

# Mercury added Products and Available Alternatives in Bangladesh







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# **Executive Summary**

**M**ercury is a chemical of global significance, because of its long-range atmospheric transmission, persistence in the environment, potential to bioaccumulate in ecosystems, and major effects on human health and the environment. As a result of growing anthropogenic contamination, much of it from the intentional use of mercury in products, mercury levels in the worldwide environment have risen dramatically during the last few centuries.

Mercury containing products continue to harm the environment even for many years after they have been disposed of. Bangladesh has no specific guidelines regarding the management of such mercury containing products, or how to safely manage the uses or disposal of either products or equipment that contains mercury or mercury compounds.

The Minamata Convention is a treaty whose purpose is to protect human health and the environment from mercury emissions and releases by implementing a variety of voluntary and mandatory measures. A Party to the Convention will not be permitted to manufacture, export, or import any mercury-added product listed in Annex A, Part I of the Convention.

Bangladesh, a signatory country of the convention is yet to ratified it. To facilitate the implementation of the ratification process of the convention, Environment and Social Development Organization – ESDO initiated a study on mercury free alternative products. The study was commissioned to check the availability and the quantity of the mercury free alternatives products such as *button cell batteries*, *bulbs*, *thermometer*, *sphygmomanometer* and *switches and relays* as a means to gauge the country's preparedness to meet its obligations under the Minamata Convention for the phase out of mercury added products.

A questionnaire survey was conducted amongst retailers, traders, importers and consumers of the products. A survey was also executed on hospitals and clinics and retailers of medical devices, and a total approximate estimate was mathematically derived.

The result of the study shows that the country is ready for transition towards mercury free alternatives, since they are already readily available in the local market. Mercury-free thermometers are now widely available in the country, with a demand of 83.5%. Markets are containing around 99% mercury-free blood pressure measuring devices. The percentage of the import of mercury free switches and relays is more than 90% and same goes for mercury free lamps and batteries. In substitution for the mercury in CFL bulbs, thermometers, switches, sphygmomanometers, button cell batteries, etc., assessment and study on products reveal that we now have mercury free alternatives like mercury-free LED lamps, digital thermometers, mechanical switches, digital sphygmomanometers and lithium-zinc batteries.

There is need to shift efforts towards consumer sensitization on benefits and availability of mercury free products, as well as improving government understanding of its obligations under Minamata Convention.

# **1. Introduction** 1.1 Background

Mercury is recognized as a toxic and persistent element, and it is documented that it has serious impacts on human health and the environment. When released it is transported globally in the atmosphere and is a global problem. Due to its unique chemical properties, mercury has been used in a wide range of products over the years, but currently, most of it is used in electrical and electronic devices, switches (including certain thermostats) and relays, measuring and control equipment, energy-efficient fluorescent light bulbs, paints, batteries and dental amalgam, laboratory equipment, cosmetics, pharmaceuticals, and jewelry items<sup>1</sup>.

These items release mercury into the environment when broken or improperly disposed of. If spilled, mercury absorbs into many materials while slowly evaporating into the air over time, allowing for exposure. According to MIA<sup>2</sup>, 32,660 kg mercury is released into the environment in Bangladesh from all mercury-added products and anthropogenic sources each year.

To reduce the risk from anthropogenic mercury releases to human health and the environment, the UNEP governing council decided in 2009 to develop a global legally binding convention on mercury. The Minamata Convention on Mercury is a global agreement to protect human health and the environment from the adverse effects of mercury. The text of the Convention was adopted by the conference of the delegates, including Bangladesh on 10 October 2013 in Japan. The convention later entered into force on 17<sup>th</sup> August 2017. The Convention calls on parties to control and reduce mercury emissions to the air, from several industries as well as certain products. The overall objective of the convention is to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds, among others, by providing controls across a range of mercury products and processes.



<sup>1</sup> <u>https://tinyurl.com/2p83r6t9</u>

<sup>2</sup> https://tinyurl.com/2p839svv

## **Background of the organization on Mercury Work**

**E**nvironment and Social Development Organization - ESDO have been working on mercury exposure to and from products containing or added mercury since March 2008. ESDO has been a strong contributor to Zero Mercury Working Group, particularly as a liaison to UNEP's mercury Product and Waste Management Partnership. ESDO move forward to create mass awareness to expose the threat and havoc of mercury in products, healthcare, industrial, and mining process. Till July 2011 ESDO's mercury phase-out campaign covered over 57 districts location. In each district, there were 5 schools chosen to be under mercury phase-out campaign where more than 800 students attended from each school. About 230,000 students were involved with the program. ESDO published a report on 'Country Situation of Mercury Sources and Hotspots in Bangladesh' in collaboration with NRDC and Zero Mercury Working Group in 2012.

## **Specific Study Objectives**

Provide information on the availability of specific mercury-free products in Bangladesh, based on existing studies, literature review, in-country information from relevant stakeholders and data collection.

Investigate specific products listed in Article 4 of Annex A part 1 of the Convention and inform on quantities of imported mercury-free products, their sources

## **1.2 Fate of Mercury in the Environment**

A very important phenomenon of mercury is its ability to build up in organisms and up along the food chain. All forms of mercury can be accumulated in organisms. However, methylmercury is taken up at a faster rate than other forms and bioaccumulates to a greater extent. Once in the environment, mercury can be transformed to an organic form, methyl mercury, that bio-magnifies as it moves up in the food chain in fish and wildlife, and eventually causes burdens of mercury in individuals thousands of times greater than that of background levels and potentially thousands of miles than that of the original source. Fish appear to bind methylmercury strongly; nearly 100 percent of mercury that bioaccumulates in predator fish is methylmercury. Most of the methylmercury in fish tissue is covalently bound to protein sulfhydryl groups. This binding results in a long half-life for elimination (60 days). As a consequence, there is a selective enrichment of methylmercury (relative to inorganic mercury) as one moves from one trophic level to the next higher trophic level. Fish are the main source of food for many birds and other animals, and mercury can seriously damage the health of these species. Loons, eagles, otters, mink, kingfishers and ospreys eat large quantities of fish. Because these predators rely on speed and coordination to obtain food, mercury may be particularly hazardous to these animals. Finally, human consumption of seafood is likely the most important route of exposure to mercury for most people.

# **1.3. Minamata Convention**

**D**ue to mounting evidence of mercury's harmful effects on human health and the environment, governments decided in 2009 to begin negotiating a legally enforceable document on mercury under the auspices of the UN Environment Programme, opening the way for an international treaty.

The Minamata Convention on mercury was signed in 2013 by 128 countries including Bangladesh. Till now 135 parties have ratified the convention. The convention draws attention to a globally important and widely used metal that, while naturally occurring, has a wide range of applications in daily products and is emitted into the atmosphere, soil, and water from several sources. Controlling anthropogenic mercury leaks throughout its lifespan has been a crucial aspect in determining the Convention's commitments.

The Convention, therefore, includes a range of measures to reduce global mercury pollution by reducing mercury supply and demand and minimizing releases and emissions of mercury.

# 2. Situation Analysis

### **2.1 Mercury Added Products and Bangladesh Status**

The Convention (Article 2(f)) defines a mercury-added product as a "product or product component that includes mercury or a mercury compound that was purposefully added." The Convention's definition is broad, aiming to include any items to which mercury was introduced during the manufacturing process to offer a specified function or feature.

This section provides information on the current situation of Bangladesh regarding mercury-added products, and linkages between them. Among the mercury-added products under Part I of Annex A, we decided to focus on the five following products:

- ✤ Batteries
- Switches and relays
- ✤ Lamps and bulb
- Sphygmomanometer
- Thermometers

Bangladesh relies on imports of various commodities, raw materials, and manufactured goods which include mercury-added products. Those mercury-added products were mostly electric and electronic devices and medical devices. But right now, the scenario has changed. Importers are importing mercury-free alternatives because of their efficiency and eco-friendliness. As a result. Mercury alternative products are widely available on the market and are within people's reach.

Besides, consumers are preferring alternative products as they are available at the market plus, they are long-lasting, save energy about 90% and don't harm the environment in any way. This information of mercury-added products has been gathered by ESDO's field survey and DoE's MIA assessment report within the timeline 2018 to June 2019.

#### 2.1.1 Data on Mercury-added Thermometer

Mercury expands and contracts uniformly with temperature and pressure variations because it is the only metal that is liquid at ambient temperature. Mercury's properties have made it helpful in devices used to measure temperature and pressure.

Source/Origin	Main Market	Quantities	Quantities	Estimated Hg
	Segment	Produced/Imported	Disposed	input, Kg
	Supplied	(piece)	(piece)	Hg/y
China	Hospitals and clinics (Govt. and private)	4,771,428	3,340,000	2338

Source: Retailers and Suppliers, ESDO's updated Survey on 60 Hospitals among around 6,000 Hospitals and clinics. This information has been gathered up to June'19

Mercury thermometers are not manufactured in Bangladesh rather they are being imported mainly from China. Around 4,771,428 pieces are being imported of which 3,340,000 pieces are being deposited causing harm to our environment and public health. These thermometers are mostly distributed to government and private hospitals and clinics.

#### 2.1.2 Data on Mercury-added Lamps

In Bangladesh, there has been a significant increase in demand for compact fluorescent lights (CFL) across the country, particularly through the Efficient Lighting Initiative of Bangladesh (ELIB) and Solar Home System (SHS) programs.

Source/Origin	Main Market Segment Supplied	Quantities Produced/Imported (piece)	Quantities Disposed (piece)	Estimated Hg input, Kg Hg/y
China, India	Households, private companies, Hospitals, Govt. facilities, etc.	35,292,739	29,998,828	382

Source: Retailers and Suppliers, Ministry of Commerce (Bangladesh), Bangladesh CFL Bulb Importers, Buyers and Distributors, Bangladesh Electrical Merchandise Manufacturers Association. This information has been gathered up to June'19.

CFL adoption has expanded quickly, with annual sales of roughly 15-20 million pieces predicted in 2013-2014. According to a survey conducted by the Environment and Social Development Organization (ESDO), the lifespan of a CFL light bulb is between 1 and 18 months, and the average customer consumes at least 3 CFL light bulbs each year<sup>3</sup>.

As mention in the ESDO 2020 survey report, according to waste concern study, in 2018, annually 25.64 million bulbs including locally manufactured and imported are generated from which only 5 million are recycled while the rest 20.5 million are dumped into the environment.<sup>4</sup>

<sup>&</sup>lt;sup>3</sup> shorturl.at/jHOP3

<sup>&</sup>lt;sup>4</sup> <u>https://wasteconcern.org/workshop-on-environmentally-sound-management-of-mercury-containing-lighting-sources/</u>

Source/Origin Band and Type	Main Market Segment Supplied	Quantities Produced/Imported (piece)	Quantities Disposed (piece)	Estimated Hg input, Kg Hg/y
China Infinity and Traditional Desk Type Mercury Sphygmomanometer	Hospitals and clinics (Govt. and private)	16500	12000	960
Japan ALPK2, Aneroid	Importers and Retailers *2018-19 years	9,30,000	0	0

#### 2.1.3 Data on Mercury-added Sphygmomanometer

Data Source: Retailers and Suppliers, ESDO's updated Survey on 60 Govt. Hospitals among around 6,200 private hospitals and clinics. Total estimation is mathematically derived and approximate.)<sup>5</sup>. This information has been gathered up to June'19.





Fig: Infinity Mercury Blood Pressure

Fig: Traditional Desk Type Mercury Sphygmomanometer

#### 2.1.4 Data on Mercury-added Batteries

Button cell batteries are not manufactured at an industrial scale in Bangladesh but are mostly imported from China and India.

Source/Origin	Main Market Segment Supplied	Quantities Disposed (t batteries sold/y)	Estimated Hg input, Kg Hg/y
	Households, private companies,		
China, Bangladesh	Hospitals, Govt. facilities, etc.	133	147

Data Source: Retailers and Suppliers, Ministry of Commerce (Bangladesh), Bangladesh Cosmetics & Toiletries Manufacturers Association. This information has been gathered up to June'19.

<sup>&</sup>lt;sup>5</sup> shorturl.at/wxNX9

Mercury in batteries is used to prevent a buildup of hydrogen gas that can cause the battery to bulge and leak. Mercury has also been used as an electrode in mercuric oxide batteries.

#### 2.1.5 Data on Mercury-added Switches and Relays

Several kinds of electrical switches contain mercury. These include:

- ➢ Tilt switches, Float switches,
- ➢ Thermostats,
- Relays that control electronic circuits

Source/Origin	Main Market Segment Supplied	Quantities Produced/Imported (piece)	Quantities Disposed (piece)	Estimated Hg input, Kg Hg/y
China, Bangladesh	Households, private companies, Hospitals, Govt. facilities	211,402,469	171,236,000	1404

(Data Source: Retailers and Suppliers, Ministry of Commerce (Bangladesh), Bangladesh Importers Association, Bangladesh Electrical Merchandise Manufacturers Association.). This information has been gathered up to June'19.

According to the study, Bangladesh has very little industrial production of electrical switches and relays, and these electrical parts are largely imported.

# **3. Methodology**

# **3.1 Study Approach**

The study was undertaken by a team of in-house personnel at ESDO. However, the study benefited greatly from the input and guidance of a project steering committee. The study is a part of the ZMWG NGO's wider projects. The study, therefore, took the following approach:

#### **Pre-Inception**

- Sharing of project activities and plans with the Project Support Group (PSG)
- Preparation of Data Collection tools and sharing with PSG for Input
- Finalization of Data collection Tool

#### **Data Collection Phase**

- Identification of Possible Data Sources
- Recruitment and training of Research assistants on the data collection tool
- Field data Collection

#### **Delivery Phase**

- Collation of Field data
- ✤ Data analysis and interpretation
- Draft Report Preparation
- Validation of draft report
- Final report Preparation

# **3.2 Methodology Used**

The study was undertaken by ESDO team members. Its focus is to collect information about mercury-free devices such as *digital thermometers* and *blood pressure machines, mercury-free switches and relays, bulbs* and *batteries*.

#### **Desk Study/Literature Review**

This entailed the review of various import/export data for mercury-added and mercury-free products in the country. The data was collected from government sources such as statistical abstracts, import/export data from the various ports of entry, as well as other similar studies in the country.

#### Surveys

Moreover, data were collected using semi-structured questionnaires. The survey is up to 18<sup>th</sup> October to 13<sup>th</sup> November 2021 and was conducted among 450 retailers, 5 importers and 5 whole sellers (only in Dhaka) and 1350 consumers in 18 districts of Bangladesh. The districts are Dhaka, Gazipur, Mymensingh, Faridpur, Tangail, Sirajganj, Comilla, Chattogram, Feni, Sylhet, Rajshahi, Bagura, Rangpur, Dinajpur, Pabna, Jessore, Khulna and Barisal.

#### **Key Informant Interviews**

Key informant interviews were held with key manufacturers/assemblers in case of lamps; importers and association of automobiles in case of switches and bulbs to ascertain their sources, and quantities used, as well as the preference factors determining the type of product used.

### **3.3 Study Limitation**

**D**ata from the sources are not significantly updated on mercury-free products. The willingness of some traders is not adequate in providing information. In some cases, some data were needed to be purchased from importers.



# **Mercury Free Alternatives**

#### 3.3 Summary of the survey findings

The study's findings were very positive, as it was discovered that mercury-free alternatives were widely available on the market. Digital thermometers and blood pressure devices were seeming to be available in hospitals, pharmacies and clinics. Mercury added batteries, switches and relays are not being produced in Bangladesh. Mercury-free batteries, lamps, switches and relays are being imported. According to the market survey, mercury-free LED lamps have created demand due to their efficiency and energy-saving quality.

# **3.4 Data on Mercury-Free lamps**

Different questions were asked to 450 bulb retailers and the feedback given below: -

How many CFL Bulb do you sell monthly?	<5	>5-<10	>10-<20	>20	Don't Sell
Frequency (CFL)	221	0	0	0	229
How many LED Bulb do you sell monthly?	<5	>5-<10	>10-<20	>20	
Frequency (LED)	6	9	23	412	0
Which kind of Bulb demand most to	CFL	LED			
the customers?					
Frequency	93	358			
Is LED bulb supply available to you?	Frequently	Occasionally	Hard to get		
Frequency	443	7	0		
Price comparison	CFL	LED	Others		
Frequency (what they consider as lower price)	227	217	6		

How much the cost (by 5-100 watt) of	CFL <sup>6</sup>	LED <sup>7</sup>	Fluorescent	LED tube <sup>9</sup>	
bulb of-			Tube <sup>8</sup>		
Price (Per Piece)	25-270	21-650	249-700	199-800	

It is very prominent from the data above those LED lamps are more sold-out items every month compared to the CFL lamps according to the bulb retailers. But the number of sales partially depended on the position and location of the shops in each specific area. But almost all of them are agreed that the demand for CFL bulbs is declining dramatically and it will go ground zero soon. Some retailers informed that they do no longer sell CFL bulbs. Therefore, LED bulb supply is more frequent compare to others. Even in the case of the price difference, the price gap of these bulbs is now smaller and consumers prefer using the LED bulb due to its low consumption criteria.



Fig 3: Comparison between CFL and LED selling frequency by the retailers (monthly)

<sup>&</sup>lt;sup>6</sup> <u>https://sindabad.com/electrical-lighting/lights-lighting-accessories/bulbs-lamps/cfl.html</u>

<sup>&</sup>lt;sup>7</sup> https://www.daraz.com.bd/products/led-ac-5-i199181799-s1146577744.html?spm=a2a0e.searchlistcategory.list.54.25e81c50qeS0Qn&search=1

<sup>&</sup>lt;sup>8</sup> https://www.daraz.com.bd/products/10w-t8-fluorescent-tube-light-1ft-hitachi-i144896836.html

<sup>&</sup>lt;sup>9</sup> <u>https://www.daraz.com.bd/products/led-10watt-economy-batten-tube-light-1feet-white-i122940890.html</u>



Fig 4: Most retailers opinion on the cheaper bulb



Fig 5: Comparison of LED and CFL bulbs on demand by the opinion of retailers.

Different questions were asked to the *10-bulb producer/importer/whole seller* and the feedback given below:

Monthly how many CFL bulbs do you	<1000	>1000-	>5000-	>10000	India	China
import annually and from which country?		<5000	<10000			
Frequency	0	10	0	0	2	8
Are the CFL bulbs made in Bangladesh?	Yes	NO	Don't know			
If so, the number of producers and yearly			exactly			
production?						
Frequency	1	4	5			
Annually how many LED bulbs do you	<1000	>1000-	>5000-	>10000	India	China
import and from which country?		<5000	<10000			
Frequency	2	1	3	4	1	9
Are the LED bulbs made in Bangladesh?	Yes	No	Don't know			
If so, the number of producers and yearly			exactly			
production?						
Frequency	2	3	5			
Does the supply of CFL bulb available to	Plentif	Medium	Occasionall			
you regularly?	ul		У			
Frequency	1	2	7			
Does the supply of LED bulb available to	Plentif	Medium	Occasionall			
you regularly?	ul		У			
Frequency	8	1	1			
What is market price of CFL, LED and	CFL	LED	Fluorescent			
Fluorescence Tube bulbs to the retailer?			Tube			
BDT (whole sale per piece)	20-40	30-50	100-150			

Maximum of the importer/whole seller opinioned that CFL bulb they imported mostly from China and some from India. In addition, they trade the highest amount of LED bulbs in Bangladesh compare to CFL bulbs. The annual trade range of LED bulb is between 5000 to 10000 but in the case of CFL, the number is between 1000-5000 only. So, it is prominent that, the importers/whole seller also produces/assembles less amount of CFL bulb due to customer few demands. Also, the supply of LED bulbs to Bangladesh is much higher than CFL bulbs.

The whole sell price of the CFL bulb was the cheapest compared to the LED and Tube light to the retailers but nowadays the price difference of CFL and LED has become pretty small. As consumers are demanding LED compact bulbs and LED tube lights because of their energy efficiency and eco-friendliness, which is why these bulbs are being imported mostly rather than CFL and fluorescent tube light.



Fig 6: Supply trend of LED bulb opinioned by the bulb producer/importer/whole seller

## **3.5 Data on Mercury-Free Batteries**

Different questions were asked to the *450 button cell battery retailers* and the feedback was given below:

How many mercury button cell batteries do you	<5	>5-<10	>10-<20	>20
sell monthly?				
	450	0	0	0
Frequency	450	U	U	U
How many lithium button cell batteries do you	<5	>5-<10	>10-<20	>20
sell monthly?				
Frequency	76	359	15	0
How many non-miniature Alkaline button cell	<5	>5-<10	>10-<20	>20
batteries do you sell monthly?				
Frequency	20	407	23	0
Which kind of button cell batteries demand most	Mercury	Lithium	Alkaline	
to the consumers?				
Frequency	30	132	288	
What sorts of button cell batteries are cheaper?	Mercury	Lithium	Alkaline	
Frequency	160	212	78	
How much the cost of button cell batteries of	Mercurv	Lithium	Alkaline	
1 5V in size				
1.5 V In size-				
BDT	35-50tk	55-70tk	75-90tk	

From the upper table it is very clear that alkaline button cell batteries sold out most by the retailers in the specific two areas. Secondly mercury button cell battery is the least popular now a days to the customers. Therefore, transparently we can state that alkaline and lithium button cell batteries popularity going up gradually. In term of price of the button cell batteries, most of the retailers stated that lithium and mercury batteries are cheaper compare to the alkaline.



Fig 7: Number of retailer's opinion regarding the cheap battery

Different questions were asked to the *10-button cell battery Importer/ Wholesalers* and the feedback given below:

Yearly how many mercury	<1000	>1000-	>5000-<10000	>10000	Country	
button cell batteries do you		<5000				
import and from which						
country?						
	0	0	0	0	Smuggle	d from
					neighbo	oring
					country	(India,
					Myanı	nar)
Are the mercury button cell	Yes	NO	Don't know			
batterie made in Bangladesh?			exactly			
If so, numbers of producer						
and yearly production?						
	1	5	4			
Annually how many Lithium	<1000	>1000-	>5000-<10000	>10000	Country	China
button cell batteries do you		<5000				
import and from which						
country?						
	E	2	2	0		10
	5	3	2	U		10
Are the Lithium button cell	Yes	NO	Don't know			
batterie made in Bangladesh?			exactly			
If so, numbers of producer						
and yearly production?						
	0	1	6			
	U	4	0			
Annually how many non-	<1000	>1000-	>5000-<10000	>10000	Country	China
miniature Alkaline button cell		<5000				

batteries do you import and					
from which country?					
	6	1	3	0	10
Are the Alkaline button cell	Yes	NO	Don't know		
batterie made in Bangladesh?			exactly		
If so numbers of producer			j		
and yearly production?					
	1	8	1		
Does the supply of mercury	Plentiful	Medium	Occasionally		
button cell batteries available					
to you regularly?					
	1	1	0		
	1	1	ð		
Does the supply of Lithium	Plentiful	Medium	Occasionally		
button cell batteries available					
to you regularly?					
	1	8	1		
	•	•	•		
Does the supply of Alkaline	Plentiful	Medium	Occasionally		
button cell batteries available					
to you regularly?					
	7	2	1		
What is market price of	Mercury	Lithium	Alkaline		
Mercury, Lithium, and					
Alkaline button cell batteries					
of 1.5V to the retailer?					
BDT	20-40tk	40-60tk	60-80tk		

Most of the button cell importers/wholesalers stated that they don't import any mercury button cell batteries from abroad. Rather it is being smuggled to Bangladesh from neighboring countries such as India, Myanmar, etc. These mercury button cell batteries are smuggled through border districts such as Cox's Bazar, Teknaf, Jessore, Rajshahi, Chapainababganj, Dinajpur, etc.

On average each whole seller imports around 1000-5000 lithium batteries annually. The batteries are imported from China mainly. Alkaline batteries are most popular nowadays to the customers and the importer yearly sold out the total piece ranges between 1000-10000 and import mostly from China. Among the supply of all batteries, alkaline availability is plentiful, next to lithium and lastly mercury. Although alkaline batteries are a little expensive compared to lithium and mercury it is very popular due to their quality and eco-friendliness.



Supply of different batteries to the importers

Fig 8: Supply of different batteries to the importers



#### **Price Range Between Different Batteries**

Fig 9: Price range between different batteries

## **3.6 Data on Digital Thermometers**

Product	Usage per year	Usage per Month	Average consumption
	(pieces)	(pieces)	(percentage)
Thermometer	741,048	61,754	83.5%

Source: ESDO survey conducted from Oct – Nov'21

Before the year 2020, there was a high demand for mercury-free thermometers. However, when the country was confronted with the coronavirus pandemic, the picture changed. According to the ESDO 2020 study<sup>10</sup>, the use of digital thermometers decreased during the pandemic. Because of the low cost, people preferred mercury thermometers over digital thermometers. With the increased demand for mercury thermometers, the import of such thermometers also increased. However, digital or mercury-free thermometers are now widely available in the country, with a demand of 83.5%. The survey has been conducted in one government hospital and four private clinics.

According to the Food and Drug Administration, Govt. of Bangladesh, they have decided to phase out mercury-containing healthcare devices by 2022. That is why the purchase or usage of mercury-added thermometers has been cut down to 50% from the end of 2019. (Due to the Covid-19 pandemic, in the year 2020, an unexpected number of mercury thermometer has been imported.)<sup>11</sup>

#### 3.7 Data on Mercury-Free Sphygmomanometer

Mercury-free blood pressure measuring devices are available at the market and pharmacies. Only a few of the Traditional Desk Type Mercury Sphygmomanometer are available, which are used by professionals in personal practice. But Aneroid Mercury Sphygmomanometer are widely used in Bangladesh. Still, most of the physicians preferred this device due to accuracy of the measurement. The data was gathered from hospitals, clinics, and market assessment.

Note: Current Usage, about 97.2% are Aneroid Mercury Sphygmomanometer. Mercury Free Digital Blood Pressure Measuring Device are about 1.7% and Traditional Desk Type Mercury Sphygmomanometer are about 1.1%. (This information is up to 2020 according ESDO survey)

# **3.8. Data on Mercury-Free Switches and Relays**

According to the market survey, Bangladesh does not produce switches; it only imports as per demands. According to the Switch and relay and auto parts association, they import less than 2% of mercury-added switches and relays by demand of the large companies and industries. Also,

<sup>&</sup>lt;sup>10</sup> <u>https://esdo.org/wp-content/uploads/Summary-Report-Thermometer-MAP2020.pdf</u>

<sup>&</sup>lt;sup>11</sup> https://esdo.org/wp-content/uploads/Summary-Report-Thermometer-MAP2020.pdf

because of the demand, mostly mercury-free switches and relays are being imported as mercury relays can present a danger with a sudden and unpredictable failure due to product fatigue.



#### **3.7 Consumer's Point of View**

From the survey, it has been seen that consumers prefer mercury-free products over mercury-added products. For example, Figure 11 and Figure 12 shows the popularity of mercury-free bulb and battery by the consumers respectively. Plus, the demand for digital thermometers has also increased with customers' demand. Besides, no mercury-added Sphygmomanometer and switches and relay is manufactured in Bangladesh, but that a few is being imported. Because of mercury-added products' inadequate supply, consumers are leaning on alternatives.



Figure 10: Demand of button cell to the consumers



#### Figure 11: Bulb most used in Household

From 18 districts, around 1350 people were surveyed and the results are based upon that. Most of people seem to prefer using mercury-free alternatives as they are efficient, eco-friendly and energy-saving. Though the price of these alternatives is higher, the way the demands are increasing, it won't be long when the price of these products will reduce and they will be available at the market at a reasonable price.



# 4. Synthesis and Conclusion

**E**SDO's analysis of the information from the Ministry of Commerce (Bangladesh) and the retailers and suppliers point to the following conclusions:

*Thermometers*: Import Data, as well as information from suppliers and retailers, point to a shifting preference for digital thermometers and infrared thermometers that are considered more accurate and easier to use. Other alternatives include electronic thermometers. This, therefore, means that alternatives are readily available in the market, hospitals, and clinics, with an average demand of 83.5%.

*Sphygmomanometers:* Mercury-free blood pressure measuring devices are available at the market and pharmacies. Only a few of the Traditional Desk Type Mercury Sphygmomanometer are available, which are used by professionals in personal practice. But Aneroid Mercury Sphygmomanometer are widely used in Bangladesh. Still, most of the physicians preferred this device due to accuracy of the measurement. The mercury sphygmomanometer comes from China and Japan and Digital ones come from Japan and Germany.

*Lamps:* People in Bangladesh are preferring LED bulbs instead of CFL bulbs as LED bulbs use at least 75% less energy, and last up to 25 times longer <sup>12</sup>than incandescent lighting and the price is almost as same as CFL. Widespread use of LED lighting has a large potential impact on energy savings. The frequency of the availability of LED lamp in the market is about 93% and according to 358 retailers out of 450 retailers, the most demandable to customers is LED lamps according to ESDO study up to Nov'21.

*Button cell batteries:* In recent times, lithium and alkaline button cell batteries' popularity has been increased because of their quality and eco-friendliness. Though it's a little expensive when it comes to efficiency, consumers are preferring alkaline and lithium. Even importers are importing lithium batteries most.

*Switches and Relays:* Electrical switches and relays are not produced in Bangladesh and they are mostly imported. Less than 2% mercury-added switches and relays are being imported and about 98% mercury-free switches and relays are being imported in Bangladesh.

Hence, the above-mentioned mercury-added products can be phased out as the alternatives are affordable and widely available.

<sup>&</sup>lt;sup>12</sup> <u>https://www.energy.gov/energysaver/led-</u>

lighting#:~:text=LED%20is%20a%20highly%20energy,times%20longer%2C%20than%20incandescent%20lighting.

# **5.** Annex

#### Study Questionnaire

#### A project study on the availability and efficacy of Mercury-free products in Bangladesh Target groups: Retailers/Importers/Traders /Consumers

#### **Introduction:**

Mercury is toxic to human health and the environment. However, it is still used in various products for specific applications even though Mercury-free alternative products have been produced for many of these same applications. Since 2013, more than 120 countries including Bangladesh have signed on to the Minamata Convention on Mercury, a global treaty that aims to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds. In the above context, the NGO; Environment and Social Development Organization (ESDO) in collaboration with its international partners, the Zero Mercury Working Group (ZMWG) is working towards the early ratification and implementation of the Minamata Convention in Bangladesh.

#### **Rationale:**

As part of current activities on the Minamata Convention being undertaken by the Government of Bangladesh, ESDO is conducting a project about the phasing out / phasing down of Mercury-added products in Bangladesh by the year 2020, in accordance with the Minamata Convention.

Accordingly, ESDO would be most grateful for your kind participation in contributing to the gathering of information on Mercury-free alternative products to replace mercury-added products that are currently imported, distributed and sold in Bangladesh. The aggregated data will be presented to the government and stakeholders prior to inclusion in a consultancy report.

Should you be agreeable to participate in this survey, provided below are several questions we would like you to answer. The interview should take only around 15 minutes to complete.

Thanking you in advance and looking forward to your participation.

Questionnaires for Bulb Retailer/Consumer			
Time:	Date:	Locatio	on
Part-1 [Participant's Info's]			
Name	Tel.		
Sex	Male Female Sho	p address:	
Age	$\boxed{} \geq 19 \boxed{} 20-29, \boxed{} 30-39, \boxed{} 4$	0-49 <u>     ≤ 50</u>	
Type of shop			
Education	Illiterate Primary, High	school 🗌 Highe	er education
Income	Income $\square \ge 50,000 \square 50,000-1,00,000 \square 1,00,000-5,00,000 \square 5,00,000 - 10,00,000 \square <10,00,000 \square <10,00,000$		
	Part-2 [Survey Ques	tions]	
<i>1</i> . How many CFL	bulbs do you sell monthly?	□<5	□>10-<20
		□>5-<10	□>20
2. How many LED	2. How many LED bulbs do you sell usually monthly?		
		□>5-<10	
		□>10-<20	
		□>20	
<i>3.</i> Which kind of bulb demand most to the customers?		□CFL	
		□LEB	
4. Is LED buld supply available to you?		□Frequently	
		□Occasionally	
		□Hard to get	
5. Which bulb is most cheaper?		□CFL	
		□Others	
6. How much the co	ost of (5-100 wt) bulb of-	a.	
a. CFL bulb		b.	
c. Elourcent Tube		d	
d. LED Tube		u.	
7. Which kind of bulb do you usage most at your			
home? (for consum	er)	□CFL	
		□Others	

Signature:

Questionnaires for Bulb Producer/Importer/Whole Seller				
Time:	Date:	Location		
Part-1 (Participant's Info's)				
Name	Tel.			
Sex	Male Female	Address:		
Age	20-29, 30-39	<u>,                                    </u>		
Type of shop				
Education	Illiterate, Primary,	High school Higher education		
Income	[] ≥ 50,000 [] 50,000-1,00,0	00 1,00,000-5,00,000 5,00,000-		
	10,00,000 -<10,00,000			
	Part-2 [Survey Qu	estions]		
1. Annually how many	y CFL bulbs do you import	□<1000		
and from which count	ry?	□>1000-<5000		
		□>5000-<10000		
		□>10000		
2 Are the CEL bulbs	might made in Rangladash? If			
2. Are the CFL builds in a number of produce	and annual production			
so, number of produce	is and annual production.	$\Box$ Don't know exactly		
		□P <sup>n</sup>		
3. Annually how many	v LED bulbs do vou import	□<1000		
and from which count	ry?	□>1000-<5000		
	5	□>5000-<10000		
		□>10000		
4. Are the LED bulbs	might made in Bangladesh? ?	□Yes		
If so, number of producers and annual production.		□No		
		□Don't know exactly		
		□No		
		□P <sup>n</sup>		
5. Does the supply of CFL bulb available to you		□Plentiful		
regularly?		□Medium		
		□Occasionally		
6. Does the supply of LED bulb available to you		□Plentiful		
frequently?		□Medium		
		□Occasionally		
7. What is the market	price of CFL, LED and	□CFL bulbs		
Flourescent Tube bulbs (10 wt) to the retailer?		□LED bulbs		
		□Fluorescent bulbs		

Signature

Questionnaire of Button Cell Batteries for Retailer			
Time:	. Date:	Location	
Part-1 [Participant's Info's]			
Name		Tel.	
Sex	Male   Female	Shop address:	
Age	$\square \ge 19 \square 20-29, \square 30-39,$	$\boxed{40-49} \le 50$	
Type of shop			
Education	Illiterate Primary, H	High school   Higher education	
Income	10,000,000 50,000-1,00,000 <10,00,000	0 1,00,000-5,00,000 5,00,000 0,000	
	Part-2 [Survey	Questions]	
1. How many merce	cury button cell batteries do you	□<5 □>10-<20	
sell in monthly?		□>5-<10 □>20	
2. How many Lithi	ium button-cell batteries do you	□<5 □>10-<20	
retail monthly?		□>5-<10 □>20	
3. How many non-	miniature cylindrical alkaline	□<5	
batteries do you	trade monthly to the customer?	□>5-<10	
		□>10-<20	
		□>20	
4. Which kind of button cell batteries demand		□Mercury button cell batteries	
most to the custo	omers?	□Lithium batteries	
		□Non-miniature cylindrical alkaline batteries	
5. Which sorts of b	outton cell batteries supply	□Mercury button cell batteries	
available to you	?	□Lithium batteries	
		□Non-miniature cylindrical alkaline batteries	
6. Which types of button cell batteries more		□Mercury button cell batteries	
cheaper?		□Lithium batteries	
		□Non-miniature cylindrical alkaline batteries	
7. How much the cost of button cell buteries of 1.5		a.	
volt in size-		L	
a. Mercury button cell batteries		0.	
c. Non-miniature cylindrical alkaline batteries		c.	

Signature

<b>Questionnaires of Button Cell Batteries for</b>		
<b>Producer/Importer/Whole Seller</b>		
Time:	Date:	Location
	Part-1 (Participant's Info's)	
Name		Tel.
Sex	Male Female	Address:
Age	20-29, $30-39$ , $40-4$	9≤50
Education	□ Illiterate □ Primary □ High sch	ool Higher education
Income	$  \geq 50,000 \ 50,000-1,00,000 \ 10,00,000\ 10,000 \ 10,00,000 \ 10,00,000 \$	0,000-5,00,000 [] 5,00,000-
	Part-2 [Survey Questions]	
<i>1</i> . Annually how man	ny mercury button cell batteries do you	□<1000
import and from w	hich country?	□>1000-<5000
		□>5000-<10000
2 Are the mercury b	utton cell batteries might made in	
Bangladesh? If so,	number of producers and annual	
production.	-	
		Don't know exactly
		No P <sup>n</sup>
<i>3.</i> Annually how man	3. Annually how many lithium button cell batteries do you	
import and from w	which country?	$\Box > 1000 - < 5000$
		□>5000-<10000
A Are the lithium bu	tton cell batteries might made in	
Bangladesh? ? If s	o, number of producers and annual	
production.	1	□No
		□Don't know exactly
		□No
		□P <sup>n</sup>
5. Annually how many non-miniature alkaline batteries do you import and from which country?		□<1000
		□>1000-<5000
		□>5000-<10000
		□>10000
		□Yes
		□No

6. Are non-miniature alkaline batteries might made in Bangladesh <sup>2</sup> <sup>2</sup> If so number of producers and annual	□Don't know exactly
production.	□No
	□P <sup>n</sup>
7. Does the supply of mercury button cell batteries	□Plentiful
available to you regularly?	□Medium
	□Occasionally
8. Does the supply of lithium button cell batteries available	□Plentiful
to you frequently?	□Medium
	□Occasionally
9. Does the supply of the non-miniature cylindrical alkaline	□Plentiful
batteries available to you frequently?	□Medium
	□Occasionally
10. What is the market price of mercury, lithium and alkaline	□Mercury
button batteries of 1.5 volt to the retailer?	□Lithium
	□Alkaline

## Signature



#MakeMercuryHistory