is available for maldive fish production in the district.

1.4 North Western Province

The North Western Province consists of two coastal districts; Puttalam and Chilaw. Annual dried Fish production for the two districts and maldive fish production for Puttalam are given in table 13.

Table 13. Production of fresh fish and died fish in the North Western Province, by coastal District

| North Western Province | | | | | |
|------------------------|---------------------|---------------------------|-----------------------------|-----------------------------------|--|
| District | No. of FI divisions | No. of fishing households | Annual fish production (kg) | Annual dried fish production (kg) | Annual <i>maldive</i> fish production (Kg) |
| Puttalam | 08 | 9701 | 64,820,206 | 2,381,919 | 2,400 |
| Chilaw | 11 | 7089 | 21,900,993 | 2,201,000 | DNA |
| All | 19 | 16790 | 86,721,199 | 4,582,919 | DNA |

The two districts of the North Western province together produce 4,583 MT of dried fish annually, each district producing similar quantities; Puttalam 2,382 MT and Chilaw 2,201 MT. Puttalam has recorded a very small amount of maldive fish production (1.2 MT annually).

The FI Division wise bread down of dried fish production is given in tables 14 and 15.

Table 14. Annual dried fish production in the Puttalam District, by FI Division

| Puttalam | | |
|-------------------|-----------------------------------|--|
| FI Division | Annual Dried fish production (kg) | Annual <i>maldive</i> fish production (kg) |
| Baththuluoya | 209,263 | DNA |
| Mangalaa-eliya | 256,756 | DNA |
| Palakuda | 126,415 | DNA |
| Kalpitiya-Land | 781,020 | 1,200 |
| Kalpitiya- Island | 634,750 | DNA |
| Kandakuliya | 94,650 | 1,200 |
| Puththalam | 183,000 | DNA |
| Wanathawilluwa | 96,065 | DNA |

Kalpitiya is the major dried fish producing area in the Puttalam District (781 MT by Kalpitiya Land and, 635 MT by Kalpitiya Island), followed by Mangala Eliya (257 MT), Baththuluoya (209 MT), Puththalam (183 MT) and Palakuda (126 MT). Very little maldive fish production is reported in the district.

Table 15. Annual dried fish production in the Chilaw District, by FI Division

| Chilaw | | |
|------------------|-----------------------------------|-------------------------------------|
| FI Division | Annual Dried fish production (kg) | Annual maldive fish production (kg) |
| Wennappuwa South | 264,000 | DNA |
| Wennappuwa North | 336,000 | DNA |
| Naththandiya | DNA | DNA |
| Maha wewa West | 45,000 | DNA |
| Maha wewa South | DNA | DNA |
| Maha wewa Center | 95,000 | DNA |
| Maha wewa North | 51,000 | DNA |
| Chilaw South | 240,000 | DNA |
| Chilaw Town | 180,000 | DNA |
| Chilaw North | 300,000 | DNA |
| Arachchikattuwa | 690,000 | DNA |

Arachchikattuwa is the major dried fish producing area in the Chilaw District (690 MT), followed by Wennappuwa North (336 MT), Wennappuwa South (264 MT), Chilaw South (240 MT) and Chilaw Town (180 MP). No production of maldive has been reported in the district.

1.5 Eastern Province

Annual production of dried fish and maldive fish in the 3 districts of the Eastern Province are given in table 16.

Table 16. Production of fresh fish and died fish in the Eastern Province, by coastal District

| Eastern Province | | | | | |
|------------------|---------------------|---------------------------|-----------------------------|-----------------------------------|-------------------------------------|
| District | No. of FI divisions | No. of fishing households | Annual fish production (kg) | Annual dried fish production (kg) | Annual maldive fish production (Kg) |
| Trincomalee | 13 | 23,277 | 42,980,771 | 2,207,474 | 10,000 |
| Batticaloa | 03 | 3959 | 3,502,970 | 150,000 | 2700 |
| Kalmunai | 11 | 7600 | 5,112,500 | 59,100 | 14,400 |
| All | 27 | 34,836 | 53,406,297 | 7,692,552 | 117,100 |

Of the three districts, Trincomalee produces the highest quantity of dried fish (2,207 MT), which is in fact, the highest reported quantity among all the coastal districts in the country. Kalmunai reports the highest maldive fish production of 14 MT per year, while Trincomalee has reported 10 MT and Batticaloa 2.7 MT of maldive fish production.

Tables 17, 18 and 19 give dried fish and maldive fish production by FI division in all 3 districts of the Eastern Province.

Table 17. Annual dried fish production in the Trincomalee District, by FI Division: North Western Province

| Trincomalee | | |
|-----------------------|-----------------------------------|-------------------------------------|
| FI Division | Annual Dried fish production (kg) | Annual maldive fish production (kg) |
| Trincomalee- North-01 | 99,452 | DNA |
| Trincomalee- North-02 | 10,000 | DNA |
| Kuchchaweli- North | 800,000 | DNA |
| Kuchchaweli-South | 50,000 | DNA |
| Trincomalee Town- 01 | 5,000 | DNA |
| Trincomalee Town- 02 | 5,000 | DNA |
| Trincomalee West | 4,000 | DNA |
| Kinniya | 724,022 | 10,000 |
| Muthur | 500,000 | DNA |
| Echchlampaththu | 10,000 | DNA |
| Seruwila | DNA | DNA |

Two FI Divisions of the Tincomalee District, namely Kuchchaweli North and Kinniya produce the highest number of dried fish annually; Kuchchaweli 800 MT and Kinniya

724 MT. This is followed by Trincomalee North (99 MT) and Muthur (50 MT). Kinniya also reports an annual maldive fish production of 10 MT.

Table 18. Annual dried fish production in the Kalmunai District, by FI Division

| Kalmunai | | |
|-----------------|-----------------------------------|-------------------------------------|
| FI Division | Annual Dried fish production (kg) | Annual maldive fish production (kg) |
| Kalmunai tamil | 2,000 | 1,000 |
| Kalmunai Muslim | 10,000 | 150 |
| Sainthamardhu | 20,000 | 100 |
| Karativu | 9,000 | 150 |
| Ninthawur | 4,100 | DNA |
| Addalaichennai | 3,400 | 4,000 |
| Akkarepattu | 500 | DNA |
| Alayandiwanda | DNA | DNA |
| Thirukkovil | 3,000 | DNA |
| Pottuvil 1 | 4,900 | DNA |
| Pottuvil 2 | 2,200 | 9,000 |
| | | |

Only 3 FI Divisions of the Kalmunai district produce more than 9 Mt of dried fish annually; Sainthamardhu (20 MT), Kalmunai Muslim (10 MT) and Karativu (9 MT). Maldive fish production is reported by Kalmunai Tamil (1 MT), Addalaichchenai (4 MT) & Pottuvil (9 MT) FI Divisions.

Table 19. Annual dried fish production in the Batticaloa District, by FI Division

| Batticaloa | | |
|------------------|-----------------------------------|-------------------------------------|
| FI Division | Annual Dried fish production (kg) | Annual maldive fish production (kg) |
| Valaichenai West | 112,000 | 2,700 |
| Valaichenai East | 35,000 | DNA |
| Vaharai South | 30,000 | DNA |

In the Batticaloa district, only Valachchenai produces a considerable quantity of dried fish (112 MT), revealing the less popularity of dried fish production in the Batticaloa district. Vlachchenai also produces 2.7 MT of maldive fish.

1.6 Comparison of dried Fish production among coastal districts

Annual dried fish production in Sri Lanka by coastal district is shown in figure 1. Except for Matara, no coastal district in both Southern and Western provinces produce more than 1,000 MT of dried fish. In the Northern Province only Jaffna produces more than 1,000 MT, while both coastal districts, both Puttalam and Chialw produce more than 2,000 MT annually. The highest annual production of dried fish is reported by the Trincomalee district, which is in excess of 7,000 MT per year,



Figure 1: District-wise annual dried fish production (Kg)

1.7 Comparison of maldive Fish production among coastal districts

Unlike dried fish, maldive fish production is recorded only by few districts and FI Divisions in the country. In contrast to dried fish, maldive fish is not produced in all districts of the country. Information furnished by the ADs reveal that maldive fish is produced only in 8 of the 15 coastal districts of the country; Matara, Galle, Hambantota, Kalutara, Puttalam, Batticalo, Kalmunai, Trincomalee, which belong to only 4 provinces of the country; Southern,

Western, North Western and Eastern. Maldivian fish production is generally practiced in the Southern province, especially in the Hambantota and Matara districts and very little production is reported from the Northern and Eastern provinces. It is worthy of note that Northern and Eastern Provinces are the traditional homeland for the Tamil people in the country!

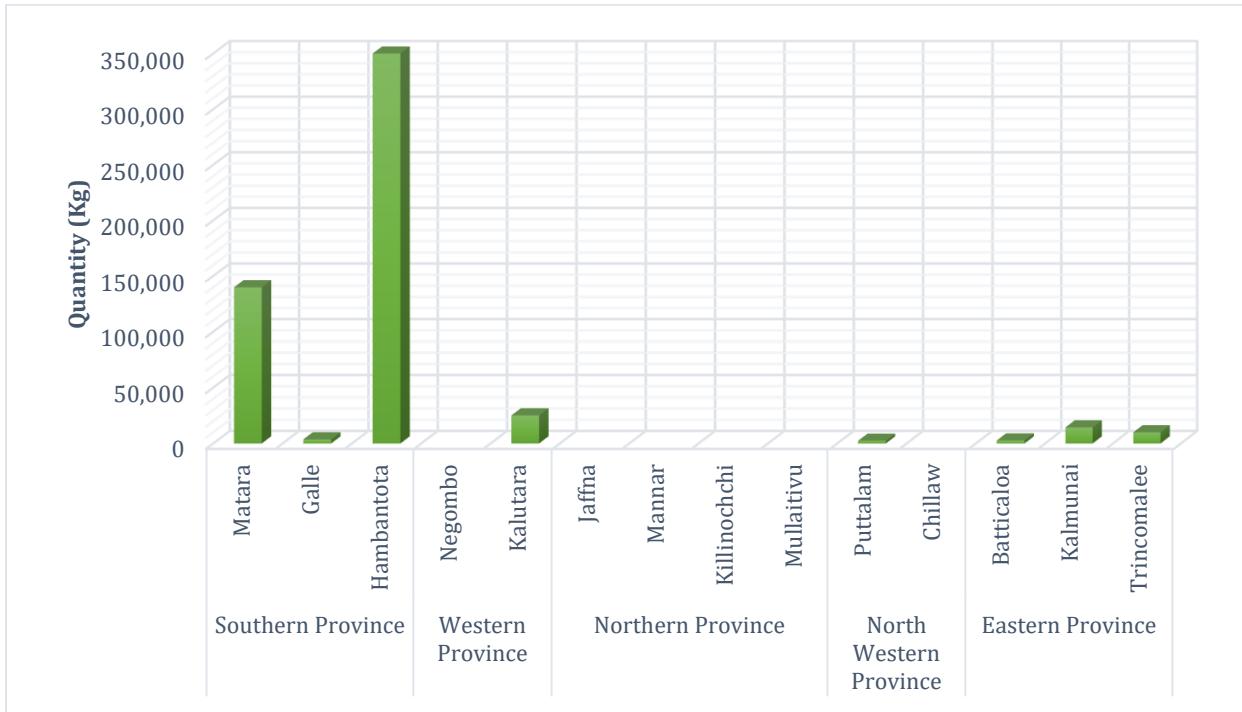


Figure 2: District-wise annual maldivian fish production (Kg)

2. Labour use

Fisheries sector has long been considered a male domain, signifying a sense of adventure and risk valued by men but from which women are often excluded. Direct fishing by women is very rare in Sri Lanka. However, fishing related roles played by women are not recognised and appreciated in the country, and they are supposed to take care of the children and shoulder household responsibilities. One of the traditional household activities of women fisher folk in Sri Lanka has been the processing of fish into dried fish, maldivian fish and salted fish, of which the two former are practiced more commonly. Dried fish processing and small-scale trading, form the major employment activity in coastal villages for women fisher folk and other marginalized groups, which earn them supplementary incomes. In fact, for many fishing villages, where dried fish processing is widely practised, it has become a way of life for the women, indicating its high social value within the fishing communities

Today, both men and women are involved in dried fish and maldivian fish making (table 20). In respect of labour use, it is to be noted that available information does not facilitate a clear

division of processing establishments into household, small scale and medium to large scale units. It can however be safely assumed that, the missing information belong to household production which generally evades processes of information collection. Thus, this study does not attempt at disaggregating data based on scale.

Table 20. Labour involvement in dried fish and *maldiva* fish production

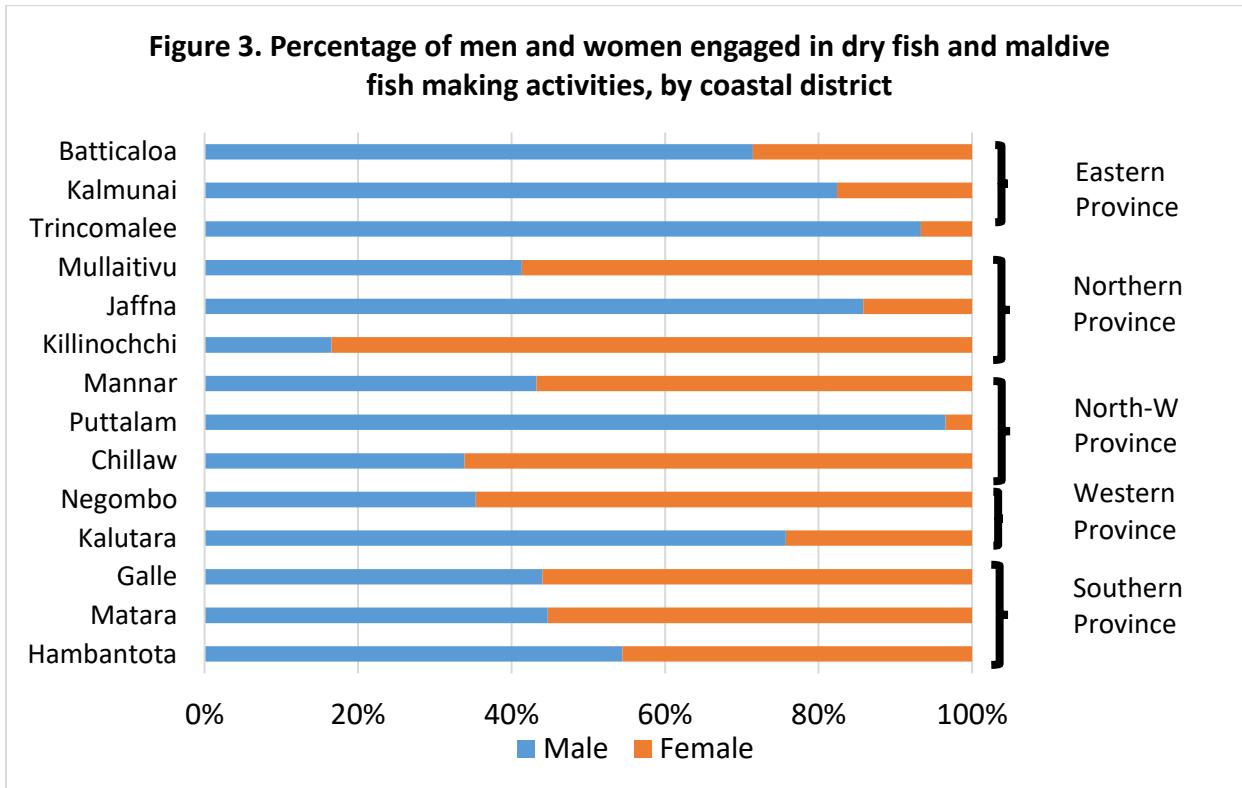
| | District | Dried Fish Production | | | Maldiva fish Production | | |
|-------------------------------|--------------|-----------------------|-----------------------|--------------------|-------------------------|-----------------------|--------------------|
| | | No. of men involved | No. of women involved | Male: Female ratio | No. of men involved | No. of women involved | Male: Female ratio |
| Southern Province | Galle | 22 | 28 | 1:1 | 7 | 13 | 1:2 |
| | Matara | 280 | 346 | 1:1 | 277 | 383 | 1:1 |
| | Hambantota | 490 | 410 | 1:1 | 433 | 433 | 1:1 |
| Western Province | Negombo | 1193 | 2182 | 1:2 | DNA | DNA | |
| | Kalutara | 78 | 25 | 3:1 | 6 | 12 | 1:2 |
| Northern Province | Jaffna | 8995 | 1486 | 6:1 | DNA | DNA | |
| | Mannar | 225 | 295 | 1:1 | DNA | DNA | |
| | Killinochchi | 38 | 192 | 1:5 | DNA | DNA | |
| | Mullaitivu | 1180 | 1675 | 1:1 | DNA | DNA | |
| North-Western Province | Puttalam | 12,256 | 437 | 28:1 | 4 | 18 | 1:4 |
| | Chillaw | 285 | 556 | 1:2 | DNA | DNA | |
| Eastern Province | Batticaloa | 100 | 40 | 2:1 | 25 | 10 | 2:1 |
| | Kalmunai | 117 | 25 | 5:1 | 11 | 3 | 4:1 |
| | Trincomalee | 280 | 20 | 14:1 | 4 | DNA | |

With the entry of business interests into fish processing, dried fish and maldiva fish making, which remained a domestic activity is now gradually getting concentrated in the hands of an investing class. Small and medium scale industries are now found in many parts of the country. This does not mean that there were no commercial ventures earlier. For example, in Kalpitiya of Puttalam District and Kiniya of Puttalam District, commercial production of dried fish has a long history. But, such ventures in the southern province (ex. Kudawella of Hambantota District) are quite recent. Along with the entry of business ventures a shift from labour use, from female to male labour is evident.

Figure 3 shows the proportion of male and female labour in dried fish production in all coastal districts.

Female labour is still dominant in the southern province due to the fact that the province's dominant mode of production is household-based. This form of production is also dominant in Negombo of the Western Province, with female employment exceeding male employment. The same is true for both districts of the North Western Province and Kilinochchi and Mullativu of the Northern Province. Fish processing is carried out at a commercial scale mainly in the Puttalam and Trincomalee Districts,

where employment is extremely biased towards male labour. The shift in gender in the processing industry has several implications for women empowerment and wellbeing of small scale fishing communities. The shift of dried fish making from a household activity carried out by women towards commercial enterprises aiming at profits, means a loss of female employment, especially in predominantly Buddhist communities where women do not get involved in fishing and beach based activities, and loss of supplementary incomes for low income families, threatening their wellbeing.



3. Fish drying technology

Only sun drying is practiced in all districts of the country, although the use of dryers by few individuals has been reported. This quite surprising because dryers have been developed by various organisations and distributed among communities in the past. The reasons could be either the high initial cost of adoption, high cost of maintenance or just inefficiency of the drying technology.

As revealed by information furnished in table 21, none of the districts had reported that sun drying was 'bad'. As reported by many districts, sun drying was considered as a 'good' method of drying fish. However, it should be noted that these assessments are made from the point of view of Assistant Directors of Fisheries.

Table 21. Assessment of Sun Drying as a method of drying fish

| | District | Method/s use for fish drying | Assessment on the efficiency of the method/s | | | | |
|-------------------------------|--------------|------------------------------|--|------|---------|-----|----------|
| | | | Very good | Good | Neutral | Bad | Very bad |
| Southern Province | Galle | Sun drying | | | | | |
| | Matara | Sun drying | | | | | |
| | Hambantota | Sun drying | | | | | |
| Western Province | Negombo | DNA | | | | | |
| | Kalutara | DNA | | | | | |
| Northern Province | Jaffna | DNA | | | | | |
| | Mannar | Sun drying | | | | | |
| | Killinochchi | Sun drying | | | | | |
| | Mullaitivu | Sun drying | | | | | |
| North-Western Province | Puttalam | Sun drying | | | | | |
| | Chillaw | Sun drying | | | | | |
| Eastern Province | Batticaloa | Sun drying | | | | | |
| | Kalmunai | Sun drying | | | | | |
| | | Smoking | | | | | |
| | Trincomalee | Sun drying | | | | | |

4. Marketing of dried fish

About 75 percent of the dried fish products are sold to wholesalers and the rest to retailers. In case of household production of dry fish the merchants visit the producing households. This is generally true with southern communities where the majority of dry fish production rests with women fisherfolk. The large scale producers have their own wholesale buyers with whom they have diverse arrangements. Marketing does not take the form of auctions. This is the case areas such as Negombo, Kalpitiya, Kniniya, etc. Due to the poor quality of products and the absence of competition among merchants, the bargaining power of small scale producers vis-à-vis merchants is rather weak, and they often complain that they do not receive a fair price. On the part of the merchants, who enjoy oligopsonistic buying powers, are able to collude and decide on buying prices more favourable to them (Amarasinghe 2020).

Information provided in table 22 show the movement of dried fish, from producing areas to the consumption areas of the country.

Table 22. Marketing of dried fish (wholesaling)

| | District | No. of wholesale centers | Major destinations of dried fish produced in the district |
|------------------------|--------------|--------------------------|--|
| Southern Province | Matara | DNA | Kandy, Colombo, Kurunegala, Hambantota, Ampara, Kalmunai, Trincomalee, Monaragala, Badulla |
| | Galle | DNA | DNA |
| | Hambantota | 20 | DNA |
| Western Province | Negombo | 14 | DNA |
| | Kalutara | 06 | DNA |
| Northern Province | Jaffna | DNA | <i>None*</i> |
| | Mannar | 131 | Kandy, Colombo, Kurunegala, Anuradhapura, Batticaloa, Killinochchi |
| | Killinochchi | 23 | |
| | Mullaitivu | DNA | Kandy, Puttalam, Negombo, Vavuniya, Anuradhapura |
| North-Western Province | Puttalam | 39 | Kandy, Colombo, Gampaha, Anuradhapura |
| | Chillaw | 23 | Kandy, Colombo, Kurunegala, Gampaha, Puttalam, Galle |
| Eastern Province | Batticaloa | 18 | Kandy, Colombo, Polonnaruwa, Ampara, Kinniya |
| | Kalmunai+ | 11 | Kandy, Colombo, Kurunegala, Kalutara, Monaragala, Badulla |
| | Trincomalee | 5 | Kandy, Colombo, Kurunegala, Polonnaruwa, Nuwara-Eliya |

* Production is insufficient for trade outside the district

It is interesting note that almost all producing areas send dried fish to Colombo, Kandy and Kurunegala, and to Anuradhapura to a lesser extent, all of which appear to be the largest dried fish consuming areas.

It is also of interest to note that, some producing areas send dried fish to other producing areas, which could probably be attributed to differences in the type of dried fish produced or, the larger producers sending suppliers to smaller producers (see table 23).

Table 23. Movement of dried fish, among producing areas

| Province | District | Major destinations which are dried fish producing districts |
|-------------------------------|-----------------|--|
| Southern Province | Matara | Hambantota, Kalmunai, Trincomalee, |
| | Galle | DNA |
| | Hambantota | DNA |
| Western Province | Negombo | DNA |
| | Kalutara | DNA |
| Northern Province | Jaffna | |
| | Mannar | Batticaloa, Killinochchi |
| | Killinoch+chi | |
| | Mullaitivu | Puttalam, Negombo, |
| North-Western Province | Puttalam | |
| | Chillaw | Puttalam, Galle |
| Eastern Province | Batticaloa | Trincomalee |
| | Kalmunai | |
| | Trincomalee | Negombo |

5. Status of dried fish market in the Districts

In general, both the competition among middlemen and the producer prices are considered as either good or neutral (table 24). However, these results, reported by the ADs are highly subjective, and needless to say that the best assessment of both these variables can only be made by the dried fish producers. Yet, the assessment of both market competition and prices as 'neutral' also shows the imperfections in information available to the ADs to make such an assessment.

Table 24. Middlemen competition and prices in the dried fish marketing

| | | District++ | Status of dried fish market in the Districts | | | | | Producer Price | | | | |
|------------------------|--------------|------------|--|------|---------|-----|----------|----------------|------|---------|-----|----------|
| | | | Very Good | Good | Neutral | Bad | Very bad | Very Good | Good | Neutral | Bad | Very bad |
| Southern Province | Galle | | | | | | | | | | | |
| | Matara | | | Red | | | | | | Red | | |
| | Hambantota | | Red | | | | | | | | | 9Ta |
| Western Province | Negombo | | | | | | | | | | | |
| | Kalutara | | | | | | | | | | | |
| Northern Province | Jaffna | | | | | | | | | | | |
| | Mannar | | | | | | | | | | | |
| | Killinochchi | | | Red | | | | | Red | | | |
| | Mullaitivu | Red | | | | | | Red | | | | |
| North-Western Province | Puttalam | Red | | | | | | | Red | | | |
| | Chillaw | | | Red | | | | | Red | | | |
| Eastern Province | Batticaloa | | Red | | | | | | | | | |
| | Kalmunai | | | Red | | | | | | Red | | |
| | Trincomalee | | Red | | | | | | Red | | | |

6. Community organisations related to dried fish sector

Very little information is available with the Ads, in respect of the number of organisations that are operative in dried fish producing districts. Apart from Matara reporting 21 community organisations, Mannar 6, Mullativu 5, Puttalam 111, Batticaloa 2 and Trincomalee 5, no information has been reported from other districts. The total number of such organisations (reported) is around 150 with a membership of 8,464. DNA in table 25 could be a reflection of absence of data or absence of organisations.

Table 25. Community organization related to dried fish, by coastal district

| | District | Number of community organisations related to dried fish industry | Number of members |
|------------------------|--------------|--|-------------------|
| Southern Province | Matara | 21 | 503 |
| | Galle | DNA | DNA |
| | Hambantota | DNA | DNA |
| Western Province | Negombo | DNA | DNA |
| | Kalutara | DNA | DNA |
| Northern Province | Jaffna | DNA | DNA |
| | Mannar | 6 | 470 |
| | Killinochchi | DNA | DNA |
| | Mullaithivu | 5 | 2560 |
| North-Western Province | Puttalam | 111 | 4490 |
| | Chillaw | DNA | DNA |
| Eastern Province | Batticaloa | 2 | 65 |
| | Kalmunai | DNA | DNA |
| | Trincomalee | 5 | 376 |

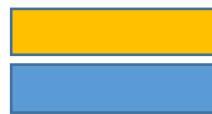
7. Major issues related to dried fish industry

The questionnaire sent to ADs also attempted at eliciting information on the various issues associated with the dried fish production. The answer given by ADs to this query is given in table 26.

Table 26. Issues related to dried fish production

| Major issues | Southern Province | | | Western Province | | Northern Province | | North Western Province | | | Eastern Province | | | |
|--|-------------------|-------|------------|------------------|----------|-------------------|--------|------------------------|------------|----------|------------------|------------|-----------|-------------|
| | Matara | Galle | Hambantota | Negombo | Kalutara | Jaffna | Mannar | Killinochchi | Mullaitivu | Puttalam | Chillaw | Batticaloa | Kalimunai | Trincomalee |
| Lack of space for fish drying | ✓ | | | | | | | | ✓ | | ✓ | | | ✓ |
| Difficulty of sun drying during the rainy days | ✓ | ✓ | | | | | ✓ | | ✓ | | | | ✓ | ✓ |
| High cost of salt | | | | | | | ✓ | | | | | | | ✓ |
| Animal attacks (flies, insects, birds) | | | | | | | ✓ | | | | | | | ✓ |
| Lack of capital/financial facilities | ✓ | | | | | | | | | | | | | ✓ |
| Absence of specific place for waste disposal | | | | | | | | | | | ✓ | | | ✓ |
| Difficulty of getting clean water for processing activities | | | | | | | ✓ | | | | | | | |
| Middleman/broker problem | ✓ | | | | | ✓ | | | | | | | | |
| Lack of awareness on new technologies of fish processing | | ✓ | | | | | | ✓ | ✓ | | | ✓ | ✓ | |
| Low consumer demand due to poor quality of the product | | ✓ | | | | | ✓ | | ✓ | | | | | |
| Inability to get fish for processing throughout the year | ✓ | | | | | | | | | ✓ | | | | |
| Lack of proper training facilities on processing | ✓ | | | | | | | | | | | | | |
| Absence of modern equipment for processing activities | ✓ | | | | | | | ✓ | | | | | ✓ | |
| Higher demand for fresh fish and difficulty to find fish for dried fish making | | | | | | | | ✓ | | ✓ | | | ✓ | |
| Poor transport facilities | ✓ | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | |
|--|---|--|--|--|--|--|--|--|---|--|---|---|---|--|
| Poor storage facilities | ✓ | | | | | | | | | | | | | |
| Absence of stable market and a stable price for the products | ✓ | | | | | | | | ✓ | | ✓ | ✓ | ✓ | |
| Poor government assistance | | | | | | | | | | | ✓ | | | |



At least 4 districts reporting the issue

At least 3 districts reporting the issue

Lack of space for fish drying, impossibility of drying fish during rainy season, lack of awareness of new technology for dried fish making and absence of a stable market with stable price, have been reported by 4 or more than 4 districts. About 3 districts have reported, low consumer demand due to poor quality of the product, absence of modern equipment for processing activities and Higher demand for fresh fish and difficulty to find fish for dried fish making as their major issues in the dried fish trade.

Suggestions proposed by ADs in resolving the above issues are given in table 27.

Table 27. Solutions suggested by ADs to overcome issues related to dried fish production

| Solutions suggested | Southern Province | | | Western Province | | Northern Province | | | North Western Province | | Eastern Province | | | |
|--|-------------------|-------|------------|------------------|----------|-------------------|--------|--------------|------------------------|----------|------------------|------------|----------|-------------|
| | Matara | Galle | Hambantota | Negombo | Kalutara | Jaffna | Mannar | Killinochchi | Mullaitivu | Puttalam | Chillaw | Batticaloa | Kalmunai | Trincomalee |
| Introduce new processing technologies instead of conventional methods | ✓ | | | | | | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ |
| Conduct awareness building and capacity building programmes for processors | ✓ | ✓ | | | | | | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Provide training and practical knowledge on fish processing | ✓ | ✓ | | | | | | | | ✓ | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Introduce methodologies/solutions to prevent wastage | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Introduce suitable methods for waste disposal | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Provide technology/facilities to make dry fish during the rainy season | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Allocate suitable space for fish drying | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Create a specific marketing strategy for products | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Government intervention to assist the processors | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Introduction of new methodologies/techniques to enhance the quality of the products | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Implement a fixed price for the products | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Strengthen community organisations in the industry | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Provide financial facilities to the processors | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Increase fish production | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |



At least 4 districts reporting the issue



At least 3 districts reporting the issue

In resolving some of the issues associated with the dried fish industry, the Ads of 4 districts and above, suggested the following strategies.

- i. the introduction of new processing technologies (change over from conventional methods),
- ii. conducting awareness building and capacity building programmes for processors,
- iii. creating a specific marketing strategy for products, while 3 districts have reported Provide training and practical knowledge on fish processing, Introduce suitable methods for waste disposal.

Ads of at least 3 districts were of the view that the following are important in resolving issues related to dried fish production.

- i. Provide training and practical knowledge on fish processing
- ii. Introduce suitable methods for waste disposal
- iii. Allocate suitable space for fish drying
- iv. Introduction of new methodologies/techniques to enhance the quality of the products
- v. Provide financial facilities to the processors

8. Summary - Key Zones of Dried Fish Production

Map 1 gives the summary of findings of Key Dried Fish Zone identification exercise. The zones are divide into three, based on the quantity of dried fish production annually: 100 – 500 MT; 500 – 1000 MT and >1000 MT. Most of the producing zones are concentrated in the Northern and North-Western Provinces. While high production niches are found in the Trincomalle, Kalutara and Matara District.

The major deficiency in the study is lack of information on the scale of production, because household production of dried, which has a strong gender dimension, were not given in district reports. None of the districts of the Eastern Province has recorded a sizeable production of dried fish.

